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REMEDIAL INVESTIGATION REPORT FOR SITE 27 MOTOR TRANSPORTATION FACILITY SITE 55 FIBER OPTIC VAULT, SITE 9 FORMER PAINT WASTE STORAGE AREA AND SITE 16 PESTICIDE RINSATE DISPOSAL AREA MCRD PARRIS ISLAND SC (VOLUME I OF II TEXT THROUGH APPENDIX C)

09/01/2012

TETRA TECH

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-94-D-0888

Rev. 2
September 2012

Remedial Investigation Report
for
Site 27 – Motor Transportation Facility Site 55 – Fiber Optic Vault Site 9 – Former Paint Waste Storage Area And Site 16 – Pesticide Rinsate Disposal Area

Marine Corps Recruit Depot
Parris Island, South Carolina

Contract Task Order 0039

September 2012

Naval Facilities Engineering Command
NAVFAC SOUTHEAST
NAS Jacksonville
Jacksonville, Florida 32212-0030

TETRA TECH

REMEDIAL INVESTIGATION
FOR
SITE 9 – FORMER PAINT WASTE STORAGE AREA,
SITE 16 – PESTICIDE RINSATE DISPOSAL AREA,
SITE 27 – MOTOR TRANSPORTATION FACILITY, AND
SITE 55 – FIBER OPTIC VAULT

MARINE CORPS RECRUIT DEPOT
PARRIS ISLAND, SOUTH CAROLINA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Naval Facilities Engineering Command Southeast
Building 103
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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 this *Remedial Investigation Report for Site 27 – Motor Transportation Facility, Site 55 –Fiber Optic Vault, Site 9- Former Paint Waste Storage Area, and Site 16- Pesticide Rinsate Disposal Area, Marine Corps Recruit Depot Parris Island, South Carolina*, dated April 2012, 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.

TIMOTHY S. EVANS REGISTERED NO. 2221 SOUTH CAROLINA PROFESSIONAL GEOLOGIST

4/30/12

Timothy S. Evans, P.G.
Registration Number 2221

Date

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ACRONYMS AND ABBREVIATIONS

°C	Degrees Celsius
°K	Degrees Kelvin
µg/kg	micrograms per kilogram
µg/L	Micrograms per Liter
ACH	Air Changes per Hour
ADAF	Age Dependent Adjustment Factor
ATSDR	Agency for Toxic Substances and Disease Registry
BCFs	Bioconcentration factors
BaP Equivalent	Benzo(a)pyrene Equivalent
bgs	below ground surface
BHC	Hexachlorocyclohexane (Lindane)
B&R Environmental	Brown and Root Environmental, Inc.
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
Cal EPA	California Environmental Protection Agency
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
cm^2	Cubic centimeters
cm/sec(cm/s)	Centimeters per second
COC	Contaminant of Concern
COPC	Chemical of Potential Concern
cPAH	Carcinogenic Polynuclear Aromatic Hydrocarbons
CS	Confirmatory Sampling
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
CTO	Contract Task Order
DA	Adsorbed dose
DAF	Dilution Attenuation Factor
DCE	Dichloroethene
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DO	Dissolved Oxygen
DoD	Department of Defense
DPT	direct-push technology
EC	electrical conductivity

ACRONYMS AND ABBREVIATIONS (CONTINUED)

EISOPQAM	Environmental Investigations Standard Operating Procedure and Quality Assurance Manual
EPC	Exposure Point Concentration
EU	Exposure Unit
FAQ	Frequently Asked Questions
FFA	Federal Facilities Agreement
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
FOV	Fiber Optic Vault
FS	Feasibility Study
GIS	Geographic Information System
g/kg	grams per kilogram
GSL	Groundwater Screening Level
HEAST	Health Effects Assessment Summary Tables
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
HRS	Hazard Ranking System
IAS	Initial Assessment Study
ID	Inside diameter
IDW	Investigation-Derived Waste
IEUBK	Integrate Exposure Uptake Biokinetic
ILCR	Incremental Lifetime Cancer Risk
IR	Installation Restoration
IRIS	Integrated Risk Information System
IUR	Inhalation Unit Risk
K	Hydraulic conductivity
K_{oc}	Organic Carbon Partition Coefficient
K_{ow}	Octanol/Water Partition Coefficient
L/kg	Liters per kilogram
LNAPL	Light Non-Aqueous Phase Liquid
MCCS	Marine Corps Community Services
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MCRD	Marine Corps Recruit Depot
mg/kg	Milligrams per kilogram

ACRONYMS AND ABBREVIATIONS (CONTINUED)

mg/kg/day	Milligrams per kilogram per day
mg/L	Milligrams per liter
mg/m3	Milligrams per cubic meter
MI	Mobility Ind3ex
MIP	membrane interface probe
mm/Hg	Millimeters Mercury
Motor T	Motor Transportation Facility
MRL	Minimal Risk Level
msl	mean sea level
MTBE	Methyl tert-butyl ether
NACIP	Naval Assessment and Control of Installation Pollutants
NAD	North American Datum
NAPL	Non-aqueous Phase Liquid
NAVD	North American Vertical Datum
NAVFAC SE	Naval Facilities Engineering Command, Southeast
NCEA	National Center for Environmental Assessment
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NGVD	National Geodetic Vertical Datum
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
NSF	National Sanitation Foundation
NTU	Nephelometric Turbidity Unit
ORNL	Oak Ridge National Laboratory
OSWER	Office of Solid Waste and Emergency Response
PA	Preliminary Assessment
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene
PEF	Particulate Emission Factor
PID	photoionization detector
ppm	parts per million
PPRTV	Provisional Peer Reviewed Toxicity Value
PTW	Principle Threat Waste
PVC	Polyvinyl chloride

ACRONYMS AND ABBREVIATIONS (CONTINUED)

QA/QC	Quality Assurance/quality Control
QC	Quality Control
RAGS	Risk Assessment Guidance for Superfund
RBC	Risk-Based Concentration
RCRA	Resource Conservation Recovery Act
RFA	RCRA Facility Assessment
RfC	Reference Concentration
RfD	Reference Dose
RFI	RCRA Facility Investigation
RGO	Remedial Goal Option
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
ROD	Records of Decision
RSL	Regional Screening Level
S	Water Solubility
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act of 1986
SCDHEC	South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources
SCMCL	South Carolina Maximum Contaminant Level
SDG	Sample Delivery Groups
SDWA	Safe Drinking Water Act
SI	Site Inspection
SIM	Selected Ion Monitoring
SSL	Soil Screening Level
SVOC	Semivolatile Organic Compound
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCDD	Tetrachlorodibenzo-p-dioxin
TCE	Trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TEF	Toxicity Equivalence Factor
Tetra Tech	Tetra Tech NUS, Inc.

ACRONYMS AND ABBREVIATIONS (CONTINUED)

TOC	Total Organic carbon
TPH	Total Petroleum Hydrocarbon
TRW	Technical Review Workgroup
TSCA	Toxic Substances Control Acto
USEPA	United States Environmental Protection Agency
UCL	Upper 95 Percent Confidence Limit
USDA	United States Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	United States Fish and Wildfire Service
UST	Underground Storage Tank
VDEQ	Virginia Department of Environmental Quality
VF	Volatilization Factor
VOC	Volatile Organic Compound
VP	Vapor Pressure
VS	Verification Step
VSI	Visual Site Inspection
yr	Year

EXECUTIVE SUMMARY

Tetra Tech, Inc. (Tetra Tech) prepared this Remedial Investigation (RI) report to summarize field activities conducted in the area of Site 9- Former Paint Waste Storage Area, Site 16- Pesticide Rinsate Disposal Area, Site 27 – Motor Transportation Facility (formerly called the Equipment Parade Deck), and Site 55 – The Fiber Optic Vault (FOV) at the Marine Corps Recruit Depot (MCRD) Parris Island, South Carolina. This RI report was prepared for Naval Facilities Engineering Command Southeast (NAVFAC SE) under the Comprehensive Long-Term Environmental Action Navy (CLEAN) IV Contract Number N62467-04-D-0055, Contract Task Order (CTO) 0039 and CLEAN V Contract Number N62470-08-D-1001, CTO JM18.

At Site 9, personnel from the Paint Shop placed liquid paint wastes and paint strippers in the storage drums, transported them to a waste oil facility (Diesel Shop) and discharged the contents into an underground storage tank. The Diesel Shop and associated underground storage tank are not identified as Solid Waste Management Units (SWMU). This practice continued until 1978, when a contractor began to dispose of the wastes at an off-base incinerator site. An unknown amount of paint wastes may have been spilled at the storage area. In 1984, a site cleanup was performed, and 6 inches of surface soil were removed and the area was covered by a concrete pad. Since 1984, wastes have not been stored at this site (NEESA, 1986).

At Site 16, rinse waters from pest control spray application containers and equipment were disposed of on a grassy area located between Quonset Huts N282 and N277 (adjacent to Site 9) from 1950 to 1977. During this time, the site received an estimated 5 to 10 gallons per week of pesticide rinsate. The disposal area was approximately 6 feet by 25 feet. Assuming a disposal rate of 250 to 400 gallons per year from 1950 to 1977, an estimated 8,000 gallons of rinsate were disposed of at Site 16.

Site 27 was a 1-acre asphalt-covered area formerly used as a parade ground and for storage of miscellaneous equipment. It was historically referred to as the Equipment Parade Deck. For an unknown period of time, out-of-service storage tanks, concrete cylinders, boilers, scrap metal, and piping were temporarily stored here. An unknown amount of hazardous material, possibly including waste petroleum products and metals, was temporarily stored at this location. Transformers containing polychlorinated biphenyl (PCB) oils were reportedly stored in the northern portion of the site; however, the exact location is not known. The asphalt at Site 27 deteriorated over time in several areas, allowing contaminants to enter underlying soil. MCRD Parris Island identified an operational need to construct a new Motor Transportation Facility at Site 27. Construction began in April 2011 and is ongoing. Site 27 is now referred to as the Motor Transportation Facility (Motor-T). The conceptual site model at Site 27 has changed since the construction of the Motor-T facility began. Surface soil at Site 27 has been disturbed

and replaced with clean fill. Once construction is complete, a cross section showing the depth of fill will be presented in the Feasibility Study (FS).

Site 55, the FOV, is located in an industrial part of MCRD Parris Island and was installed in September 2001. The vault is an oversized utility manhole used for the installation of fiber optic communications cables in this part of MCRD. When the FOV was being installed, Light Non-Aqueous Phase Liquid (LNAPL) was discovered floating on groundwater. In March of 2001 a tanker truck was used to remove 555 gallons of a used oil and water mixture from the FOV. The contents of the tanker truck were then disposed of as non-hazardous waste by Safety-Kleen Systems. In September 2001, a soil sample was collected next to the vault and analysis indicated the presence of benzene, toluene, ethylbenzene, and xylenes (BTEX). In November 2001, an additional 50 gallons of a used oil and water mixture was disposed of as non-hazardous waste by Safety-Kleen Systems, Inc. The FOV Area (Site 55) is located just east of the Site 27, Motor-T Area, and based on prior investigations, groundwater flows predominantly to the northwest from the FOV Area toward the Motor-T (and ultimately toward the 3rd Battalion Pond northwest of the Motor-T Area). Consequently, contaminants in the soil and groundwater in the FOV Area may be impacting groundwater and subsurface soil within the Motor T Area of Site 27.

Previous investigations at Sites 9, 16, 27, and 55 included the Initial Assessment Study (IAS) in 1986 (Sites 9 and 16), an RI Verification Step (VS) in 1988 (Site 16), a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA), which included a file review and Visual Site Inspection (VSI) in 1990 (Sites 9, 16, and 27), Relative Site Ranking efforts in 1995 (Sites 9 and 27), Site Inspection (SI)/Confirmatory Sampling (CS) in 1999 (Sites 9 and 27), Soil and Groundwater Field Screening in 2002 (Site 55), a Groundwater Investigation in 2003 (Site 55). Some of these investigations included a records review of available site files to determine if there was a possibility of contaminant release to the environment. Other investigations included field activities such as soil and groundwater sampling.

The RI field sampling activities at Sites 27 and 55 were completed in three phases occurring in 2007, 2008, and 2010. The human health risk assessment identified contaminants of concern (COCs) for risks to child, adult, and lifelong residents at both Site 27 and Site 55 in surface soil, subsurface soil (Site 27 only), and groundwater from direct contact. At Site 27, the following COCs were retained for surface soil: carcinogenic PAHs, Aroclor-1260, chromium, and arsenic; for subsurface soil: alpha-BHC, delta-BHC, 4,4'- DDD, arsenic, chromium, and thallium; for direct contact with groundwater: benzene, chlorobenzene, aldrin, dieldrin, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, 1,1-biphenyl, 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, ethylbenzene, 4.4'-DDD, 4,4'-DDT, heptachlor epoxide, aluminum, arsenic, beryllium, chromium, iron, and manganese; for vapor intrusion: chlorobenzene; and for LNAPL: benzene, chlorobenzene, aldrin, dieldrin, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, 1,1-biphenyl, 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, ethylbenzene, 4.4'-DDD, 4,4'-DDT, and heptachlor epoxide. At

Site 55 the following COCs were retained for surface soil: carcinogenic PAHs, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, beta-BHC, arsenic, and chromium; for direct contact with groundwater: 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, 1,1-biphenyl, benzene, chlorobenzene, ethylbenzene, xylenes, carcinogenic PAHs, naphthalene, 2-methylnaphthalene, dibenzofuran, 4,4'-DDD, 4,4'- DDE, 4,4'-DDT, aldrin, dieldrin, endrin, endrin ketone, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, alpha-chlordane, gamma-chlordane, heptachlor epoxide, heptachlor, aluminum, antimony, arsenic, beryllium, chromium, cobalt, iron, manganese, nickel, thallium, and vanadium; for vapor intrusion: chlorobenzene; and for LNAPL: benzene, chlorobenzene, aldrin, dieldrin, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, arsenic, chromium, 1,1-biphenyl, 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, ethylbenzene, 4,4'-DDD, 4,4'-DDT, and heptachlor epoxide..

The RI field sampling activities at Sites 9 and 16 were completed in August 2010 and September 2011. The human health risk assessment identified COCs for risks to child and lifelong residents at both Site 9 and Site 16 in surface soil. At Site 9 and 16 the following COCs were retained for surface soil: carcinogenic PAHs, 4,4'-DDE, 4,4'-DDT, alpha-chlordane, gamma-chlordane, Aroclor-1260, heptachlor, arsenic, and chromium; and for direct contact with groundwater: heptachlor epoxide, heptachlor, alpha-BHC, beta-BHC, delta-BHC, arsenic, and chromium.

Based on the results of the RI at Sites 27 and 55, no additional investigation is needed beyond limited in situ sampling that could be conducted as part of the remedial action design phase to refine the extent of LNAPL free product. Because of the unacceptable risks posed from consumption of groundwater at the sites, the LNAPL identified as Principle Threat Waste (PTW) and the presence of highly contaminated soils in the clay layer (acting as a smear zone) remedial alternatives to address these media will be developed and evaluated in the FS. The source of the LNAPL was not identified during the RI. However; enough information is available to proceed to a FS to evaluate remedial options.

Based on the results of the RI at Sites 9 and 16, no additional investigation is needed. Based on the recommendations in the SI/CS (Tetra Tech, 2010), Sites 9 and 16 should be jointly excavated to address risk driven chemicals in the surface soil. The source of the contamination at Sites 9 and 16 was not identified during the RI, but identified contamination was likely caused by the historic storage and disposal activities conducted at the sites. During the RI at Sites 9 and 16, sufficient data was collected to proceed to a Focused FS to evaluate remedial options.

1.0 INTRODUCTION

1.1 PURPOSE OF REMEDIAL INVESTIGATION REPORT

Tetra Tech, Inc. (Tetra Tech) prepared this Remedial Investigation (RI) report to summarize field activities conducted in the area of Site 9- Former Paint Waste Storage Area, Site 16- Pesticide Rinsate Disposal Area, Site 27 – Motor Transportation Facility (formerly called the Equipment Parade Deck), and Site 55 – The Fiber Optic Vault (FOV) at the Marine Corps Recruit Depot (MCRD) Parris Island, South Carolina. This RI was prepared for Naval Facilities Engineering Command Southeast (NAVFAC SE) under the Comprehensive Long-Term Environmental Action Navy (CLEAN) IV Contract Number N62467-04-D-0055, Contract Task Order (CTO) 0039 and CLEAN V Contract Number N62470-08-D-1001, CTO JM18.

1.2 REGULATORY SETTING

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and Superfund Amendments and Reauthorization Act of 1986 (SARA) established a program for the cleanup of hazardous waste disposal and spill sites nationwide. CERCLA, as amended by SARA, was promulgated to identify contamination resulting from past operations at closed or abandoned facilities (where operations ceased prior to November 1980) and to institute corrective measures as appropriate. This program contains provisions for the cleanup of contamination from past hazardous waste operations and past hazardous material spills and is the framework for Installation Restoration (IR) programs at Navy and Marine Corps installations. NAVFAC SE has the responsibility for implementing the Navy's IR Program at MCRD Parris Island.

In addition, the United State Environmental Protection Agency (U.S. EPA) has published regulations for responding to oil and hazardous spills in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The NCP established a phased approach to address potential emergency responses or removal situations. The response process consists of the preparation of a Preliminary Assessment (PA) and Site Inspection (SI). When the PA and SI are completed, the site is scored using the Hazard Ranking System (HRS). A site with an HRS score of 28.50 or greater becomes eligible for the National Priorities List (NPL). If one site on a federal facility is proposed for the NPL, the entire installation is proposed and subject to the requirements of the NPL.

Sites placed on the NPL are subject to an RI and potentially a remedial action where the objective is to eliminate, reduce, or control risks to human health and the environment. Once a federal facility is placed on the NPL, the negotiation of a Federal Facilities Agreement (FFA) is required. The FFA formalizes relationships between the federal agency, the United States Environmental Protection Agency (USEPA),

and the state agency that oversees CERCLA, identifies sites of potential historical contamination and prioritizes them for cleanup, establishes a strategy for corrective action activities, and provides for public involvement opportunities.

The Navy has been conducting various IR Program activities at MCRD Parris Island since 1986. MCRD Parris Island was placed on the NPL in early 1995. An FFA was signed by the Navy in December 2004 and the USEPA and South Carolina Department of Health and Environmental Control (SCDHEC) in January 2005.

In 1996, the MCRD Parris Island Partnering Team was established. The original members of the team were the Navy, Marine Corps – MCRD Parris Island, USEPA, and SCDHEC. In 1997, representatives of the National Oceanic and Atmospheric Administration (NOAA), the South Carolina Department of Natural Resources (SCDNR), and United States Fish and Wildlife Service (USFWS) joined the team as natural resource trustees. The partnering team was developed to facilitate the development, review, and approval of work plans, RI reports, Feasibility Study (FS) Reports, and decision documents [Proposed Plans and Records of Decision (RODs)].

1.3 SCOPE OF REMEDIAL INVESTIGATION

Previous investigations at Sites 9, 16, 27, and 55 indicated the potential presence of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and inorganic compounds in soil and/or groundwater in the area (see Section 1.4.3). Site 55 was identified because of groundwater contamination detected during installation of the fiber optic vault; the source of that contamination is unknown. For the purposes of characterizing the groundwater and soil contamination in the area of the fiber optic vault, Sites 9, 16, 27, and 55 were investigated concurrently during the RI. Although the sites are considered as separate units, they are linked together by their close proximity. The most likely sources for the pesticides in groundwater were once thought to have been Site 9 and Site 16 to the east, which have a history of pesticide operations. Additionally, potential contamination from Site 55 may extend to Site 27.

As a result of previous investigations at these sites (described further in Section 1.4.3), the following objectives were developed to support the RI:

- Determine the extent of potential groundwater contamination associated with Sites 9, 16, 27, and 55.
- Determine whether any releases at Sites 9, 16, 27, and 55 have impacted groundwater, and if so, to what extent.

- Determine the sources of any identified groundwater contamination at these sites.
- Determine the extent of soil contamination at Sites 9, 16, 27, and 55 in support of a remedial action.

The Site 27 RI field investigation, which expanded to include Site 55, was conducted in three phases – Phase I (September 2007), Phase II (August 2008), and Phase III (August 2010). Soil and groundwater were media of concern.

The Sites 9 and 16 RI field investigation was conducted in August 2010 and September 2011. Soil and groundwater were media of concern.

Data collected in support of the RI and any additional data collected during previous investigations was used to assess the human health risks associated with potential direct contact with contaminants. Human health risks to construction workers, site employees (maintenance and other), and future residents (adult and child) was assessed. Ecological risks are not evaluated in this RI because of the industrial nature of Sites 9, 16, 27, and 55 and the lack of ecological habitat. Although ecological risks were not evaluated during the RI, it is expected that groundwater monitoring at Sites 27 and 55 will be proposed in the Feasibility Study. Groundwater monitoring results will be used to evaluate groundwater contaminant migration in the direction of the 3rd Battalion Pond, which is located west of Site 27, and assist in the determination of the future need for ecological risk evaluation.

1.4 HISTORICAL INFORMATION

1.4.1 Facility Background

MCRD Parris Island located adjacent to Port Royal Sound in Beaufort County, South Carolina (Figure 1-1); Parris Island is three miles south of the city of Beaufort and 30 miles northeast of Savannah, Georgia (Figure 1-1). Hilton Head Island, a popular tourist destination, is approximately 3 miles to the southwest across Port Royal Sound. MCRD Parris Island has been operated as a recruit training facility for the U. S. Marine Corps since 1915 and is currently the reception and recruit training facility for the Marine Corps for enlisted men from states east of the Mississippi River and for enlisted women nationwide. MCRD Parris Island's 8,047 acres include dry land, salt marshes, tidal creeks, and ponds (Figure 1-2). The developed areas of MCRD Parris Island contain administrative office buildings, training facilities, recruit and family housing, building and vehicle maintenance shops, and community facilities.

1.4.2 Site 9, Site 16, Site 27, and Site 55 Background and History

Site 27 was a 1-acre asphalt-covered area (Figure 1-3) formerly used as a parade ground and for storage of miscellaneous equipment. It was historically referred to as the Equipment Parade Deck. For an

unknown period of time, out-of-service storage tanks, concrete cylinders, boilers, scrap metal, and piping were temporarily stored here. An unknown amount of hazardous material, possibly including waste petroleum products and metals, was temporarily stored at this location. Transformers containing PCB oils were reportedly stored in the northern portion of the site; however, the exact location is not known. The asphalt at Site 27 deteriorated over time in several areas, allowing contaminants to enter underlying soil. MCRD Parris Island identified an operational need to construct a new Motor Transportation Facility at Site 27. Construction began in April 2011 and is ongoing. Site 27 is now referred to as the Motor Transportation Facility (Motor-T).

Site 55, the FOV, is an oversized utility manhole used for the installation of fiber optic communications cables. Site 55 was historically only considered as the area that the FOV physically occupied; however, in this report any reference to Site 55 includes the exposure unit around the actual physical FOV (Figure 1-3). Installed in September 2001, the FOV is located approximately 20 feet east of Atsugi Street, 100 feet southwest of Building 401, and 140 feet northwest of Building 405, adjacent to Site 27 (Figure 1-3). There is no regular or routine access to the vault. The vault is composed of pre-cast concrete, and has inner dimensions of 12 feet long by 6 feet wide by 8 feet deep. The walls include blanked cutouts for fiber optic cables to enter the vault from the north, east, south, and west. Site 55 is relatively flat with both grassy and paved areas. Overhead steam lines are present near the vault, and an underground sewer line is located approximately 70 feet to the northeast. When the FOV was being constructed, light non-aqueous phase liquid (LNAPL) was discovered floating on water in the vault interior. In March of 2001 a tanker truck was used to remove 555 gallons of a used oil and water mixture from the FOV. The contents of the tanker truck were disposed of as non-hazardous waste by Safety-Kleen Systems, Inc at that time. In September 2001, a soil sample was collected next to the vault and analysis indicated the presence of benzene, toluene, ethylbenzene, and xylenes (BTEX). In November 2001, an additional 50 gallons of a used oil and water mixture was disposed of as non-hazardous waste by Safety-Kleen Systems, Inc. Waste manifests for these disposal events are provided in Appendix C-17. In September 2001, a soil sample was collected next to the vault and analysis indicated the presence of benzene, toluene, ethylbenzene, and xylenes (BTEX). The FOV was subsequently entered into the Environmental Restoration Program and designated Site 55. Based on prior investigations, there is a high likelihood that contaminants from Site 55 have migrated to Site 27 and impacted subsurface soil and groundwater.

Other sites in the area include Site 9, the former Paint Waste Storage Area, and Site 16, the Pesticide Rinsate Disposal Area (see Figure 1-3). Based on the Conceptual Site Model (CSM), it is believed that activities conducted at nearby sites, including Sites 9 and 16, may have contributed to potential contamination at Sites 27 and 55. Although other smaller source areas may exist within Site 27,

contamination migrating from Site 55 is believed to be the principal source of contamination at this site (Figure 1-4). As a result of the original CSM, Sites 9, 16, 27, and 55 were investigated concurrently.

Site 9 (former Paint Waste Storage Area) was utilized from 1969 to 1984 to store wastes from the Paint Shop. At that time, the area was a 20-foot by 60-foot unpaved site located in the northwestern corner of Parris Island, between Quonset Hut N277 and Building 895 (Figure 1-3). While Site 9 was active, personnel from the Paint Shop placed liquid paint wastes and paint strippers in 55-gallon and 330-gallon storage drums. The paint wastes generally consisted of mineral spirits, kerosene, and diesel fuels, while the paint strippers likely contained methylene chloride. The wastes were accumulated in the drums, and the drums were periodically transported to a waste oil facility (Diesel Shop) and discharged into an underground storage tank. The Diesel Shop and associated underground storage tank are not identified as a Solid Waste Management Unit (SMWU). This practice continued until 1978, when a contractor began to dispose of the wastes at an off-base incinerator site. Between 1969 and 1984, an unknown amount of paint wastes may have been spilled at the storage area. In 1984, a site cleanup was performed during which 6 inches of surface soil were removed and the area was covered by a concrete pad. Since 1984, wastes have not been stored at this site (NEESA, 1986). The intent of the 1984 concrete pad was not documented, but it was speculated that the concrete was installed to improve the functionality of the site as a storage area (i.e., providing a hard surface for access by material handling, forklifts, pallet jacks, etc.) rather than achieving a remedial objective. However, recommendations presented in the Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) Report included further investigation to determine if residual contamination is present at the site (A.T. Kearney, 1990).

Site 16 (Pesticide Rinsate Disposal Area) is a grassy area located between Quonset Huts N282 and N277 (Figure 1-3) where rinse waters from pest control spray application containers and equipment were disposed from 1950 to 1977. During this time, the site received an estimated 5 to 10 gallons per week of pesticide rinsate. The disposal area was approximately 6 feet by 25 feet. Pesticides used at the Depot during this period included aldrin, baygon, chlordane, dursban, malathion, naled, and dichlorodiphenyltrichloroethane (DDT). Assuming an average disposal rate of approximately 300 gallons per year from 1950 to 1977, an estimated 8,000 gallons of rinsate were disposed at Site 16.

Detailed historical building use information could not be found for the buildings in the area of Sites 9, 16, 27, and 55. MCRD Parris Island reports that Building 401 is a RCRA/Toxic Substances Control Act (TSCA)/Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)-compliant pest control facility that was constructed in the early 1990s, while Building 405 is a small warehouse that has been used by the 3rd Battalion and Marine Corps Community Services (MCCS) over the past 10 years. Building 852

(approximately 200 feet to the north of Site 55) has housed administrative functions for at least the past 30 years, with no known pesticide handling activity at any time.

Sites 9, 16, 27, and 55 are located in an industrial part of MCRD as shown on Figure 1-3. The nearest resident lives approximately 2,000 feet south of these sites. There are no day care facilities or schools within a 2,000-foot radius. An area of archaeological concern is located south of Site 27 and southwest of Sites 55, 9, and 16 and is managed by the Cultural Resources Office within the Natural Resources and Environmental Affairs Office at MCRD Parris Island. Intrusive activities were not conducted in this area during any stage of the RI. If intrusive activities are required in the area or archeological concern during remedy implementation these efforts will be coordinated with all cultural resources stakeholders as necessary.

1.4.3 Previous Investigations

Previous investigations in the area of Site 27 included the Initial Assessment Study (IAS) in 1986 (Sites 9 and 16), an RI Verification Step (VS) in 1988 (Site 16), an RFA, which included a file review and Visual Site Inspection (VSI) in 1990 (Sites 9, 16, and 27); Relative Site Ranking efforts in 1995 (Sites 9 and 27); SI/Confirmatory Sampling (CS) in 1999 (Site 9, 16 and 27); Soil and Groundwater Field Screening in 2002 (Site 55); and a Groundwater Investigation in 2003 (Site 55). Some of these investigations were “desktop” exercises to determine if there was a possibility of contaminant release to the environment based on the information in the files, and some of these investigations included field activities such as soil and groundwater sampling. Table 1-1 provides a summary of the samples collected during these investigations. Boring logs, sample log sheets, and well constructions sheets from these previous investigations are included in Appendix A. Data from these investigations are included in Appendix B.

1.4.3.1 Initial Assessment Study – Sites 9 and 16 (1986)

An IAS was conducted in 1986 for Sites 9 and 16, as well as other sites throughout MCRD Parris Island, to identify potentially contaminated sites at MCRD Parris Island that may pose a threat to human health and the environment. The IAS, which is equivalent to a PA under CERCLA, was conducted under the Naval Assessment and Control of Installation Pollutants (NACIP) Program by NEESA.

No samples were collected during the IAS. The IAS indicated that no further action at Site 9 was necessary because of the site cleanup performed in 1984 at the Site. The IAS also recommended that Site 16 be evaluated further because of the potential for contaminant migration at Site 16 (NEESA, September 1986).

1.4.3.2 Remedial Investigation Verification Step (RI VS) – Site 16 (1988)

Based on the results of the IAS, Site 16 was included in an RI VS conducted in February 1988 at various sites at MCRD Parris Island (McClelland Consultants, 1990). At Site 16, three soil borings (PAI16-SB1 to PAI16-SB3) (Figure 1-5) were drilled to less than 10 feet below ground surface (bgs), where a tight clay confining unit was encountered. Boring logs from these three soil borings are provided in Appendix A-1. Soil samples were collected from a depth of 3 feet bgs at each boring and submitted to a laboratory for analyses of priority pollutant pesticides and for total metals (arsenic, cadmium, chromium, and lead).

The results of the chemical analyses (Appendix B-1) indicated that arsenic, chromium, lead, and 4,4'-DDT, along with its degradation products 4,4'-dichlorodiphenyldichloroethylene (DDE) and 4,4'-dichlorodiphenyldichloroethane (DDD), were detected in the sample from boring PAI16-SB1. Arsenic, chromium, and lead were also detected in the sample from PAI16-SB2 and chromium and lead were detected in the sample from PAI16-SB3. Pesticides were not detected in the samples from these two locations.

Based on these data, the RI VS recommended further evaluation at Site 16 to determine the depth and extent of the DDT and DDT degradation products present in the subsurface soils at this site. In addition, an evaluation of the groundwater in the vicinity of Site 16 was recommended to determine whether groundwater quality had been affected (McClelland Consultants, 1990).

1.4.3.3 RCRA Facility Assessment – Sites 9, 16, and 27 (1990)

A. T. Kearney conducted a file review of the MCRD Parris Island facility in January 1990 and a VSI in February 1990 that were summarized in an Interim RFA report. Sites 9, 16, and 27 were included in this report. Based on a review of available information, the RFA recommended no further action at Site 9 because prior remediation (1984 site cleanup) at the site adequately addressed site concerns. Further investigation was recommended to ensure no residual contamination remained at Site 9. The RFA also recommended a RCRA Facility Investigation (RFI) for Site 16 because of the previous detection of 4,4'-DDT and its degradation products (4,4'-DDD and 4,4'-DDE) in the soil at the site. Because documentation on Site 27 was scarce and because stains on the asphalt were noted during the VSI in February 1990, RFA Phase II sampling was recommended for Site 27 (Tetra Tech, 2002).

1.4.3.4 Relative Site Ranking – Sites 9 and 27 (1995)

Brown and Root Environmental (B&R Environmental) collected samples for laboratory analyses as part of the Navy's relative site ranking efforts in 1995. Five soil samples were collected from Sites 9 and 27 as part of this effort, which was documented in the SI/CS Report (Tetra Tech, 2010a) and is discussed below

in Section 1.4.3.5. Sample log sheets for the samples collected in 1995 are included in Appendix A-2. Complete analytical results for these samples are presented in Appendix B-2.

1.4.3.5 Site Inspection/Confirmatory Sampling – Sites 9 and 27 (1999)

The SI/CS involved seven sites at MCRD Parris Island, including Sites 9 and 27. Three soil and two groundwater samples were collected at Site 27 and Site 9 respectively during the SI/CS. Sample locations are shown on Figure 1-5. Field forms for the work performed during the SI/CS are provided in Appendix A-3. Complete analytical results for these samples are presented in Appendix B-3.

Sites 9 and 16

In December 1995, three surface soil samples [PI-009-01(32) through PI-009-03(34)] were collected from approximately 0 to 6 inches bgs at Site 9 during this effort. The first sample [PI-009-01(32)] was collected under the concrete pad, the second sample [PI-009-02(33)] was collected along the eastern edge of pavement because of a small amount of standing water at the location (slope of pad allowed runoff to accumulate at this point), and the third sample [PI-009-03(34)] was collected from a small drainage swale on the southeastern corner of the pad. Sample locations are shown on Figure 1-5. The three soil samples collected from Site 9 were analyzed for Target Compound List (TCL) VOCs, SVOCs, pesticides, polychlorinated biphenyls (PCBs), Target Analyte List (TAL) metals, and cyanide. Appendix B Table B-2.1 provides complete analytical results for these samples.

Two temporary monitoring wells [PAI-09-GW-01(S) and PAI-09-GW-02(S)] were installed at Site 9 in December 1999. Locations of these temporary monitoring wells are shown on Figure 1-5. Groundwater samples were collected from these two wells and analyzed for TCL VOCs, total TAL metals, and cyanide. In addition, the sample from PAI-09-GW-01(S) was analyzed for Appendix IX volatiles and tin. Appendix B Table B-3.1 provides complete analytical results for these samples.

In the three surface soil samples collected at Site 9, 3 VOCs, 12 SVOCs, 4 pesticides, and 1 PCB were detected. Of these detections, carbon tetrachloride, chloroform, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, carbazole, fluoranthene, pentachlorophenol, pyrene, 4,4'-DDE, 4,4'-DDT, and Aroclor-1260 were detected above the most stringent human health and/or ecological screening criteria. Additionally, of the 18 inorganics detected (excluding macronutrients), most were found at concentrations above human health and/or ecological screening criterion (Tetra Tech, 2010a).

The exceedances were primarily found in soil sample PI-009-02(33), located on the eastern side of Building 895, and to a lesser extent in PI-009-03(34), at the southeastern corner of the building. Soil in

the location where sample PI-009-01(32) was collected is currently covered with concrete and contained the fewest criteria exceedances. (Tetra Tech, 2010a)

No VOCs were detected in groundwater. Of the eight inorganics detected in groundwater, only one detection of aluminum exceeded the South Carolina Maximum Contaminant Level (SCMCL). (Tetra Tech, 2010a)

The SI/CS Report recommended that an Extended SI followed by a Focused Feasibility Study (FS) be completed for Sites 9 and 16. Additionally, the installation of three piezometers was recommended to determine groundwater flow direction and for determination of whether pesticides had impacted groundwater. It was recommended that Sites 9 and 16 be jointly excavated. (Tetra Tech, 2010a)

Site 27

In December 1995, two soil samples [PI-027-01(46) and PI-027-02(47)] were collected from approximately 0 to 6 inches bgs at Site 27 to support relative site ranking efforts. The first sample [PI-027-01(46)] was collected in a low-lying area. The asphalt was deteriorating and a dark stain was noticed at this location. The second sample [PI-027-02(47)] was collected along the northeastern edge in a grassy swale adjacent to a potential PCB-containing transformer storage site. The sample locations are shown on Figure 1-5.

The two soil samples collected from Site 27 were analyzed for TCL VOCs, SVOCs, pesticides, PCBs, TAL metals, and cyanide. Table B-2.2 provides complete analytical results for these samples.

In December 1999, three surface soil samples (PAI-27-SS-03-01 through PAI-27-SS-05-01) were collected at Site 27 at the locations shown on Figure 1-5. All three samples were analyzed for PCBs only. Samples PAI-27-SS-03-01 and PAI-27-SS-04-01 were collected from 0 to 1 foot bgs in grassy depressions where the transformer storage site was believed to be located. Sample PAI-27-SS-05-01 was collected at a depth of 8 to 20 inches bgs (below 2 inches of asphalt and 6 inches of gravel) in a location where cracks in the asphalt were observed. Sample log sheets for the soil samples collected in December 1999 are provided in Appendix A-3. Complete analytical results for these samples are presented in Appendix B-3.

Evaluation of the soil data collected in 1995 and 1999 indicates that past use of Site 27 as a transformer storage area has not impacted the soil with PCBs. However, detections of organics were observed in the two surface soil samples collected in 1995 indicating that some impact has occurred. In these samples, 3 VOCs, 12 SVOCs, and 5 pesticides were detected. Of these organic detections, concentrations of chloroform, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, fluoranthene, phenanthrene,

pyrene, 4,4'-DDE, 4,4'-DDE, and 4,4'-DDT were measured greater than human health and/or ecological screening criterion. Additionally, of the 15 inorganics identified (excluding macronutrients), antimony, arsenic, chromium, lead, selenium, vanadium, and zinc were detected in one or more samples at concentrations greater than human health or ecological screening criterion.

1.4.3.6 Soil and Groundwater Field Screening – Site 55 (2002)

The investigations at Site 55 followed the discovery of petroleum hydrocarbons floating on water in the FOV following installation of the vault. When the petroleum hydrocarbons were observed in the vault in September 2001, a soil sample was collected next to the vault and analyzed for lead, PCBs, and BTEX. Only BTEX compounds (not lead and PCBs) were detected in the sample [benzene – 19.7 mg/kg, toluene – 51 mg/kg, ethylbenzene – 61 milligrams per kilogram (mg/kg), and xylenes at 2,790 mg/kg]. Based on the presence of free product in the groundwater and BTEX in the soil sample collected in September 2001, SCDHEC requested that an assessment of the vault be performed (Tetra Tech, 2004).

In July 2002, soil and groundwater field screening activities were performed using a direct-push technology (DPT) rig equipped with a membrane interface probe (MIP). Drilling at 17 initial borings involved the use of the MIP with an electrical conductivity (EC) detector to determine the extent of free product and to provide subsurface geologic information. The initial MIP/EC profiling suggested the presence of a small area of petroleum fuels primarily between 7 to 10 feet bgs (below the first confining layer detected during the investigation) (Columbia Technologies, 2002). The MIP report and associated Figures are presented in Appendix J. Five temporary piezometers (PAI-55-P1 through PAI-55-P5 on Figure 1-5) were installed to determine free product thickness and water-level elevations (Tetra Tech, 2004).

Based on the results of the initial screening, additional DPT borings (PAI-55-FDP01 through PAI-55-FDP22 on Figure 1-5) were advanced to depths of 8 to 12 feet bgs and used to collect 19 subsurface soil and 21 groundwater samples for screening by a mobile laboratory (two groundwater samples were also obtained from piezometers PAI-55-P3 and PAI-55-P4). Boring logs for the additional DPT borings are included in Appendix A-4. Samples from PAI-55-FDP13 were not analyzed, because the presence of free product in the boring may have adversely affected the mobile laboratory equipment (Tetra Tech, 2004). However, PAI-55-FDP20 was installed immediately adjacent to PAI-55-FDP13 and the samples collected from that boring were analyzed by the mobile laboratory. Because of the presence of the floating petroleum hydrocarbons, the soil and groundwater samples were analyzed for common constituents of fuel products [BTEX, chlorobenzene, methyl tert-butyl ether (MTBE), and naphthalene]. BTEX, chlorobenzene, MTBE, and naphthalene were detected in the groundwater samples, but only chlorobenzene and naphthalene were detected in the soil samples. The analytical results from the mobile laboratory for the soil and groundwater samples are presented in Appendix B-4.

The results of the field screening indicated that the shallow surficial aquifer was contaminated (Tetra Tech, 2004). Floating product was detected in boring PAI-55-FDP13 (although it was not detected in the adjacent boring PAI-55-FDP20) and the highest concentrations of contaminants were found in borings west of the FOV (PAI-55-FDP02, PAI-55-FDP04, PAI-55-FDP05, PAI-55-FDP17, and PAI-55-FDP22) and one boring located immediately east of the FOV (PAI-55-FDP12). However, soil analytical data obtained during the screening indicated minimal soil contamination within the DPT borings. Chlorobenzene and naphthalene were the only analytes detected in the soil borings (PAI-55-FDP02, PAI-55-FDP03, and PAI-55-FDP04).

1.4.3.7 Groundwater Investigation – Site 55 (2003)

Site 55 was initially investigated under the Underground Storage Tank (UST) program, but based on the results of the July 2002 field screening (Section 1.4.3.6), SCDHEC requested that the site be transferred to the Bureau of Land and Waste Management RCRA Program for oversight (Tetra Tech, 2004). The results of the July 2002 field screening were used to select the locations for 21 monitoring wells that were installed in December 2002 in the Site 55 area, as shown on Figure 1-5. Boring logs and monitoring well construction sheets for the 21 monitoring wells are provided in Appendix A-5. Twelve of the monitoring wells were developed and sampled in July 2003 to isolate/confirm a source area, to characterize the intermediate and deep portions of the surficial aquifer, and to investigate the downgradient shallow surficial aquifer. The other nine wells were developed and sampled during Phase I of the RI, discussed in Section 3.3.5. Monitoring well development records and groundwater sample log sheets for the 12 monitoring wells sampled in July 2003 are also provided in Appendix A-5. Because the site had been switched to the IR Program, the analytical program for these groundwater samples was expanded to include VOCs, SVOCs, pesticides, and PCBs. Because of the limited surface soil detections observed during the 2002 field screening, no soil sampling was conducted during the July 2003 investigation. Complete analytical results for these groundwater samples are presented in Appendix B-5.

Free product was encountered at monitoring well PAI-27-MW06S when the wells were installed in December 2002, but was not encountered in any of the monitoring wells sampled in July 2003. The 2003 analytical results indicated the presence of 11 VOCs, 10 SVOCs, and 7 pesticides in the groundwater samples collected from the monitoring wells in the Site 55 area and confirmed the presence of chlorobenzene, BTEX, and naphthalene (detected in the 2002 field screening). However, the concentrations of these compounds in the 2003 samples were significantly lower than the concentrations detected in the 2002 field screening samples. The Preliminary Assessment/Site Inspection and Confirmatory Sampling Report for Site 55 recommended that Site 55 proceed to a focused RI to further characterize the nature and extent of contamination related to a potential petroleum and/or pesticide release and to quantify risks posed to human health and the environment (Tetra Tech, 2004).

1.5 REPORT ORGANIZATION

This RI report is divided into seven sections. Section 1.0, Introduction, provides historical information regarding MCRD Parris Island and Sites 9, 16, 27, and 55. Section 2.0, Environmental Setting, provides geological and geographical information for MCRD Parris Island and the surrounding areas. Section 3.0, Investigation Summary, summarizes the RI sampling program and presents the Sites 9, 16, 27, and 55 geology and hydrogeology based on the field results. Section 4.0, Nature and Extent of Contamination, addresses the nature and extent of site contamination for all investigated media. Section 5.0, Contaminant Fate and Transport, is a reference-like section describing the chemical and physical properties of the analytes positively detected at Sites 9, 16, 27, and 55. Section 6.0, Human Health Risk Assessment, provides a discussion of the risk posed to human receptors from chemicals in soil and groundwater at Sites 9, 16, 27, and 55. Section 7.0 provides the Conclusions and Recommendations of the RI.

Appendices A through J contain support documentation for the field investigation and supplemental information for the evaluation of results.

TABLE 1-1

SAMPLE SUMMARY - PREVIOUS INVESTIGATIONS
SITE 27 - EQUIPMENT PARADE DECK
MCRD PARRIS ISLAND, SOUTH CAROLINA

Sample Identification	Sample Location	Analyses					
		VOCs	SVOCs	PAHs	Pesticides	PCBs	Metals
Surface Soil Samples							
1995 Relative Site Ranking							
PI-009-01(32)	PI009-01	●	●		●	●	●
PI-009-02(33)	PI009-02	●	●		●	●	●
PI-009-03(34)	PI009-03	●	●		●	●	●
PI-027-01(46)	PI027-01	●	●		●	●	●
PI-027-02(47)	PI027-02	●	●		●	●	●
PI-027-02(47)-D	PI027-02	●	●		●	●	●
1999 SI/CS							
PAI-27-SS-03-01	PAI-27-SS03					●	
PAI-27-SS-04-01	PAI-27-SS04					●	
PAI-27-SS-05-01	PAI-27-SS05					●	
Subsurface Soil Samples							
1988 RI VSI							
PAI16-SB1-3	PAI16-SB1				●		(1)
PAI16-SB2-3	PAI16-SB2				●		(1)
PAI16-SB2-3D	PAI16-SB2				●		(1)
PAI16-SB3-3	PAI16-SB3				●		(1)

TABLE 1-1

SAMPLE SUMMARY - PREVIOUS INVESTIGATIONS
SITE 27 - EQUIPMENT PARADE DECK
MCRD PARRIS ISLAND, SOUTH CAROLINA

Sample Identification	Sample Location	Analyses					
		VOCs	SVOCs	PAHs	Pesticides	PCBs	Metals
2002 Field Screening							
FOVSFB-0106	PAI-55-FDP01	(2)					
FOVSFB-0204	PAI-55-FDP02	(2)					
FOVSFB-0206	PAI-55-FDP02	(2)					
FOVSFB-0305	PAI-55-FDP03	(2)					
FOVSFB-0406	PAI-55-FDP04	(2)					
FOVSFB-0505	PAI-55-FDP05	(2)					
FOVSFB-0605	PAI-55-FDP06	(2)					
FOVSFB-0803	PAI-55-FDP08	(2)					
FOVSFB-1005	PAI-55-FDP10	(2)					
FOVSFB-1105	PAI-55-FDP11	(2)					
FOVSFB-1204	PAI-55-FDP12	(2)					
FOVSFB-1305	PAI-55-FDP13/FDP20	(2)					
FOVSFB-1405	PAI-55-FDP14	(2)					
FOVSFB-1505	PAI-55-FDP15	(2)					
FOVSFB-1605	PAI-55-FDP16	(2)					
FOVSFB-1704	PAI-55-FDP17	(2)					
FOVSFB-1804	PAI-55-FDP18	(2)					
FOVSFB-1904	PAI-55-FDP19	(2)					
FOVSFB-2104	PAI-55-FDP21	(2)					

TABLE 1-1

SAMPLE SUMMARY - PREVIOUS INVESTIGATIONS
SITE 27 - EQUIPMENT PARADE DECK
MCRD PARRIS ISLAND, SOUTH CAROLINA

Sample Identification	Sample Location	Analyses					
		VOCs	SVOCs	PAHs	Pesticides	PCBs	Metals
Groundwater Samples							
1999 SI/CS							
PAI-09-GW-01-01	PAI-09-MW-01(S)	●					●
PAI-09-GW-02-01	PAI-09-MW-02(S)	●					●
2002 Field Screening							
FOVGFB-0110	PAI-55-FDP01	(2)					
FOVGFB-0210	PAI-55-FDP02	(2)					
FOVGFB-0311	PAI-55-FDP03	(2)					
FOVGFB-0412	PAI-55-FDP04	(2)					
FOVGFB-0509	PAI-55-FDP05	(2)					
FOVGFB-0612	PAI-55-FDP06	(2)					
FOVGFB-0710	PAI-55-FDP07	(2)					
FOVGFB-0808	PAI-55-FDP08	(2)					
FOVGFB-0911	PAI-55-FDP09	(2)					
FOVGFB-1010	PAI-55-FDP10	(2)					
FOVGFB-1109	PAI-55-FDP11	(2)					
FOVGFB-1210	PAI-55-FDP12	(2)					
FOVGFB-1410	PAI-55-FDP14	(2)					
FOVGFB-1510	PAI-55-FDP15	(2)					
FOVGFB-1610	PAI-55-FDP16	(2)					
FOVGFB-1710	PAI-55-FDP17	(2)					
FOVGFB-1810	PAI-55-FDP18	(2)					
FOVGFB-1910	PAI-55-FDP19	(2)					
FOVGFB-2022	PAI-55-FDP13/FDP20	(2)					
FOVGFB2110	PAI-55-FDP21	(2)					
FOVGFB-2210	PAI-55-FDP22	(2)					
FOVGFP-0310	PAI-55-P3	(2)					
FOVGFP-0410	PAI-55-P4	(2)					

TABLE 1-1

SAMPLE SUMMARY - PREVIOUS INVESTIGATIONS
SITE 27 - EQUIPMENT PARADE DECK
MCRD PARRIS ISLAND, SOUTH CAROLINA

Sample Identification	Sample Location	Analyses					
		VOCs	SVOCs	PAHs	Pesticides	PCBs	Metals
2003 Groundwater Investigation							
PAI-FOV-GW-01-01	PAI-27-MW01S	●	●		●	●	
PAI-FOV-GW-07-01	PAI-27-MW07I	●	●		●	●	
PAI-FOV-GW-08-01	PAI-27-MW08D	●	●		●	●	
PAI-FOV-GW-10-01	PAI-27-MW10S	●	●		●	●	
PAI-FOV-GW-11-01	PAI-27-MW11S	●	●		●	●	
PAI-FOV-GW-12-01	PAI-27-MW12I	●	●		●	●	
PAI-FOV-GW-13-01	PAI-27-MW13D	●	●		●	●	
PAI-FOV-GW-17-01	PAI-27-MW17S	●	●		●	●	
PAI-FOV-GW-18-01	PAI-27-MW18I	●	●		●	●	
PAI-FOV-GW-19-01	PAI-27-MW19S	●	●		●	●	
PAI-FOV-GW-20-01	PAI-27-MW20S	●	●		●	●	
PAI-FOV-GW-21-01	PAI-27-MW21S	●	●		●	●	

1 Arsenic, cadmium, chromium, and lead.
2 Benzene, chlorobenzene, ethylbenzene, methyl tert-butyl ether, toluene, naphthalene

PAHs Polynuclear aromatic hydrocarbons
PCBs Polychlorinated biphenyls
SVOCs Semivolatile organic compounds
VOCs Volatile organic compounds

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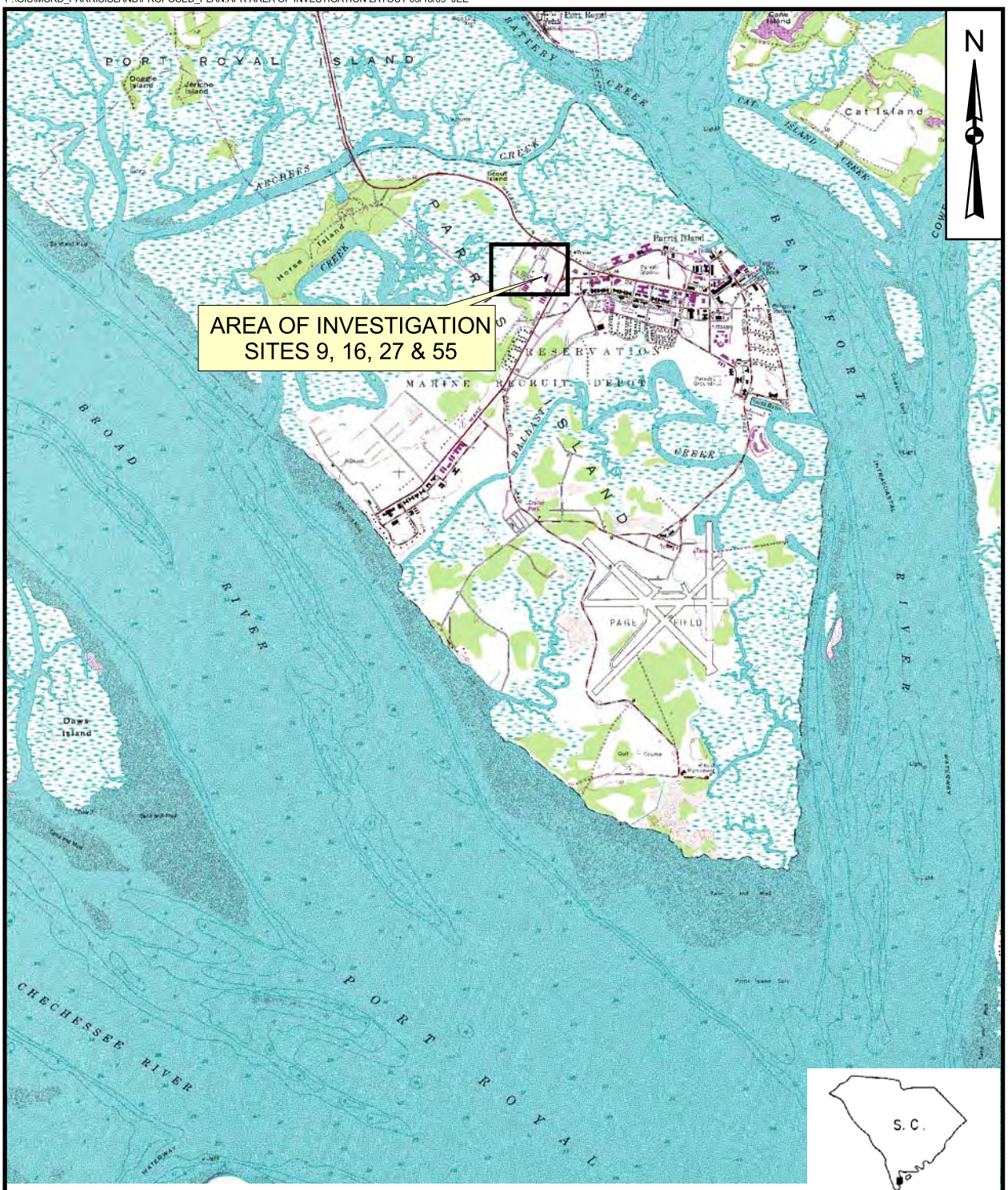
DRAWN BY	DATE	CONTRACT NUMBER	CTO NUMBER
J. ENGLISH	01/21/09	___	JM25
CHECKED BY	DATE	APPROVED BY	DATE
S. HILL	01/31/12	___	___
REVISED BY	DATE	APPROVED BY	DATE
J. NOVAK	01/31/12	___	___
SCALE AS NOTED		FIGURE NO. FIGURE 1-1	REV 0

NAVFAC

BASE LOCATION MAP
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA

P:\GIS\MCRD_PARRISISLAND\PROPOSED_PLAN.APR AREA OF INVESTIGATION LAYOUT 03/18/09 JEE



SOURCE: USGS 7.5 MINUTE
PARRIS ISLAND QUADRANGLE, 1979.

DRAWN BY K. MOORE	DATE 11/16/06	DEPOT & SITE LOCATION MAP MCRD PARRIS ISLAND, SOUTH CAROLINA	CONTRACT NUMBER 0039
CHECKED BY G. ZIMMERMAN	DATE 03/18/09		APPROVED BY ___ DATE ___
COST/SCHEDULE-AREA			APPROVED BY ___ DATE ___
SCALE AS NOTED			DRAWING NO. FIGURE 1-2 / REV 0

NAVFAC

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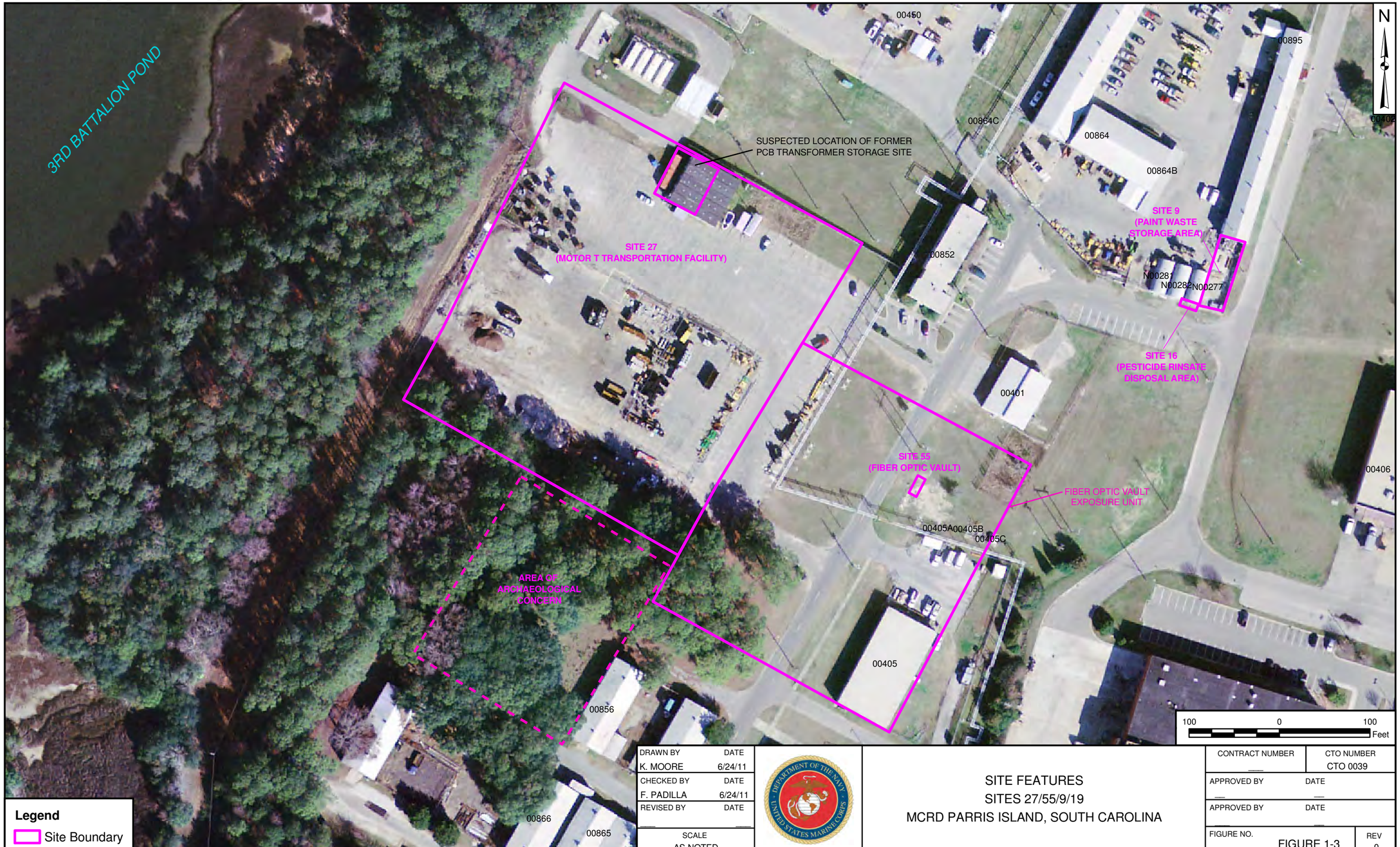

DRAWN BY	DATE
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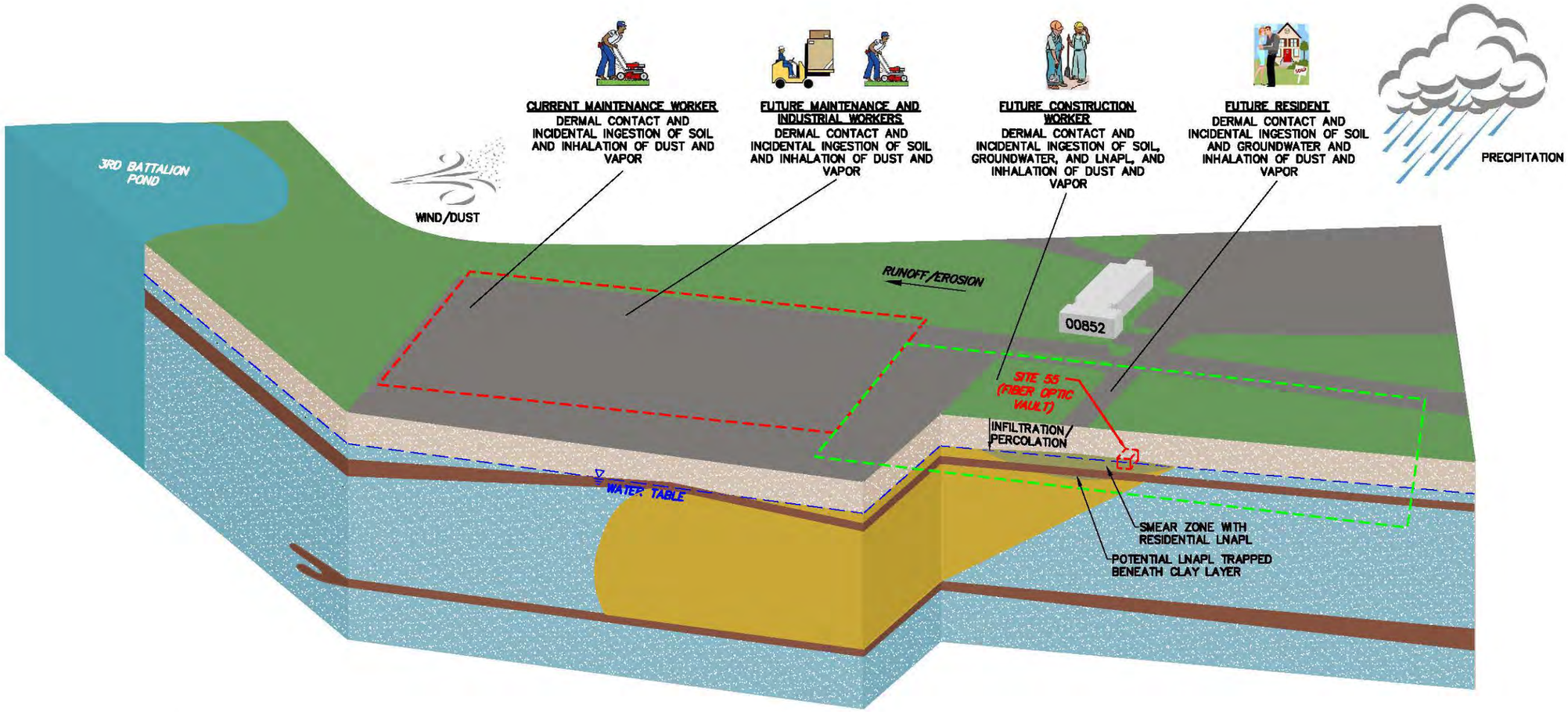
CHECKED BY	DATE
F. PADILLA	6/24/11
REVISED BY	DATE
SCALE	
AS NOTED	

SITE FEATURES
SITES 27/55/9/19
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
	CTO 0039
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 1-3	REV 0



LEGEND

- SITE 27 (MOTOR TRANSPORTATION FACILITY)
- FIBER OPTIC VAULT EXPOSURE UNIT
- WATER TABLE
- SAND
- WATER BEARING ZONE
- CLAY
- GROUND WATER CONTAMINATION

DRAWN BY CK DATE 3/29/10	NAVFAC	CONCEPTUAL SITE MODEL SITE 27 AND SITE 55 MCRD PARRIS ISLAND PARRIS ISLAND, SOUTH CAROLINA
CHECKED BY DATE		CONTRACT NO. 2406
REVISED BY DATE		OWNER NO.
SCALE NOT TO SCALE		APPROVED BY DATE
		DRAWING NO. FIGURE 1-4 REV. 0

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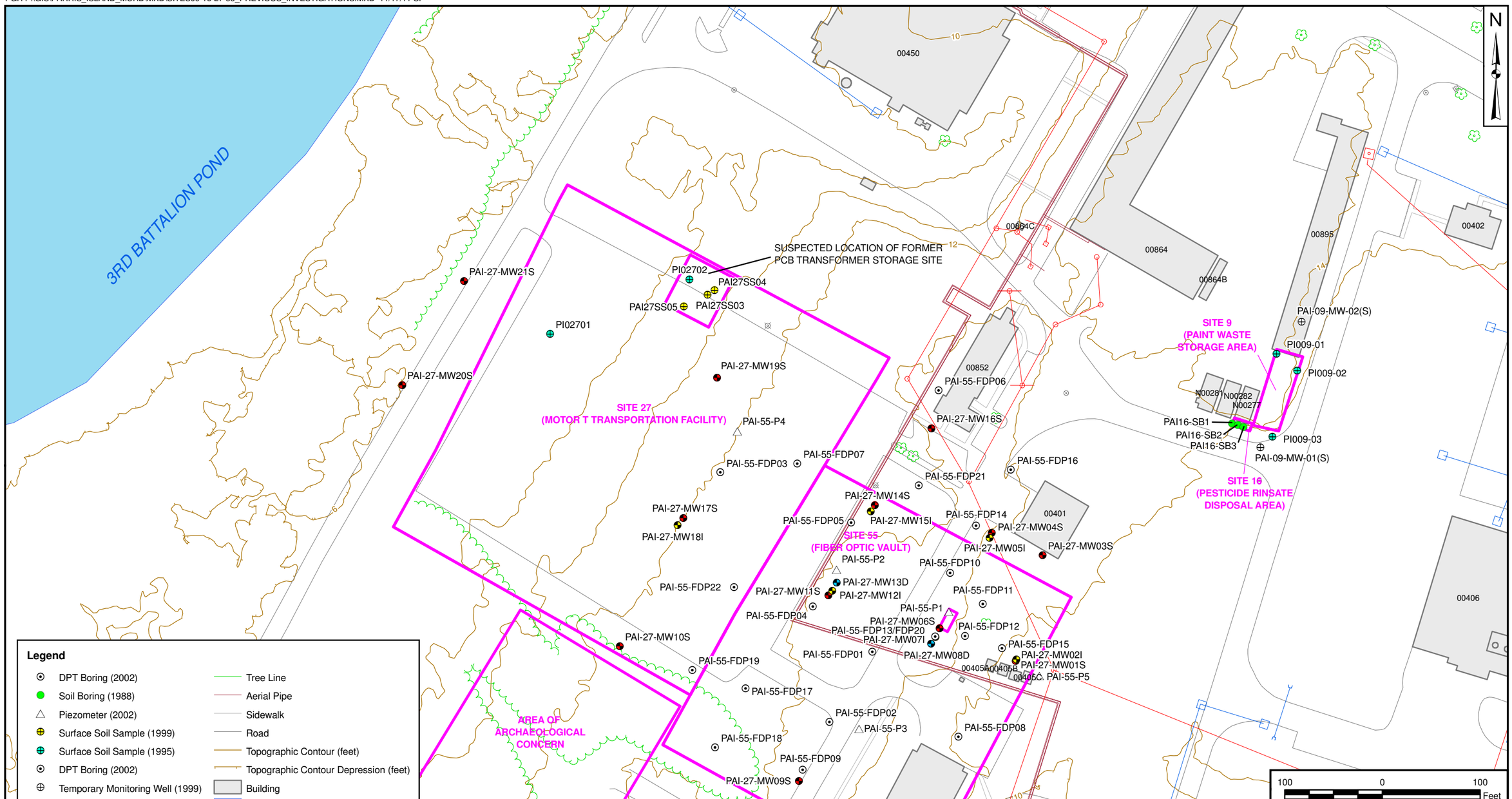

DRAWN BY	DATE
K. MOORE	6/24/11
CHECKED BY	DATE
T. DECK	11/17/11
REVISED BY	DATE
S. PAXTON	11/17/11
SCALE	
AS NOTED	

SAMPLE LOCATIONS
PREVIOUS INVESTIGATIONS
SITES 27/55/9/16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
	CTO 0039
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 1 - 5	REV 0

2.0 ENVIRONMENTAL SETTING

This section contains general information about the environmental setting common to all the sites currently under investigation at MCRD Parris Island. A comprehensive discussion of the environmental setting at the MCRD can be found in the Master Work Plan (B&R Environmental, 1998) or the Initial Assessment Study (IAS) (NEESA, 1986).

More detailed discussions of the geology and hydrogeology of Sites 9, 16, 27, and 55 are included in Sections 3.5 and 3.6.

2.1 CLIMATE

MCRD Parris Island is in the southernmost region of South Carolina, where the climate is milder than elsewhere in the state. This low-lying coastal area has numerous islands, inlets, streams, and marshes and a temperature regime that clearly reflects the influences of its maritime and southern location. The climate is subtropical, with long and hot summers followed by short and mild winters. Precipitation is abundant, ranging from 40 to 58 inches in most years and averaging about 49 inches per year. Precipitation in the amount of 0.1 inch or more falls on an average of about 77 days per year. The annual distribution shows a major monthly maximum of about 7 inches in July and a major monthly minimum of about 2 inches in November. Approximately 70 percent of rain falls during the April-October growing season with an average rainfall of 34 inches during this time period.

2.2 TOPOGRAPHY

MCRD Parris Island lies in the Lower Coastal Plain physiographic province and consists of Parris Island (the largest and most developed island), seven smaller, named islands, and many small unnamed islands. Elevations at MCRD Parris Island range from sea level to 22 feet above mean sea level (msl). Because of the low elevation, the majority of the Depot is within the 100-year flood plain.

The Depot covers 8,047 acres: 744 acres are devoted to facilities and infrastructure; 1,502 acres are uplands managed for timber production and wildlife; 4,344 acres are salt marsh; and the remainder consists of creeks, ponds, and causeways. Dry land makes up 3,274 acres (NEESA, 1986).

The elevations in the area of Sites 9, 16, 27, and 55 range from approximately 4 to 15 feet above msl. The area around the FOV (Site 55) is one of the highest topographic areas at MCRD Parris Island. The ground surface in this area slopes radially from the FOV in all directions, although the majority of Sites 9,

16, 27, and 55 slopes to the northwest toward the 3rd Battalion Pond. Sites 9, 16, 27, and 55 lie within the 100-year flood plain.

2.3 SURFACE WATER DRAINAGE

Drainage off the land surface at MCRD Parris Island is to the nearest surface water body. Three generally east-west trending creeks drain much of the Depot. Archers Creek, at the northern boundary of the Depot, connects Battery Creek to the north with the Broad River to the west of Parris Island (see Figure 1-2). Ribbon Creek drains the area between Horse and Parris Islands and flows westward into the Broad River. Ballast Creek drains the middle of Parris Island and flows eastward into the Beaufort River. The Beaufort and Broad Rivers meet at the southern end of Parris Island and empty into Port Royal Sound, which extends southeastward to the Atlantic Ocean. Smaller unnamed creeks drain the areas west and east of Page Field.

The nearest surface water bodies to Sites 9, 16, 27, and 55 are the 3rd Battalion Pond (approximately 300 feet northwest of Site 27) and an unnamed tributary of Archers Creek (700 feet north-northeast of Sites 9 and 16). Surface water in the area drains into surface drainage features and then into the 3rd Battalion Pond.

2.4 SOILS

Soils at MCRD Parris Island have been mapped by the U.S. Soil Conservation Service, now referred to as the United States Department of Agriculture (USDA) Natural Resources Conservation Service, as both individual soils and groupings of soils (units). The Depot has been mapped as having 15 individual soil types, but only eight types are present beneath sites currently under investigation. Three soil units have been mapped for the Depot (the Wando-Seabrook-Seewee, Coosaw-Williman-Ridgeland, and Bohicket-Capers-Handsboro Soil Unit). A further discussion of the soils and soil units identified at the MCRD can be found in the Master Work Plan for MCRD Parris Island (B&R Environmental, 1998) or the IAS (NEESA, 1986).

2.5 GEOLOGY

Beaufort County lies within the Lower Coastal Plain of South Carolina. Primarily, six geological units are present in the Beaufort-Jasper County Area. These units from the oldest (Eocene age) to the youngest (Pleistocene age) are the Santee Limestone, Cross Formation, Cooper Group, Chandler Bridge Formation, Hawthorn Formation, and Pleistocene sands and clays.

The Santee Limestone is considered the middle confining unit within the Floridan Aquifer System with low permeability (USGS, 1988). The maximum thickness of the Santee Limestone is 110 feet in this region and occurs approximately 600 feet bgs. It is middle Eocene in age and it consists of fossil-rich limestone and upper unit mudstone.

Overlying the Santee Limestone is the Cross Formation. The Cross Formation is considered to be part of the local confining unit and is Upper and Middle Eocene in age (USGS, 1988; Harris and Zullo, 1991). The Cross Formation reportedly varies in thickness from 35 to 135 feet. It consists of pale yellowish-gray sandy fossil rich limestone.

The Cooper Group disconformably overlies the Cross Formation. The Cooper Group is upper Eocene in age and varies from 40 to 100 feet in thickness. The lower portion of the Cooper group is divided into two formations, with the Harleyville Formation overlying the Parkers Ferry Formation. The Harleyville Formation consists of compact clay and clayey limestone. The Parkers Ferry Formation consists of clay and fine grained fossiliferous limestone. The upper portion of the Cooper Group is the Ashley Formation. The Ashley Formation fills channels that are cut into the underlying Harleyville and Parkers Ferry Formations reaching up to 200 feet in thickness. The Ashley Formation is loosely referred as the “Ashley Marl” and has been described as “phosphatic, muddy, calcareous, very fine-grained sand” (Harris and Zullo, 1991).

The Chandler Bridge Formation disconformably overlies the Ashley Formation. The Chandler Bridge Formation is Upper Oligocene in age and reaches a maximum thickness of approximately 16 feet. This formation consists of very fine to fine-grained, quartz phosphate sand with minor clay.

The Hawthorn Formation is Miocene in age and considered to be the upper semi-confining unit above the Floridan Aquifer System. It is a limestone consisting of fine sand, silt, clayey sand, sandy clay, clay, and phosphatic pebbles.

A further discussion of the hydrogeological characteristics of the Beaufort-Jasper County area can be found in the Master Work Plan for MCRD Parris Island (B&R Environmental, 1998). The site-specific geology for Sites 9, 16, 27, and 55 are discussed in Section 3.5.

2.6 HYDROGEOLOGY

Two primary aquifers are present within the Beaufort-Jasper County Area: the surficial aquifer and the Floridan Aquifer. These aquifers are generally separated by the Hawthorn Formation and Cooper Group, which act as the upper confining units to the underlying Floridan Aquifer.

In the MCRD Parris Island area, the shallow, unconfined aquifer generally consists of permeable, fine to medium, Pleistocene age sands. Surface relief is relatively low. The area is drained by fresh and brackish-water streams inland and by tidal streams along the coast. The water table in the MCRD Parris Island area usually ranges from 0 to 10 feet bgs and is most commonly found at a depth of 3 feet bgs. Water table fluctuations are a function of recharge, evaporation, and transpiration and have been observed to be as great as 6.5 feet at some locations (Glowacz, et al., 1980). The direction of groundwater flow in the upper portion of the shallow surficial aquifer is generally toward the nearest surface water body, such as a pond, river, tidal creek, or the ocean.

In the Beaufort-Jasper County Area, the Floridan Aquifer system occurs near land surface, and confining beds vary from essentially 0 to more than 150 feet in thickness. Groundwater in the Floridan Aquifer occurs in solutionally enlarged openings or cavities in the limestone. In general, groundwater occurs in a series of broadly defined water-bearing (permeable) zones that serve as aquifers and are separated by less permeable bedrock. Two hydrogeologic zones within the Floridan Aquifer lie beneath the MCRD Parris Island area. These two hydrogeologic units consist of a 200-foot-thick upper hydrogeologic unit that contains an upper permeable zone and an 800-foot-thick lower hydrogeologic unit that has a somewhat lower permeability compared to the upper unit.

A further discussion of the hydrogeological characteristics of the Beaufort-Jasper County area can be found in the Master Work Plan for MCRD Parris Island (B&R Environmental, March 1998). The site specific hydrogeology of Sites 9, 16, 27, and 55 is detailed in Section 3.6.

2.7 ECOLOGY

General discussions on the natural communities of MCRD Parris Island and threatened and endangered plants and animals that are known to occur or potentially occur here can be found in the Master Work Plan for MCRD Parris Island (B&R Environmental, 1998) or the IAS (NEESA, 1986).

Sites 9, 16, 27, and 55 are located within an industrialized area of the Depot. Terrestrial habitat in the area of the sites is limited to weeds, turf grasses, and shrubs. Ecological receptors that use the mowed lawns surrounding the site are limited to a few species of invertebrates, lizards, and birds that are typically found in urban areas. The nearest surface water bodies are the 3rd Battalion Pond (300 feet northwest of Site 27) and a tributary of Archers Creek (700 feet north-northeast of Sites 9 and 16).

Large areas of turf grass are located north and east of Site 27. An isolated 400-foot by 400-foot area of large pines (*Pinus* spp.) is located south of the site. Talasea Street lies west of the site, and an area of pines and oaks (*Quercus* spp.) is located west of Talasea Street. There are no sensitive terrestrial habitats at or near the site.

An active bald eagle nest is located approximately 1,000 feet southwest of the site, and the nearest wetland is located approximately 300 feet northwest of the site, at the marshy edge of the 3rd Battalion Pond.

Special-status species in the vicinity of the site consist of three species that use the 3rd Battalion Pond: the wood stork (*Mycteria americana*), the American alligator (*Alligator mississippiensis*), and the bald eagle (*Haliaeetus leucocephalus*). The status of each is as follows:

- Wood stork – federally endangered
- Alligator – threatened due to similarity of appearance to American crocodile
- Bald eagle – delisted, but protected by Bald and Golden Eagle Protection Act

3.0 REMEDIAL INVESTIGATION SUMMARY

This section includes a remedial investigation summary for Sites 27 and 55 and Sites 9 and 16. Some of the remedial investigation was broken into Phase by Site. Therefore, details regarding the investigations at each site are presented below.

3.1 INVESTIGATION BACKGROUND - SITES 27 AND 55

The RI field investigation for the Sites 27 and 55 was performed in three phases – Phase I (September 2007), Phase II (August 2008) and Phase III (August 2010). The Work Plan for Phase I of the RI was finalized in September 2007 (Tetra Tech, 2007) and the field activities were completed in September 2007. The Phase I activities consisted of installation of shallow, intermediate, and deep (temporary) groundwater monitoring wells; collection of groundwater samples from these temporary monitoring wells and from existing permanent monitoring wells; collection of surface and subsurface soil samples; and measurement of water levels in the monitoring wells. The Phase I field activities were intended to support the following objectives:

- To characterize the nature and extent of contaminant migration from past releases at Site 27 – Motor T and Site 55 – FOV. The media of concern are soil and groundwater located in the vicinity of Sites 27 and 55.

- To assess the human health risks associated with potential direct contact with contaminants. Human health risks to construction workers, site employees (maintenance and other), adolescent trespassers, and future residents are assessed.

Phase I of the RI was originally designed to collect screening data via temporary wells and to be quickly followed by Phase II installation of permanent monitoring wells at locations identified in consultation with USEPA and SCDHEC. However, Phase I sampling results indicated that groundwater from some locations that were thought to be unimpacted contained unacceptably high (i.e., greater than risk-based screening criteria) concentrations of VOCs and pesticides. These sampling results suggested that some sources of contamination had not been identified and as a consequence the extent of contamination had not been fully delineated. Therefore, additional groundwater samples were collected as part of Phase II of the RI. Additional soil samples were also collected in an attempt to try to identify possible source areas.

The Work Plan Addendum for Phase II of the RI was submitted in July 2008 (Tetra Tech, 2008) and the field activities were completed in August 2008. The Phase II field activities consisted of installation of

shallow and intermediate permanent groundwater monitoring wells, collection of groundwater samples from these new monitoring wells and existing permanent monitoring wells, collection of surface and subsurface soil samples, and measurement of water levels in the monitoring wells. Slug tests of existing and new (installed during Phase II) monitoring wells were also conducted. These Phase II field activities were intended to meet the following objectives:

- To define the extent of the pesticide contamination in groundwater.
- To define the extent of the chlorobenzene (and other VOC) contamination in groundwater.
- To determine if there is a soil source of pesticides and VOCs in the Site 27 and Site 55 area.

Based on the results of the Phase II RI, an additional RI (Phase III) was conducted. The Phase III sampling and analysis plan (SAP) was submitted to USEPA and SCDHEC in November 2010 (Tetra Tech, 2010b) and the field activities were completed in August 2010. The Phase III field activities consisted of installation of temporary shallow and intermediate well points, collection of groundwater samples from temporary wells and existing permanent monitoring wells, collection of surface and subsurface soil samples, and the measurement of water levels in the monitoring wells. These Phase III field activities were intended to support the following objectives:

- To determine how best to carry out CERCLA and remedial action without hindering Depot construction activities.
- To support remedy selection and a ROD.
- To characterize the nature and extent of contamination at the site and to estimate human health risk from exposure to contaminants in surface and subsurface soil and groundwater water.
- To provide water level data useful for determining groundwater flow direction.
- To further characterize the subsurface.

The data from Phase I, II and III, of the RI and any additional data collected during subsequent investigations was used to support the risk assessment and, in conjunction with the historical data, used to define the nature and extent of contamination and aid in the evaluation of remedies. The sections that follow discuss the field activities conducted (Section 3.3 and 3.4) and deviations from the work plan (Section 3.5). In addition, information collected during the investigation was used to supplement existing site-specific geologic and hydrogeologic information in the Sites 27 and 55 areas (Section 3.7 and 3.8).

3.2 INVESTIGATION BACKGROUND - SITES 9 AND 16

RI field activities for Sites 9 and 16 were performed during August 2010 and September 2011. The activities consisted of surface and subsurface soil sampling, on-site analysis of soil samples (to assist

with site delineation), installation of four temporary monitoring wells, and groundwater sampling of newly installed temporary monitoring wells. These field activities supported the collection of data to meet the following objectives:

- Determine how best to carry out CERCLA and remedial action.
- To support remedy selection and a ROD.
- To characterize the nature and extent of contamination at the site and to estimate human health risk for receptors exposed to surface and subsurface soil and groundwater.
- To provide water level data useful for determining groundwater flow direction.

A summary of the field investigation sampling rationale is presented in Table 3-1. The following sections discuss field activities conducted, deviations from the work plan, and site-specific geologic and hydrogeologic information at Sites 9 and 16.

3.3 FIELD INVESTIGATIONS – SITES 27 AND 55

The following sections discuss the specific field activities conducted in the Sites 27 and 55 areas during the Phase I RI (September 2007), the Phase II RI (August 2008), and the Phase III RI (August 2010). Activities included surface and subsurface soil sampling, temporary and permanent monitoring well installation, groundwater sampling, slug tests, and investigation-derived waste (IDW) management. In Phase I and II, the two sites were investigated as one site during the RIs. During the Phase III RI the sites were investigated during the same field effort but reported on separately. Figure 3-1 identifies the sites' boundaries.

A summary of the samples collected during Phase I, Phase II, and Phase III field investigations and the rationale for this work are presented in Table 3-1. Table 3-2 provides well construction details for the monitoring wells installed in the Sites 27 and 55 area, including the permanent monitoring wells installed during the previous groundwater investigation in December 2002, the temporary monitoring wells installed during Phase I of the RI in September 2007, the permanent monitoring wells installed during Phase II of the RI in August 2008, and the temporary monitoring wells installed in August 2010. Water level measurements are provided in Table 3-3. All soil and groundwater sample locations for Phase I, Phase II, and Phase III of the RI are shown on Figure 3-1. Field logs from the three phases of the RI field activities are presented in Appendix C. The chain-of-custody forms for all samples collected during all three phases of the RI are provided in Appendix C-1.

3.3.1 Surface Soil Sampling

Phase I

During the Phase I RI field activities (September 2007), surface soil samples were collected from 13 locations, as shown on Figure 3-1. Three samples were collected in the grass-covered area outside the edge of the Motor T (PAI-27-SO-01 through PAI-27-SO-03), three samples were collected within the area of the Motor T (PAI-27-SO-04 through PAI-27-SO-06), and seven samples were collected within surface drainage features along the northwestern, western, and southwestern edge of the Motor T (PAI-27-SO-07 through PAI-27-SO-13). The surface soil samples were collected with disposable trowels, except for the surface soil samples PAI-27-SO-03 through PAI-27-SO-07. At these sample locations, the DPT rig used for the temporary monitoring well installation (Section 3.3.4) was used to collect the surface soil samples. Surface soil samples were collected from beneath the surface cover (root zone or asphalt sub-base) in the 0 to 1 foot bgs interval. The surface soil samples were screened in the field using a photoionization detector (PID) and shipped to the laboratory for analysis (VOCs, SVOCs, pesticides, PCBs, and metals).

Phase II

During the 2008 RI, surface soil samples were collected from 19 soil borings, as shown on Figure 3-1. The boring/sample locations were biased toward areas of potential concern. Seven borings were located near the FOV (PAI-27-SO-14 through PAI-27-SO-19 and PAI-27-SO-30), eight borings were located near the well cluster downgradient of the FOV (PAI-27-SO-20 through PAI-27-SO-25, PAI-27-SO-31, and PAI-27-SO-32), and the remaining four borings were spread throughout the Site 55/Site 27 area (PAI-27-SO-26 through PAI-27-SO-29). The soil borings were collected using a DPT rig equipped with a 2-inch diameter, 5-foot-long sampler. After the sampler was retrieved, the entire soil sample was screened with a PID for the presence of VOCs and visually classified as to lithology, soil moisture, and other pertinent characteristics. The surface portion of the core sample was separated using disposable trowels, placed in appropriate sample containers, and sent to the laboratory for analysis (VOCs, pesticides, TOC, and pH).

Phase III

During the 2010 RI, surface soil samples were collected from 19 soil borings at Site 27, as shown on Figure 3-1. As before, the boring/sample locations were biased toward areas of potential concern based on results from Phase I and Phase II sampling. Soil borings PAI-27-SO38, PAI-27-SO39, PAI-27-SO43, PAI-27-SO44, PAI-27-SO46 and PAI-27-SO47 were identified as areas needing further data. Additionally, soil borings PAI-27-SO33 through PAI-27-SO37, PAI-27-SO40 through PAI-27-SO42, and PAI-27-SO45 were advanced to further delineate Site 27. The soil borings were collected using a DPT rig

equipped with a 2-inch diameter, 5-foot-long sampler. After the sampler was retrieved, the entire soil sample was screened with a PID for the presence of VOCs and visually classified as to lithology, soil moisture, and other pertinent characteristics. The surface portion of the core sample (0 to 1 foot bgs) was separated using disposable trowels, placed in appropriate sample containers, and sent to the laboratory for analysis [VOCs, SVOC-select ion monitoring (SIM), PCBs, pesticides, metals, pH and TOC]. A portion of this sample was also set aside for on-site analytical testing. Test kits used during this event were: DDT, Hydrocarbons (PetroFLAG), TPH (oil in soil) and non-aqueous phase liquid (NAPL) (FLUTe liner). Based on the results of the test kit sampling, which is further described in Section 3.3.3, additional step-out samples were collected at PAI-27-SO38A, PAI-27-SO45A and PAI-27-SO45B.

During the 2010 RI, 32 surface soil samples were collected at Site 55, as shown on Figure 3-1. The boring/sample locations were biased toward areas of potential concern based on results from the Phase I and Phase II sampling events. Soil borings PAI-55-SO02, PAI-55-SO03, PAI-55-SO04, PAI-55-SO05, PAI-55-SO08, PAI-55-SO09, PAI-55-SO10, PAI-55-SO11, PAI-55-SO12, PAI-55-SO13, PAI-55-SO14, PAI-55-SO16, PAI-55-SO17, and PAI-55-SO18 were identified as areas needing further data. Additionally, soil borings PAI-55-SO01, PAI-55-SO06, PAI-55-SO07, and PAI-55-SO15 were advanced to further delineate Site 55. Soil sampling was conducted with the same procedures as described in Phase III for Site 27 above. Based on the results of the test kit sampling, additional step-out samples were collected at locations PAI-55-SO02A, PAI-55-SO07A, PAI-55-SO07B, PAI-55-SO10A, PAI-55-SO10B, PAI-55-SO10C, PAI-55-SO14A, PAI-55-SO14B, PAI-55-SO14C, PAI-55-SO17A, PAI-55-SO17B, PAI-55-SO17C, PAI-55-SO17D, and PAI-55-SO18A (Section 3.3.3).

Phase I RI surface soil sample log sheets are provided in Appendix C-2, Phase II RI surface soil sample log sheets are provided in Appendix C-3, Phase III RI surface soil sample information is provided in Appendix C-1 – Chain-of-Custody Forms and C-5 – Phase III Soil Boring Logs. The analytical results for the Phase I, II and III RI surface soil samples are provided in Appendix D.

3.3.2 Subsurface Soil Sampling

Phase I

During Phase I of the RI (September 2007), one subsurface soil sample was collected at location PAI-27-SO-03 (Figure 3-1). The DPT rig used for the temporary monitoring well installation (Section 3.3.4) was also used to collect the subsurface soil sample from the 1 to 2 feet bgs interval (beneath the asphalt surface cover). Field observations indicated the need to advance the soil boring to a deeper interval at this location. The subsurface soil sample was sent to the laboratory for analysis (VOCs, SVOCs, pesticides, PCBs, and metals).

Phase II

During Phase II of the RI (August 2008), subsurface soil samples were collected from each of the 19 soil borings where surface soil samples were collected (PAI-27-SO-14 through PAI-27-SO-32 on Figure 3-1). As noted in Section 3.2.1, the soil borings were collected using a DPT rig equipped with a 2-inch diameter, 5-foot-long sampler. After the sampler was retrieved, the entire soil sample was screened for the presence of VOCs with a PID and visually classified as to lithology, soil moisture, and other pertinent characteristics. The portion of the core exhibiting the highest PID reading, containing staining (based on visual observation), or the closest to the water table (if no staining or PID hits were observed) was separated using disposal trowels, placed in appropriate sample containers, and sent to the laboratory for analysis (VOCs, pesticides, TOC, and pH).

Phase III

During Phase III of the RI (August 2010), Site 27 subsurface soil samples were collected from each of the 19 soil borings where surface soil samples were collected (PAI-27-SO33 through PAI-27-SO48 on Figure 3-1). The purpose of the subsurface soil sampling was to identify and delineate any contaminants in the 3-5 foot bgs interval to which construction and maintenance workers may be exposed in the future and to characterize the clay layer (usually present at 6-8 feet bgs) and the first few feet of the surficial aquifer that may be acting together to cause a smear zone of contamination. As noted in Section 3.2.1, the soil borings were collected using a DPT rig equipped with a 2-inch diameter, 5-foot-long sampler. After the sampler was retrieved, the entire soil sample was screened with a PID for the presence of VOCs and visually classified as to lithology, soil moisture, and other pertinent characteristics. Two soil samples were collected from each of the soil boring locations. One sample was collected from the 3-to-5 foot interval and a second sample was collected from the clay layer just below the water table. Each sample was placed in an appropriate sample container using a disposable trowel and shipped to the laboratory for analysis (VOCs, SVOC-SIM, PCBs, pesticides, metals, pH and TOC). A portion of each sample was also set aside for on-site analytical testing. Test kits used during this event were: DDT, Hydrocarbons (PetroFLAG), TPH (oil in soil) and NAPL (FLUTe liner). Based on the results of the test kit sampling, additional step-out samples were collected at PAI-27-SO38A, PAI-27-SO45A and PAI-27-SO45B (Section 3.2.3).

During Phase III of the RI (August 2010), Site 55 subsurface soil samples were collected from 27 of the 32 soil borings where surface soil samples were collected (PAI-55-SO01 through PAI-55-SO18 on Figure 3-1). As noted in Section 3.3.1 – Phase III, the soil borings were collected using a DPT rig equipped with a 2-inch diameter, 5-foot-long sampler. After the sampler was retrieved, the entire soil sample was screened for the presence of VOCs with a PID and visually classified as to lithology, soil moisture, and other pertinent characteristics. Two soil samples were collected from each of the soil

boring locations. One sample was collected from the 3- to 5-foot interval and a second sample was collected from the clay layer just below the water table. Each sample was placed in an appropriate sample container using a disposable trowel and shipped to the laboratory for analysis (VOCs, SVOC-SIM, PCBs, pesticides, metals, pH, and TOC). A portion of each sample was also set aside for on-site analytical testing. Test kits used during this event were: DDT, Hydrocarbons (PetroFLAG), TPH (oil in soil) and NAPL (FLUTe liner). Based on the results of the test kit sampling, additional step out samples were collected at PAI-55-SO02A, PAI-55-SO07A, PAI-55-SO10A, PAI-55-SO10B, PAI-55-SO14A, PAI-55-SO14B, PAI-55-SO14C, PAI-55-SO17A, and PAI-55-SO18A (Section 3.3.3).

The Phase I RI subsurface soil sample log sheet is provided in Appendix C-2, Phase II RI subsurface soil sample log sheets are provided in Appendix C-3, and Phase III RI subsurface soil sample chain-of-custody forms are provided in Appendix C-1. Boring logs for the Phase II RI soil borings are provided in Appendix C-4 and Phase III RI soil boring are provided in Appendix C-5. The analytical results for the Phase I, II and III RI subsurface soil samples are provided in Appendix D.

3.3.3 Phase III On-site Soil Sample Analysis and Step-Out Decisions

3.3.3.1 Methods

On-site analytical screening tools were used for all soil samples collected during the Phase III RI. The only soil samples not analyzed on site were collected from the temporary well point locations. No step-out samples were to be collected from these temporary well point locations. On-site screening tools were: PID, Oil-in-Soil™ test kits, TPH PetroFLAG test kits, DDT test kits, and the FLUTe liner (Tables 3-4, 3-5, 3-6, and 3-7). These screening tools were used to assist in both vertical and horizontal delineation at Sites 27 and 55.

If any of the field measured constituents were detected with the field test kits, a step-out boring was advanced 50 feet from the original location unless that location fell within 25 feet of an already established soil boring location. An “elevated” concentration measured from one of the field test kits is a concentration greater than the detection limit for that field test kit. In order to establish the PetroFLAG hydrocarbon test kit action level, a background concentration was estimated for surface and subsurface conditions separately based on the lowest value plus 10 times the result from soil borings PAI-27-SO33, PAI-27-SO34, and PAI-27-SO35. Estimated values for hydrocarbon results of 2000 parts per million (ppm) for surface and 1000 ppm for subsurface were conservatively used to get a rough estimate of what may be considered above background. Locations PAI-27-SO33, PAI-27-SO34, and PAI-27-SO35 were chosen as background locations based on their results with the on-site analytical kit PetroFLAG and their distance from the assumed source area (PAI-27-MW11S). This information was used to make field decisions to determine where step-out locations should be placed. Background was established to

account for the asphalt (which contains hydrocarbons) as it covers portions of the surface soil sampling locations.

Site 27

Based on on-site analytical results outlined in Tables 3-4 (surface soil) and 3-5 (subsurface soil) the following step-out field decisions were made at Site 27.

Subsurface sample results at PAI-27-SO45 indicated elevated levels of DDT (2 to 20 ppm); therefore, a total of two step-out locations were advanced. These locations were west and north of PAI-27-SO45 and designated PAI-27-SO45A and PAI-27-SO45B, respectively. Additionally, an elevated hydrocarbons result was detected in the surface soil sample PAI-27-SO-38 (1889 ppm); therefore, one additional location was advanced. This location was intended to be a step-out from PAI-27-SO38 but because of other work (preconstruction) field personnel mixed up original sample locations and the step-out sample location was instead measured 50 feet west from PAI-27-SO36. However, after further review this step-out location was deemed unnecessary because the result was within an acceptable range of background (1000-2000 ppm). Based on the on-site results of the step-out borings, surface and subsurface soil was sufficiently delineated and no further step-out borings were advanced at Site 27.

Furthermore, no step-out locations were advanced from PAI-27-SO35, PAI-27-SO40, PAI-27-SO43, PAI-27-SO44, and PAI-27-SO48 because on-site analytical results were below established on-site background concentrations and field test kit action levels or step-outs would have been within 25 feet of an already established sample location.

Site 55

Based on on-site analytical results outlined in Tables 3-6 (surface soil) and 3-7 (subsurface soil) the following step-out field decisions were made at Site 55.

Several surface and subsurface sample results indicated elevated levels of hydrocarbons, TPH, and DDT; therefore, a total of 15 step-out locations were completed for Site 55. Step-out borings were advanced from the following boring locations: PAI-55-SO02, PAI-55-SO07, PAI-55-SO10, PAI-55-SO14, PAI-55-SO17, and PAI-55-SO18.

One step-out was advanced west of PAI-55-SO02 because elevated levels of both DDT (>20 ppm) and hydrocarbons (968 ppm) were detected in subsurface soil. No further step-outs were needed.

Since elevated levels of DDT (>20 ppm) and hydrocarbons (1118 ppm) were detected in the subsurface soil at PAI-55-SO07, PAI-55-SO07A was advanced. An elevated PID reading was detected at the surface at PAI-55-SO07A; therefore, an additional surface soil sample was collected at PAI-55-SO07B. This final location had a DDT measurement of 0.2 to 1 ppm and elevated concentrations of hydrocarbons (off scale). It was decided that the hydrocarbons were likely a result of asphalt debris being present in the sample. No additional samples were collected.

Since elevated levels of DDT (>20 ppm) and hydrocarbons (1514 ppm) were detected in the subsurface at PAI-55-SO10, PAI-55-SO10A was advanced. Elevated levels of DDT were detected in subsurface soil (2 to 20 ppm) at PAI-55-SO10A; therefore, PAI-55-SO10B was advanced. An elevated concentration of DDT was detected in surface soil at PAI-55-SO10B (0.2 to 1 ppm), so one additional surface soil sample was collected at PAI-55-SO10C. No DDT was detected at this location.

Since elevated levels of DDT and hydrocarbons were detected in both surface (DDT 1 to 10 ppm) and subsurface soil (DDT >20 ppm, TPH >500 ppm) at PAI-55-SO14, PAI-55-SO14A was advanced. Elevated levels of DDT (>20 ppm) and hydrocarbons (1994 ppm) were detected in the subsurface soil at PAI-55-SO14A; therefore, PAI-55-SO14B was advanced. Elevated levels of DDT and hydrocarbons were detected in the surface (DDT 0.2 to 1 ppm) and subsurface soil (DDT > 20 ppm, TPH > 500 ppm) at PAI-55-SO14B; therefore, PAI-55-SO14C was advanced. No elevated concentrations were found at this location.

Elevated levels of DDT and hydrocarbons were detected in both the surface (hydrocarbons off scale) and subsurface soil (DDT > 20 ppm) at PAI-55-SO17; therefore, PAI-55-SO17A was advanced. Elevated levels of DDT were detected at the surface (1-10 ppm) at PAI-55-SO17A; therefore, an additional surface soil sample at PAI-55-SO17B was collected. Elevated levels of DDT (1 to 10 ppm) were still detected at the surface at PAI-55-SO17B; therefore, two additional surface soil samples (PAI-55-SO17C and PAI-55-SO17D) were collected and sent to the laboratory for analysis.

Elevated levels of DDT were detected in both the surface (1 to 10 ppm) and subsurface soil (0.4-2 ppm) at PAI-55-SO18; therefore, PAI-55-SO18A was advanced. No elevated concentrations were found at this location.

All soil screening tools were used in accordance with manufacturers' specifications.

3.3.4 Temporary Monitoring Well Installation

Phase I

Twenty-six temporary wells (12 shallow wells, 13 intermediate wells, and 1 deep well) were installed at 14 locations as a part of the Phase I RI field activities in September 2007. The temporary monitoring wells were installed in accordance with the state of South Carolina's well requirements. Figure 3-1 shows the locations of the temporary monitoring wells installed at Sites 27 and 55 in September 2007. Table 3-2 provides construction details for the wells.

The temporary monitoring wells installed during Phase I were completed using DPT methods. The wells were constructed with certified-clean well construction material (1-inch Schedule 40, flush-threaded, PVC well screen and compatibly threaded PVC well casing) and installed within a 3.25-inch-diameter outer casing using a Geoprobe Dual Tube Sample System. The PVC used in the wells meets National Sanitation Foundation (NSF) Standard 14 as specified in the USEPA Region 9 Environmental Investigations Standard Operating Procedure and Quality Assurance Manual (EISOPQAM) (1996b). The screens for the monitoring wells were 5 feet long with 0.010-inch openings and were installed so that the well screens straddled the water table. The shallow temporary monitoring wells were screened within the 6 to 14.5 feet bgs interval. The intermediate temporary monitoring wells were screened just on top of the clay unit delineated during earlier investigations at approximately 24 to 25 feet bgs (all wells screened within the 18 to 25 feet bgs range). The deep temporary monitoring well was screened at 29 to 34 feet bgs (below a 1-foot-thick clay layer at 24 feet bgs). The temporary wells were not developed before groundwater sampling began. Once sampling was completed the temporary wells were abandoned.

Phase III

Four temporary monitoring wells (PAI-27-TW65S, PAI-27-TW66I, PAI-27-TW67S, and PAI-27-TW68I) were installed in August 2010 during the Phase III field investigation, as shown on Figure 3-1. Monitoring well construction information is summarized in Table 3-2. DPT was used to install these monitoring wells. The four monitoring wells were advanced to 10, 10, 26.5 and 27 feet bgs, respectively.

All temporary wells installed in 2010 were constructed with certified-clean well construction material (1-inch Schedule 40, flush-threaded, PVC well screen and compatibly threaded PVC well casing). The PVC used in the wells meets NSF Standard 14 as specified in the USEPA Region 9 EISOPQAM (1996b). The screens for the monitoring wells were 5 feet long with 0.010-inch openings and were installed so that the well screens straddled the water table. The risers were then installed so that they extended approximately 1 foot above the ground surface.

A primary filter pack of clean silica sand (No. 2 sand) was installed flush with the bottom of the well to a minimum of 1 foot above the top of the well screen. A minimum 1-foot-thick seal of 100 percent sodium bentonite pellets was installed above the primary filter pack and allowed to hydrate in accordance with the manufacturer's recommendations. Prior to sampling, the well was developed by removing a volume of water much higher than a normal sampling rate to remove fine particulates and pull water through the sand pack.

ARM Environmental Services Inc., a licensed South Carolina driller, installed the four temporary monitoring wells at the site, with oversight by Tetra Tech field personnel.

Boring logs, well construction sheets, and sample log sheets are provided in Appendix C.

3.3.5 Permanent Monitoring Well Installation

Twenty-one permanent monitoring wells were installed as part of the Preliminary Assessment/ Confirmatory Sampling efforts in 2002 and 2003. Information regarding the well installation has been reported in the Preliminary Assessment/Site Inspection and Confirmatory Sampling Report for Site/SWMU 55 Fiber Optic Vault (Tetra Tech, 2004). These wells have been sampled during various phases of the RI. Well construction details are included in Table 3-2.

Phase II

Seventeen permanent monitoring wells (PAI-27-MW48I, PAI-27-MW49S, PAI-27-MW50I, PAI-27-MW51S, PAI-27-MW52I, PAI-27-MW53S, PAI-27-MW54I, PAI-27-MW55S, PAI-27-MW56I, PAI-27-MW57S, PAI-27-MW58S, PAI-27-MW59I, PAI-27-MW60I, PAI-27-MW61I, PAI-27-MW62S, PAI-27-MW63S, PAI-27-MW64S) were installed at Sites 27 and 55 as part of the Phase II RI field activities in August 2008. The permanent monitoring wells were installed in accordance with South Carolina well requirements by a licensed South Carolina driller employed by Vironex. The nine shallow wells were installed to bottom depths ranging from 12 to 13 feet bgs with 9- to 10-foot screened intervals. The bottom depths of the eight intermediate wells ranged from 19 to 25 feet bgs with 5-foot screened intervals. The locations of the permanent monitoring wells are shown on Figure 3-1. Table 3-2 provides the construction details for the permanent monitoring wells installed during Phase II, as well as the construction details for the existing permanent monitoring wells.

The 17 permanent wells were installed using a DPT rig equipped with 4.25-inch inside diameter (ID) hollow-stem augers, which were used to bore to the desired depth. The monitoring wells were installed through the augers upon completion of each boring. During monitoring well installation, soil samples were collected continuously to the termination depth of the borings to provide lithologic data. Soil

samples were collected for logging purposes using a 2-inch-diameter, 5-foot-long sampler in the eight intermediate wells and in the shallow wells not clustered with intermediate wells (shallow wells clustered with intermediate wells were not logged for lithology). Potable water was used to fill the augers during drilling to prevent sand from flowing into the augers or, when necessary, to remove a sand bridge created during installation of the sand pack.

All wells were constructed with certified-clean well construction material. Monitoring wells were constructed of 2-inch ID, flush-threaded PVC well screen and flush-threaded PVC well casing riser. The PVC met NSF Standard 14 as specified in USEPA's EISOPQAM (1996b). All shallow wells were constructed with 10-foot screens with 0.010-inch slot-size openings [PAI-27MW-58S had a 9-foot screen (see section 3.5.1)]. The intermediate wells were constructed with 5-foot screens with 0.010-inch slot-size openings. Well screen lengths were selected so that the screened intervals of the shallow and intermediate wells within a cluster did not overlap.

A primary filter pack of clean silica sand [No. 1 sand (fine)] was installed from 6 inches below the bottom of the screen to a minimum of 2 feet above the top of the well screen. A minimum 2-foot-thick seal of 100 percent sodium bentonite pellets was installed above the primary filter pack and allowed to hydrate in accordance with the manufacturer's recommendations. The annular space above the bentonite seal was grouted with neat cement or a bentonite/cement mixture from the top of the bentonite seal to at least 2 feet bgs. The concrete used to form the pad filled the remaining annular space.

Nine monitoring wells (PAI-27-MW48I, PAI-27-MW51S, PAI-27-MW52I, PAI-27-MW55S, PAI-27-MW56I, PAI-27-MW60I, PAI-27-MW62S, PAI-27-MW63S, and PAI-27-MW64S) were installed with risers and protective casings, whereas eight monitoring wells (PAI-27-MW49S, PAI-27-MW50I, PAI-27-MW53S, PAI-27-MW54I, PAI-27-MW57S, PAI-27-MW58S, PAI-27-MW59I, and PAI-27-MW61I) were installed as at-grade (flush-mount) wells.

Once installed, the groundwater monitoring wells were developed using a surge block and submersible pump. The surge block was used to sweep the screen interval (and filter pack) several times throughout the development process. The development water was pumped into 55-gallon drums and labeled as IDW. Water was collected during development for water quality measurement; a Horiba U-10 water quality meter was used in the field to measure temperature, specific conductance, pH, salinity, dissolved oxygen (DO), and turbidity. The wells were developed until the monitored parameters stabilized in accordance with the Work Plan Addendum (Tetra Tech, 2008). A target turbidity of 10 Nephelometric Turbidity Units (NTUs) was used in an attempt to reduce the turbidity as much as possible during the development phase. Time pumped, volume of water pumped, and the turbidity of the water were all used to determine whether development was complete when stabilization had been achieved.

Boring logs for the permanent monitoring wells installed during Phase II of the RI are provided in Appendix C-8, well construction sheets for the permanent monitoring wells are provided in Appendix C-9, and monitoring well development records for the permanent monitoring wells installed during Phase II are included in Appendix C-11.

3.3.6 Groundwater Sampling

Groundwater sampling was performed in all three phases of the RI (September 2007, August 2008, and August 2010). During the first phase of the RI (September 2007), groundwater samples were collected from nine permanent monitoring wells installed in December 2002 and from the 26 temporary monitoring wells installed during the September 2007 field activities. During Phase II of the RI conducted in August 2008, groundwater samples were collected from 19 existing permanent monitoring wells (installed in December 2002) and 17 new permanent monitoring wells (installed in August 2008).

The analytical results from the Phase I, II, and III RI groundwater sampling (temporary monitoring wells and permanent monitoring wells) are provided in Appendix D.

3.3.6.1 Temporary Monitoring Well Sampling

Phase I

Groundwater sampling of the temporary monitoring wells was performed in September 2007 using a peristaltic pump and pre-cleaned disposable polyethylene tubing. The tubing was lowered in the temporary well to approximately the midpoint of the well screen. The wells were then purged in accordance with the low-flow sampling techniques specified in the approved work plan (Tetra Tech, 2007). Water-level data and water-quality parameters (pH, specific conductivity, temperature, turbidity, DO, and salinity) were collected during purging of the temporary monitoring wells and recorded on Groundwater Sample Log Sheets. The groundwater sample from each well was collected by reducing the flow to minimize volatilization of the sample and collecting the sample in the appropriate containers directly from the tubing after it passed through the peristaltic pump. The groundwater samples from the temporary monitoring wells were shipped to the laboratory for analysis [VOCs, SVOCs, pesticides, and PCBs (two wells only)]. Groundwater Sample Log Sheets for the temporary monitoring wells sampled in September 2007 are provided in Appendix C-12.

Phase III

Groundwater sampling of the temporary monitoring wells was performed in August 2010 using a peristaltic pump and pre-cleaned disposable polyethylene tubing. The tubing was lowered in the temporary well to approximately the midpoint of the well screen. The wells were then purged in

accordance with the low-flow sampling techniques specified in the approved work plan (Tetra Tech, 2010b). Water-level data and water-quality parameters (pH, specific conductivity, temperature, turbidity, DO, and salinity) were collected during purging of the temporary monitoring wells and recorded on Groundwater Sample Log Sheets. The groundwater sample from each well was collected by reducing the flow to minimize volatilization of the sample and collecting the sample in the appropriate containers directly from the tubing after it passed through the peristaltic pump. The groundwater samples from the temporary monitoring wells were shipped to the laboratory for analysis (VOCs, SVOCs, pesticides, PCBs, metals, TOC, TDS and Alkalinity). Groundwater Sample Log Sheets for the temporary monitoring wells sampled in August 2010 are provided in Appendix C-15.

3.3.6.2 Permanent Monitoring Well Sampling

Nine groundwater samples were collected from existing permanent monitoring wells during September 2007 (Phase I). During Phase II of the RI in August 2008, groundwater samples were collected from 36 permanent monitoring wells [19 existing and 17 new (August 2008) permanent monitoring wells]. During Phase III of the RI in August 2010, groundwater samples were collected from 36 existing permanent monitoring wells.

Groundwater sampling for the permanent wells was similar to that of the temporary wells. Peristaltic pumps with pre-cleaned dedicated Teflon® tubing were used to purge the monitoring wells. Prior to purging, the intake of the Teflon tubing was placed approximately between the midpoint of the screen and the bottom of the hole, or at the center of the water column if the water level was below the top of the screen. Purging was performed using the low-flow technique described in the Work Plan (Tetra Tech, 2007), the Work Plan Addendum (Tetra Tech, 2008), and the Sampling and Analysis Plan (Tetra Tech, 2010b). The wells were purged in an effort to lower the turbidity to less than the benchmark of 10 NTUs.

Water-level data and water-quality parameters [pH, specific conductivity, temperature, turbidity, DO, salinity, and oxidation-reduction potential (ORP)] were collected during purging of the permanent monitoring wells and recorded on Low-Flow Purge Data Sheets and Groundwater Sample Log Sheets. The groundwater sample from each well was collected by reducing the flow to minimize volatilization of the sample and collecting the sample in the appropriate containers directly from the tubing after it passed through the peristaltic pump. The groundwater samples were shipped to the laboratory for analysis (September 2007 - VOCs, SVOCs, and pesticides; August 2008 - VOCs, pesticides, TOC, and pH; and August 2010 – VOCs, SVOCs, pesticides, PCBs, metals, TOC, TDS and Alkalinity).

Groundwater Sample Log Sheets and Low Flow Purge Data Sheets for the permanent monitoring wells sampled in September 2007 (Phase I) are provided in Appendix C-13, the Groundwater Sample Log

Sheets and Low Flow Purge Data Sheets for the permanent monitoring wells sampled in August 2008 (Phase II) are provided in Appendix C-14, and the Groundwater Sample Log Sheets and Low Flow Purge Data Sheets for permanent monitoring wells sampled in August 2010 (Phase III) are provided in Appendix C-15.

3.3.7 Product Sampling

A hydrocarbon product of undetermined origin was noted on top of the groundwater in monitoring well PAI-27-MW11S during Phase II of the RI in August 2008. A sample of this product was collected using a peristaltic pump and pre-cleaned Teflon tubing. The tubing was attached to the hydrocarbon interface probe and lowered into the well until the tubing was in the center of the product layer within the well. The sample was collected in the appropriate containers directly from the tubing after it passed through the peristaltic pump. The sample was sent to the laboratory for analysis (VOCs, SVOCs, pesticides, PCBs, and metals). The analytical results for the hydrocarbon product sampled during the Phase II RI are provided in Table 3-11 and Appendix D-7.

3.3.8 Water-Level Measurements

Phase I

Following installation of the temporary monitoring wells in September 2007 during Phase I of the RI, one round of synoptic water-level measurements was collected from existing permanent monitoring wells and the temporary monitoring wells to determine groundwater flow directions. Water-level measurements were taken on September 26, 2007 with a water-level indicator using the top of the well riser as the reference point for determining depths to water. Water-level measurements were recorded to the nearest 0.01 foot in the field logbook. Floating product was not detected during this round of water-level measurements. Table 3-3 provides the groundwater levels measured during Phase I of the RI.

Phase II

Two rounds of synoptic water-level measurements were collected in August 2008 during Phase II of the RI from existing and new (installed during Phase II) permanent monitoring wells. One round was collected August 18, 2008 between 0930 and 1105 (high tide) and the second round was collected August 18, 2008 between 1535 and 1723 (low tide). Water-level measurements were taken with a hydrocarbon interface probe using the top of the well riser as the reference point. Water-level measurements were recorded to the nearest 0.01 foot on groundwater level measurement sheets. Floating product was noted at one location (PAI-27-MW11S) during both of these two rounds of water-level measurements. Table 3-3 provides the groundwater levels measured during Phase II of the RI. Please note that several wells are incorrectly identified in the water-level measurement forms from 2008

presented in Appendix C-16. Wells identified as PI055MWXX where XX signifies the monitoring well number actually correspond to monitoring wells PAI-27-MWXX.

Phase III

Following installation of the temporary monitoring wells in August 2010 during Phase III of the RI, one round of synoptic water-level measurements was collected from existing permanent monitoring wells and the temporary monitoring wells to determine groundwater flow directions. Water-level measurements were taken on August 8, 2010 with a water-level indicator using the top of the well riser as the reference point for determining depths to water. Water-level measurements were recorded to the nearest 0.01 foot on groundwater level measurement sheets. Floating product was noted at one location (PAI-27-MW11S) during this round of water-level measurements. Table 3-3 provides the groundwater levels measured during Phase III of the RI.

Groundwater Level Measurement Sheets for Phase I, Phase II, and Phase III of the RI are included in Appendix C-16.

Additional water-level measurements were taken during well development, sampling, and hydraulic testing activities.

3.3.9 Sample Handling, Packaging, and Shipping

This section of the RI identifies the general procedures for storing and transferring collected samples.

3.3.9.1 Sampling Handling

The following subsections describe the precautions taken to ensure that sample integrity was maintained throughout the sample collection and shipping processes. Each sample was divided among the required number of containers. Each container of a particular sample was specific to the analysis of one or more analyte groups (fractions). Sample collection followed a logical sequence to ensure that the more volatile components of samples were not lost during sample handling or that losses were minimized. For example, samples for VOCs were collected first and containerized immediately after collection to prevent or minimize losses from volatilization. Samples for VOC analyses were also handled in a way that minimized agitation or disturbance, again to prevent loss of VOCs. In general, sample fractions were containerized in the following sequence: VOCs, TOC, SVOCs, PAH-SIM, pesticides, PCBs, pH, metals, TDS, and alkalinity.

Sample nomenclature was governed by the Phase I and II Work Plan (Tetra Tech, 2007), Phase II Work Plan Addendum (Tetra Tech, 2008), and the Phase III SAP (Tetra Tech, 2010b). Samples were shipped in coolers via air courier (e.g. Federal Express) to CompuChem Laboratories in Cary, North Carolina. Samples were associated into sample delivery groups (SDGs). An SDG is compiled in the chronological sequence in which the samples were received at the laboratory over a period of up to 20 days. Additional details concerning various aspects of sample handling are provided below.

3.3.9.2 Sample Preservation

Preservation requirements for samples for each of the analytes of interest were provided in the Phase I and II Work Plan (Tetra Tech, 2007), Phase II Work Plan Addendum (Tetra Tech, 2008), and the Phase III SAP (Tetra Tech, 2010b). Sample bottles for aqueous samples contained the proper amounts and types of preservatives prior to being shipped to MCRD Parris Island. The samples were promptly chilled with ice to 4±2 degrees Celsius (°C) and packaged in an insulated cooler. Each cooler included a temperature blank. The samples and ice were sealed in heavy-duty plastic bags to prevent water leakage.

3.3.9.3 Sample Labeling

Sample labels were written out in real time during sample collection. Before samples were packaged, the sample labels were checked to make sure that the information on the label was complete and correct. This information was also checked against the information on the sample collection log sheet and the chain-of-custody form.

3.3.9.4 Sample Packaging

Each sample container was placed in a re-sealable bag to prevent cross-contamination or leakage. The re-sealable bag was then placed in a bubble-wrap sleeve to protect it from breakage. Only shipping containers that met minimum packaging requirements of 49 Code of Federal Regulations 174 for safe shipment were used. Ice was then placed around and between the samples in sufficient quantity to chill the samples to 4±2°C during transport to the analytical laboratory.

The completed field chain-of-custody form was signed, placed in a sealed plastic envelope, and taped to the top inside cover of the shipping container. Appendix C-1 includes copies of the completed chain-of-custody forms. The Field Operations Leader was responsible for completion of the following items:

- Sample labels
- Chain-of-custody forms
- Custody seals for coolers

- Shipping labels for coolers
- Express mail air bills

3.3.9.5 Sample Shipping

Shipping containers (i.e., coolers) were sealed with nylon strapping tape, and custody seals were signed, dated, and affixed in a manner that would allow the receiver to identify tampering that may have occurred during transport to the laboratory.

Shipments were made by Federal Express in a timely manner in order for the laboratory to analyze samples within the established holding times. Copies of the air bills were retained by the Field Operations Leader and assigned to the chain of custody for tracking purposes, if needed, and for communications with the laboratory.

3.3.10 Slug Tests

During Phase II of the RI (August 2008), slug tests were performed in 24 monitoring wells. Rising-head slug tests were performed in the monitoring wells as multiple well screens straddled the water table. To obtain accurate results, the slug tests were conducted after the monitoring wells installed during Phase II had been thoroughly developed and allowed to stabilize. The slug tests were performed by inserting a PVC 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 drop of water level within the well. A Level TROLL 700 pressure transducer and a data logger were used to record the rate of water-level recovery. Detailed results of these slug tests are described in Section 3.8 – Site Specific Hydrogeology.

3.3.11 Surveying

The locations of the soil borings and temporary monitoring wells installed at Sites 27 and 55 area during Phase I of the RI (September 2007), the locations of the permanent monitoring wells installed in 2002 and sampled during Phase I of the RI (September 2007), and the locations of the soil borings and new permanent monitoring wells installed in the Site 27 area during Phase II of the RI (August 2008) were surveyed for horizontal and vertical control by Palmetto Land Surveying, Inc., of Charleston, South Carolina (South Carolina licensed), in accordance with the Work Plan (Tetra Tech, 2007) and Work Plan Addendum (Tetra Tech, 2008). The soil boring and temporary monitoring well locations installed during the Phase III field effort were surveyed for horizontal and vertical control by Palmetto Land Surveying (South Carolina licensed) in accordance with the SAP (Tetra Tech, 2010b). All surveyed locations were surveyed horizontally to the nearest 0.10 foot. The top of riser and the ground surface elevation adjacent to the PVC at each temporary monitoring well location were surveyed to within 0.01-foot vertical accuracy.

The North American Datum (NAD) 1983 was used as the horizontal datum and the sample locations were surveyed to the nearest 0.10 foot. Vertical elevations were referenced to 1988 National Geodetic Vertical Datum (NGVD). The elevations for the monitoring wells were measured at the notch in the uncapped PVC well riser pipe and at the top of the protective casing to the nearest 0.01 foot. For all sample locations, including monitoring wells, ground surface elevations were surveyed to the nearest 0.01 foot. The survey information was entered into the Geographic Information System (GIS) for MCRD Parris Island.

As noted above, several of the permanent monitoring wells installed in 2002, which were not surveyed by a licensed surveyor when they were installed, were surveyed in 2007 by Palmetto Land Surveying. The ground elevations and top of riser elevations for these monitoring wells varied slightly from the information previously reported for these wells. Consequently, the groundwater elevations for those monitoring wells installed in 2002 that were not surveyed in 2007 are approximate.

Survey records are provided in Appendix C-22.

3.3.12 Investigation-Derived Waste

During the three phases of the RI, soil cuttings, decontamination, development, and purge waters were transferred to 55 gallon drums and staged on site. These were tested, found to be nonhazardous, and sent off-site for disposal in a nonhazardous landfill. All IDW was handled in accordance with the Master Work Plan (Tetra Tech, 2001), the Work Plan (Tetra Tech, 2007), the Work Plan Addendum (Tetra Tech, 2008) and the SAP (Tetra Tech, 2010b).

3.3.13 Well Abandonment

Phase I

Twenty-six temporary monitoring wells sampled during Phase I were subsequently abandoned. Vironex, a South Carolina licensed driller, performed the well abandonment according to South Carolina state regulations and provided Water Well Records [(form *DHEC 1903 (07/2003*),, provided in Appendix C-10]. Temporary well points were removed, and all wells were backfilled with bentonite grout using a tremie pipe to ensure the location was sealed from the bottom of the well to the ground surface.

Phase III

Because construction was planned to begin at Site 27, the four temporary monitoring wells (PAI-27-TW-65S, PAI-27-TW-66I, PAI-27-TW-67S, and PAI-27-TW-68I) that had been installed and then sampled as part of the Phase III investigation as well as two permanent monitoring wells (PAI-27-MW17S and PAI-27-MW18I) were abandoned in August 2010. ARM Environmental Services, Inc., a South Carolina licensed driller, performed the well abandonment according to South Carolina state regulations and provided Water Well Records [form *DHEC 1903 (07/2003*)], provided in Appendix C-10. Temporary well points were removed then all wells were backfilled with bentonite grout utilizing a tremie pipe to ensure the location was sealed from the bottom of the well to the ground surface.

3.3.14 Soil Boring Abandonment

All soil borings that were advanced during the three phases of the RI went below the water table; therefore, abandonment of the soil borings was completed in the same manner as well abandonment. Phase I and II soil borings were abandoned by Vironex and Phase III soil borings were abandoned by ARM Environmental Services, Inc. Both are licensed South Carolina drillers and performed the soil boring abandonment according to South Carolina state regulations and provided Water Well Records [form *DHEC 1903 (07/2003]*), provided in Appendix C-10.

3.4 FIELD INVESTIGATIONS – SITES 9 AND 16

The following sections discuss the activities performed during the field investigation at Sites 9 and 16, the Paint Waste Storage Area and Pesticide Rinsate Disposal Area, respectively, including surface and subsurface soil sampling, groundwater sampling, temporary monitoring well installation, groundwater level measurements, and IDW management. The activities were conducted to meet requirements of the SAP for Sites 9, 16, and 55 (Tetra Tech, 2010c). The field activities followed Tetra Tech SOPs provided in the SAP Appendix D.

3.4.1 Direct Push Technology Drilling/Sampling

Surface and subsurface soil samples were collected to provide information on the horizontal and vertical movement of constituents from Sites 9 and 16. A total of seven soil borings (Figure 3-1) were advanced. Most soil boring depths were advanced to 5 feet bgs. Where temporary well points were installed, borings were advanced to 10 and 20 feet bgs.

DPT methods were used to drill the borings. This technique involves pushing tools hydraulically or mechanically into the ground to the desired depth. This method was used to collect both surface and

subsurface soil samples at various locations throughout Sites 9 and 16. The soil samples were collected in 1.5-inch ID, 5-foot-long acetate liners. All soil cuttings were placed in 55-gallon drums labeled as soil cuttings. A composite sample was prepared for the laboratory from the soil cuttings to characterize this waste for appropriate disposal.

3.4.2 Surface and Subsurface Soil Sample Handling/Analysis

A summary of the soil samples collected and analyses performed is presented in Table 3-1. Upon sample retrieval, each soil core was screened for the presence of volatile organics with a PID (calibrated to 100 ppm isobutylene) and visually classified for lithology, soil moisture, and other pertinent observations. Soil boring logs were created and copies are provided in Appendix C-19. The soil fractions to be analyzed for VOCs were collected first using Terra Core samplers and placed in a cooler of ice maintained at 4 degrees Centigrade (°C). The soil fractions to be analyzed for SVOCs, PAH-SIM, pesticides, PCBs, metals, pH, and TOC was mixed, placed into the required containers, immediately sealed, and placed in a cooler at 4°C. The 5-foot-long clear acetate sleeves were cleaned of soil and disposed as non-hazardous, municipal trash. Soil sample log sheets were created and copies are provided in Appendix C-19.

The soil samples were shipped to CompuChem Laboratories in Cary, North Carolina, for chemical analysis (see Section 3.4.7 for additional information on sample handling, packaging, and shipping procedures). Validated laboratory data memoranda are provided in Appendix D-17. Analytical results are provided in Appendix D-11 (surface soil) and Appendix D-12 (subsurface soil).

3.4.2.1 On-site Soil Sample Analysis and Step-out Decisions

On-site analytical screening tools were used for soil samples collected at Sites 9 and 16. Surface sample step-out locations PAI-9/16-SO02A, PAI-9/16-SO02B, PAI-9/16-SO04B, and PAI-9/16-SO04C were sent directly to the laboratory for analysis. On-site screening tools were: PID, Oil-in-Soil TM test kits, TPH PetroFLAG test kits, DDT test kits, and the FLUTe liner (Table 3-8 and 3-9). These screening tools were used to assist in both vertical and horizontal delineation at Sites 9 and 16 and followed the same process as described in Section 3.3.3. This sampling was completed concurrently with the field screening that was completed at Sites 27 and 55 in August 2010.

If any of the field measured constituents were detected with the field test kits, a step-out boring was advanced 50 feet from the original unless that location fell within 25 feet of an already established soil boring location. For hydrocarbon results, background was estimated for surface and subsurface conditions separately based on the lowest value from locations on the western portion of the site considered to be background locations. To calculate a background concentration, the lowest test kit

value (PAI-27-SO33, PAI-27-SO34, and PAI-27-SO35) were multiplied by 10. The 10 times value for borings PAI-27-SO33, PAI-27-SO34, and PAI-27-SO35 were then averaged to calculate the background concentration. Estimated hydrocarbon values of 2000 ppm for surface and 1000 ppm for subsurface were conservatively used to provide an estimate of what could be considered a high concentration in comparison to background. This information was used with the other test kit results to select samples for laboratory analysis.

Seven step-out surface soil samples were collected based on on-site analytical detected levels of DDT. One step-out sample was collected to the east of PAI-9/16-SO05 (PAI-9/16-SO05A) and PAI-9/16-SO06 (PAI-9/16-SO06A). The results from the step-out samples did not indicate detectable levels of DDT; therefore, no further step-out samples were collected. Two step-out samples were collected to the southwest of PAI-9/16-SO02 (PAI-9/16-SO02A and PAI-9/16-SO02B). These samples were sent directly to the laboratory for analysis. Three step-out locations were collected east of PAI-9/16-SO04 (PAI-9/16-SO04A, PAI-9/16-SO04B, PAI-9/16-SO04B, and PA-9/16-SO04C). The first two of these samples PAI-9/16-SO04 and PAI-9/16-SO04A were analyzed on site and measurable concentrations of DDT were reported. Based on these result two additional step-outs (PAI-9/16-SO04B and PAI-9/16-SO04C) were collected and sent directly to the laboratory for analysis. Soil screening tools were used in accordance with their manufactures specifications.

3.4.3 Temporary Well Drilling and Installation

Four temporary monitoring wells (PAI-9/16-TW01S, PAI-9/16-TW02I, PAI-9/16-TW03S and PAI-9/16-TW04I) were installed at Sites 9 and 16 during this investigation as shown on Figure 3-1. A summary of the monitoring well construction information can be found in Table 3-2. DPT was used for monitoring well installation. The depths of the four monitoring wells were 10, 10, 20, and 20 feet bgs.

All temporary wells installed at Sites 9 and 16 in 2010 were constructed with certified-clean well construction material (1-inch Schedule 40, flush-threaded, PVC well screen and compatibly threaded PVC well casing). The PVC used in the wells meets NSF Standard 14 as specified in the USEPA Region 9 EISOPQAM (1996b). The screens for the monitoring wells were 5 feet long with 0.010-inch openings and were installed so that the well screens straddled the water table. The risers were then installed so that they extended approximately 1 foot above the ground surface.

A primary filter pack of clean silica sand (No. 2 sand) was installed flush with the bottom of the well to a minimum of 1 foot above the top of the well screen. A minimum 1-foot-thick seal of 100 percent sodium bentonite pellets was installed above the primary filter pack and allowed to hydrate in accordance with the manufacturer's recommendations. Prior to sampling, the well was developed by removing a volume of

water much higher than a normal sampling rate to remove fine particulates and pull water through the sand pack.

ARM Environmental Services Inc., a South Carolina licensed driller, installed the four temporary monitoring wells at the site, with oversight by Tetra Tech field personnel. Boring logs, well construction diagrams, and well permits are provided in Appendix C.

3.4.4 Permanent Monitoring Well Installation

In September 2011, two permanent monitoring wells were installed at Sites 9 and 16 (PAI-9/16-MW05S and PAI-9/16-MW06I) as shown on Figure 3-1. The permanent monitoring wells were installed in accordance with South Carolina well requirements by a South Carolina licensed driller (ARM Environmental Services). The shallow well (PAI-9/16-MW05S) was installed to a depth of 17 feet with a 10-foot well screen. The bottom depth of the intermediate well (PAI-9/16-MW06I) was 22 feet bgs with 10-foot well screen. Table 3-2 provides the construction details for the permanent monitoring wells installed at Sites 9 and 16, as well as the construction details for the existing permanent monitoring wells.

The two permanent wells were installed using a DPT rig equipped with 4.25-inch ID hollow-stem augers, which were used to bore to the desired depth. During monitoring well installation, soil samples were collected continuously to the termination depth of the borings to provide lithologic data. Soil samples were collected for logging purposes using a 2-inch-diameter, 5-foot-long sampler from intermediate well (since the shallow well was installed in a location adjacent to the intermediate well it was not logged separately for lithology). The monitoring wells were installed through the augers upon completion of each boring.

All wells were constructed with certified-clean well construction material. Monitoring wells were constructed of 2-inch ID, flush-threaded PVC well screen and flush-threaded PVC well casing riser. The PVC met NSF Standard 14 as specified in USEPA's EISOPQAM (1996b). The wells were constructed with 10-foot screens with 0.010-inch slot-size openings.

A primary filter pack of clean silica sand (No. 2 sand fine) was installed from 6 inches below the bottom of the screen to a minimum of 2 feet above the top of the well screen. A minimum 2-feet-thick seal of 100 percent sodium bentonite pellets was installed above the primary filter pack and allowed to hydrate in accordance with the manufacturer's recommendations. The annular space above the bentonite seal was grouted with neat cement or a bentonite/cement mixture from the top of the bentonite seal to at least 2 feet bgs. The concrete used to form the pad filled the remaining annular space. The wells were installed as at-grade (flush-mount).

Once installed, the groundwater monitoring wells were developed using a submersible pump. The pump was used to sweep the screen during the development process to remove fine materials. The development water was pumped into 55-gallon drums and labeled as IDW. Water was collected during development for water quality measurement; a Horiba U-52 water quality meter was used in the field to measure temperature, specific conductance, pH, salinity, DO, and turbidity. The wells were developed until the monitored parameters stabilized in accordance with the Sites 9, 16 and 55 Sample and Analysis Plan (Tetra Tech, 2010c). A target turbidity of 10 NTUs was used in an attempt to reduce the turbidity as much as possible during the development phase. Time pumped, volume of water pumped, and the turbidity of the water was used to determine whether development was complete when stabilization had been achieved.

Appendix C-20 contains permanent monitoring well construction sheets. Appendix C-21 contains monitoring well development records.

3.4.5 Groundwater Level Measurements

In 2010, one round of synoptic water level measurements was collected from all temporary monitoring wells at the site to determine static water potentiometric water surface elevations for shallow groundwater. The synoptic measurements were collected within a 24-hour period of consistent weather conditions to minimize atmospheric/precipitation effects on groundwater levels. Measurements were collected with an electrical water-oil interface probe (Solinist or equivalent) using the top of the well casing (i.e., riser pipe) as the reference point for determining the depth to water and LNAPL. Water level measurements were recorded to the nearest 0.01 foot on a groundwater level measurement form included in Appendix C-16.

In September 2011, a comprehensive round of water level measurements for wells not affected by construction activities at Site 27 was collected. Water level measurements were collected at Sites 9, 16, 27, and 55 in support of developing a potentiometric surface map for the September 2011 sampling effort at Sites 9 and 16.

3.4.6 Groundwater Sampling

Groundwater sampling of wells at Sites 9 and 16 occurred on August 7, 2010 and September 9, 2011 to determine the constituents that may be present at the Site. Table 3-1 provides a summary of the groundwater samples collected. The monitoring wells were purged and sampled using standard purging techniques (low flow) in accordance with the SAP Appendix D, SOP (Tetra Tech, 2010c). Using a peristaltic pump and dedicated polyethylene tubing, one to three screen casing volumes were purged from the well. Prior to purging, the intake of the sampling pump was placed at the approximate midpoint of the well screen or the midpoint of the water column present in the well and at least 2 feet from the

bottom of the well. Water quality parameters (pH, temperature, specific conductance, turbidity, and DO) were measured and recorded at 5- to 10-minute intervals. Measurements were collected until the parameters stabilized for at least three consecutive readings and the minimum purge volume (one screen volume) was removed. Stabilization of the above parameters was defined as follows:

- pH ± 0.2 standard unit
- Temperature ± 10%
- Turbidity less than 10 NTUs
- Specific conductance ± 10 percent

If the turbidity remained greater than 10 NTUs but the other field parameters stabilized, a filtered metal sample was collected in addition to the unfiltered metal sample. Purge water was containerized in 55-gallon drums and labeled IDW.

After the parameters stabilized and immediately prior to sampling, the temperature, pH, specific conductance, turbidity, and DO of the groundwater sample were measured and recorded on a Groundwater Sample Log Sheet. The sample containers were filled by allowing the pump discharge to flow with minimal turbulence down the inside of the container.

Groundwater Sample Log Sheets are provided in Appendix C-19. The results of the groundwater sample analysis are presented in Section 4. Analytic results are presented in Appendix D-13.

3.4.7 Sample Handling, Packaging, and Shipping

This section of the RI identifies the general procedures for storing and transferring collected samples.

3.4.7.1 Sampling Handling

The following subsections describe the precautions taken to make sure that sample integrity was maintained throughout the sample collection and shipping processes. Each sample was divided among three to four containers. Each container of a particular sample was specific to the analysis of one or more analyte groups (fractions). Sample collection followed a logical sequence to make sure that the more volatile components of samples were not lost or that losses were minimized during sample handling. For example, samples for VOCs were collected first and containerized immediately after collection to prevent or minimize losses from volatilization. Samples for VOC analyses were also handled in a way that minimized agitation or disturbance, again to prevent loss of VOCs. Aqueous VOC samples did not have air bubbles in them after containerization (no head space). In general, sample fractions were

containerized in the following sequence: VOCs, TOC, SVOC, PAH-SIM, pesticides, PCB, pH, metals, TDS and alkalinity.

Sample nomenclature was governed by the SAP (Tetra Tech, 2010c). Samples were shipped in coolers via air courier (e.g. Federal Express) to CompuChem Laboratories in Cary, North Carolina. Samples were associated into SDGs. An SDG is compiled in the chronological sequence in which the samples were received at the laboratory over a period of up to 20 days. Additional details concerning various aspects of sample handling are provided below.

3.4.7.2 Sample Preservation

Preservation requirements for samples for each of the analytes of interest were provided in Worksheet #19 of the SAP (Tetra Tech, 2010c). Sample bottles for aqueous samples contained the proper amounts and types of preservatives prior to being shipped to MCRD Parris Island. The samples were promptly chilled with ice to 4 ± 2°C and packaged in an insulated cooler. Each cooler included a temperature blank. The samples and ice were sealed in heavy-duty plastic bags to prevent water leakage.

3.4.7.3 Sample Labeling

Sample labels were written out in real time during sample collection. Before samples were packaged, the sample labels were checked to make sure that the information on the label was complete and correct. This information was also checked against the information on the sample collection log sheet and the chain-of-custody form.

3.4.7.4 Sample Packaging

Each sample container was placed in bubble-wrap sleeve to prevent from breakage. The bubble-wrapped sample container was then placed in a zip-lock bag to prevent cross-contamination and leakage. Only shipping containers that met minimum packaging requirements of 49 Code of Federal Regulations 174 for safe shipment were used. Ice was then placed around and between the samples in sufficient quantity to chill the samples to 4 ± 2 ^{o}C during transport to the analytical laboratory.

The completed field chain-of-custody form was signed, placed in a sealed plastic envelope, and taped to the top inside cover of the shipping container. Appendix C-1 includes copies of the completed chain-of-custody forms. The Field Operations Leader was responsible for completion of the following items:

- Sample labels

- Chain-of-custody forms
- Custody seals for coolers
- Shipping labels for coolers
- Express mail air bills

3.4.7.5 Sample Shipping

Shipping containers (i.e., coolers) were sealed with nylon strapping tape, and custody seals were signed, dated, and affixed in a manner that would allow the receiver to identify tampering that may have occurred during transport to the laboratory.

Shipments were made by Federal Express following completion of sample collection. Copies of the air bills were retained by the Field Operations Leader and assigned to the chain of custody for tracking purposes, if needed, and for communications with the laboratory.

3.4.8 Surveying

The soil boring locations at Sites 9 and 16 were surveyed for horizontal control by Palmetto Land Surveying (South Carolina licensed) in accordance with the SAP (Tetra Tech, 2010c). The temporary monitoring wells at Sites 9 and 16 were also surveyed for horizontal and vertical control. All surveyed locations were surveyed horizontally to the nearest 0.10 foot. The top of riser (where notched) and the ground surface elevation adjacent to the protective cover at each monitoring well location were surveyed to within 0.01-foot vertical accuracy. The horizontal data is referenced to the NAD 1983 and the vertical data is referenced to the North American Vertical Datum (NAVD) 88.

3.4.9 Investigation-Derived Waste

During the RI field activities, decontamination water, development water, purge water, and soil cuttings were containerized in 55-gallon drums and stored on site. Other IDW such as trowels, paper towels, etc. were double-bagged and placed in MCRD Parris Island trash receptacles (dumpsters). Following the investigation, composite soil and water samples were submitted for laboratory testing to characterize the waste for appropriate disposal via Toxicity Characteristic Leaching Procedure (TCLP) analysis. Completed Waste Profiles were signed and are provided in Appendix C-17. The IDW was handled in accordance with the SAP (Tetra Tech, 2010c). The drums were picked up, transported, and disposed by American Waste Processing of Maywood, Illinois.

3.4.10 Well Abandonment

Abandonment of the temporary monitoring wells occurred after wells were sampled in preparation for pending construction. ARM Environmental Services Inc., a licensed South Carolina driller, performed the well abandonment according to South Carolina state regulations and provided water well sealing forms, provided in Appendix C-10. Temporary well points were removed then all wells were backfilled with bentonite chips and hydrated in accordance with SCDHEC regulations.

3.5 DEVIATIONS FROM THE WORK PLAN

3.5.1 Site 27

The following deviation from the Phase I Work Plan (Tetra Tech, 2007) occurred during the Phase I Field Activities.

The work plan recommended that the screens for the shallow temporary monitoring wells be installed so that the screens straddled the water table. However, water level measurements collected after the water levels had stabilized following monitoring well installation indicated that the water levels rose to elevations above the zone that saturation was encountered.

The following deviations from the Phase II Work Plan Addendum (Tetra Tech, 2008) were noted during the Phase II Field Activities:

- The Work Plan Addendum indicated that exploratory borings at three locations (PAI-27MW57S, PAI-27MW49S, and PAI-27MW51S) were to be installed to approximately 35 feet bgs to provide additional lithologic information for the study area. However, during the August 2008 field investigation, adequate samples could not be recovered at depths greater than 25 to 30 feet, suggesting the borings did not extend to the clay layer previously encountered near 35 feet bgs.

- The location of the PAI-27MW53S/PAI-27MW54I cluster was moved 120 feet to the south because the original location was within an area of archeological concern (suspected burial area).

- The Work Plan Addendum called for the installation of well screens with 0.020 inch slot-sized openings and the use of sand passing U.S. Standard Sieve No. 20-40 in the new well installations. However, due to the presence of fine-grained material at the site, screens with 0.010 inch slot-sized openings and No. 1 (fine) sand were used for construction of the new monitoring wells. In addition, the Work Plan Addendum called for installation of 5-foot-long or 10-foot-long well screens. The well screen installed in PAI-27-MW58S was 9 feet long because the overall depth of the well was shallow

and did not allow the installation of a 10-foot-long well screen while maintaining the required thickness of the filter pack and bentonite seal.

- The Work Plan Addendum called for the sampling of groundwater from monitoring well PAI-27-MW09S. However, the well was dry at the time of sampling (obstruction in the well). This well was sample during the 2010 sampling event and no obstruction was observed at this time.

- Surface and subsurface soil samples were collected from three additional soil borings (PAI-27-SB030, PAI-27-SB031, and PAI-27-SB032) at the request of USEPA (boring locations are shown on Figure 3-1). The samples were analyzed for VOCs, pesticides, and TOC.

- A sample of a hydrocarbon product found on top of the groundwater was collected from monitoring well PAI-27MW11S (the sampling and analysis was not identified in the Work Plan Addendum).

The following deviations from the Phase III Work Plan (Tetra Tech, 2010b) occurred during the Phase III Field Activities:

- PAI-27-SO41 was moved approximately 20 feet to the east based on utility location.

- PAI-27-SO48 was added approximately 80 feet north of PAI-27-SO46 per request of USEPA.

- After further discussion, the USEPA recommended subsurface samples be collected below the clay smear zone. Therefore, most subsurface soil was collected from 8 to 10 feet bgs instead of 6 to 8 feet bgs.

- Select soil borings were advanced to 10 to 15 feet bgs instead of the anticipated 8 feet bgs based on field observations and USEPA recommendations.

- USEPA recommended temporary wells be screened across the clay zones instead of immediately above the clay zones.

3.5.2 Site 55

The following deviations from the Phase III Work Plan (Tetra Tech, 2010c) occurred during the Phase III Field Activities:

- PAI-55-SO18 was added approximately to the northeast corner of Site 55 per request of USEPA.

- After further discussion, the USEPA recommended subsurface samples be collected along the bottom of the clay smear zone where LNAPL may be trapped and/or smeared. Therefore, most subsurface soil samples were collected from 8 to 10 feet bgs instead of 6 to 8 feet bgs.

3.5.3 Sites 9 and 16

No deviations from the Sites 9, 16, and 55 Sampling and Analysis Plan (SAP) (Tetra Tech, 2010b) occurred during the field investigation at Sites 9 and 16.

3.6 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Tetra Tech established a quality control (QC) program to monitor and assess the quality of field work and laboratory work performed during environmental investigations. This program included various types of QC samples as indicated below. The field QC samples consisted of field duplicates, trip blanks, equipment rinsate blanks, source water blank, and temperature blanks. Temperature blanks were included in each cooler submitted to the laboratory to monitor sample storage conditions prior to arrival at the laboratory. Each type of field QC sample had the same preservation, analysis, and reporting procedures as the related environmental samples with the exception of temperature blanks. The log sheets for the quality assurance/quality control (QA/QC) samples are included in Appendix D-17. Laboratory QC samples consisted of laboratory control samples, laboratory duplicates, internal standards, laboratory method blanks, matrix spikes, matrix spike duplicates, equipment blank, source water blank, post digestion spikes, and surrogates. Katahdin Laboratories conducted the laboratory QC for the Phase I and II sampling effort at Sites 27 and 55 in accordance with the Work Plan (Tetra Tech, 2007) and Work Plan Addendum (Tetra Tech, 2008). CompuChem Laboratories conducted the laboratory QC for the Phase III Sites 27 and 55 RI and the Sites 9 and 16 RI in accordance with their respective SAP (Tetra Tech, 2010b, 2010c). Tetra Tech reviewed the laboratory QC during the data validation process and problems with data quality were discussed in the data validation memoranda provided in Appendix D-17.

3.7 SITE-SPECIFIC GEOLOGY

Sites 27 and 55

Geologic conditions in the area of Sites 27 and 55 were interpreted from data collected during the three phases of the RI, as well as data collected during the earlier investigations discussed in Section 1.0. Four geologic cross-sections were oriented through the Sites 27 and 55 as shown on Figure 3-2. The cross-sections are presented on Figures 3-3 and 3-4.

The surface conditions at Sites 27 and 55 are either grassy or paved with asphalt. The asphalt pad at Site 27 consists of approximately 3 to 4 inches of asphalt and gravel underlain by sand with varying organic content. The paved area around the FOV (Site 55) also consists of approximately 4 inches of asphalt and gravel underlain by sand.

The subsurface conditions of Sites 27 and 55 are generally uniform. Silty sand is present below the sites with clay layers occurring at shallow and deeper depths. A clay layer (0.5 to 3.5 feet thick) occurs at depths between approximately 2 feet bgs (at PAI-27-MW56I west of the Site 27 pad) to approximately 8 feet bgs (at PAI-27-TW-25I just south of the FOV). This clay layer was generally laterally continuous throughout the area, except for a few areas. This unit was not present in the area around PAI-27-TW-33S (Building 401) or approaching the 3rd Battalion Pond (not present in PAI-27-MW62S). The second laterally continuous clay unit (1.5 to 5 feet thick) occurs at approximately 24 to 25 feet bgs throughout Sites 27 and 55. This unit is not present in the area between PAI-27-TW-32I and PAI-27-TW-39S in the northern portion of the area. Silty clay was also encountered in the boring for the deep monitoring well PAI-27-MW08D at 36 feet bgs.

Sites 9 and 16

The subsurface in the area of Sites 9 and 16 were similar to Sites 27 and 55. The soils at Sites 9 and 16 consist of light brown to tan, fine to very fine silty sand underlain by the uppermost clay layer (occurring 4 to 8 feet bgs) and varies from 0.5 to 3 feet in thickness. Below the uppermost clay is a light brown/brown to orange, fine sand with discontinuous layers of sandy clay/clay that extends to approximately between 20 to 22 feet bgs where another gray clay approximately 2 feet thick was encountered. Below this clay layer was a gray, medium to fine sand with little clay and shell fragments to the end of the soil boring (25 feet bgs). The cross section A-A' is presented on Figure 3-5.

3.8 SITE-SPECIFIC HYDROGEOLOGY

Groundwater in the area of Sites 9, 16, 27, and 55 occurs in the surficial units, which is separated from the underlying regional Tertiary Floridan aquifer by the Hawthorn Formation, a confining unit that extends beneath MCRD Parris Island. The shallow groundwater in the surficial units discharges to on-site streams and tidal areas within the base. Therefore, contaminants within the surficial aquifer could discharge to these site streams and tidal areas, which ultimately discharge to the Beaufort and Broad Rivers, which flow into Port Royal Sound.

Groundwater was encountered in the silty sand units at the site to depths of approximately 36 feet bgs at Sites 9, 16, 27, and 55 areas. The laterally continuous clay units are interpreted to be low permeability units, limiting vertical groundwater flow. Groundwater appears to be under semi-confining conditions.

During the installation of temporary wells in 2007 and the permanent wells in 2008, groundwater was not encountered until the shallow clay layer had been penetrated, and then water levels in the wells rose to above this layer.

Sites 27 and 55

Table 3-3 summarizes water level measurements during the three phases of RI investigations at Sites 27 and 55. Figure 3-6 presents the potentiometric surface map for the shallow groundwater, and Figure 3-7 presents the potentiometric surface map for the intermediate groundwater as measured during Phase II of the Sites 27 and 55 RI (August 2008). The shallow groundwater beneath the majority of the Site 27 area flows northwest toward the 3rd Battalion Pond, with a component flowing to the north. The average hydraulic gradient in the shallow zone in August 2008 was 0.008. The intermediate groundwater is interpreted to flow radially from the PAI-27-MW06S/PAI-27-MW07I/PAI-27-MW08D cluster, with a similar hydraulic gradient of 0.008. Groundwater elevation differences between the shallow, intermediate, and deeper zones indicate an overall downward component of flow.

Water levels were measured in August 2008 at the predicted high and low tides. The shallow wells (PAI-27-MW20S, PAI-27-MW55S, and PAI-27-MW62S) along the edge of the marsh of the 3rd Battalion Pond exhibited responses of up to 0.20 foot change due to tidal changes, while the majority of the remaining site wells did not exhibit a tidal influence. One intermediate zone well (PAI-27-MW54I) also exhibited a slight response of 0.19 foot change in response to the tidal change. The deeper zone wells had negative responses of less than 0.10 foot, possibly related to tidal lag effects.

Water level measurements from the 2010 investigations along with potentiometric surface maps for the shallow and intermediate zones are presented in Table 3-3 and Figures 3-8 and 3-9, respectively. Groundwater was encountered in the shallow wells during the 2010 investigation at approximately 1.1 to 15 feet NAVD 88 and in the intermediate wells at approximately 2.8 to 7.0 feet NAVD 88. Similar to August 2008, shallow groundwater flows northwest toward the 3rd Battalion Pond, with a component flowing to the north toward an unnamed tributary of Archer's Creek (700 feet north-northeast of Sites 9 and 16). The average hydraulic gradient in the shallow zone in August 2010 was 0.009. The intermediate groundwater is interpreted to flow radially from the PAI-27-MW06S/PAI-27-MW07I/PAI-27-MW08D cluster, with a similar hydraulic gradient of 0.010.

Groundwater elevation differences between the shallow, intermediate, and deeper zones indicate an overall downward component of flow. The location on a topographic high along with the observed downward component of groundwater flow suggests that the area is a local recharge area and groundwater will flow radially to the nearest base level [i.e., water bodies (streams, marshes, etc.)].

Rising-head slug tests were performed in 24 monitoring wells across the Site 27 area to estimate the hydraulic conductivities of the shallow, intermediate, and deeper zones. Slug tests were conducted in 13 shallow wells, 10 intermediate wells, and the 1 deeper well. The results of the slug test evaluations are summarized in Table 3-10; water-level recovery plots and calculations are included in Appendix C-18. The geometric mean hydraulic conductivity (K) for the 13 shallow surficial wells was estimated to be approximately 10.5 feet per day [3.72×10^{-3} centimeters per second (cm/sec)], which is within the typical range for silty sands and fine sands (Fetter, 1980). The geometric mean K for the intermediate wells was calculated to be approximately 0.83 foot per day (2.92×10^{-4} cm/sec), which is also within the typical lower range for silty sand or clayey sands. The K for the deeper well was calculated to be approximately 0.08 foot per day (2.82×10^{-5} cm/sec), which is again within the typical lower range for silty sand or clayey sands.

Based on average hydraulic gradients for 2008 and 2010, the estimated K values, and an assumed effective porosity of 0.30 for the silty sand, the estimated advective flow velocity of groundwater is 0.3 foot per day (108 feet per year) for the shallow zone and 0.02 foot per day (9.0 feet per year) for the intermediate zone.

Sites 9 and 16

Water level measurements from the 2010 and 2011 investigations along with potentiometric surface maps for the shallow and intermediate zones are presented in Table 3-3 and Figures 3-8 through 3-11. Groundwater at 9 and 16 was encountered in the shallow wells during the 2010 investigation at approximately 5.2 to 7 feet NAVD 88 and in the intermediate wells at approximately 5.2 to 6 feet NAVD 88.

Water level measurements were collected at Sites 9, 16, 27, and 55 in support of developing a potentiometric surface map for the September 2011 sampling effort at Sites 9 and 16. As stated previously, in September 2011, a comprehensive round of water level measurements were collected from wells accessible at Site 27; a number of wells were not accessible for measurements due to construction activities at Site 27. Groundwater across Sites 9, 16, 27, and 55 was encountered in the shallow wells at approximately 5.4 and 7.9 feet NAVD 88 and in the intermediate wells at approximately 3.4 and 7.2 feet NAVD 88. Groundwater flows semi-radially from Sites 27 and 55 in the shallow and intermediate zones. Groundwater flow is to the north and west at Site 27 and west to south at Site 55. Groundwater was encountered at approximately 6 feet NAVD 88 in the newly installed shallow and intermediate monitoring wells at 9 and 16. Groundwater flows north-northeast in the shallow and intermediate zones in the area of Sites 9 and 16.

Construction commenced at Site 27 in 2010, resulting in multiple wells being inaccessible for measurement in 2011. The lack of water level data from the inaccessible wells does not affect the shallow groundwater flow interpretation for the September 2011 sampling event. Shallow groundwater flows north toward an unnamed tributary of Archer's Creek (700 feet north-northeast of Sites 9 and 16), and west to southwest toward unnamed tributaries of Ribbon Creek. The hydraulic gradient in the shallow zone was 0.006 in September 2011, and the hydraulic gradient in the intermediate zone was 0.007.

The interpreted groundwater flow in the eastern portion of the sites is similar to the interpreted flow from data gathered in 2010. The lack of water level data for the intermediate zone limited interpretation of groundwater flow on the western portion of Site 27, however, this is not considered significant limitation. Based on past events, groundwater flow in the western portion of Site 27 is expected to be to the northwest toward the 3rd Battalion Pond and similar to the shallow groundwater zone flow.

Aquifer testing was not conducted at Sites 9 and 16 but based on the sites close proximities to Site 27 the above noted values for hydraulic conductivity are assumed to be similar for Sites 9 and 16. Therefore, the estimated advective flow velocity of groundwater in the area of Sites 9 and 16 is 0.2 foot per day (77 feet per year) for the shallow zone and 0.019 foot per day (7.1 feet per year) for the intermediate zone.

TABLE 3-1

SAMPLING RATIONALE
SITE 9/16 - PAINT WASTE STORAGE AREA/ PESTICIDE RINSATE DISPOSAL AREA
MARINE CORPS RECRUIT DEPOT
PARRIS ISLAND, SOUTH CAROLINA

Sample Location		Sampling Rationale
Surface surface Soil	**Year of Sample collection**	
PAI-9/16-SO-01 to PAI-9/16-SO07	2010	Utilized onsite analytical to determine elevated concentrations of DDT, Hydrocarbons (Petroflag), TPH (oil in soil), NAPL (FLUTe liner), PID and visual observations. Samples were collected for TCL VOCs, SVOCs, PAH-SIM, Pesticides, PCBs, TAL Metals, pH, and TOC.
PAI-9/15-MW05-0001	2011	Samples were collected for TCL VOCs, SVOCs, PAH-SIM, Pesticides, PCBs, TAL Metals, pH, and TOC. PID and visual observations.
Subsurface Soil		
PAI-9/16-SO-01 to PAI-9/16-SO07	2010	Utilized onsite analytical to determine elevated concentrations of DDT, Hydrocarbons (Petroflag), TPH (oil in soil), NAPL (FLUTe liner), PID and visual observations. Samples were collected for TCL VOCs, SVOCs, PAH-SIM, Pesticides, PCBs, TAL Metals, pH, and TOC.
PAI-9/15-MW05-0709	2011	Samples were collected for TCL VOCs, SVOCs, PAH-SIM, Pesticides, PCBs, TAL Metals, pH, and TOC. PID and visual observations.
Groundwater		
PAI-9/16-GW-01S to PAI-9/16-GW-4I	2010	Samples collected from these wells to determine if pesticide and paint waste are traveling into the groundwater. Samples were collected for TCL VOCs, SVOCs, PAH-SIM, PCBs, Pesticides, TAL metals (total), TDS, TOC, and alkalinity.
PAI-9/16-GW-05S to PAI-9/16-GW-6D	2011	Samples were collected for TCL VOCs, SVOCs, PAH-SIM, Pesticides, PCBs, TAL Metals, pH, and TOC.

TABLE 3-2

MONITORING WELL CONSTRUCTION DETAILS
SITES 27, 9, AND 16
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA

Well Number	Installation Date	Ground Elevation (feet NAVD 88)	Top of Riser Elevation (feet NAVD 88)	Screened Interval				Well Details			
				From (ft bgs)	Elevation (feet NAVD 88)	To (feet bgs)	Elevation (feet NAVD 88)	Total Boring Depth (feet)	Screen Length (feet)	Diam. (inches)	Material
Shallow Monitoring Wells											
Site 27											
PAI-27-MW01S [1]	12/11/2002	12.14	15.02	2.1	10.04	12.1	0.04	12.5	10	2	PVC
PAI-27-MW03S [3]	12/11/2002	13.38	13.24	4.15	9.23	14.15	-0.77	14.15	10	2	PVC
PAI-27-MW04S [3]	12/12/2002	14.08	13.87	3.3	10.78	13.3	0.78	14.0	10	2	PVC
PAI-27-MW06S [3]	12/16/2002	14.97	17.84	4.0	10.97	14.0	0.97	14.0	10	2	PVC
PAI-27-MW09S [3]	12/10/2002	15.34	15.07	4.0	11.34	14.0	1.34	14.0	10	2	PVC
PAI-27-MW10S [1]	12/12/2002	12.73	15.60	2.0	10.73	12.0	0.73	12.0	10	2	PVC
PAI-27-MW11S [1]	12/14/2002	15.28	18.12	4.1	11.18	14.1	1.18	14.1	10	2	PVC
PAI-27-MW14S [3]	12/13/2002	13.96	16.79	3.2	10.76	13.2	0.76	14.0	10	2	PVC
PAI-27-MW16S [3]	12/11/2002	11.43	11.25	3.6	7.83	13.6	-2.17	14.0	10	2	PVC
PAI-27-MW17S [1]	12/11/2002	NA[2]	12.50	4.0	8.50	14.0	-1.50	14.0	10	2	PVC
PAI-27-MW19S [1]	12/10/2002	NA[2]	11.59	2.0	9.59	12.0	-0.41	12.0	10	2	PVC
PAI-27-MW20S [1]	12/11/2002	7.28	9.98	4.1	3.18	14.1	-6.82	14.1	10	2	PVC
PAI-27-MW21S [1]	12/11/2002	7.62	10.44	2.4	5.22	12.4	-4.78	12.4	10	2	PVC
PAI-27-TW-22S [4]	9/21/2007	10.79	12.27	8.0	2.79	13.0	-2.21	13.0	5	1	PVC
PAI-27-TW-24S [4]	9/21/2007	11.72	12.88	9.0	2.72	14.0	-2.28	15.0	5	1	PVC
PAI-27-TW-26S [4]	9/20/2007	14.70	16.43	8.0	6.70	13.0	1.70	13.0	5	1	PVC
PAI-27-TW-28S [4]	9/20/2007	11.98	13.07	7.0	4.98	12.0	-0.02	12.0	5	1	PVC
PAI-27-TW-30S [4]	9/19/2007	11.51	12.43	6.0	5.51	11.0	0.51	11.0	5	1	PVC
PAI-27-TW-33S [4]	9/21/2007	13.10	13.95	8.0	5.10	13.0	0.10	13.0	5	1	PVC
PAI-27-TW-39S [4]	9/20/2007	13.94	NA[5]	8.0	5.94	13.0	0.94	13.0	5	1	PVC
PAI-27-TW-41S [4]	9/20/2007	7.55	8.77	6.0	1.55	11.0	-3.45	11.0	5	1	PVC
PAI-27-TW-43S [4]	9/19/2007	9.36	9.88	9.5	-0.14	14.5	-5.14	14.5	5	1	PVC
PAI-27-TW-46S [4]	9/20/2007	14.12	15.87	8.0	6.12	13.0	1.12	13.0	5	1	PVC
PAI-27-MW49S [6]	8/8/2008	13.49	13.24	3.0	10.49	13.0	0.49	13.5	10	2	PVC
PAI-27-MW51S [6]	8/9/2008	10.31	10.05	3.0	7.31	13.0	-2.69	13.5	10	2	PVC
PAI-27-MW53S [6]	8/9/2008	13.85	13.67	3.0	10.85	13.0	0.85	13.5	10	2	PVC
PAI-27-MW55S [6]	8/7/2008	6.92	10.11	3.0	3.92	13.0	-6.08	13.5	10	2	PVC
PAI-27-MW57S [6]	8/8/2008	7.38	7.20	3.0	4.38	13.0	-5.62	13.5	10	2	PVC
PAI-27-MW58S [6]	8/8/2008	7.69	7.44	3.0	4.69	12.0	-4.31	12.5	9	2	PVC
PAI-27-MW62S [6]	8/7/2008	6.67	9.94	3.0	3.67	13.0	-6.33	13.5	10	2	PVC
PAI-27-MW63S [6]	8/10/2008	14.26	16.95	3.0	11.26	13.0	1.26	13.5	10	2	PVC
PAI-27-MW64S [6]	8/10/2008	14.36	16.91	3.0	11.36	13.0	1.36	13.5	10	2	PVC
PAI-27-TW65S [7]	8/6/2008	13.41	13.71	5.0	8.71	10.0	3.71	10.00	5	1	PVC
PAI-27-TW67S [7]	8/3/2008	13.90	14.19	5.0	9.19	10.0	4.19	10.00	5	1	PVC
Site 9/16											
PAI-27-TW-35S [4]	9/21/2007	11.83	13.84	8.0	3.83	13.0	-1.17	13.0	5	1	PVC
PAI-27-TW-37S [4]	9/21/2007	12.87	13.17	8.0	4.87	13.0	-0.13	13.0	5	1	PVC
PAI-9/16-TW01S [7]	8/6/2008	11.69	12.06	5.0	7.06	10.0	2.06	10.00	5	1	PVC
PAI-9/16-TW03S [7]	8/6/2008	11.75	12.08	5.0	7.08	10.0	2.08	10.00	5	1	PVC
PAI-9/16-MW05S [8]	9/7/2011	14.47	14.20	7.0	7.2	17.0	-2.8	17.00	10	2	PVC
Intermediate Monitoring Wells											
Site 27											
PAI-27-MW02I [3]	12/17/2002	11.85	14.69	21.8	-9.95	24.8	-12.95	25.0	3	2	PVC
PAI-27-MW05I [3]	12/13/2002	13.97	13.81	20.55	-6.58	23.55	-9.58	24.00	3	2	PVC
PAI-27-MW07I [1]	12/16/2002	15.26	18.12	23.8	-8.54	26.8	-11.54	27.0	3	2	PVC
PAI-27-MW12I [1]	12/13/2002	15.37	18.15	18.7	-3.33	21.7	-6.33	24.0	3	2	PVC
PAI-27-MW15I [3]	12/13/2002	13.96	16.71	21.0	-7.04	24.0	-10.04	24.0	3	2	PVC
PAI-27-MW18I [1]	12/12/2002	NA[2]	12.44	19.5	-7.06	24.5	-12.06	24.5	5	2	PVC
PAI-27-TW-23I [4]	9/21/2007	10.86	11.88	18.0	-7.14	23.0	-12.14	25.0	5	1	PVC
PAI-27-TW-25I [4]	9/21/2007	15.30	15.85	19.0	-3.70	24.0	-8.70	25.0	5	1	PVC
PAI-27-TW-27I [4]	9/20/2007	14.80	15.75	19.0	-4.20	24.0	-9.20	25.0	5	1	PVC
PAI-27-TW-29I [4]	9/20/2007	12.10	13.11	19.0	-6.90	24.0	-11.90	24.0	5	1	PVC
PAI-27-TW-31I [4]	9/19/2007	11.47	11.87	19.0	-7.53	24.0	-12.53	24.0	5	1	PVC

TABLE 3-2

MONITORING WELL CONSTRUCTION DETAILS
SITES 27, 9, AND 16
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA

Well Number	Installation Date	Ground Elevation (feet NAVD 88)	Top of Riser Elevation (feet NAVD 88)	Screened Interval				Well Details			
				From (ft bgs)	Elevation (feet NAVD 88)	To (feet bgs)	Elevation (feet NAVD 88)	Total Boring Depth (feet)	Screen Length (feet)	Diam. (inches)	Material
PAI-27-TW-32I (4)	9/20/2007	11.30	11.77	19.0	-7.70	24.0	-12.70	25.0	5	1	PVC
PAI-27-TW-34I (4)	9/21/2007	13.07	13.87	20.0	-6.93	25.0	-11.93	25.0	5	1	PVC
PAI-27-TW-40I (4)	9/20/2007	13.95	14.53	19.0	-5.05	24.0	-10.05	25.0	5	1	PVC
PAI-27-TW-42I (4)	9/20/2007	7.55	7.97	20.0	-12.45	25.0	-17.45	25.0	5	1	PVC
PAI-27-TW-44I (4)	9/19/2007	9.44	10.02	19.5	-10.06	24.5	-15.06	25.0	5	1	PVC
PAI-27-TW-47I (4)	9/20/2007	14.09	15.21	19.0	-4.91	24.0	-9.91	25.0	5	1	PVC
PAI-27-MW48I (6)	8/9/2008	15.23	14.98	19.5	-4.27	24.5	-9.27	25.0	5	2	PVC
PAI-27-MW50I (6)	8/8/2008	13.46	13.23	19.0	-5.54	24.0	-10.54	24.5	5	2	PVC
PAI-27-MW52I (6)	8/9/2008	10.25	10.00	20.0	-9.75	25.0	-14.75	25.5	5	2	PVC
PAI-27-MW54I (6)	8/9/2008	13.82	13.57	19.0	-5.18	24.0	-10.18	24.5	5	2	PVC
PAI-27-MW56I (6)	8/7/2008	6.91	9.97	20.0	-13.09	25.0	-18.09	25.5	5	2	PVC
PAI-27-MW59I (6)	8/8/2008	7.68	7.33	14.0	-6.32	19.0	-11.32	19.5	5	2	PVC
PAI-27-MW60I (6)	8/10/2008	12.19	14.66	19.0	-6.81	24.0	-11.81	24.5	5	2	PVC
PAI-27-TW66I (7)	8/6/2010	13.38	13.72	21.0	-7.3	26.0	-12.3	26.00	5	1	PVC
PAI-27-TW68I (7)	8/3/2010	13.90	14.23	22.0	-7.8	27.0	-12.8	27.00	5	1	PVC
Site 9/16											
PAI-27-MW61I (6)	8/10/2008	14.54	14.13	19.5	-4.96	24.5	-9.96	25.0	5	2	PVC
PAI-27-TW-36I (4)	9/21/2007	11.85	12.39	19.0	-7.15	24.0	-12.15	25.0	5	1	PVC
PAI-27-TW-38I (4)	9/21/2007	12.97	13.22	18.0	-5.03	23.0	-10.03	25.0	5	1	PVC
PAI-9/16-TW02I (7)	8/6/2010	11.72	12.10	15.0	-2.9	20.0	-7.9	20.00	5	1	PVC
PAI-9/16-TW04I (7)	8/6/2010	11.77	12.33	15.0	-2.7	20.0	-7.7	20.00	5	1	PVC
PAI-9/16-MW06I (8)	9/7/2011	14.56	14.36	12.0	2.4	22.0	-7.6	25.00	10	2	PVC
Deep Monitoring Wells											
Site 27											
PAI-27-MW08D (1)	12/17/2002	15.38	18.16	33.0	-17.62	36.0	-20.62	36.0	3	2	PVC
PAI-27-MW13D (1)	12/18/2002	15.23	18.06	32.8	-17.57	35.8	-20.57	36.0	3	2	PVC
PAI-27-TW-45D (4)	9/19/2007	11.60	11.99	29.0	-17.40	34.0	-22.40	35.0	5	1	PVC

Notes:
bgs - below ground surface
ft - feet
msl - mean sea level
NA - Not available.
NAVD - North American Vertical Datum
PVC - polyvinyl chloride

1 - Ground Elevations and Top of Riser Elevations not obtained from a licensed surveyor; consequently, a margin of error may exist. Ground Elevations, Top of Riser Elevations, and Screened Interval Depths are approximate. Ground Elevations obtained by subtracting length of riser from Top of Riser Elevations (Table 3-2 - Tetra Tech, 2003).
2 - Riser length not reported; therefore, Ground Elevation could not be determined.
3 - Ground Elevations and Top of Riser Elevations of Permanent Monitoring Wells were obtained by a licensed surveyor in October 2007. Ground Elevations, Top of Riser Elevations, and Screened Interval Depths vary from information originally provided in December 2002.
4 - Ground Elevations of Temporary Wells obtained from a licensed surveyor in October 2007. Top of Riser Elevations obtained from adding length of risers to surveyed Ground Elevations.
5 - Length of riser not indicated on Temporary Monitoring Well Sheet, Top of Riser Elevation assumed to be same as Ground Elevation.
6 - Ground Elevations and Top of Riser Elevations of Permanent Wells obtained from a licensed surveyor in September 2008.
7 - Ground Elevations and Top of Riser Elevations of Temporary Wells obtained from a licensed surveyor in August 2010.
8- Ground Elevations and Top of Riser Elevations of Permanent Wells obtained from a licensed surveyor in September 2011.

TABLE 3-3

WATER LEVEL MEASUREMENTS
2002 THROUGH 2011
SITES 27, 9, AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

Well Number	Installation Date	Ground Elevation[1] (feet NAVD 88)	Top of Riser Elevation[1] (feet NAVD 88)	Screened Interval				Well Details				Water Level Information 2002			
				From (fbgs)	Elevation (feet NAVD 88)	To (fbgs)	Elevation (feet NAVD 88)	Well Depth (feet)	Screen Length (feet)	Diam. (inches)	Material	Date Measured	Depth to Product (feet below Top of Riser)	Depth to Water (feet below Top of Riser)	Elevation (feet NAVD 88)
SHALLOW WELLS															
Site 27															
PAI-27-MW01S [1]	12/11/2002	12.14	15.02	4.15	9.23	14.15	-0.77	14.15	10.00	2	PVC	2002/12/20	---	6.26	8.76
PAI-27-MW03S [3]	12/11/2002	13.38	13.24	4.15	9.23	14.15	-0.77	14.15	10.00	2	PVC	2002/12/20	---	4.75	8.49
PAI-27-MW04S [3]	12/12/2002	14.08	13.87	3.3	10.78	13.3	0.78	13.3	10	2	PVC	2002/12/20	---	5.37	8.50
PAI-27-MW06S [3]	12/16/2002	14.97	17.84	4.0	10.97	14.0	0.97	14.0	10	2	PVC	2002/12/20	8.87	8.97	8.87
PAI-27-MW09S [3]	12/10/2002	15.34	15.07	4.0	11.34	14.0	1.34	14.0	10	2	PVC	2002/12/20	---	6.22	8.85
PAI-27-MW10S [1]	12/12/2002	12.73	15.60	3.2	10.76	13.2	0.76	13.2	10	2	PVC	2002/12/20	---	7.06	8.54
PAI-27-MW11S [1]	12/14/2002	15.28	18.12	3.6	7.83	13.6	-2.17	13.6	10	2	PVC	2002/12/20	---	9.10	9.02
PAI-27-MW14S [3]	12/13/2002	13.96	16.79	3.2	10.76	13.2	0.76	13.2	10	2	PVC	2002/12/20	---	8.18	8.61
PAI-27-MW16S [3]	12/11/2002	11.43	11.25	3.6	7.83	13.6	-2.17	13.6	10	2	PVC	2002/12/20	---	6.11	5.14
PAI-27-MW17S [1]	12/11/2002	NA [3]	12.50	8.0	6.70	13.0	1.70	13.0	5	1	PVC	2002/12/20	---	3.62	8.88
PAI-27-MW19S [1]	12/10/2002	NA [3]	11.59	6.0	5.51	11.0	0.51	11.0	5	1	PVC	2002/12/20	---	2.98	8.61
PAI-27-MW20S [1]	12/11/2002	7.28	9.98	8.0	5.10	13.0	0.10	13.0	5	1	PVC	2002/12/20	---	3.79	6.19
PAI-27-MW21S [1]	12/11/2002	7.62	10.44	8.0	3.83	13.0	-1.17	13.0	5	1	PVC	2002/12/20	---	4.33	6.11
PAI-27-TW-22S [4]	9/21/2007	10.79	12.27	8.0	2.79	13.0	-2.21	13.0	5	1	PVC	---	---	---	---
PAI-27-TW-24S [4]	9/21/2007	11.72	12.88	9.0	2.72	14.0	-2.28	15.0	5	1	PVC	---	---	---	---
PAI-27-TW-26S [4]	9/20/2007	14.70	16.43	8.0	6.70	13.0	1.70	13.0	5	1	PVC	---	---	---	---
PAI-27-TW-28S [4]	9/20/2007	11.98	13.07	7.0	4.98	12.0	-0.02	12.0	5	1	PVC	---	---	---	---
PAI-27-TW-30S [4]	9/19/2007	11.51	12.43	6.0	5.51	11.0	0.51	11.0	5	1	PVC	---	---	---	---
PAI-27-TW-33S [4]	9/21/2007	13.10	13.95	8.0	5.10	13.0	0.10	13.0	5	1	PVC	---	---	---	---
PAI-27-TW-39S [4]	9/20/2007	13.94	NA[5]	8.0	5.94	13.0	0.94	13.0	5	1	PVC	---	---	---	---
PAI-27-TW-41S [4]	9/20/2007	7.55	8.77	6.0	1.55	11.0	-3.45	11.0	5	1	PVC	---	---	---	---
PAI-27-TW-43S [4]	9/19/2007	9.36	9.88	9.5	-0.14	14.5	-5.14	14.5	5	1	PVC	---	---	---	---
PAI-27-TW-46S [4]	9/20/2007	14.12	15.87	8.0	6.12	13.0	1.12	13.0	5	1	PVC	---	---	---	---
PAI-27-MW49S [6]	8/8/2008	13.49	13.24	3.0	10.49	13.0	0.49	13.5	10	2	PVC	---	---	---	---
PAI-27-MW51S [6]	8/9/2008	10.31	10.05	3.0	7.31	13.0	-2.69	13.5	10	2	PVC	---	---	---	---
PAI-27-MW53S [6]	8/9/2008	13.85	13.67	3.0	10.85	13.0	0.85	13.5	10	2	PVC	---	---	---	---
PAI-27-MW55S [6]	8/7/2008	6.92	10.11	3.0	3.92	13.0	-6.08	13.5	10	2	PVC	---	---	---	---
PAI-27-MW57S [6]	8/8/2008	7.38	7.20	3.0	4.38	13.0	-5.62	13.5	10	2	PVC	---	---	---	---
PAI-27-MW58S [6]	8/8/2008	7.69	7.44	3.0	4.69	12.0	-4.31	12.5	9	2	PVC	---	---	---	---
PAI-27-MW62S [6]	8/7/2008	6.67	9.94	3.0	3.67	13.0	-6.33	13.5	10	2	PVC	---	---	---	---
PAI-27-MW63S [6]	8/10/2008	14.26	16.95	3.0	11.26	13.0	1.26	13.5	10	2	PVC	---	---	---	---
PAI-27-MW64S [6]	8/10/2008	14.36	16.91	3.0	11.36	13.0	1.36	13.5	10	2	PVC	---	---	---	---
PAI-27-TW65S [7]	8/6/2008	13.41	13.71	5.0	8.71	10.0	3.71	10.00	5	1	PVC	---	---	---	---
PAI-27-TW67S [7]	8/3/2008	13.90	14.19	5.0	9.19	10.0	4.19	10.00	5	1	PVC	---	---	---	---
Site 9/16															
PAI-27-TW-35S [4]	9/21/2007	11.83	13.84	8.0	3.83	13.0	-1.17	13.0	5	1	PVC	---	---	---	---
PAI-27-TW-37S [4]	9/21/2007	12.87	13.17	8.0	4.87	13.0	-0.13	13.0	5	1	PVC	---	---	---	---
PAI-9/16-TW01S [7]	8/6/2008	11.69	12.06	5.0	7.06	10.0	2.06	10.00	5	1	PVC	---	---	---	---
PAI-9/16-TW03S [7]	8/6/2008	11.75	12.08	5.0	7.08	10.0	2.08	10.00	5	1	PVC	---	---	---	---
PAI-9/16-MW05S [10]	9/7/2011	14.47	14.20	7.0	7.2	17.0	-2.8	17.00	10	2	PVC	---	---	---	---

TABLE 3-3

WATER LEVEL MEASUREMENTS
2002 THROUGH 2011
SITES 27, 9, AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

Well Number	Installation Date	Ground Elevation[1] (feet NAVD 88)	Top of Riser Elevation[1] (feet NAVD 88)	Screened Interval				Well Details				Water Level Information 2002			
				From (fbgs)	Elevation (feet NAVD 88)	To (fbgs)	Elevation (feet NAVD 88)	Well Depth (feet)	Screen Length (feet)	Diam. (inches)	Material	Date Measured	Depth to Product (feet below Top of Riser)	Depth to Water (feet below Top of Riser)	Elevation (feet NAVD 88)
INTERMEDIATE WELLS															
Site 27															
PAI-27-MW02I [3]	12/17/2002	11.85	14.69	21.8	-9.95	24.8	-12.95	24.8	3	2	PVC	2002/12/20	---	10.17	4.52
PAI-27-MW05I [3]	12/13/2002	13.97	13.81	20.55	-6.58	23.55	-9.58	23.55	3	2	PVC	2002/12/20	---	5.82	7.99
PAI-27-MW07I [1]	12/16/2002	15.26	18.12	3.3	10.78	13.3	0.78	13.3	10	2	PVC	2002/12/20	---	9.50	8.62
PAI-27-MW12I [1]	12/13/2002	15.37	18.15	21.8	-9.95	24.8	-12.95	24.8	3	2	PVC	2002/12/20	---	11.37	6.78
PAI-27-MW15I [3]	12/13/2002	13.96	16.71	21.0	-7.04	24.0	-10.04	24.0	3	2	PVC	2002/12/20	---	8.34	8.37
PAI-27-MW18I [1]	12/12/2002	NA [3]	12.44	20.55	-6.58	23.55	-9.58	23.55	3	2	PVC	2002/12/20	---	6.60	5.84
PAI-27-TW-23I [4]	9/21/2007	10.86	11.88	18.0	-7.14	23.0	-12.14	25.0	5	1	PVC	---	---	---	---
PAI-27-TW-25I [4]	9/21/2007	15.30	15.85	19.0	-3.70	24.0	-8.70	25.0	5	1	PVC	---	---	---	---
PAI-27-TW-27I [4]	9/20/2007	14.80	15.75	19.0	-4.20	24.0	-9.20	25.0	5	1	PVC	---	---	---	---
PAI-27-TW-29I [4]	9/20/2007	12.10	13.11	19.0	-6.90	24.0	-11.90	24.0	5	1	PVC	---	---	---	---
PAI-27-TW-31I [4]	9/19/2007	11.47	11.87	19.0	-7.53	24.0	-12.53	24.0	5	1	PVC	---	---	---	---
PAI-27-TW-32I [4]	9/20/2007	11.30	11.77	19.0	-7.70	24.0	-12.70	25.0	5	1	PVC	---	---	---	---
PAI-27-TW-34I [4]	9/21/2007	13.07	13.87	20.0	-6.93	25.0	-11.93	25.0	5	1	PVC	---	---	---	---
PAI-27-TW-40I [4]	9/20/2007	13.95	14.53	19.0	-5.05	24.0	-10.05	25.0	5	1	PVC	---	---	---	---
PAI-27-TW-42I [4]	9/20/2007	7.55	7.97	20.0	-12.45	25.0	-17.45	25.0	5	1	PVC	---	---	---	---
PAI-27-TW-44I [4]	9/19/2007	9.44	10.02	19.5	-10.06	24.5	-15.06	25.0	5	1	PVC	---	---	---	---
PAI-27-TW-47I [4]	9/20/2007	14.09	15.21	19.0	-4.91	24.0	-9.91	25.0	5	1	PVC	---	---	---	---
PAI-27-MW48I [6]	8/9/2008	15.23	14.98	19.5	-4.27	24.5	-9.27	25.0	5	2	PVC	---	---	---	---
PAI-27-MW50I [6]	8/8/2008	13.46	13.23	19.0	-5.54	24.0	-10.54	24.5	5	2	PVC	---	---	---	---
PAI-27-MW52I [6]	8/9/2008	10.25	10.00	20.0	-9.75	25.0	-14.75	25.5	5	2	PVC	---	---	---	---
PAI-27-MW54I [6]	8/9/2008	13.82	13.57	19.0	-5.18	24.0	-10.18	24.5	5	2	PVC	---	---	---	---
PAI-27-MW56I [6]	8/7/2008	6.91	9.97	20.0	-13.09	25.0	-18.09	25.5	5	2	PVC	---	---	---	---
PAI-27-MW59I [6]	8/8/2008	7.68	7.33	14.0	-6.32	19.0	-11.32	19.5	5	2	PVC	---	---	---	---
PAI-27-MW60I [6]	8/10/2008	12.19	14.66	19.0	-6.81	24.0	-11.81	24.5	5	2	PVC	---	---	---	---
PAI-27-TW66I [7]	8/6/2010	13.38	13.72	21.0	-7.3	26.0	-12.3	26.00	5	1	PVC	---	---	---	---
PAI-27-TW68I [7]	8/3/2010	13.90	14.23	22.0	-7.8	27.0	-12.8	27.00	5	1	PVC	---	---	---	---
Site 9/16															
PAI-27-MW61I [6]	8/10/2008	14.54	14.13	19.5	-4.96	24.5	-9.96	25.0	5	2	PVC	---	---	---	---
PAI-27-TW-36I [4]	9/21/2007	11.85	12.39	19.0	-7.15	24.0	-12.15	25.0	5	1	PVC	---	---	---	---
PAI-27-TW-38I [4]	9/21/2007	12.97	13.22	18.0	-5.03	23.0	-10.03	25.0	5	1	PVC	---	---	---	---
PAI-9/16-TW02I [7]	8/6/2010	11.72	12.10	15.0	-2.90	20.0	-7.90	20.00	5	1	PVC	---	---	---	---
PAI-9/16-TW04I [7]	8/6/2010	11.77	12.33	15.0	-2.70	20.0	-7.67	20.00	5	1	PVC	---	---	---	---
PAI-9/16-MW06I [10	9/7/2011	14.56	14.36	12.0	2.4	22.0	-7.6	25.00	10	2	PVC	---	---	---	---
DEEP WELLS															
PAI-27-MW08D [1]	12/17/2002	15.38	18.16	33.0	-17.62	36.0	-20.62	36.0	3	2	PVC	2002/12/20	---	10.38	7.78
PAI-27-MW13D [1]	12/18/2002	15.23	18.06	32.8	-17.57	35.8	-20.57	36.0	3	2	PVC	2002/12/20	---	9.25	8.81
PAI-27-TW-45D [4]	9/19/2007	11.60	11.99	29.0	-17.40	34.0	-22.40	35.0	5	1	PVC	---	---	---	---

Notes:

NA - Not Available
msl - mean sea level
NM - Not Monitored

PVC - polyvinyl chloride
*Some wells were inaccessibe in 2011 due to construction

1 - Ground Elevations and Top of Riser Elevations not obtained from a licensed surveyor; consequently, a margin of error may exist. Ground Elevations, Top of Riser Elevations, and Screened Interval Depths are approximate. Ground Elevations obtained by subtracting length of riser from Top of Riser Elevations (Table 3-2 - Tetra Tech, 2003).

2 - Riser length not reported. Therefore, Ground Elevation could not be determined.

3 - Ground Elevations and Top of Riser Elevations of Permanent Monitoring Wells were obtained by a licensed surveyor in October 2007. Ground Elevations, Top of Riser Elevations, and Screened Interval Depths vary from information originally provided in December 2002.

4 - Ground Elevations of Temporary Wells obtained from a licensed surveyor in October 2007. Top of Riser Elevations obtained from adding length of risers to surveyed Ground Elevations.

5 - Length of riser not indicated on Temporary Monitoring Well Sheet, Top of Riser Elevation assumed to be same as Ground Elevation.

6 - Ground Elevations and Top of Riser Elevations of Permanent Wells obtained from licensed surveyor in September 2008.

7 - Ground Elevations and Top of Riser Elevations of Temporary Wells obtained from a licensed surveyor in August 2010.

8 - Depth to Water not measured because water levels in monitoring well had not recovered.

9 - Depth to Water may be approximate because water levels in monitoring well may not have completely recovered.

10 - Ground Elevations and Top of Riser Elevations of Permanent Monitoring Wells were obtained by a licensed surveyor in September 2011.

TABLE 3-3

WATER LEVEL MEASUREMENTS
2002 THROUGH 2011
SITES 27, 9, AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

Well Number	Installation Date	Ground Elevation[1] (feet NAVD 88)	Top of Riser Elevation[1] (feet NAVD 88)	Screened Interval				Well Details				Water Level Information 2003			Water Level Information 2007		
				From (fbgs)	Elevation (feet NAVD 88)	To (fbgs)	Elevation (feet NAVD 88)	Well Depth (feet)	Screen Length (feet)	Diam. (inches)	Material	Date Measured	Depth to Water (feet below Top of Riser)	Elevation (feet NAVD 88)	Date Measured	Depth to Water (feet below Top of Riser)	Elevation (feet NAVD 88)
SHALLOW WELLS																	
Site 27																	
PAI-27-MW01S [1]	12/11/2002	12.14	15.02	4.15	9.23	14.15	-0.77	14.15	10.00	2	PVC	2003/07/11	---	8.85	2007/09/26	7.05	7.97
PAI-27-MW03S [3]	12/11/2002	13.38	13.24	4.15	9.23	14.15	-0.77	14.15	10.00	2	PVC	2003/07/11	---	8.85	2007/09/26	5.78	7.46
PAI-27-MW04S [3]	12/12/2002	14.08	13.87	3.3	10.78	13.3	0.78	13.3	10	2	PVC	2003/07/11	---	8.69	2007/09/26	6.55	7.32
PAI-27-MW06S [3]	12/16/2002	14.97	17.84	4.0	10.97	14.0	0.97	14.0	10	2	PVC	2003/07/11	---	9.49	2007/09/26	9.76	8.08
PAI-27-MW09S [3]	12/10/2002	15.34	15.07	4.0	11.34	14.0	1.34	14.0	10	2	PVC	2003/07/11	---	9.33	2007/09/26	7.73	7.34
PAI-27-MW10S [1]	12/12/2002	12.73	15.60	3.2	10.76	13.2	0.76	13.2	10	2	PVC	2003/07/11	---	8.50	2007/09/26	9.42	6.18
PAI-27-MW11S [1]	12/14/2002	15.28	18.12	3.6	7.83	13.6	-2.17	13.6	10	2	PVC	2003/07/11	---	9.41	2007/09/26	11.33	6.79
PAI-27-MW14S [3]	12/13/2002	13.96	16.79	3.2	10.76	13.2	0.76	13.2	10	2	PVC	2003/07/11	---	9.28	2007/09/26	9.55	7.24
PAI-27-MW16S [3]	12/11/2002	11.43	11.25	3.6	7.83	13.6	-2.17	13.6	10	2	PVC	2003/07/11	---	8.72	2007/09/26	7.46	3.79
PAI-27-MW17S [1]	12/11/2002	NA [3]	12.50	8.0	6.70	13.0	1.70	13.0	5	1	PVC	2003/07/11	---	9.30	2007/09/26	NM	NM
PAI-27-MW19S [1]	12/10/2002	NA [3]	11.59	6.0	5.51	11.0	0.51	11.0	5	1	PVC	2003/07/11	---	8.80	2007/09/26	4.43	7.16
PAI-27-MW20S [1]	12/11/2002	7.28	9.98	8.0	5.10	13.0	0.10	13.0	5	1	PVC	2003/07/11	---	4.47	2007/09/26	6.12	3.86
PAI-27-MW21S [1]	12/11/2002	7.62	10.44	8.0	3.83	13.0	-1.17	13.0	5	1	PVC	2003/07/11	---	4.49	2007/09/26	6.42	4.02
PAI-27-TW-22S [4]	9/21/2007	10.79	12.27	8.0	2.79	13.0	-2.21	13.0	5	1	PVC	---	---	---	2007/09/26	4.91	7.36
PAI-27-TW-24S [4]	9/21/2007	11.72	12.88	9.0	2.72	14.0	-2.28	15.0	5	1	PVC	---	---	---	2007/09/26	5.31	7.57
PAI-27-TW-26S [4]	9/20/2007	14.70	16.43	8.0	6.70	13.0	1.70	13.0	5	1	PVC	---	---	---	2007/09/26	9.28	7.15
PAI-27-TW-28S [4]	9/20/2007	11.98	13.07	7.0	4.98	12.0	-0.02	12.0	5	1	PVC	---	---	---	2007/09/26	6.32	6.75
PAI-27-TW-30S [4]	9/19/2007	11.51	12.43	6.0	5.51	11.0	0.51	11.0	5	1	PVC	---	---	---	2007/09/26	5.78	6.65
PAI-27-TW-33S [4]	9/21/2007	13.10	13.95	8.0	5.10	13.0	0.10	13.0	5	1	PVC	---	---	---	2007/09/26	6.03	7.92
PAI-27-TW-39S [4]	9/20/2007	13.94	NA[5]	8.0	5.94	13.0	0.94	13.0	5	1	PVC	---	---	---	2007/09/26	9.08	NA
PAI-27-TW-41S [4]	9/20/2007	7.55	8.77	6.0	1.55	11.0	-3.45	11.0	5	1	PVC	---	---	---	2007/09/26	3.82	4.95
PAI-27-TW-43S [4]	9/19/2007	9.36	9.88	9.5	-0.14	14.5	-5.14	14.5	5	1	PVC	---	---	---	2007/09/26	3.39	6.49
PAI-27-TW-46S [4]	9/20/2007	14.12	15.87	8.0	6.12	13.0	1.12	13.0	5	1	PVC	---	---	---	2007/09/26	9.06	6.81
PAI-27-MW49S [6]	8/8/2008	13.49	13.24	3.0	10.49	13.0	0.49	13.5	10	2	PVC	---	---	---	---	---	---
PAI-27-MW51S [6]	8/9/2008	10.31	10.05	3.0	7.31	13.0	-2.69	13.5	10	2	PVC	---	---	---	---	---	---
PAI-27-MW53S [6]	8/9/2008	13.85	13.67	3.0	10.85	13.0	0.85	13.5	10	2	PVC	---	---	---	---	---	---
PAI-27-MW55S [6]	8/7/2008	6.92	10.11	3.0	3.92	13.0	-6.08	13.5	10	2	PVC	---	---	---	---	---	---
PAI-27-MW57S [6]	8/8/2008	7.38	7.20	3.0	4.38	13.0	-5.62	13.5	10	2	PVC	---	---	---	---	---	---
PAI-27-MW58S [6]	8/8/2008	7.69	7.44	3.0	4.69	12.0	-4.31	12.5	9	2	PVC	---	---	---	---	---	---
PAI-27-MW62S [6]	8/7/2008	6.67	9.94	3.0	3.67	13.0	-6.33	13.5	10	2	PVC	---	---	---	---	---	---
PAI-27-MW63S [6]	8/10/2008	14.26	16.95	3.0	11.26	13.0	1.26	13.5	10	2	PVC	---	---	---	---	---	---
PAI-27-MW64S [6]	8/10/2008	14.36	16.91	3.0	11.36	13.0	1.36	13.5	10	2	PVC	---	---	---	---	---	---
PAI-27-TW65S [7]	8/6/2008	13.41	13.71	5.0	8.71	10.0	3.71	10.00	5	1	PVC	---	---	---	---	---	---
PAI-27-TW67S [7]	8/3/2008	13.90	14.19	5.0	9.19	10.0	4.19	10.00	5	1	PVC	---	---	---	---	---	---
Site 9/16																	
PAI-27-TW-35S [4]	9/21/2007	11.83	13.84	8.0	3.83	13.0	-1.17	13.0	5	1	PVC	---	---	---	2007/09/26	7.47	6.37
PAI-27-TW-37S [4]	9/21/2007	12.87	13.17	8.0	4.87	13.0	-0.13	13.0	5	1	PVC	---	---	---	2007/09/26	6.13	7.04
PAI-9/16-TW01S [7]	8/6/2008	11.69	12.06	5.0	7.06	10.0	2.06	10.00	5	1	PVC	---	---	---	---	---	---
PAI-9/16-TW03S [7]	8/6/2008	11.75	12.08	5.0	7.08	10.0	2.08	10.00	5	1	PVC	---	---	---	---	---	---
PAI-9/16-MW05S [10]	9/7/2011	14.47	14.20	7.0	7.2	17.0	-2.8	17.00	10	2	PVC	---	---	---	---	---	---

TABLE 3-3

WATER LEVEL MEASUREMENTS
2002 THROUGH 2011
SITES 27, 9, AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

Well Number	Installation Date	Ground Elevation[1] (feet NAVD 88)	Top of Riser Elevation[1] (feet NAVD 88)	Screened Interval				Well Details				Water Level Information 2003			Water Level Information 2007		
				From (fbgs)	Elevation (feet NAVD 88)	To (fbgs)	Elevation (feet NAVD 88)	Well Depth (feet)	Screen Length (feet)	Diam. (inches)	Material	Date Measured	Depth to Water (feet below Top of Riser)	Elevation (feet NAVD 88)	Date Measured	Depth to Water (feet below Top of Riser)	Elevation (feet NAVD 88)
INTERMEDIATE WELLS																	
Site 27																	
PAI-27-MW02I [3]	12/17/2002	11.85	14.69	21.8	-9.95	24.8	-12.95	24.8	3	2	PVC	2003/07/11	---	7.88	2007/09/26	7.77	6.92
PAI-27-MW05I [3]	12/13/2002	13.97	13.81	20.55	-6.58	23.55	-9.58	23.55	3	2	PVC	2003/07/11	---	8.97	2007/09/26	7.99	5.82
PAI-27-MW07I [1]	12/16/2002	15.26	18.12	3.3	10.78	13.3	0.78	13.3	10	2	PVC	2003/07/11	---	8.81	2007/09/26	10.70	7.42
PAI-27-MW12I [1]	12/13/2002	15.37	18.15	21.8	-9.95	24.8	-12.95	24.8	3	2	PVC	2003/07/11	---	8.90	2007/09/26	10.73	7.42
PAI-27-MW15I [3]	12/13/2002	13.96	16.71	21.0	-7.04	24.0	-10.04	24.0	3	2	PVC	2003/07/11	---	8.95	2007/09/26	9.71	7.00
PAI-27-MW18I [1]	12/12/2002	NA [3]	12.44	20.55	-6.58	23.55	-9.58	23.55	3	2	PVC	2003/07/11	---	8.44	2007/09/26	NM	NM
PAI-27-TW-23I [4]	9/21/2007	10.86	11.88	18.0	-7.14	23.0	-12.14	25.0	5	1	PVC	---	---	---	2007/09/26	4.68	7.20
PAI-27-TW-25I [4]	9/21/2007	15.30	15.85	19.0	-3.70	24.0	-8.70	25.0	5	1	PVC	---	---	---	2007/09/26	8.58	7.27
PAI-27-TW-27I [4]	9/20/2007	14.80	15.75	19.0	-4.20	24.0	-9.20	25.0	5	1	PVC	---	---	---	2007/09/26	8.67	7.08
PAI-27-TW-29I [4]	9/20/2007	12.10	13.11	19.0	-6.90	24.0	-11.90	24.0	5	1	PVC	---	---	---	2007/09/26	6.37	6.74
PAI-27-TW-31I [4]	9/19/2007	11.47	11.87	19.0	-7.53	24.0	-12.53	24.0	5	1	PVC	---	---	---	2007/09/26	5.32	6.55
PAI-27-TW-32I [4]	9/20/2007	11.30	11.77	19.0	-7.70	24.0	-12.70	25.0	5	1	PVC	---	---	---	2007/09/26	7.97	3.80
PAI-27-TW-34I [4]	9/21/2007	13.07	13.87	20.0	-6.93	25.0	-11.93	25.0	5	1	PVC	---	---	---	2007/09/26	7.13	6.74
PAI-27-TW-40I [4]	9/20/2007	13.95	14.53	19.0	-5.05	24.0	-10.05	25.0	5	1	PVC	---	---	---	2007/09/26	8.60	5.93
PAI-27-TW-42I [4]	9/20/2007	7.55	7.97	20.0	-12.45	25.0	-17.45	25.0	5	1	PVC	---	---	---	2007/09/26	NM[8]	NM
PAI-27-TW-44I [4]	9/19/2007	9.44	10.02	19.5	-10.06	24.5	-15.06	25.0	5	1	PVC	---	---	---	2007/09/26	7.17[9]	NM
PAI-27-TW-47I [4]	9/20/2007	14.09	15.21	19.0	-4.91	24.0	-9.91	25.0	5	1	PVC	---	---	---	2007/09/26	8.27	6.94
PAI-27-MW48I [6]	8/9/2008	15.23	14.98	19.5	-4.27	24.5	-9.27	25.0	5	2	PVC	---	---	---	---	---	---
PAI-27-MW50I [6]	8/8/2008	13.46	13.23	19.0	-5.54	24.0	-10.54	24.5	5	2	PVC	---	---	---	---	---	---
PAI-27-MW52I [6]	8/9/2008	10.25	10.00	20.0	-9.75	25.0	-14.75	25.5	5	2	PVC	---	---	---	---	---	---
PAI-27-MW54I [6]	8/9/2008	13.82	13.57	19.0	-5.18	24.0	-10.18	24.5	5	2	PVC	---	---	---	---	---	---
PAI-27-MW56I [6]	8/7/2008	6.91	9.97	20.0	-13.09	25.0	-18.09	25.5	5	2	PVC	---	---	---	---	---	---
PAI-27-MW59I [6]	8/8/2008	7.68	7.33	14.0	-6.32	19.0	-11.32	19.5	5	2	PVC	---	---	---	---	---	---
PAI-27-MW60I [6]	8/10/2008	12.19	14.66	19.0	-6.81	24.0	-11.81	24.5	5	2	PVC	---	---	---	---	---	---
PAI-27-TW66I [7]	8/6/2010	13.38	13.72	21.0	-7.3	26.0	-12.3	26.00	5	1	PVC	---	---	---	---	---	---
PAI-27-TW68I [7]	8/3/2010	13.90	14.23	22.0	-7.8	27.0	-12.8	27.00	5	1	PVC	---	---	---	---	---	---
Site 9/16																	
PAI-27-MW61I [6]	8/10/2008	14.54	14.13	19.5	-4.96	24.5	-9.96	25.0	5	2	PVC	---	---	---	---	---	---
PAI-27-TW-36I [4]	9/21/2007	11.85	12.39	19.0	-7.15	24.0	-12.15	25.0	5	1	PVC	---	---	---	2007/09/26	6.15	6.24
PAI-27-TW-38I [4]	9/21/2007	12.97	13.22	18.0	-5.03	23.0	-10.03	25.0	5	1	PVC	---	---	---	2007/09/26	6.51	6.71
PAI-9/16-TW02I [7]	8/6/2010	11.72	12.10	15.0	-2.90	20.0	-7.90	20.00	5	1	PVC	---	---	---	---	---	---
PAI-9/16-TW04I [7]	8/6/2010	11.77	12.33	15.0	-2.70	20.0	-7.67	20.00	5	1	PVC	---	---	---	---	---	---
PAI-9/16-MW06I [10]	9/7/2011	14.56	14.36	12.0	2.4	22.0	-7.6	25.00	10	2	PVC	---	---	---	---	---	---
DEEP WELLS																	
PAI-27-MW08D [1]	12/17/2002	15.38	18.16	33.0	-17.62	36.0	-20.62	36.0	3	2	PVC	2003/07/11	---	2.86	2007/09/26	15.11	3.05
PAI-27-MW13D [1]	12/18/2002	15.23	18.06	32.8	-17.57	35.8	-20.57	36.0	3	2	PVC	2003/07/11	---	2.25	2007/09/26	14.90	3.16
PAI-27-TW-45D [4]	9/19/2007	11.60	11.99	29.0	-17.40	34.0	-22.40	35.0	5	1	PVC	---	---	---	2007/09/26	9.18	2.81

Notes:

NA - Not Available
msl - mean sea level
NM - Not Monitored

PVC - polyvinyl chloride
*Some wells were inaccessibe in 2011 due to construction

1 - Ground Elevations and Top of Riser Elevations not obtained from a licensed surveyor; consequently, a margin of error may exist. Ground Elevations, Top of Riser Elevations, and Screened Interval Depths are approximate. Ground Elevations obtained by subtracting length of riser from Top of Riser Elevations (Table 3-2 - Tetra Tech, 2003).

2 - Riser length not reported. Therefore, Ground Elevation could not be determined.

3 - Ground Elevations and Top of Riser Elevations of Permanent Monitoring Wells were obtained by a licensed surveyor in October 2007. Ground Elevations, Top of Riser Elevations, and Screened Interval Depths vary from information originally provided in December 2002.

4 - Ground Elevations of Temporary Wells obtained from a licensed surveyor in October 2007. Top of Riser Elevations obtained from adding length of risers to surveyed Ground Elevations.

5 - Length of riser not indicated on Temporary Monitoring Well Sheet, Top of Riser Elevation assumed to be same as Ground Elevation.

6 - Ground Elevations and Top of Riser Elevations of Permanent Wells obtained from licensed surveyor in September 2008.

7 - Ground Elevations and Top of Riser Elevations of Temporary Wells obtained from a licensed surveyor in August 2010.

8 - Depth to Water not measured because water levels in monitoring well had not recovered.

9 - Depth to Water may be approximate because water levels in monitoring well may not have completely recovered.

10 - Ground Elevations and Top of Riser Elevations of Permanent Monitoring Wells were obtained by a licensed surveyor in September 2011.

TABLE 3-3

WATER LEVEL MEASUREMENTS
2002 THROUGH 2011
SITES 27, 9, AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

Well Number	Installation Date	Ground Elevation[1] (feet NAVD 88)	Top of Riser Elevation[1] (feet NAVD 88)	Screened Interval				Well Details				Water Level Information						
												2008 - High Tide (1015 hrs)				2008 - Low Tide (1627 hrs)		
				From (fbgs)	Elevation (feet NAVD 88)	To (fbgs)	Elevation (feet NAVD 88)	Well Depth (feet)	Screen Length (feet)	Diam. (inches)	Material	Date Measured	Depth to Product (feet below Top of Riser)	Depth to Water (feet below Top of Riser)	Elevation (feet NAVD 88)	Depth to Product (feet below Top of Riser)	Depth to Water (feet below Top of Riser)	Elevation (feet NAVD 88)
SHALLOW WELLS																		
Site 27																		
PAI-27-MW01S [1]	12/11/2002	12.14	15.02	4.15	9.23	14.15	-0.77	14.15	10.00	2	PVC	8/18/2008	---	7.16	7.86	---	7.16	7.86
PAI-27-MW03S [3]	12/11/2002	13.38	13.24	4.15	9.23	14.15	-0.77	14.15	10.00	2	PVC	8/18/2008	---	6.06	7.18	---	6.03	7.21
PAI-27-MW04S [3]	12/12/2002	14.08	13.87	3.3	10.78	13.3	0.78	13.3	10	2	PVC	8/18/2008	---	6.95	6.92	---	6.95	6.92
PAI-27-MW06S [3]	12/16/2002	14.97	17.84	4.0	10.97	14.0	0.97	14.0	10	2	PVC	8/18/2008	---	10.67	7.17	---	10.66	7.18
PAI-27-MW09S [3]	12/10/2002	15.34	15.07	4.0	11.34	14.0	1.34	14.0	10	2	PVC	8/18/2008	---	NM	NM	---	NM	NM
PAI-27-MW10S [1]	12/12/2002	12.73	15.60	3.2	10.76	13.2	0.76	13.2	10	2	PVC	8/18/2008	---	9.80	5.80	---	10.12	5.48
PAI-27-MW11S [1]	12/14/2002	15.28	18.12	3.6	7.83	13.6	-2.17	13.6	10	2	PVC	8/18/2008	11.05	11.48	6.64	11.06	11.52	6.60
PAI-27-MW14S [3]	12/13/2002	13.96	16.79	3.2	10.76	13.2	0.76	13.2	10	2	PVC	8/18/2008	---	9.99	6.80	---	9.98	6.81
PAI-27-MW16S [3]	12/11/2002	11.43	11.25	3.6	7.83	13.6	-2.17	13.6	10	2	PVC	8/18/2008	---	7.82	3.43	---	7.83	3.42
PAI-27-MW17S [1]	12/11/2002	NA [3]	12.50	8.0	6.70	13.0	1.70	13.0	5	1	PVC	8/18/2008	---	4.87	7.63	---	4.89	7.61
PAI-27-MW19S [1]	12/10/2002	NA [3]	11.59	6.0	5.51	11.0	0.51	11.0	5	1	PVC	8/18/2008	---	4.93	6.66	---	4.91	6.68
PAI-27-MW20S [1]	12/11/2002	7.28	9.98	8.0	5.10	13.0	0.10	13.0	5	1	PVC	8/18/2008	---	6.64	3.34	---	6.72	3.26
PAI-27-MW21S [1]	12/11/2002	7.62	10.44	8.0	3.83	13.0	-1.17	13.0	5	1	PVC	8/18/2008	---	7.02	3.42	---	7.13	3.31
PAI-27-TW-22S [4]	9/21/2007	10.79	12.27	8.0	2.79	13.0	-2.21	13.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-24S [4]	9/21/2007	11.72	12.88	9.0	2.72	14.0	-2.28	15.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-26S [4]	9/20/2007	14.70	16.43	8.0	6.70	13.0	1.70	13.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-28S [4]	9/20/2007	11.98	13.07	7.0	4.98	12.0	-0.02	12.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-30S [4]	9/19/2007	11.51	12.43	6.0	5.51	11.0	0.51	11.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-33S [4]	9/21/2007	13.10	13.95	8.0	5.10	13.0	0.10	13.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-39S [4]	9/20/2007	13.94	NA[5]	8.0	5.94	13.0	0.94	13.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-41S [4]	9/20/2007	7.55	8.77	6.0	1.55	11.0	-3.45	11.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-43S [4]	9/19/2007	9.36	9.88	9.5	-0.14	14.5	-5.14	14.5	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-46S [4]	9/20/2007	14.12	15.87	8.0	6.12	13.0	1.12	13.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-MW49S [6]	8/8/2008	13.49	13.24	3.0	10.49	13.0	0.49	13.5	10	2	PVC	8/18/2008	---	6.79	6.45	---	6.79	6.45
PAI-27-MW51S [6]	8/9/2008	10.31	10.05	3.0	7.31	13.0	-2.69	13.5	10	2	PVC	8/18/2008	---	2.37	7.68	---	2.40	7.65
PAI-27-MW53S [6]	8/9/2008	13.85	13.67	3.0	10.85	13.0	0.85	13.5	10	2	PVC	8/18/2008	---	8.63	5.04	---	8.83	4.84
PAI-27-MW55S [6]	8/7/2008	6.92	10.11	3.0	3.92	13.0	-6.08	13.5	10	2	PVC	8/18/2008	---	7.67	2.44	---	7.71	2.40
PAI-27-MW57S [6]	8/8/2008	7.38	7.20	3.0	4.38	13.0	-5.62	13.5	10	2	PVC	8/18/2008	---	3.01	4.19	---	3.07	4.13
PAI-27-MW58S [6]	8/8/2008	7.69	7.44	3.0	4.69	12.0	-4.31	12.5	9	2	PVC	8/18/2008	---	2.64	4.80	---	2.63	4.81
PAI-27-MW62S [6]	8/7/2008	6.67	9.94	3.0	3.67	13.0	-6.33	13.5	10	2	PVC	8/18/2008	---	7.12	2.82	---	7.25	2.69
PAI-27-MW63S [6]	8/10/2008	14.26	16.95	3.0	11.26	13.0	1.26	13.5	10	2	PVC	8/18/2008	---	11.31	5.64	---	11.30	5.65
PAI-27-MW64S [6]	8/10/2008	14.36	16.91	3.0	11.36	13.0	1.36	13.5	10	2	PVC	8/18/2008	---	9.76	7.15	---	9.77	7.14
PAI-27-TW65S [7]	8/6/2008	13.41	13.71	5.0	8.71	10.0	3.71	10.00	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW67S [7]	8/3/2008	13.90	14.19	5.0	9.19	10.0	4.19	10.00	5	1	PVC	---	---	---	---	---	---	---
Site 9/16																		
PAI-27-TW-35S [4]	9/21/2007	11.83	13.84	8.0	3.83	13.0	-1.17	13.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-37S [4]	9/21/2007	12.87	13.17	8.0	4.87	13.0	-0.13	13.0	5	1	PVC	---	---	---	---	---	---	---
PAI-9/16-TW01S [7]	8/6/2008	11.69	12.06	5.0	7.06	10.0	2.06	10.00	5	1	PVC	---	---	---	---	---	---	---
PAI-9/16-TW03S [7]	8/6/2008	11.75	12.08	5.0	7.08	10.0	2.08	10.00	5	1	PVC	---	---	---	---	---	---	---
PAI-9/16-MW05S [10]	9/7/2011	14.47	14.20	7.0	7.2	17.0	-2.8	17.00	10	2	PVC	---	---	---	---	---	---	---

TABLE 3-3

WATER LEVEL MEASUREMENTS
2002 THROUGH 2011
SITES 27, 9, AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

Well Number	Installation Date	Ground Elevation[1] (feet NAVD 88)	Top of Riser Elevation[1] (feet NAVD 88)	Screened Interval				Well Details				Water Level Information						
												2008 - High Tide (1015 hrs)				2008 - Low Tide (1627 hrs)		
				From (fbgs)	Elevation (feet NAVD 88)	To (fbgs)	Elevation (feet NAVD 88)	Well Depth (feet)	Screen Length (feet)	Diam. (inches)	Material	Date Measured	Depth to Product (feet below Top of Riser)	Depth to Water (feet below Top of Riser)	Elevation (feet NAVD 88)	Depth to Product (feet below Top of Riser)	Depth to Water (feet below Top of Riser)	Elevation (feet NAVD 88)
INTERMEDIATE WELLS																		
Site 27																		
PAI-27-MW02I [3]	12/17/2002	11.85	14.69	21.8	-9.95	24.8	-12.95	24.8	3	2	PVC	8/18/2008 [4]	---	11.99	2.70	---	8.15	6.54
PAI-27-MW05I [3]	12/13/2002	13.97	13.81	20.55	-6.58	23.55	-9.58	23.55	3	2	PVC	8/18/2008	---	7.56	6.25	---	7.47	6.34
PAI-27-MW07I [1]	12/16/2002	15.26	18.12	3.3	10.78	13.3	0.78	13.3	10	2	PVC	8/18/2008	---	11.09	7.03	---	11.10	7.02
PAI-27-MW12I [1]	12/13/2002	15.37	18.15	21.8	-9.95	24.8	-12.95	24.8	3	2	PVC	8/18/2008	---	11.15	7.00	---	11.17	6.98
PAI-27-MW15I [3]	12/13/2002	13.96	16.71	21.0	-7.04	24.0	-10.04	24.0	3	2	PVC	8/18/2008	---	10.14	6.57	---	10.17	6.54
PAI-27-MW18I [1]	12/12/2002	NA [3]	12.44	20.55	-6.58	23.55	-9.58	23.55	3	2	PVC	8/18/2008 [4]	---	7.03	5.41	---	6.87	5.57
PAI-27-TW-23I [4]	9/21/2007	10.86	11.88	18.0	-7.14	23.0	-12.14	25.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-25I [4]	9/21/2007	15.30	15.85	19.0	-3.70	24.0	-8.70	25.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-27I [4]	9/20/2007	14.80	15.75	19.0	-4.20	24.0	-9.20	25.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-29I [4]	9/20/2007	12.10	13.11	19.0	-6.90	24.0	-11.90	24.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-31I [4]	9/19/2007	11.47	11.87	19.0	-7.53	24.0	-12.53	24.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-32I [4]	9/20/2007	11.30	11.77	19.0	-7.70	24.0	-12.70	25.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-34I [4]	9/21/2007	13.07	13.87	20.0	-6.93	25.0	-11.93	25.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-40I [4]	9/20/2007	13.95	14.53	19.0	-5.05	24.0	-10.05	25.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-42I [4]	9/20/2007	7.55	7.97	20.0	-12.45	25.0	-17.45	25.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-44I [4]	9/19/2007	9.44	10.02	19.5	-10.06	24.5	-15.06	25.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-47I [4]	9/20/2007	14.09	15.21	19.0	-4.91	24.0	-9.91	25.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-MW48I [6]	8/9/2008	15.23	14.98	19.5	-4.27	24.5	-9.27	25.0	5	2	PVC	8/18/2008	---	8.26	6.72	---	8.32	6.66
PAI-27-MW50I [6]	8/8/2008	13.46	13.23	19.0	-5.54	24.0	-10.54	24.5	5	2	PVC	8/18/2008	---	6.85	6.38	---	6.85	6.38
PAI-27-MW52I [6]	8/9/2008	10.25	10.00	20.0	-9.75	25.0	-14.75	25.5	5	2	PVC	8/18/2008	---	6.79	3.21	---	6.76	3.24
PAI-27-MW54I [6]	8/9/2008	13.82	13.57	19.0	-5.18	24.0	-10.18	24.5	5	2	PVC	8/18/2008	---	8.61	4.96	---	8.80	4.77
PAI-27-MW56I [6]	8/7/2008	6.91	9.97	20.0	-13.09	25.0	-18.09	25.5	5	2	PVC	8/18/2008	---	7.09	2.88	---	7.09	2.88
PAI-27-MW59I [6]	8/8/2008	7.68	7.33	14.0	-6.32	19.0	-11.32	19.5	5	2	PVC	8/18/2008	---	2.61	4.72	---	2.60	4.73
PAI-27-MW60I [6]	8/10/2008	12.19	14.66	19.0	-6.81	24.0	-11.81	24.5	5	2	PVC	8/18/2008	---	9.93	4.73	---	9.92	4.74
PAI-27-TW66I [7]	8/6/2010	13.38	13.72	21.0	-7.3	26.0	-12.3	26.00	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW68I [7]	8/3/2010	13.90	14.23	22.0	-7.8	27.0	-12.8	27.00	5	1	PVC	---	---	---	---	---	---	---
Site 9/16																		
PAI-27-MW61I [6]	8/10/2008	14.54	14.13	19.5	-4.96	24.5	-9.96	25.0	5	2	PVC	8/18/2008	---	8.35	5.78	---	8.34	5.79
PAI-27-TW-36I [4]	9/21/2007	11.85	12.39	19.0	-7.15	24.0	-12.15	25.0	5	1	PVC	---	---	---	---	---	---	---
PAI-27-TW-38I [4]	9/21/2007	12.97	13.22	18.0	-5.03	23.0	-10.03	25.0	5	1	PVC	---	---	---	---	---	---	---
PAI-9/16-TW02I [7]	8/6/2010	11.72	12.10	15.0	-2.90	20.0	-7.90	20.00	5	1	PVC	---	---	---	---	---	---	---
PAI-9/16-TW04I [7]	8/6/2010	11.77	12.33	15.0	-2.70	20.0	-7.67	20.00	5	1	PVC	---	---	---	---	---	---	---
PAI-9/16-MW06I [10	9/7/2011	14.56	14.36	12.0	2.4	22.0	-7.6	25.00	10	2	PVC	---	---	---	---	---	---	---
DEEP WELLS																		
PAI-27-MW08D [1]	12/17/2002	15.38	18.16	33.0	-17.62	36.0	-20.62	36.0	3	2	PVC	8/18/2008	---	15.74	2.42	---	15.70	2.46
PAI-27-MW13D [1]	12/18/2002	15.23	18.06	32.8	-17.57	35.8	-20.57	36.0	3	2	PVC	8/18/2008	---	15.59	2.47	---	15.52	2.54
PAI-27-TW-45D [4]	9/19/2007	11.60	11.99	29.0	-17.40	34.0	-22.40	35.0	5	1	PVC	---	---	---	---	---	---	---

Notes:

NA - Not Available
msl - mean sea level
NM - Not Monitored

PVC - polyvinyl chloride
*Some wells were inaccessibe in 2011 due to construction

1 - Ground Elevations and Top of Riser Elevations not obtained from a licensed surveyor; consequently, a margin of error may exist. Ground Elevations, Top of Riser Elevations, and Screened Interval Depths are approximate. Ground Elevations obtained by subtracting length of riser from Top of Riser Elevations (Table 3-2 - Tetra Tech, 2003).

2 - Riser length not reported. Therefore, Ground Elevation could not be determined.

3 - Ground Elevations and Top of Riser Elevations of Permanent Monitoring Wells were obtained by a licensed surveyor in October 2007. Ground Elevations, Top of Riser Elevations, and Screened Interval Depths vary from information originally provided in December 2002.

4 - Ground Elevations of Temporary Wells obtained from a licensed surveyor in October 2007. Top of Riser Elevations obtained from adding length of risers to surveyed Ground Elevations.

5 - Length of riser not indicated on Temporary Monitoring Well Sheet, Top of Riser Elevation assumed to be same as Ground Elevation.

6 - Ground Elevations and Top of Riser Elevations of Permanent Wells obtained from licensed surveyor in September 2008.

7 - Ground Elevations and Top of Riser Elevations of Temporary Wells obtained from a licensed surveyor in August 2010.

8 - Depth to Water not measured because water levels in monitoring well had not recovered.

9 - Depth to Water may be approximate because water levels in monitoring well may not have completely recovered.

10 - Ground Elevations and Top of Riser Elevations of Permanent Monitoring Wells were obtained by a licensed surveyor in September 2011.

TABLE 3-3

WATER LEVEL MEASUREMENTS
2002 THROUGH 2011
SITES 27, 9, AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

Well Number	Installation Date	Ground Elevation[1] (feet NAVD 88)	Top of Riser Elevation[1] (feet NAVD 88)	Screened Interval				Well Details				Water Level Information 2010				Water Level Information 2011*			
				From (fbgs)	Elevation (feet NAVD 88)	To (fbgs)	Elevation (feet NAVD 88)	Well Depth (feet)	Screen Length (feet)	Diam. (inches)	Material	Date Measured	Depth to Product (feet below Top of Riser)	Depth to Water (feet below Top of Riser)	Depth to Water (feet NAVD 88)	Date Measured	Depth to Product (feet below Top of Riser)	Depth to Water (feet below Top of Riser)	Depth to Water (feet NAVD 88)
SHALLOW WELLS																			
Site 27																			
PAI-27-MW01S [1]	12/11/2002	12.14	15.02	4.15	9.23	14.15	-0.77	14.15	10.00	2	PVC	08/08/2010	---	7.45	7.57	09/30/2011	---	6.87	8.15
PAI-27-MW03S [3]	12/11/2002	13.38	13.24	4.15	9.23	14.15	-0.77	14.15	10.00	2	PVC	08/08/2010	---	6.37	6.87	09/30/2011	---	5.4	7.84
PAI-27-MW04S [3]	12/12/2002	14.08	13.87	3.3	10.78	13.3	0.78	13.3	10	2	PVC	08/08/2010	---	7.18	6.69	09/30/2011	---	6.07	7.80
PAI-27-MW06S [3]	12/16/2002	14.97	17.84	4.0	10.97	14.0	0.97	14.0	10	2	PVC	08/08/2010	---	10.92	6.92	09/30/2011	---	9.88	7.96
PAI-27-MW09S [3]	12/10/2002	15.34	15.07	4.0	11.34	14.0	1.34	14.0	10	2	PVC	08/08/2010	---	6.88	8.19	09/30/2011	---	7.87	7.20
PAI-27-MW10S [1]	12/12/2002	12.73	15.60	3.2	10.76	13.2	0.76	13.2	10	2	PVC	08/08/2010	---	9.7	5.90	09/30/2011	---	8.62	6.98
PAI-27-MW11S [1]	12/14/2002	15.28	18.12	3.6	7.83	13.6	-2.17	13.6	10	2	PVC	08/08/2010	11.20	11.53	6.59	09/30/2011	---	11.2	6.92
PAI-27-MW14S [3]	12/13/2002	13.96	16.79	3.2	10.76	13.2	0.76	13.2	10	2	PVC	08/08/2010	---	10.01	6.78	09/30/2011	---	9.1	7.69
PAI-27-MW16S [3]	12/11/2002	11.43	11.25	3.6	7.83	13.6	-2.17	13.6	10	2	PVC	08/08/2010	---	8.1	3.15	09/30/2011	---	NM	NM
PAI-27-MW17S [1]	12/11/2002	NA [3]	12.50	8.0	6.70	13.0	1.70	13.0	5	1	PVC	08/08/2010	---	5.64	6.86	09/30/2011	---	NM	NM
PAI-27-MW19S [1]	12/10/2002	NA [3]	11.59	6.0	5.51	11.0	0.51	11.0	5	1	PVC	08/08/2010	---	5.34	6.25	09/30/2011	---	NM	NM
PAI-27-MW20S [1]	12/11/2002	7.28	9.98	8.0	5.10	13.0	0.10	13.0	5	1	PVC	08/08/2010	---	7.91	2.07	09/30/2011	---	NM	NM
PAI-27-MW21S [1]	12/11/2002	7.62	10.44	8.0	3.83	13.0	-1.17	13.0	5	1	PVC	08/08/2010	---	8.23	2.21	09/30/2011	---	NM	NM
PAI-27-TW-22S [4]	9/21/2007	10.79	12.27	8.0	2.79	13.0	-2.21	13.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-24S [4]	9/21/2007	11.72	12.88	9.0	2.72	14.0	-2.28	15.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-26S [4]	9/20/2007	14.70	16.43	8.0	6.70	13.0	1.70	13.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-28S [4]	9/20/2007	11.98	13.07	7.0	4.98	12.0	-0.02	12.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-30S [4]	9/19/2007	11.51	12.43	6.0	5.51	11.0	0.51	11.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-33S [4]	9/21/2007	13.10	13.95	8.0	5.10	13.0	0.10	13.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-39S [4]	9/20/2007	13.94	NA[5]	8.0	5.94	13.0	0.94	13.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-41S [4]	9/20/2007	7.55	8.77	6.0	1.55	11.0	-3.45	11.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-43S [4]	9/19/2007	9.36	9.88	9.5	-0.14	14.5	-5.14	14.5	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-46S [4]	9/20/2007	14.12	15.87	8.0	6.12	13.0	1.12	13.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-MW49S [6]	8/8/2008	13.49	13.24	3.0	10.49	13.0	0.49	13.5	10	2	PVC	08/08/2010	---	7.05	6.19	09/30/2011	---	NM	NM
PAI-27-MW51S [6]	8/9/2008	10.31	10.05	3.0	7.31	13.0	-2.69	13.5	10	2	PVC	08/08/2010	---	2.58	7.47	09/30/2011	---	2.35	7.70
PAI-27-MW53S [6]	8/9/2008	13.85	13.67	3.0	10.85	13.0	0.85	13.5	10	2	PVC	08/08/2010	---	7.8	5.87	09/30/2011	---	8.22	5.45
PAI-27-MW55S [6]	8/7/2008	6.92	10.11	3.0	3.92	13.0	-6.08	13.5	10	2	PVC	08/08/2010	---	9	1.11	09/30/2011	---	NM	NM
PAI-27-MW57S [6]	8/8/2008	7.38	7.20	3.0	4.38	13.0	-5.62	13.5	10	2	PVC	08/08/2010	---	4.06	3.14	09/30/2011	---	NM	NM
PAI-27-MW58S [6]	8/8/2008	7.69	7.44	3.0	4.69	12.0	-4.31	12.5	9	2	PVC	08/08/2010	---	3.22	4.22	09/30/2011	---	NM	NM
PAI-27-MW62S [6]	8/7/2008	6.67	9.94	3.0	3.67	13.0	-6.33	13.5	10	2	PVC	08/08/2010	---	8.3	1.64	09/30/2011	---	NM	NM
PAI-27-MW63S [6]	8/10/2008	14.26	16.95	3.0	11.26	13.0	1.26	13.5	10	2	PVC	08/08/2010	---	11.55	5.40	09/30/2011	---	10.8	6.15
PAI-27-MW64S [6]	8/10/2008	14.36	16.91	3.0	11.36	13.0	1.36	13.5	10	2	PVC	08/08/2010	---	9.7	7.21	09/30/2011	---	9.23	7.68
PAI-27-TW65S [7]	8/6/2008	13.41	13.71	5.0	8.71	10.0	3.71	10.00	5	1	PVC	08/08/2010	---	7.48	6.23	---	---	---	---
PAI-27-TW67S [7]	8/3/2008	13.90	14.19	5.0	9.19	10.0	4.19	10.00	5	1	PVC	08/08/2010	---	7.8	6.39	---	---	---	---
Site 9/16																			
PAI-27-TW-35S [4]	9/21/2007	11.83	13.84	8.0	3.83	13.0	-1.17	13.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-37S [4]	9/21/2007	12.87	13.17	8.0	4.87	13.0	-0.13	13.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-9/16-TW01S [7]	8/6/2008	11.69	12.06	5.0	7.06	10.0	2.06	10.00	5	1	PVC	08/08/2010	---	5.01	7.05	---	---	---	---
PAI-9/16-TW03S [7]	8/6/2008	11.75	12.08	5.0	7.08	10.0	2.08	10.00	5	1	PVC	08/08/2010	---	6.87	5.21	---	---	---	---
PAI-9/16-MW05S [10]	9/7/2011	14.47	14.20	7.0	7.2	17.0	-2.8	17.00	10	2	PVC	---	---	---	---	09/30/2011	---	8.08	6.12

TABLE 3-3

WATER LEVEL MEASUREMENTS
2002 THROUGH 2011
SITES 27, 9, AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

Well Number	Installation Date	Ground Elevation[1] (feet NAVD 88)	Top of Riser Elevation[1] (feet NAVD 88)	Screened Interval				Well Details				Water Level Information 2010				Water Level Information 2011*			
				From (fbgs)	Elevation (feet NAVD 88)	To (fbgs)	Elevation (feet NAVD 88)	Well Depth (feet)	Screen Length (feet)	Diam. (inches)	Material	Date Measured	Depth to Product (feet below Top of Riser)	Depth to Water (feet below Top of Riser)	Depth to Water (feet NAVD 88)	Date Measured	Depth to Product (feet below Top of Riser)	Depth to Water (feet below Top of Riser)	Depth to Water (feet NAVD 88)
INTERMEDIATE WELLS																			
Site 27																			
PAI-27-MW02I [3]	12/17/2002	11.85	14.69	21.8	-9.95	24.8	-12.95	24.8	3	2	PVC	08/08/2010	---	8.34	6.35	09/30/2011	---	7.75	6.94
PAI-27-MW05I [3]	12/13/2002	13.97	13.81	20.55	-6.58	23.55	-9.58	23.55	3	2	PVC	08/08/2010	---	7.11	6.70	09/30/2011	---	6.63	7.18
PAI-27-MW07I [1]	12/16/2002	15.26	18.12	3.3	10.78	13.3	0.78	13.3	10	2	PVC	08/08/2010	---	11.25	6.87	09/30/2011	---	10.62	7.50
PAI-27-MW12I [1]	12/13/2002	15.37	18.15	21.8	-9.95	24.8	-12.95	24.8	3	2	PVC	08/08/2010	---	11.3	6.85	09/30/2011	---	10.56	7.59
PAI-27-MW15I [3]	12/13/2002	13.96	16.71	21.0	-7.04	24.0	-10.04	24.0	3	2	PVC	08/08/2010	---	10.3	6.41	09/30/2011	---	9.47	7.24
PAI-27-MW18I [1]	12/12/2002	NA [3]	12.44	20.55	-6.58	23.55	-9.58	23.55	3	2	PVC	08/08/2010	---	6.27	6.17	09/30/2011	---	NM	NM
PAI-27-TW-23I [4]	9/21/2007	10.86	11.88	18.0	-7.14	23.0	-12.14	25.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-25I [4]	9/21/2007	15.30	15.85	19.0	-3.70	24.0	-8.70	25.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-27I [4]	9/20/2007	14.80	15.75	19.0	-4.20	24.0	-9.20	25.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-29I [4]	9/20/2007	12.10	13.11	19.0	-6.90	24.0	-11.90	24.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-31I [4]	9/19/2007	11.47	11.87	19.0	-7.53	24.0	-12.53	24.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-32I [4]	9/20/2007	11.30	11.77	19.0	-7.70	24.0	-12.70	25.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-34I [4]	9/21/2007	13.07	13.87	20.0	-6.93	25.0	-11.93	25.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-40I [4]	9/20/2007	13.95	14.53	19.0	-5.05	24.0	-10.05	25.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-42I [4]	9/20/2007	7.55	7.97	20.0	-12.45	25.0	-17.45	25.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-44I [4]	9/19/2007	9.44	10.02	19.5	-10.06	24.5	-15.06	25.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-47I [4]	9/20/2007	14.09	15.21	19.0	-4.91	24.0	-9.91	25.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-MW48I [6]	8/9/2008	15.23	14.98	19.5	-4.27	24.5	-9.27	25.0	5	2	PVC	08/08/2010	---	7.96	7.02	09/30/2011	---	7.81	7.17
PAI-27-MW50I [6]	8/8/2008	13.46	13.23	19.0	-5.54	24.0	-10.54	24.5	5	2	PVC	08/08/2010	---	7.16	6.07	09/30/2011	---	NM	NM
PAI-27-MW52I [6]	8/9/2008	10.25	10.00	20.0	-9.75	25.0	-14.75	25.5	5	2	PVC	08/08/2010	---	6.84	3.16	09/30/2011	---	6.57	3.43
PAI-27-MW54I [6]	8/9/2008	13.82	13.57	19.0	-5.18	24.0	-10.18	24.5	5	2	PVC	08/08/2010	---	7.85	5.72	09/30/2011	---	8.2	5.37
PAI-27-MW56I [6]	8/7/2008	6.91	9.97	20.0	-13.09	25.0	-18.09	25.5	5	2	PVC	08/08/2010	---	7.13	2.84	09/30/2011	---	NM	NM
PAI-27-MW59I [6]	8/8/2008	7.68	7.33	14.0	-6.32	19.0	-11.32	19.5	5	2	PVC	08/08/2010	---	3.14	4.19	09/30/2011	---	NM	NM
PAI-27-MW60I [6]	8/10/2008	12.19	14.66	19.0	-6.81	24.0	-11.81	24.5	5	2	PVC	08/08/2010	---	10.08	4.58	09/30/2011	---	9.65	5.01
PAI-27-TW66I [7]	8/6/2010	13.38	13.72	21.0	-7.3	26.0	-12.3	26.00	5	1	PVC	08/08/2010	---	7.6	6.12	09/30/2011	---	---	---
PAI-27-TW68I [7]	8/3/2010	13.90	14.23	22.0	-7.8	27.0	-12.8	27.00	5	1	PVC	08/08/2010	---	8.03	6.20	09/30/2011	---	---	---
Site 9/16																			
PAI-27-MW61I [6]	8/10/2008	14.54	14.13	19.5	-4.96	24.5	-9.96	25.0	5	2	PVC	08/08/2010	---	8.68	5.45	09/30/2011	---	8.21	5.92
PAI-27-TW-36I [4]	9/21/2007	11.85	12.39	19.0	-7.15	24.0	-12.15	25.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-27-TW-38I [4]	9/21/2007	12.97	13.22	18.0	-5.03	23.0	-10.03	25.0	5	1	PVC	---	---	---	---	---	---	---	---
PAI-9/16-TW02I [7]	8/6/2010	11.72	12.10	15.0	-2.90	20.0	-7.90	20.00	5	1	PVC	08/08/2010	---	6.01	6.05	---	---	---	---
PAI-9/16-TW04I [7]	8/6/2010	11.77	12.33	15.0	-2.70	20.0	-7.67	20.00	5	1	PVC	08/08/2010	---	7.11	4.97	---	---	---	---
PAI-9/16-MW06I [10]	9/7/2011	14.56	14.36	12.0	2.4	22.0	-7.6	25.00	10	2	PVC	---	---	---	---	09/30/2011	---	8.33	6.03
DEEP WELLS																			
PAI-27-MW08D [1]	12/17/2002	15.38	18.16	33.0	-17.62	36.0	-20.62	36.0	3	2	PVC	08/08/2010	---	16.04	2.12	09/30/2011	---	15.47	2.69
PAI-27-MW13D [1]	12/18/2002	15.23	18.06	32.8	-17.57	35.8	-20.57	36.0	3	2	PVC	08/08/2010	---	15.89	2.17	09/30/2011	---	15.3	2.76
PAI-27-TW-45D [4]	9/19/2007	11.60	11.99	29.0	-17.40	34.0	-22.40	35.0	5	1	PVC	---	---	---	---	---	---	---	---

Notes:

NA - Not Available
msl - mean sea level
NM - Not Monitored

PVC - polyvinyl chloride
*Some wells were inaccessibe in 2011 due to construction

1 - Ground Elevations and Top of Riser Elevations not obtained from a licensed surveyor; consequently, a margin of error may exist. Ground Elevations, Top of Riser Elevations, and Screened Interval Depths are approximate. Ground Elevations obtained by subtracting length of riser from Top of Riser Elevations (Table 3-2 - Tetra Tech, 2003).

2 - Riser length not reported. Therefore, Ground Elevation could not be determined.

3 - Ground Elevations and Top of Riser Elevations of Permanent Monitoring Wells were obtained by a licensed surveyor in October 2007. Ground Elevations, Top of Riser Elevations, and Screened Interval Depths vary from information originally provided in December 2002.

4 - Ground Elevations of Temporary Wells obtained from a licensed surveyor in October 2007. Top of Riser Elevations obtained from adding length of risers to surveyed Ground Elevations.

5 - Length of riser not indicated on Temporary Monitoring Well Sheet, Top of Riser Elevation assumed to be same as Ground Elevation.

6 - Ground Elevations and Top of Riser Elevations of Permanent Wells obtained from licensed surveyor in September 2008.

7 - Ground Elevations and Top of Riser Elevations of Temporary Wells obtained from a licensed surveyor in August 2010.

8 - Depth to Water not measured because water levels in monitoring well had not recovered.

9 - Depth to Water may be approximate because water levels in monitoring well may not have completely recovered.

10 - Ground Elevations and Top of Riser Elevations of Permanent Monitoring Wells were obtained by a licensed surveyor in September 2011.

TABLE 3-4

SITE 27 ON-SITE SOIL TEST KIT RESULTS - SURFACE SOIL
AUGUST 2010
MCRD PARRIS ISLAND, SOUTH CAROLINA

Sample ID	Date	Time	FLUTe	PID	DDT in ppm	PetroFLAG Hydrocarbon in ppm	Oil in Soil TPH in ppm	Comments
PAI-27-SO33-01	2010/07/21	1620	ND	0.0; 0.0	0 - 0.2	370	<500	
PAI-27-SO34-01	2010/07/24	915	ND	0.0; 0.0	0 - 0.2	1121	<500	
PAI-27-SO35-01	2010/07/21	820	ND	0.0; 0.0	0.2 - 1.0	477	<500	
PAI-27-SO36-01	2010/07/22	720	ND	0.0; 0.0	0 - 0.2	848	<500	
PAI-27-SO37-01	2010/07/21	915	ND	0.0; 0.0	0 - 0.2	217	<500	
PAI-27-SO38-01	2010/07/24	1205	ND	0.0; 0.0	0 - 0.2	1889	<500	
PAI-27-SO38A-01	2010/08/03	1315	ND	0.0; 0.0	0 - 0.2	159	<500	
PAI-27-SO39-01	2010/07/24	1105	ND	0.0; 0.0	0 - 0.2	409	<500	
PAI-27-SO40-01	2010/07/21	1100	ND	0.0; 0.0	0.2 - 1.0	896	<500	
PAI-27-SO41-01	2010/07/21	1510	ND	0.0; 0.0	0 - 0.2	143	<500	
PAI-27-SO42-01	2010/07/21	1255	ND	0.0; 0.0	0 - 0.2	143	<500	
PAI-27-SO43-01	2010/07/22	1505	ND	0.0; 0.0	0 - 0.2	625	<500	
PAI-27-SO44-01	2010/07/22	1120	ND	0.0; 0.0	0.2 - 1.0	1091	<500	
PAI-27-SO45-01	2010/07/23	1535	ND	0.0; 0.0	0 - 0.2	549	<500	
PAI-27-SO45A-01	2010/08/03	1440	ND	0.0; 0.0	0 - 0.2	340	<500	
PAI-27-SO45B-01	2010/08/03	1525	ND	0.7; 0.1	0 - 0.2	148	<500	
PAI-27-SO46-01	2010/08/06	1540	ND	0.0; 0.0	*	*	*	TW location
PAI-27-SO47-01	2010/08/03	1000	ND	0.0; 0.0	*	*	*	TW location
PAI-27-S048-01	2010/07/22	950	ND	0.0; 0.0	0 - 0.2	368	<500	

Notes:

ppm - parts per million ND - not detected

* - On-site analytical not completed because this was a temporary well point.

Elevated DDT

TABLE 3-5

SITE 27 ON-SITE SOIL TEST KIT RESULTS - SUBSURFACE SOIL
AUGUST 2010
MCRD PARRIS ISLAND, SOUTH CAROLINA

Sample ID	Date	Time	FLUTe	PID	DDT in ppm	PetroFLAG Hydrocarbon in ppm	Oil in Soil TPH in ppm	Comments
PAI-27-SO33-05	2010/07/21	1630	ND	0.0; 0.0	0 - 0.2	183	<500	
PAI-27-SO33-08	2010/07/21	1640	ND	0.0; 0.0	0 - 0.2	100	<500	
PAI-27-SO34-05	2010/07/24	920	ND	0.0; 0.0	0 - 0.4	402	<500	
PAI-27-SO34-12	2010/07/24	940	ND	0.0; 0.0	0 - 0.4	414	<500	
PAI-27-SO35-05	2010/07/21	825	ND	0.0; 0.0	0 - 0.2	174	<500	
PAI-27-SO35-08	2010/07/21	835	ND	0.0; 0.0	0 - 0.2	150	<500	
PAI-27-SO36-05	2010/07/22	725	ND	0.0; 0.0	0 - 0.2	94	<500	
PAI-27-SO36-08	2010/07/22	750	ND	0.0; 0.0	0 - 0.4	238	<500	
PAI-27-SO37-05	2010/07/21	930	ND	0.0; 0.0	0 - 0.2	53	<500	
PAI-27-SO37-08	2010/07/21	940	ND	0.0; 0.0	0 - 0.2	183	<500	
PAI-27-SO38-05	2010/07/24	1210	Hit at 4 feet [A]	0.0; 0.0	0 - 0.2	23	<500	
PAI-27-SO38-10	2010/07/24	1215	ND	0.1; 0.0	0 - 0.4	272	<500	
PAI-27-SO38A-05	2010/08/03	1320	ND	0.0; 0.0	0 - 0.4	12	<500	
PAI-27-SO38A-10	2010/08/03	1325	ND	0.0; 0.0	0 - 0.4	288	<500	
PAI-27-SO39-05	2010/07/24	1110	Hit at 3 feet [A]	0.0; 0.0	0 - 0.2	122	<500	
PAI-27-SO39-10	2010/07/24	1130	ND	0.1; 2.6	0 - 0.4	86	<500	
PAI-27-SO40-05	2010/07/21	1110	ND	0.0; 0.0	0 - 0.2	37	<500	
PAI-27-SO40-08	2010/07/21	1125	ND	0.0; 0.0	0 - 0.2	73	<500	
PAI-27-SO41-05	2010/07/21	1520	ND	0.0; 0.0	0 - 0.2	64	<500	
PAI-27-SO41-08	2010/07/21	1540	ND	0.0; 0.0	0 - 0.2	212	<500	
PAI-27-SO42-05	2010/07/21	1305	ND	0.0; 0.0	0 - 0.2	43	<500	
PAI-27-SO42-08	2010/07/21	1405	ND	0.0; 0.0	0 - 0.4	82	<500	
PAI-27-SO43-05	2010/07/22	1510	ND	0.0; 0.0	0 - 0.2	5	<500	
PAI-27-S043-08	2010/07/22	1535	ND	0.0; 0.0	2 - 20	242	<500	
PAI-27-SO44-05	2010/07/22	1125	ND	0.0; 0.0	0 - 0.2	73	<500	
PAI-27-SO44-08	2010/07/22	1145	Hit at 7.5 feet	8.2; 7.6	>20	1686	>500	PID at 8-10: 101.5 and 9.6
PAI-27-SO45-05	2010/07/23	1540	ND	0.0; 0.0	0 - 0.2	24	<500	
PAI-27-SO45-10	2010/07/23	1555	ND	0.0; 0.0	2 - 20	52	<500	
PAI-27-SO45A-05	2010/08/03	1445	ND	0.0; 0.0	0 - 0.2	0	<500	
PAI-27-SO45A-10	2010/08/03	1450	ND	0.0; 0.0	0 - 0.4	46	<500	
PAI-27-SO45B-05	2010/08/03	1530	ND	0.1; 0.1	0 - 0.2	23	<500	
PAI-27-SO45B-10	2010/08/03	1535	ND	0.0; 0.0	0 - 0.4	96	<500	
PAI-27-SO46-05	2010/08/06	1545	Hit at 6 feet	0.0; 0.0	*	*	*	
PAI-27-SO46-10	2010/08/06	1550	ND	33; 13	*	*	*	PID 11-15: 4.7; 0.4; 0.8; 1.4; 0.3
PAI-27-SO47-05	2010/08/03	1005	ND	0.3; 0.4	*	*	*	
PAI-27-SO47-08	2010/08/03	1010	Hit at 8 feet	0.4; 40.7	*	*	*	
PAI-27-SO47-10	2010/08/03	1015	ND	41.0;94.7; 16.3	*	*	*	PID 11-15: 13.6; 17.9; 0.9; 4.5; 3.5
PAI-27-SO48-05	2010/07/22	955	ND	0.0; 0.0	0 - 0.2	77	<500	
PAI-27-SO48-08	2010/07/22	1000	ND	32.2; 2.7	0 - 0.2	278	>500 [B]	

Notes

ppm - parts per million ND - not detected

Diluted Sample - dilution already calculated in listed result

* - on-site analytical not completed because this was a temp well point.

[A] - questionable hit on Flute liner

[B] - very slight reaction to oil in soil test kit

Elevated DDT

Elevated TPH

More than one parameter elevated

FLUTe hit

TABLE 3-6

SITE 55 ON-SITE SOIL TEST KIT RESULTS - SURFACE SOIL
AUGUST 2010
MCRD PARRIS ISLAND, SOUTH CAROLINA

Sample ID	Date	Time	FLUTe	PID	DDT in ppm	PetroFLAG Hydrocarbon in ppm	Oil in Soil TPH in ppm	Comments
PAI-55-SO01-01	2010/07/23	1145	ND	0.0; 0.0	0 - 0.2	96	<500	
PAI-55-SO02-01	2010/07/23	1000	ND	0.0; 0.0	0 - 0.2	183	<500	
PAI-55-SO02A-01	2010/08/04	0840	ND	0.0; 0.0	0 - 0.2	170	<500	
PAI-55-SO03-01	2010/07/23	840	ND	0.0; 0.0	0.2 - 1.0	564	<500	
PAI-55-SO04-01	2010/07/22	1400	ND	0.0; 0.0	0 - 0.2	333	<500	
PAI-55-SO05-01	2010/07/23	1425	ND	0.0; 0.0	0.2 - 1.0	364	<500	
PAI-55-SO06-01	2010/07/24	1445	ND	0.0; 0.0	0 - 0.2	432	<500	
PAI-55-SO07-01	2010/07/25	1115	ND	19.8; 0.0	0 - 0.2	429	<500	
PAI-55-SO07A-01	2010/08/04	0920	ND	16.1; 12.0	0 - 0.2	387	<500	
PAI-55-SO07B-01	2010/08/06	1340	NA	0.0; 0.0	0.2 - 1.0	Off Scale	<500	
PAI-55-SO08-01	2010/07/25	955	ND	1.1;0.3	0.2 - 1.0	336	<500	
PAI-55-SO09-01	2010/07/25	850	ND	0.1; 0.2	0 - 0.2	155	<500	
PAI-55-SO10-01	2010/07/24	1540	ND	0.0; 0.0	0 - 0.2	193	<500	
PAI-55-SO10A-01	2010/08/04	1105	ND	0.0; 0.0	0 - 0.2	136	<500	
PAI-55-SO10B-01	2010/08/05	1130	ND	0.0; 0.0	0.2 - 1.0	523	<500	
PAI-55-SO10C-01	2010/08/06	1355	ND	0.0; 0.0	0 - 0.2	283	<500	
PAI-55-SO11-01	2010/07/25	1410	ND	0.0; 0.0	0 - 0.2	84	<500	
PAI-55-SO12-01	2010/07/26	1105	ND	0.0; 0.0	0.2 - 1.0	726	<500	
PAI-55-SO13-01	2010/07/26	0955	ND	0.0; 0.0	0.2 - 1.0	422	<500	
PAI-55-SO14-01	2010/07/26	0850	ND	0.0; 0.0	1.0 - 10.0	317	<500	
PAI-55-SO14A-01	2010/08/04	1345	ND	0.0; 0.0	0 - 0.2	202	<500	
PAI-55-SO14B-01	2010/08/05	0905	ND	0.0; 0.0	0.2 - 1.0	292	<500	
PAI-55-SO14C-01	2010/08/06	1350	ND	0.0; 0.0	1.0 - 10.0	278	<500	
PAI-55-SO15-01	2010/07/26	1410	ND	0.0; 0.0	0 - 0.2	478	<500	
PAI-55-SO16-01	2010/07/27	0850	ND	0.0; 0.0	0.2 - 1.0	Off Scale	<500	
PAI-55-SO17-01	2010/07/27	0955	ND	0.0; 0.0	0.2 - 1.0	Off Scale	<500	
PAI-55-SO17A-01	2010/08/04	1000	ND	0.0; 0.0	1.0 - 10.0	1169	<500	
PAI-55-SO17B-01	2010/08/06	1433	ND	0.0; 0.0	1.0 - 10.0	755	<500	
PAI-55-SO17C-02	2010/08/12	1020	NA	NA	NA	NA	NA	
PAI-55-SO17D-03	2010/08/12	1030	NA	NA	NA	NA	NA	
PAI-55-SO18-01	2010/07/27	1055	ND	0.0; 0.0	1.0 - 10.0	222	<500	
PAI-55-SO18A-01	2010/08/04	1305	ND	0.0; 0.0	0 - 0.2	334	<500	

Notes:

ppm - parts per million ND - not detected NA - not analyzed

Elevated DDT

More than one parameter elevated

TABLE 3-7

SITE 55 ON-SITE SOIL TEST KIT RESULTS - SUBSURFACE SOIL
AUGUST 2010
MCRD PARRIS ISLAND, SOUTH CAROLINA

Sample ID	Date	Time	FLUTe	PID	DDT in ppm	PetroFLAG Hydrocarbon in ppm	Oil in Soil TPH in ppm	Comments
PAI-55-SO01-05	2010/07/23	1150	ND	0.0	0 - 0.2	39	<500	
PAI-55-SO01-10	2010/07/23	1155	ND	0.0	0 - 0.4	88	<500	
PAI-55-SO02-05	2010/07/23	1005	ND	0.0; 0.1	0 - 0.2	33	<500	
PAI-55-SO02-08	2010/07/23	1015	ND	0.0; 96.3	>20	968	<500	
PAI-55-SO02-10	2010/07/23	1020	ND	38.9; 15.5; 4.1	>20	136	<500	
PAI-55-SO02A-05	2010/08/04	0845	ND	0.0; 0.0	0 - 0.2	0	<500	
PAI-55-SO02A-10	2010/08/04	0850	ND	0.0; 0.4	0 - 0.4	160	<500	
PAI-55-SO03-05	2010/07/23	845	ND	0.0	0.2 - 1.0	19	<500	
PAI-55-SO03-10	2010/07/23	850	Hit at 8'	39.2; 6.2; 5.1	>20	136	<500	PID at 6-8: 0.4; 6.7
PAI-55-SO04-05	2010/07/22	1405	ND	0.0	0 - 0.2	42	<500	
PAI-55-SO04-10	2010/07/22	1415	Hit at 9-10	22.6;7.8	>20	2634	>500	PID at 6-8: 8.0;11.0
PAI-55-SO05-05	2010/07/23	1430	ND	0.0	0.2 - 1.0	1	<500	
PAI-55-SO05-10	2010/07/23	1435	ND	62.6; 90.4	>20	Off Scale	>500	PID at 6-8: 1.3; 0.6
PAI-55-SO06-05	2010/07/24	1450	ND	0.0	0 - 0.2	65	<500	
PAI-55-SO06-10	2010/07/24	1455	ND	0.0	0 - 0.4	74	<500	
PAI-55-SO07-05	2010/07/25	1120	ND	0.0; 0.5	0 - 0.2	17	<500	
PAI-55-SO07-10	2010/07/25	1130	ND	88.9; 4.0	>20	1118	>500	PID at 6-8: 8.9; 31.3
PAI-55-SO07A-05	2010/08/04	0925	ND	0.3; 0.0	0 - 0.2	0	<500	
PAI-55-SO07A-10	2010/08/04	0930	ND	0.0; 0.0	0 - 0.4	0	<500	PID at 6-8: 1.7; 0.6
PAI-55-SO08-05	2010/07/25	1000	ND	0.4; 0.3; 0.2	0 - 0.2	38	<500	
PAI-55-SO08-10	2010/07/25	1010	ND	0.5;1.6	0.4 - 2.0	50	<500	PID at 6-8: 0.3; 0.5
PAI-55-SO09-05	2010/07/25	855	ND	0.3;0.4;9.4	>10	1028	<500	
PAI-55-SO09-10	2010/07/25	925	ND	8.4; 162.0; 172	>20	Off Scale	>500	PID at 6-8: 20.3; 35.1
PAI-55-SO10-05	2010/07/24	1545	ND	0.0	0 - 0.2	57	<500	
PAI-55-SO10-10	2010/07/24	1550	ND	11.3; 7.3	>20	1514	<500	
PAI-55-SO10A-05	2010/08/04	1110	ND	0.0; 0.0	0 - 0.2	20	<500	
PAI-55-SO10A-09	2010/08/04	1115	ND	0.0; 0.0	2.0 - 20.0	28	<500	
PAI-55-SO10B-05	2010/08/05	1135	ND	0.0; 0.0	0 - 0.2	56	<500	
PAI-55-SO10B-10	2010/08/05	1140	ND	0.0; 0.0	0 - 0.4	36	<500	
55-SO11-05	2010/07/25	1415	ND	0.0; 0.0	0 - 0.2	20	<500	
PAI-55-SO11-08	2010/07/25	1425	ND	1.7; 2.8	>20	986	>500	

TABLE 3-7

SITE 55 ON-SITE SOIL TEST KIT RESULTS - SUBSURFACE SOIL
AUGUST 2010
MCRD PARRIS ISLAND, SOUTH CAROLINA

Sample ID	Date	Time	FLUTe	PID	DDT in ppm	PetroFLAG Hydrocarbon in ppm	Oil in Soil TPH in ppm	Comments
PAI-55-SO11-10	2010/07/25	1430	Hit at 9'bgs	50.6; 34.4; 217	>20	Off Scale	>500	
PAI-55-SO12-05	2010/07/26	1110	ND	0.0; 0.0	0 - 0.2	0	<500	
PAI-55-SO12-10	2010/07/26	1115	ND	4.6; 5.0	>20	876	>500	
PAI-55-SO13-05	2010/07/26	1000	ND	0.0; 0.0	0 - 0.2	16	<500	PID at 6-8: 0.0; 0.4
PAI-55-SO13-10	2010/07/26	1005	Hit at 9.5-10'	48.2;12.2; 218	>20	Off Scale	>500	
PAI-55-SO14-05	2010/07/26	0855	ND	0.0; 0.0	0 - 0.2	59	<500	
PAI-55-SO14-10	2010/07/26	0900	ND	9.4; 19.4; 1.5	>20	916	>500	PID at 6-8: 1.5; 0.0
PAI-55-SO14A-05	2010/08/04	1350	ND	0.0; 0.0	0 - 0.2	8	<500	
PAI-55-SO14A-10	2010/08/04	1355	Hit at 8'	114; 15.3; 5.4	>20	1994	>500	
PAI-55-SO14B-05	2010/08/05	0910	ND	0.0; 0.0	0 - 0.2	40	<500	
PAI-55-SO14B-10	2010/08/05	0915	ND	26.3; 25.2	>20	996	>500	
PAI-55-SO14C-05	2010/08/06	1355	ND	0.0; 0.0	0 - 0.2	17	<500	
PAI-55-SO14C-10	2010/08/06	1400	ND	0.0; 0.0	0 - 0.4	56	<500	
PAI-55-SO15-05	2010/07/26	1415	ND	0.0; 0.0	0 - 0.2	0	<500	
PAI-55-SO15-10	2010/07/26	1420	ND	0.0; 0.0	0 - 0.4	0	<500	
PAI-55-SO16-05	2010/07/27	0855	ND	0.0; 0.0	0 - 0.2	0	<500	
PAI-55-SO16-10	2010/07/27	0900	ND	0.1; 0.0	0 - 0.4	0	<500	PID at 6-8: 0.3; 0.1; 0.2
PAI-55-SO17-05	2010/07/27	1000	ND	0.0; 0.0	0.2 - 1.0	0	<500	PID at 6-8: 0.2; 0.9
PAI-55-SO17-10	2010/07/27	1005	ND	0.6; 2.5; 15.3	>20	76	<500	
PAI-55-SO17A-05	2010/08/04	1005	ND	0.0; 0.0	0 - 0.2	5	<500	
PAI-55-SO17A-10	2010/08/04	1010	ND	0.0; 0.0	0 - 0.4	92	<500	
PAI-55-SO18-05	2010/07/27	1100	ND	0.0; 0.0	0 - 0.2	0	<500	
PAI-55-SO18-10	2010/07/27	1105	ND	0.0; 0.0	0.4 - 2.0	0	<500	
PAI-55-SO18A-05	2010/08/04	1310	ND	0.0; 0.0	0 - 0.2	780	<500	
PAI-55-SO18A-10	2010/08/04	1315	ND	0.0; 0.0	0 - 0.4	26	<500	

Notes:
ppm - parts per million ND - not detected
Diluted Sample - dilution already calculated in listed result
Elevated DDT
More than one parameter elevated

TABLE 3-8

SITES 9 AND 16 ON-SITE SOIL TEST KIT RESULTS - SURFACE SOIL
AUGUST 2010
MCRD PARRIS ISLAND, SOUTH CAROLINA

Sample ID	Date	Time	FLUTe	PID	DDT in ppm	PetroFLAG Hydrocarbon in ppm	Oil in Soil TPH in ppm
PAI-9/16-SO01-01	2010/08/05	1020	ND	0.0; 0.0	0 - 0.2	86	<500
PAI-9/16-SO02-01	2010/08/06	1050	ND	0.0; 0.0	0.2 - 1.0	221	<500
PAI-9/16-SO02A-01	2010/08/12	945	NA	0.0; 0.0	NA	NA	NA
PAI-9/16-SO02B-01	2010/08/12	950	NA	0.0; 0.0	NA	NA	NA
PAI-9/16-SO03-01	2010/08/05	1325	ND	0.0; 0.0	0 - 0.2	173	<500
PAI-9/16-SO04-01	2010/08/05	1410	ND	0.0; 0.0	1.0 - 10.0	391	<500
PAI-9/16-SO04A-01	2010/08/06	1405	ND	0.0; 0.0	0.2 - 1.0	760	<500
PAI-9/16-SO04B-01	2010/08/12	1000	NA	0.0; 0.0	NA	NA	NA
PAI-9/16-SO04C-01	2010/08/12	1010	NA	0.0; 0.0	NA	NA	NA
PAI-9/16-SO05-01	2010/08/05	1450	ND	0.0; 0.0	1.0 - 10.0	230	<500
PAI-9/16-SO05A-01	2010/08/06	1413	ND	0.0; 0.0	0 - 0.2	275	<500
PAI-9/16-SO06-01	2010/08/05	1535	ND	0.0; 0.0	1.0 - 10.0	968	<500
PAI-9/16-SO06A-01	2010/08/06	1420	ND	0.0; 0.0	0 - 0.2	381	<500
PAI-9/16-SO07-01	2010/08/06	0930	ND	0.0; 0.0	0 - 0.2	59	<500

Notes:
ppm - parts per million
ND - Not Detected
NA - Not Analyzed
Elevated DDT

TABLE 3-9

SITES 9 AND 16 ON-SITE SOIL TEST KIT RESULTS - SUBSURFACE SOIL
AUGUST 2010
MCRD PARRIS ISLAND, SOUTH CAROLINA

Sample ID	Date	Time	FLUTe	PID	DDT in ppm	PetroFLAG Hydrocarbon in ppm	Oil in Soil TPH in ppm
PAI-9/16-SO01-05	2010/08/05	1025	ND	0.0; 0.0	0 - 0.2	15	<500
PAI-9/16-SO02-05	2010/08/06	1055	ND	0.0; 0.0	0 - 0.2	0	<500
PAI-9/16-SO03-05	2010/08/05	1330	ND	0.0; 0.0	0 - 0.2	76	<500
PAI-9/16-SO04-05	2010/08/05	1415	ND	0.0; 0.0	0 - 0.4	16	<500
PAI-9/16-SO05-05	2010/08/05	1455	ND	0.0; 0.0	0 - 0.2	44	<500
PAI-9/16-SO06-05	2010/08/05	1540	ND	0.0; 0.0	0 - 0.2	47	<500
PAI-9/16-SO07-05	2010/08/06	0935	ND	0.0; 0.0	0 - 0.2	36	<500

Notes:

Diluted Sample - dilution already calculated in listed result

ND - Not detected

TABLE 3-10

HYDRAULIC CONDUCTIVITY SUMMARY
SITE 27 - AUGUST 2008
MCRD PARRIS ISLAND, SOUTH CAROLINA

Monitoring Well	Test Type	Screened Interval (ft bgs)	Hydraulic Conductivity K (ft/day)	Hydraulic Conductivity K (cm/sec)
Shallow Zone				
PAI-27-MW6	Rising Head	4-14	1.38	4.86E-04
PI027MW14	Rising Head	3.2-13.2	30.6	1.08E-02
PI027MW16	Rising Head	3.6-13.6	33.3	1.17E-02
PI027MW19	Rising Head	2-12	19.0	6.71E-03
PI027MW21	Rising Head	2.4-12.4	15.4	5.43E-03
PAI-27-MW49S	Rising Head	3-13	33.7	1.19E-02
PAI-27-MW51S	Rising Head	3-13	4.0	1.41E-03
PAI-27-MW53S	Rising Head	3-13	17.6	6.22E-03
PAI-27-MW55S	Rising Head	3-13	10.5	3.72E-03
PAI-27-MW57S	Rising Head	3-13	2.1	7.35E-04
PAI-27-MW58S	Rising Head	3-13	1.5	5.19E-04
PAI-27-MW63S	Rising Head	3-13	34.0	1.20E-02
PAI-27-MW64S	Rising Head	3-13	18.6	6.57E-03
		Geometric Mean	10.5	3.72E-03
		Arithmetic Mean	17.1	6.02E-03
Intermediate Zone				
PI055MW07I	Rising Head	23.8-26.8	0.48	1.71E-04
PI027MW15I	Rising Head	21-24	0.76	2.66E-04
PAI-27-MW48I	Rising Head	19.5-24.5	0.57	2.01E-04
PAI-27-MW50I	Rising Head	19-24	0.77	2.70E-04
PAI-27-MW52I	Rising Head	20-25	0.67	2.36E-04
PAI-27-MW54I	Rising Head	19-24	0.54	1.90E-04
PAI-27-MW56I	Rising Head	20-25	21.98	7.75E-03
PAI-27-MW59I	Rising Head	14-19	0.88	3.11E-04
PAI-27-MW60I	Rising Head	19-24	0.37	1.29E-04
PAI-27-MW61I	Rising Head	19.5-24.5	0.36	1.28E-04
		Geometric Mean	0.83	2.92E-04
		Arithmetic Mean	4.0	1.42E-03
Deep Zone				
PI055MW08D	Rising Head	33-36	0.08	2.82E-05
		Geometric Mean	0.08	2.82E-05
		Arithmetic Mean	3.1	1.08E-03

Notes:
ft bgs - feet below ground surface
ft/day - feet per day
cm/sec - centimeters per second

Table 3-11 Positive Hit Table
Free Product
Site 27
MCRD Parris Island, South Carolina

FREE PRODUCT

LOCATION	**PAI-27-MW11S**
SAMPLE ID	**PAI-27-PR-11S-01**
SAMPLE DATE	**8/14/2008**
METALS (MG/KG)	
SELENIUM	2.9
SEMIVOLATILES (UG/KG)	
1,1-BIPHENYL	190000
2-METHYLNAPHTHALENE	2200000
BAP EQUIVALENT	410
BAP EQUIVALENT-HALFND	115460
BAP EQUIVALENT-POS	410
BENZO(K)FLUORANTHENE	41000 J
DIBENZOFURAN	190000
FLUORENE	150000
NAPHTHALENE	290000
PHENANTHRENE	430000
PYRENE	34000 J
TOTAL PAHS	3145000
TOTAL PAHS HALFND	3695000
VOLATILES (UG/KG)	
1,2,4-TRICHLOROBENZENE	120000
1,2-DICHLOROBENZENE	26000 J
1,4-DICHLOROBENZENE	110000
CHLOROBENZENE	75000
ETHYLBENZENE	22000 J
O-XYLENE	26000 J
TOTAL XYLENES	26000 J
PESTICIDES/PCBS (MG/KG)	
4,4'-DDD	18000
4,4'-DDE	660
4,4'-DDT	24000
BETA-BHC	200
DELTA-BHC	1800 J
TOTAL BHC HALFND	2050
TOTAL DDT HALFND	42660
TOTAL DDT POS	42660

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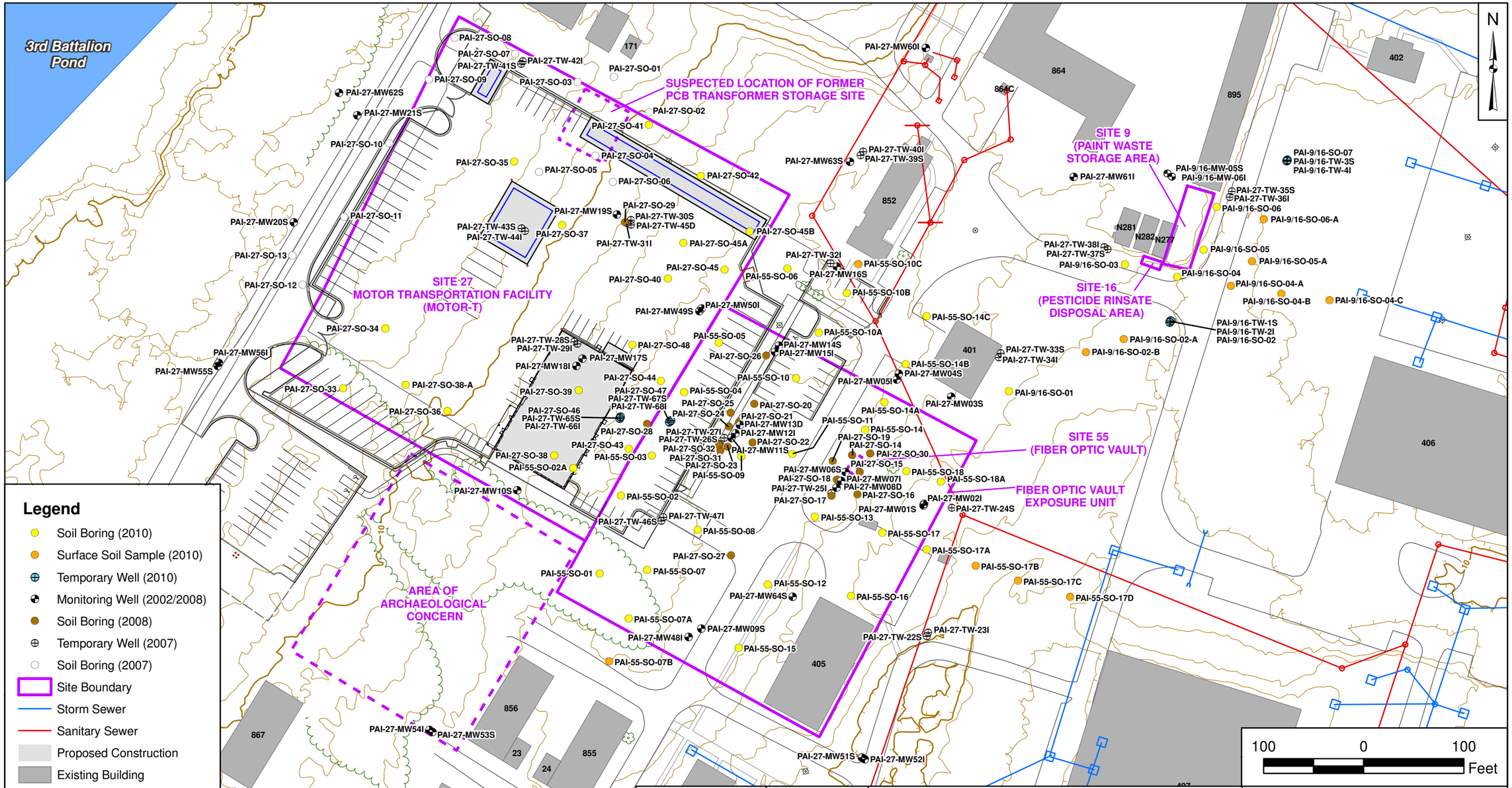

DRAWN BY	DATE
T. WHEATON	11/30/10
CHECKED BY	DATE
T. DECK	10/19/11
COST/SCHEDULE-AREA	
SCALE AS NOTED	

SAMPLE LOCATIONS
PHASE I, PHASE II, AND PHASE III REMEDIAL INVESTIGATION
SITES 27/55/9/16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 3-1	REV 0

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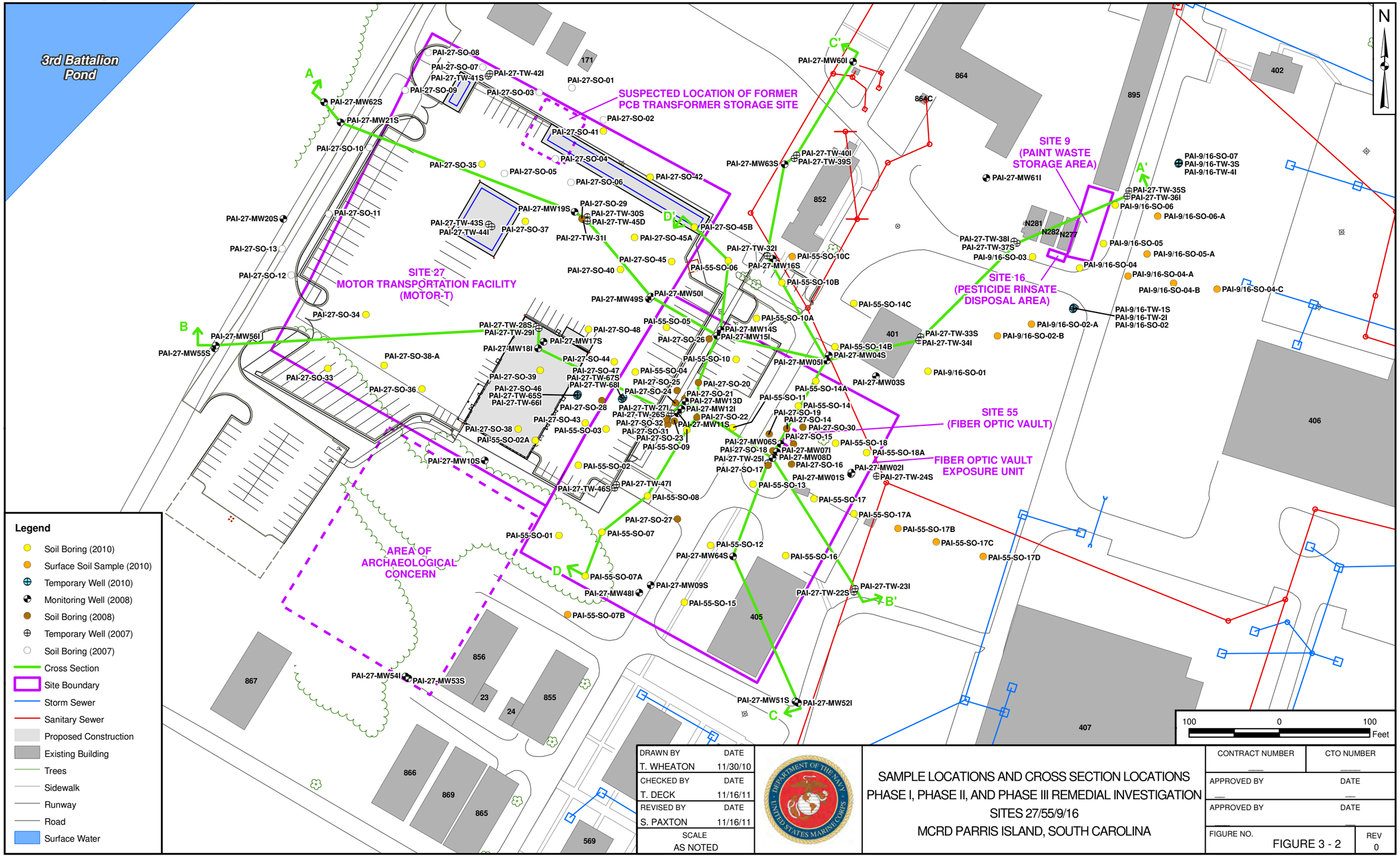
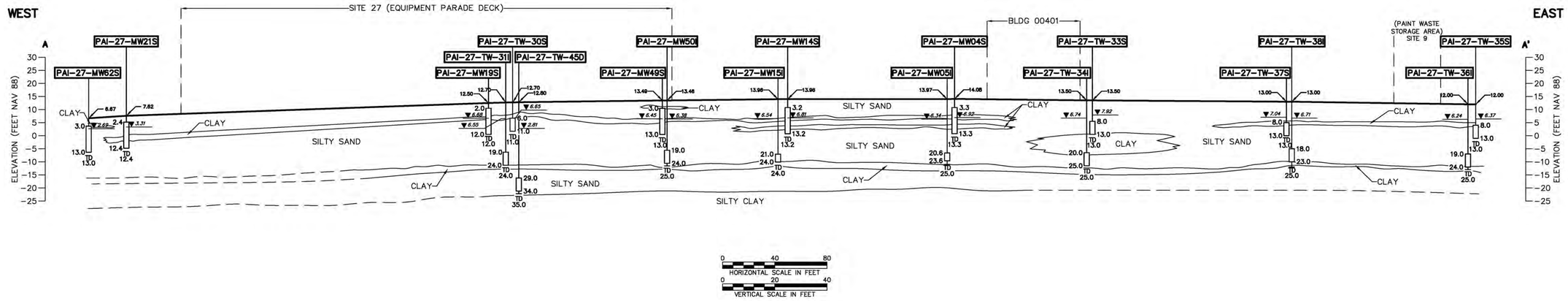
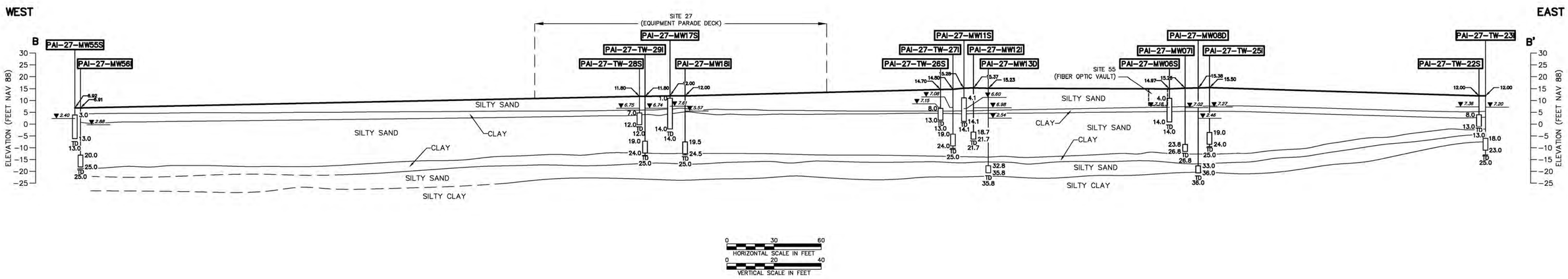


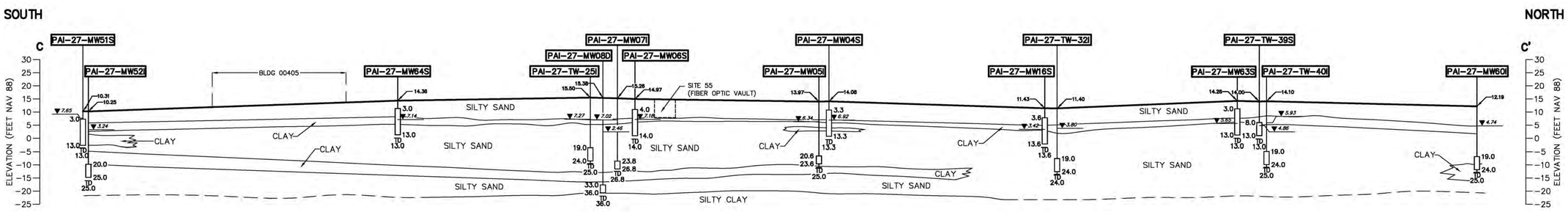
DRAWN BY	DATE
T. WHEATON	11/30/10
CHECKED BY	DATE
T. DECK	11/16/11
REVISED BY	DATE
S. PAXTON	11/16/11
SCALE	
AS NOTED	

SAMPLE LOCATIONS AND CROSS SECTION LOCATIONS
PHASE I, PHASE II, AND PHASE III REMEDIAL INVESTIGATION
SITES 27/55/9/16
MCRD PARRIS ISLAND, SOUTH CAROLINA

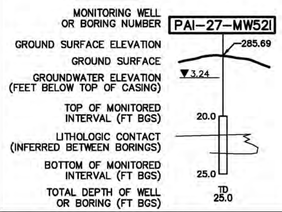
CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 3 - 2	REV 0







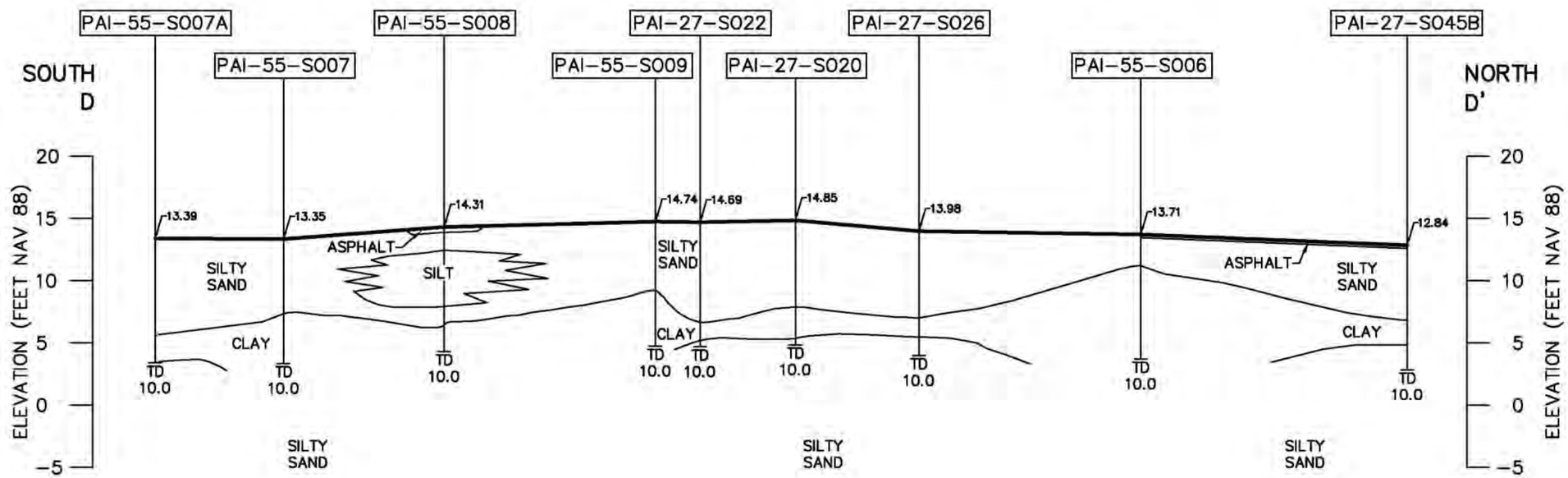
LEGEND:



NOTES:
1.) TEMPORARY WELL (TW) WATER LEVELS MEASURED 9/07.
2.) MONITORING WELL (MW) WATER LEVELS MEASURED AT LOW TIDE 8/08.

DRAWN BY CK DATE 6/22/09	NAVFAC	CROSS SECTIONS A–A', B–B', AND C–C' SITES 27 AND 55 MCRD PARRIS ISLAND, SOUTH CAROLINA	CONTRACT NO. 0455
CHECKED BY DATE			OWNER NO.
REVISED BY DATE			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3–3 REV. 0

A2AD-0455F0004.dwg 10/24/11 CK PIT



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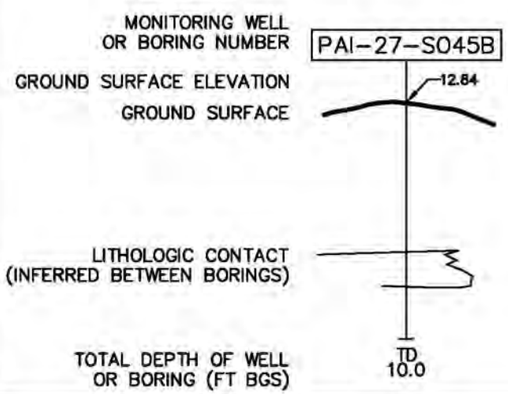
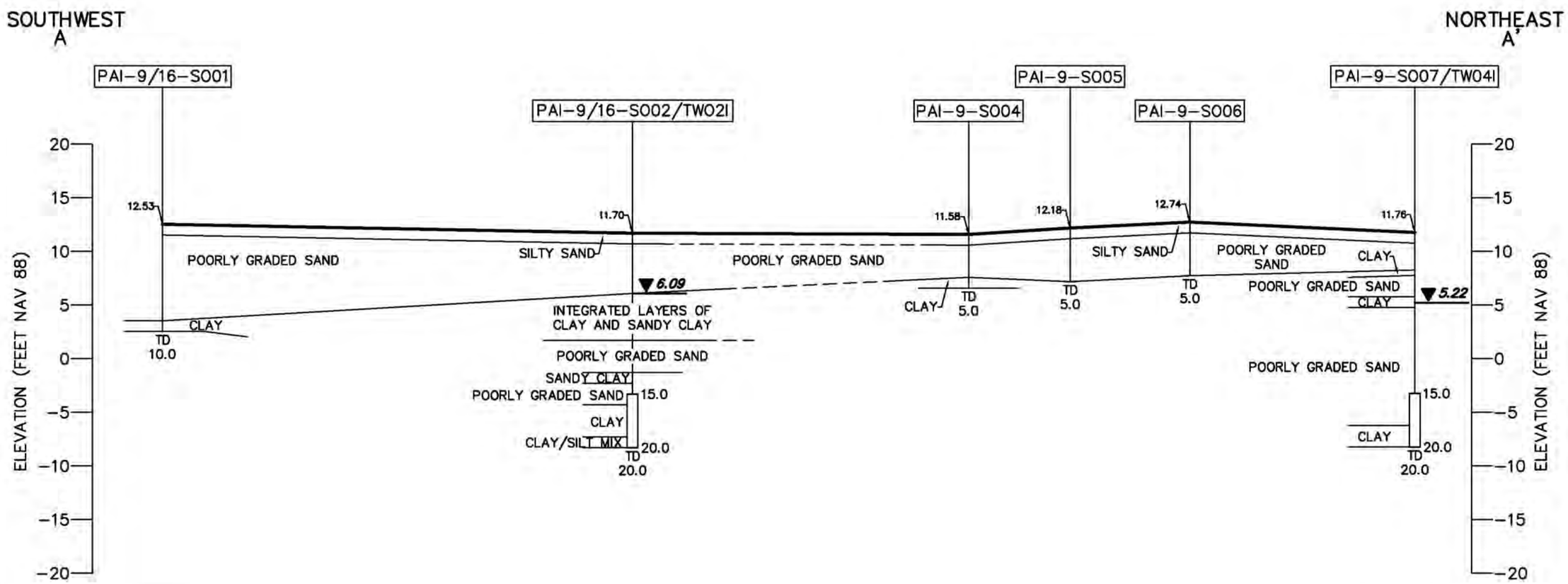


0 50 100
HORIZONTAL SCALE: 1" = 50'

0 10 20
VERTICAL SCALE: 1" = 10'

DRAWN BY CK DATE 1/17/11	NAVFAC	GEOLOGICAL CROSS SECTION D–D' SITES 27 AND 55 MCRD PARRIS ISLAND PARRIS ISLAND, SOUTH CAROLINA	CONTRACT NO. 0455
CHECKED BY SEH DATE 1/17/11			OWNER NO.
REVISED BY DATE			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3–4 REV. 0

R:\0455 – MCRD Parris Island\Figures\0455FG003.dwg PIT CARLY.KRAMER 11/21/2011 7:03:27 AM



LEGEND:

MONITORING WELL OR BORING NUMBER — PAI-9-S007/TW04I

GROUND SURFACE ELEVATION — 11.76

GROUND SURFACE

GROUNDWATER ELEVATION — 5.22

TOP OF MONITORED INTERVAL (FT BGS) — 15.0

LITHOLOGIC CONTACT (INFERRED BETWEEN BORINGS)

BOTTOM OF MONITORED INTERVAL (FT BGS) — 20.0

TOTAL DEPTH OF WELL OR BORING (FT BGS) — TD 20.0

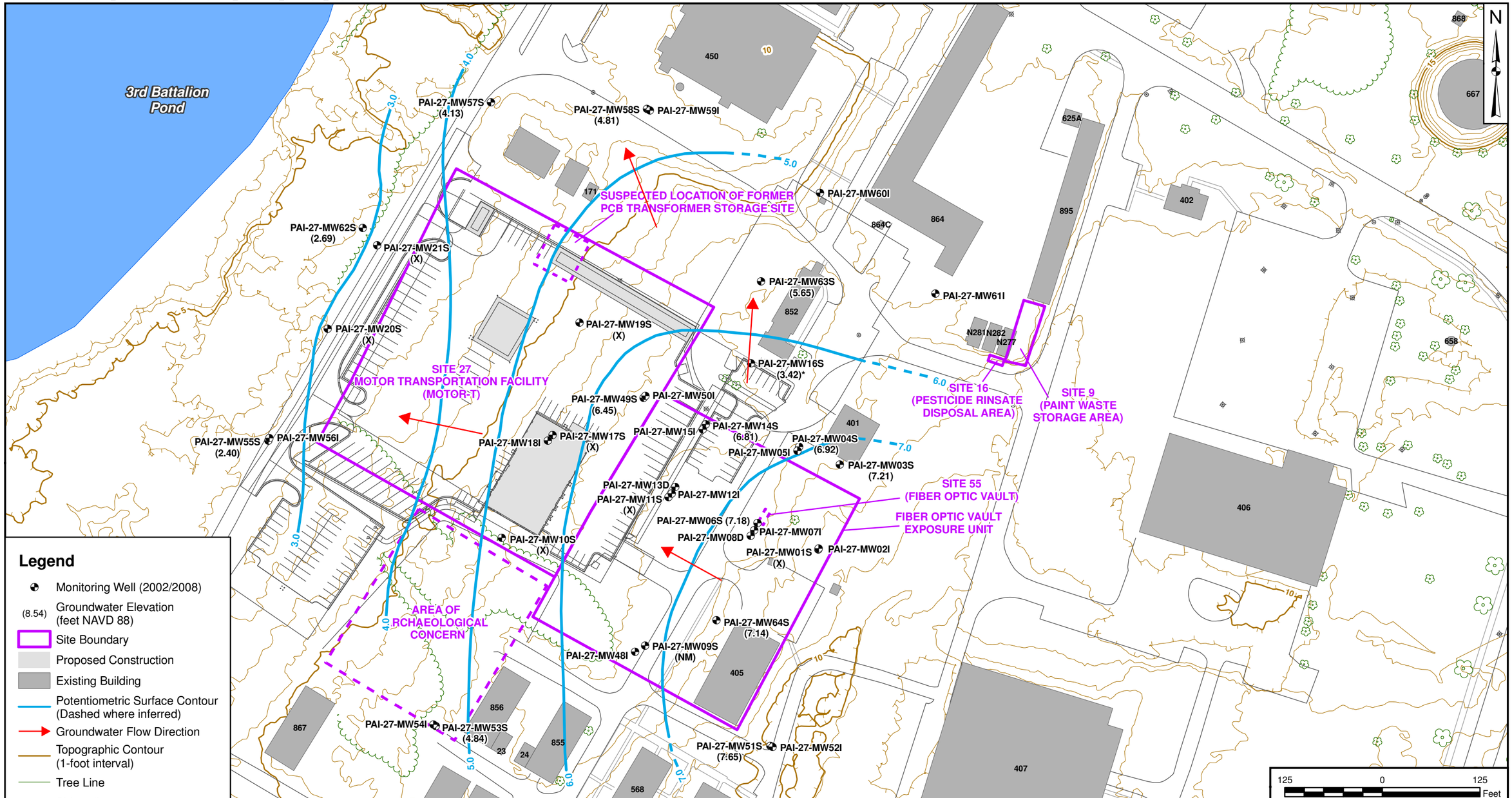
0 40 80
HORIZONTAL SCALE: 1" = 40'

0 10 20
VERTICAL SCALE: 1" = 10'

DRAWN BY CK DATE 1/12/11	NAVFAC	GEOLOGICAL CROSS SECTION A-A' SITE 9/16 MCRD PARRIS ISLAND PARRIS ISLAND, SOUTH CAROLINA	CONTRACT NO. 2688
CHECKED BY SEH DATE 1/12/11			OWNER NO.
REVISED BY DATE			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3-5 REV. 0

R:\2688 – MCRD Parris Island\Figures\2688FG002.dwg PIT CARLY.KRAMER 10/25/2011 9:32:02 AM

PGH P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_POTENTIO_SHALLOW_AUG2008.MXD 11/16/11 SP



Legend

- Monitoring Well (2002/2008)
- (8.54) Groundwater Elevation (feet NAVD 88)
- Site Boundary
- Proposed Construction
- Existing Building
- Potentiometric Surface Contour (Dashed where inferred)
- Groundwater Flow Direction
- Topographic Contour (1-foot interval)
- Tree Line
- Sidewalk
- Road
- Surface Water

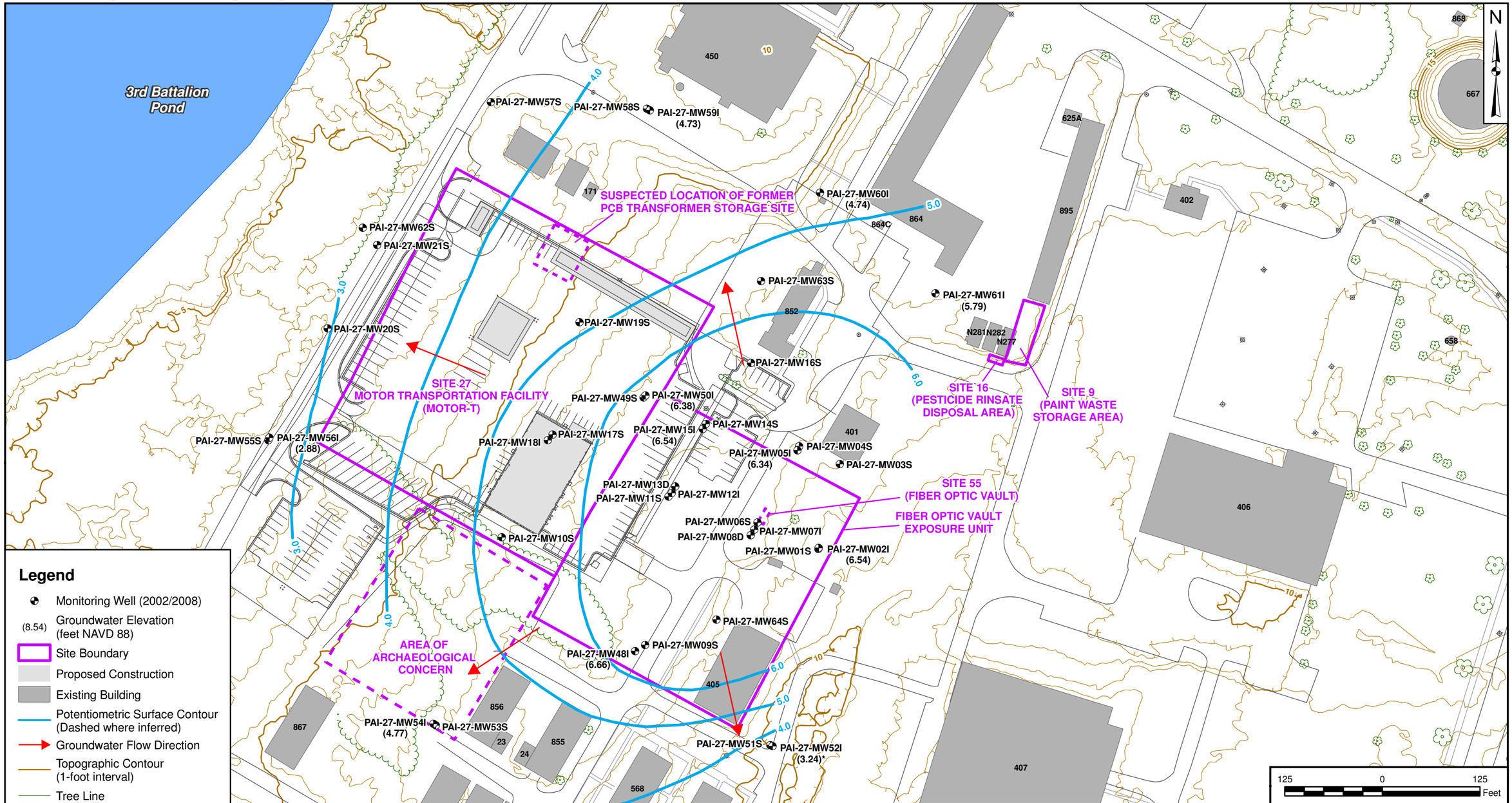
Notes:
* Well not used for contouring
(X) - Well has not been professionally surveyed therefore not used for contouring.
(NM) - Not Measured

DRAWN BY	DATE
T. WHEATON	04/11/11
CHECKED BY	DATE
T. DECK	11/16/11
REVISED BY	DATE
S. PAXTON	11/16/11
SCALE	
AS NOTED	

GROUNDWATER POTENTIOMETRIC SURFACE MAP
SHALLOW WELLS - AUGUST 2008
SITES 27/55/9/16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 3 - 6	REV 0

PGH P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_POTENTIO_INTERMED_AUG2008.MXD 11/16/11 SP

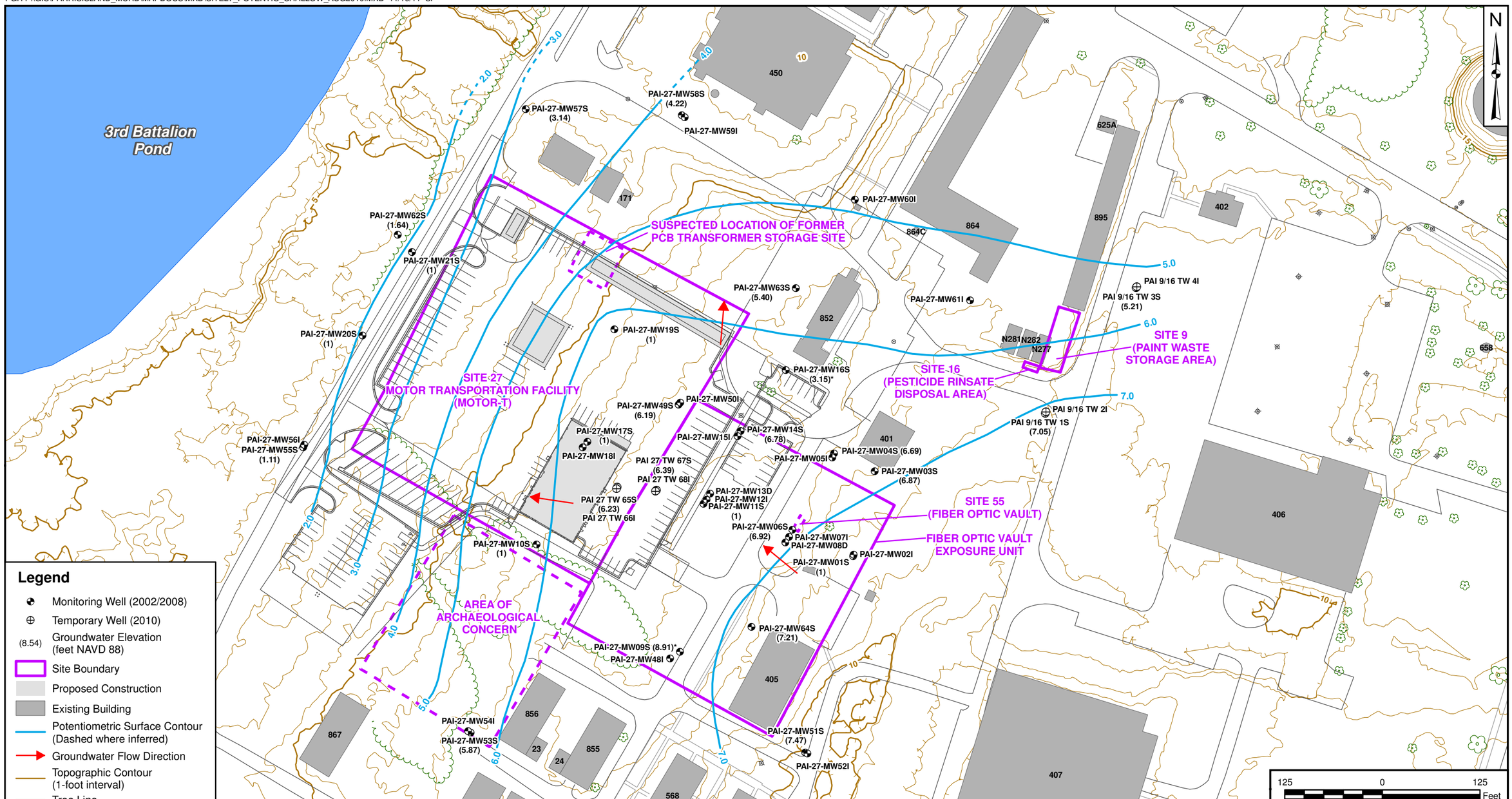


DRAWN BY	DATE
T. WHEATON	04/11/11
CHECKED BY	DATE
T. DECK	11/16/11
REVISED BY	DATE
S. PAXTON	11/16/11
SCALE	
AS NOTED	

GROUNDWATER POTENTIOMETRIC SURFACE MAP
INTERMEDIATE WELLS - AUGUST 2008
SITES 27/55/9/16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 3 - 7	REV 0

PGH P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_POTENTIO_SHALLOW_AUG2010.MXD 11/16/11 SP



Legend

- Monitoring Well (2002/2008)
- Temporary Well (2010)
- (8.54) Groundwater Elevation (feet NAVD 88)
- Site Boundary
- Proposed Construction
- Existing Building
- Potentiometric Surface Contour (Dashed where inferred)
- Groundwater Flow Direction
- Topographic Contour (1-foot interval)
- Tree Line
- Sidewalk
- Road
- Surface Water

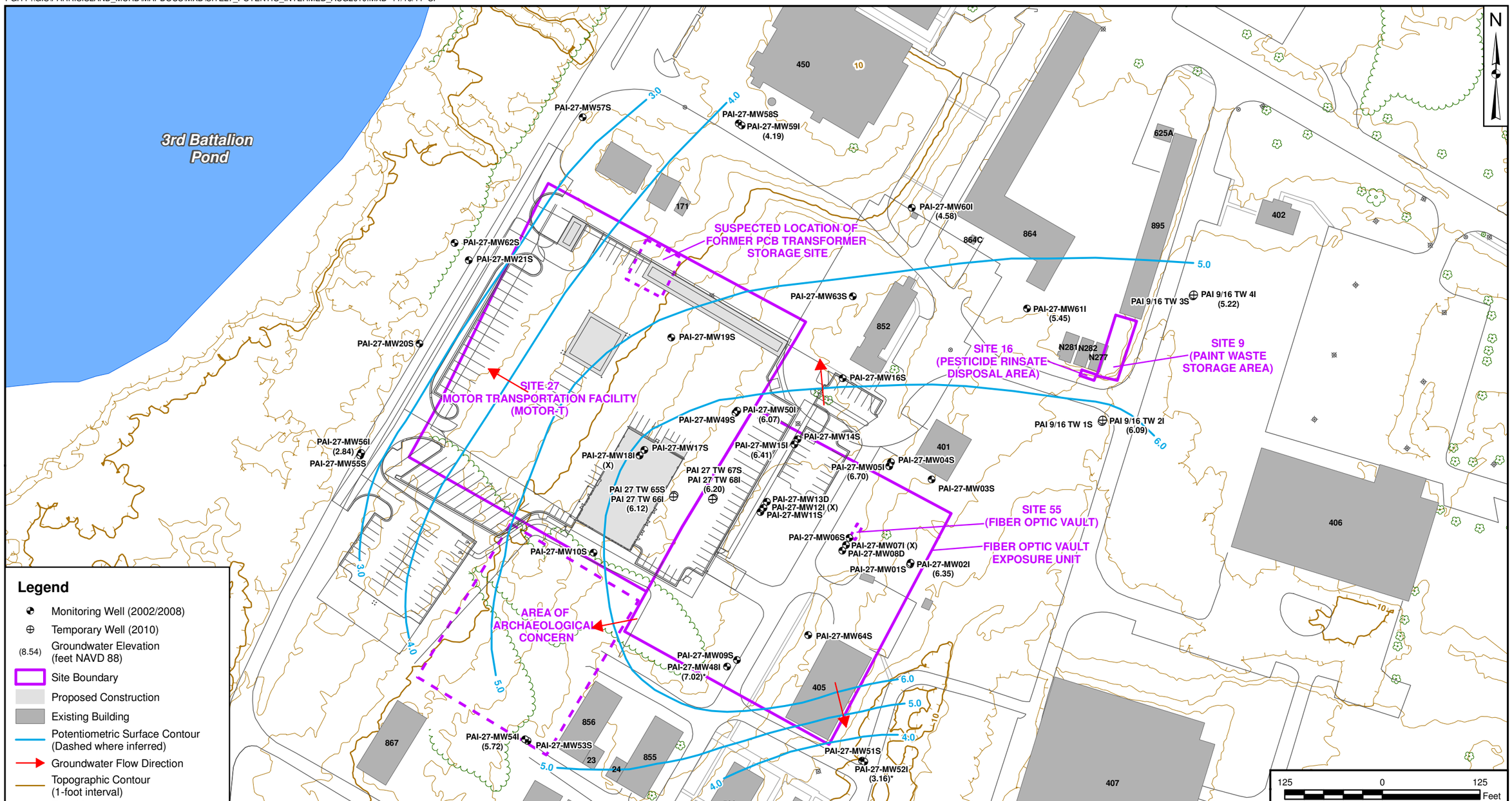
Notes:
* Well not used for contouring
(1) - Well has not been professionally surveyed therefore not used for contouring

DRAWN BY	DATE
T. WHEATON	12/07/10
CHECKED BY	DATE
T. DECK	11/16/11
REVISED BY	DATE
S. PAXTON	11/16/11
SCALE	
AS NOTED	

GROUNDWATER POTENTIOMETRIC SURFACE MAP
SHALLOW WELLS - AUGUST 2010
SITES 27/55/9/16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 3 - 8	REV 0

PGH P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_POTENTIO_INTERMED_AUG2010.MXD 11/16/11 SP



Legend

- Monitoring Well (2002/2008)
- Temporary Well (2010)
- (8.54) Groundwater Elevation (feet NAVD 88)
- Site Boundary
- Proposed Construction
- Existing Building
- Potentiometric Surface Contour (Dashed where inferred)
- Groundwater Flow Direction
- Topographic Contour (1-foot interval)
- Tree Line
- Sidewalk
- Road
- Surface Water

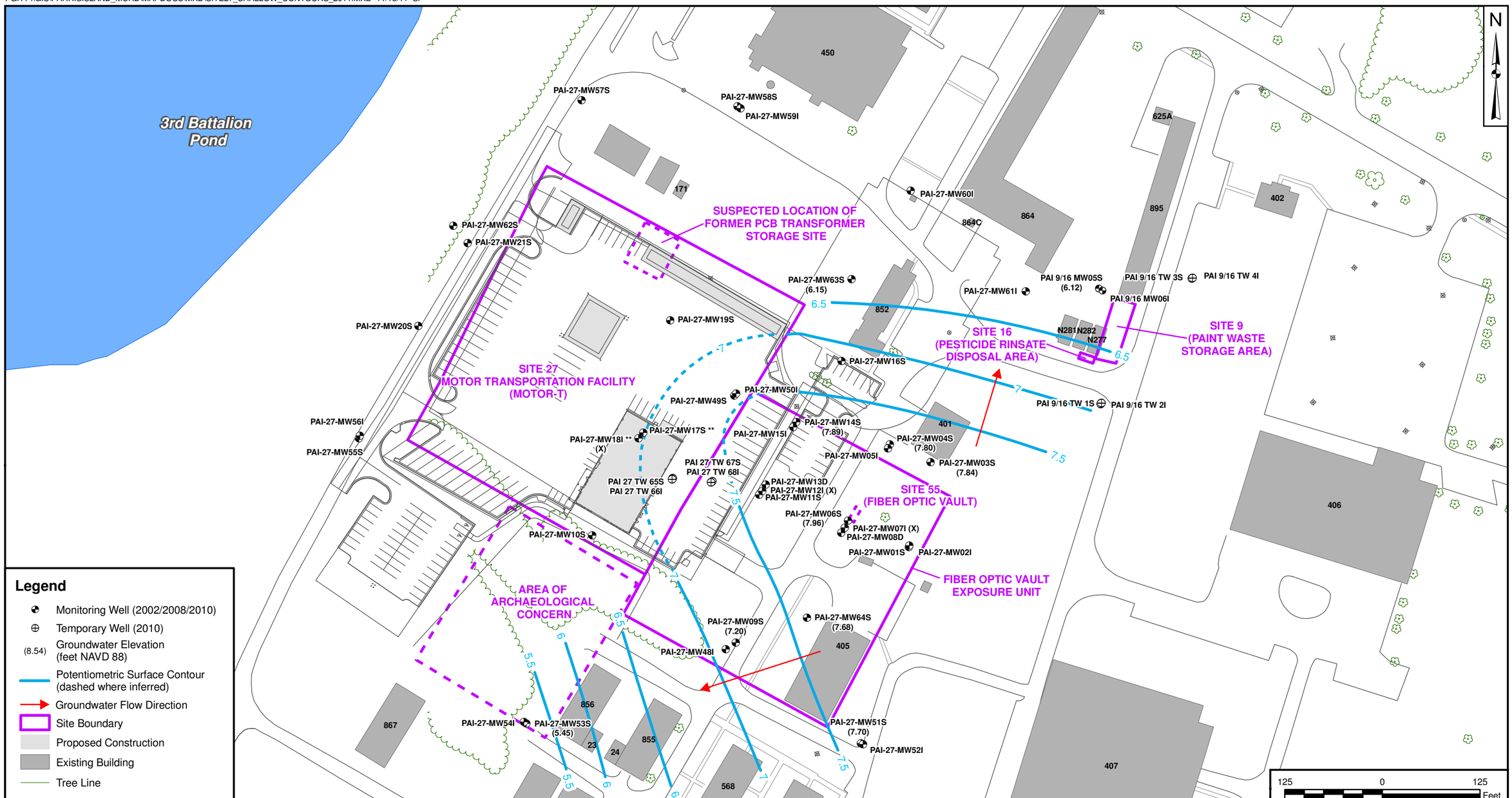
Notes:
* Well not used for contouring
(X) - Well has not been professionally surveyed therefore not used for contouring.

DRAWN BY T. WHEATON	DATE 12/07/10
CHECKED BY T. DECK	DATE 11/16/11
REVISED BY S. PAXTON	DATE 11/16/11
SCALE AS NOTED	

GROUNDWATER POTENTIOMETRIC SURFACE MAP
INTERMEDIATE WELLS - AUGUST 2010
SITES 27/55/9/16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 3 - 9	REV 0

PGH P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_SHALLOW_CONTOURS_2011.MXD 11/18/11 SP



Legend

- Monitoring Well (2002/2008/2010)
- Temporary Well (2010)
- (8.54) Groundwater Elevation (feet NAVD 88)
- Potentiometric Surface Contour (dashed where inferred)
- Groundwater Flow Direction
- Site Boundary
- Proposed Construction
- Existing Building
- Tree Line
- Sidewalk
- Road
- Surface Water

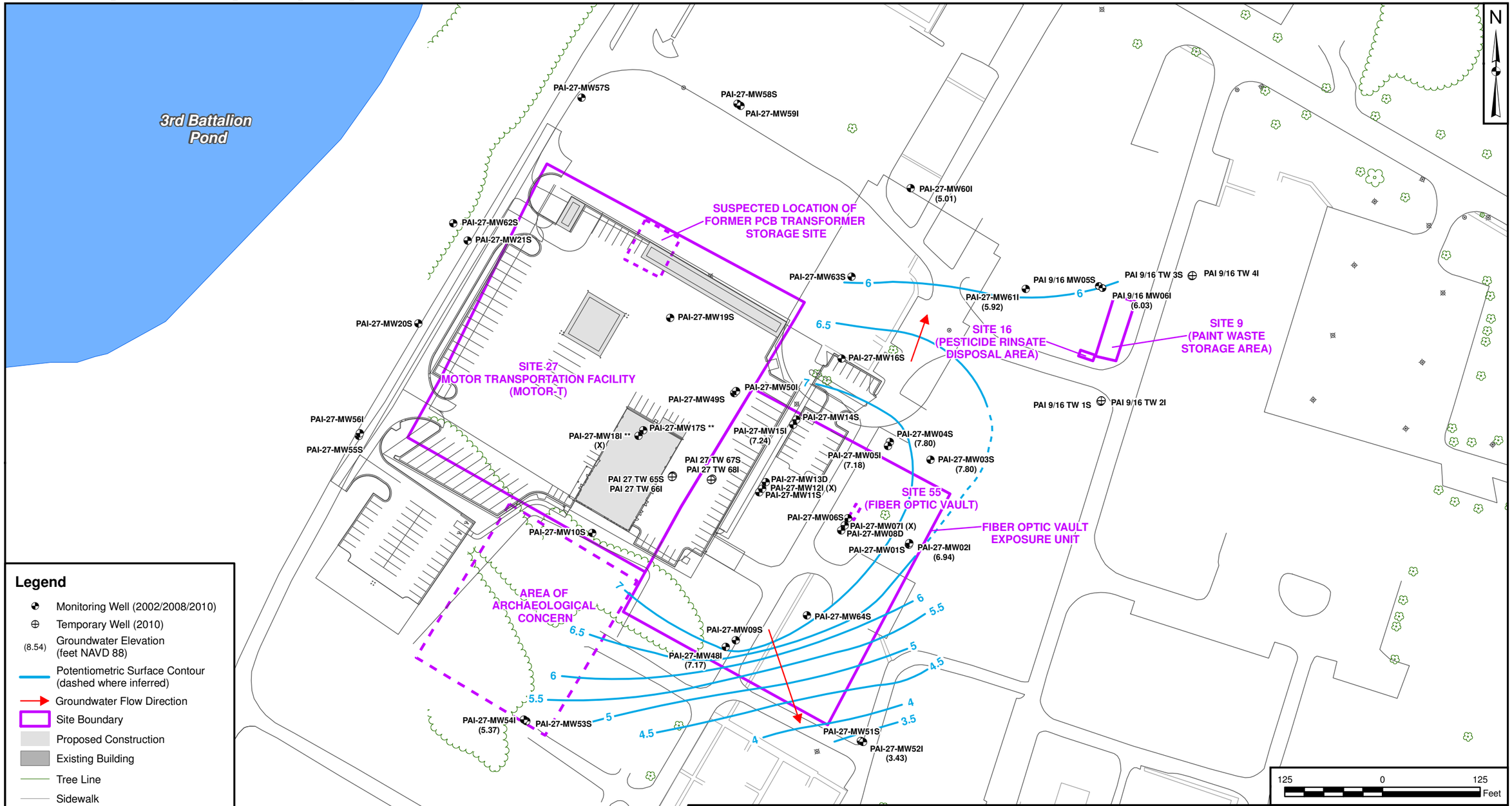
Notes:
* Well not used for contouring.
** Well has been abandoned.
(X) - Well has not been professionally surveyed, therefore is not used for contouring.

DRAWN BY J. ENGLISH	DATE 10/12/11
CHECKED BY T. DECK	DATE 11/18/11
REVISED BY S. PAXTON	DATE 11/18/11
SCALE AS NOTED	

GROUNDWATER POTENTIOMETRIC SURFACE MAP
SHALLOW WELLS, 2011
SITES 27/55/9/16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 3 - 10	REV 0

PGH P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_INTERMEDIATE_CONTOURS_2011.MXD 11/18/11 SP



Legend

- Monitoring Well (2002/2008/2010)
- Temporary Well (2010)
- (8.54) Groundwater Elevation (feet NAVD 88)
- Potentiometric Surface Contour (dashed where inferred)
- Groundwater Flow Direction
- Site Boundary
- Proposed Construction
- Existing Building
- Tree Line
- Sidewalk
- Road
- Surface Water

Notes:
* Well not used for contouring.
** Well has been abandoned.
(X) - Well has not been professionally surveyed, therefore is not used for contouring.

DRAWN BY	DATE
J. ENGLISH	10/12/11
CHECKED BY	DATE
T. DECK	11/18/11
REVISED BY	DATE
S. PAXTON	11/18/11
SCALE	
AS NOTED	

GROUNDWATER POTENTIOMETRIC SURFACE MAP
INTERMEDIATE WELLS, 2011
SITES 27/55/9/16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
2688	JM18
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 3 - 11	REV 0

4.0 NATURE AND EXTENT OF CONTAMINATION

Defining the nature and extent of contamination is a critical part of site characterization. By definition, the nature and extent of contamination relates to the characteristics of any contaminants that might be present and the size of the area affected. This section describes the nature and extent of contamination in the Sites 9, 16, 27, and 55 areas as defined by the results of sampling and laboratory analyses of soil and groundwater samples collected during field investigations.

Previous investigations at Sites 9, 16, and 27 focused on determining if historical activities at the various sites had contaminated the surrounding media (soil and groundwater). The previous investigations indicated that paint storage at Site 9 had not impacted the groundwater in the vicinity of Site 9 and that transformer storage at Site 27 had not impacted the soil with PCBs.

Potential contamination (petroleum hydrocarbons) was identified at Site 55 (FOV) in the fall of 2001. The source of this contamination has yet to be identified. Subsequent field investigations were conducted in July 2002, December 2002, and July 2003 to determine the nature and extent of contamination associated with the petroleum hydrocarbons found floating on the groundwater at Site 55.

MCRD Parris Island identified a need for a military construction project at Site 27 and, as a consequence, further investigation was planned at Sites 27 and 55. Because the Site 55 investigations revealed groundwater contamination had migrated to Site 27 from Site 55, the Site 27 Phase I and Phase II RI field activities included the entire Site 27 area. Phase I of the Site 27 RI was conducted in July 2007 and included groundwater samples and water-level measurements collected from 26 temporary monitoring wells and 9 existing permanent monitoring wells that were installed in December 2002. Additionally, in order to investigate potential impacts form surface water run-off, Phase I included collection of surface soil samples at 13 locations and one subsurface soil sample in drainage ditches around at Site 27. Soil samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. Groundwater samples were analyzed for VOCs, SVOCs, PAHs, pesticides, and PCBs. VOCs, SVOCs (including PAHs), pesticides, PCBs, and metals were all detected in the soil samples less than screening criterion; however, PAHs were detected in four surface soil samples (PAI-27-SO-01, PAI-27-SO-06, PAI-27-SO-12 and PAI-27-SO-13) exceeding screening criterion. Additionally, one PCB (Aroclor 1260) was detected exceeding screening criterion in soil boring PAI-27-SO-08. VOCs (14 of 35 samples), SVOCs and PAHS (8 of 35 samples), and pesticides and PCBs (23 of 35 samples) were detected in groundwater samples exceeding screening criteria during Phase I.

Phase II of the Site 27 RI was conducted in August 2008 and included groundwater samples and water level measurements collected from 17 newly installed permanent monitoring wells and 20 existing permanent monitoring wells. Additionally, surface and subsurface soil samples were collected from 19 soil borings. The soil samples and groundwater samples were analyzed for VOCs and pesticides. VOCs and pesticides were detected in the groundwater, surface soil, and subsurface soil at concentrations above screening criterion.

Phase III of Sites 27 and 55 RI was conducted in August 2010 and included groundwater samples and water-level measurements collected from four newly installed temporary monitoring wells and 37 existing permanent monitoring wells. During Phase III, 52 surface soil and 40 subsurface soil samples were collected from locations across Sites 27 and 55 and screened with on-site analytical tools (PID, Oil-in-Soil™ test kits, TPH PetroFLAG test kits, DDT test kits, and the FLUTe liner) to assist with delineation of contaminants and characterization of the potential smear zone associated with the clay layer. The soil samples collected during the Phase III investigation were analyzed for VOCs, SVOCs, PAHs, pesticides, PCBs, metals, pH, and TOC. VOCs, SVOCs, PAHs, pesticides, PCBs, metals, pH, TOC, TDS, and alkalinity were measured in groundwater. See Table 3-1 for a comprehensive list of sample locations and analytes corresponding to each monitoring well and soil boring.

RI field activities for Sites 9 and 16 were conducted in August 2010 and September 2011 and included groundwater samples and water-level measurements from four newly installed temporary monitoring wells (August 2010) and two newly installed permanent monitoring wells (September 2011). Similarly to the Phase III RI field screening activities at Sites 27 and 55, 15 surface and 8 subsurface soil samples were collected and screened with on-site analytical tools (PID, Oil-in-Soil™ test kits, TPH PetroFLAG test kits, DDT test kits, and the FLUTe liner) to delineate contaminants and characterize the potential smear zone associated with the clay layer. The soil samples collected during the Sites 9 and 16 field investigation were analyzed for VOCs, SVOCs, PAHs, pesticides, PCBs, metals, pH, and TOC. VOCs, SVOCs, PAHs, pesticides, PCBs, metals, pH, TOC, TDS, and alkalinity were analyzed in groundwater. See Table 3-1 for a comprehensive list of sample locations and analytes corresponding to each monitoring well and soil boring.

The nature and extent of soil and groundwater contamination discussed in the following sections is based on the evaluation of data collected to date from investigations at Sites 9, 16, 27, and 55. Table 1-1 lists samples collected and analysis performed at Sites 9, 16, 27, and 55 during previous investigations. Table 3-1 provides a summary of the samples, analysis conducted, and rationale for samples collected during Phases I, II, and III of the RI at Sites 27 and 55 and the samples collected in support of the Sites 9 and 16 RI. Analytical results tables for soil and groundwater samples collected at Sites 27 and 55 can

be found in Appendices D-9 and D-10, respectively. Analytical results tables for soil and groundwater samples collected at Sites 9 and 16 can be found in Appendices D-15 and D-16, respectively.

To provide some perspective on the discussion of the nature and extent of contamination, the soil and groundwater data were compared to the most current USEPA screening criteria that have been developed for evaluating risks to human and ecological receptors that were published at the time the data was being evaluated. A discussion of the screening criteria used in this RI Report is provided in the remainder of this section.

USEPA Screening Levels for Human Health

USEPA has developed a set of screening levels for soil and groundwater. The screening levels were developed by combining toxicity factors [reference doses (RfD) and cancer slope factors (CSF)] with "standard" exposure scenarios to calculate chemical concentrations corresponding to fixed levels of risk [i.e., a Hazard Quotient (HQ) of 1 for non-carcinogens or a lifetime cancer risk of 1×10^{-6}, whichever occurs at a lower concentration]. The exposure scenarios for soil include direct ingestion and dermal exposure by child and adult receptors (residential screening levels) and direct ingestion and dermal exposure by adult receptors (industrial screening levels). For screening purposes, the non-carcinogenic screening levels were divided by 10 to account for possible additive effects of multiple compounds.

USEPA Maximum Contaminant Level

Maximum Contaminant Levels (MCLs) represent a legal threshold limit on the concentration of a hazardous substance that is permissible in drinking water under the Safe Drinking Water Act (SDWA). USEPA first determines how much of the contaminant may be present with no adverse health effects. This level is called the Maximum Contaminant Level Goal (MCLG); MCLGs are non-enforceable public health goals. The legally enforced MCL is then set as close as possible to the MCLG. The MCL for a contaminant may be higher than the MCLG if small quantities of a contaminant are difficult to measure, there are no available treatment technologies, or if USEPA determines that the costs of treatment would outweigh the public health benefits of a lower MCL.

Analytical results are presented graphically in a series of figures, as listed below. For clarity, the tag maps for soil and groundwater present only the results for contaminants that exceed the lowest USEPA screening criterion. Based on analysis performed and criterion exceedances observed, tag maps were prepared for VOCs, SVOCs, pesticides, and metals. In order to make the analysis more accessible and more consistent throughout the document, each group of pollutants was broken down further in order to note peculiarities, anomalies, and extraordinary events in order to refine the Sites 9, 16, 27, and 55 CSM.

A brief description of the chemicals corresponding to each of the maps is presented below.

The VOCs shown on the tag maps are as follows:

Sites 27 and 55: Figure 4-1 (soils), Figure 4-6 (groundwater) includes 1,2,4-tricholorbenzene, 1,2-dichlorobenzene, 1,4-dichlorobenzene, and chlorobenzene, Figure 4-7 (groundwater) includes BTEX, and Figure 4-8 (groundwater) includes cis-1,2 dichloroethene, tetrachloroethene, and chloroform.

Sites 9 and 16: No VOC exceedances were measured; therefore, tag maps were not generated.

The SVOCs shown on the tag maps are:

Sites 27 and 55: Figure 4-2 (soils) and Figure 4-8 (groundwater) include SVOCs/benzo(a)pyrene equivalents (BaP equivalents) exceedances.

Sites 9 and 16: Figure 4-12 (soils) includes BaP equivalents exceedances. Figure 4-15 (groundwater) includes a single naphthalene exceedance.

The pesticides shown on the maps are:

Sites 27 and 55: Figure 4-3 (soils) and Figure 4-9 (groundwater) include alpha-hexachlorocyclohexane [(lindane) BHC], beta-BHC, delta-BHC, gamma-BHC (lindane). Figure 4-4 (soils) and Figure 4-10 (groundwater) include 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.

Sites 9 and 16: Figure 4-13 (soils) includes 4,4'-DDE, 4,4'-DDT, alpha-Chlordane, Aroclor-1260, beta-BHC, gamma-Chlordane, and heptachlor exceedances. Figure 4-16 (groundwater) includes alpha-BHC, beta-BHC, delta-BHC, heptachlor, and heptachlor epoxide exceedances.

Metals shown on the maps are:

Sites 27 and 55: Figure 4-5 (soils) includes antimony, arsenic, lead, selenium, and thallium. Figure 4-11 (groundwater) includes aluminum, arsenic, beryllium, chromium, iron, lead, thallium and vanadium.

Sites 9 and 16: Figure 4-14 (soil) includes arsenic, cobalt, and lead exceedances and Figure 4-17 (groundwater) includes arsenic exceedances.

A complete analytical data set for surface soil, subsurface soil, and groundwater samples is provided in Appendix D.

4.1 SURFACE SOIL

Surface soil samples were collected at Site 27 in 1995, 1999, 2007, 2008, and 2010; at Site 55 in 2007, 2008, and 2010; and at Sites 9 and 16 in 1995, 2010, and 2011. The focus of the investigations and chemicals of concern (Tables 1-1 and 3-1) varied from site to site and from sampling round to sampling round. The complete dataset of chemical analysis results for surface soil samples can be found in Appendix D-9. Summary of surface soil results including frequency of detections and exceedances are presented in Table 4-1 (Sites 27 and 55) and Table 4-3 (Sites 9 and 16).

VOCs

Sites 27 and 55

In general, VOCs were detected at relatively low concentrations [less than 20 micrograms per kilogram (ug/kg)] in the surface soil samples collected at Sites 27 and 55. All of the detected VOCs were less than the lowest screening criterion. Table 4-1 summarizes the analytical results for VOCs in surface soil. The following gives a brief description of selected VOCs in surface soil.

Chlorobenzenes were detected in surface soil samples, with mono-chlorobenzene having the highest detection frequency (~13 percent). The highest concentration of chlorobenzene (6 µg/kg) was found in soil sample PAI-27-SO-29. The highest concentrations of 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, and 1,4-dichlorobenzene were found in PAI-27-SO-14. 1,3-dichlorobenzene was not detected in any surface soil sample.

Tetrachloroethene (PCE) was the only chlorinated ethene detected in surface soil samples. It was found in only one sample (PI02702) at a concentration of 2 µg/kg, which is less than the lowest applicable screening criterion.

Chlorinated methanes were also detected in surface soil samples infrequently, with methylene chloride having the highest detection frequency (~5 percent). The highest concentration of methylene chloride (0.81 µg/kg) was found in PAI-27-SO-36. Carbon tetrachloride and chloroform were detected in only one sample (PI02702) at concentrations of 3 µg/kg and 6.5 µg/kg, respectively. Chloromethane was detected in only one sample (PAI-55-SO-17B) at 7.8 µg/kg. All detections were less than the lowest applicable screening criterion.

BTEX compounds were found in the surface soil infrequently (less than 15 percent of detection rate). Benzene was not found in any surface soil sample. Figure 4-18 is a total BTEX (the sum of benzene, toluene, ethylbenzene and total xylenes) isoconcentration map created using data from the Phase III Sites 27 and 55 2010 RI. BTEX compounds were mainly found in surface soil within Sites 27 and 55, with the highest concentration of total BTEX (2.73 ug/kg) found at PAI-55-SO-05 in 2010.

Sites 9 and 16

In general, VOCs were detected infrequently and at relatively low concentrations (less than 140 ug/kg) in the surface soil samples collected from Sites 9 and 16. All of the detected VOCs were less than the lowest screening criterion. Table 4-3 summarizes the analytical results for VOCs in surface soil. The following is a brief description of select VOCs in surface soil.

Chlorobenzene was detected infrequently (~17 percent) in surface soil samples. Acetone had the highest detection frequency (~83 percent). The highest concentration of acetone (140 µg/kg) was found in soil sample PAI-9/16-SO04C-01. The only detection of 1,2,4-trichlorobenzene (1.9 J ug/kg) was in sample PAI-9/16MW05-0001. 1,2-Dichlorobenzene, 1,3-dichlorobenzene and 1,4-dichlorobenzene were not detected in any surface samples at Sites 9 and 16.

PCE was the only chlorinated ethene detected in surface soil samples. It was found in two samples (PI-009-02_33 and PI-009-02_34) at a concentration of 2 J µg/kg.

Chlorinated methanes were also detected infrequently in surface soil samples, with carbon tetrachloride and chloroform having the highest detection frequency (~6 percent). The highest concentration of carbon tetrachloride and chloroform (6 J and 11 µg/kg, respectively) was found in PI-009-02_33. Methylene chloride and chloromethane were not detected in the surface soil.

BTEX compounds were found in the surface soil infrequently (~ 6 percent of detection rate). Benzene was found in one surface soil sample (PAI-9/16-SO04A-01) at 0.32 J ug/kg. Figure 4-18 is an isoconcentration map of total BTEX (the sum of benzene, toluene, ethylbenzene and total xylenes) in surface soil at Sites 27 and 55 using data from the Phase III RI in 2010. Figure 4-18 also includes data collected at Sites 9 and 16 during the same time.

SVOCs

Sites 27 and 55

PAH compounds were detected in approximately 88 percent of the surface soil samples collected across Sites 27 and 55. The concentration of BaP equivalents exceeded the lowest USEPA screening criterion in approximately 75 percent of samples with positive PAH detections (see Table 4-1). Figure 4-2 is a tag

map showing the surface soil samples that exceeded the lowest screening criterion for BaP equivalents. It can be seen that there is no apparent clustering of BaP equivalents exceedances in any specific area. Figure 4-19 shows the isoconcentration contours for benzo(a)pyrene in surface soil. Benzo(a)pyrene is a chemical that is used to calculate the BaP equivalents and, in the case of the surface soil, the highest contributor to BaP equivalents. There appeared to be two areas where the concentrations of benzo(a)pyrene were the highest, the first being a hotspot around sampling location PAI-27-SO-34 and the other an elongated area between Building 405 and the proposed construction area at Site 27. There also appeared to be a long and narrow area across Site 27 where benzo(a)pyrene was not detected. In addition, a few non-PAH SVOCs were infrequently detected in surface soil samples, but all were less than the lowest screening criterion (see Appendix D-8-1). The SVOC contamination in surface soil may be a result of asphalt present at Sites 27 and 55.

Sites 9 and 16

PAH compounds were detected in approximately 78 percent of the surface soil samples collected across Sites 9 and 16. The concentration of BaP equivalents exceeded the lowest USEPA screening criterion in approximately 73 percent of samples with positive PAH detections (see Table 4-3). Figure 4-12 is a tag map showing the surface soil samples that exceeded the lowest screening criterion for BaP equivalents. Figure 4-19 is an isoconcentration map representing benzo(a)pyrene in surface soil. Benzo(a)pyrene is a chemical that is used to calculate the BaP equivalents and, in the case of the surface soil, the highest contributor to BaP equivalents. There are no clear hot spots shown on Figure 4-19. There are two elongated areas where the isocontours for benzo(a)pyrene are not inferred. One is from the southern boundary of Site 16 and moves south west towards Building 401. The second area begins east of Site 9 and roughly follows borings PAI-0/16-SO-06, PAI-9/16-SO-06-A, PAI-9/16-SO-05-A, PAI-9/16-SO-04-B, and PAI-9/16-SO-04-C. In addition, several non-PAH SVOCs were infrequently (7 percent being the highest rate) detected in surface soil samples, but all measured concentrations were less than the lowest screening criterion (see Appendix D-14). The SVOC detections in surface soil may be the result of asphalt surrounding Sites 9 and 16.

Pesticides

Sites 27 and 55

Pesticides were the most frequently detected contaminants in surface soil. DDTs were detected in approximately 80 to 90 percent of the surface soil samples, generally from all areas of Sites 27 and 55. Conversely, BHCs were detected in approximately 13 to 50 percent of the surface soil samples, mostly from samples collected from Site 55. DDTs, beta-BHC, and delta-BHC were also detected in the floating product sample collected from monitoring well PAI-27-MW11S in 2008. The remaining pesticides were detected at concentrations below the lowest screening level. Table D-8-1 (Appendix D) shows the

frequency of detection and related statistical analyses for all the pesticides that had positive detections in surface soil samples.

Pesticides were consistently found at high concentrations in surface soil samples. Figures 4-20, 4-21, and 4-22 are maps of the isoconcentration of 4,4'-DDT, 4,4'-DDD, and total BHCs, respectively, in surface soil. The highest concentrations of pesticides in surface soil samples were found in the vicinity of Site 55. The percentage of samples that exceeded the lowest screening criterion for DDTs (7 percent) and BHCs (3 percent) (see Table 4-1).

Sites 9 and 16

Pesticides were detected in surface soil samples at Sites 9 and 16. DDT was detected in all of the surface soil samples; however, only 2 out of 18 samples had measured concentrations exceeding screening criteria. 4,4'-DDE and 4,4'-DDT were detected above the lowest USEPA screening criterion in boring PAI-9/16-MW-05S. Conversely, BHCs were detected in approximately 50 percent of the surface soil samples, with exceedances of the lowest screening criterion for BHC compounds (beta and gamma-BHC) occurring at boring PAI-9/16-MW-05S, which was a surface soil sample collected in September 2011, during the installation of monitoring well PAI-9/16-MW-05S. Alpha and gamma chlordane were both detected above the lowest screening criterion in boring PAI-9/16-SO-06 and PAI-9/16-MW-05S. Endrin, endrin aldehyde, and heptachlor were detected above the lowest screening criterion in boring PAI-9/16-MW-05S. Heptachlor epoxide was detected above the lowest screening criterion in boring PAI-9/16-SO-06. Table 4-3 shows the frequency of detections and exceedances, while Table D-14 (Appendix D) shows additional statistical analyses for all the pesticides that had positive detections in surface soil samples.

Figures 4-20, 4-21, and 4-22 are isoconcentration maps of 4,4'-DDT, 4,4'-DDD, and total BHCs in surface soil. The highest concentrations of pesticides in surface soil samples were generally found east and south of Sites 9 and 16. However, the percentage of samples with positive detections that exceeded the lowest screening criterion for pesticides was relatively low, with approximately 11 percent for DDTs and 13 percent for BHCs (see Table 4-3).

PCBs

Sites 27 and 55

During previous investigations PCBs were detected in two samples, one was collected from Site 9 (PI-009-02-33) in 1995, and one was collected from Site 27 [PAI-27-SS-08-01 (Figure 3-1)] in 2007. The sample from 2007 (PAI-27-SS-08-01) had a measured concentration of 485 ug/kg that exceeded the lowest screening criterion. This surface soil sample was collected from northern corner of Site 27, in the suspected location of the former PCBs transformer storage site (Figure 3-1). PCBs were not detected in

any of the three samples collected in 1999 from the suspected location of the former PCB transformer storage site. PCBs were not detected in any sample collected during the Phase III sampling event.

Sites 9 and 16

As stated above, PCBs were detected in only one sample collected from Site 9 [PI-009-02-33 collected at location PI009-02 (Figure 1-5)]. This sample had a measured concentration that was below the USEPA screening criterion. PCBs were not detected during the RI field activities conducted in August 2010 and September 2011.

Metals

Sites 27 and 55

Metals were detected in surface soil samples, with three metals (arsenic, lead, and thallium) in exceedance of the lowest USEPA screening criterion at several locations across Sites 27 and 55 (see Figure 4-5). Arsenic was detected in approximately 80 percent of the surface soil samples; however, all concentrations exceeded the lowest criterion. Lead was detected in all surface soil samples, but only one sample exceeded the lowest screening criterion. Thallium was only detected in two surface soil samples, and one sample (PAI-27-SO-38A) exceeded the lowest screening criterion.

Sites 9 and 16

Metals, primarily arsenic, were detected in surface soil samples collected from Sites 9 and 16, (see Figure 4-15). Table 4-3 and Appendix D-14 present metals detected at Sites 9 and 16.

4.2 SUBSURFACE SOIL

Subsurface soil samples were collected from Site 27 in 2007, 2008, and 2010; from Site 55 in 2002 and 2010; and from Sites 9 and 16 in 1988, 1995, 2010, and 2011. The focus of the analytical programs (Tables 1-1 and 3-1) varied from site to site and from sampling round to sampling round. The complete dataset of chemical analysis results for intermediate (4 to 5 feet bgs) and deep (9 to 10 feet bgs) soil samples can be found in Appendix D-9. The frequency of detection for each analyte can be found in Appendix D-8-2 (intermediate soil) and Appendix D-8-3 (deep soil) for Sites 27 and 55, and D-14 for Sites 9 and 16. Summary of subsurface soil results (intermediate and deep soils) including frequency of detections and exceedances are presented in Table 4-1 (Sites 27 and 55) and Table 4-3 (Sites 9 and 16).

VOCs

Sites 27 and 55

VOCs were detected more frequently in subsurface soil samples than they were in surface soil samples. The concentration of VOCs in soil generally increases at Site 27 and 55 with sampling depth. Most of the VOCs and the highest concentrations of VOCs were detected in the subsurface soil samples collected in 2008 from around the FOV. Seven of the 18 VOCs that were found in the subsurface soils were also detected in the floating product sample collected in 2008 (See Section 4.4).

As shown in Table 4-1, chlorobenzene concentrations increased with depth. The highest detections of chlorobenzenes were found in deep soil samples, including 1,2,4-trichlorobenzene (3,000 µg/kg) and 1,4-dichlorobenzene (3,100 µg/kg) in PAI-27-SO-14, 1,2-dichlorobenzene (910 µg/kg) and 1,3-dichlorobenzene (58 µg/kg) in PAI-27-SO-15, and chlorobenzene (86,000 µg/kg) in PAI-55-SO-13 (Figure 3-1). 1,4-Dichlorobenzene was measured in samples collected from PAI-27-SO-14 and PAI-27-SO-46 and was the only chlorobenzene with exceedances observed above the lowest screening criteria (Figure 4-1). The isoconcentration map of chlorobenzene in deep soil at Sites 27 and 55 (Figure 4-23) shows an elongated high concentration area (>10,000 µg/kg) adjacent to the FOV in addition to a localized hot spot around PAI-27-TW-66I.

PCE was the only chlorinated ethene detected in intermediate-depth soil. It was found in one sample (PAI-27-SO-28), at a concentration of 6 µg/kg. PCE, trichloroethene (TCE) and cis-1,2-dichloroethene (DCE) were detected infrequently in deep soil samples (see Table 4-1). None of the subsurface soil samples exceeded the lowest screening criterion for chlorinated ethenes.

Carbon tetrachloride and chloroform were not detected in any subsurface soil samples, while methylene chloride and chloromethane were detected, approximately 12 and 2 percent of the time, respectively. None of the subsurface soil samples exceeded the lowest screening criterion for chlorinated methanes.

BTEX compounds were found infrequently in intermediate-depth soil samples (~3 percent to 19 percent), but at a relatively higher frequency in deep soil samples (~31 percent to 44 percent) (see Table 4-1 and Appendix D-8-3). None of the subsurface soil samples exceeded any of the soil screening criterion for BTEX. Figure 4-24 shows the isoconcentration contours of BTEX in deep soil. The contours indicate a high concentration area (>1,000 ug/kg) west of the FOV around PAI-55-SO-09 and PAI-55-SO-11 and a localized hot spot around PAI-27-SO-46.

<u>Sites 9 and 16</u>

The concentrations of VOCs in soil generally decreases at Site 9 and 16 with sampling depth. The only VOC detected in the subsurface soil at Sites 9 and 16 was acetone. All detections of acetone were below the lowest USEPA screening criterion.

SVOCs

Sites 27 and 55

PAH compounds were detected much less frequently in intermediate and deep soil samples than surface soil (see Table 4-1). No exceedance of the lowest screening criterion for BaP equivalents was observed in intermediate and deep soil samples. Naphthalene concentrations exceeded the lowest screening criteria in 2 out of the 16 samples analyzed in the subsurface soil. Non-PAH SVOCs were also detected infrequently (~17 percent of samples) in the deep soil samples, but all concentrations were below the lowest screening criterion (Appendix Table D-9).

Sites 9 and 16

PAH compounds were detected much less frequently in intermediate soils (~20 percent of samples) than surface soil (see Table 4-3). No detections of PAHs were observed in deep soil samples. No exceedances of the lowest screening criterion were observed in the subsurface soil. The frequency of detections in the subsurface soils is presented in Appendix Table D-14.

Pesticides

Sites 27 and 55

Pesticides detected in subsurface soil samples include 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, and gamma-chlordane. With the exception of gamma-chlordane, all pesticides were detected in the sample of the floating product (PAI-27-MW11S) collected in 2008. Tables D-9-2 and D-9-3 show the frequency of detection and other statistical results of all the pesticides that had positive detections in intermediate and deep soil samples.

Figures 4-25, 4-26, and 4-27 show the isoconcentration contours for 4,4'-DDT, 4,4'-DDD, and total BHCs in deep soil. The highest concentrations of pesticides were generally detected in samples collected from Site 55. Approximately 4 percent of detections exceed the lowest screening criteria (see Table 4-1). However, the deep soil samples exceeded the lowest screening criterion for both DDTs and BHCs; 22 of 35 samples exceeded screening criterion for 4,4'-DDD (63 percent) and 22 out of 29 samples exceeded screening criterion for delta-BHC (76 percent) (see Table 4-1).

Sites 9 and 16

Pesticides were detected in approximately 56 percent of the intermediate and deep soil samples (see Table 4-3). Appendix Table D-14 shows the frequency of detection and other statistical results of all the pesticides that had positive detections in intermediate and deep soil samples.

Figures 4-25, 4-26, and 4-27 are the isoconcentration maps for 4,4'-DDT, 4,4'-DDD, and total BHCs in deep soil. As discussed above, pesticides were detected at Site 55 south of Sites 9 and 16. No exceedances of the lowest screening criterion were observed in the subsurface soils at Sites 9 and 16 (Table 4-3).

PCBs

Sites 27 and 55

Only the subsurface sample collected in 2007 from boring PAI-27-SO-03 at Site 27 was analyzed for PCBs (Figure 3-1). No PCBs were detected in this sample. PCBs were not detected in any sample collected during the Phase III sampling event.

Sites 9 and 16

PCBs were not detected in any sample collected in the subsurface soils at Sites 9 and 16.

Metals

Sites 27 and 55

Arsenic and thallium exceeded the lowest screening criterion in all intermediate-depth soil samples with positive detections (See Table 4-1). Arsenic also exceeded the screening criterion in all 17 deep soil samples with positive detections; thallium was only detected in two deep soil samples, and one of these exceeded the lowest screening criterion; iron was detected in all samples in the subsurface with one exceedance of the lowest screening criterion. Figure 4-5 shows the soil sampling locations with metal exceedances.

Sites 9 and 16

Metals were detected in approximately 72 percent of subsurface soil samples, with arsenic in exceedance of the lowest screening criterion levels at Sites 9 and 16 sample locations (see Figure 4-15). Arsenic was detected in approximately 60 percent of the subsurface soil samples with results exceeding the lowest screening criteria in four out of five samples. Table 4-3 and Appendix D-14 present metals detected at Sites 9 and 16.

4.3 GROUNDWATER

Groundwater samples were collected at Site 55 in 2002 as part of the field screening effort; at Sites 27 and 55 in 2003, 2007, 2008, and 2010; and from Site 9 and 16 in 1999, 2010, and 2011. The focus of the analytical programs (Tables 1-1 and 3-1) varied from site to site and from sampling round to sampling

round. The complete dataset of chemical analysis results for groundwater samples can be found in Appendix D-10.

Chlorobenzenes, BTEX, DDTs, and BHCs were the analytes most frequently detected in groundwater. Consequently, isoconcentration maps were developed for chlorobenzene (Figures 4-28 and 4-29), total BTEX (Figures 4-30 and 4-31), 4,4'-DDT (Figures 4-32 and 4-33), 4,4'-DDD (Figures 4-34 and 4-35) and total BHCs (Figures 4-36 and 4-37) in shallow wells (screened approximately 3 to 17 feet bgs) and intermediate wells screened (approximately 19 to 27 feet bgs) groundwater based on the 2010 sampling results. Isoconcentration maps were not generated for the deep groundwater wells (screened approximately 32 to 36 feet bgs) due to the limited number of samples collected and exceedances observed. The frequency of detection and other statistical analyses for the chemicals in groundwater can be found in Tables D-8-4 (shallow groundwater), D-8-5 (intermediate groundwater), and D-8-6 (deep groundwater). A summary of groundwater results including frequency of detections and exceedances are presented in Table 4-2 (Sites 27 and 55) and Table 4-4 (Sites 9 and 16). Results for shallow, intermediate, and deep groundwater are discussed below.

VOCs

Sites 27 and 55

Chlorobenzene was detected in approximately 63 percent of groundwater samples (see Table 4-2). Shallow and intermediate groundwater samples had exceedances (approximately 44 and 50 percent, respectively) of the lowest screening criterion, while deep groundwater samples did not have any exceedances of chlorobenzene. 1,4-Dichlorobenzene exceeded the lowest screening criteria in approximately 84 percent of shallow groundwater samples, 88 percent of intermediate groundwater samples, and 67 percent of deep groundwater samples with positive detections. 1,2,4-Trichlorobenzene exceeded the lowest screening criteria in approximately 53 percent of shallow groundwater samples and 100 percent of intermediate groundwater samples with positive detections. No exceedances of the lowest screening criteria for 1,2,4-trichlorobenzene were measured in deep groundwater. Figure 4-6 includes the tags at groundwater sampling locations with exceedances of chlorobenzenes. Figures 4-28 and 4-29 are isoconcentration maps for chlorobenzene in shallow and intermediate groundwater, respectively, based on the 2010 data. The areas of highest chlorobenzene concentrations in shallow and intermediate groundwater were generally immediately downgradient of Site 55. However, the highest concentration of chlorobenzene [980 micrograms per liter (µg/L)] in intermediate groundwater was measured approximately 80 feet north-northwest from the location where the highest concentration of chlorobenzene was found in 2008. It is possible that chlorobenzenes are migrating in the intermediate groundwater. The highest concentrations of chlorobenzene in shallow groundwater (2000 ug/L) were measured in the shallow temporary wells installed in 2010 (PAI-27-TW-65S). The isoconcentration maps for chlorobenzene in previous years can be found in Appendix E-1. Monitoring well PAI-27-MW-08D

(located downgradient of Site 55) is the deep groundwater location with the highest chlorobenzenes concentration (as presented in Table 4-2).

Chlorinated ethenes and methanes were infrequently detected in groundwater samples. One exceedance of PCE and two exceedances of chloroform were observed in shallow groundwater samples relative to the lowest screening criterion. The other chlorinated ethenes and methanes were either not detected or did not exceed the lowest screening criterion.

BTEX compounds were found mainly in shallow and intermediate groundwater samples. Benzene was detected in shallow, intermediate, and deep-water samples at a similar rate (approximately 32, 33, and 40 percent, respectively). Exceedances of the lowest screening criteria for benzene occurred in approximately 80 percent of shallow, 33 percent of intermediate, and 50 percent of deep groundwater samples with detections. Ethylbenzene was detected in approximately 18 percent of shallow and 11 percent of intermediate groundwater samples. Ethylbenzene was not detected in deep groundwater samples. Exceedances of the lowest screening criteria for ethylbenzene occurred in approximately 81 percent of shallow and 40 percent of intermediate groundwater samples with detections. Toluene was detected in approximately 16 percent of shallow and 7 percent of intermediate groundwater samples. Toluene was not detected in deep groundwater samples, and no exceedances of toluene were reported in any groundwater samples. Figures 4-30 and 4-31 are the isoconcentration maps of total BTEX in shallow and intermediate groundwater, respectively. The highest BTEX concentration areas in shallow, intermediate, and deep groundwater are immediately downgradient of the FOV at Site 55.

Sites 9 and 16

BTEX and total xylenes were detected in approximately 33 percent of shallow and intermediate groundwater samples (see Table 4-4). Additionally, acetone (intermediate only), carbon disulfide (shallow only), and ethylbenzene were detected in groundwater at Sites 9 and 16. There were no exceedances of the lowest screening criterion levels for any detected VOC. No deep groundwater samples were collected.

SVOCs

Sites 27 and 55

SVOCs were detected relatively infrequently (approximately 15 percent of samples) in groundwater (see Appendices D-8-4 through D-8-6). A summary of the detection and exceedance percentages for SVOCs is presented in Table 4-2.

Twelve PAH compounds were found in shallow groundwater samples. The BaP equivalents exceeded the lowest screening criterion in one shallow groundwater sample (PAI-27-TW-26S). The compound

1,1-biphenyl was the only non-PAH SVOC that exceeded the lowest screening criterion level in shallow groundwater at PAI-27-MW06S, PAI-27-MW11S, PAI-27-MW19S, PAI-27-TW-65S, and PAI-27-TW-67S.

Eight PAH compounds were detected in intermediate groundwater samples, but no exceedance of BaP equivalents was observed because these PAHs were not included in the calculation for BaP equivalents. The compound 1,1-biphenyl was also the only non-PAH SVOC that exceeded the lowest screening criterion level in intermediate groundwater (PAI-27-TW-25I).

Three PAH compounds were detected in deep groundwater samples, but no exceedance of BaP equivalents was found because these PAHs were not included in the calculation for BaP equivalents. No non-PAH SVOCs were detected in deep groundwater samples.

Sites 9 and 16

SVOCs were detected relatively infrequently (approximately 19 percent of samples) in groundwater (see Appendices D-14). A summary of the detection and exceedance percentages for SVOCs is presented in Table 4-4.

Two PAHs (fluoranthene and pyrene) were detected in one shallow groundwater sample (PAI-9/16-TW-01S) less than the lowest screening criterion.

Six PAH compounds (1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, fluorene, naphthalene, and phenanthrene) were detected in intermediate groundwater samples, but no exceedances of the lowest screening criterion were observed. The compound caprolactam was the only non-PAH SVOC that was detected (below the lowest screening criterion) in intermediate groundwater.

Pesticides

Sites 27 and 55

DDTs and BHCs were detected in approximately 48 percent of groundwater sample (see Table 4-2). Approximately 76 percent of samples with DDT and BHC detection also exceeded the lowest screening criterion. The maximum concentrations of DDTs and BHCs in groundwater were usually orders of magnitude higher than their theoretical solubilities in pure water. This was possibly the result of co-solvent effect due to the presence of BTEX and other weathered diesel products from LNAPL residuals in the smear zone. Detailed discussion of the likely presence of LNAPL in the subsurface can be found in Section 4.4. Figures 4-32 through 4-37 show the isoconcentration contours of 4,4'-DDT, 4,4'-DDD, and total BHCs in shallow and intermediate groundwater, respectively. Areas with high concentrations of DDTs and BHCs were generally immediately downgradient of the FOV, the same pattern seen with chlorobenzenes and BTEX. Such collocated plumes suggest that DDTs, BHCs, chlorobenzenes, and

BTEX in groundwater possibly originated from the same source, most likely the LNAPL residuals in the smear zone.

Sites 9 and 16

DDTs and BHCs were detected in approximately 22 percent of groundwater samples collected from the shallow and intermediate depth (see Table 4-4). Delta-BHC (PAI-9/16-TW-03S), heptachlor epoxide (PAI-27-TW-37S), and heptachlor (PAI-9/16-TW-01S) exceeded the lowest screening criteria in one shallow groundwater sample. Alpha-BHC, beta-BHC, and delta-BHC exceeded the lowest screening criteria in intermediate groundwater at PAI-9/16-TW-04I. Figures 4-32 through 4-37 show the isoconcentration contours of 4,4'-DDT, 4,4'-DDD, and total BHCs in shallow and intermediate groundwater. Areas with high concentrations of DDTs and BHCs were generally in the area of temporary monitoring wells PAI-9/16-TW-3S and PAI-9/16-TW-4I northeast of Site 9.

PCBs

Sites 27 and 55

PCBs were not detected in any of the groundwater samples analyzed.

Sites 9 and 16

PCBs were not detected in any of the groundwater samples analyzed.

Metals

Sites 27 and 55

Table 4-2 presents a summary of the metals that exceeded the screening criterion for groundwater. Figure 4-11 shows the groundwater sampling locations where the concentrations of metals were higher than screening criterion. Detailed detection frequency and other statistical results for all metals can be found in Appendices D-8-4 through D-8-6.

In the 24 shallow groundwater samples analyzed for metals, aluminum, iron, and lead, only one sample (PAI-27-MW-14S) exceeded the lowest screening criterion. Antimony also had only one exceedance at PAI-27-MW-03S. Arsenic had two exceedances, with the highest concentration of 35.5 µg/L at PAI-27-TW-67S.

In intermediate groundwater, nine metals (aluminum, arsenic, beryllium, chromium, cobalt, iron, lead, thallium, and vanadium) exceeded the lowest screening criterion in one to six samples out of 17 analyzed for metals. The highest concentrations of these metals were all found at one location (PAI-27-GW-15I).

Two deep groundwater samples were analyzed for metals, but no exceedances were found.

Sites 9 and 16

Table 4-4 presents a summary of the metals detections observed in groundwater samples collected from Sites 9 and 16. Arsenic was the only metal that exceeded the lowest screening criteria in one well (PAI-9/16-MW-06I). Figure 4-17 shows the groundwater sampling location where arsenic was higher than screening criterion. Detailed detection frequency and other statistical results for all metals can be found in Appendices D-14.

4.4 FLOATING PRODUCT

There were no concerns about subsurface contamination at Site 55 until free product was found in the FOV shortly after its installation in 2001. Free product and oil sheen have been observed in monitoring wells close to Site 55 and soil and groundwater contamination has also been discovered in the general area of Sites 9, 16, 27, and 55 during subsequent investigations. However, the source of the free product has not been clearly identified nor has its extent been delineated. This section will discuss possible sources and extent of the free product based on the site history and the soil, groundwater, and free product sampling results.

4.4.1 Summary of Investigation Results

Initial Observation and Preliminary Removal Efforts in 2001

The FOV at Site 55 is constructed of pre-cast concrete with inner dimensions of approximately 12 feet long by 6 feet wide by 8 feet deep. The walls include blanked cutouts for fiber optic cables to enter the vault from the north, east, south, and west. Petroleum hydrocarbons were found with water in the vault in September 2001 following the installation of the vault. A soil sample was collected next to the vault and analyzed for lead, PCBs, and BTEX. BTEX compounds were detected in the sample (benzene – 19.7 mg/kg, toluene – 51 mg/kg, ethylbenzene – 61 mg/kg, and xylenes – 2,790 mg/kg).

In late October 2001, approximately 0.5 inch of free product was observed in the vault floating on approximately 1 foot of water. Efforts were made to remove the free product and stop the infiltration of groundwater into the vault by applying a sealing compound to the internal concrete surfaces. In late fall 2001, the free product and water in the vault were pumped out and the vault was steam cleaned. Information regarding the disposition of the oil and water mixture that was removed from the FOV is provided in Appendix C-17. During early 2002, the water table had fallen and the lower row of cutouts was capped to prevent additional accumulation of fluids. Water and free product was also removed from the vault by Tetra Tech in March 2003, and the internal concrete surface was resealed at this time.

During the 2011 sampling event, water was present in the FOV. It is unclear if the water was a result of precipitation or groundwater infiltration. No measurements or samples were collected.

Soil and Groundwater Field Screening in 2002

In July 2002, soil and groundwater field screening was performed using a DPT rig equipped with an MIP at Site 55. An EC detector was used with the MIP in the drilling at 17 initial borings to determine the extent of free product and to provide subsurface geologic information. The initial MIP/EC profiling suggested the presence of a small area of petroleum fuels, primarily between 7 to 10 feet bgs (below the first confining layer identified during the investigation) (Columbia Technologies, 2002). Five temporary piezometers (PAI-55-P1 through PAI-55-P5 on Figure 1-5) were installed to determine free product thickness and water-level elevations (Tetra Tech, 2003).

Based on the results of the initial screening, additional DPT borings (PAI-55-FDP01 through PAI-55-FDP22 on Figure 1-5) were advanced to depths of 8 to 12 feet bgs and used to collect 19 subsurface soil and 21 groundwater samples for screening by a mobile laboratory (two groundwater samples were also obtained from piezometers PAI-55-P3 and PAI-55-P4). Samples from PAI-55-FDP13 were not analyzed, likely because the presence of free product in the boring may have adversely affected the mobile laboratory equipment (Tetra Tech, 2003). However, soil boring PAI-55-FDP20 was installed immediately adjacent to PAI-55-FDP13 and the samples collected from that boring were analyzed by the mobile laboratory. Because of the presence of the floating petroleum hydrocarbons, the soil and groundwater samples were analyzed for common constituents of fuel products (BTEX, chlorobenzene, MTBE, and naphthalene). BTEX, chlorobenzene, MTBE, and naphthalene were detected in the groundwater samples, while chlorobenzene and naphthalene were detected in the soil samples.

The results of the field screening indicated that the shallow surficial aquifer was contaminated (Tetra Tech, 2003). Floating product was detected in boring PAI-55-FDP13 (although it was not detected in the adjacent boring PAI-55-FDP20) and the highest concentrations of contaminants were found in borings west of the FOV (PAI-55-FDP02, PAI-55-FDP04, PAI-55-FDP05, PAI-55-FDP17, and PAI-55-FDP22) and one boring located immediately east of the FOV (PAI-55-FDP12). However, soil analytical data obtained during the screening indicated minimal soil contamination within the DPT borings. Chlorobenzene and naphthalene were the only analytes detected in the soil borings (PAI-55-FDP02, PAI-55-FDP03, and PAI-55-FDP04) (Tetra Tech, 2003).

Groundwater Investigation in 2003

The results of the July 2002 field screening were used to select the locations for 21 monitoring wells that were installed in December 2002 in the Site 55 area, as shown on Figure 1-5. Twelve of the monitoring

wells were developed and sampled in July 2003 to isolate/confirm a source area, to characterize the intermediate and deep portions of the surficial aquifer, and to investigate the downgradient shallow surficial aquifer.

Free product was encountered at monitoring well PAI-27-MW06S when the wells were installed in December 2002, but was not encountered in any of the monitoring wells sampled during the July 2003 groundwater sampling event. The 2003 analytical results indicated the presence of 11 VOCs, 10 SVOCs, and 7 pesticides in the groundwater samples collected from the monitoring wells in the Site 55 area, and confirmed the presence of chlorobenzene, BTEX, and naphthalene (detected in the 2002 field screening). However, the concentrations of these compounds detected in the 2003 samples were significantly lower than the concentrations detected in the 2002 field screening samples. The PA/SI and Confirmatory Sampling Report for Site 55 recommended that Site 55 proceed to a focused RI to further characterize the nature and extent of contamination related to a potential petroleum and/or pesticide release and to quantify risks posed to human health and the environment (Tetra Tech, 2003).

Phase II RI in 2008

A sample of the free product identified in PAI-27-MW11S in 2008 was collected and analyzed. The thickness of the product was measured at 0.43 feet and 0.46 feet during the synoptic round water level measurements collected during this sampling event. The results (see Appendix F) indicated that the free product consisted of three major classes of chemicals: pesticides, chlorobenzenes, and hydrocarbons. The pesticides detected in the free product sample included DDT, DDD, DDE, beta-BHC and delta-BHC, at a combined concentration of approximately 45 grams per kilogram (g/kg). Chlorobenzenes, including mono-, di-, and tri-chlorobenzenes, had a combined concentration of approximately 0.33 g/kg in the free product sample. The hydrocarbons in the free product included ethylbenzene, xylenes, and a number of PAHs (e.g. 1,1-biphenyl, 2-methylnaphthalene, benzo(k)fluoranthene, dibenzofuran, fluorene, naphthalene, phenanthrene, and pyrene) and had a combined concentration of approximately 3.57 g/kg. In addition, metals including aluminum, barium, calcium, chromium, copper, iron, magnesium, selenium, sodium, vanadium, and zinc were also detected in the sample at very low concentrations. However, a large fraction of the organic components in the free product could not be identified or quantified because of difficulties encountered during the sample analysis. Comparison of the detected components in the free product with the typical composition of a number of petroleum hydrocarbons indicated that diesel oil, fuel oils, or motor oils were the likely sources of the hydrocarbons in the free product because of the presence of 1,1-biphenyl and benzo(k)fluoranthene. These compounds are not typically found in gasoline or kerosene but are found in various kinds of oils.

The VOCs, SVOCs, and pesticides detected in the free product sample were also found in the subsurface soil samples and groundwater samples.

Phase III RI in 2010

During the Phase III RI in 2010, free product was found again in PAI-27-MW11S, and measured at 0.33 feet thick, but no sample was collected for a chemical analysis. Chemical analysis of newly collected soil and groundwater samples indicated the presence of VOCs, SVOCs, and pesticides.

4.4.2 Possible Sources

During and after World War II, DDT was widely used at military bases to kill insects for control of infectious diseases such as malaria and typhus (ATSDR, 2002). DDT in its original form is not suitable for direct use as an insecticide because it is a whitish, slightly gummy, rather coarse crystalline material and practically insoluble in water (Krieger, 2010). However, DDT can be readily dissolved in many organic solvents such as acetone, xylene, and petroleum oils. Therefore, DDT was often used in kerosene or diesel fuel solutions or emulsions mixed with mineral oil (e.g. xylenes) and surfactants (e.g. Triton X-100) (Bishopp, 1946). Similar to DDT, BHC can also be dissolved in diesel fuel solutions for spray applications.

The chemical components in the free product sample collected from monitoring well PAI-27-11S in 2008 can be associated with historical site-wide pesticide application at the Depot and reported disposal of pesticide rinsate waste at Site 16. It was reported by site personnel that diesel fuel was used to prepare DDT solutions for spraying at the Depot. However, no written documentation could be located to confirm this practice. In addition, use of DDT in other forms (e.g. powders, suspensions, or emulsions) or accidental spills of pesticide solutions could not be excluded. Other pesticides used at the Depot include aldrin, baygon, chlordane, dursban, malathion, and naled. Rinsate water from pest control spray application containers and equipment was reportedly discharged at Site 16 from 1950 to 1977 (Note that the use of DDT has been banned in the US since 1973). During this time, the site received an estimated 5 to 10 gallons per week of pesticide rinsate. The disposal area at Site 16 was approximately 6 feet by 25 feet. Assuming an average disposal rate of approximately 300 gallons per year from 1950 to 1977, an estimated 8,000 gallons of rinsate had been disposed at Site 16 (Tetra Tech, 2009).

Chlorobenzene is an intermediate used to produce DDT (ATSDR, 1990). A typical DDT product could contain approximately 2.44 percent chlorobenzene as impurity (Middleditch, 1989). More importantly, chlorobenzene was also used as a solvent carrier for pesticides (e.g. DDT and BHC) and many other chemicals. Use of chlorobenzene as a solvent carrier for pesticides and the application of this pesticide mixture is a major source of chlorobenzene in the environment (Malcolm et al., 2004).

The chlorobenzenes detected in the free product sample from PAI-27-MW11S are likely from both the impurity component and the original solvent carrier of DDT used at the site. Chlorobenzenes are more soluble in water and more volatile than DDT. Therefore, the remaining concentrations of chlorobenzenes in the free product were lower than DDTs and BHCs.

Based on hydrology established during investigations conducted from 2008 to 2011 direct application of pesticide rinsate at Site 16 or paint waste spillage at Site 9 is an unlikely source for pesticide/paint waste in free product (Figures 3-6 through 3-11). Based on potentiometric surface maps both shallow and intermediate groundwater flow from Site 55 towards Sites 9 and 16.

4.4.3 Presence and Extent of LNAPL

A chemical mixture of LNAPLs carrying pesticide residuals, diesel oil, and other organic solvents have entered the subsurface. Because the surface and shallow soil is primarily silty sand, this chemical cocktail would continue to migrate downward until a confining clay layer or the groundwater table is encountered.

During the downward migration, part of the LNAPL would be trapped in soil pores or retained by soil particles due to the strong adsorption of natural organic matter in soil along the migration path. However, most of the pesticides and VOCs retained in surface and near surface soils might have been lost after several decades due to volatilization, dissolution, desorption, photolysis, or biodegradation processes. Therefore, the concentrations of pesticides and VOCs in surface (0 to 1 feet bgs) and intermediate (4 to 5 feet bgs) soil samples are very low and often negligible compared to deeper subsurface soil samples (see detailed discussions in Sections 4.1 and 4.2).

There are two thin clay layers (~6 to 8 feet bgs and ~30 feet bgs) underneath the site that vary in depth and thickness from place to place and may act to impede downward groundwater flow in the shallow silty sand units. The groundwater in shallow wells exhibits semi-confining conditions. The downward migration of the LNAPL would be limited by the first clay layer, where it would start to accumulate and spread laterally under the decreasing hydraulic gradient or the surface contour of the clay layer. Some of the LNAPL components would be removed over time by sorption, dissolution, or volatilization, while the remaining LNAPL would distribute itself both as residual and in pools. As the groundwater surface fluctuates over time, a smear zone would be formed with LNAPL trapped within interstitial pore spaces both above and below the groundwater surface, with continuously decreasing saturation with depth into the saturated zone.

With infiltration water from surface recharge and flowing groundwater from upgradient locations, dissolved-phase plumes would evolve from the dissolution of LNAPL components and continue to

develop until all LNAPL has been depleted or the leading edge of the plumes are at steady-state with natural attenuation processes.

Additionally, LNAPL may have been introduced into the subsurface below the first clay layer near the FOV. Once released in the subsurface, the LNAPL could be potentially be pinned beneath the adjacent clay layer and/or smeared within the clay. The LNAPL then degraded in place and/or migrated along with groundwater underneath the clay layer.

Despite the removal efforts in 2001, free product was still observed in isolated monitoring wells in recent sampling events (e.g. PAI-27-MW11S in 2010). This suggests that there is still LNAPL remaining in the subsurface in a localized area around PAI-27-MW11S.

Fortunately, recently collected soil, groundwater and LNAPL data can provide indirect evidence of possible LNAPL presence at other certain locations. Assuming organic contaminants (e.g. chlorobenzenes and BTEX compounds) are distributed in aqueous, adsorbed, and NAPL (if present) phases, in saturated soil, if the total concentration of a compound in a saturated soil sample exceeds the sum of its concentrations in dissolved and adsorbed phases, it is likely that there is NAPL presence at that location. Figure 4-38 shows the deep soil sample locations where LNAPL might be present assuming the maximum groundwater concentrations of chlorobenzenes are greater than the effective solubilities estimated based on molar fractions in the LNAPL sample. Detailed methodology and calculations to derive these possible LNAPL locations can be found in Appendix F. Because of the complexity of the LNAPL's nature and extent in the smear zone, the LNAPL composition at other locations might be quite different from the only LNAPL sample collected in 2008. Therefore, the effective solubility of LNAPL components might also be different from place to place, which can be seen from the discrepancies between the estimated solubilities and maximum detected groundwater concentrations per location. Figure 4-39 shows the possible LNAPL locations based on the maximum groundwater concentrations of chlorobenzenes, which are essentially a subset of locations presented in Figure 4-38 because the maximum groundwater concentrations of chlorobenzenes were mostly greater than the estimated effective solubilities. It can be seen that most of the possible LNAPL locations are in the vicinity Site 55 and on the southeast boundary of Site 27. Figure 4-40 presents subsurface soil concentrations that exceed leachability criteria overlain with the approximate extent of groundwater contamination.

TABLE 4-1

SUMMARY OF RI SOIL RESULTS
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

Chlorobenzenes

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)[i]	Sample location with highest concentration	Range [units µg-kg]
The detection frequency of chlorobenzenes increases with the sampling depth.	Surface[ii]	1,2,4-Trichlorobenzene	1 out of 83 samples (1.2%)	0 out of 1 samples	PAI-27-SO-14	Avg: 3
		1,2-Dichlorobenzene	1 out of 83 samples (1.2%)	0 out of 1 samples	PAI-27-SO-14	Avg; 2
		1,3-Dichlorobenzene	Not Detected			
		1,4-Dichlorobenzene	2 out of 83 samples (2.4%)	0 out of 2 samples	PAI-27-SO-14	0.53 - 3
		Chlorobenzene	11 out of 85 samples (12.9%)	0 out of 11 samples	PAI-27-SO-29	0.31 - 6
	Intermediate[iii]	1,2,4-Trichlorobenzene	1 out of 32 samples (3.12%)	0 out of 1 samples	PAI-27-SO-28	Avg: 430
		1,2-Dichlorobenzene	1 out of 32 samples (3.12%)	0 out of 1 samples	PAI-27-SO-28	Avg: 190
		1,3-Dichlorobenzene	1 out of 32 samples (3.12%)	Not Applicable	PAI-27-SO-28	Avg: 18
		1,4-Dichlorobenzene	1 out of 32 samples (3.12%)	0 out of 1 samples	PAI-27-SO-28	Avg: 360
		Chlorobenzene	2 out of 32 samples (6.25%)	0 out of 2 samples	PAI-27-SO-28	0.33 - 380
	Deep[iv]	1,2,4-Trichlorobenzene	22 out of 52 samples (42.3%)	0 out of 22 samples	PAI-27-SO-14	1 - 3,000
		1,2-Dichlorobenzene	24 out of 52 samples (46.15%)	0 out of 24 samples	PAI-27-SO-15	2.6 - 910
		1,3-Dichlorobenzene	6 out of 52 samples (11.53%)	Not Applicable	PAI-27-SO-15	0.4 - 58
		1,4-Dichlorobenzene	24 out of 52 samples (46.15%)	2 out of 24 samples (8.3%)	PAI-27-SO-14	5.9 - 3,100
		Chlorobenzene	30 out of 52 samples (57.7%)	0 out of 30 samples	PAI-55-SO-13	0.27 - 86,000

Chlorinated ethenes

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)	Sample location with highest concentration	Range [units µg-kg]
PCE is the only pollutant that is found in all the sample depths in the soil. The detection of PCE increases with sampling depth. TCE and cis-1,2-DCE are only found in deep soil samples.	Surface	PCE	1 out of 85 samples (1.17%)	0 out of 1 samples	PI02702	Avg: 2
		TCE	Not Detected			
		cis-1,2-DCE	Not Detected			
	Intermediate	PCE	1 out of 32 samples (3.12%)	0 out of 1 samples	PAI-27-SO-28	Avg: 6
		TCE	Not Detected			
		cis-1,2-DCE	Not Detected			
	Deep	PCE	7 out of 52 samples (13.4%)	0 out of 7 samples	PAI-27-SO-14	2 - 92
		TCE	3 out of 52 samples (5.76%)	0 out of 3 samples	PAI-55-SO-11	1.24 - 3.8
		cis-1,2-DCE	1 out of 52 samples (1.92%)	0 out of 1 samples	PAI-55-SO-13	Avg: 0.45

TABLE 4-1

SUMMARY OF RI SOIL RESULTS
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

Chlorinated methanes

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)	Sample location with highest concentration	Range [units µg-kg]
The presence of Methylene Chloride increases with sampling depth. Carbon Tetrachloride and Chloroform are only present in the surface soil.	Surface	Carbon Tetrachloride	1 out of 85 samples (1.17%)	0 out of 1 samples	PI02702	Avg: 3
		Chloroform	1 out of 85 samples (1.17%)	0 out of 1 samples	PI02702	5 - 8 (Avg: 6.5)
		Methylene Chloride	4 out of 85 samples (4.7%)	0 out of 4 samples	PAI-27-SO-36	0.5 - 0.81
		Chloromethane	1 out of 85 samples (1.17%)	0 out of 1 samples	PAI-55-SO-17B	Avg: 7.8
	Intermediate	Carbon Tetrachloride	Not Detected			
		Chloroform	Not Detected			
		Methylene Chloride	3 out of 32 samples (9.37%)	0 out of 3 samples	PAI-27-SO-41	0.58 - 0.82
		Chloromethane	1 out of 32 samples (3.17%)	0 out of 1 samples	PAI-55-SO-14C	Avg: 7.7
	Deep	Carbon Tetrachloride	Not Detected			
		Chloroform	Not Detected			
		Methylene Chloride	7 out of 52 samples (13.46%)	0 out of 7 samples	PAI-55-SO-09	0.46 - 2.8
		Chloromethane	1 out of 52 samples (1.92%)	0 out of 1 samples	PAI-55-SO-14C	Avg: 7.6

BTEX

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)	Sample location with highest concentration	Range [units µg-kg]
The detection frequency of BTEX compounds increases with the sampling depth. None of the BTEX pollutants exceeded any screening level criteria.	Surface	Benzene	Not Detected			
		Ethylbenzene	3 out of 85 samples (3.52%)	0 out of 3 samples	PAI-27-SO-14	1 - 4
		Toluene	9 out of 85 samples (10.58%)	0 out of 9 samples	PAI-27-SO-05	0.35 - 9
		Total Xylenes	10 out of 85 samples (11.76%)	0 out of 10 samples	PAI-27-SO-05	0.24 - 17
		BTEX	14 out of 85 samples (16.47%)	Not Applicable	PAI-27-SO-05	0.24 - 29
	Intermediate	Benzene	1 out of 32 samples (3.12%)	0 out of 1 samples	PAI-27-SO-28	Avg: 26
		Ethylbenzene	1 out of 32 samples (3.12%)	0 out of 1 samples	PAI-27-SO-28	Avg: 57
		Toluene	6 out of 32 samples (18.75%)	0 out of 6 samples	PAI-27-SO-43	0.46 - 2.2
		Total Xylenes	5 out of 32 samples (15.625%)	0 out of 5 samples	PAI-27-SO-28	0.18 - 1
		BTEX	8 of 32 samples (25%)	Not Applicable	PAI-27-SO-28	0.18 - 84
	Deep	Benzene	23 out of 52 samples (44.2%)	0 out of 23 samples	PAI-27-SO-15	0.55 - 640
		Ethylbenzene	21 out of 52 samples (40.3%)	0 out of 21 samples	PAI-27-SO-16	1 - 2,500
		Toluene	16 out of 52 samples (30.76%)	0 out of 16 samples	PAI-55-SO-11	0.35 - 2,200
		Total Xylenes	19 out of 52 samples (36.53%)	0 out of 19 samples	PAI-27-SO-16	0.45 - 8,900
		BTEX	27 out of 52 samples (51.92%)	Not Applicable	PAI-27-SO-16	0.43 - 11,474

TABLE 4-1

SUMMARY OF RI SOIL RESULTS
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

SVOCs PAHs

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)	Sample location with highest concentration	Range [units µg-kg]
The presence of SVOCs in surface soil is relatively high (from ~45% to 85%). The exceedances of such SVOCs vary from 1% to 93%. There were no exceedances among any of the SVOCs in the intermediate soil. Naphthalene was the only SVOC that exceeded the lowest USEPA screening criteria in the subsurface soil	Surface	Benzo(a)anthracene	56 out of 67 samples (83.58%)	11 out of 56 samples (19.64%)	PAI-27-SO-12	1.7 - 50,000
		Benzo(a)pyrene	46 out of 67 samples (68.65%)	43 out of 46 samples (93.47%)	PAI-27-SO-12	5 - 42,000
		Benzo(b)fluoranthene	51 out of 67 samples (76.11%)	25 out of 51 samples (49.0%)	PAI-27-SO-12	8.4 - 60,000
		Benzo(k)fluoranthene	47 out of 67 samples (70.14%)	1 out of 47 samples (2.12%)	PAI-27-SO-12	4.6 - 20,000
		Chrysene	58 out of 67 samples (86.56%)	1 out of 58 samples (1.72%)	PAI-27-SO-12	4 - 55,000
		Dibenzo(a,h)anthracene	31 out of 67 samples (46.26%)	26 out of 31 samples (83.87%)	PAI-27-SO-12	4.4 - 6,700
		Indeno(1,2,3-cd)pyrene	49 out of 67 samples (73.13%)	13 out of 49 samples (26.53%)	PAI-27-SO-12	6.3 - 26,000
		Naphthalene	45 out of 67 samples (67.16%)	0 out of 45 samples	PAI-27-SO-12	0.8 - 780
		PAHs[v] (measured in BaP equivalents)	59 out of 67 samples (88.05%)	44 out of 59 samples (74.57%)	PAI-27-SO-12	0.174 - 62,555
	Intermediate	Benzo(a)anthracene	5 out of 23 samples (21.73%)	0 out of 5 samples	PAI-27-SO-34	0.66 - 8.6
		Benzo(a)pyrene	4 out of 23 samples (17.39%)	0 out of 4 samples	PAI-27-SO-34	1.1 - 11
		Benzo(b)fluoranthene	5 out of 23 samples (21.73%)	0 out of 5 samples	PAI-55-SO-18A	1 - 12
		Benzo(k)fluoranthene	5 out of 23 samples (21.73%)	0 out of 5 samples	PAI-55-SO-18A	0.73 - 8
		Chrysene	5 out of 23 samples (21.73%)	0 out of 5 samples	PAI-27-SO-34	0.76 - 11
		Dibenzo(a,h)anthracene	1 out of 23 samples (4.34%)	0 out of 1 samples	PAI-27-SO-45A	Avg: 2
		Indeno(1,2,3-cd)pyrene	4 out of 23 samples (17.39%)	0 out of 4 samples	PAI-27-SO-34 PAI-55-SO-18A	0.6 - 13
		Naphthalene	2 out of 23 samples (8.69%)	0 out of 2 samples	PAI-27-SO-38A	1.8 - 17
		PAHs (measured in BaP equivalents)	5 out of 23 samples (21.73%)	0 out of 5 samples	PAI-27-SO-34	0.174 - 14.349
	Deep	Benzo(a)anthracene	11 out of 42 samples (26.19%)	0 out of 11 samples	PAI-55-SO-04	0.76 - 11
		Benzo(a)pyrene	5 out of 42 samples (11.90%)	0 out of 5 samples	PAi-55-SO-04	0.57 - 4.2
		Benzo(b)fluoranthene	8 out of 42 samples (19.04%)	0 out of 8 samples	PAI-27-SO-33	0.8 - 12
		Benzo(k)fluoranthene	10 out of 42 samples (23.80%)	0 out of 10 samples	PAI-27-SO-33	0.59 - 12
		Chrysene	11 out of 42 samples (26.19%)	0 out of 11 samples	PAI-55-SO-04	1.2 - 13
		Dibenzo(a,h)anthracene	Not Detected			
		Indeno(1,2,3-cd)pyrene	3 out of 42 samples (7.14%)	0 out of 3 samples	PAI-55-SO-04	0.54 - 5.9
		Naphthalene	16 out of 42 samples (38.09%)	2 out of 16 samples (12.5%)	PAI-55-SO-11	0.95 - 15,000
		PAHs (measured in BaP equivalents)	12 out of 42 samples (28.57%)	0 out of 12 samples	PAI-55-SO-04	0.0029 - 6.291

TABLE 4-1

SUMMARY OF RI SOIL RESULTS
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

Pesticides DDTs

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)	Sample location with highest concentration	Range [units µg-kg]
The presence of DDTs along the soil profile is somewhat consistent.	Surface	4,4'-DDT	78 out of 86 samples (90.69%)	6 out of 78 samples (7.69%)	PAI-27-SO-17	0.2653 - 290,000
		4,4'-DDD	69 out of 86 samples (80.23%)	5 out of 69 samples (7.24%)	PAI-27-SO-16	0.2775 - 440,000
		4,4'-DDE	78 out of 86 samples (90.69%)	6 out of 78 samples (7.69%)	PAI-27-SO-16	0.13 - 34,000
		Total DDTs	83 out of 86 samples (96.51%)	Not Applicable	PAI-27-SO-16	0.34 - 569,000
	Intermediate	4,4'-DDT	24 out of 32 samples (75%)	1 out of 24 samples (4.16%)	PAI-27-SO-22	0.28 - 2,700
		4,4'-DDD	23 out of 32 samples (71.87%)	1 out of 23 samples (4.34%)	PAI-27-SO-28	0.13 - 270,000
		4,4'-DDE	17 out of 32 samples (53.1%)	0 out of 17 samples	PAI-27-SO-22	0.088 - 250
		Total DDTs	27 out of 32 samples (84.375%)	Not Applicable	PAI-27-SO-28	0.28 - 270,000
	Deep	4,4'-DDT	35 out of 52 samples (67.30%)	19 out of 35 samples (54.28%)	PAI-55-SO-11	0.37 - 190,000
		4,4'-DDD	35 out of 52 samples (67.30%)	22 out of 35 samples (62.8%)	PAI-27-SO-14	0.16 - 1,400,000
		4,4'-DDE	28 out of 52 samples (53.8%)	3 out of 28 samples (10.71%)	PAI-27-SO-14	0.13 - 44,000
		Total DDTs	40 out of 52 samples (76.92%)	Not Applicable	PAI-27-SO-14	0.16 - 1,460,000

Pesticides BHCs

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)	Sample location with highest concentration	Range [units µg-kg]
The presence of BHCs along the soil profile is somewhat consistent.	Surface	Alpha-BHC	27 out of 86 samples (31.39%)	1 out of 27 samples (3.7%)	PAI-27-SO-30	0.11 - 92
		Beta-BHC	34 out of 86 samples (39.53%)	1 out of 34 samples (2.94%)	PAI-27-SO-18	0.15 - 2,300
		Delta-BHC	43 out of 86 samples (50%)	1 out of 43 samples (2.32%)	PAI-27-SO-30	0.084 - 120
		Gamma-BHC	17 out of 86 samples (13.76%)	0 out of 17 samples	PAI-27-SO-30	0.083 - 83
		Total BHCs	53 out of 86 samples (61.62%)	Not Applicable	PAI-27-SO-18	0.15 - 2,300
	Intermediate	Alpha-BHC	9 out of 32 samples (28.12%)	1 out of 9 samples (11.1%)	PAI-27-SO-28	0.22 - 14,000
		Beta-BHC	9 out of 32 samples (28.12%)	0 out of 9 samples	PAI-27-SO-44	0.49 - 4.3
		Delta-BHC	21 out of 32 samples (65.62%)	2 out of 21 samples (9.52%)	PAI-27-SO-28	0.13 - 20,000
		Gamma-BHC	10 out of 32 samples (31.25%)	0 out of 10 samples	PAI-27-SO-30	0.055 - 24
		Total BHCs	22 out of 32 samples (68.75%)	Not Applicable	PAI-27-SO-28	0.055 - 34,000
	Deep	Alpha-BHC	26 out of 52 samples (50%)	7 out of 26 samples (26.92%)	PAI-27-SO-47	0.14 - 4,900
		Beta-BHC	39 out of 52 samples (75%)	9 out of 39 samples (23.07%)	PAI-27-SO-14	0.23 - 16,000
		Delta-BHC	39 out of 52 samples (75%)	22 out of 39 samples (56.41%)	PAI-27-SO-14	0.12 - 100,000
		Gamma-BHC	19 out of 52 samples (36.5%)	3 out of 19 samples (15.78%)	PAI-27-SO-47	0.073 - 2,600
		Total BHCs	44 out of 52 samples (84.61%)	Not Applicable	PAI-27-SO-14	0.23 - 116,000

TABLE 4-1

SUMMARY OF RI SOIL RESULTS
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

PCBs

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)	Sample location with highest concentration	Range [units µg-kg]
The only measurable presence of PCBs is at the surface soil level. The sample did exceed the lowest USEPA screening criteria	Surface	Aroclor-1260	1 out of 70 samples (1.4%)	1 out of 1 samples (100%)	PAI-27-S0-08	460 - 510 (Avg: 485)
	Intermediate	Aroclor-1260	Not Detected			
	Deep	Aroclor-1260	Not Detected			

Metals

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)	Sample location with highest concentration	Range [units µg-kg]
Arsenic and thallium are the two metals that are above the lowest screening criteria in the three sample levels for soil.	Surface	Arsenic	53 out of 67 samples (79.10)	53 out of 53 samples (100%)	PAI-55-SO-07B	0.46 - 17.5
		Iron	67 out of 67 samples (100%)	0 out of 67 samples	PAI-27-SO-08	930 - 10,600
		Lead	67 out of 67 samples (100%)	1 out of 67 samples (1.49%)	PAI-55-SO-55	2.9 - 1,140
		Thallium	2 out of 67 samples (3.22%)	1 out of 2 samples (50%)	PAI-27-SO-45B	0.3 - 0.88
	Intermediate	Arsenic	4 out of 23 samples (17.39%)	4 out of 4 samples (100%)	PAI-27-SO-41	0.93 - 13.2
		Iron	23 out of 23 samples (100%)	0 out of 23 samples	PAI-27-SO-41	115 - 32,100
		Lead	23 out of 23 samples (100%)	0 out of 23 samples	PAI-27-SO-41	1.33 - 20.2
		Thallium	1 out of 23 samples (4.34%)	1 out of 1 samples (100%)	PAI-27-SO-38A	Avg: 4.51
	Deep	Arsenic	17 out of 42 samples (40.47%)	17 out of 17 samples (100%)	PAI-27-SO-37	0.54 - 9.97
		Iron	42 out of 42 samples (100%)	1 out of 42 samples (2.38%)	PAI-27-SO-37	1,890 - 65,300
		Lead	42 out of 42 samples (100%)	0 out of 42 samples	PAI-27-SO-44	3.22 - 20.7
		Thallium	2 out of 42 samples (4.76%)	1 out of 2 samples (50%)	PAI-27-SO-38A	0.53 - 5.86

Acronyms

DCE Dichloroethene
TCE Trichloroethene
PCE Tetrachloroethene

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i When there was a detectable concentration of a chemical, the concentration was compared to the lowest screening criterion; when concentration > screening criterion it was considered an exceedance.
ii Typical depth 0-1 foot
iii Typical depth 4-5 feet
iv Typical depth 9-10 feet
v The chemicals used to calculate the PAHs measured in BaP equivalents are: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene

Not Applicable – Exceedances not evaluated because no criteria was available

TABLE 4-2

SUMMARY OF RI GROUNDWATER RESULTS
SITE 27 – MOTOR TRANSPORTATION FACILITY
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

Chlorobenzenes

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)[i]	Sample location with highest concentration	Range [units µg-L]
Chlorobenzene had the highest detection rate across the three sampling depths. The percentage of exceedance for the pollutants in this group was higher in the intermediate groundwater depth than in the shallow or deep groundwater.	Shallow	1,2,4 Trichlorobenzene	17 out of 62 samples (27.41%)	9 out of 17 samples (52.9%)	PAI-27-MW-06S	0.13 - 9
		1,2 Dichlorobenzene	31 out of 62 samples (50%)	0 out of 31 samples	PAI-27-TW-26S	.061 - 33
		1,3 Dichlorobenzene	2 out of 62 samples (3.22%)	Not Applicable	PAI-27-MW-11S	0.4 - 0.5
		1,4, Dichlorobenzene	37 out of 62 samples (59.67%)	31 out of 37 samples (83.78%)	PAI-27-TW-26S	0.25 - 82
		Chlorobenzene	39 out of 62 samples (62.90%)	17 out of 39 samples (43.58%)	PAI-27-TW-26S	0.17 - 2500
	Intermediate	1,2,4 Trichlorobenzene	2 out of 46 samples (4.34%)	2 out of 2 samples (100%)	PAI-27-MW-12I	4 - 5
		1,2 Dichlorobenzene	16 out of 46 samples (34.78%)	0 out of 16 samples	PAI-27-MW-12I	0.065 - 20
		1,3 Dichlorobenzene	2 out of 46 samples (4.34%)	Not Applicable	PAI-27-MW-12I	0.4 - 1
		1,4, Dichlorobenzene	16 out of 46 samples (34.78%)	14 out of 16 samples (87.5%)	PAI-27-MW-12I	0.077 - 65
		Chlorobenzene	27 out of 46 samples (58.69%)	13 out of 27 samples (48.1%)	PAI-27-MW-50I	0.079 - 980
	Deep	1,2,4 Trichlorobenzene	2 out of 5 samples (40%)	0 out of 2 samples	PAI-27-MW-08D	0.385 - 2
		1,2 Dichlorobenzene	2 out of 5 samples (40%)	0 out of 2 samples	PAI-27-MW-08D	0.6 - 0.62
		1,3 Dichlorobenzene	Not Detected			
		1,4, Dichlorobenzene	3 out of 5 samples (60%)	2 out of 3 samples (66.6%)	PAI-27-MW-08D	0.049 - 2
		Chlorobenzene	3 out of 5 samples (60%)	0 out of 3 samples	PAI-27-MW-08D	.03 - 4

Chlorinated ethenes

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)	Sample location with highest concentration	Range [units µg-L]
Chlorinated ethenes have a very low detection rate through the three sampling layers in groundwater. Tetrachloroethene (PCE) in the surface groundwater was the only sample that was above the screening criteria level.	Shallow	PCE	1 out of 62 samples (1.61%)	1 out of 1 samples (100%)	PAI-27-MW-63S	Avg 0.6
		TCE	Not Detected			
		cis-1,2-DCE	1 out of 62 samples (1.61%)	0 out of 1 samples	PAI-27-TW-26S	Avg 0.6
	Intermediate	PCE	Not Detected			
		TCE	Not Detected			
		cis-1,2-DCE	1 out of 46 samples (2.17%)	0 out of 1 samples	PAI-27-MW-05I	Avg 0.13
	Deep	PCE	Not Detected			
		TCE	Not Detected			
		cis-1,2-DCE	Not Detected			

TABLE 4-2

SUMMARY OF RI GROUNDWATER RESULTS
SITE 27 – MOTOR TRANSPORTATION FACILITY
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

Chlorinated methanes

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)	Sample location with highest concentration	Range [units µg-L]
Chloroform that was found in the shallow groundwater in Sites 27 and 55 was the only pollutant in this group to exceed the lowest screening criteria level.	Shallow	Carbon Tetrachloride	Not Detected			
		Chloroform	5 out of 62 samples (8.06%)	2 out of 5 samples (40%)	PAI-27-MW-53S	0.042 - 0.73
		Methylene Chloride	Not Detected			
		Chloromethane	2 out of 62 samples (3.22%)	0 out of 2 samples	PAI-MW-63S	0.7 - 0.9
	Intermediate	Carbon Tetrachloride	Not Detected			
		Chloroform	Not Detected			
		Methylene Chloride	Not Detected			
		Chloromethane	1 out of 46 samples (2.17%)	0 out of 1 samples	PAI-MW-07I	Avg: 0.6
	Deep	Carbon Tetrachloride	Not Detected			
		Chloroform	Not Detected			
		Methylene Chloride	Not Detected			
		Chloromethane	Not Detected			

BTEX

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)	Sample location with highest concentration	Range [units µg-L]
Benzene was found in the three groundwater sampling levels. Ethylbenzene and benzene had relatively similar percentages of exceedances of the lowest criteria level.	Shallow	Benzene	20 out of 62 samples (32.25%)	16 out of 20 samples (80%)	PAI-27-TW-26S	0.039 - 230
		Ethylbenzene	11 out of 62 samples (17.74%)	9 out of 11 samples (81.81%)	PAI-27-TW-26S	; 0.3 - 120
		Toluene	10 out of 62 samples (16.12%)	0 out of 10 samples	PAI-27-TW-26S	0.083 - 18
		Total Xylenes	9 out of 62 samples (14.51%)	1 out of 9 samples (11.11%)	PAI-27-TW-26S	0.25 - 430
		BTEX	25 out of 62 samples (40.32%)	Not available	PAI-27-TW-26S	0.039 - 798
	Intermediate	Benzene	15 out of 46 samples (32.60%)	11 out of 15 samples (33.33%)	PAI-27-TW-25I	0.043 - 24
		Ethylbenzene	5 out of 46 samples (10.86%)	2 out of 5 samples (40%)	PAI-27-TW-25I	0.6 - 7
		Toluene	3 out of 46 samples (6.52%)	0 out of 3 samples	PAI-27-TW-25I	0.08 - 1
		Total Xylenes	2 out of 46 samples (4.34%)	0 out of 2 samples	PAI-27-TW-25I	0.5 - 20
		BTEX	16 out of 46 samples (34.78%)	Not Applicable	PAI-27-TW-25I	0.0215 - 52
	Deep	Benzene	2 out of 5 samples (40%)	1 out of 2 samples (50%)	PAI-27-MW-08D	0.33 - 0.6
		Ethylbenzene	Not Detected			
		Toluene	Not Detected			
		Total Xylenes	Not Detected			
		BTEX	2 out of 5 samples (40%)	Not applicable	PAI-27-MW-08D	0.3 - 6

TABLE 4-2

SUMMARY OF RI GROUNDWATER RESULTS
SITE 27 – MOTOR TRANSPORTATION FACILITY
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

SVOCs Miscellaneous

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)	Sample location with highest concentration	Range [units µg-L]
In shallow and intermediate groundwater 1,1-biphenyl has a 100% exceedances of the lowest screening criteria. There were no detections of PAHs and 1,1-byphenyl in deep groundwater.	Shallow	1,1-biphenyl	8 out of 42 samples (19.04%)	8 out of 8 samples (100%)	PAI-27-TW-67S	1.67 - 12
	Intermediate	1,1-biphenyl	1 out of 32 samples (3.125%)	1 out of 1 samples (100%)	PAI-27-TW-25I	Avg: 4
	Deep	1,1-biphenyl	Not Detected			

SVOCs PAHs

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)	Sample location with highest concentration	Range [units µg-L]
The detection rate for PAHs is relatively low. All detections of naphthalene were in exceedance of the lowest screening criteria for shallow and deep groundwater. The detection of PAHs was overall higher in shallow groundwater than at the other sampling depths.	Shallow	2-Methylnaphthalene	8 out of 42 samples (19.04%)	1 out of 8 samples (12.5%)	PAI-27-MW-06S	0.016 - 240
		Dibenzo(a,h)anthracene	1 out of 42 samples (2.38%)	1 out of 1 samples (100%)	PAI-27-TW-26S	Avg: 0.12
		Indeno(1,2,3-cd)pyrene	1 out of 42 samples (2.38%)	1 out of 1 samples (100%)	PAI-TW-26S	Avg: 0.13
		Naphthalene	9 out of 42 samples (21.42%)	9 out of 9 samples (100%)	PAI-27-MW-06S	0.24 - 250
		PAHs[ii] (measured in BaP equivalents)	1 out of 42 samples (2.38%)	1 out of 1 samples (100%)	PAI-27-TW-26S	Avg: 0.133
	Intermediate	2-Methylnaphthalene	11 out of 32 samples (34.37%)	0 out of 11 samples	PAI-27-TW-25I	0.017 - 35
		Dibenzo(a,h)anthracene	Not Detected			
		Indeno(1,2,3-cd)pyrene	Not Detected			
		Naphthalene	9 out of samples 32 (28.12%)	6 out of 9 samples (66.66%)	PAI-27-TW-25I	0.042 - 55
		PAHs	Not Detected			
	Deep	2-Methylnaphthalene	2 out of 3 samples (66.66%)	0 out of 2 samples	PAI-27-MW08D	0.03 - 0.054
		Dibenzo(a,h)anthracene	Not Detected			
		Indeno(1,2,3-cd)pyrene	Not Detected			
		Naphthalene	1 out of 3 samples (33.33%)	1 out of 1 samples (100%)	PAI-27-MW-13D	Avg: 0.2
		PAHs	Not Detected			

TABLE 4-2

SUMMARY OF RI GROUNDWATER RESULTS
SITE 27 – MOTOR TRANSPORTATION FACILITY
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

Pesticides DDTs

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)	Sample location with highest concentration	Range [units µg-L]
The highest percentage of exceedances for DDTs occurred in shallow groundwater.	Shallow Groundwater	4,4'-DDT	24 out of 62 samples (38.70%)	13 out of 24 samples (54.16%)	PAI-27-MW-06S	0.0083 - 1600
		4,4'-DDD	27 out of 62 samples (43.54%)	16 out of 27 samples (59.25%)	PAI-27-MW-06S	0.0077 - 3400
		4,4'-DDE	12 out of 62 samples (19.35%)	6 out of 12 samples (50%)	PAI-27-MW-06S	0.0075 - 36
		Total DDTs	32 out of 62 samples (51.6%)	Not applicable	PAI-27-MW-06S	0.0077 - 5000
	Intermediate	4,4'-DDT	12 out of 46 samples (26.08%)	4 out of 12 samples (33.33%)	PAI-27-TW-25I	0.0053 - 2.8
		4,4'-DDD	19 out of 46 samples (41.30%)	7 out of 19 samples (36.84%)	PAI-27-MW-07I	0.0076 - 1.4
		4,4'-DDE	6 out of 46 samples (13.04%)	0 out of 6 samples	PAI-27-MW-15I	0.0047 - 0.043
		Total DDTs	20 out of 46 samples (43.47%)	Not Applicable	PAI-27-TW-25I	0.0076 - 4
	Deep	4,4'-DDT	2 out of 5 samples (40%)	0 out of 2 samples	PAI-27-MW-08D	0.0079 - 0.034
		4,4'-DDD	4 out of 5 samples (80%)	2 out of 4 samples (50%)	PAI-27-MW-08D	0.02 - 1.7
		4,4'-DDE	2 out of 5 samples (40%)	0 out of 2 samples	PAI-27-MW-08D	0.012 - 0.046
		Total DDTs	4 out of 5 samples (80%)	Not Applicable	PAI-27-MW-08D	0.0279 - 1.732

Pesticides BHCs

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)	Sample location with highest concentration	Range [units µg-L]
For BHCs the percentage of exceedances was fairly consistent through the three sampling levels of groundwater.	Shallow	Alpha-BHC	44 out of 62 samples (70.96%)	40 out of 44 samples (90.90%)	PAI-27-MW-06S	0.0033 - 470
		Beta-BHC	35 out of 62 samples (56.45%)	32 out of 35 samples (91.42%)	PAI-27-MW-06S	0.015 - 130
		Delta-BHC	48 out of 62 samples (77.41%)	45 out of 48 samples (93.75%)	PAI-27-MW-06S	0.0037 - 700
		Gamma-BHC	28 out of 62 samples (45.16%)	21 out of 28 samples (64.28%)	PAI-27-MW-06S	0.004 - 540
		Total BHCs	51 out of 62 samples (82.25%)	Not Applicable	PAI-27-MW-06S	0.00425 - 1840
	Intermediate	Alpha-BHC	20 out of 46 samples (43.47%)	18 out of 20 samples (90%)	PAI-27-TW-25I	0.0029 - 4.7
		Beta-BHC	15 out of 46 samples (32.60%)	13 out of 15 samples (86.6%)	PAI-27-MW-12I	0.014 - 3.7
		Delta-BHC	27 out of 46 samples (58.69%)	24 out of 27 samples (88.8%)	PAI-27-TW-25I	0.0039 - 13
		Gamma-BHC	15 out of 46 samples (32.60%)	8 out of 15 samples (53.33%)	PAI-27-TW-25I	0.0035 - 2.2
		Total BHCs	27 out of 46 samples (58.69%)	Not Applicable	PAI-27-TW-25I	0.161 - 21.5
	Deep	Alpha-BHC	3 out of 5 samples (60%)	3 out of 3 samples (100%)	PAI-27-MW-08D	0.032 - 0.24
		Beta-BHC	3 out of 5 samples (60%)	3 out of 3 samples (100%)	PAI-27-MW-08D	0.038 - 0.71
		Delta-BHC	4 out of 5 samples (80%)	3 out of 4 samples (75%)	PAI-27-MW-08D	0.0089 - 0.89
		Gamma-BHC	2 out of 5 samples (40%)	0 out of 2 samples	PAI-27-MW-08D	0.0094 - 0.014
		Total BHCs	4 out of 5 samples (80%)	Not Applicable	PAI-27-MW-08D	0.0089 - 1.49

PCBs

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)	Sample location with highest concentration	Range [units µg-L]
PCBs were not detected in any of the samples analyzed.	Surface	PCBs	Not Detected			
	Intermediate	PCBs	Not Detected			
	Deep	PCBs	Not Detected			

TABLE 4-2

SUMMARY OF RI GROUNDWATER RESULTS
SITE 27 – MOTOR TRANSPORTATION FACILITY
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

Metals

Summary	Sampling Depth	Contaminant	Number of Detections (%)	Number of Exceedances(%)	Sample location with highest concentration	Range [units µg-L]
All antimony and arsenic shallow groundwater samples were above the lowest USEPA screening criteria. None of the metals analyzed were above the lowest screening criteria in the deep groundwater.	Shallow	Aluminum	17 out of 24 samples (70.3%)	1 out of 17 samples (5.88%)	PAI-27-MW14S	36.3 - 41900
		Antimony	1 out of 24 samples (4.16%)	1 out of 1 samples (100%)	PAI-27-MW-03S	Avg: 29
		Arsenic	2 out of 24 samples (8.33%)	2 out of 2 samples (100%)	PAI-27-TW-67S	7.89 - 35.5
		Beryllium	1 out of 24 samples (4.16%)	0 out of 1 samples	PAI-27-MW-14S	Avg: 1.49
		Chromium	12 out of 24 samples (50%)	0 out of 12 samples	PAI-27-MW-14S	0.86 - 77.4
		Cobalt	Not Detected			
		Iron	22 out of 24 samples (91.6%)	1 out of 22 samples (4.54%)	PAI-27-MW-14S	40.2 - 27,100
		Lead	12 out of 24 samples (50%)	1 out of 12 samples (8.33%)	PAI-27-MW-14S	1.77 - 20.8
		Thallium	Not detected			
		Vanadium	13 out of 24 samples (54.16%)	0 out of 13 samples	PAI-27-MW-14S	2.01 - 74.2
	Intermediate	Aluminum	12 out of 17 samples (70.58%)	1 out of 12 samples (8.33%)	PAI-27-MW-15I	39 - 64,800
		Antimony	Not Detected			
		Arsenic	6 out of 17 samples (35.29%)	6 out of 6 samples (100%)	PAI-27-MW-15I	2.7 - 125
		Beryllium	2 out of 17 samples (11.76%)	2 out of 2 samples (100%)	PAI-27-MW-15I	4.16 - 7.4
		Chromium	10 out of 17 samples (58.82%)	1 out of 10 samples (10%)	PAI-27-MW-15I	1.12 - 146
		Cobalt	1 out of 17 samples (5.88%)	1 out of 1 samples (100%)	PAI-27-MW-15I	Avg: 46.4
		Iron	17 out of 17 samples (100%)	1 out of 17 samples (5.88%)	PAI-27-MW-15I	260 - 70,600
		Lead	9 out of 17 samples (52.94%)	1 out of 9 samples (11.11%)	PAI-27-MW-15I	1.65 - 38.2
		Thallium	1 out of 17 samples (5.88%)	1 out of 1 samples (100%)	PAI-27-MW-15I	Avg: 3.11
		Vanadium	6 out of 17 samples (35.29%)	1 out of 6 samples (16.66%)	PAI-27-MW-15I	1.65 - 200
	Deep	Aluminum	1 out of 2 samples (50%)	0 out of 1 samples	PAI-27-MW-08D	75 - 100
		Antimony	Not Detected			
		Arsenic	Not Detected			
		Beryllium	Not Detected			
		Chromium	2 out of 2 samples (100%)	0 out of 2 samples	PAI-27-MW-08D	1.47 - 1.74
		Cobalt	Not Detected			
		Iron	2 out of 2 samples (100%)	0 out of 2 samples	PAI-27MW-13D	2330 - 17600
		Lead	1 out of 2 samples (50%)	0 out of 1 samples	PAI-27-MW-08D	Avg: 1.91
		Thallium	Not Detected			
		Vanadium	Not Detected			

Acronyms

DCE Dichloroethene
PCE Tetrachloroethene
TCE Trichloroethene

[i] When there was a detectable concentration of a chemical, the concentration was compared to the lowest screening criterion; when concentration > screening criterion it was considered an exceedance
[ii] The chemicals used to calculate the PAHs in BaP equivalents are: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene

Not Applicable – Exceedances not evaluated because no criteria was available

TABLE 4-3

SUMMARY OF RI SOIL RESULTS
SITES 9 and 16
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

Volatile Organics

Summary	Sampling Depth	Contaminant	Detections		Minimum Criteria	Minimum Exceedance		Location with Max Detection [i]	Range (ug/kg)
Most contaminants were detected in shallow soils. Acetone was detected most frequently and had the highest result concentration, but no exceedances were observed in any sampling interval.	Surface (0-2 feet)	1,2,4-TRICHLOROBENZENE	1/15	7%	22000	0/1	0%	PAI-9/16-MW-05S	1.9 J - 1.9 J
		2-BUTANONE	8/18	44%	28000000	0/8	0%	PAI-9/16-MW-05S	2.325 - 11 J
		ACETONE	15/18	83%	61000000	0/15	0%	PAI-9/16-SO-04C	17 - 140
		BENZENE	1/18	6%	1100	0/1	0%	PAI-9/16-SO-04A	0.32 J - 0.32 J
		BTEX	1/17	6%	NC	0/1	0%	PAI-9/16-SO-04A	0.32 - 0.32
		CARBON DISULFIDE	1/18	6%	820000	0/1	0%	PAI-9/16-MW-05S	2.5 J - 2.5 J
		CARBON TETRACHLORIDE	1/18	6%	610	0/1	0%	PAI09SB02	6 J - 6 J
		CHLOROBENZENE	3/18	17%	290000	0/3	0%	PAI-9/16-SO-04A	0.88 J - 1.3 J
		CHLOROFORM	1/18	6%	290	0/1	0%	PAI09SB02	11 - 11
		METHYL ACETATE	12/15	80%	78000000	0/12	0%	PAI-9/16-SO-02	1.5 J - 53
		TETRACHLOROETHENE	2/18	11%	550	0/2	0%	PAI09SB02 & PAI09SB03	2 J - 2 J
	Intermediate (2-5 feet)	1,2,4-TRICHLOROBENZENE	Not Detected						
		2-BUTANONE	Not Detected						
		ACETONE	4/7	57%	61000000	0/4	0%	PAI-9/16-SO-05	7.7 J - 16
		BENZENE	Not Detected						
		BTEX	Not Detected						
		CARBON DISULFIDE	Not Detected						
		CARBON TETRACHLORIDE	Not Detected						
		CHLOROBENZENE	Not Detected						
		CHLOROFORM	Not Detected						
		METHYL ACETATE	Not Detected						
		TETRACHLOROETHENE	Not Detected						
	Deep (7-9 feet)	1,2,4-TRICHLOROBENZENE	Not Detected						
		2-BUTANONE	Not Detected						
		ACETONE	Not Detected						
		BENZENE	Not Detected						
		BTEX	Not Analyzed						
		CARBON DISULFIDE	Not Detected						
		CARBON TETRACHLORIDE	Not Detected						
		CHLOROBENZENE	Not Detected						
		CHLOROFORM	Not Detected						
		METHYL ACETATE	Not Detected						
		TETRACHLOROETHENE	Not Detected						

SVOCs Miscellaneous

Summary	Sampling Depth	Contaminant	Detections		Minimum Criteria	Minimum Exceedance		Location with Max Detection	Range (ug/kg)
No detections were observed in the intermediate and deep sampling intervals. Bis-(2-ethylhexyl)phthalate was detected most frequently in the shallow soils. No criteria exceedances were observed.	Surface (0-2 feet)	BENZALDEHYDE	1/15	7%	7800000	0/1	0%	PAI-9/16-SO-02B	29 J - 29 J
		BIS(2-ETHYLHEXYL)PHTHALATE	3/18	17%	35000	0/3	0%	PAI-9/16-SO-02A	70 J - 110 J
		CARBAZOLE	1/18	6%	NC	0/1	0%	PAI09SB03	34 J - 34 J
		DI-N-OCTYL PHTHALATE	1/18	6%	NC	0/1	0%	PAI-9/16-SO-05A	80 J - 80 J
		PENTACHLOROPHENOL	1/18	6%	890	0/1	0%	PAI09SB01	23 J - 23 J
	Intermediate (2-5 feet)	BENZALDEHYDE	Not Detected						
		BIS(2-ETHYLHEXYL)PHTHALATE	Not Detected						
		CARBAZOLE	Not Detected						
		DI-N-OCTYL PHTHALATE	Not Detected						
		PENTACHLOROPHENOL	Not Detected						
	Deep (7-9 feet)	BENZALDEHYDE	Not Detected						
		BIS(2-ETHYLHEXYL)PHTHALATE	Not Detected						
		CARBAZOLE	Not Detected						
		DI-N-OCTYL PHTHALATE	Not Detected						
		PENTACHLOROPHENOL	Not Detected						

TABLE 4-3

SUMMARY OF RI SOIL RESULTS
SITES 9 and 16
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

PAHs

Summary	Sampling Depth	Contaminant	Detections		Minimum Criteria	Minimum Exceedance		Location with Max Detection	Range (ug/kg)
PAHs were not detected during analysis of deep soils, but some exceedances were found in intermediate soils with the most detections observed in the shallow soils. The concentrations and detection rates were lower in the intermediate soils than in the shallow soils. Shallow soil analysis revealed concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene that exceeded the minimum USEPA criteria value.	Surface (0-2 feet)	1-METHYLNAPHTHALENE	14/15	93%	22000	0/14	0%	PAI-9/16-SO-02B	0.63 J - 35
		2-METHYLNAPHTHALENE	14/18	78%	310000	0/14	0%	PAI-9/16-SO-02B	0.79 J - 43
		ACENAPHTHENE	10/18	56%	3400000	0/10	0%	PAI-9/16-SO-04A	0.79 J - 8.7 J
		ACENAPHTHYLENE	11/18	61%	3400000	0/11	0%	PAI-9/16-SO-06	0.68 J - 9.8
		ANTHRACENE	12/18	67%	17000000	0/12	0%	PAI-9/16-SO-04A	0.49 J - 17 J
		BENZO(A)ANTHRACENE	17/18	94%	150	1/17	6%	PAI09SB02	2.2 J - 310 J
		BENZO(A)PYRENE	16/18	89%	15	10/16	63%	PAI09SB02	4.5 J - 580
		BENZO(B)FLUORANTHENE	15/18	83%	150	1/15	7%	PAI09SB02	7 J - 610
		BENZO(G,H,I)PERYLENE	15/18	83%	1700000	0/15	0%	PAI09SB02	5.9 J - 380
		BENZO(K)FLUORANTHENE	15/18	83%	1500	0/15	0%	PAI09SB02	5.1 - 560
		CHRYSENE	16/18	89%	15000	0/16	0%	PAI09SB02	6.8 J - 420
		DIBENZO(A,H)ANTHRACENE	8/18	44%	15	0/8	0%	PAI-9/16-SO-02B	1.6 J - 14
		FLUORANTHENE	17/18	94%	2300000	0/17	0%	PAI09SB02	5.3 J - 300 J
		FLUORENE	11/18	61%	2300000	0/11	0%	PAI-9/16-SO-04A	0.59 J - 7 J
		INDENO(1,2,3-CD)PYRENE	14/18	78%	150	1/14	7%	PAI09SB02	5.1 J - 470
		NAPHTHALENE	12/18	67%	3600	0/12	0%	PAI-9/16-SO-02B	0.78 J - 30
		PHENANTHRENE	17/18	94%	1700000	0/17	0%	PAI-9/16-SO-04A	3.4 J - 99
		PYRENE	17/18	94%	1700000	0/17	0%	PAI09SB02	5.1 J - 460
	Intermediate (2-5 feet)	1-METHYLNAPHTHALENE	1/7	14%	22000	0/1	0%	PAI-9/16-SO-04	0.64 J - 0.64 J
		2-METHYLNAPHTHALENE	Not Detected						
		ACENAPHTHENE	Not Detected						
		ACENAPHTHYLENE	Not Detected						
		ANTHRACENE	Not Detected						
		BENZO(A)ANTHRACENE	1/7	14%	150	0/1	0%	PAI-9/16-SO-04	0.85 J - 0.85 J
		BENZO(A)PYRENE	2/7	29%	15	0/2	0%	PAI-9/16-SO-04	0.65 J - 0.66 J
		BENZO(B)FLUORANTHENE	2/7	29%	150	0/2	0%	PAI-9/16-SO-04	0.78 J - 1 J
		BENZO(G,H,I)PERYLENE	1/7	14%	1700000	0/1	0%	PAI-9/16-SO-01	0.74 J - 0.74 J
		BENZO(K)FLUORANTHENE	2/7	29%	1500	0/2	0%	PAI-9/16-SO-01	0.7 J - 0.71 J
		CHRYSENE	2/7	29%	15000	0/2	0%	PAI-9/16-SO-04	0.78 J - 1.4 J
		DIBENZO(A,H)ANTHRACENE	Not Detected						
		FLUORANTHENE	1/7	14%	2300000	0/1	0%	PAI-9/16-SO-04	1.7 J - 1.7 J
		FLUORENE	Not Detected						
		INDENO(1,2,3-CD)PYRENE	1/7	14%	150	0/1	0%	PAI-9/16-SO-01	0.74 J - 0.74 J
		NAPHTHALENE	1/7	14%	3600	0/1	0%	PAI-9/16-SO-04	4.8 J - 4.8 J
		PHENANTHRENE	1/7	14%	1700000	0/1	0%	PAI-9/16-SO-04	2.2 J - 2.2 J
		PYRENE	2/7	29%	1700000	0/2	0%	PAI-9/16-SO-04	1.1 J - 1.5 J
	Deep (7-9 feet)	1-METHYLNAPHTHALENE	Not Detected						
		2-METHYLNAPHTHALENE	Not Detected						
		ACENAPHTHENE	Not Detected						
		ACENAPHTHYLENE	Not Detected						
		ANTHRACENE	Not Detected						
		BENZO(A)ANTHRACENE	Not Detected						
		BENZO(A)PYRENE	Not Detected						
		BENZO(B)FLUORANTHENE	Not Detected						
		BENZO(G,H,I)PERYLENE	Not Detected						
		BENZO(K)FLUORANTHENE	Not Detected						
		CHRYSENE	Not Detected						
		DIBENZO(A,H)ANTHRACENE	Not Detected						
		FLUORANTHENE	Not Detected						
		FLUORENE	Not Detected						
		INDENO(1,2,3-CD)PYRENE	Not Detected						
		NAPHTHALENE	Not Detected						
		PHENANTHRENE	Not Detected						
		PYRENE	Not Detected						

TABLE 4-3

SUMMARY OF RI SOIL RESULTS
SITES 9 and 16
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

Pesticides/PCBs

Summary	Sampling Depth	Contaminant	Detections		Minimum Criteria	Minimum Exceedance		Location with Max Detection	Range (ug/kg)
Pesticides and/or PCBs were detected in all sampling intervals. Several contaminants exceeded the USEPA criteria in the shallow soils. Contaminants found at soil location PAI 9/16-MW05S exceeded or were detected most often.	Surface (0-2 feet)	4,4'-DDD	15/18	83%	2000	0/15	0%	PAI-9/16-MW-05S	0.34 J - 640 J
		4,4'-DDE	18/18	100%	1400	2/18	11%	PAI-9/16-MW-05S	2 J - 8400
		4,4'-DDT	18/18	100%	1700	2/18	11%	PAI-9/16-MW-05S	2.6 J - 12000
		ALDRIN	7/18	39%	29	0/7	0%	PAI-9/16-SO-06	0.08 J - 6.8
		ALPHA-BHC	5/18	28%	77	0/5	0%	PAI-9/16-MW-05S	0.11 J - 57 J
		ALPHA-CHLORDANE	16/18	89%	1600	1/16	6%	PAI-9/16-MW-05S	0.2 J - 16000 J
		AROCLOR-1260	1/18	6%	220	1/1	100%	PAI09SB02	810 J - 810 J
		BETA-BHC	8/18	44%	270	1/8	13%	PAI-9/16-MW-05S	0.19 J - 580
		DELTA-BHC	7/18	39%	77	0/7	0%	PAI-9/16-MW-05S	0.082 J - 73 J
		DIELDRIN	9/18	50%	30	0/9	0%	PAI-9/16-SO-06	0.078 J - 15
		ENDOSULFAN I	6/17	35%	370000	0/6	0%	PAI-9/16-SO-06	0.16 J - 3.8 J
		ENDOSULFAN II	9/18	50%	370000	0/9	0%	PAI-9/16-SO-06	0.13 J - 4 J
		ENDOSULFAN SULFATE	10/18	56%	370000	0/10	0%	PAI-9/16-SO-05	0.079 J - 6.6 J
		ENDRIN	9/18	50%	18000	0/9	0%	PAI-9/16-MW-05S	0.058 J - 3700 J
		ENDRIN ALDEHYDE	14/18	78%	18000	0/14	0%	PAI-9/16-MW-05S	0.14 J - 1600 J
		ENDRIN KETONE	10/18	56%	18000	0/10	0%	PAI-9/16-MW-05S	0.066 J - 50 J
		GAMMA-BHC (LINDANE)	2/18	11%	520	0/2	0%	PAI-9/16-MW-05S	0.13 J - 14 J
		GAMMA-CHLORDANE	15/18	83%	1600	1/15	7%	PAI-9/16-MW-05S	0.18 J - 14000
		HEPTACHLOR	6/18	33%	110	1/6	17%	PAI-9/16-MW-05S	0.13 J - 930
		HEPTACHLOR EPOXIDE	11/18	61%	53	0/11	0%	PAI-9/16-SO-06	0.063 J - 8.8
		METHOXYCHLOR	6/18	33%	310000	0/6	0%	PAI-9/16-MW-05S	0.54 J - 80 J
	Intermediate (2-5 feet)	4,4'-DDD	5/9	56%	2000	0/5	0%	PAI16-SB1	0.29 J - 486
		4,4'-DDE	7/9	78%	1400	0/7	0%	PAI16-SB1	0.26 J - 421
		4,4'-DDT	7/9	78%	1700	0/7	0%	PAI16-SB1	0.59 J - 1380
		ALDRIN	1/9	11%	29	0/1	0%	PAI-9/16-SO-06	1.8 J - 1.8 J
		ALPHA-BHC	Not Detected						
		ALPHA-CHLORDANE	2/7	29%	1600	0/2	0%	PAI-9/16-SO-06	0.1925 - 280 J
		AROCLOR-1260	Not Detected						
		BETA-BHC	3/9	33%	270	0/3	0%	PAI-9/16-SO-05	0.195 - 0.31 J
		DELTA-BHC	4/9	44%	77	0/4	0%	PAI-9/16-SO-01	0.095 J - 0.41 J
		DIELDRIN	3/9	33%	30	0/3	0%	PAI-9/16-SO-06	0.092 J - 8.2 J
		ENDOSULFAN I	Not Detected						
		ENDOSULFAN II	1/9	11%	370000	0/1	0%	PAI-9/16-SO-06	6.1 J - 6.1 J
		ENDOSULFAN SULFATE	Not Detected						
		ENDRIN	1/9	11%	18000	0/1	0%	PAI-9/16-SO-06	11 J - 11 J
		ENDRIN ALDEHYDE	1/9	11%	18000	0/1	0%	PAI-9/16-SO-02	0.23 J - 0.23 J
		ENDRIN KETONE	2/7	29%	18000	0/2	0%	PAI-9/16-SO-06	0.092 J - 0.69 J
		GAMMA-BHC (LINDANE)	Not Detected						
		GAMMA-CHLORDANE	3/7	43%	1600	0/3	0%	PAI-9/16-SO-06	0.085 J - 390
		HEPTACHLOR	Not Detected						
		HEPTACHLOR EPOXIDE	4/9	44%	53	0/4	0%	PAI-9/16-SO-06	0.09 J - 5 J
		METHOXYCHLOR	1/7	14%	310000	0/1	0%	PAI-9/16-SO-06	2.7 J - 2.7 J
	Deep (7-9 feet)	4,4'-DDD	1/1	100%	2000	0/1	0%	PAI-9/16-MW-05S	0.16 J - 0.16 J
		4,4'-DDE	1/1	100%	1400	0/1	0%	PAI-9/16-MW-05S	0.2 J - 0.2 J
		4,4'-DDT	1/1	100%	1700	0/1	0%	PAI-9/16-MW-05S	0.19 J - 0.19 J
		ALDRIN	Not Detected						
		ALPHA-BHC	Not Detected						
		ALPHA-CHLORDANE	1/1	100%	1600	0/1	0%	PAI-9/16-MW-05S	0.44 J - 0.44 J
		AROCLOR-1260	Not Detected						
		BETA-BHC	Not Detected						
		DELTA-BHC	Not Detected						
		DIELDRIN	Not Detected						
		ENDOSULFAN I	Not Detected						
		ENDOSULFAN II	Not Detected						
		ENDOSULFAN SULFATE	Not Detected						
		ENDRIN	Not Detected						
		ENDRIN ALDEHYDE	Not Detected						
		ENDRIN KETONE	Not Detected						
		GAMMA-BHC (LINDANE)	Not Detected						
		GAMMA-CHLORDANE	1/1	100%	1600	0/1	0%	PAI-9/16-MW-05S	0.42 J - 0.42 J
		HEPTACHLOR	Not Detected						
		HEPTACHLOR EPOXIDE	Not Detected						
		METHOXYCHLOR	Not Detected						

TABLE 4-3

SUMMARY OF RI SOIL RESULTS
SITES 9 and 16
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

Inorganics

Summary	Sampling Depth	Contaminant	Detections		Minimum Criteria	Minimum Exceedance		Location with Max Detection	Range (mg/kg)
All intervals contained positive detections for metals. Arsenic exceeded most often. The overall frequency of detection for arsenic was 75% with a 95% frequency of exceedance.	Surface (0-2 feet)	ALUMINUM	18/18	100%	77000	0/18	0%	PAI-9/16-MW-05S	1620 - 5550
		ANTIMONY	2/18	11%	31	0/2	0%	PAI09SB02	0.34 J - 4.7
		ARSENIC	15/18	83%	0.39	15/15	100%	PAI09SB02	0.56 J - 8.4
		BARIUM	18/18	100%	15000	0/18	0%	PAI09SB02	10.3 J - 104
		BERYLLIUM	12/18	67%	160	0/12	0%	PAI09SB02	0.04 J - 3.7
		CADMIUM	3/18	17%	70	0/3	0%	PAI09SB02	0.62 J - 3.1
		CALCIUM	18/18	100%	NC	0/18	0%	PAI-9/16-SO-03	339 J - 188000
		CHROMIUM	18/18	100%	NC	0/18	0%	PAI09SB02	2.41 - 105
		COBALT	7/18	39%	23	1/7	14%	PAI09SB02	0.28 J - 23.5
		COPPER	18/18	100%	3100	0/18	0%	PAI09SB02	1.09 - 615
		IRON	18/18	100%	55000	0/18	0%	PAI09SB02	1160 - 16700
		LEAD	17/18	94%	400	1/17	6%	PAI09SB02	6.58 - 826
		MAGNESIUM	18/18	100%	NC	0/18	0%	PAI-9/16-SO-03	105 - 2300
		MANGANESE	18/18	100%	1800	0/18	0%	PAI09SB02	8.99 - 178
		MERCURY	15/18	83%	10	0/15	0%	PAI09SB02	0.0166 J - 0.4
		NICKEL	16/18	89%	1500	0/16	0%	PAI09SB02	1.01 J - 253
		POTASSIUM	8/18	44%	NC	0/8	0%	PAI09SB01	71.3 - 662
		SELENIUM	8/18	44%	390	0/8	0%	PAI09SB02	0.23 J - 0.91
		SILVER	2/18	11%	390	0/2	0%	PAI09SB02	0.07 J - 0.56
		SODIUM	15/18	83%	NC	0/15	0%	PAI09SB02	42.7 J - 715
		THALLIUM	1/18	6%	0.78	0/1	0%	PAI-9/16-SO-03	0.42 J - 0.42 J
		VANADIUM	18/18	100%	390	0/18	0%	PAI09SB02	2.24 - 12.9
		ZINC	18/18	100%	23000	0/18	0%	PAI09SB02	10.4 - 3490
	Intermediate (2-5 feet)	ALUMINUM	7/7	100%	77000	0/7	0%	PAI-9/16-SO-04	2290 - 8670
		ANTIMONY	1/7	14%	31	0/1	0%	PAI-9/16-SO-06	3.25 J - 3.25 J
		ARSENIC	5/9	56%	0.39	4/5	80%	PAI-9/16-SO-01	0.148 - 8.91
		BARIUM	7/7	100%	15000	0/7	0%	PAI-9/16-SO-04	7.65 J - 21.5 J
		BERYLLIUM	2/7	29%	160	0/2	0%	PAI-9/16-SO-04	0.03 J - 0.07 J
		CADMIUM	Not Detected						
		CALCIUM	7/7	100%	NC	0/7	0%	PAI-9/16-SO-04	244 J - 959
		CHROMIUM	9/9	100%	NC	0/9	0%	PAI-9/16-SO-04	1.86 - 9.51
		COBALT	1/7	14%	23	0/1	0%	PAI-9/16-SO-04	0.34 - 0.53 J
		COPPER	3/7	43%	3100	0/3	0%	PAI-9/16-SO-02	0.75 - 1.68
		IRON	7/7	100%	55000	0/7	0%	PAI-9/16-SO-07	460 - 2640
		LEAD	9/9	100%	400	0/9	0%	PAI16-SB1	1.57 - 8.4
		MAGNESIUM	7/7	100%	NC	0/7	0%	PAI-9/16-SO-04	89 J - 363 J
		MANGANESE	7/7	100%	1800	0/7	0%	PAI-9/16-SO-07	1.86 - 5.07
		MERCURY	6/7	86%	10	0/6	0%	PAI-9/16-SO-04	0.00932 J - 0.047
		NICKEL	4/7	57%	1500	0/4	0%	PAI-9/16-SO-03	0.86 J - 1.68
		POTASSIUM	4/7	57%	NC	0/4	0%	PAI-9/16-SO-04	71.3 J - 381 J
		SELENIUM	1/7	14%	390	0/1	0%	PAI-9/16-SO-04	0.28 J - 0.28 J
		SILVER	Not Detected						
		SODIUM	3/7	43%	NC	0/3	0%	PAI-9/16-SO-06	34.1 J - 163 J
		THALLIUM	Not Detected						
		VANADIUM	7/7	100%	390	0/7	0%	PAI-9/16-SO-07	1.16 J - 7.58
		ZINC	7/7	100%	23000	0/7	0%	PAI-9/16-SO-07	1.3 J - 4.97
	Deep (7-9 feet)	ALUMINUM	1/1	100%	77000	0/1	0%	PAI-9/16-MW-05S	3260 - 3260
		ANTIMONY	1/1	100%	31	0/1	0%	PAI-9/16-MW-05S	0.08 J - 0.08 J
		ARSENIC	1/1	100%	0.39	1/1	100%	PAI-9/16-MW-05S	8.3 - 8.3
		BARIUM	1/1	100%	15000	0/1	0%	PAI-9/16-MW-05S	5.7 - 5.7
		BERYLLIUM	1/1	100%	160	0/1	0%	PAI-9/16-MW-05S	0.1 J - 0.1 J
		CADMIUM	Not Detected						
		CALCIUM	1/1	100%	NC	0/1	0%	PAI-9/16-MW-05S	275 - 275
		CHROMIUM	1/1	100%	NC	0/1	0%	PAI-9/16-MW-05S	4.1 - 4.1
		COBALT	1/1	100%	23	0/1	0%	PAI-9/16-MW-05S	0.46 J - 0.46 J
		COPPER	Not Detected						
		IRON	1/1	100%	55000	0/1	0%	PAI-9/16-MW-05S	1010 - 1010
		LEAD	1/1	100%	400	0/1	0%	PAI-9/16-MW-05S	1.4 - 1.4
		MAGNESIUM	1/1	100%	NC	0/1	0%	PAI-9/16-MW-05S	152 - 152
		MANGANESE	1/1	100%	1800	0/1	0%	PAI-9/16-MW-05S	3.4 - 3.4
		MERCURY	1/1	100%	10	0/1	0%	PAI-9/16-MW-05S	0.007 J - 0.007 J
		NICKEL	1/1	100%	1500	0/1	0%	PAI-9/16-MW-05S	1.7 J - 1.7 J
		POTASSIUM	1/1	100%	NC	0/1	0%	PAI-9/16-MW-05S	112 - 112
		SELENIUM	Not Detected						
		SILVER	Not Detected						
		SODIUM	Not Detected						
		THALLIUM	Not Detected						
		VANADIUM	1/1	100%	390	0/1	0%	PAI-9/16-MW-05S	2 J - 2 J
		ZINC	1/1	100%	23000	0/1	0%	PAI-9/16-MW-05S	3.6 - 3.6

i - results from the Site 9 and 16 SI/CS were included in the data evaluation during the RI to provide a more robust data set J = estimated NC = no criteria

TABLE 4-4

SUMMARY OF RI GROUNDWATER RESULTS
SITES 9 and 16
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

Volatile Organics

Summary	Sampling Depth	Contaminant	Detections		Minimum Criteria	Minimum Exceedance		Location with Max Detection	Range (ug/L)
Xylenes had the highest detected result. No VOC detections exceeded the minimum USEPA Criteria.	Shallow	ACETONE	Not Detected						
		BTEX	2/6	33.3%	NC	0/2	0.0%	PAI-9/16-TW-03S	0.41 - 0.428
		CARBON DISULFIDE	1/7	14.3%	1000	0/1	0.0%	PAI-9/16-TW-03S	0.054 J - 0.054 J
		ETHYLBENZENE	2/7	28.6%	1.5	0/2	0.0%	PAI-9/16-TW-03S	0.08 J - 0.098 J
		M+P-XYLENES	2/5	40.0%	10000	0/2	0.0%	PAI-9/16-TW-01S & PAI-9/16-TW-03S	0.25 J - 0.25 J
		O-XYLENE	2/5	40.0%	200	0/2	0.0%	PAI-9/16-TW-03S	0.081 J - 0.084 J
		TOTAL XYLENES	2/6	33.3%	200	0/2	0.0%	PAI-9/16-TW-01S & PAI-9/16-TW-03S	0.33 J - 0.33 J
	Intermediate	ACETONE	1/6	16.7%	22000	0/1	0.0%	PAI-27-MW61I	5 J - 5 J
		BTEX	2/6	33.3%	NC	0/2	0.0%	PAI-9/16-TW-04I	0.12 - 0.268
		CARBON DISULFIDE	Not Detected						
		ETHYLBENZENE	1/7	14.3%	1.5	0/1	0.0%	PAI-9/16-TW-04I	0.058 J - 0.058 J
		M+P-XYLENES	2/7	28.6%	10000	0/2	0.0%	PAI-9/16-TW-04I	0.093 J - 0.16 J
		O-XYLENE	2/7	28.6%	200	0/2	0.0%	PAI-9/16-TW-04I	0.031 J - 0.046 J
		TOTAL XYLENES	2/6	33.3%	200	0/2	0.0%	PAI-9/16-TW-04I	0.12 J - 0.21 J

SVOCs Miscellaneous

Summary	Sampling Depth	Contaminant	Detections		Minimum Criteria	Minimum Exceedance		Location with Max Detection	Range (ug/L)
Only caprolactam was detected with no exceedances.	Shallow	CAPROLACTAM	Not Detected						
	Intermediate	CAPROLACTAM	1/4	25%	18000	0/1	0.0%	PAI-9/16-TW-02I	3.7 J - 3.7 J

TABLE 4-4

SUMMARY OF RI GROUNDWATER RESULTS
SITES 9 and 16
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

PAHs

Summary	Sampling Depth	Contaminant	Detections		Minimum Criteria	Minimum Exceedance		Location with Max Detection	Range (ug/L)
Intermediate depth samples had the bulk of detections for PAHs. In one sample, Napthalene exceeded the minimum USEPA criteria value.	Shallow	1-METHYLNAPHTHALENE	Not Detected						
		2-METHYLNAPHTHALENE	Not Detected						
		ACENAPHTHENE	Not Detected						
		FLUORANTHENE	1/5	20.0%	1500	0/1	0.0%	PAI-9/16-TW-01S	0.018 J - 0.018 J
		FLUORENE	Not Detected						
		NAPHTHALENE	Not Detected						
		PHENANTHRENE	Not Detected						
		PYRENE	1/5	20.0%	1100	0/1	0.0%	PAI-9/16-TW-01S	0.02 J - 0.02 J
	Intermediate	1-METHYLNAPHTHALENE	1/4	25.0%	2.3	0/1	0.0%	PAI-9/16-TW-04I	1.4 - 1.4
		2-METHYLNAPHTHALENE	1/6	16.7%	150	0/1	0.0%	PAI-9/16-TW-04I	1.6 - 1.6
		ACENAPHTHENE	1/6	16.7%	2200	0/1	0.0%	PAI-9/16-TW-04I	0.047 J - 0.047 J
		FLUORANTHENE	Not Detected						
		FLUORENE	1/6	16.7%	1500	0/1	0.0%	PAI-9/16-TW-04I	0.072 J - 0.072 J
		NAPHTHALENE	1/6	16.7%	0.14	1/1	100.0%	PAI-9/16-TW-04I	1.3 - 1.3
		PHENANTHRENE	1/6	16.7%	1100	0/1	0.0%	PAI-9/16-TW-04I	0.054 J - 0.054 J
		PYRENE	Not Detected						

TABLE 4-4

SUMMARY OF RI GROUNDWATER RESULTS
SITES 9 and 16
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

Pesticides/PCBs

Summary	Sampling Depth	Contaminant	Detections		Minimum Criteria	Minimum Exceedance		Location with Max Detection	RANGE (ug/L)
PAI-9/16-TW-03S had the bulk of exceedances in the shallow wells and PAI-9/16-TW-04I had the bulk of detections in intermediate depth wells. There were several exceedances; however, the exceeding contaminants were different in shallow and intermediate wells.	Shallow	4,4'-DDD	1/5	20.0%	0.28	0/1	0.0%	PAI-9/16-TW-03S	0.21 - 0.21
		4,4'-DDE	2/5	40.0%	0.2	0/2	0.0%	PAI-9/16-TW-01S	0.0025 J - 0.026 J
		4,4'-DDT	2/5	40.0%	0.2	0/2	0.0%	PAI-9/16-TW-03S	0.022 J - 0.068 J
		ALPHA-BHC	1/5	20.0%	0.011	0/1	0.0%	PAI-9/16-TW-03S	0.0086 J - 0.0086 J
		ALPHA-CHLORDANE	1/5	20.0%	0.19	0/1	0.0%	PAI-9/16-MW-05S	0.0036 J - 0.0036 J
		BETA-BHC	No Detections						
		DELTA-BHC	1/5	20.0%	0.011	1/1	100.0%	PAI-9/16-TW-03S	0.015 J - 0.015 J
		DIELDRIN	1/5	20.0%	0.0042	0/1	0.0%	PAI-9/16-MW-05S	0.0026 J - 0.0026 J
		GAMMA-BHC (LINDANE)	2/5	40.0%	0.061	0/2	0.0%	PAI-9/16-TW-03S	0.0034 J - 0.012 J
		GAMMA-CHLORDANE	1/5	20.0%	0.19	0/1	0.0%	PAI-9/16-MW-05S	0.0037 J - 0.0037 J
		HEPTACHLOR EPOXIDE	1/5	20.0%	0.0074	1/1	100.0%	PAI-27-TW-37S	0.35 J - 0.35 J
		HEPTACHLOR	2/5	40.0%	0.015	1/2	50.0%	PAI-9/16-TW-01S	0.012 J - 0.019 J
	Intermediate	4,4'-DDD	2/7	28.6%	0.28	0/2	0.0%	PAI-9/16-TW-04I	0.028 J - 0.06 J
		4,4'-DDE	1/7	14.3%	0.2	0/1	0.0%	PAI-27-MW61I	0.024 J - 0.024 J
		4,4'-DDT	2/7	28.6%	0.2	0/2	0.0%	PAI-9/16-TW-04I	0.026 J - 0.033 J
		ALPHA-BHC	1/7	14.3%	0.011	1/1	100.0%	PAI-9/16-TW-04I	0.018 J - 0.018 J
		ALPHA-CHLORDANE	2/7	28.6%	0.19	0/2	0.0%	PAI-9/16-MW-06I	0.0021 J - 0.0059 J
		BETA-BHC	1/7	14.3%	0.037	1/1	100.0%	PAI-9/16-TW-04I	0.05 - 0.05
		DELTA-BHC	1/7	14.3%	0.011	1/1	100.0%	PAI-9/16-TW-04I	0.14 - 0.14
		DIELDRIN	No Detections						
		GAMMA-BHC (LINDANE)	1/7	14.3%	0.061	0/1	0.0%	PAI-9/16-TW-04I	0.0044 J - 0.0044 J
		GAMMA-CHLORDANE	1/7	14.3%	0.19	0/1	0.0%	PAI-9/16-MW-06I	0.0045 J - 0.0045 J
		HEPTACHLOR EPOXIDE	2/7	28.6%	0.0074	0/2	0.0%	PAI-9/16-TW-02I	0.003 J - 0.0033 J
		HEPTACHLOR	No Detections						

TABLE 4-4

SUMMARY OF RI GROUNDWATER RESULTS
SITES 9 and 16
REMEDIAL INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

Inorganics

Summary	Sampling Depth	Contaminant	Detections		Minimum Criteria	Minimum Exceedance		Location with Max Detection	Range (ug/L)
All metal analyses yielded results below the minimum USEPA screening value with the exception of arsenic. Arsenic exceeded the minimum criteria value in one sample.	Shallow	ALUMINUM	4/5	80%	37000	0/4	0.0%	PAI-9/16-TW-01S	27.3 J - 1300
		ANTIMONY	2/5	40%	6	0/2	0.0%	PAI09GW02	1.9 J - 5.9
		ARSENIC	Not Detected						
		BARIUM	4/5	80%	2000	0/4	0.0%	PAI-9/16-TW-01S	12.2 - 33.3 J
		CADMIUM	1/5	20%	5	0/1	0.0%	PAI-9/16-MW-05S	0.07 J - 0.07 J
		CALCIUM	5/5	100%	NC	0/5	0.0%	PAI09GW01	16400 - 42500
		CHROMIUM	2/5	40%	100	0/2	0.0%	PAI09GW01	0.44 J - 0.7
		COBALT	1/5	20%	11	0/1	0.0%	PAI-9/16-MW-05S	0.29 J - 0.4 J
		COPPER	1/5	20%	1300	0/1	0.0%	PAI-9/16-TW-03S	8.76 - 8.76
		IRON	3/5	60%	26000	0/3	0.0%	PAI-9/16-TW-01S	9.7 J - 3430
		LEAD	1/5	20%	15	0/1	0.0%	PAI-9/16-TW-01S	1.95 J - 1.95 J
		MAGNESIUM	5/5	100%	NC	0/5	0.0%	PAI-9/16-TW-03S	1330 - 3520 J
		MANGANESE	3/5	60%	880	0/3	0.0%	PAI-9/16-TW-01S	2.3 J - 94.6
		MERCURY	1/5	20%	0.63	0/1	0.0%	PAI-9/16-TW-03S	0.117 J - 0.117 J
		NICKEL	1/5	20%	730	0/1	0.0%	PAI-9/16-MW-05S	0.3 J - 0.33 J
		POTASSIUM	3/5	60%	NC	0/3	0.0%	PAI09GW02	1610 - 4040
		SELENIUM	1/5	20%	50	0/1	0.0%	PAI-9/16-TW-03S	2.63 J - 2.63 J
		SODIUM	4/5	80%	NC	0/4	0.0%	PAI-9/16-TW-01S	2780 J - 9180
		VANADIUM	3/5	60%	180	0/3	0.0%	PAI-9/16-MW-05S	2.1 J - 5.5 J
		ZINC	3/5	60%	11000	0/3	0.0%	PAI-9/16-TW-01S	1.1 J - 15.6 J
	Intermediate	ALUMINUM	4/4	100%	37000	0/4	0.0%	PAI-9/16-TW-04I	30.1 J - 263
		ANTIMONY	1/4	25%	6	0/1	0.0%	PAI-9/16-MW-06I	2.9 J - 2.9 J
		ARSENIC	1/4	25%	0.045	1/1	100.0%	PAI-9/16-MW-06I	7.9 J - 7.9 J
		BARIUM	4/4	100%	2000	0/4	0.0%	PAI-9/16-TW-04I	10.6 - 48.2 J
		CADMIUM	1/4	25%	5	0/1	0.0%	PAI-9/16-MW-06I	0.07 J - 0.07 J
		CALCIUM	4/4	100%	NC	0/4	0.0%	PAI-9/16-TW-04I	18800 - 22700
		CHROMIUM	1/4	25%	100	0/1	0.0%	PAI-9/16-MW-06I	0.44 J - 0.44 J
		COBALT	1/4	25%	11	0/1	0.0%	PAI-9/16-MW-06I	0.27 J - 0.27 J
		COPPER	1/4	25%	1300	0/1	0.0%	PAI-9/16-MW-06I	0.88 J - 0.88 J
		IRON	4/4	100%	26000	0/4	0.0%	PAI-27-MW61I	9.8 J - 12900
		LEAD	Not Detected						
		MAGNESIUM	4/4	100%	NC	0/4	0.0%	PAI-27-MW61I	2110 - 5170
		MANGANESE	3/4	75%	880	0/3	0.0%	PAI-27-MW61I	29.6 - 64.1
		MERCURY	1/4	25%	0.63	0/1	0.0%	PAI-27-MW61I	0.405 - 0.405
		NICKEL	1/4	25%	730	0/1	0.0%	PAI-9/16-MW-06I	0.34 J - 0.34 J
		POTASSIUM	2/4	50%	NC	0/2	0.0%	PAI-27-MW61I	2660 - 4310 J
		SELENIUM	Not Detected						
		SODIUM	4/4	100%	NC	0/4	0.0%	PAI-9/16-TW-02I	4280 - 40100
		VANADIUM	2/4	50%	180	0/2	0.0%	PAI-9/16-MW-06I	4.36 J - 7.8 J
		ZINC	3/4	75%	11000	0/3	0.0%	PAI-9/16-TW-04I	1.8 J - 13 J

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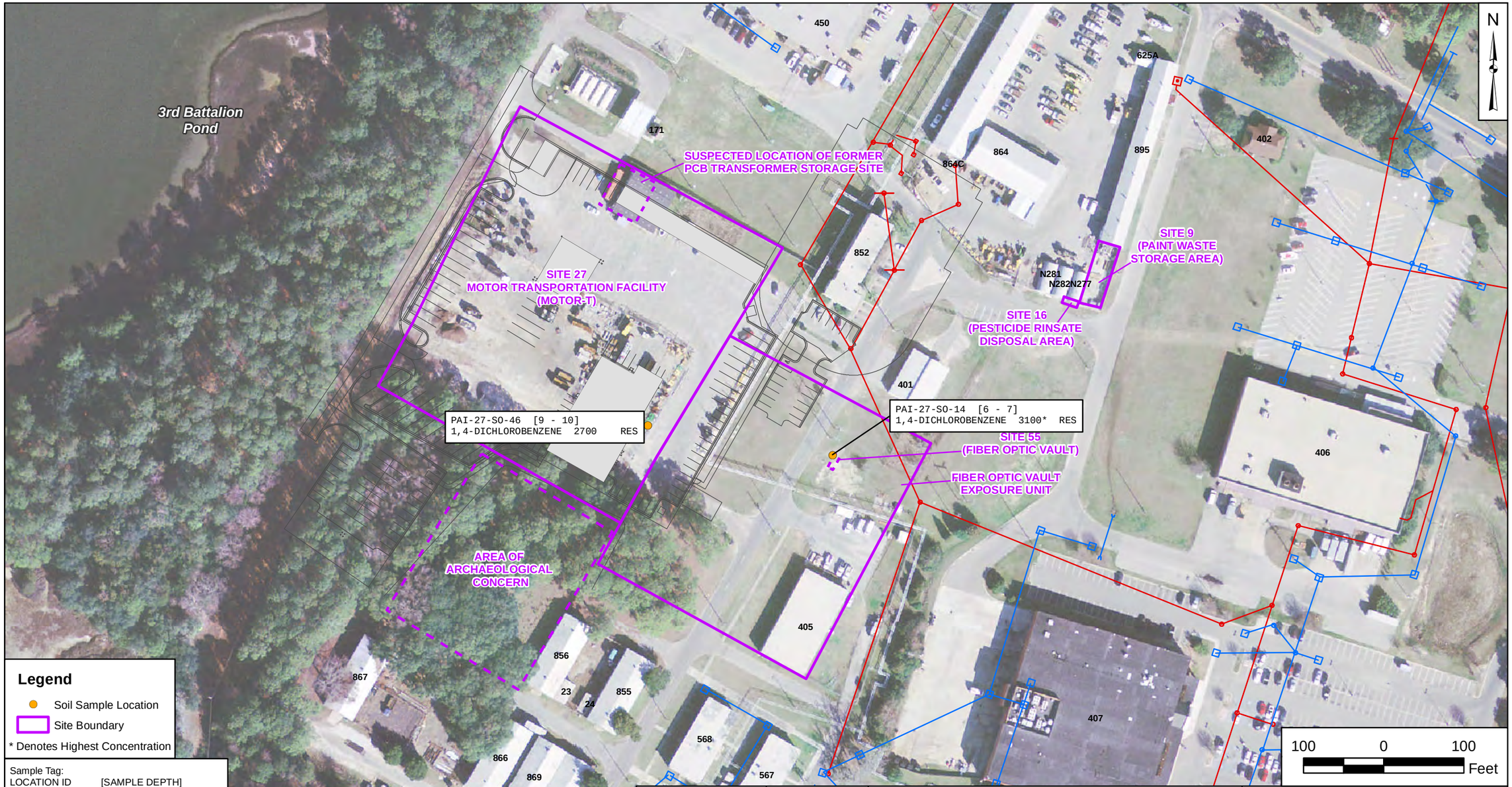

Legend

- Soil Sample Location
- Site Boundary

* Denotes Highest Concentration

Sample Tag:
LOCATION ID [SAMPLE DEPTH]
POLLUTANT CONCENTRATION (UG/KG)

POLLUTANT	UNIT	USEPA INDUSTRIAL RSL	USEPA RESIDENTIAL RSL
1,2,4-TRICHOLOROBENZENE	UG/KG	99000	22000
1,2-DICHOLOROBENZENE	UG/KG	9800000	1900000
1,4-DICHOLOROBENZENE	UG/KG	12000	2400
CHOLOROBENZENE	UG/KG	1400000	290000

DRAWN BY T. WHEATON	DATE 05/23/11	SELECTED VOCs (1,2,4-TRICHLOROBENZENE, 1,2-DICHLOROBENZENE, 1,4-DICHLOROBENZENE, AND CHLOROBENZENE) EXCEEDANCES IN SOIL SITES 27 AND 55 MCRD PARRIS ISLAND, SOUTH CAROLINA
CHECKED BY M. PADILLA	DATE 06/28/11	
COST/SCHEDULE-AREA		
SCALE AS NOTED		

CONTRACT NUMBER CTO 0039	
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. FIGURE 4-1	REV 0

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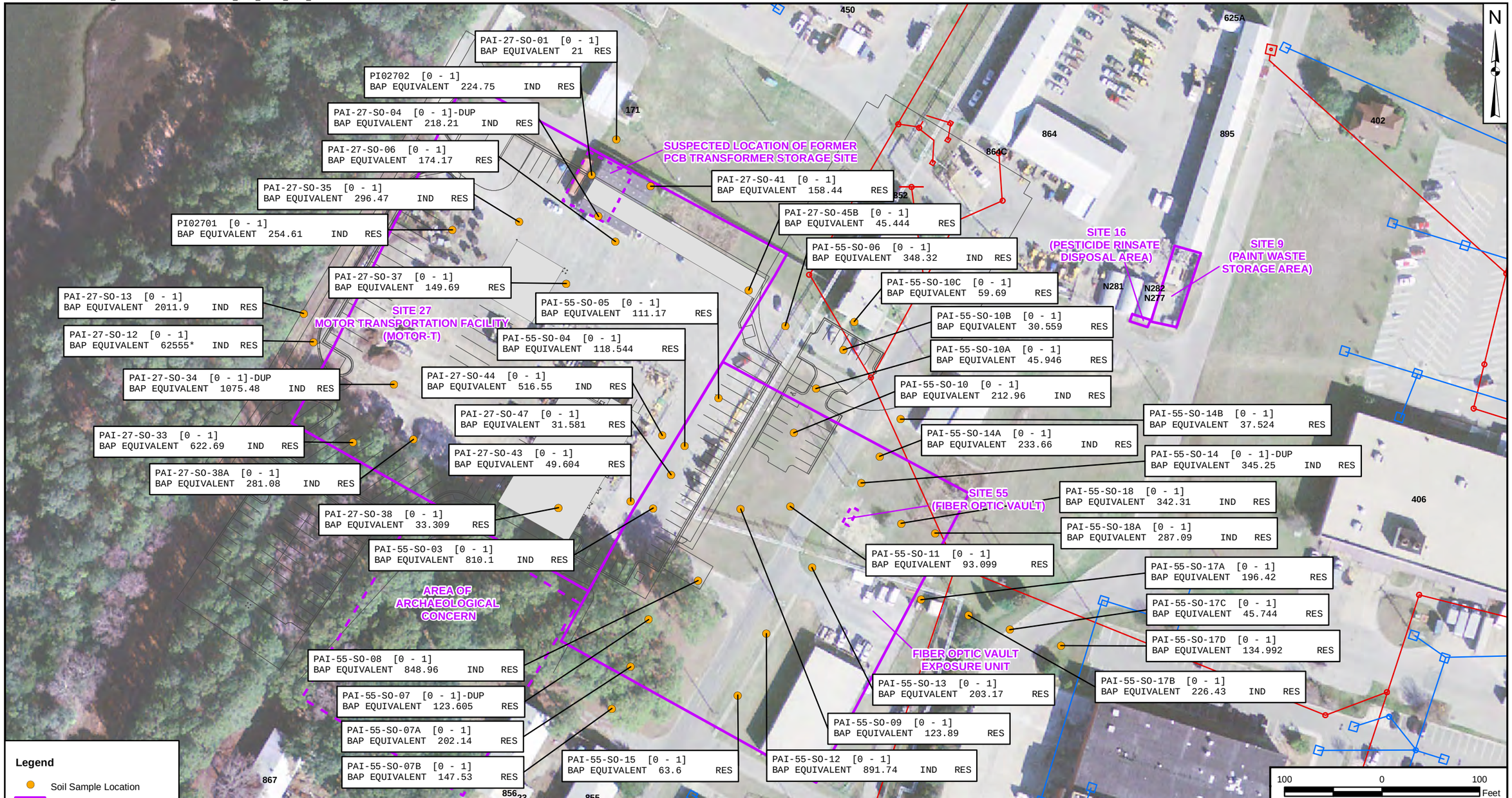

Legend

- Soil Sample Location
- Site Boundary

* Denotes Highest Concentration

Sample Tag:
LOCATION ID [SAMPLE DEPTH]
POLLUTANT CONCENTRATION (UG/KG)

POLLUTANT	UNIT	USEPA INDUSTRIAL RSL	USEPA RESIDENTIAL RSL
SVOCs (BAP EQUIVALENT)	UG/KG	210	15

DRAWN BY	DATE
T. WHEATON	05/23/11
CHECKED BY	DATE
T. DECK	11/16/11
REVISED BY	DATE
S. PAXTON	11/16/11
SCALE	
AS NOTED	

BENZO(A)PYRENE EQUIVALENTS
EXCEEDANCES IN SOIL
SITES 27 AND 55
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
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APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 4 - 2	REV 0

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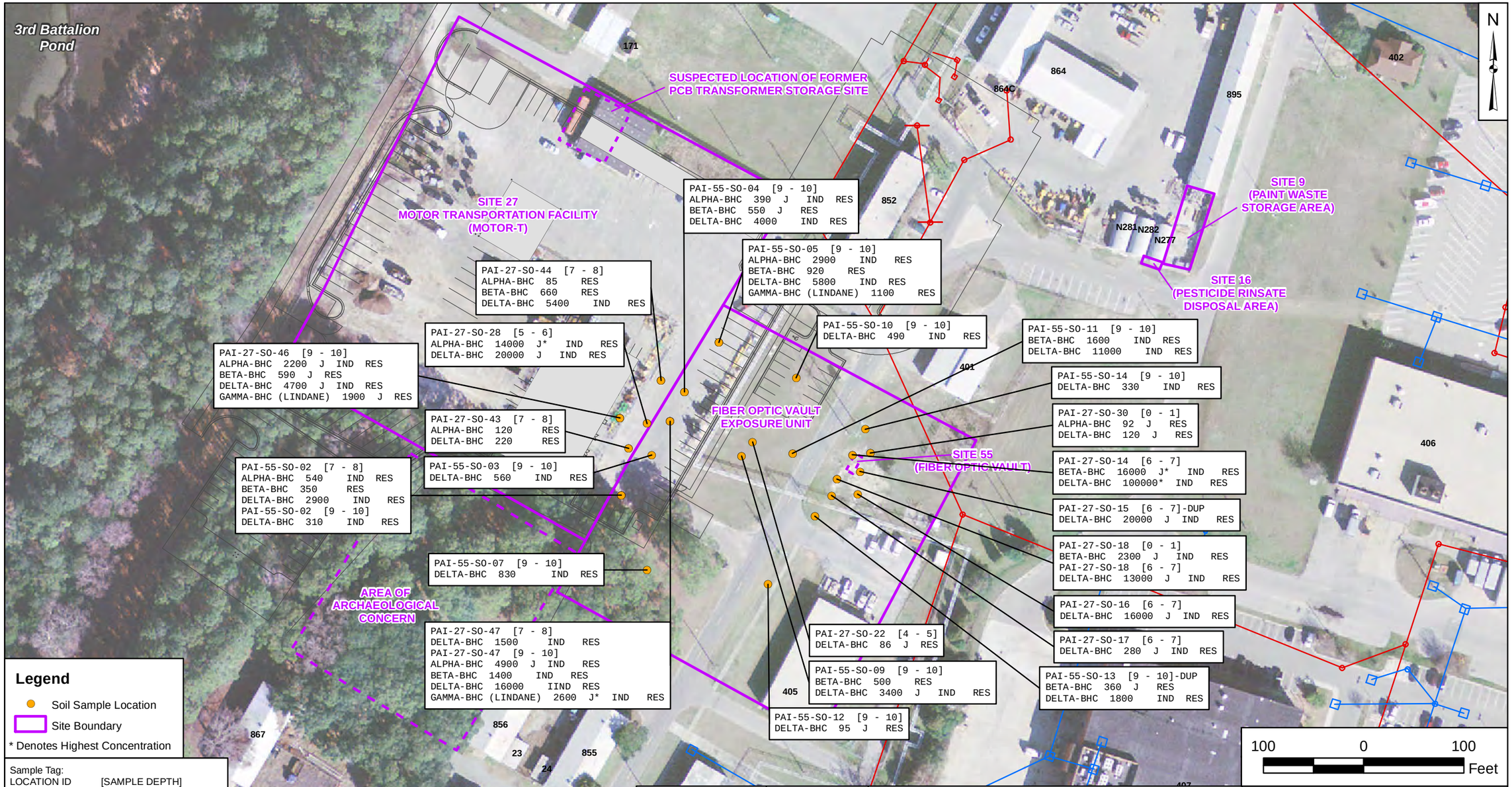

Legend

- Soil Sample Location
- Site Boundary

* Denotes Highest Concentration

Sample Tag:
LOCATION ID [SAMPLE DEPTH]
POLLUTANT CONCENTRATION (UG/KG)

POLLUTANT	UNIT	USEPA INDUSTRIAL RSL	USEPA RESIDENTIAL RSL
ALPHA-BHC	UG/KG	270	77
BETA-BHC	UG/KG	960	270
DELTA-BHC	UG/KG	270	77
GAMMA-BHC (LINDANE)	UG/KG	2100	520

DRAWN BY T. WHEATON	DATE 05/23/11
CHECKED BY M. PADILLA	DATE 06/28/11
COST/SCHEDULE-AREA	
SCALE AS NOTED	

SELECTED PESTICIDES
(ALPHA-BHC, BETA-BHC, DELTA-BHC, GAMMA-BHC (LINDANE))
EXCEEDANCES IN SOIL
SITES 27 AND 55
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER
CTO 0039

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APPROVED BY —	DATE —
FIGURE NO. FIGURE 4-3	REV 0

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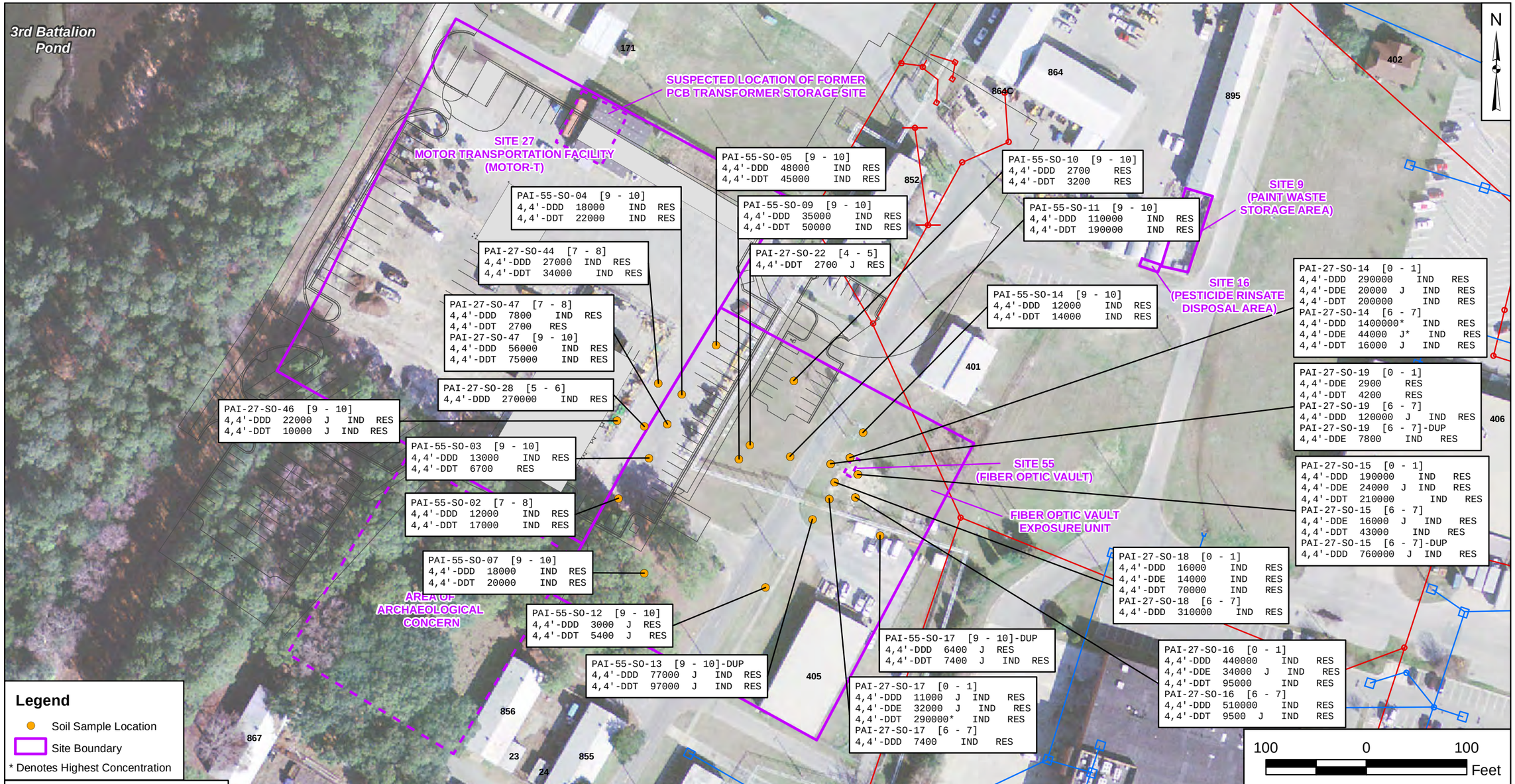

Legend

- Soil Sample Location
- Site Boundary

* Denotes Highest Concentration

Sample Tag:
LOCATION ID [SAMPLE DEPTH]
POLLUTANT CONCENTRATION (UG/KG)

POLLUTANT	UNIT	USEPA INDUSTRIAL RSL	USEPA RESIDENTIAL RSL
4,4-DDD	UG/KG	7200	2000
4,4-DDE	UG/KG	5100	1400
4,4-DDT	UG/KG	7000	1700

DRAWN BY T. WHEATON	DATE 05/23/11
CHECKED BY M. PADILLA	DATE 06/28/11
COST/SCHEDULE-AREA	
SCALE AS NOTED	

SELECTED PESTICIDES
(4,4'-DDD, 4,4'-DDE, AND 4,4'-DDT)
EXCEEDANCES IN SOIL
SITES 27 AND 55
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER
CTO 0039

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FIGURE NO. FIGURE 4-4	REV 0

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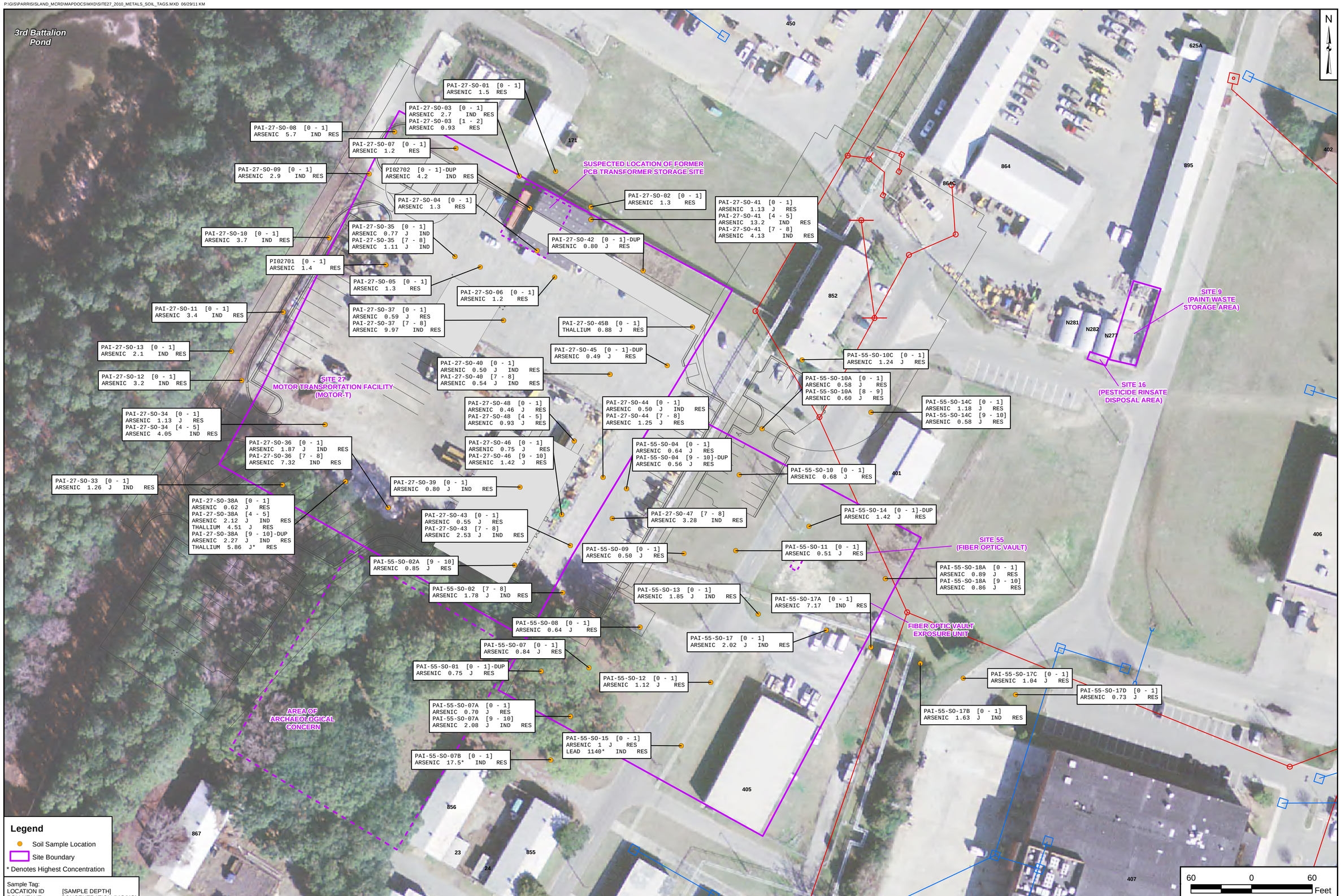

POLLUTANT	UNIT	USEPA INDUSTRIAL RSL	USEPA RESIDENTIAL RSL
ANTIMONY	MG/KG	410	31
ARSENIC	MG/KG	1.6	0.39
LEAD	MG/KG	800	400
SELENIUM	MG/KG	5100	390
THALLIUM	MG/KG	10	0.78

DRAWN BY T. WHEATON	DATE 05/23/11
CHECKED BY F. PADILLA	DATE 06/29/11
COST/SCHEDULE-AREA	
SCALE AS NOTED	

SELECTED METALS
(ANTIMONY, ARSENIC, LEAD, SELENIUM, AND THALLIUM)
EXCEEDANCES IN SOIL
SITES 27 AND 55
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER CTO 0039

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APPROVED BY — DATE —

FIGURE NO. FIGURE 4-5

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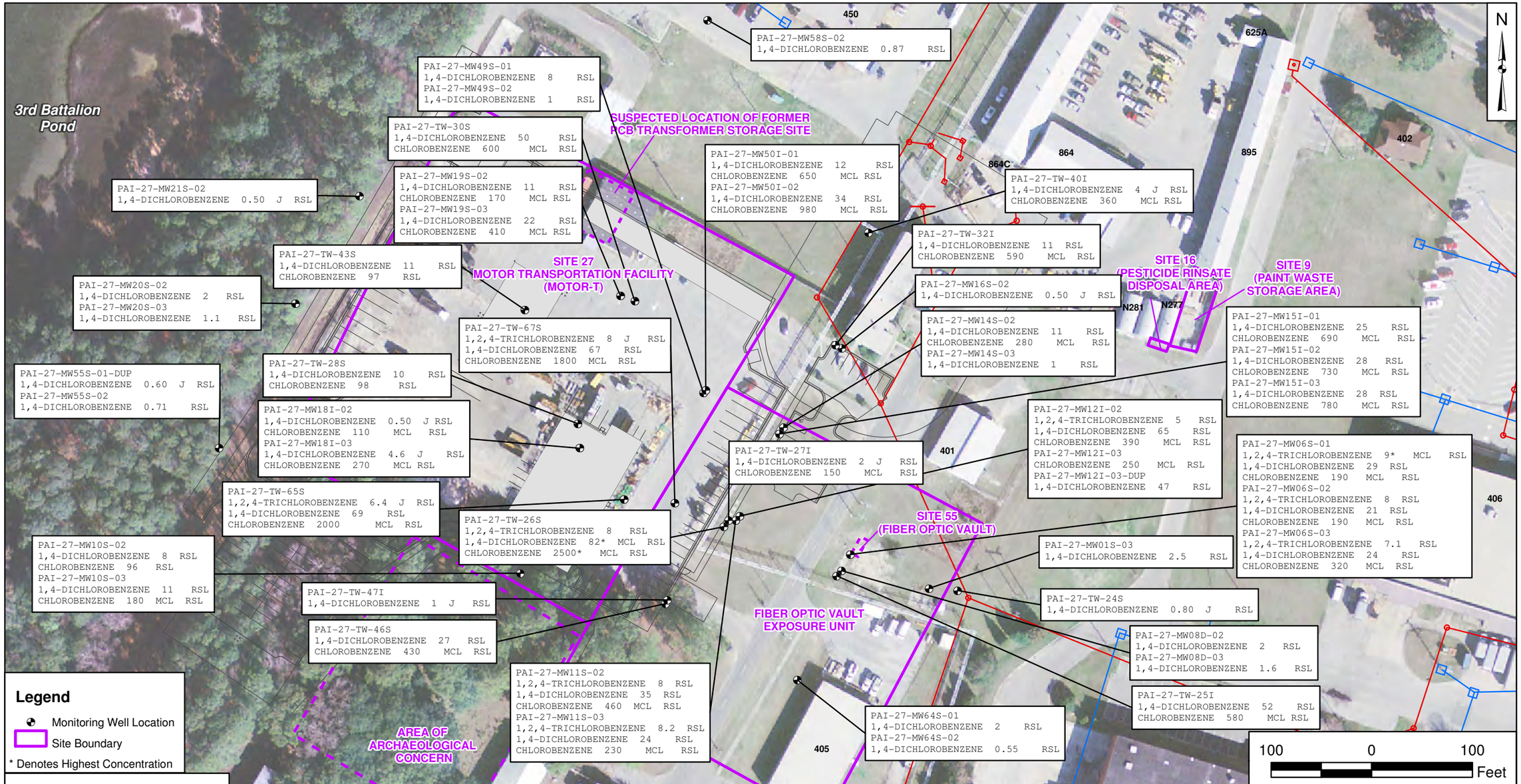

Legend

- Monitoring Well Location
- Site Boundary

* Denotes Highest Concentration

Sample Tag:
LOCATION ID [SAMPLE DEPTH]
POLLUTANT CONCENTRATION (UG/L)

POLLUTANT	UNIT	FEDERAL MCL	USEPA TAPWATER
1,2,4- TRICHLOROBENZENE	UG/L	70	4.1
1,2-DICHLOROBENZENE	UG/L	600	370
1,4-DICHLOROBENZENE	UG/L	75	0.43
CHLOROBENZENE	UG/L	100	91

DRAWN BY T. WHEATON	DATE 05/24/11
CHECKED BY M. PADILLA	DATE 06/28/11
COST/SCHEDULE-AREA	
SCALE AS NOTED	

VOCs
(1,2,4-TRICHLOROBENZENE, 1,2-DICHLOROBENZENE, 1,4-DICHLOROBENZENE, AND CHLOROBENZENE)
EXCEEDANCES IN GROUNDWATER
SITES 27 AND 55
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER
CTO 0039

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FIGURE NO. FIGURE 4-6

REV 0

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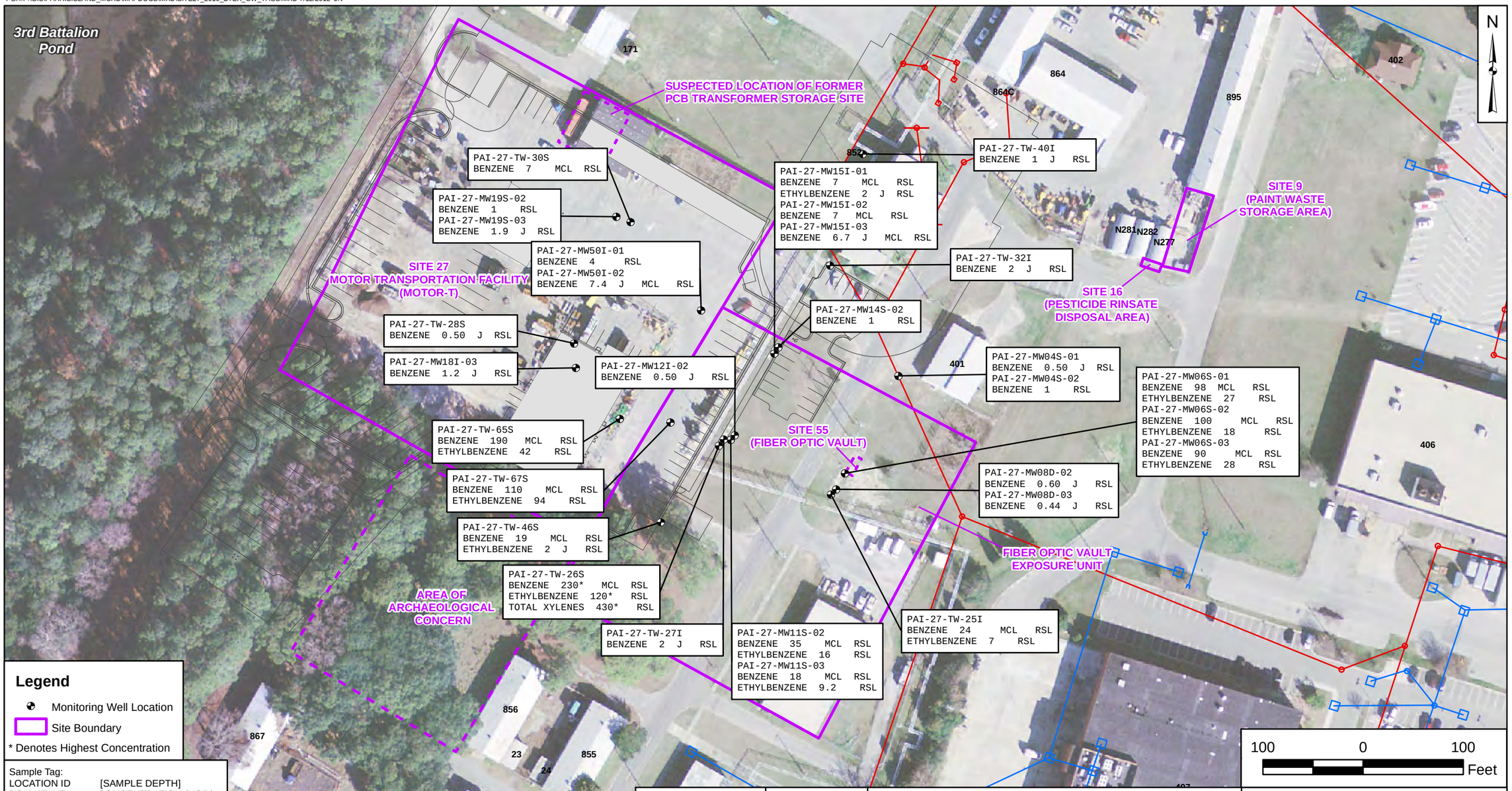

Legend

- Monitoring Well Location
- Site Boundary

* Denotes Highest Concentration

Sample Tag:
LOCATION ID [SAMPLE DEPTH]
POLLUTANT CONCENTRATION (UG/L)

POLLUTANT	UNIT	FEDERAL MCL	USEPA TAPWATER
BENZENE	UG/L	5	0.39
ETHYLBENZENE	UG/L	700	1.3
TOLUENE	UG/L	1000	860
TOTAL XYLENES	UG/L	10000	190

DRAWN BY T. WHEATON	DATE 05/24/11
CHECKED BY T. DECK	DATE 7/12/2012
COST/SCHEDULE-AREA	
SCALE AS NOTED	

SELECTED VOCs
(BENZENE, ETHYLBENZENE, TOLUENE, AND TOTAL XYLENES)
EXCEEDANCES IN GROUNDWATER
SITES 27 AND 55
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER CTO 0039	
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FIGURE NO. FIGURE 4-7	REV 0

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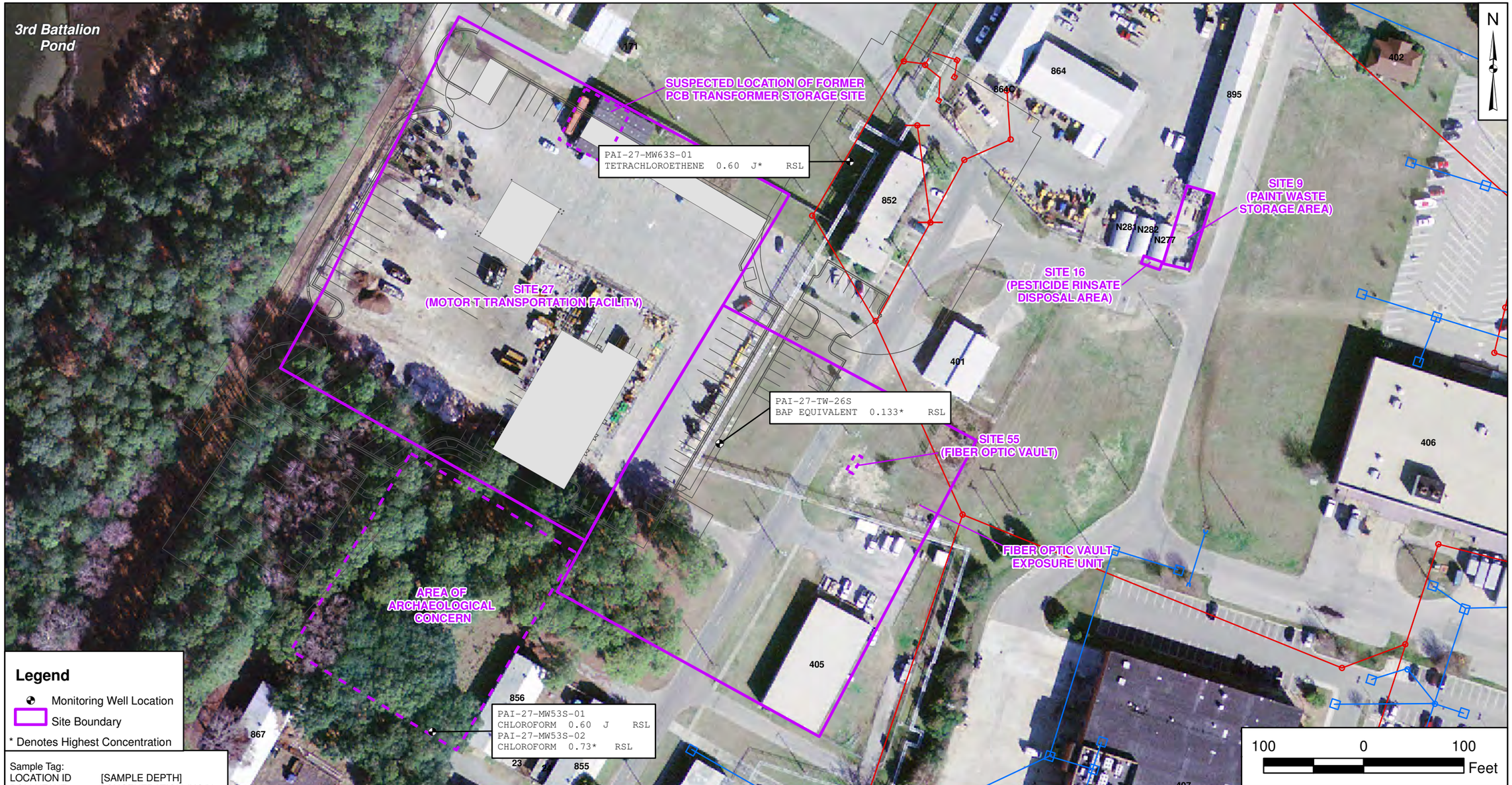

Legend

- Monitoring Well Location
- Site Boundary

* Denotes Highest Concentration

Sample Tag:
LOCATION ID [SAMPLE DEPTH]
POLLUTANT CONCENTRATION (UG/L)

POLLUTANT	UNIT	FEDERAL MCL	USEPA TAPWATER
CIS 1,2-DICHLOROETHENE	UG/L	70	73
TETRACHLOROETHENE	UG/L	5	0.11
CHLOROFORM	UG/L	80	0.19
CHLOROMETHANE	UG/L	NC	190
SVOCs (BAP EQUIVALENT)	UG/L	NC	0.0029

DRAWN BY	DATE
T. WHEATON	05/24/11
CHECKED BY	DATE
F. PADILLA	06/29/11
COST/SCHEDULE-AREA	
SCALE AS NOTED	

VOCs
(CIS-1,2-DICHLOROETHENE, TETRACHLOROETHENE, CHLOROFORM, CHLOROMETHANE) AND SVOCs (BENZO(A)PYRENE EQUIVALENTS) EXCEEDANCES IN GROUNDWATER
SITES 27 AND 55
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER
CTO 0039

APPROVED BY — DATE —

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FIGURE NO. FIGURE 4-8 REV 0

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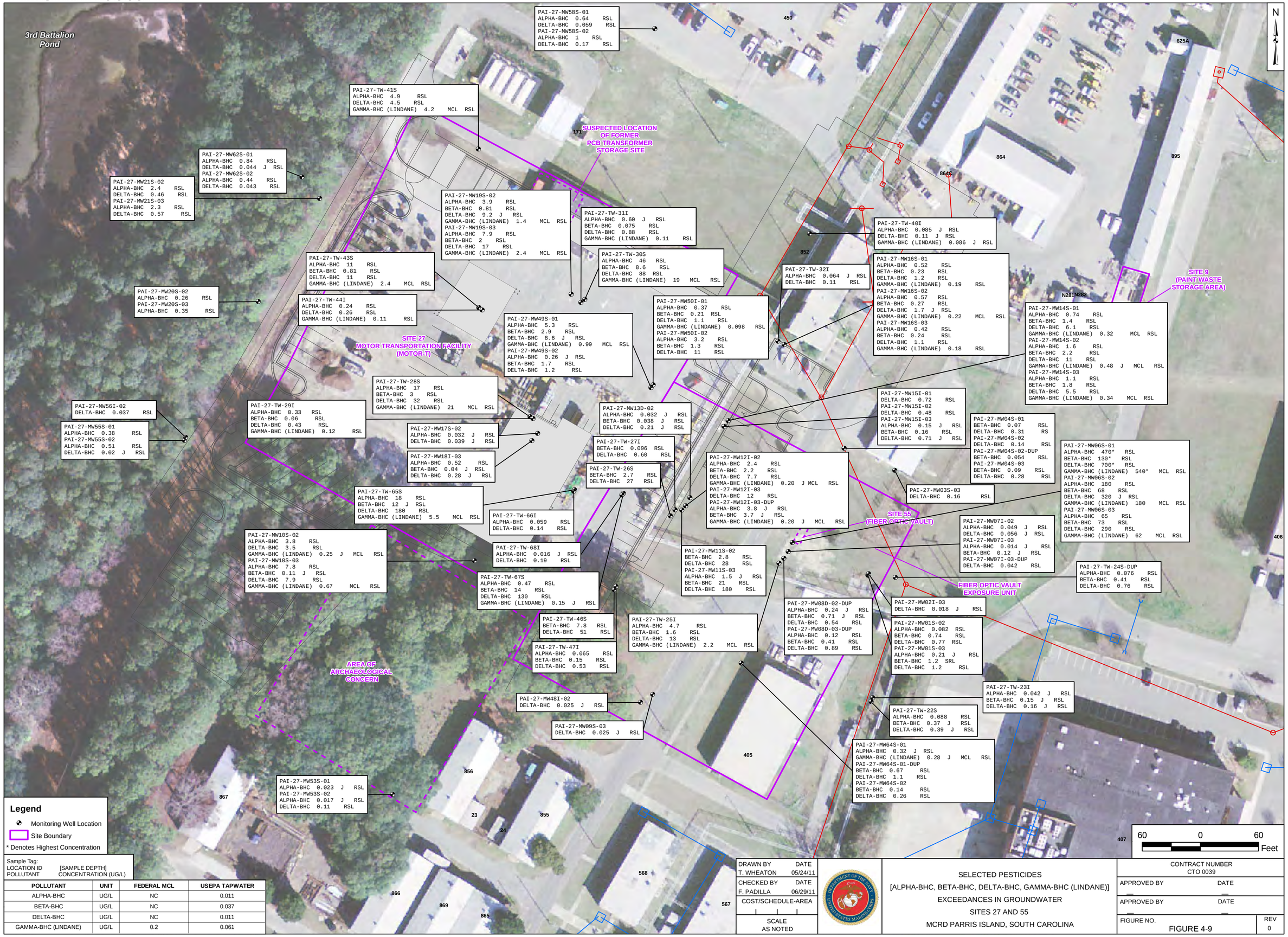

Legend

- Monitoring Well Location
- Site Boundary

* Denotes Highest Concentration

Sample Tag:
LOCATION ID [SAMPLE DEPTH]
POLLUTANT CONCENTRATION (UG/L)

POLLUTANT	UNIT	FEDERAL MCL	USEPA TAPWATER
ALPHA-BHC	UG/L	NC	0.011
BETA-BHC	UG/L	NC	0.037
DELTA-BHC	UG/L	NC	0.011
GAMMA-BHC (LINDANE)	UG/L	0.2	0.061

DRAWN BY T. WHEATON	DATE 05/24/11
CHECKED BY F. PADILLA	DATE 06/29/11
COST/SCHEDULE-AREA	
SCALE AS NOTED	

SELECTED PESTICIDES
[ALPHA-BHC, BETA-BHC, DELTA-BHC, GAMMA-BHC (LINDANE)]
EXCEEDANCES IN GROUNDWATER
SITES 27 AND 55
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER
CTO 0039

APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 4-9	REV 0

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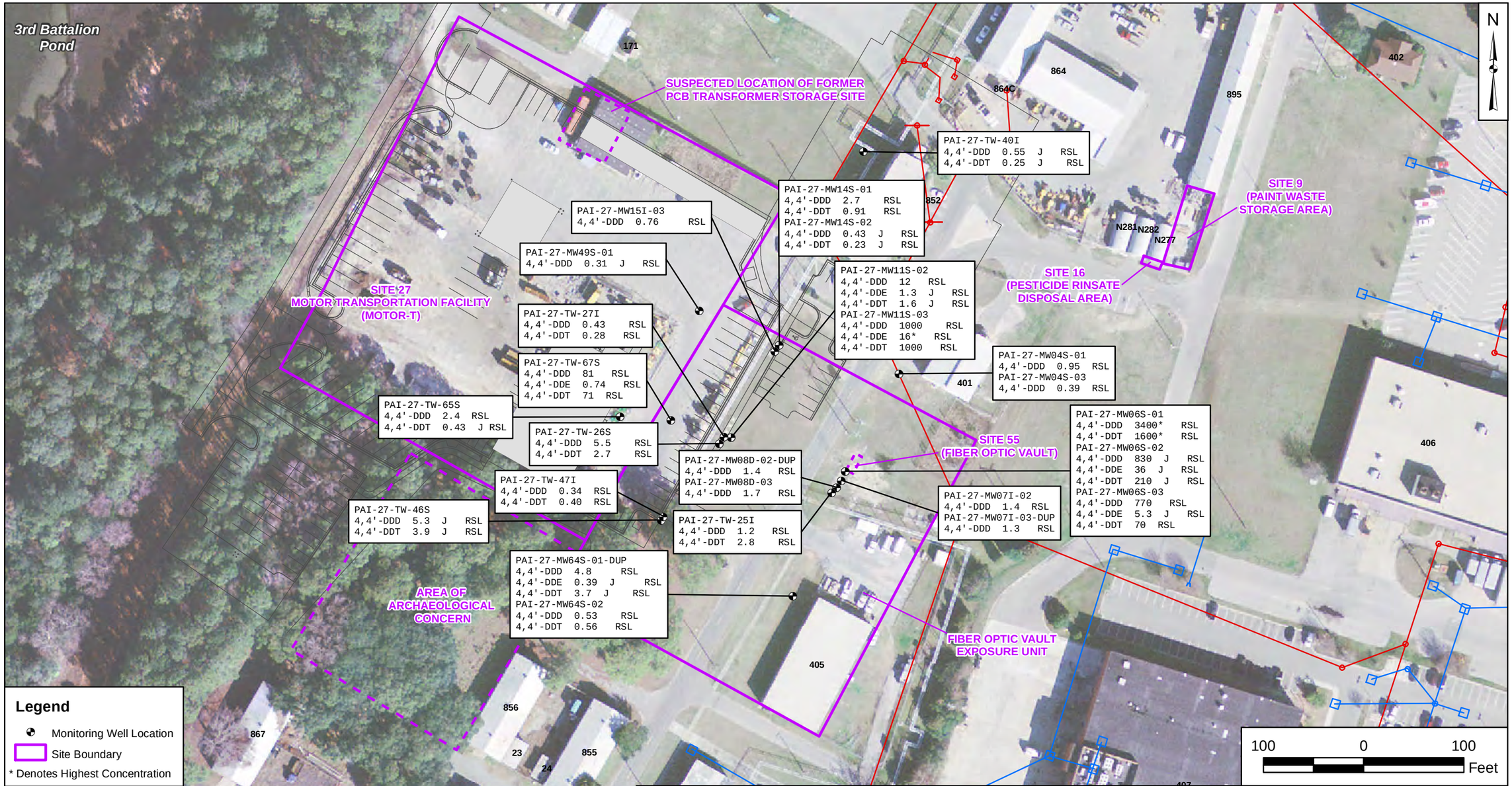


Legend

- Monitoring Well Location
- Site Boundary

* Denotes Highest Concentration

Sample Tag:
LOCATION ID [SAMPLE DEPTH]
POLLUTANT CONCENTRATION (UG/L)

POLLUTANT	UNIT	FEDERAL MCL	USEPA TAPWATER
4,4-DDD	UG/L	NC	0.28
4,4-DDE	UG/L	NC	0.2
4,4-DDT	UG/L	NC	0.2

DRAWN BY T. WHEATON	DATE 05/24/11
CHECKED BY M. PADILLA	DATE 06/28/11
COST/SCHEDULE-AREA	
SCALE AS NOTED	

SELECTED PESTICIDES
(4,4'-DDD, 4,4'-DDE, AND 4,4'-DDT)
EXCEEDANCES IN GROUNDWATER
SITES 27 AND 55
MCRD PARRIS ISLAND, SOUTH CAROLINA

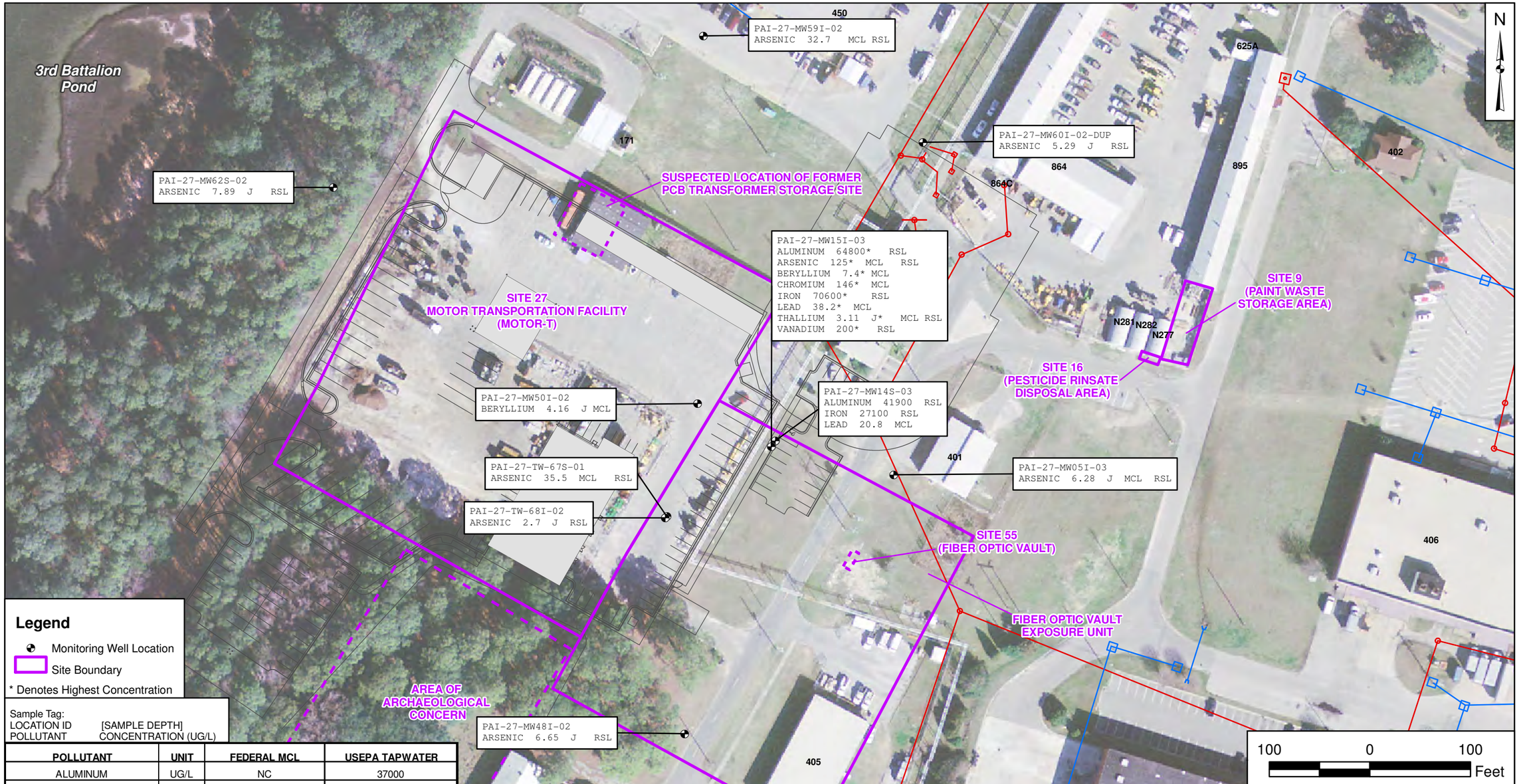
CONTRACT NUMBER
CTO 0039

APPROVED BY — DATE —

APPROVED BY — DATE —

FIGURE NO. FIGURE 4-10 REV 0

P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_METALS_GW_TAGS.MXD 06/28/11 SS



POLLUTANT	UNIT	FEDERAL MCL	USEPA TAPWATER
ALUMINUM	UG/L	NC	37000
ARSENIC	UG/L	10	0.045
BERYLLIUM	UG/L	4	73
CHROMIUM	UG/L	100	0.043
IRON	UG/L	NC	26000
LEAD	UG/L	15	NC
THALLIUM	UG/L	2	0.37
VANADIUM	UG/L	NC	180

DRAWN BY	DATE
T. WHEATON	05/24/11
CHECKED BY	DATE
M. PADILLA	06/28/11
COST/SCHEDULE-AREA	
SCALE AS NOTED	

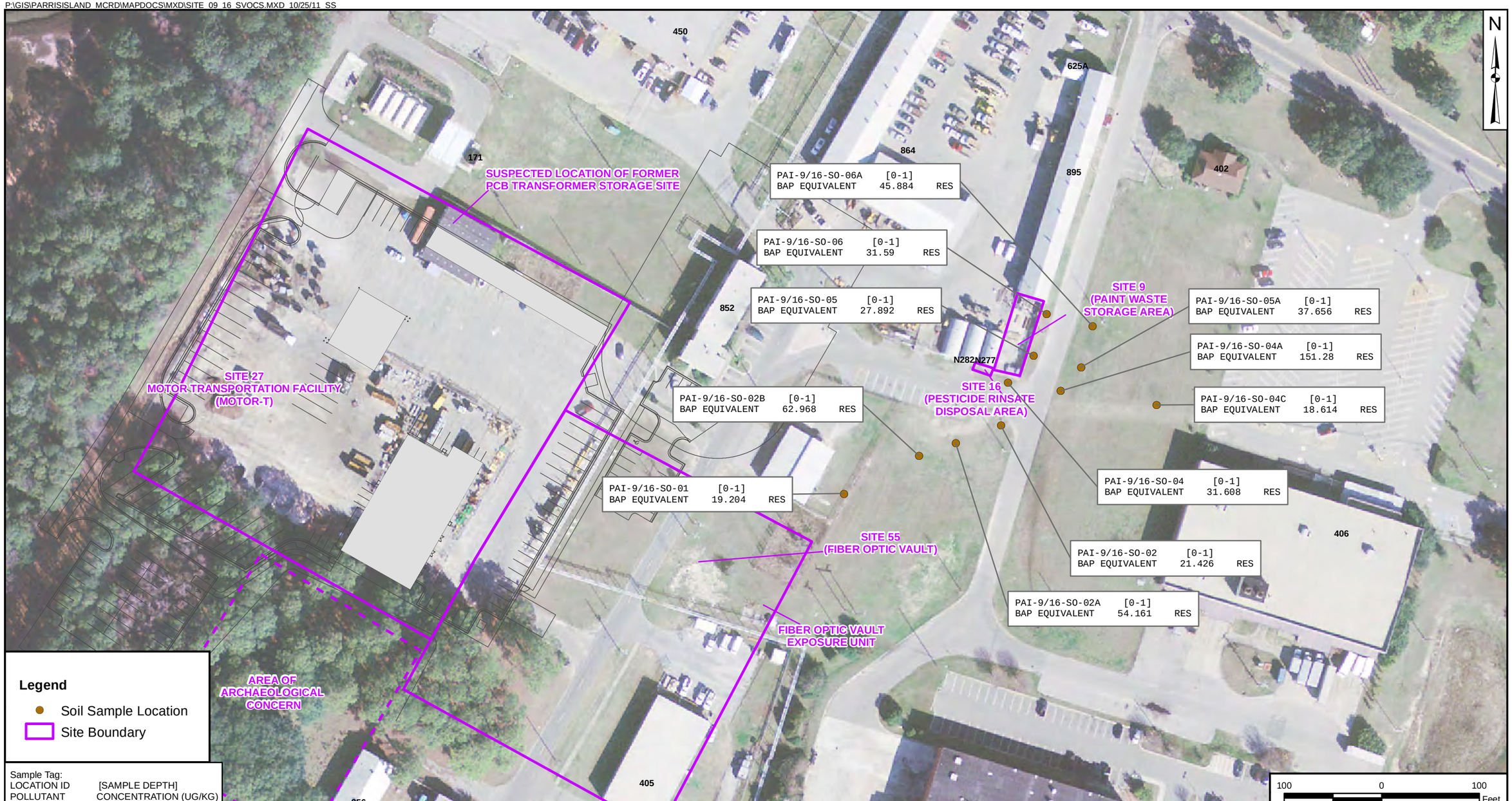
METALS
(ANTIMONY, ARSENIC, BERYLLIUM, CHROMIUM, IRON, LEAD, THALLIUM AND VANADIUM)
EXCEEDANCES IN GROUNDWATER
SITES 27 AND 55
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER
CTO 0039

APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—

FIGURE NO. FIGURE 4-11 REV 0

P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE_09_16_SVOCS.MXD 10/25/11 SS



POLLUTANT	UNIT	USEPA INDUSTRIAL RSL	USEPA RESIDENTIAL RSL
BAP EQUIVALENT	UG/KG	210	15
B (A) ANTH	UG/KG	2100	150
B (A) PYRENE	UG/KG	210	15
B (B) FLUOR	UG/KG	2100	150
I (1,2,3-CD) PYR	UG/KG	2100	150

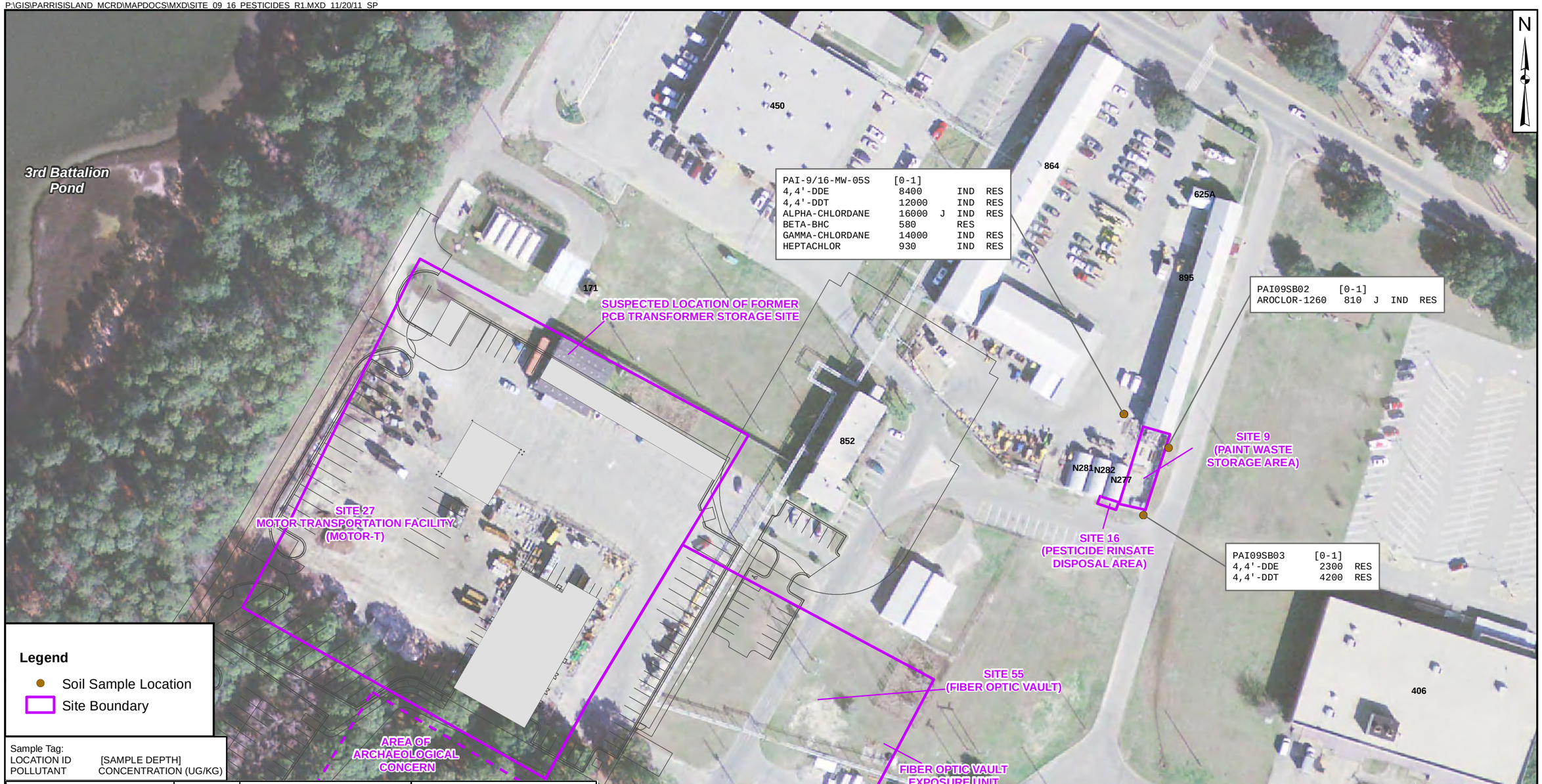
DRAWN BY S. STROZ	DATE 10/24/11
CHECKED BY T. DECK	DATE 10/25/11
REVISED BY	DATE
SCALE AS NOTED	

NAVFAC

SVOCs
(SVOCs MEASURED IN BENZO(A) PYRENE EQUIVALENTS (BAP EQUIVALENTS))
EXCEEDANCES IN SOIL
SITES 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. 4-12	REV 0

P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE_09_16_PESTICIDES_R1.MXD 11/20/11 SP



Legend

- Soil Sample Location
- Site Boundary

Sample Tag:
LOCATION ID [SAMPLE DEPTH]
POLLUTANT CONCENTRATION (UG/KG)

POLLUTANT	UNIT	USEPA INDUSTRIAL RSL	USEPA RESIDENTIAL RSL
4,4'-DDE	UG/KG	5100	1400
4,4'-DDT	UG/KG	7000	1700
ALPHA-CHLORDANE	UG/KG	6500	1600
AROCLOR-1260	UG/KG	740	220
BETA-BHC	UG/KG	960	270
GAMMA-CHLORDANE	UG/KG	6500	1600
HEPTACHLOR	UG/KG	380	110

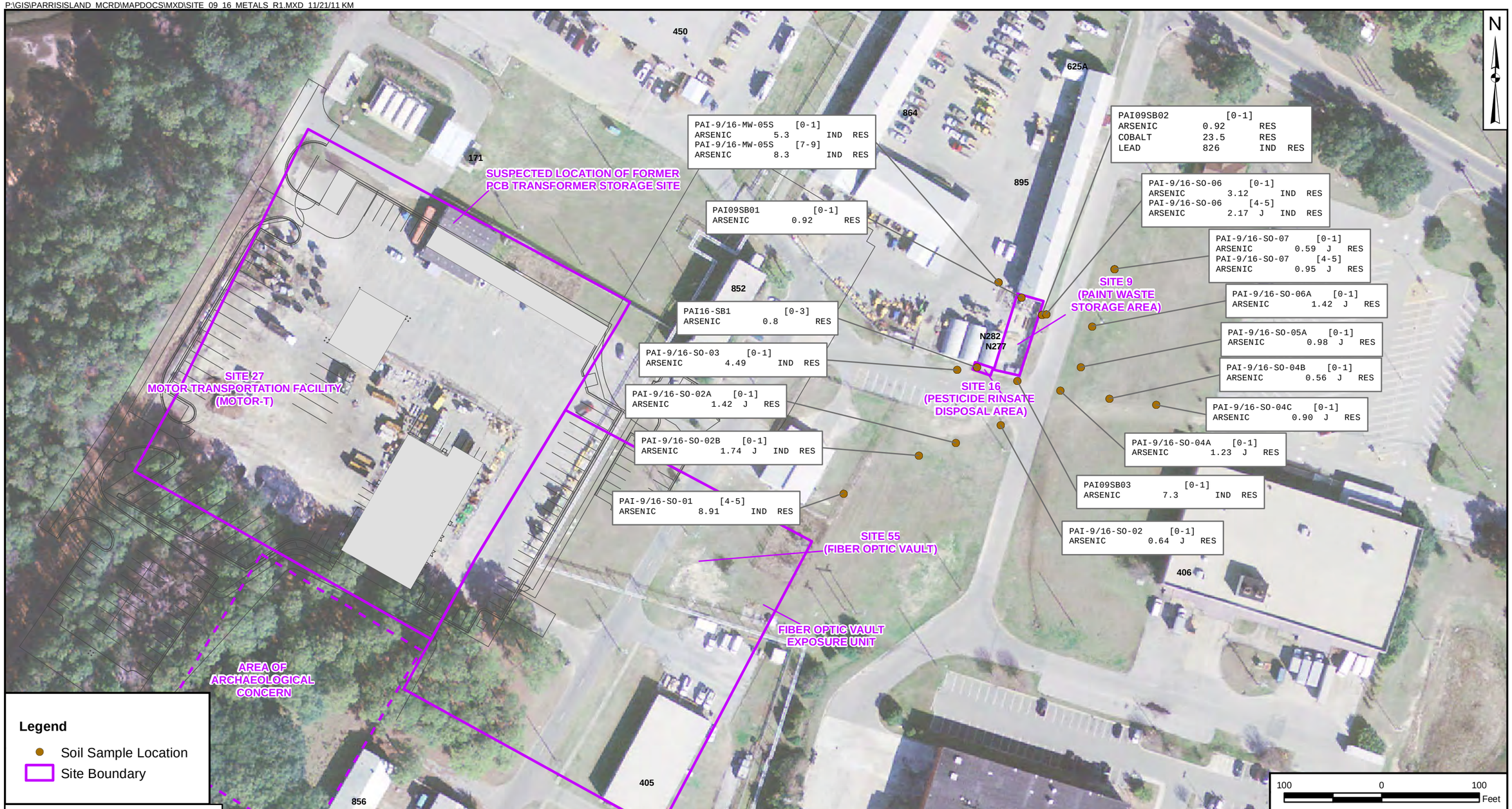
DRAWN BY S. STROZ	DATE 11/20/11
CHECKED BY T. DECK	DATE 11/20/11
REVISED BY	DATE
SCALE AS NOTED	

NAVFAC

PESTICIDES AND PCBs
EXCEEDANCES IN SOIL
SITES 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. 4-13	REV 0

P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE_09_16_METALS_R1.MXD 11/21/11 KM



Legend

- Soil Sample Location
- Site Boundary

Sample Tag:
LOCATION ID [SAMPLE DEPTH]
POLLUTANT CONCENTRATION (MG/KG)

ANALYTE	UNIT	USEPA INDUSTRIAL RSL	USEPA RESIDENTIAL RSL
ARSENIC	MG/KG	1.6	0.39
COBALT	MG/KG	300	23
LEAD	MG/KG	800	400

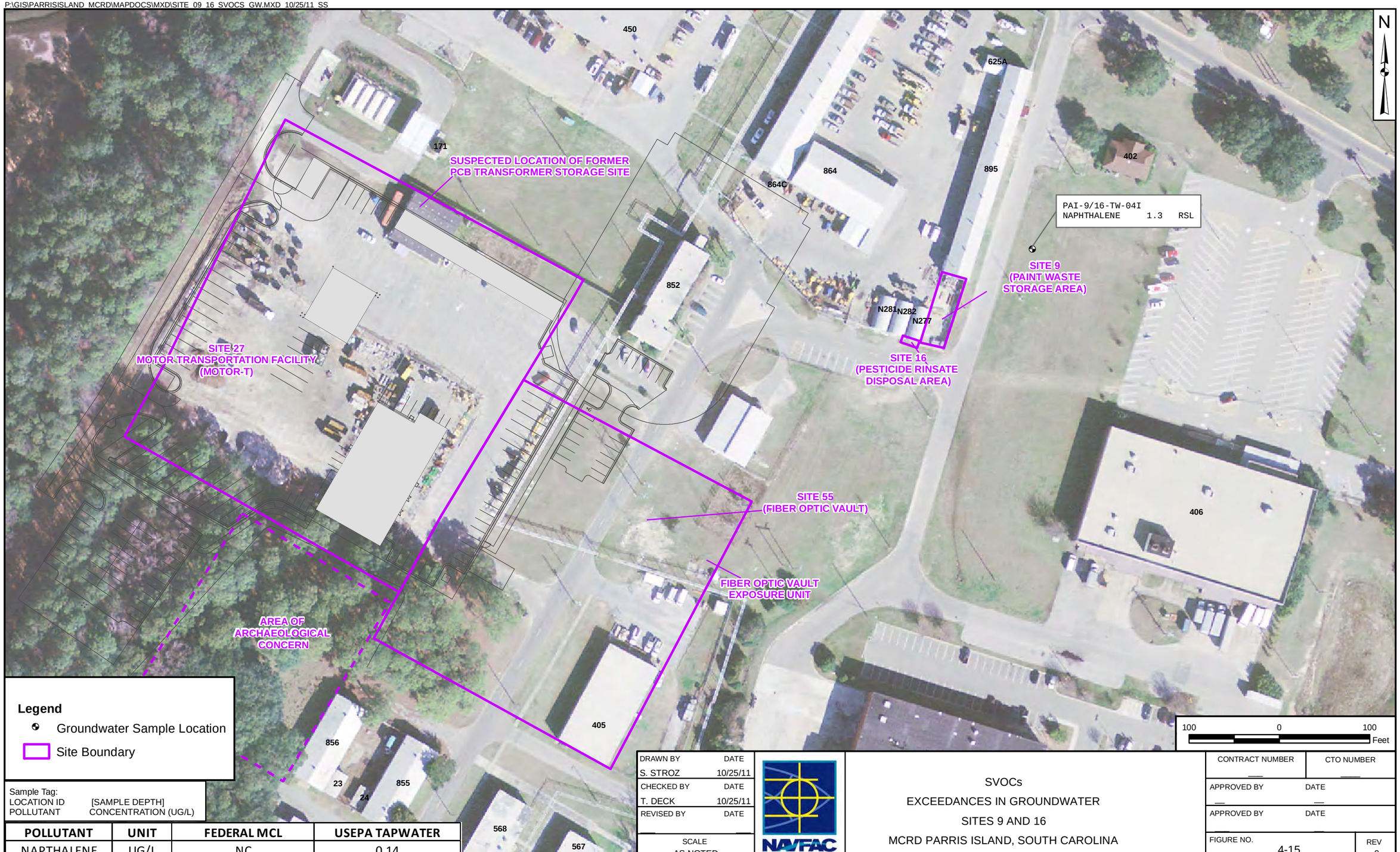
DRAWN BY	DATE
K. MOORE	11/21/11
CHECKED BY	DATE
T. DECK	11/21/11
REVISED BY	DATE
SCALE AS NOTED	

NAVFAC

METALS
EXCEEDANCES IN SOIL
SITES 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. 4-14	REV 0

P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE_09_16_SVOCS_GW.MXD 10/25/11 SS



POLLUTANT	UNIT	FEDERAL MCL	USEPA TAPWATER
NAPTHALENE	UG/L	NC	0.14

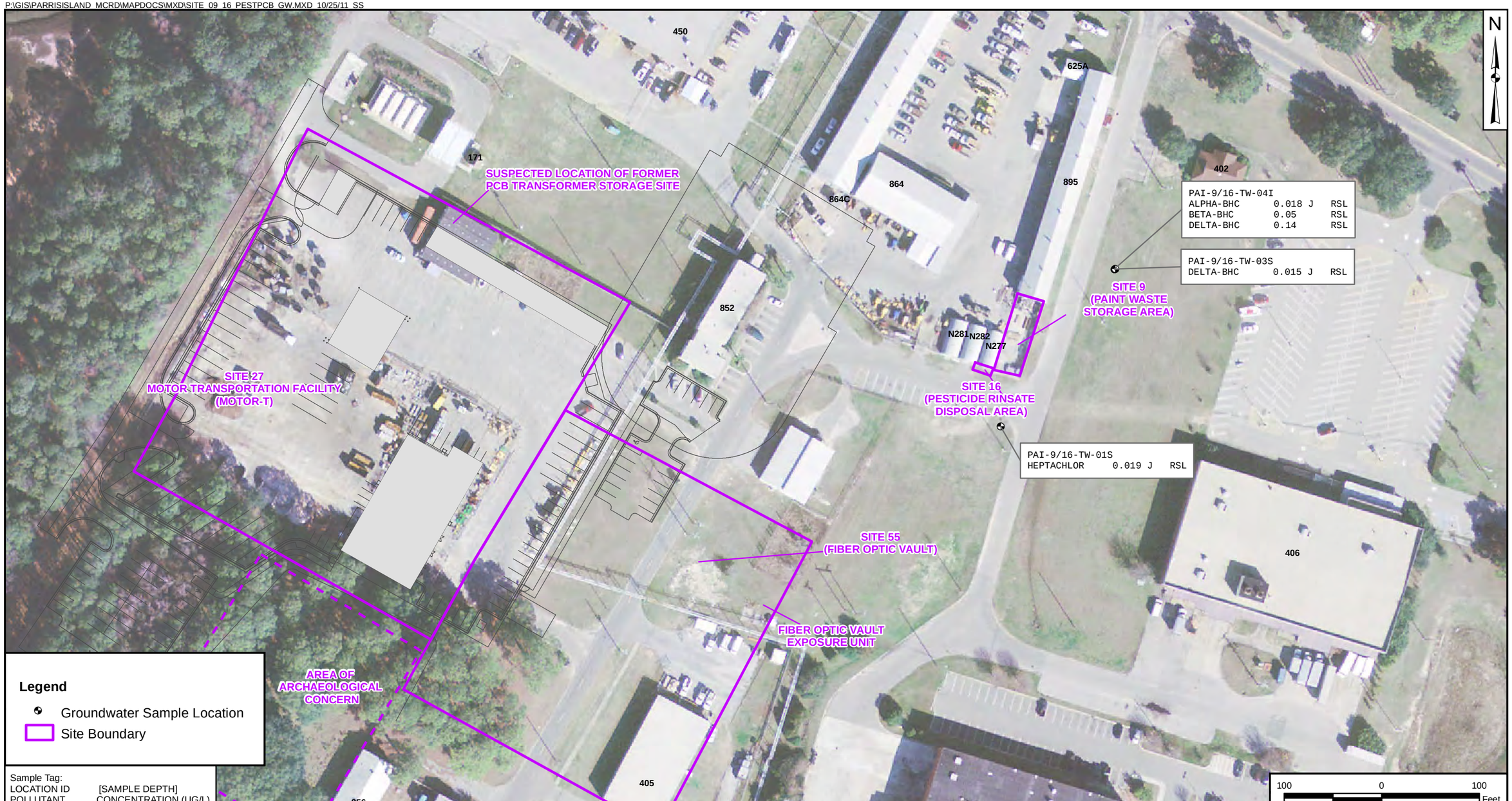
DRAWN BY	DATE
S. STROZ	10/25/11
CHECKED BY	DATE
T. DECK	10/25/11
REVISED BY	DATE
SCALE AS NOTED	

NAVFAC

SVOCs
EXCEEDANCES IN GROUNDWATER
SITES 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. 4-15	REV 0

P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE_09_16_PESTPCB_GW.MXD 10/25/11 SS



Legend

- Groundwater Sample Location
- Site Boundary

Sample Tag:
LOCATION ID [SAMPLE DEPTH]
POLLUTANT CONCENTRATION (UG/L)

POLLUTANT	UNIT	FEDERAL MCL	USEPA TAPWATER
ALPHA-BHC	UG/L	NC	0.011
BETA-BHC	UG/L	NC	0.037
DELTA-BHC	UG/L	NC	0.011
HEPTACHLOR	UG/L	0.4	0.015
HEPT EPOXIDE	UG/L	0.2	0.0074

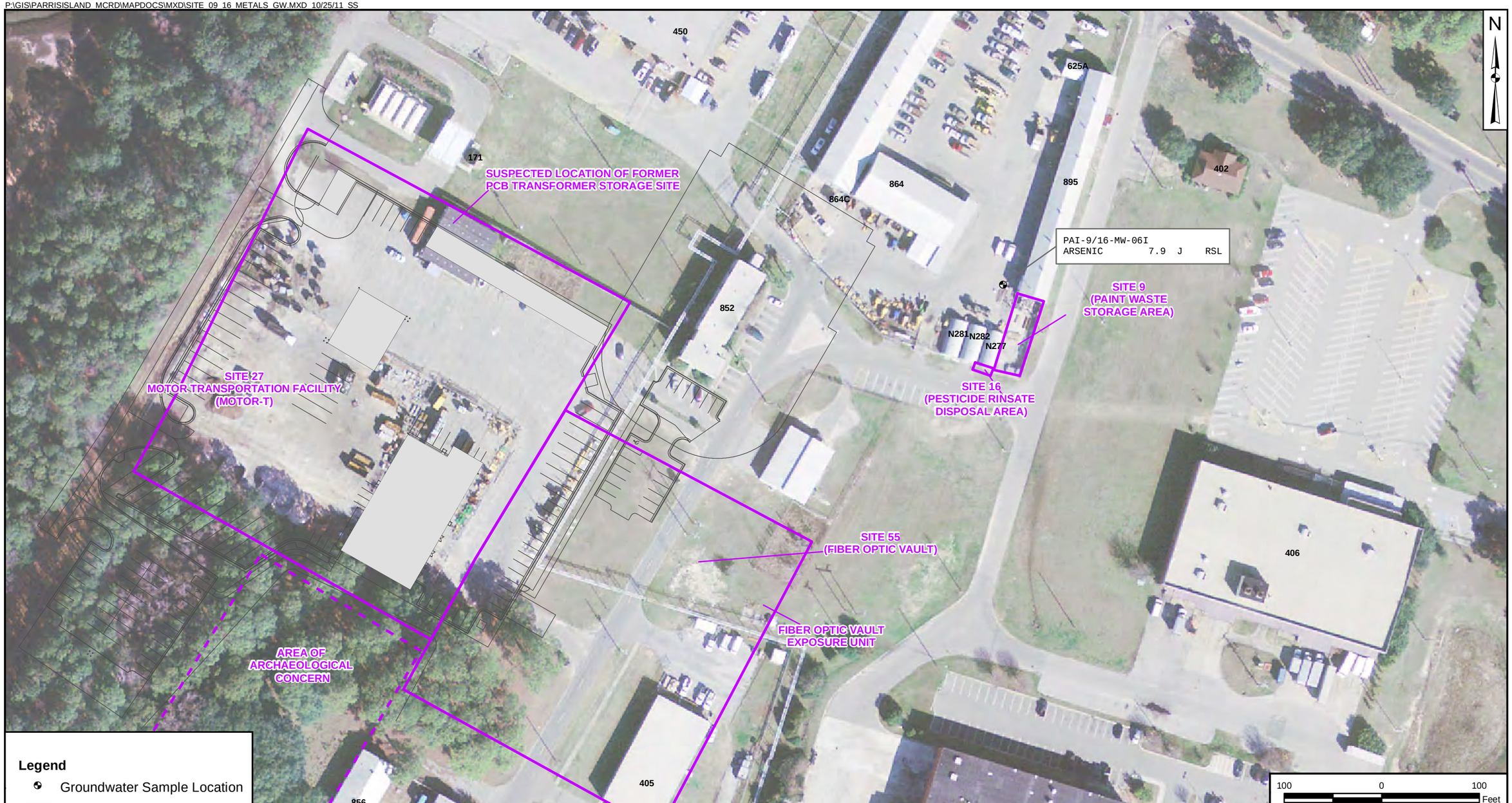
DRAWN BY S. STROZ	DATE 10/25/11
CHECKED BY T. DECK	DATE 10/25/11
REVISED BY	DATE
SCALE AS NOTED	

NAVFAC

PESTICIDES AND PCBs
EXCEEDANCES IN GROUNDWATER
SITES 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. 4-16	REV 0

P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE_09_16_METALS_GW.MXD 10/25/11 SS



Legend

- Groundwater Sample Location
- Site Boundary

Sample Tag:
LOCATION ID [SAMPLE DEPTH]
POLLUTANT CONCENTRATION (UG/L)

POLLUTANT	UNIT	FEDERAL MCL	USEPA TAPWATER
ARSENIC	UG/L	10	0.045

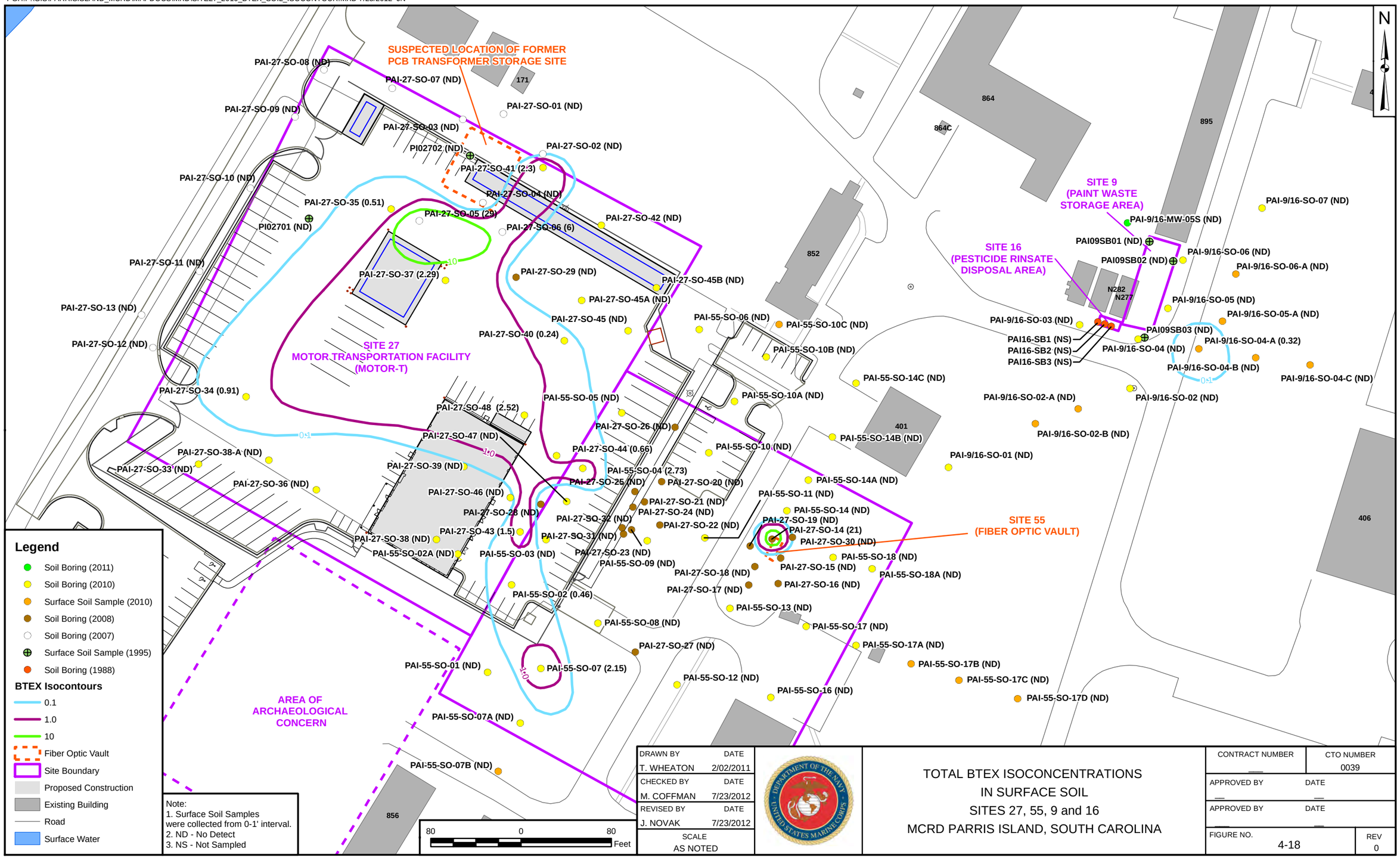
DRAWN BY	DATE
S. STROZ	10/25/11
CHECKED BY	DATE
T. DECK	10/25/11
REVISED BY	DATE
SCALE	
AS NOTED	

NAVFAC

METALS
EXCEEDANCES IN GROUNDWATER
SITES 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. 4-17	REV 0

PGH:P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_BTEX_SOIL_ISOCONTOUR.MXD 7/23/2012 JN

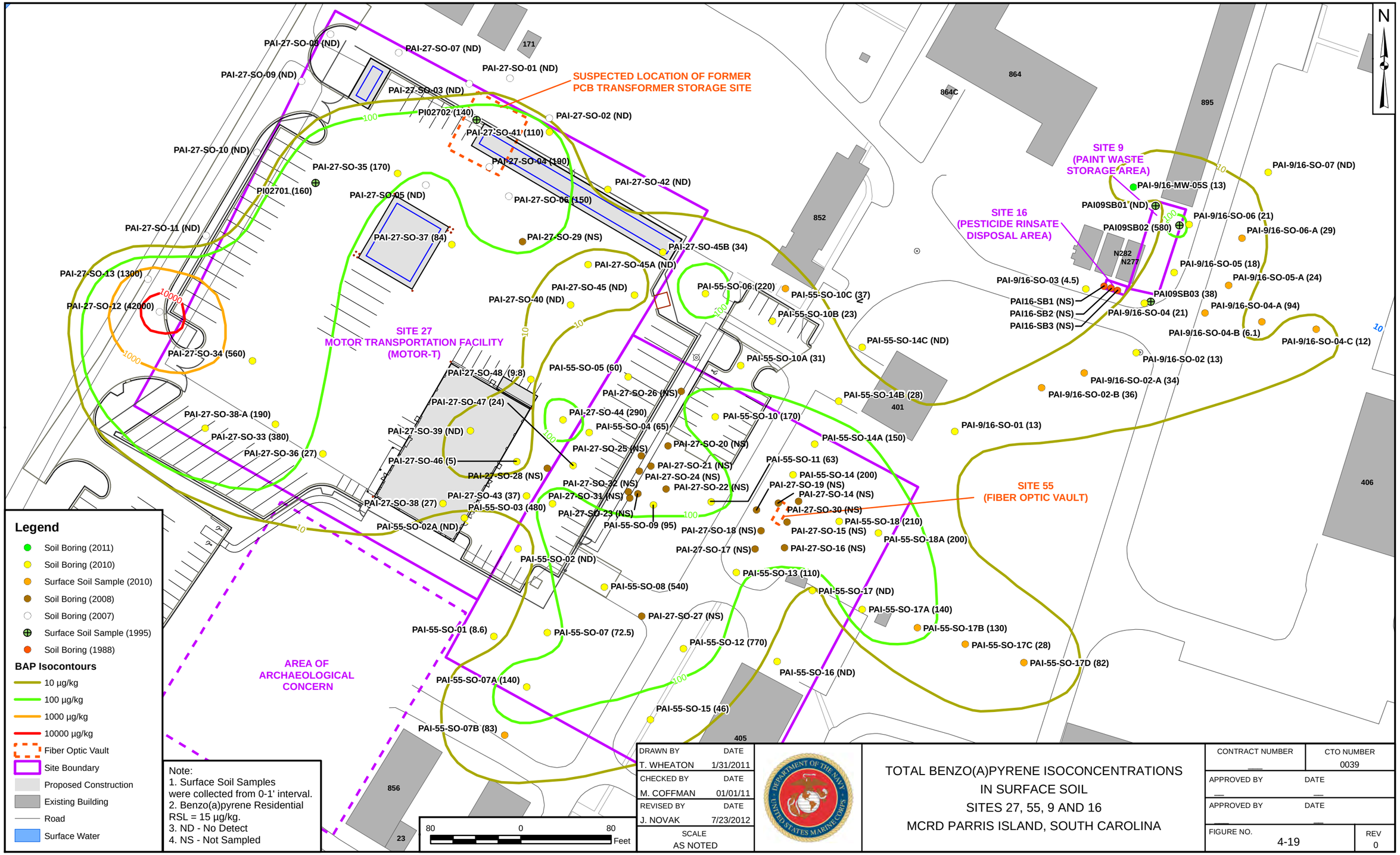


DRAWN BY	DATE
T. WHEATON	2/02/2011
CHECKED BY	DATE
M. COFFMAN	7/23/2012
REVISED BY	DATE
J. NOVAK	7/23/2012
SCALE	
AS NOTED	

TOTAL BTEX ISOCONCENTRATIONS
IN SURFACE SOIL
SITES 27, 55, 9 and 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
—	0039
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO. 4-18	REV 0

PGH P:\GIS\FACILITY\MAPDOCS\MXD\NAME.MXD MM/DD/YY GIS



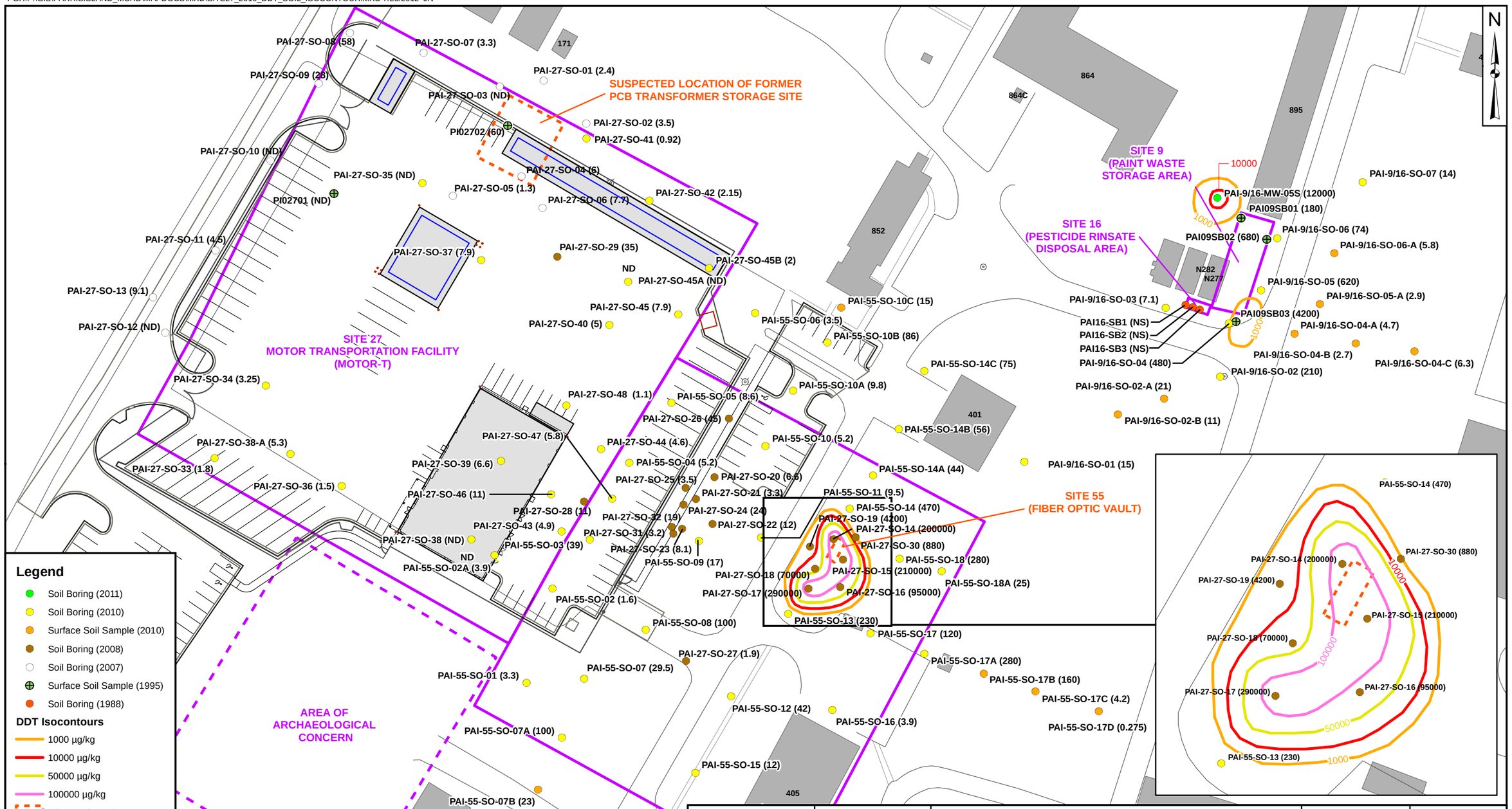
Note:
1. Surface Soil Samples were collected from 0-1' interval.
2. Benzo(a)pyrene Residential RSL = 15 µg/kg.
3. ND - No Detect
4. NS - Not Sampled

DRAWN BY T. WHEATON	DATE 1/31/2011
CHECKED BY M. COFFMAN	DATE 01/01/11
REVISED BY J. NOVAK	DATE 7/23/2012
SCALE AS NOTED	

TOTAL BENZO(A)PYRENE ISOCONCENTRATIONS
IN SURFACE SOIL
SITES 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER —	CTO NUMBER 0039
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. 4-19	REV 0

PGH:P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_DDT_SOIL_ISOCONTOUR.MXD 7/23/2012 JN



Legend

- Soil Boring (2011)
- Soil Boring (2010)
- Surface Soil Sample (2010)
- Soil Boring (2008)
- Soil Boring (2007)
- Surface Soil Sample (1995)
- Soil Boring (1988)

DDT Isocontours

- 1000 µg/kg
- 10000 µg/kg
- 50000 µg/kg
- 100000 µg/kg
- Fiber Optic Vault
- Site Boundary
- Proposed Construction
- Existing Building
- Road
- Surface Water

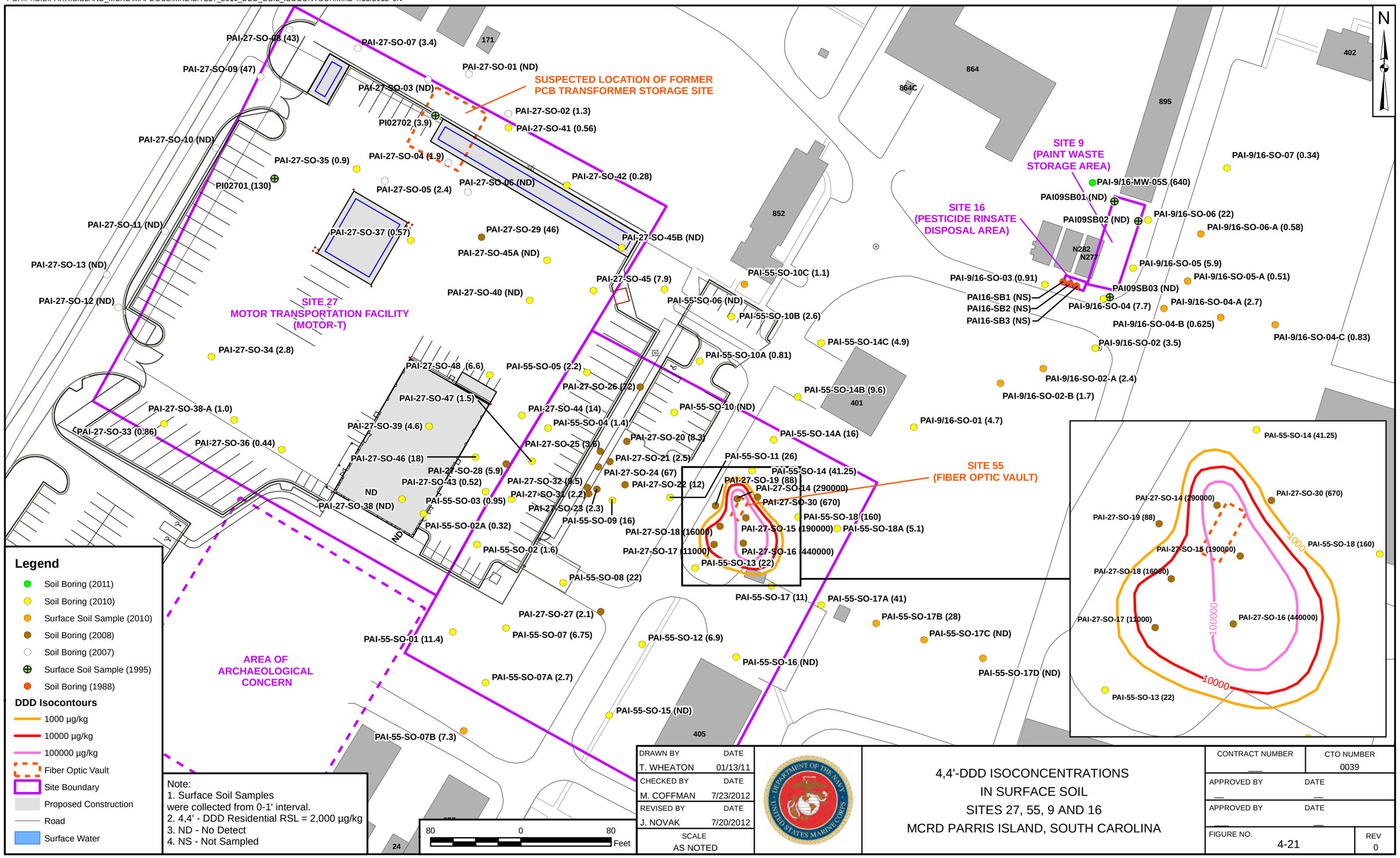
Note:
1. Surface Soil Samples were collected from 0-1' interval.
2. 4,4' - DDD Residential RSL = 1,700 µg/kg
3. ND - No Detect
4. NS - Not Sampled

DRAWN BY T. WHEATON	DATE 12/21/10
CHECKED BY M. COFFMAN	DATE 7/23/2012
REVISED BY J. NOVAK	DATE 7/23/2012
SCALE AS NOTED	

4,4'-DDT ISOCONCENTRATIONS
IN SURFACE SOIL
SITES 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER —	CTO NUMBER 0039
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. 4-20	REV 0

PGH:P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_DDD_SOIL_ISOCONTOUR.MXD 7/23/2012 JN



Legend

- Soil Boring (2011)
- Soil Boring (2010)
- Surface Soil Sample (2010)
- Soil Boring (2008)
- Soil Boring (2007)
- Surface Soil Sample (1995)
- Soil Boring (1988)

DDD Isocontours

- 1000 µg/kg
- 10000 µg/kg
- 100000 µg/kg
- Fiber Optic Vault
- Site Boundary
- Proposed Construction
- Road
- Surface Water

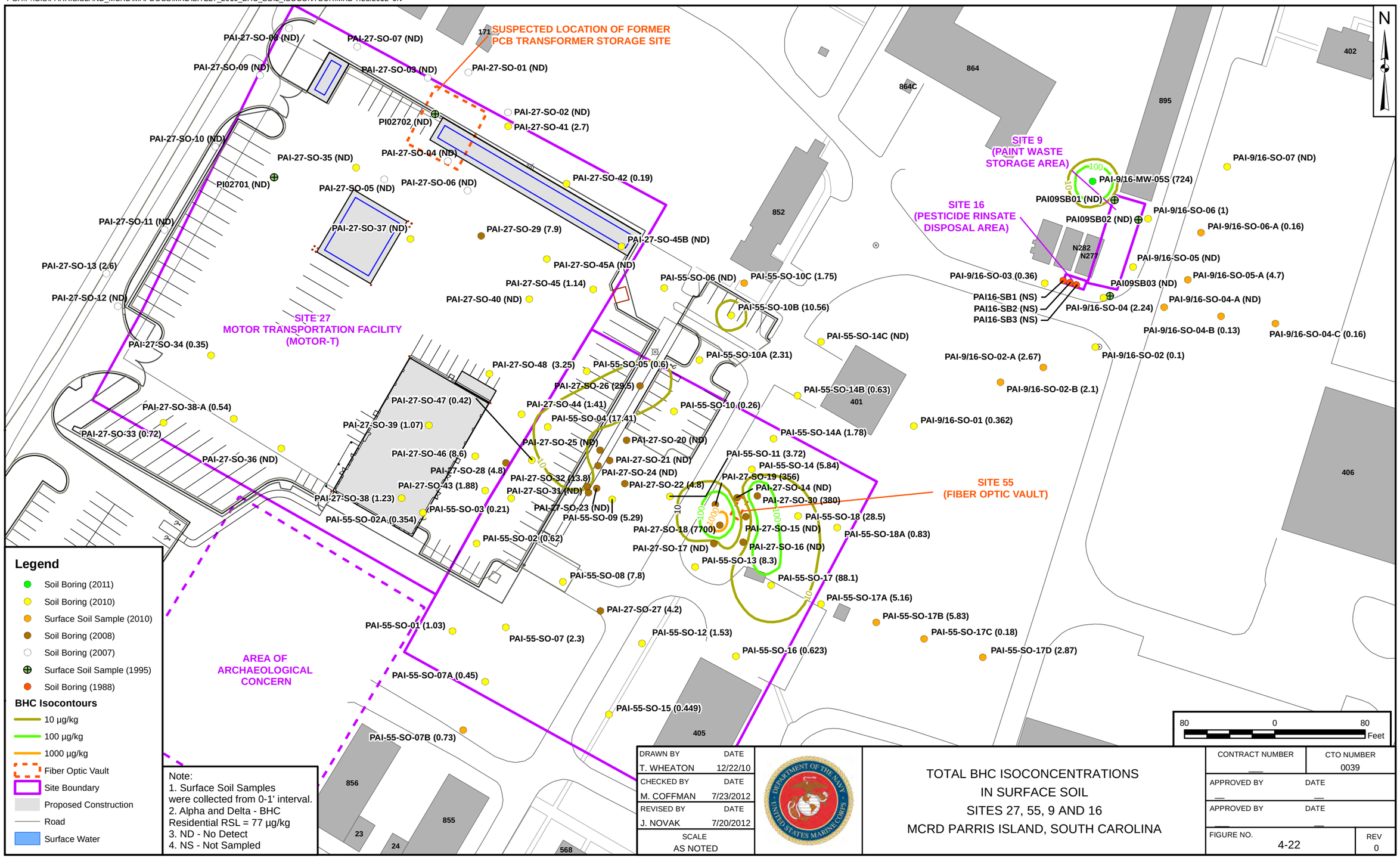
Note:
1. Surface Soil Samples were collected from 0-1' interval.
2. 4,4' - DDD Residential RSL = 2,000 µg/kg
3. ND - No Detect
4. NS - Not Sampled

DRAWN BY T. WHEATON	DATE 01/13/11
CHECKED BY M. COFFMAN	DATE 7/23/2012
REVISED BY J. NOVAK	DATE 7/20/2012
SCALE AS NOTED	

4,4'-DDD ISOCONCENTRATIONS
IN SURFACE SOIL
SITES 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER —	CTO NUMBER 0039
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. 4-21	REV 0

PGH:P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_BHC_SOIL_ISOCONTOUR.MXD 7/23/2012 JN

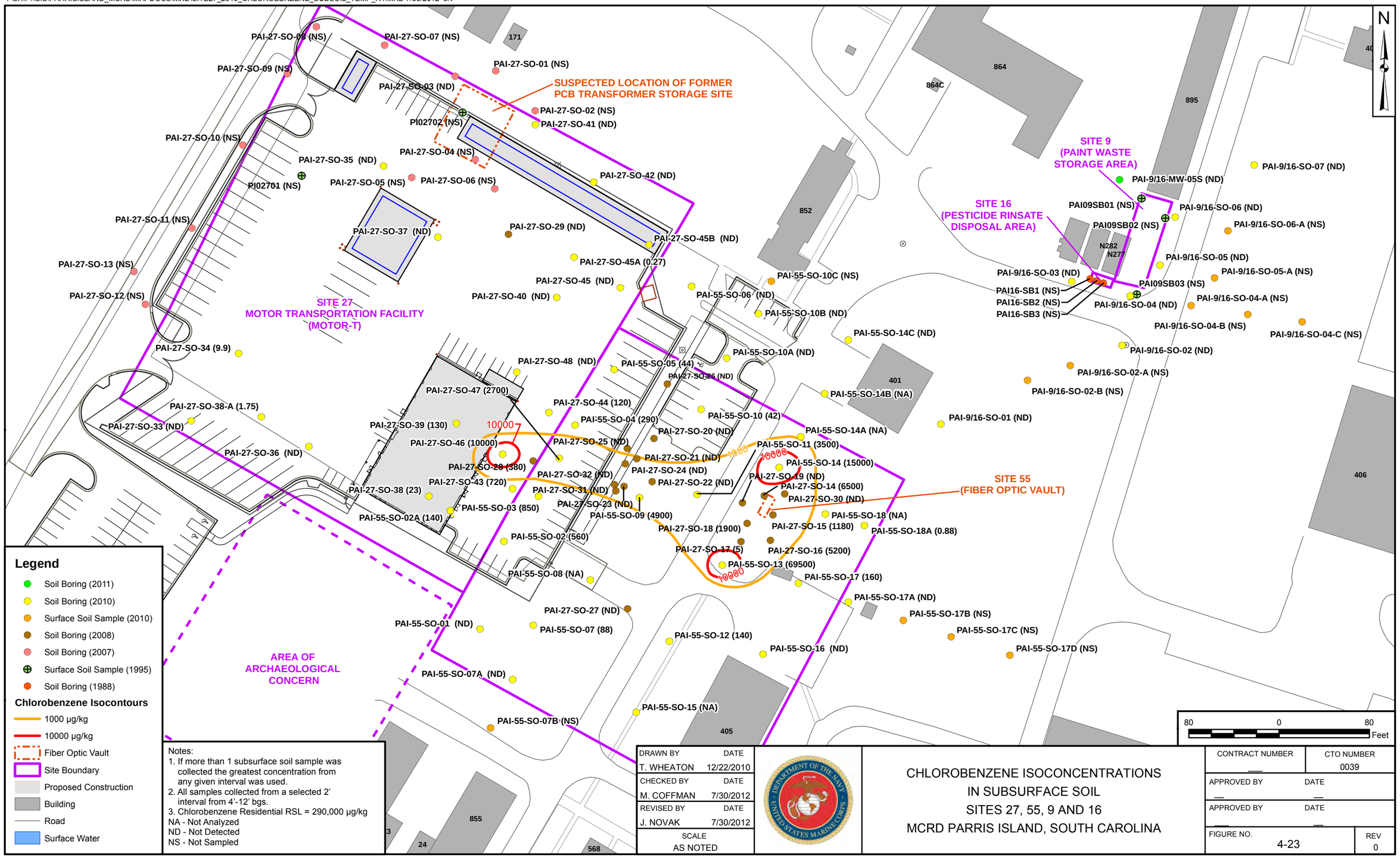


DRAWN BY	DATE
T. WHEATON	12/22/10
CHECKED BY	DATE
M. COFFMAN	7/23/2012
REVISED BY	DATE
J. NOVAK	7/20/2012
SCALE	
AS NOTED	

TOTAL BHC ISOCONCENTRATIONS
IN SURFACE SOIL
SITES 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
—	0039
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO. 4-22	REV 0

PGH:P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_CHLOROBENZENE_SUBSOIL_TEMP_R1.MXD 7/30/2012 JN



Legend

- Soil Boring (2011)
- Soil Boring (2010)
- Surface Soil Sample (2010)
- Soil Boring (2008)
- Soil Boring (2007)
- Surface Soil Sample (1995)
- Soil Boring (1988)

Chlorobenzene Isocontours

- 1000 µg/kg
- 10000 µg/kg
- Fiber Optic Vault
- Site Boundary
- Proposed Construction
- Building
- Road
- Surface Water

Notes:
1. If more than 1 subsurface soil sample was collected the greatest concentration from any given interval was used.
2. All samples collected from a selected 2' interval from 4'-12' bgs.
3. Chlorobenzene Residential RSL = 290,000 µg/kg

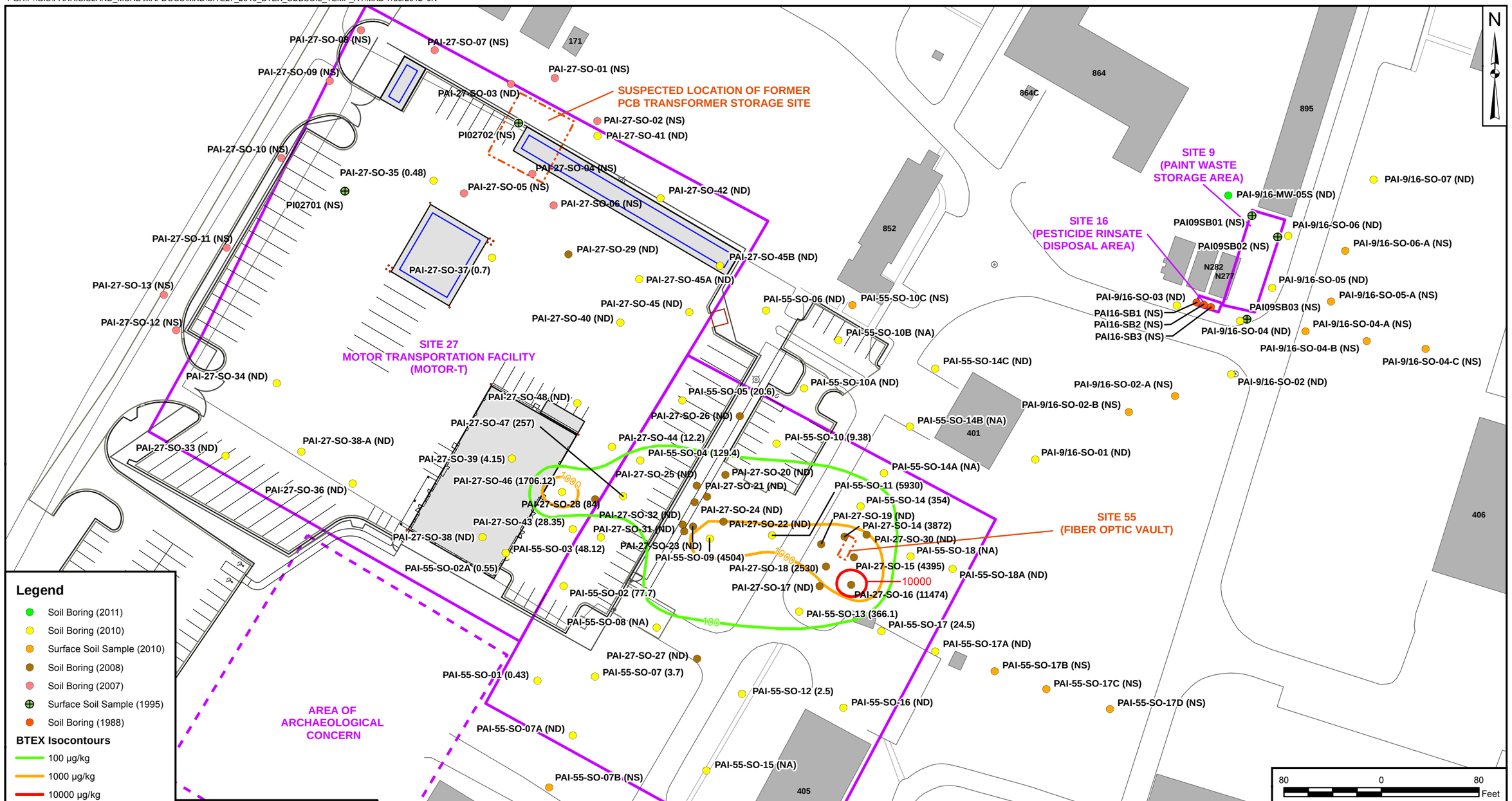
NA - Not Analyzed
ND - Not Detected
NS - Not Sampled

DRAWN BY	DATE
T. WHEATON	12/22/2010
CHECKED BY	DATE
M. COFFMAN	7/30/2012
REVISED BY	DATE
J. NOVAK	7/30/2012
SCALE	
AS NOTED	

CHLOROBENZENE ISOCONCENTRATIONS
IN SUBSURFACE SOIL
SITES 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
—	0039
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
4-23	0

PGH:P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_BTEX_SUBSOIL_TEMP_R1.MXD 7/30/2012 JN



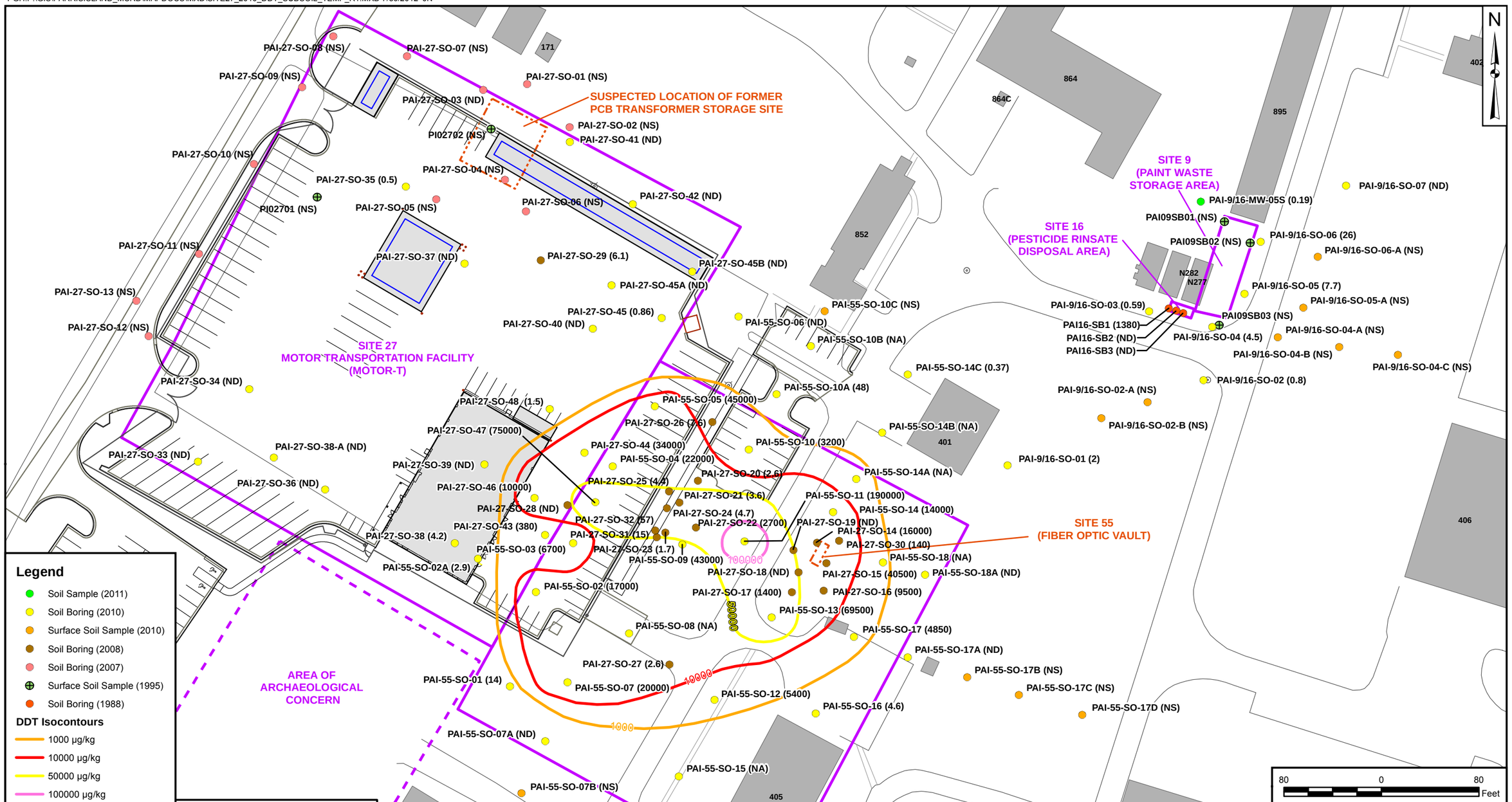
Notes:
1. If more than 1 subsurface soil sample was collected the greatest concentration from any given interval was used.
2. All samples collected from a selected 2' interval from 4'-12' bgs.
3. Benzne Residential RSL = 1,100 µg/kg
NA - Not Analyzed
ND - Not Detected
NS - Not Sampled

DRAWN BY	DATE
T. WHEATON	2/02/2011
CHECKED BY	DATE
M. COFFMAN	7/30/2012
REVISED BY	DATE
J. NOVAK	7/30/2012
SCALE	
AS NOTED	

TOTAL BTEX ISOCONCENTRATION
IN SUBSURFACE SOIL
SITES 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
—	0039
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO. 4-24	REV 0

PGH:P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_DDT_SUBSOIL_TEMP_R1.MXD 7/30/2012 JN



Legend

- Soil Sample (2011)
- Soil Boring (2010)
- Surface Soil Sample (2010)
- Soil Boring (2008)
- Soil Boring (2007)
- Surface Soil Sample (1995)
- Soil Boring (1988)

DDT Isocontours

- 1000 µg/kg
- 10000 µg/kg
- 50000 µg/kg
- 100000 µg/kg
- Fiber Optic Vault
- Site Boundary
- Proposed Construction
- Building
- Road
- Surface Water

Notes:
1. If more than 1 subsurface soil sample was collected the greatest concentration from any given interval was used.
2. All samples collected from a selected 2' interval from 4'-12' bgs.
3. 4'4 - DDT Residential RSL = 1,700 µg/kg

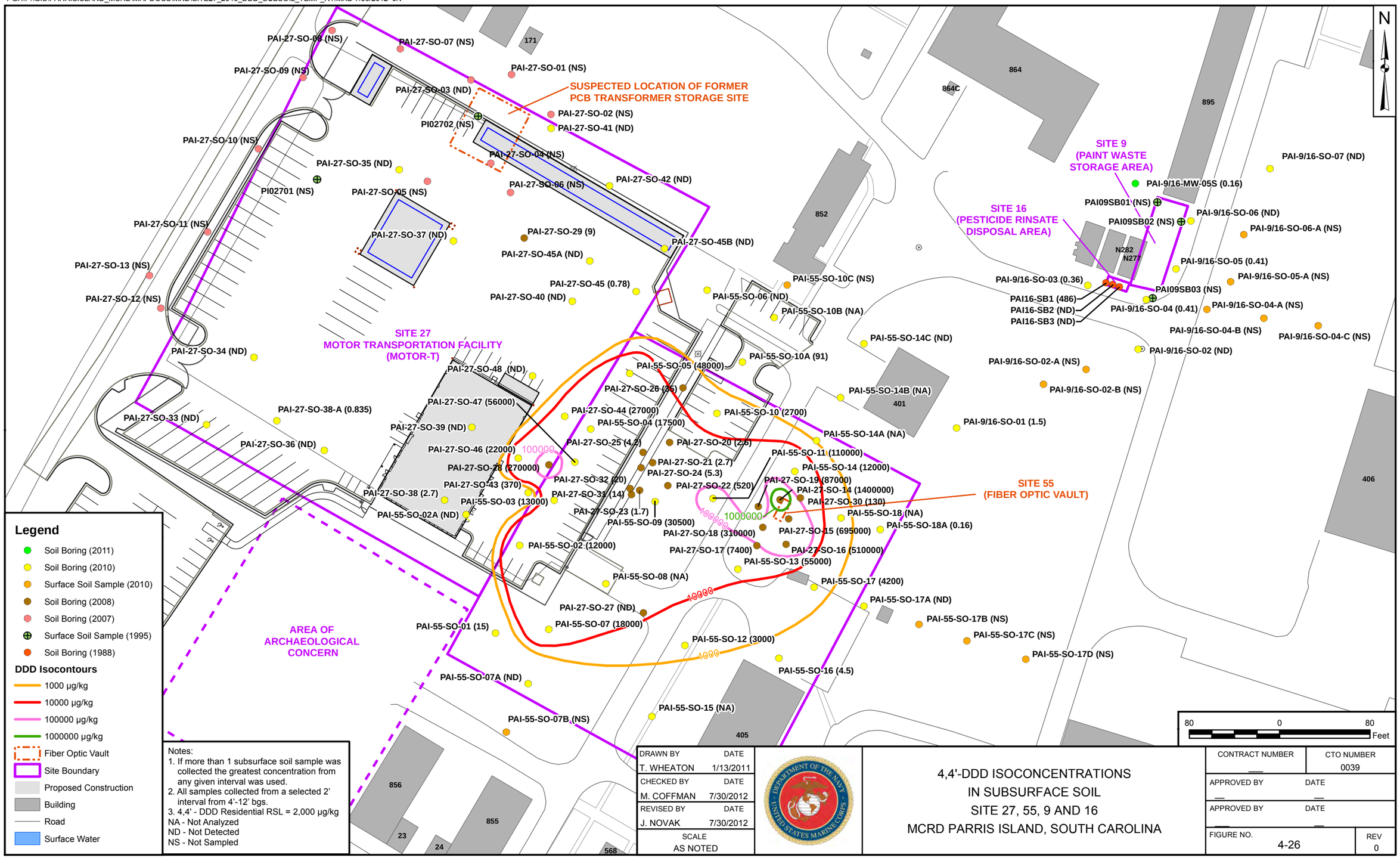
NA - Not Analyzed
ND - Not Detected
NS - Not Sampled

DRAWN BY T. WHEATON	DATE 12/21/2010
CHECKED BY M. COFFMAN	DATE 7/30/2012
REVISED BY J. NOVAK	DATE 7/30/2012
SCALE AS NOTED	

4,4'- DDT ISOCONCENTRATIONS
IN SUBSURFACE SOIL
SITES 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER —	CTO NUMBER 0039
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. 4-25	REV 0

PGH:P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_DDD_SUBSOIL_TEMP_R1.MXD 7/30/2012 JN



Legend

- Soil Boring (2011)
- Soil Boring (2010)
- Surface Soil Sample (2010)
- Soil Boring (2008)
- Soil Boring (2007)
- Surface Soil Sample (1995)
- Soil Boring (1988)

DDD Isocontours

- 1000 µg/kg
- 10000 µg/kg
- 100000 µg/kg
- 1000000 µg/kg
- Fiber Optic Vault
- Site Boundary
- Proposed Construction
- Building
- Road
- Surface Water

Notes:
1. If more than 1 subsurface soil sample was collected the greatest concentration from any given interval was used.
2. All samples collected from a selected 2' interval from 4'-12' bgs.
3. 4,4' - DDD Residential RSL = 2,000 µg/kg

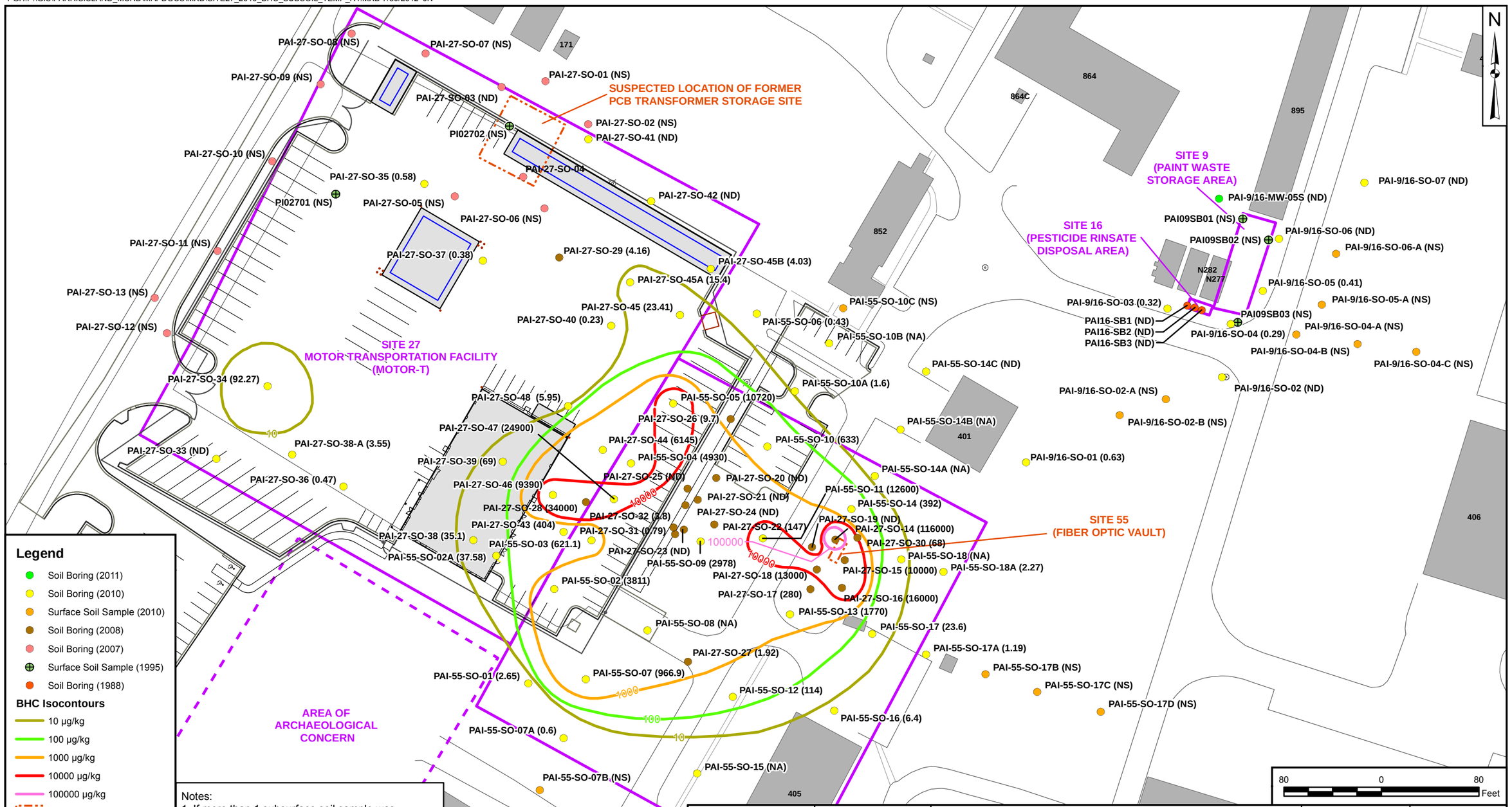
NA - Not Analyzed
ND - Not Detected
NS - Not Sampled

DRAWN BY	DATE
T. WHEATON	1/13/2011
CHECKED BY	DATE
M. COFFMAN	7/30/2012
REVISED BY	DATE
J. NOVAK	7/30/2012
SCALE	
AS NOTED	

4,4'-DDD ISOCONCENTRATIONS
IN SUBSURFACE SOIL
SITE 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
—	0039
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO. 4-26	REV 0

PGH:P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_BHC_SUBSOIL_TEMP_R1.MXD 7/30/2012 JN



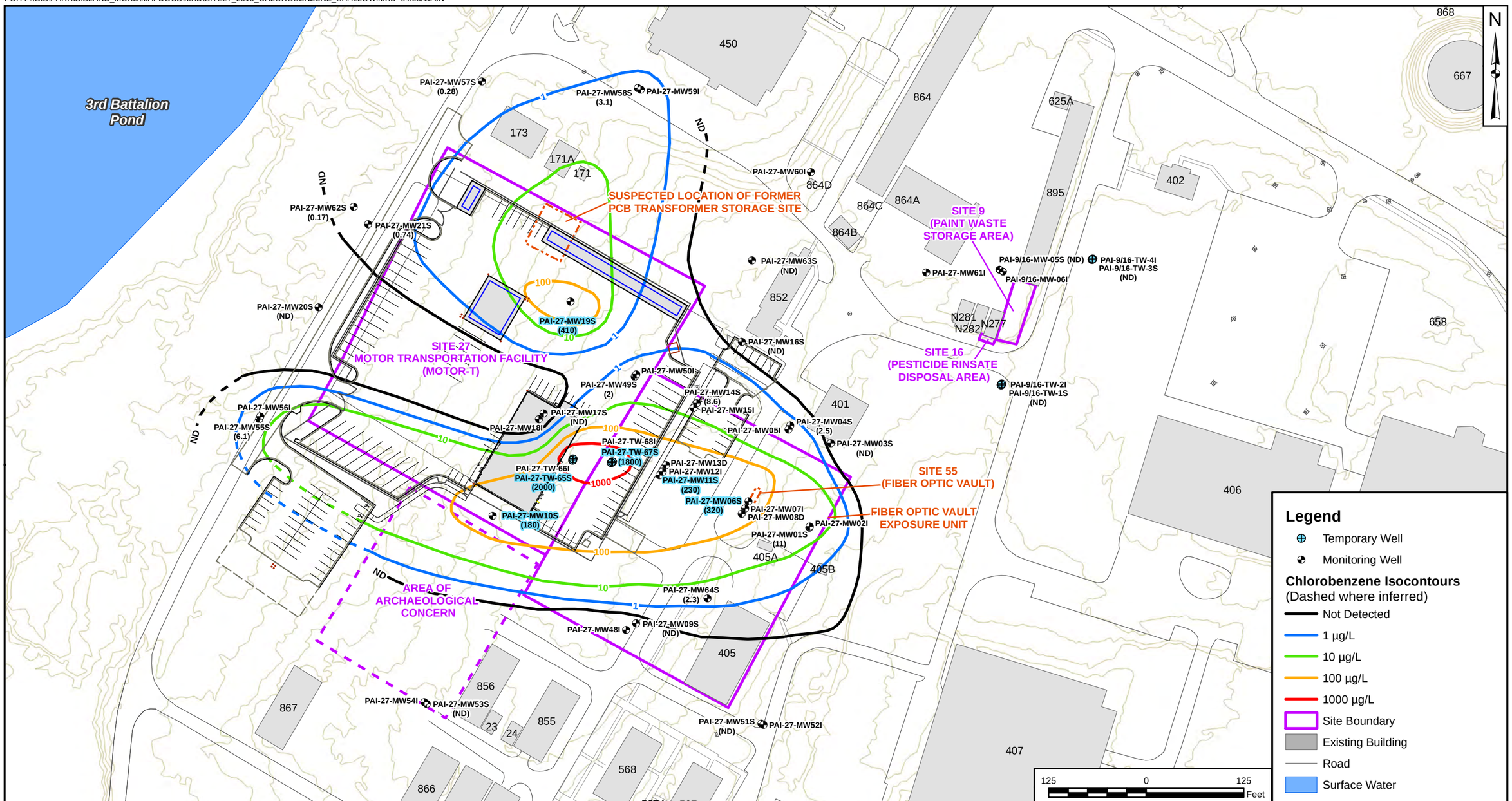
Notes:
1. If more than 1 subsurface soil sample was collected the greatest concentration from any given interval was used.
2. All samples collected from a selected 2' interval from 4'-12' bgs.
3. Alpha and Delta - BHC Residential RSL = 77 µg/kg
NA - Not Analyzed
ND - Not Detected
NS - Not Sampled

DRAWN BY	DATE
T. WHEATON	12/22/2010
CHECKED BY	DATE
M. COFFMAN	7/30/2012
REVISED BY	DATE
J. NOVAK	7/30/2012
SCALE	
AS NOTED	

TOTAL BHC ISOCONCENTRATIONS
IN SUBSURFACE SOIL
SITES 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
—	0039
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
4-27	0

PGH P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_CHLOROBENZENE_SHALLOW.MXD 04/25/12 JN



Note: Highlighted samples represent exceedance of the screening criteria

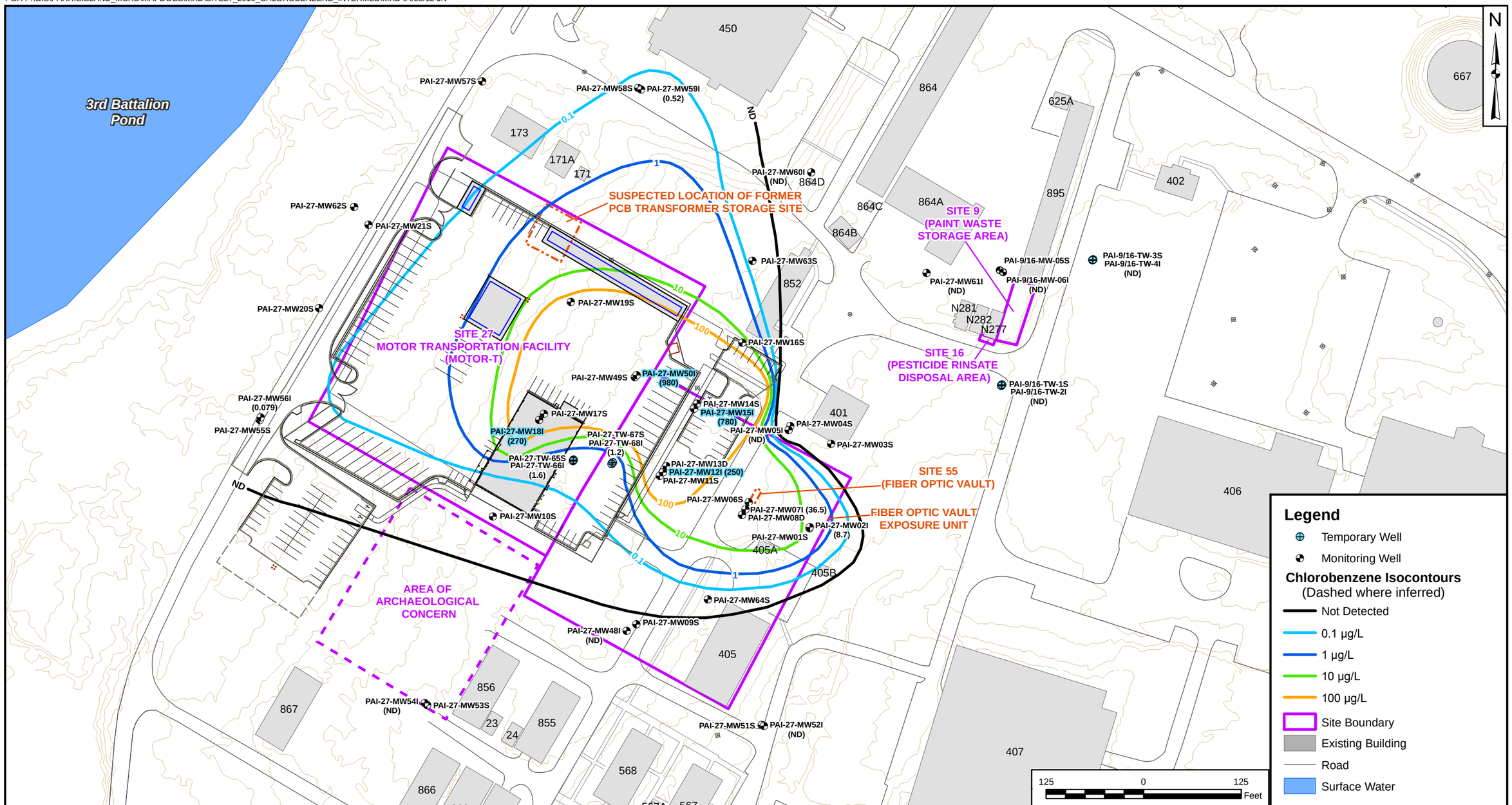
PARAMETER	UNITS	USEPA FEDERAL MCL	USEPA TAP WATER RSL
CHLOROBENZENE	UG/L	100	91

DRAWN BY	DATE
T. WHEATON	12/20/10
CHECKED BY	DATE
T. DECK	04/26/12
REVISED BY	DATE
J. NOVAK	04/25/12
SCALE	
AS NOTED	

CHLOROBENZENE ISOCONCENTRATIONS IN
SHALLOW GROUNDWATER - 2010
SITES 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 4-28	REV 0

PGH P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_CHLOROBENZENE_INTERMED.MXD 04/25/12 JN



Note: Highlighted samples represent exceedance of the screening criteria

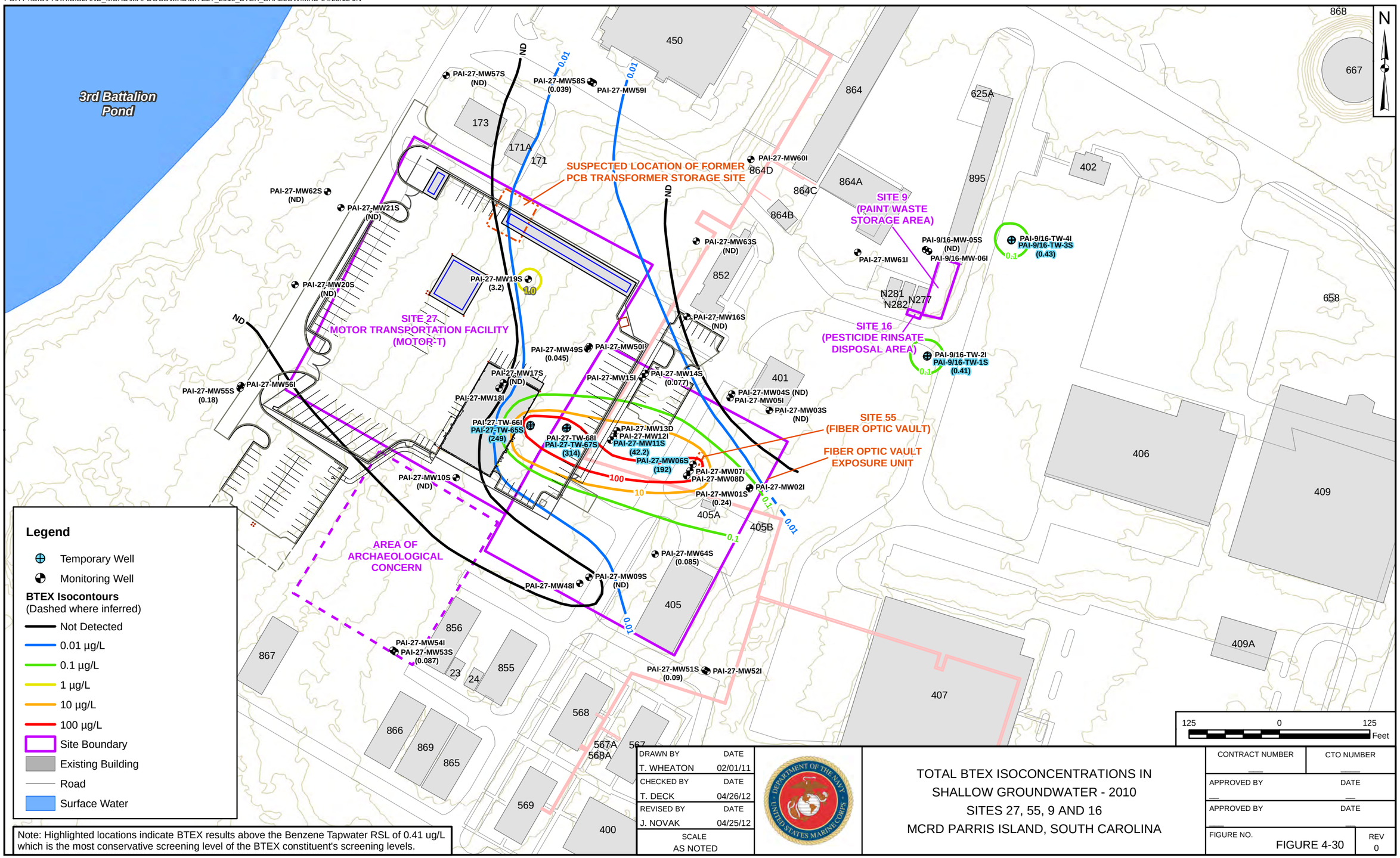
PARAMETER	UNITS	USEPA FEDERAL MCL	USEPA TAP WATER RSL
CHLOROBENZENE	UG/L	100	91

DRAWN BY	DATE
T. WHEATON	12/20/10
CHECKED BY	DATE
T. DECK	04/26/12
REVISED BY	DATE
J. NOVAK	04/25/12
SCALE	
AS NOTED	

CHLOROBENZENE ISOCONCENTRATIONS IN
INTERMEDIATE GROUNDWATER - 2010
SITES 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
—	0039
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO. FIGURE 4-29	REV 0

PGH P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_BTEX_SHALLOW.MXD 04/25/12 JN



Legend

- Temporary Well
- Monitoring Well

BTEX Isocontours
(Dashed where inferred)

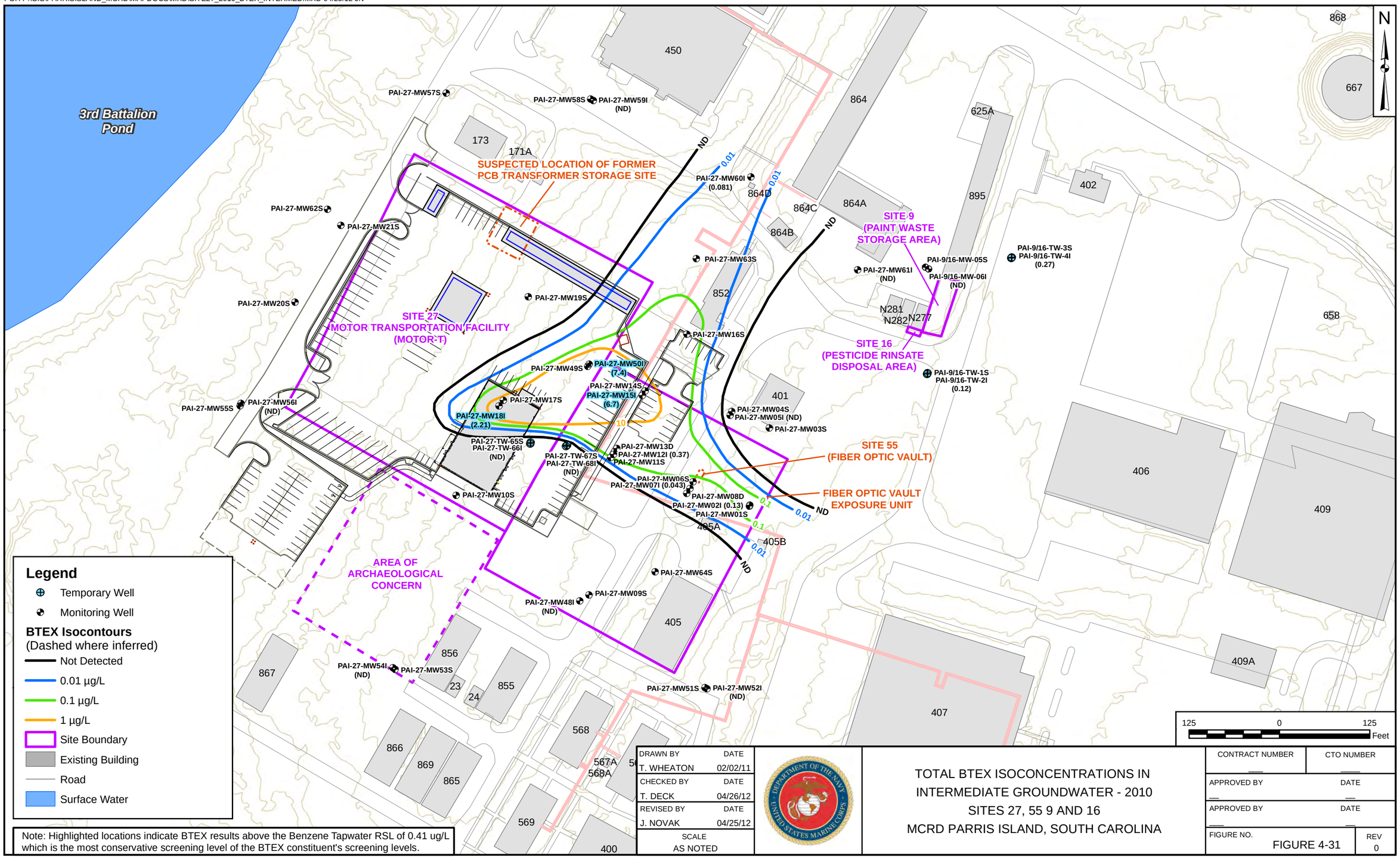
- Not Detected
- 0.01 µg/L
- 0.1 µg/L
- 1 µg/L
- 10 µg/L
- 100 µg/L
- Site Boundary
- Existing Building
- Road
- Surface Water

Note: Highlighted locations indicate BTEX results above the Benzene Tapwater RSL of 0.41 ug/L which is the most conservative screening level of the BTEX constituent's screening levels.

DRAWN BY	DATE	CONTRACT NUMBER	CTO NUMBER
T. WHEATON	02/01/11		
CHECKED BY	DATE	APPROVED BY	DATE
T. DECK	04/26/12		
REVISED BY	DATE	APPROVED BY	DATE
J. NOVAK	04/25/12		
SCALE		FIGURE NO.	REV
AS NOTED		FIGURE 4-30	0

TOTAL BTEX ISOCONCENTRATIONS IN
SHALLOW GROUNDWATER - 2010
SITES 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

PGH P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_BTEX_INTERMED.MXD 04/25/12 JN



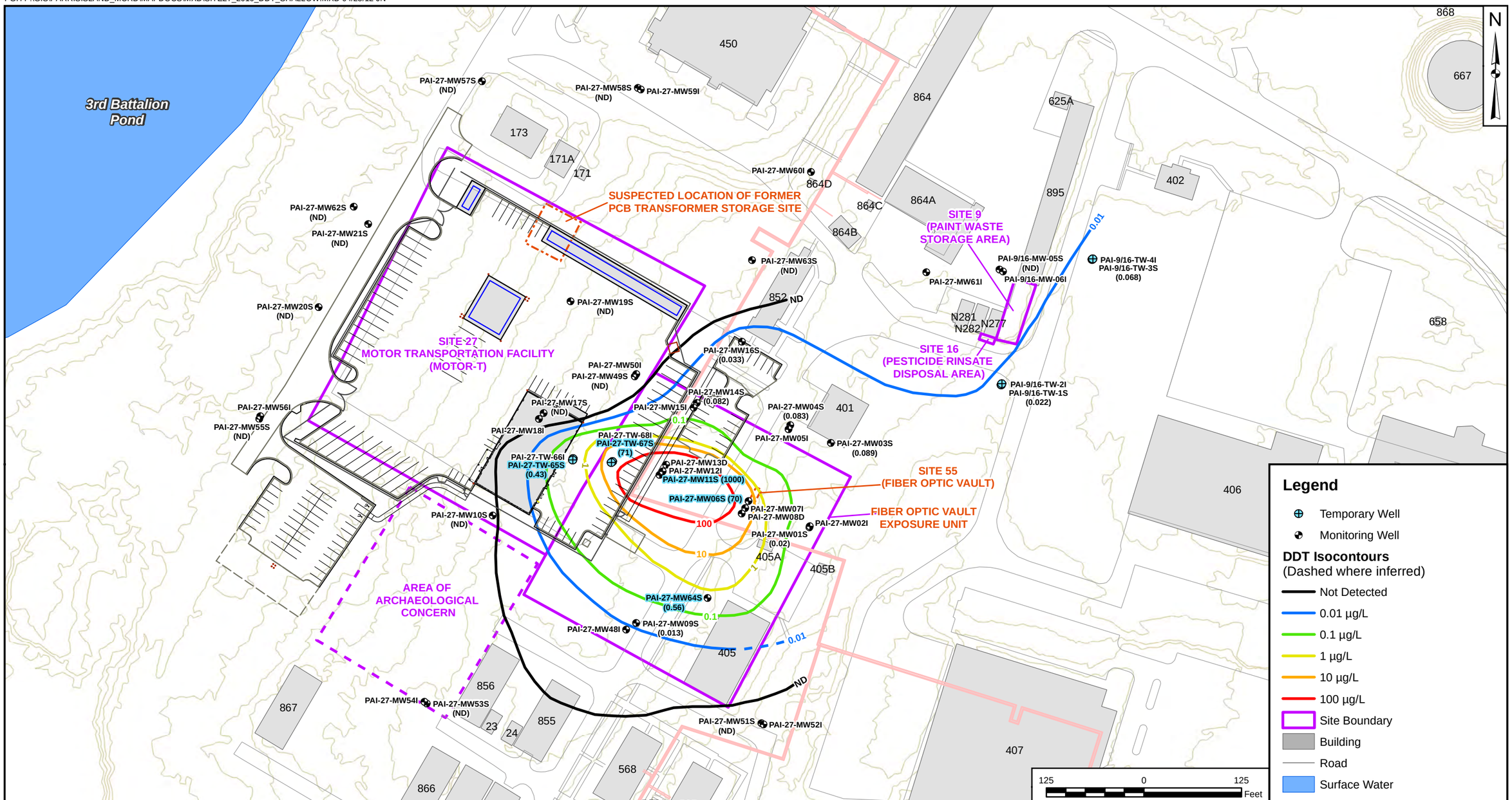
Note: Highlighted locations indicate BTEX results above the Benzene Tapwater RSL of 0.41 ug/L which is the most conservative screening level of the BTEX constituent's screening levels.

DRAWN BY T. WHEATON	DATE 02/02/11
CHECKED BY T. DECK	DATE 04/26/12
REVISED BY J. NOVAK	DATE 04/25/12
SCALE AS NOTED	

TOTAL BTEX ISOCONCENTRATIONS IN INTERMEDIATE GROUNDWATER - 2010
SITES 27, 55 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 4-31	REV 0

PGH P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_DDT_SHALLOW.MXD 04/25/12 JN



Note: Highlighted samples represent exceedance of the screening criteria

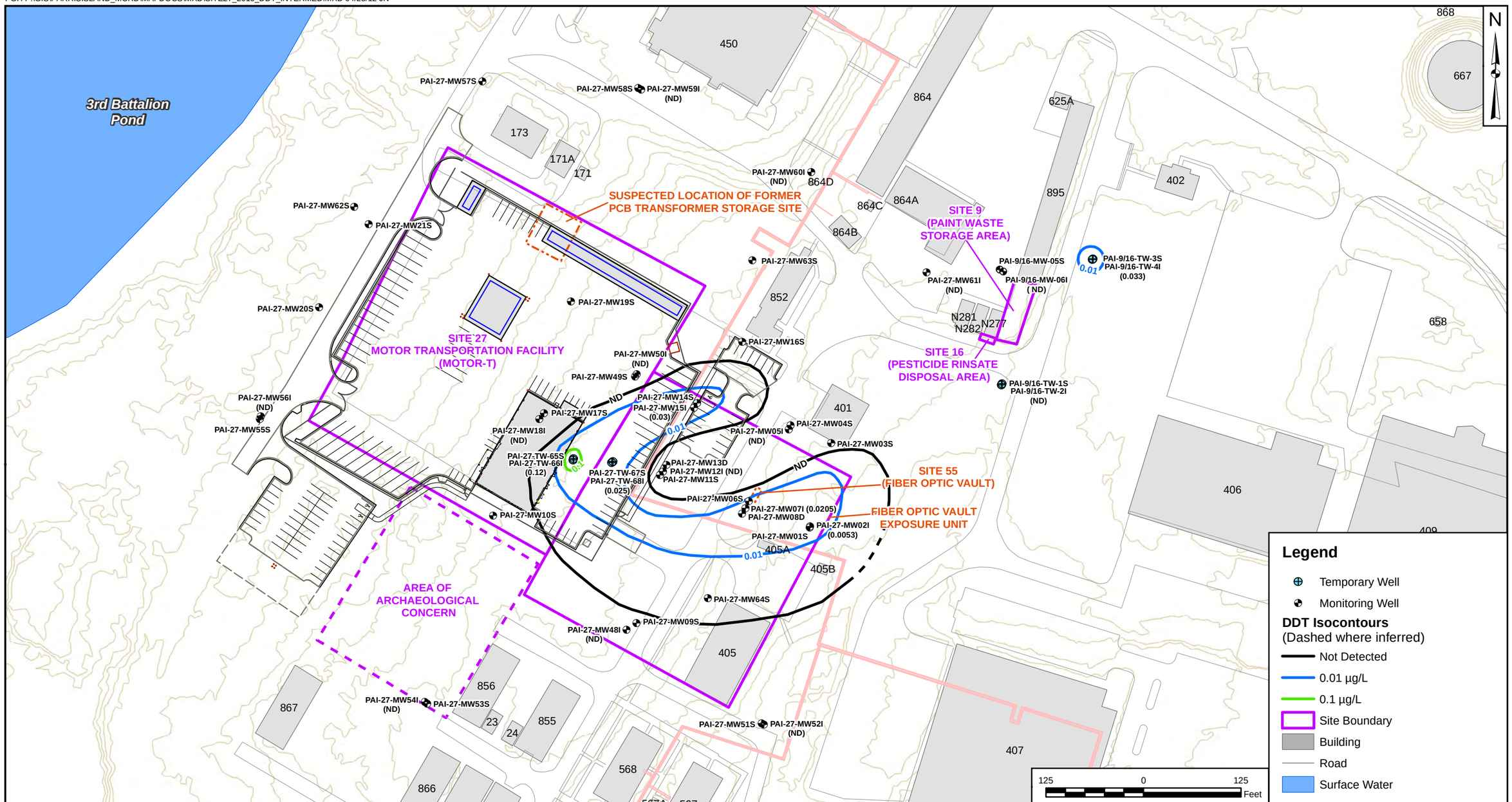
PARAMETER	UNITS	USEPA FEDERAL MCL	USEPA TAPWATER RSL
4,4'-DDT	UG/L	NC	0.2

DRAWN BY	DATE
T. WHEATON	12/21/10
CHECKED BY	DATE
T. DECK	04/26/12
REVISED BY	DATE
J. NOVAK	04/25/12
SCALE	
AS NOTED	

4,4'-DDT ISOCONCENTRATIONS IN
SHALLOW GROUNDWATER - 2010
SITES 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
—	0039
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 4-32	0

PGH P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_DDT_INTERMED.MXD 04/25/12 JN



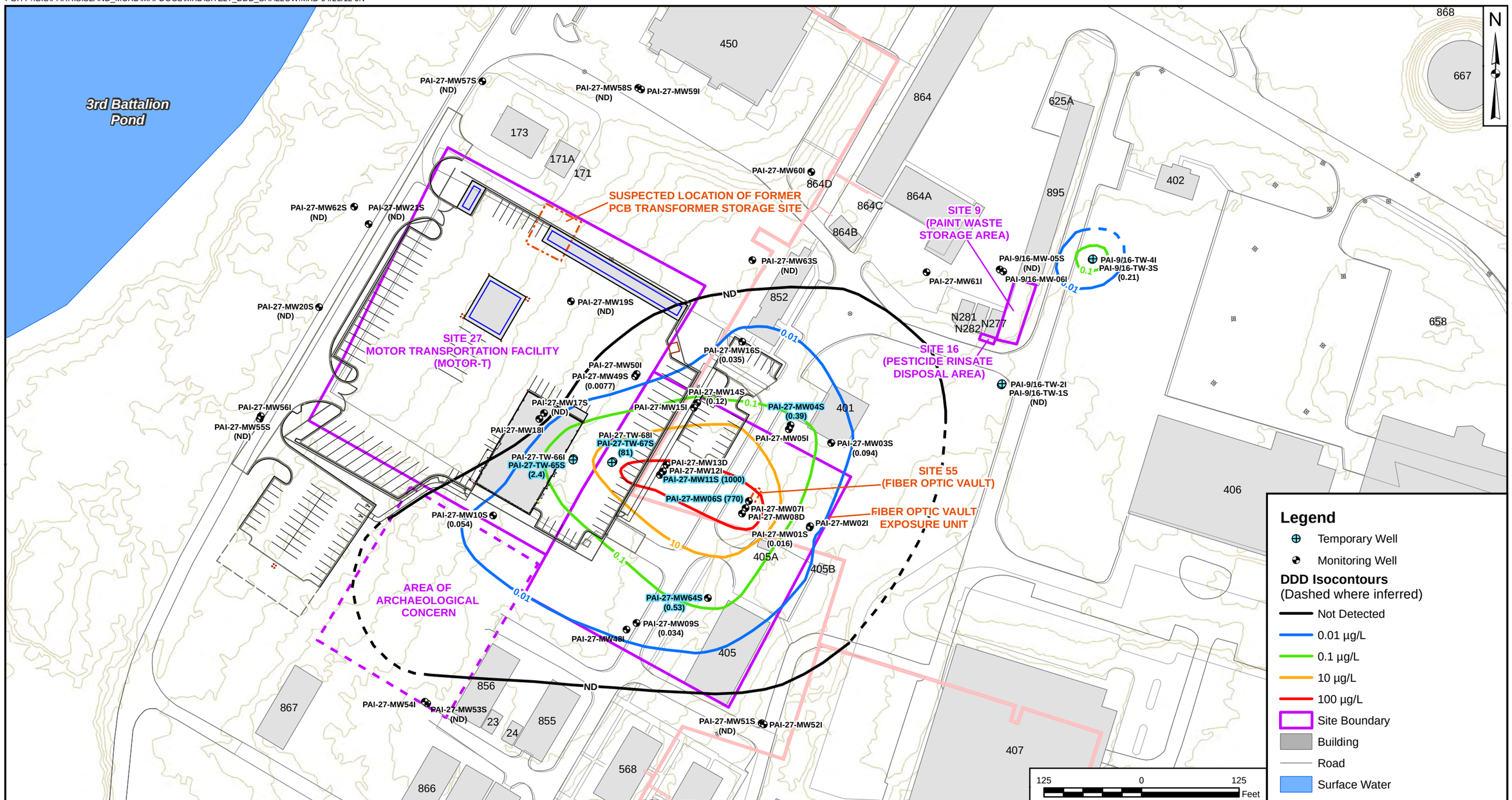
PARAMETER	UNITS	USEPA FEDERAL MCL	USEPA TAPWATER RSL
4,4'-DDT	UG/L	NC	0.2

DRAWN BY	DATE
T. WHEATON	12/21/10
CHECKED BY	DATE
T. DECK	04/26/12
REVISED BY	DATE
J. NOVAK	04/25/12
SCALE	
AS NOTED	

4,4'-DDT ISOCONCENTRATIONS IN INTERMEDIATE GROUNDWATER - 2010
SITES 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 4-33	REV 0

PGH P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_DDD_SHALLOW.MXD 04/25/12 JN



Note: Highlighted samples represent exceedance of the screening criteria

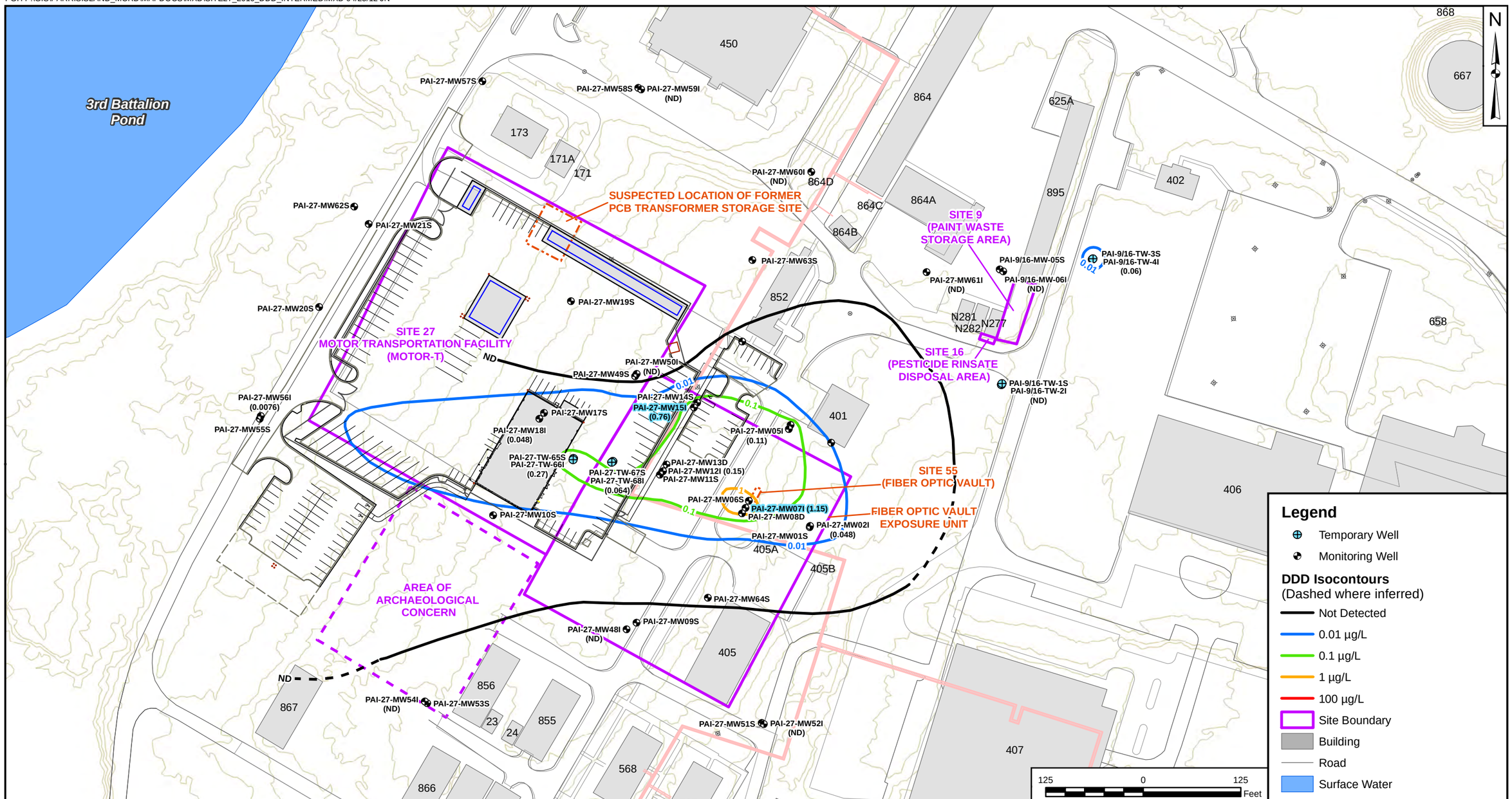
PARAMETER	UNITS	USEPA FEDERAL MCL	USEPA TAP WATER RSL
4,4'-DDD	UG/L	NC	0.28

DRAWN BY T. WHEATON	DATE 01/13/11
CHECKED BY T. DECK	DATE 04/26/12
REVISED BY J. NOVAK	DATE 04/25/12
SCALE AS NOTED	

4,4'-DDD ISOCONCENTRATIONS IN
SHALLOW GROUNDWATER - 2010
SITES 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER ___	CTO NUMBER 0039
APPROVED BY ___	DATE ___
APPROVED BY ___	DATE ___
FIGURE NO. FIGURE 4-34	REV 0

PGH P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_DDD_INTERMED.MXD 04/25/12 JN



Legend

- Temporary Well
- Monitoring Well

DDD Isocontours
(Dashed where inferred)

- Not Detected
- 0.01 µg/L
- 0.1 µg/L
- 1 µg/L
- 100 µg/L
- Site Boundary
- Building
- Road
- Surface Water

Note: Highlighted samples represent exceedance of the screening criteria

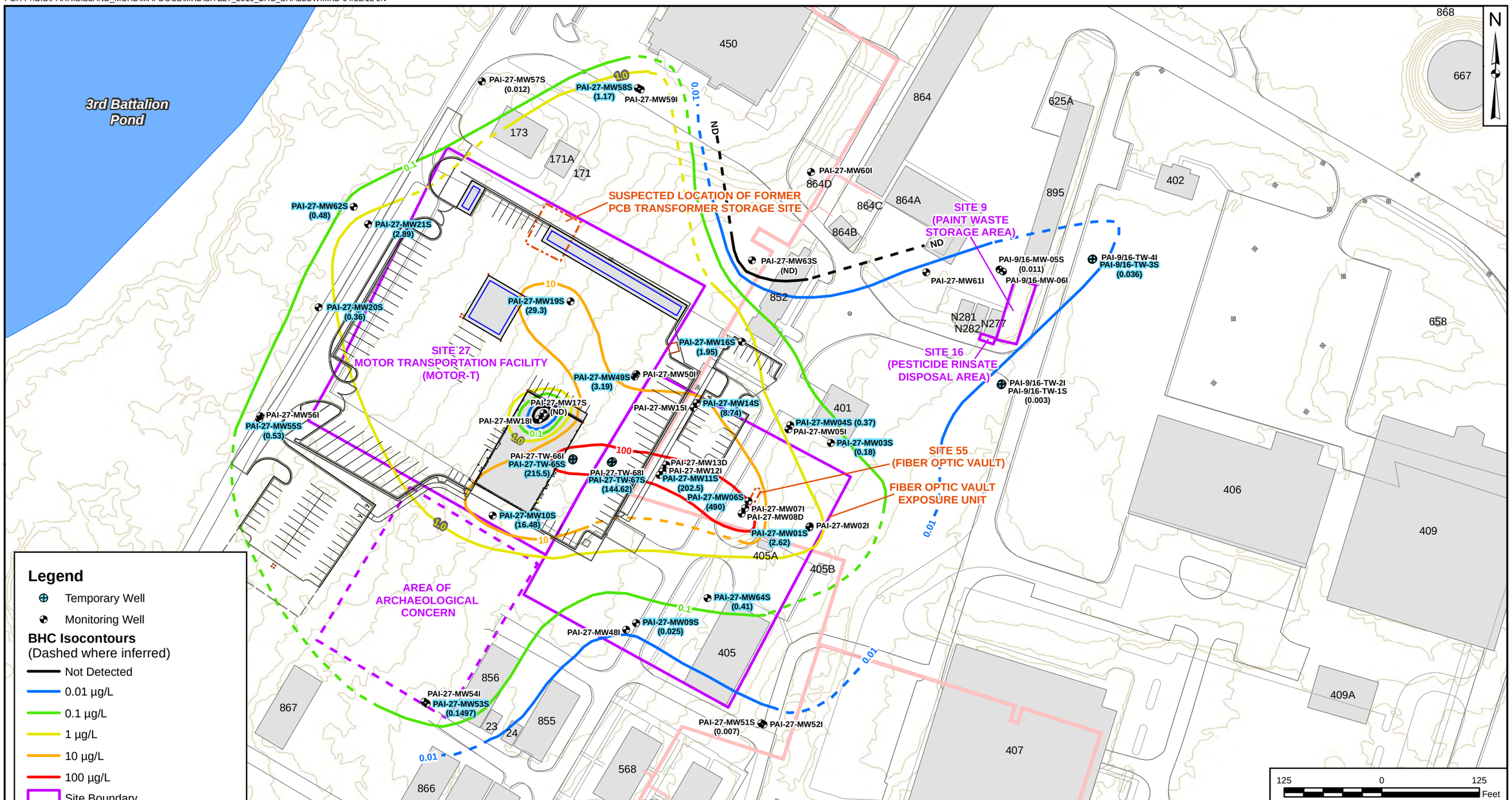
PARAMETER	UNITS	USEPA FEDERAL MCL	USEPA TAP WATER RSL
4,4'-DDD	UG/L	NC	0.28

DRAWN BY	DATE
T. WHEATON	01/13/11
CHECKED BY	DATE
T. DECK	04/26/12
REVISED BY	DATE
J. NOVAK	04/25/12
SCALE	
AS NOTED	

4,4'-DDD ISOCONCENTRATIONS IN
INTERMEDIATE GROUNDWATER - 2010
SITES 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
___	0039
APPROVED BY	DATE
___	___
APPROVED BY	DATE
___	___
FIGURE NO. FIGURE 4-35	REV 0

PGH P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_BHC_SHALLOW.MXD 04/25/12 JN



Legend

- Temporary Well
- Monitoring Well

BHC Isocontours
(Dashed where inferred)

- Not Detected
- 0.01 µg/L
- 0.1 µg/L
- 1 µg/L
- 10 µg/L
- 100 µg/L
- Site Boundary
- Building
- Road
- Surface Water

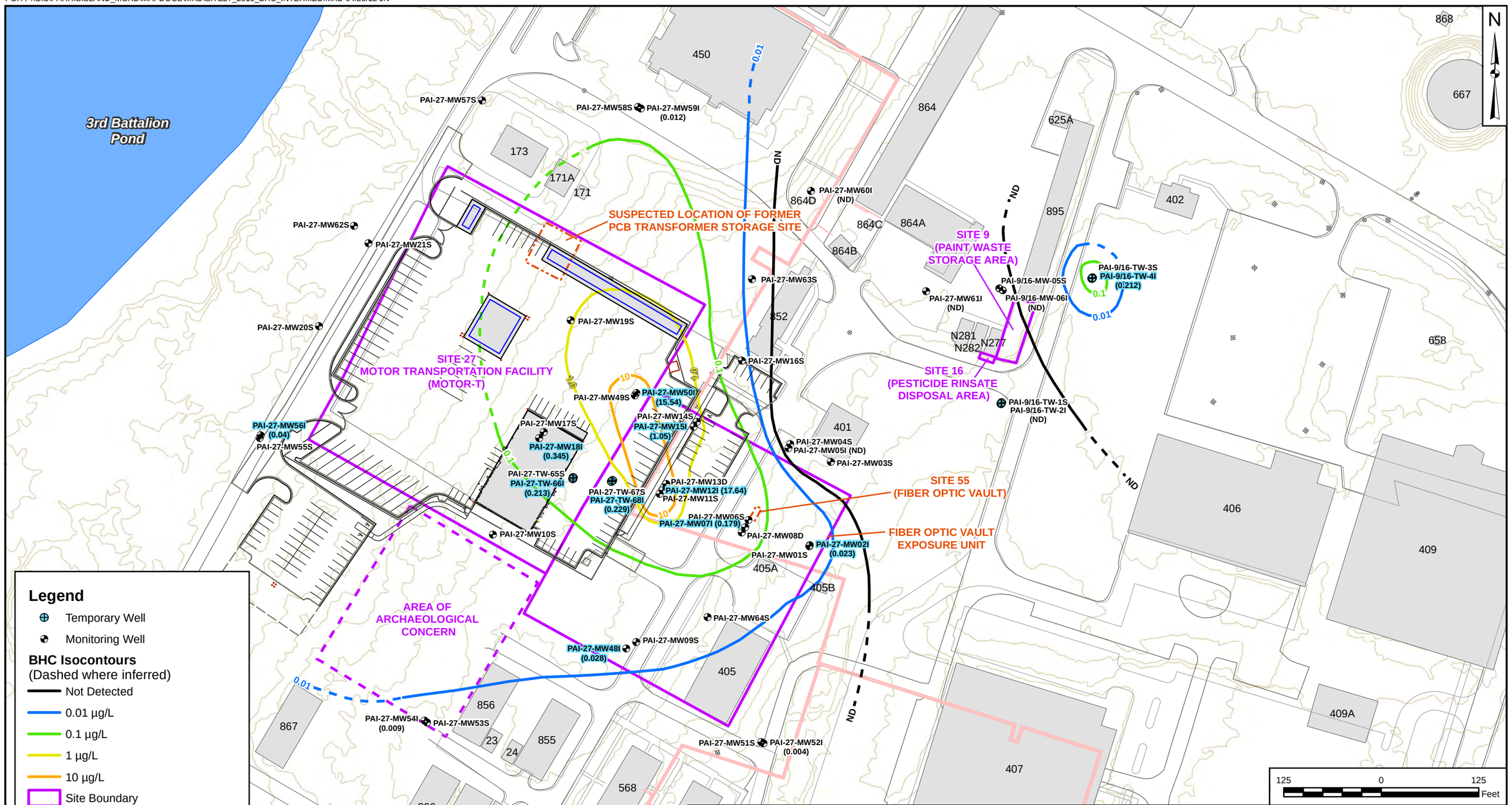
Note: Highlighted locations represent Total BHC concentrations above the Technical BHC Tapwater RSL of 0.022 ug/L

DRAWN BY T. WHEATON	DATE 01/12/11
CHECKED BY T. DECK	DATE 04/26/12
REVISED BY J. NOVAK	DATE 04/25/12
SCALE AS NOTED	

TOTAL BHC ISOCONCENTRATIONS IN
SHALLOW GROUNDWATER - 2010
SITES 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 4-36	REV 0

PGH P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_2010_BHC_INTERMED.MXD 04/25/12 JN



Note: Highlighted locations represent Total BHC concentrations above the Technical BHC Tapwater RSL of 0.022 ug/L

DRAWN BY	DATE
T. WHEATON	12/21/10
CHECKED BY	DATE
T. DECK	04/26/12
REVISED BY	DATE
J. NOVAK	04/25/12
SCALE	
AS NOTED	

TOTAL BHC ISOCONCENTRATIONS IN
INTERMEDIATE GROUNDWATER - 2010
SITES 27, 55, 9 AND 16
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 4-37	REV 0

P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_55_SOILS_LNAPL_2.MXD 06/29/11 SS

Legend

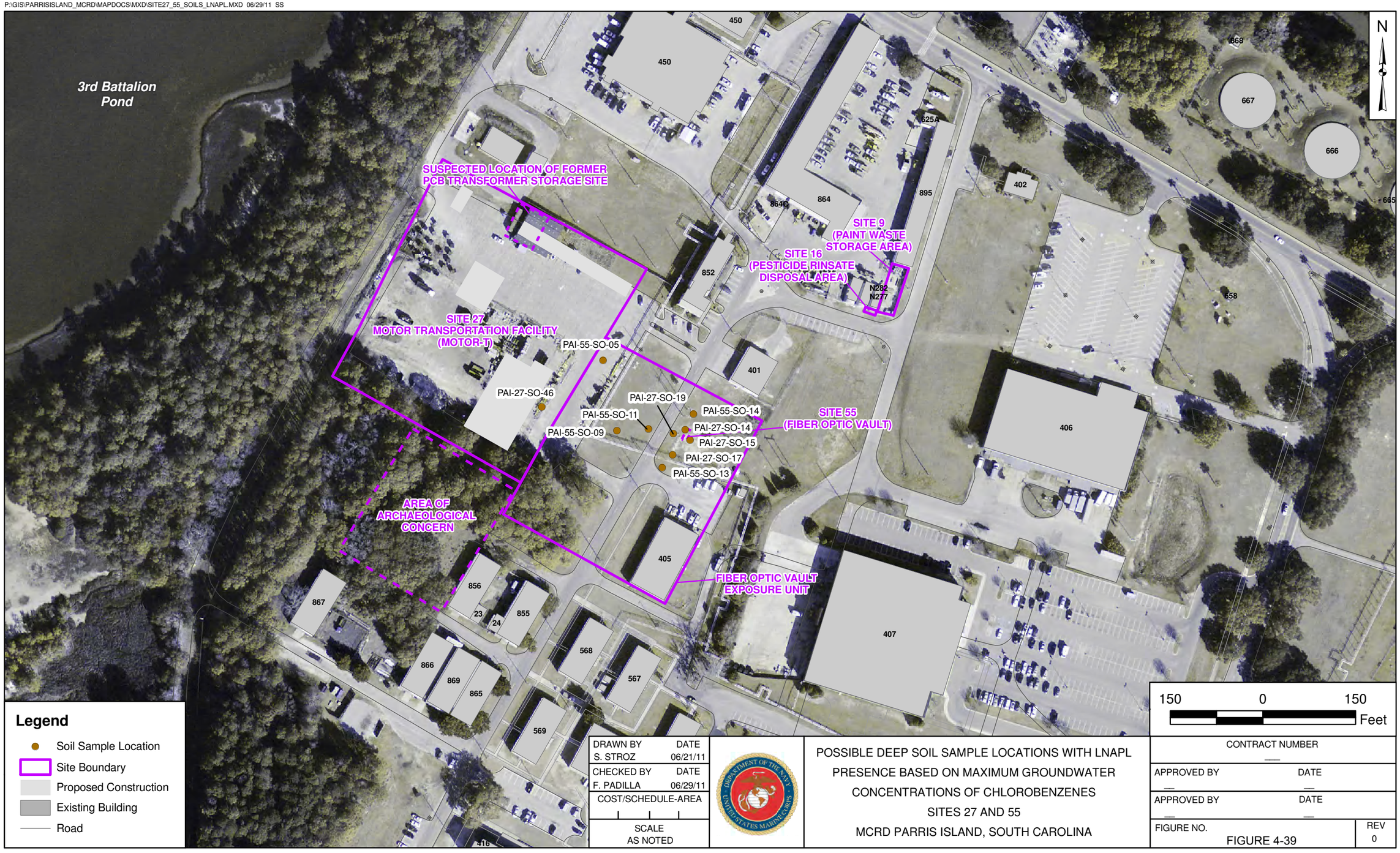
- Soil Sample Location
- Site Boundary
- Proposed Construction
- Existing Building
- Road

DRAWN BY S. STROZ	DATE 06/22/11
CHECKED BY M. PADILLA	DATE 06/29/11
COST/SCHEDULE-AREA	
SCALE AS NOTED	

POSSIBLE DEEP SOIL SAMPLE LOCATIONS WITH LNAPL PRESENCE BASED ON EFFECTIVE SOLUBILITIES OF CHLOROBENZENES
SITES 27 AND 55
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 4-38	REV 0

P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_55_SOILS_LNAPL.MXD 06/29/11 SS

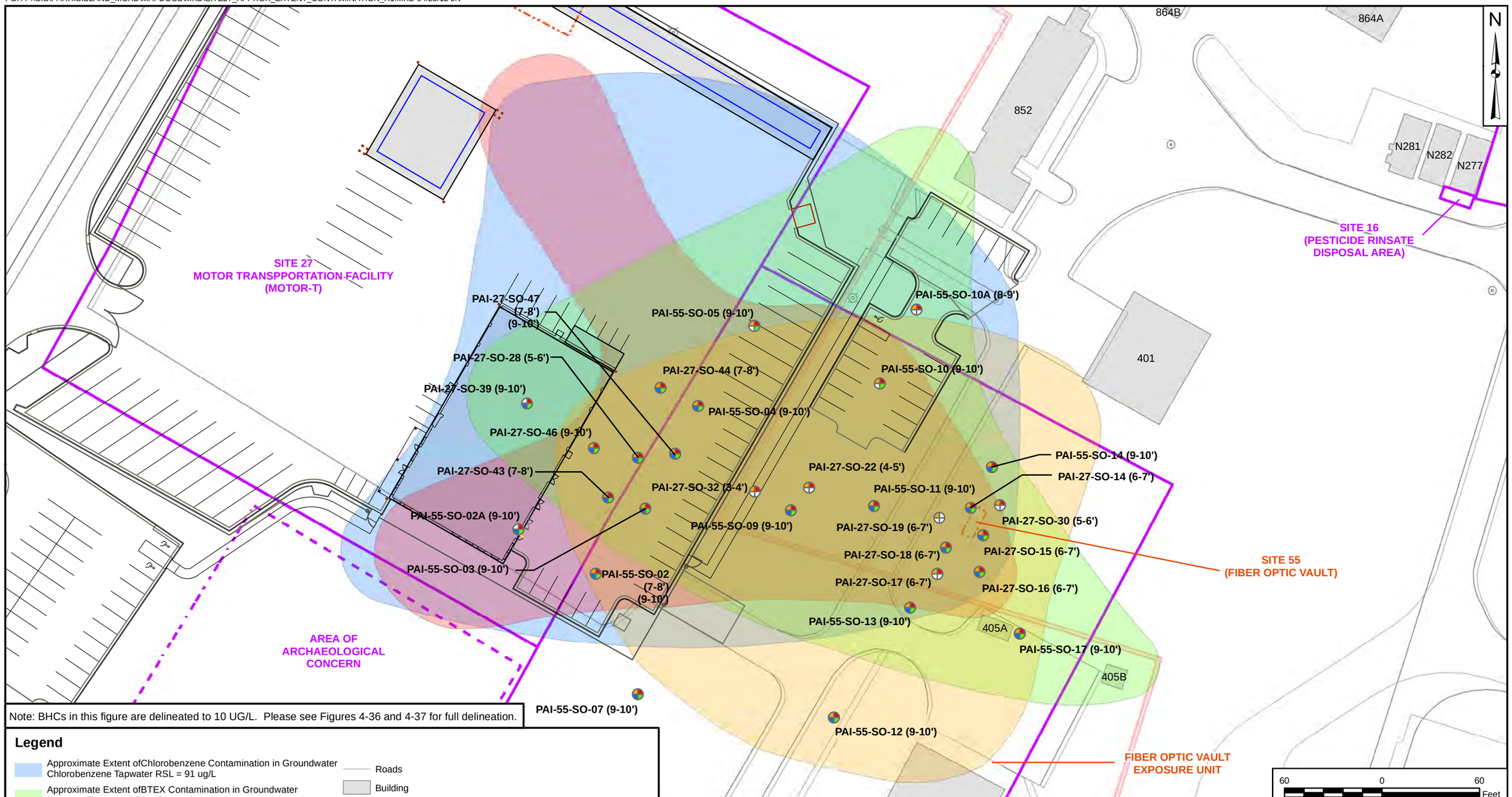


DRAWN BY S. STROZ	DATE 06/21/11
CHECKED BY F. PADILLA	DATE 06/29/11
COST/SCHEDULE-AREA	
SCALE AS NOTED	

POSSIBLE DEEP SOIL SAMPLE LOCATIONS WITH LNAPL PRESENCE BASED ON MAXIMUM GROUNDWATER CONCENTRATIONS OF CHLOROBENZENES
SITES 27 AND 55
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER ___	
APPROVED BY ___	DATE ___
APPROVED BY ___	DATE ___
FIGURE NO. FIGURE 4-39	REV 0

PGH P:\GIS\PARRISISLAND_MCRD\MAPDOCS\MXD\SITE27_APPROX_EXTENT_CONTAMINATION_R1.MXD 04/25/12 JN



Note: BHCs in this figure are delineated to 10 UG/L. Please see Figures 4-36 and 4-37 for full delineation.

Legend

- Approximate Extent ofChlorobenzene Contamination in Groundwater Chlorobenzene Tapwater RSL = 91 ug/L
- Approximate Extent ofBTEX Contamination in Groundwater Benzene Tapwater RSL = 0.41 ug/L
- Approximate Extent ofDDTs Contamination in Groundwater Total DDT Tapwater RSL = 0.2 ug/L
- Approximate Extent of BHC Contamination in Groundwater Technical BHC Tapwater RSL = 0.022 ug/L
- Fiber Optic Vault
- Site Boundary
- Aerial Steam Pipe
- Roads
- Building
- Area of Archaeological Concern
- Proposed Construction
- Sidewalk
- Runway
- Road

CHART KEY

DDTs BHCs Chlorobenzenes BTEX

Note: No Color if No Exceedance of Leachability Criteria or if No Presence of Residual LNAPL

DRAWN BY J. NOVAK	DATE 04/03/12
CHECKED BY T. DECK	DATE 04/26/12
REVISED BY J. NOVAK	DATE 04/25/12
SCALE AS NOTED	

SUBSURFACE SOIL LEACHABILITY CRITERIA
EVALUATION AND APPROXIMATE EXTENT
OF GROUNDWATER CONTAMINATION
SITES 27 AND 55
MCRD PARRIS ISLAND, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER 0039
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 4 - 40	REV 0

5.0 CHEMICAL FATE AND TRANSPORT ANALYSIS

Knowledge of a contaminant's potential to migrate and persist in an environmental medium is critical when evaluating the potential for a chemical to elicit an adverse human health or ecological effect. This section contains information on various aspects of contaminant fate and transport and the chemical properties affecting contaminant migration at MRCD Parris Island Sites 9, 16, 27, and Site 55. Section 5.1 contains a discussion of the various chemical and physical properties of significant contaminants detected in environmental media at Sites 9, 16, 27, and 55 and how they affect chemical migration and transport. Section 5.2 presents a brief discussion of chemical persistence.

5.1 CHEMICAL AND PHYSICAL PROPERTIES IMPACTING FATE AND TRANSPORT

Table 5-1 presents the physical and chemical properties of the organic compounds detected at Sites 9, 16, 27, and Site 55. Several classes of contaminants were detected in surface soil, subsurface soil, and groundwater at the site. These included chlorobenzenes, fuel related compounds (e.g., benzene and xylenes), PAHs, pesticides (namely BHCs and DDTs), dibenzofuran, and 1,1-biphenyl. The physical and chemical properties of interest include the following:

- Specific gravity
- Vapor pressure
- Water solubility
- Octanol/water partition coefficient (K_{ow})
- Organic carbon partition coefficient (K_{oc})
- Henry's Law constant
- Mobility index

Empirically determined values of water solubility, K_{ow}, K_{oc}, vapor pressure, Henry's Law constant, bioconcentration factor (BCF), and specific gravity from the scientific literature are presented in Table 5-1, when available. A discussion of the environmental significance of each of these parameters follows.

5.1.1 <u>Specific Gravity</u>

Specific gravity is the ratio of the weight of a given volume of pure chemical at a specified temperature to the weight of the same volume of water at a given temperature. Its primary use is to determine whether a chemical will have a tendency to float or sink in water if it is present as a pure chemical or at very high concentrations. Chemicals with a specific gravity greater than one will tend to sink, and chemicals with a specific gravity less than one will tend to float.

Specific gravities of detected chemicals have relevance for Sites 9, 16, 27, and Site 55 because of the floating product discovered in monitoring well samples collected at Site 55 in 2008 and 2010. Of the chemicals detected at Sites 9, 16, 27, and Site 55, VOCs (i.e., benzene, ethylbenzene, and xylenes) have a specific gravity less than one (indicating that they would tend to float in water). However, chlorobenzenes, PAHs, pesticides, dibenzofuran, and 1,1-biphenyl, which generally have specific gravities greater than one and would most likely sink in water, have been detected in the floating product at Site 27 and Site 55. In addition, these compounds have generally been detected at higher concentrations in the groundwater samples from the shallow monitoring wells than in the groundwater samples from the intermediate and deep monitoring wells. Therefore, at Sites 9, 16, 27, and Site 55, it appears that the characteristics of these compounds have been altered to some extent by being mixed with the VOCs in the floating product.

5.1.2 Vapor Pressure

Vapor pressure provides an indication of the rate at which a chemical volatilizes from both soil and water. It is of primary importance at environmental interfaces such as surface soil/air and surface water/air. Vapor pressures for VOCs are generally several orders of magnitude greater than vapor pressures for most PAHs and pesticides. Chemicals with higher vapor pressures are expected to enter the atmosphere much more readily than chemicals with lower vapor pressures. Volatilization is a significant loss process for VOCs in surface soil. The concentrations of VOCs detected in surface soil (chlorobenzene and xylenes) at Sites 9, 16, 27, and Site 55 are well below soil saturation concentrations and, therefore, volatilization from surface soil is not expected to be an important loss mechanism at the site in the future. The concentrations of VOCs in the surface soils are generally lower than the concentrations of SVOCs in subsurface soils, indicating that volatilization of these compounds from surface soils may have already occurred.

The concentrations of VOCs detected in groundwater at the site were well below screening criteria for vapor intrusion at most locations. However concentrations of benzene and chlorobenzene in groundwater at some locations (PAI-27-MW06S, PAI-27-MW-11S, PAI-27-MW12I, PAI-27-MW14S, and PAI-27-MW15I) exceeded the vapor intrusion screening levels indicating the potential for vapors from groundwater to affect indoor air quality if buildings were constructed in the immediate vicinity of the FOV (Site 55) in the future.

5.1.3 Water Solubility

The rate at which a chemical is leached from a waste deposit by infiltrating precipitation is proportional to its water solubility. More-soluble chemicals are more readily leached than less-soluble chemicals. The water solubilities presented in Table 5-1 indicate that VOCs are usually several orders of magnitude more water soluble than PAHs and pesticides. At Sites 27 and Site 55, concentrations greater than screening

levels of BTEX, chlorobenzenes, and pesticides were detected in the floating product, subsurface soil, and groundwater, indicating that there may be a relationship between the contamination in the floating product and in the subsurface soil and groundwater. Because the water solubilities of pesticides detected at Sites 9, 16, 27, and 55 (BHCs and DDTs) are very low, it is unlikely that leaching from subsurface soil to groundwater would account for the levels of pesticides found in groundwater. Because these compounds are more soluble in organic environments, it is more likely that these compounds have leached from the floating product and have subsequently been dispersed in the soil and groundwater as a result of the other compounds (VOCs) in the floating product increasing the solubilities of the pesticides. The solubilities of SVOCs detected in the floating product are even lower than the solubilities of pesticides, which may be the reason that SVOCs have not been detected in groundwater samples as widely as pesticides.

Studies have shown that the salinity of the water can also affect the solubility of chemicals. In general, the water solubility of non-polar organic chemicals decreases as salinity increases and the solubility of polar chemicals increases as salinity increases. The significance of this for Sites 9, 16, 27, and 55 is that the solubilities of the chemicals of interest in groundwater (i.e., BTEX, chlorobenzenes, PAHs, and pesticides) would decrease as salinity increases. Conversely, the Henry's Law constants of these chemicals would increase (because Henry's Law Constant ≈ Vapor Pressure/Solubility) and volatilization from water would, therefore, increase. The groundwater in the area of Sites 9, 16, 27, and 55 is not saline (as measured during the latest sampling round of groundwater sampling). Therefore, this effect of salinity on the solubility and vapor pressure would not be a factor until the contaminated groundwater entered a saline water body, such as the 3rd Battalion Pond.

5.1.4 Henry's Law Constant

Both vapor pressure and water solubility are useful in determining volatilization rates from groundwater. The ratio of these two parameters (Henry's Law constant) is used to calculate the equilibrium chemical concentrations in the vapor (air) phase versus the liquid (water) phase for the dilute solutions commonly encountered in environmental settings. In general, chemicals having a Henry's Law constant of less than 1×10^{-5} atm-m^3/mole, such as PAHs and dioxins/furans, should volatilize very little and be present only in minute amounts in the atmosphere or soil gas. For chemicals with a Henry's Law constant greater than 5×10^{-3} atm-m^3/mole (i.e., VOCs), volatilization and diffusion in soil gas could be significant. As indicated previously, volatilization from surface soil is not likely to be a concern for Sites 9, 16, 27, and 55. However, vapor intrusion from groundwater could be an issue at some locations (if buildings are constructed in these locations) because concentrations of several VOCs exceeded screening criteria for vapor intrusion. Note that the Henry's Law constants shown in Table 5-1 apply to chemicals dissolved in water at 20-25°C and cannot be used to predict the volatilization of chemicals in free product.

As discussed previously, variations of salinity in water (groundwater or surface water) could affect the values of the Henry's Law constants for site-related chemicals. Because the chemicals of interest at Sites 9, 16, 27, and 55 are classified as non-polar, the Henry's Law constants for these chemicals are expected to increase when salinity increases. As the Henry's Law constants increase, the rate of volatilization from water will also increase, resulting in higher chemical concentrations in air. Since groundwater at Sites 9, 16, 27, and 55 is not saline, the rate of volatilization from groundwater is not expected to change. However, this could affect ambient air concentrations from the 3rd Battalion Pond if the pond were impacted by contaminated groundwater.

There is a possibility that groundwater at Site 27 could flow into the 3rd Battalion Pond, which is downgradient of Site 55. If this occurred, chemicals could volatilize from the pond into ambient air. The volatilization half-lives of chemicals of interest at the site provided in the following table provide an indication of chemical volatilization rates from ponds and lakes.

Volatilization Half-Lives from Surface Water

Benzene – 3.5 days (lake)
Toluene – 4 days (lake)
Ethylbenzene – 4.1 days (lake)
Xylenes – 4.1 days (lake), 6 days (pond)
Chlorobenzene – 4.3 days (lake), 8 days (pond)
Chlorobenzene – marine ecosystem – winter (13 days), spring (21 days), summer (4.6 days)
Dichlorobenzenes – 120 hours (lake)
1,2,4-Trichlorobenzene – 135 hours (lake)
Naphthalene – 0.17 to 11.55 hours (lake)
2-Methylnaphthalene – 5.3 days (lake), 78 days (pond, if sediment adsorption is considered)
Benzo(a)pyrene – not volatile
Fluorene – 167 hours (pond)
Fluoranthene – 62 days (pond)
Phenanthrene – 195.7 days (lake)
Alpha-BHC – 74 days (lake)
4,4'-DDT – 68 days (lake, if no adsorption is considered), 129 years (pond, considering adsorption)

5.1.5 Octanol/Water Partition Coefficient

K_{ow} is a measure of the equilibrium partitioning of chemicals between octanol and water. A linear relationship between the K_{ow} and the uptake of chemicals by fatty tissues of animal and human receptors has been established. It is also useful in characterizing the sorption of compounds by organic soils where experimental values are not available. PAHs and pesticides such as DDT are several orders of magnitude more likely to partition to fatty tissues than the more water-soluble VOCs. The K_{ow} is also used to estimate water-to-fish tissue BCFs in aquatic organisms. Knowledge of BCFs (and K_{ow}) are likely

not as important as other parameters for Sites 9, 16, 27, and 55 because surface water and sediment are not currently media of concern at the site. However, knowledge of K_{ow} is useful in predicting which chemicals are likely to partition into the fatty tissue of humans, animals, and plants, and in predicting the ultimate fate of organic chemicals in the environment.

5.1.6 Organic Carbon Partition Coefficient

The K_{oc} indicates the tendency of a chemical to adhere to soil particles containing organic carbon. It is a useful factor for understanding the environmental fate and transport processes at Sites 9, 16, 27, and 55 because there may be a relationship between organic chemicals detected in subsurface soil and groundwater at the site. This parameter may be used to infer the relative rates at which chemicals are transported in groundwater. Chemicals such as most pesticides and PAHs are relatively immobile in the soil and are preferentially bound to the soil. PAHs and pesticides are not normally subject to groundwater transport to the extent that compounds with higher water solubilities are, but are easily transported by erosional processes when they are present in surface soils. However, the solubilities of the pesticides appear to be impacted by the presence of other organic compounds in the floating product and, as a result, the pesticides may be subject to groundwater transport similar to compounds with higher water solubilities. Normally, chemicals detected in groundwater at Sites 9, 16, 27, and 55 will be more tightly bound to soil and particulates with high organic carbon content and rich in organic matter and, therefore, will be less mobile in such environments. Chemicals with a high K_{oc} generally have low water solubility and vice versa.

5.1.7 Mobility Index

The mobility index (MI) is a quantitative assessment of mobility that uses water solubility [milligrams per liter (mg/L)] (S), vapor pressure [millimeters mercury (mm Hg)] (VP), and the K_{oc} [liters per kilogram (L/kg)] (Laskowski, 1983). It is defined as follows:

$$MI = \log ((S*VP)/K_{oc})$$

A scale to evaluate MI as presented by Ford and Gurba (1994) is as follows:

Relative MI	Mobility Description
> 5	extremely mobile
0 to 5	very mobile
-5 to 0	slightly mobile
-10 to - 5	immobile
< -10	very immobile

Of the chemicals detected at Sites 9, 16, 27, and 55, monocyclic aromatics (benzene, xylenes) and chlorobenzenes generally have MIs between 0 and 5 and are considered very mobile. Lighter molecular weight PAHs, such as fluorene and naphthalene, have MIs ranging from -5 to 0 and are considered slightly mobile, and the heavier molecular weight PAHs (e.g., benzo(k)fluoranthene) and pesticides are classified as very immobile, having MIs less than -5. The MIs of pesticides detected at Sites 9, 16, 27, and 55 range from -7 (delta-BHC) to -14.2 (4,4'-DDT) and are considered to be very immobile. However, the MIs for the pesticides may be higher than indicated here because of the impact the floating product appears to have on the solubilities of these compounds. The MIs for chemicals detected at Sites 9, 16, 27, and 55 are presented in Table 5-1. The ranges of MIs for the chemicals of possible concern at Sites 9, 16, 27, and 55 are as follows:

- Monocyclic Aromatics (0.5 to 3.45)
- Monochlorobenzene (1.4)
- Dichlorobenzenes (-0.68 to -0.46)
- 1,2,4-Trichlorobenzene (-1.1)
- Naphthalenes (-3.88 to -3.44)
- 1,1-Biphenyl (-5)
- Lighter PAHs (-10.75 to -3.5)
- Heavier PAHs (-21 to -15.2)
- BHCs (-10.4 to -7)
- DDTs (-14 to - 11)

The pesticide MIs may explain why BHCs in groundwater are more widely distributed than DDTs and why pesticides and not SVOCs are detected in the groundwater samples. The MI for BHCs may be twice that of DDTs. The MIs for both BHCs and DDTs are greater than the MIs for the heavier PAHs. As shown in Figures 4-22 and 4-27, the BHC plume extends more than twice as far downgradient than DDTs (Figures 4-20 and 4-25).

These MIs are useful for predicting the behavior of chemicals in the dissolved phase but are likely not helpful for understanding the movement of the floating product found at Site 55.

5.2 CHEMICAL PERSISTENCE

The persistence of various classes of chemicals is discussed in this section. Several transformation mechanisms affect chemical persistence, such as hydrolysis, biodegradation, photolysis, and oxidation/reduction reactions. The persistence of compounds detected in soil and groundwater at Sites 9, 16, 27, and Site 55 are discussed in the following subsections.

5.2.1 Monocyclic Aromatics

Monocyclic aromatics were detected in surface soil, subsurface soil, and groundwater at Sites 9, 16, 27, and 55. Monocyclic aromatic compounds such as benzene, toluene, xylenes, toluene, and chlorobenzenes are not considered to be persistent in the environment, particularly in comparison to chemicals such as PAHs and DDTs. 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 microorganisms, macronutrient availability, soil reaction (pH), temperature, etc.

In the event that these compounds discharge to surface water bodies, volatilization and biodegradation may occur relatively rapidly. For example, a reported first-order biodegradation rate constant for benzene is 0.11 day^{-1} in aquatic systems. This corresponds to an aquatic half-life of approximately 6 days. Other monocyclic aromatics are subject to similar degradation processes in aquatic environments.

However, chlorinated monocyclic aromatics such as 1,2,4-trichlorobenzene, which was detected in groundwater, are not expected to be as susceptible to microbial degradation. 1,2,4-Trichlorobenzene is expected to biodegrade slowly in soils and water with biodegradation half-lives ranging from several weeks to a few months (TOXNET, 2009).

Estimated aquatic biodegradation rates for the chemicals of interest at Sites 9, 16, 27, and 55 are presented in Section 5.3.

5.2.2 PAHs

PAHs are generally regarded to be very persistent in the environment. PAHs have very low solubilities, vapor pressures, and Henry's Law constants and high K_{oc} and K_{ow} The lower molecular weight PAHs (e.g., acenaphthene, fluorene, and naphthalene) are more environmentally mobile than the higher molecular weight PAHs [e.g., benzo(a)pyrene, benzo(a)anthracene, and chrysene] and are more likely to leach to groundwater. The high molecular weight PAHs are less mobile and tend to adhere to soil particles. Therefore, PAHs in soil are much more likely to bind to soil and be transported via mass transport mechanisms than to go into solution. The lower molecular weight PAHs are much more water soluble than the heavier PAHs (by 2 to 5 orders of magnitude) and consequently are expected to be detected in the groundwater more frequently and at higher concentrations. At Sites 9, 16, 27, and 55, this is evidenced by the fact that the lower molecular weight PAHs were detected in groundwater but none of the heavier molecular weight PAHs were detected in groundwater samples even though some of the heavier molecular weight PAHs were detected in the floating product. PAHs are subject to degradation

via aerobic bacteria but may be relatively persistent in the absence of microbial populations or macronutrients such as phosphorus and nitrogen.

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

Landspreading applications have indicated that PAHs are highly amenable to microbial degradation in soil. The rate of degradation is influenced by temperature, pH, oxygen concentration, initial chemical concentration, and moisture. Photolysis, hydrolysis, and oxidation are not important fate processes for the degradation of PAHs in soil (ATSDR, 2006).

The most important fate processes of PAHs in water are photo-oxidation, chemical oxidation, and biodegradation. PAHs do not contain functional groups that are susceptible to hydrolytic action, and hydrolysis is considered to be an insignificant degradation mechanism. The rate of photodegradation is influenced by water depth, turbidity, and temperature. Benzo(a)pyrene and chrysene 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.

5.2.3 Pesticides

Two classes of pesticides, BHCs and DDTs, were detected in soil and groundwater at Sites 9, 16, 27 and 55. Whether pesticides are sprayed, dusted, or applied directly to the soil, the soil is generally the ultimate sink for these chemicals. These compounds tend to remain in the soil and do not leach significantly, unless the characteristics of the pesticides, such as water solubilities, are changed because of the presence of other organic compounds (such as the floating product). Surface soil runoff may carry pesticides to adjacent surface water bodies where they are likely to settle in the sediment. In water, they would not be expected to biodegrade or hydrolyze to any significant extent and will likely bioconcentrate in aquatic organisms.

5.2.4 Miscellaneous Organic Compounds

Two organic chemicals (1,1-biphenyl and dibenzofuran), which do not fall into the categories discussed above, were detected in soil and groundwater at Site 27 and Site 55. The fate and persistence characteristics of these compounds are discussed in the following paragraphs.

1,1-Biphenyl

1,1-Biphenyl is used in organic synthesis, as a heat transfer agent, in plant disease control, manufacture of benzidene, as a dyeing assistant for polyesters, and its former use as a fungistat on shipping papers for oranges may result in its release to the environment through various waste streams. It is also synthesized in certain plants and in algae. If released to soil, 1,1-biphenyl is expected to have low to slight mobility based upon K_{oc} values of 870 to 3,300. Volatilization from moist soil surfaces is expected to be an important fate process based upon a Henry's Law constant of $3.08X10^{-4}$ atm-cu m/mole. If released into water, 1,1-biphenyl is expected to adsorb to suspended solids and sediment based upon the measured K_{oc}s. BCF values from 280 to 4,500 suggest bioconcentration in aquatic organisms is high to very high. The most likely pathway by which the general public is exposed to 1,1-biphenyl is by inhalation due to the release of this substance from combustion of natural products, fuel, and refuse, and cigarette smoke.

Dibenzofuran

Dibenzofuran is found in coal tar, is a component of heat-transfer oils, and is used as a carrier for dyeing and printing textiles, an intermediate for production of dyes, and as an antioxidant in plastics. If released to soil, dibenzofuran is expected to have slight mobility based upon an estimated K_{oc} of 4,200. Volatilization from water surfaces is expected to be an important fate process based upon the estimated Henry's Law constant. Estimated volatilization half-lives for a model river and model lake are 5 hours and 7 days, respectively. However, volatilization from water surfaces is expected to be attenuated by adsorption to suspended solids and sediment. BCF values for fish range from 300 to 2,420.

5.3 CHEMICAL BIODEGRADATION RATES

Aquatic biodegradation rates for the chemicals of interest at Sites 9, 16, 27, and 55 are presented in this section. These values were obtained from TOXNET at (http://toxnet.nlm.nih.gov). Some values were obtained from studies of environmental media. Other values were derived from experimental studies.

Biodegradation Half-Lives for Chemical Detected in Water at Sites 9, 16, 27 and 55

	Aerobic	Anaerobic
Benzene	16 to 28 days	stable
	2 to 6 days (estuarine system)	
Toluene	4 days	56 days
Ethylbenzene	10 days (seawater)	8 days
	10 to 21 days in gasoline and fuel contaminated water	

Xylenes	Little data; have been shown to biodegrade in seawater	
Chlorobenzene	150 days (river)	46.2 days (estuarine sediment)
1,2-Dichlorobenzene	slow	37 days
1,4-Dichlorobenzene	1 year or more	slow
1,2,4,-Trichlorobenzene	24 days	110 days
Naphthalene	7 days (oil polluted estuarine stream)	
	24 days (clean estuarine stream)	
	63 days (coastal waters)	
	1700 days (Gulf Stream near Georgia)	
	0.8 to 43 days in freshwater	
	Biodegrades rapidly in heavily oil polluted water	
2-Methylnaphthalene	10 days	14 days
Benzo(k)fluoranthene	Not Available	Not Available
Fluorene	biodegrades readily	slow with limited oxygen
Fluoranthene	143 to 182 days in oil enriched coastal sediment	
Phenanthrene	28 to 79 days	Not Available
BHCs	Little data but will likely biodegrade slowly aerobically and anaerobically	
4,4'-DDT	Variable depending on conditions; DDT has been shown to biodegrade readily under anaerobic conditions but exhibits very little or no degradation under aerobic conditions	

5.4 SUMMARY

Several classes of chemicals were detected in groundwater at MCRD Parris Island Sites 9, 16, 27, and 55. These included fuel related compounds, such as benzene, mono-, di, and tri-chlorobenzenes, PAHs, and pesticides (BHCs and DDTs). These chemicals were also detected in the floating product detected in samples collected near the FOV in 2008. The environmental fate and transport characteristics of these chemical classes were discussed in the previous sections.

For chemicals detected and dissolved in groundwater at Sites 9, 16, 27, and 55, BTEX compounds are more likely to float on water than chlorobenzenes, PAHs, and pesticides. Normally, BTEX compounds and chlorobenzenes are more water soluble, have higher vapor pressures, and higher Henry's Law constants than PAHs and pesticides. Consequently, BTEX and chlorobenzenes are more mobile in soil and groundwater and tend to volatilize at much greater rates than PAHs and pesticides. The mobility of the organic chemicals detected at the site can be affected by environmental factors such as the presence of organic matter and organic carbon content of the soil. The higher the organic carbon content, the less mobile these chemicals will tend to be. In general, PAHs and pesticides are expected to be more persistent in the environment than BTEX and chlorobenzenes. However, this can be affected by site conditions. For

example, naphthalene may persist for long periods of time in unpolluted waters but is known to biodegrade rapidly in oil contaminated water.

The discussion in the preceding paragraph applies only to chemicals dissolved in water but does not apply to the behavior of chemicals found in floating product such as that detected in the area of Site 55. For example, chlorobenzenes, PAHs, and pesticides have very low water solubilities, but are more soluble in organic solvents, such as gasoline. This can explain why these compounds were detected at much higher concentrations in the floating product than in the groundwater. LNAPL can act as a long-term source for dissolved plumes. The movement of product plumes is also likely to be different than dissolved-phase plumes. Migration of product plumes will be subject to a number of site-specific factors including: fluid properties of the floating product (e.g., viscosity and density), relative permeability of the product, conductivity of the porous media, hydraulic gradient, and fluctuating groundwater surface. These factors can combine to produce a plume that is not spreading or migrating but may be recoverable in the central portion of Site 55.

TABLE 5-1

ENVIRONMENTAL FATE AND TRANSPORT PARAMETERS FOR ORGANIC CHEMICALS
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Chemical	Specific Gravity (@ 20/4°C)[1]	Vapor Pressure (mm Hg @ 20-25°C)[2]	Solubility (mg/L @ 20-25°C)[3]	Octanol/Water Partition Coefficient[3]	Organic Carbon Partition Coefficient[3]	Henry's Law Constant (atm-m^3/mole)[3]	Bioconcentration Factor (mg/L/mg/kg)[4]	Mobility Index log((solubility*VP)/K_{oc})
1,2-Dichlorobenzene	1.3059	1.36E+00	1.56E+02	2.69E+03	6.17E+02	1.50E-03	2.30E+02	-0.46
1,2,4-Trichlorobenzene	1.459	4.60E-01	3.00E+02	1.02E+04	1.78E+03	1.42E-03	6.50E+02	-1.11
1,4-Dichlorobenzene	1.2475	1.74E+00	7.38E+01	2.63E+03	6.16E+02	2.43E-03	2.3E+02[5]	-0.68
Benzene	0.8765	9.48E+01	1.75E+03	1.35E+02	5.89E+01	5.55E-03	3.70E+01	3.45
Chlorobenzene	1.11	1.18E+01	4.72E+02	7.24E+02	2.19E+02	3.70E-03	3.10E+01[6]	1.41
Ethylbenzene	0.867	9.60E+00	1.69E+02	1.38E+03	3.63E+02	7.88E-03	4.70E+02	0.65
Isopropylbenzene	0.862	4.50E+00	6.13E+01	4.57E+03	2.29E+03	1.15E-02	2.70E+02	-0.92
Toluene	0.8669	2.84E+01	5.26E+02	5.62E+02	1.82E+02	6.64E-03	1.48E+02	1.91
m-Xylene	0.8684	8.29E+00	1.61E+02	1.58E+03	4.07E+02	7.32E-03	5.80E+01[6]	0.52
o-Xylene	0.8801	6.61E+00	1.78E+02	1.35E+03	3.63E+02	5.20E-03	5.00E+01[6]	0.51
p-Xylene	0.861	8.84E+00	1.85E+02	1.48E+03	3.89E+02	7.66E-03	5.30E+01[6]	0.62
Xylene Mixture	0.864	7.99E+00	1.61E+02	1.58E+03	4.07E+02	7.32E-03	5.80E+01[6]	0.50
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)								
Acenaphthene	1.07	5.00E-03	4.24E+02	8.32E+03	7.08E+03	1.55E-04	1.10E+03	-3.52
Benzo(a)anthracene	1.274	5.00E-09	9.40E-03	5.01E+05	3.98E+05	3.35E-06	5.30E+04	-15.93
Benzo(a)pyrene	1.351	5.00E-09	1.62E-03	1.29E+06	1.02E+06	1.13E-06	1.40E+05	-17.10
Benzo(b)fluoranthene	NA	5.00E-07	1.50E-03	1.58E+06	1.23E+06	1.11E-04	1.40E+05	-15.21
Benzo(k)fluoranthene	NA	9.59E-11	8.00E-04	1.58E+06	1.23E+06	8.29E-07	1.40E+05	-19.20
Chrysene	1.274	6.30E-09	1.60E-03	5.01E+05	3.98E+05	9.46E-05	5.30E+04	-16.60
Dibenzo(a,h)anthracene	1.282	1.39E-11	2.49E-03	4.90E+06	3.80E+06	1.47E-08	6.90E+05	-20.04
Fluoranthene	1.252	9.22E-06	2.06E-01	1.32E+05	1.07E+05	1.61E-05	1.20E+04	-10.75
Fluorene	1.202	3.20E-04	1.98E+00	1.62E+04	1.38E+04	6.36E-05	3.80E+03	-7.34
Indeno(1,2,3-cd)pyrene	NA	1.25E-10	2.20E-05	4.47E+06	3.47E+06	1.60E-06	3.50E+05	-21.10
Naphthalene	1.162	8.50E-02	3.10E+01	2.29E+03	2.00E+03	4.83E-04	4.20E+02	-2.88
2-Methylnaphthalene	1.0058	5.50E-02	2.46E+01	7.24E+03	2.98E+03	5.18E-04	1.90E+02[6]	-3.34
Phenanthrene	0.98	1.12E-04	6.00E-01	3.72E+04	2.08E+04	4.22E-05	5.40E+02[6]	-8.49
Pyrene	1.271	8.92E-05	1.35E-01	1.29E+05	1.05E+05	1.10E-05	1.20E+04	-9.94
OTHER SEMIVOLATILE ORGANIC COMPOUNDS								
1,1-Biphenyl	1.041	8.90E-03	7.48E+00	1.02E+04	3.30E+03	3.08E-04	2.30E+02[6]	-4.70
Dibenzofuran	1.0886 (99°C)	2.48E-03	3.10E+00	1.32E+04	4.20E+03	2.12E-04	3.00E+02[6]	-5.74
PESTICIDES								
alpha-BHC	1.87	4.50E-05	2.00E+00	6.31E+03	1.76E+03	1.06E-05	3.10E+02[6]	-7.29
beta-BHC	1.89	3.60E-07	2.40E-01	6.46E+03	2.14E+03	7.43E-07	3.10E+02[6]	-10.39
delta-BHC	1.87	3.50E-05	1.00E+01	1.38E+04	3.38E+03	4.30E-07	3.10E+02[6]	-6.98
4,4-DDD	1.385	1.35E-06	9.00E-02	1.26E+06	4.58E+04	4.00E-06	8.60E+03[6]	-11.58
4,4-DDE	NA	6.00E-06	1.20E-01	5.75E+06	8.64E+04	2.10E-05	2.10E+04[6]	-11.08
4,4-DDT	0.985	1.67E-07	2.50E-02	3.39E+06	6.78E+05	8.10E-06	4.20E+04[6]	-14.21

NA - Not available.
1 - USEPA, Handbook of RCRA Groundwater Monitoring Constituents: Chemical and Physical Properties (September 1992).
2 - TOXNET (Hazardous Substance Data Bank) (http://toxnet.nlm.nih.gov, January 2009).
3 - USEPA, Soil Screening Guidance (July 1996a and December 2002).
4 - USEPA, Aquatic Fate Process Data for Organic Priority Pollutants (December 1982).
5 - Groundwater Chemical Desk Reference (Montgomery, J.H., Lewis Publishers, CRC Press, 1996).
6 - Risk Assessment Information System (http://risk.lsd.ornl.gov, January 2009).

6.0 HUMAN HEALTH RISK ASSESSMENT

This section presents the Human Health Risk Assessment (HHRA) for Site 9, the Former Paint Waste Storage Area; Site 16, the Pesticide Rinsate Disposal Area; Site 27, the Motor T; and Site 55, the FOV, at MCRD Parris Island. The objective of the HHRA 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 HHRA:

- U.S. Navy Human Health Risk Assessment Guidance (Navy, February 2008).
- Exposure Factors Handbook. Office of Health and Environmental Assessment, Washington, D.C. EPA/600/P-95/002Fa (USEPA, 1997b).
- Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. OSWER Directive 9285.6 03, OSWER, Washington, D.C. (USEPA, 1991).
- Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. Office of Emergency and Remedial Response, Washington, D.C. OSWER 9285.6-10 (USEPA, 2002b).
- Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual (Part A) (USEPA, 1989).
- Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final. Office of Superfund Remediation and Technology Innovation, Washington, D.C. 20460 EPA/540/R/99/005, OSWER 9285.7-02EP; PB99-963312 (USEPA, 2004b).
- Guidelines for Carcinogen Risk Assessment. EPA/630/P-03/001B. (USEPA, 2005a).
- Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens. EPA/630/R-03/003F (USEPA, 2005b).

- Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), Final. Office of Superfund Remediation and Technology Innovation, Washington, D.C. 20460 EPA-540-R-070-002, OSWER 9285.7-82 (USEPA, 2009a).

This HHRA is structured and reported according to the guidelines of the Risk Assessment Guidance for Superfund (RAGS) Part D: Human Health Evaluation Manual, Standardized Planning, Reporting, and Review of Superfund Risk Assessments (USEPA, 2001a) and consists of six components: data evaluation, exposure assessment, toxicity assessment, risk characterization, uncertainty analysis, and development of remedial goal options. Sections 6.1 through 6.7 contain detailed discussions of the six components and a summary of the HHRA for Sites 27 and 55. Sections 6.8 through 6.14 contain detailed discussion of the six components and a summary of the HHRA for Sites 9 and 16.

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 incomplete, and no potential risks are considered to exist for human receptors.

6.1 DATA EVALUATION – SITES 27 AND 55

Data evaluation, the first component of a baseline HHRA, is a medium-specific task involving the compilation and evaluation of analytical data. The second step (and the main objective) of the data evaluation is to develop a medium-specific list of chemicals of potential concern (COPCs) that will be used to quantitatively and/or qualitatively determine potential human health risks for site media. COPCs are selected primarily based on a toxicity screen (i.e., a comparison of site contaminant concentrations to conservative toxicity screening values). A background screen (i.e., a comparison of site concentrations to background concentrations) is usually performed as part of the data evaluation, but no established facility background data is available at this time for Parris Island. A background data set is currently under evaluation and will be used in the future when investigating sites and making remedial decisions.

Although Sites 27 and 55 are adjacent to one another, the historic site use was not similar and the current site use is not similar. The sites may be different with regards to their potential remedy. Therefore, for this HHRA, they are treated as separate exposure units.

6.1.1 Data Usability

Soil samples used in this HHRA were collected during Sites 27 and 55 field investigations in 1995, 1999, 2002, 2007, 2008, and 2010. Only soil samples collected from the unsaturated zone (less than 8 feet bgs) were used in this HHRA. Groundwater samples used in this HHRA were collected during Sites 27 and 55 field investigations in 2007, 2008, and 2010. Appendix G.1 lists the samples that were used in the HHRA.

A data usability assessment was performed on all RI samples from Sites 27 and 55 field investigations in 2007 through 2010 following the guidance provided in the Work Plan for Phase I (September 2007) (Tetra Tech, 2007), the Work Plan Addendum for Phase II (August 2008) (Tetra Tech, 2008), and the SAP for Phase III (August 2010) (Tetra Tech, 2010b).

The usability of the data generated during this RI directly affects whether project objectives have been achieved. All of the results from samples that were submitted to the analytical laboratory were validated according to several specifications. A description of the data review processes used to determine whether analytical laboratory data are of acceptable technical quality for use in decision making and summary tables that support the review of the data collected from Sites 9, 16, 27, and 55 are presented in the Data Quality Review (DQR) in Appendix I.

The DQR includes data verification and data validation processes. Verification is a process used to ensure that contractual requirements were satisfied. Validation is a comparison of data quality indicators (DQIs) against prescribed acceptance criteria to assess analytical method performance. The DQIs include measures to assess the bias and precision of the analytical calibrations and sample analyses. Together, verification and validation are the first steps in evaluating the DQIs of precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS). Each of the PARCCS is discussed in greater detail in the DQR.

Assignment of data qualification flags conformed to rules established in the USEPA guidance documents “Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review” (USEPA, October 1999), “CLP National Functional Guidelines for Inorganic Data Review” (USEPA, October 2004), and the Department of Defense (DoD) guidance document “Quality Systems Manual (QSM) for Environmental Laboratories”, Version 4.1 (DoD, April 2009), to the greatest extent practicable for non-contract laboratory program (non-CLP) data. Numerical criteria used in conjunction with these rules were specified in the Work Plan, Work Plan Addendum, and SAPs. USEPA SW-846 methods were used to analyze surface soil, subsurface soil, and groundwater samples for VOCs, SVOCs, including low level PAHs, pesticides, PCBs, and/or metals. The analytical data with validation flags, data validation

summary narrative reports, and data validation qualifications and discussions can be found in the reports in Appendix D. A detailed description of the data qualification flags can be found in the DQR.

The data collected during the Phase I, Phase II, and Phase III RI field activities were determined to be of sufficient quality to be used for determining the nature and extent of chemical contaminants identified at Sites 9, 16, 27, and 55. QC samples collected during the Phase I sampling event included 3 field duplicate samples, 6 matrix spike/matrix spike duplicate (MS/MSD) samples, 2 equipment rinsate blanks, and 4 trip blanks. QC samples collected during the Phase II sampling event included 8 field duplicate samples, 1 MS/MSD sample, 6 trip blanks, 1 source water blank, and 1 equipment rinsate blank. QC samples collected during the Phase III sampling events included 20 field duplicate samples, 1 MS/MSD sample, 5 trip blanks, and 1 equipment rinsate blank. These QC sample quantities generally met or exceeded the minimum frequencies and/or quantities defined in the corresponding Work Plan, Work Plan Addendum, and SAPs.

Data validation was performed in accordance with the SAP for all organics and metals following the USEPA CLP Functional Guidelines described above, and in conjunction with the DoD QSM Version 4.1 and method specific criteria presented in the Work Plan, Work Plan Addendum, and SAPs.

Sampling issues or field or laboratory conditions were identified that caused a rejection (R or UR) of 0 out of the 7,826 total data points from the Phase I sampling event, 0 of the 5,986 total data points from the Phase II sampling event, and 353 of the 35,198 total data points from the Phase III sampling events (yielding valid data for 49,010 of the 49,363 total data points), so 99.28% of the data points are considered usable, which exceeds the 95% completeness goal. None of the rejected data points were used in the HHRA calculations.

Field duplicate precision measurements exceeded the acceptance criteria of 50 relative percent difference (RPD) for soil samples and 30 percent of RPD for aqueous samples (or two times the laboratory reporting limit for non-metals and four times the laboratory reporting limit for metals) for one or more analytes in all 31 of the 31 field duplicate data sets. A number of accuracy measurements exceeded the acceptance criteria for initial calibration (ICAL) linear range; and continuing calibration verification (CCV), interference check standard (ICS), internal standard (IS), or surrogate percent recoveries (%Rs) for detected and non-detected analytes. These data were qualified as estimated (J or UJ) and are considered usable.

Some results were flagged with the qualifiers J, U, or UJ because the data were outside QC acceptance criteria. For all detected target analytes in surface and subsurface soil, and groundwater, the Limits of Quantitation (LOQs) were sufficiently sensitive (below the corresponding PSLs for human health direct

contact and/or ecological exposure as originally identified in Worksheet #15 of each SAP and as revised according to current USEPA risk-based criteria as identified in Table I-3) to meet the project quality objectives (PQOs), with the exceptions noted in the DQR. Any positive detection between the LOQ and the laboratory detection limit (DL) were qualified as estimated (J) and are considered usable.

6.1.2 Data Evaluation

6.1.2.1 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 (RBCs) is used to focus the risk assessment on meaningful chemicals and exposure routes.

In general, a chemical is selected as a COPC and retained for further quantitative risk evaluation if the maximum detection in a sampled medium exceeds the lowest RBC. Chemicals eliminated from further evaluation are assumed to present minimal risks to potential human receptors. Medium-specific tables summarizing the selection of COPCs are included in the risk assessment.

6.1.2.2 Derivation of Screening Criteria

The primary COPC screening criteria for environmental media at Sites 27 and 55 are derived from USEPA "Regional Screening Levels" (RSLs) developed by the U.S. Department of Energy's Oak Ridge National Laboratory (ORNL) (USEPA, 2011c). These risk-based concentrations are based on exposure pathways for which generally accepted methods, models, and assumptions have been developed (i.e., ingestion, dermal contact, inhalation) for specific land use conditions (residential, industrial). The COPC screening levels used to evaluate soil and groundwater data are listed in Tables 6-1 and 6-2, and defined in the following narrative.

Screening Levels for Soil - Screening levels to select COPCs for direct human contact exposures to surface and subsurface soil are based on USEPA RSLs for Residential Soil (USEPA, 2011c). COPC screening levels based on the USEPA RSLs correspond to a systemic hazard quotient (HQ) of 0.1 for noncarcinogens or an incremental lifetime cancer risk (ILCR) of $1x10^{-6}$ for carcinogens. In contrast, USEPA RSLs for noncarcinogens are based on an HQ of 1. The COPC screening levels derived for soils are based on an HQ of 0.1, to account for the potential cumulative effects of several chemicals affecting the same target organ or producing the same adverse noncarcinogenic effect.

Maximum chemical concentrations in soil were also compared to soil screening levels (SSLs) for groundwater protection, which were designed to protect groundwater at most sites (as published in the USEPA RSL table). These groundwater protection SSLs allow an initial qualitative evaluation of the potential for chemical migration from soil to groundwater. Chemicals with concentrations exceeding the SSLs' criteria may potentially migrate from the soil to groundwater in sufficient quantities to pose groundwater quality problems. Chemicals detected at concentrations exceeding the SSL for groundwater protection, but at concentrations less than COPC screening levels for direct-contact risk, were not evaluated quantitatively in this HHRA.

Screening Levels for Groundwater - To be conservative, groundwater at the site was evaluated assuming potential residential groundwater use. COPC screening levels for groundwater are based on USEPA RSLs for tap water (USEPA, 2011c) and the primary federal SDWA MCLs (USEPA, 2011a).

The COPC screening levels based on USEPA RSLs for tap water correspond to a systemic HQ of 0.1 for noncarcinogens or an incremental lifetime cancer risk of $1x10^{-6}$ for carcinogens.

Federal SDWA MCLs for public drinking water supplies are enforceable standards designed to protect human health and promulgated under the federal SDWA. Primary MCLs are based on laboratory or epidemiological studies and apply to public water systems. A public water system is defined as a system providing water to the public for human consumption that either has at least 15 service connections or regularly serves an average of 25 individuals daily for at least 60 days per year. Primary MCLs are designed to prevent adverse human health effects, but also reflect the technical feasibility of removing a contaminant from water.

Groundwater screening levels for evaluating the vapor intrusion to indoor air (GSL_{vapor}) were derived using USEPA's Vapor Intrusion Screening Level (VISL) Calculator (USEPA, 2012). VISL criteria were derived using the referenced spreadsheet tool in concert with the residential air USEPA RSLs presented in the 2011c RSL table. Criteria were derived for those chemicals which are listed to be sufficiently volatile and sufficiently toxic in Appendix A of the Department of Defense (DoD) Vapor Intrusion Handbook (2009). The values correspond to a target cancer risk level of $1x10^{-6}$, or a hazard index (HI) of 0.1 for carcinogens and noncarcinogens, respectively. The GSL_{vapor} were derived to identify chemical concentrations in groundwater that may adversely affect the indoor air quality of a building overlying subsurface VOC contamination. The GSL_{vapor} assume a subsurface attenuation factor of 0.001 from groundwater concentrations to indoor air concentrations. Methodology for calculating the criteria and a copy of the calculated screening criteria are included in Appendix G.2.

Screening Levels for Lead - Guidance from the USEPA Office of Prevention, Pesticides, and Toxic Substances 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, 1994). To be conservative, 400 mg/kg will be used as the screening level for COPC selection for soil. However, guidance from the USEPA Technical Review Workgroup for Lead indicates that "a reasonable screening level for soil lead at commercial/industrial (i.e., non-residential) sites is 800 mg/kg" for a typical non-contact-intensive worker (2011b); 800 mg/kg is also the current USEPA RSL for soils, assuming an industrial land use scenario. The SDWA action level of 15 µg/L will be used as the screening level for lead in groundwater.

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., 1,3-dichlorobenzene, acenaphthylene, benzo(g,h,i)perylene, phenanthrene, alpha and gamma-chlordane, delta-BHC, Endosulfan I, Endosulfan II, Endosulfan Sulfate, Endrin Aldehyde, and Endrin Ketone]. In the COPC screening, acenaphthene was used as a surrogate for acenaphthylene, pyrene was selected as a surrogate for benzo(g,h,i)perylene and phenanthrene, chlordane was used as a surrogate for alpha- and gamma-chlordane, alpha-BHC was used as a surrogate for delta-BHC, Endosulfan was used as a surrogate for Endosulfan I, Endosulfan II, and Endosulfan Sulfate, and Endrin was used as a surrogate for Endrin Aldehyde and Endrin Ketone.

The screening criteria used in the selection of COPCs are summarized in Tables 6-1 and 6-2 for soil and groundwater, respectively.

6.1.2.3 Decision Rules for Establishing COPCs

The following decision rules were used to select an initial list of COPCs for Sites 27 and 55:

- A chemical detected in soil was selected as a COPC for soil if any detected chemical concentration exceeds the screening levels for soils.

- A chemical detected in groundwater was selected as a COPC for groundwater if the maximum detected concentration in any well is greater than screening levels for groundwater.

6.1.3 COPCs Selected for HHRA

COPCs were selected for surface soil, subsurface soil, and groundwater using COPC screening concentrations described in Section 6.1.2.2 and decision rules described in Section 6.1.2.3. 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 6-3 through 6-8 for Site 27 and 6-3A through 6-8A for Site 55. A summary of the chemicals retained as COPCs for Site 27 is presented in Table 6-9. A summary of the chemicals retained as COPCs for Site 55 is presented in Table 6-9A. The RAGS Part D tables for chemicals retained as COPCs are included in Appendix G.3.

6.1.3.1 Surface Soil

Site 27

Fifteen VOCs, 2 SVOCs, 18 PAHs, 21 pesticides/PCBs, and 23 inorganics were detected in surface soil samples collected at Site 27. Surface soil samples were collected from beneath the surface cover (root zone or asphalt sub-base) in the 0 to 1 foot bgs interval. A comparison of maximum detected surface soil concentrations to screening levels based on RSLs for residential exposures is presented in Table 6-3. The following chemicals were detected at maximum concentrations exceeding direct contact risk-based COPC screening levels and were retained as COPCs for surface soil at Sites 27.

- PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and benzo(a)pyrene equivalents]
- PCBs (Aroclor-1260)
- Inorganics (aluminum, arsenic, chromium, iron, manganese, and thallium)

The maximum detected concentrations of aluminum, iron, and manganese exceeded the COPC screening levels (set at an HI of 0.1); however they do not exceed the RSLs. Aroclor-1260 was only detected in one surface soil sample.

A comparison of the maximum detected surface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater is presented in Table 6-4. The following chemicals were detected at maximum concentrations in surface soil that exceeded the COPC screening levels for migration from soil to groundwater and were retained as COPCs for surface soil at Site 27.

- VOCs (carbon tetrachloride, chloroform, ethylbenzene, and tetrachloroethene)

- SVOCs (Bis(2-ethylhexyl)phthalate)
- PAHs [1-methynaphthalene, 2-methylnaphthalene, 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, naphthalene, phenanthrene, and pyrene]
- Pesticides/PCBs (4,4'-DDE, Aldrin, alpha-BHC, Aroclor-1260, beta-BHC, delta-BHC, Dieldrin, gamma-BHC, heptachlor, and heptachlor epoxide)
- Inorganics (antimony, arsenic, chromium, cobalt, copper, iron, lead, manganese, mercury, selenium, and thallium)

Though carbon tetrachloride, tetrachloroethene, bis(2-ethylhexyl)phthalate, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-c,d)pyrene, Aroclor-1260, antimony, cobalt, and thallium were detected at maximum concentrations in surface soil that exceeded the COPC screening levels for migration from soil to groundwater, they were not detected in groundwater samples from Site 27. Though 1-methylnaphthalene, 2-methylnaphthalene, phenanthrene, pyrene, 4,4'-DDE, copper, lead, mercury , and selenium were detected at maximum concentrations in surface soil that exceeded the COPC screening levels for migration from soil to groundwater, they were not identified as COPCs in groundwater at Site 27.

Site 55

Fourteen VOCs, 5 SVOCs, 18 PAHs, 20 pesticides/PCBs, and 23 inorganics were detected in surface soil samples collected at Site 55. Surface soil samples were collected from beneath the surface cover (root zone or asphalt sub-base) in the 0 to 1 foot bgs interval. A comparison of maximum detected surface soil concentrations to screening levels based on RSLs for residential exposures is presented in Table 6-3A. The following chemicals were detected at maximum concentrations exceeding direct contact risk-based COPC screening levels and were retained as COPCs for surface soil at Sites 27.

- PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and benzo(a)pyrene equivalents]
- Pesticides/PCBs (4.4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha-BHC, beta-BHC, and delta-BHC)
- Inorganics (antimony, arsenic, chromium, cobalt, iron, lead, and thallium)

The maximum detected concentrations of antimony, cobalt, iron, and thallium exceeded the COPC screening levels (set at an HI of 0.1); however they do not exceed the RSLs. Thallium was only detected in one surface soil sample.

A comparison of the maximum detected surface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater is presented in Table 6-4A. The following chemicals were detected at maximum concentrations in surface soil that exceeded the COPC screening levels for migration from soil to groundwater and were retained as COPCs for surface soil at Site 55.

- VOCs (1,2,4-trichlorobenzene, 1,4-dichlorobenzene, and ethylbenzene)
- SVOCs (Bis(2-ethylhexyl)phthalate)
- PAHs [1-methynaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and naphthalene]
- Pesticides/PCBs (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Aldrin, alpha-BHC, alpha-chlordane, beta-BHC, delta-BHC, Dieldrin, gamma-BHC, gamma-chlordane, heptachlor, and heptachlor epoxide)
- Inorganics (antimony, arsenic, barium, chromium, cobalt, copper, iron, lead, manganese, mercury, selenium, thallium, and zinc)

Though benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene were detected at maximum concentrations in surface soil that exceeded the COPC screening levels for migration from soil to groundwater, they were not detected in groundwater samples from Site 55. Though 1-methylnaphthalene, barium, copper, selenium, and zinc were detected at maximum concentrations in surface soil that exceeded the COPC screening levels for migration from soil to groundwater, they were not identified as COPCs in groundwater at Site 55.

6.1.3.2 Subsurface Soil

<u>Site 27</u>

Eighteen VOCs, 18 PAHs, 17 pesticides/PCBs, and 21 inorganics were detected in subsurface soil samples collected at Site 27. Subsurface soil samples were collected from 3 feet bgs to the first few feet of the surficial aquifer. Subsurface soil is defined in the manner because construction of a foundation does not typically go beyond the water table into the saturated zone. A comparison of maximum detected subsurface soil concentrations to screening levels based on RSLs for residential exposures is presented

in Table 6-5. The following chemicals were detected at maximum concentrations exceeding direct contact risk-based COPC screening levels and were retained as COPCs for subsurface soil at Sites 27.

- PAHs [benzo(a)pyrene equivalents]
- Pesticides (4,4'-DDD, alpha-BHC, and delta-BHC)
- Inorganics (aluminum, arsenic, chromium, iron, thallium, and vanadium)

The maximum detected concentrations of aluminum, iron, and vanadium exceeded the screening levels (set at an HI of 0.1); however, they do not exceed the RSLs. Thallium was only detected in one subsurface soil sample.

A comparison of the maximum detected subsurface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater is presented in Table 6-6. The following chemicals were detected at maximum concentrations in subsurface soil that exceeded the COPC screening levels for migration from soil to groundwater and were retained as COPCs for subsurface soil at Site 27.

- VOCs (1,2,4-trichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, benzene, chlorobenzene, ethylbenzene, and tetrachloroethene)
- PAHs (1-methynaphthalene, benzo(a)pyrene, and naphthalene)
- Pesticides/PCBs (4,4'-DDD, alpha-BHC, beta-BHC, delta-BHC, dieldrin, gamma-BHC, heptachlor and heptachlor epoxide)
- Inorganics (aluminum, antimony, arsenic, chromium, cobalt, iron, lead, mercury, selenium, and thallium)

Though 1,3-dichlorobenzene, tetrachloroethene, benzo(a)pyrene, antimony, cobalt, and thallium were detected at maximum concentrations in subsurface soil that exceeded COPC screening levels for migration from soil to groundwater, they were not detected in groundwater samples from Site 27. Although 1-methylnaphthalene, lead, mercury, and selenium were detected at maximum concentrations in subsurface soil that exceeded COPC screening levels for migration from soil to groundwater, they were not identified as COPCs in groundwater at Site 27.

Site 55

Eight VOCs, 16 PAHs, 14 pesticides/PCBs, and 17 inorganics were detected in subsurface soil samples collected at Site 55. Subsurface soil samples were collected from 3 feet bgs to the first few feet of the

surficial aquifer. Subsurface soil is defined in the manner because construction of a foundation does not typically go beyond the water table into the saturated zone. A comparison of maximum detected subsurface soil concentrations to screening levels based on RSLs for residential exposures is presented in Table 6-5A. The following chemicals were detected at maximum concentrations exceeding direct contact risk-based COPC screening levels and were retained as COPCs for subsurface soil at Site 55.

- PAHs [benzo(a)pyrene equivalents]
- Pesticides (4,4'-DDT and delta-BHC)
- Inorganics (chromium)

Benzo(a)pyrene equivalents were only detected in one subsurface soil sample.

A comparison of the maximum detected subsurface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater is presented in Table 6-6A. The following chemicals were detected at maximum concentrations in subsurface soil that exceeded the COPC screening levels for migration from soil to groundwater and were retained as COPCs for subsurface soil at Site 27.

- PAHs (benzo(a)pyrene and naphthalene)
- Pesticides/PCBs (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha-BHC, beta-BHC, delta-BHC, dieldrin, gamma-BHC, and heptachlor epoxide)
- Inorganics (antimony, chromium, and iron)

Though benzo(a)pyrene was detected at a maximum concentration in subsurface soil that exceeded COPC screening levels for migration from soil to groundwater, it was not detected in groundwater samples from Site 55.

6.1.3.3 Groundwater

Site 27

Fifteen VOCs, 3 SVOCs, 9 PAHs, 20 pesticides, and 18 inorganics were detected in groundwater samples collected at Site 27. A comparison of the maximum detected groundwater concentrations to screening levels based on the RSLs for ingestion of tap water and USEPA MCLs is presented in Table 6-7. The following chemicals were detected in groundwater at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for groundwater at Site 27.

- VOCs (1,2,4-trichlorobenzene, 1,4-dichlorobenzene, benzene, chlorobenzene, chloroform, and ethylbenzene)
- SVOCs (1,1-biphenyl and dibenzofuran)
- PAHs [naphthalene]
- Pesticides (4,4'-DDD, 4,4'-DDT, Aldrin, alpha-BHC, beta-BHC, delta-BHC, dieldrin, gamma-BHC, heptachlor, and heptachlor epoxide)
- Inorganics (aluminum, arsenic, beryllium, chromium, iron, manganese, and vanadium)

The maximum detected concentrations of dibenzofuran, aluminum, and beryllium exceed the screening levels (set at an HI of 0.1); however, they do not exceed the RSLs. Benzene, chlorobenzene, gamma-BHC, arsenic, and beryllium were detected in groundwater samples at concentrations which exceeded the USEPA MCL. Dibenzofuran, naphthalene, aldrin, dieldrin, heptachlor, and beryllium were only detected in one groundwater sample.

A comparison of maximum detected groundwater VOC, SVOC, and pesticide concentrations to screening levels for chemical migration from groundwater through building foundations and into indoor air is presented in Table 6-8. The following chemicals were detected in groundwater at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for groundwater at Site 27.

- VOCs (1,2,4-trichlorobenzene, 1,4-dichlorobenzene, benzene, chlorobenzene, chloroform, and ethylbenzene)
- SVOCs (1,1-biphenyl and naphthalene)

Site 55

Twenty-four VOCs, 6 SVOCs, 11 PAHs, 19 pesticides, and 21 inorganics were detected in groundwater samples collected at Site 55. A comparison of the maximum detected groundwater concentrations to screening levels based on the RSLs for ingestion of tap water and USEPA MCLs is presented in Table 6-7A. The following chemicals were detected in groundwater at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for groundwater at Site 55.

- VOCs (1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, benzene, chlorobenzene, ethylbenzene, and xylenes)

- SVOCs (1,1-biphenyl, bis(2-ethylhexyl phthalate) and dibenzofuran)
- PAHs [2-methylnaphthalene, dibenzo(a,h)anthracene, indeno(1,2,3-c,d)pyrene, naphthalene, and benzo(a)pyrene equivalents]
- Pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Aldrin, alpha-BHC, alpha-chlordane, beta-BHC, delta-BHC, dieldrin, endrin, endrin ketone, gamma-BHC, gamma-chlordane, heptachlor, and heptachlor epoxide)
- Inorganics (aluminum, antimony, arsenic, beryllium, chromium, cobalt, iron, lead, manganese, mercury, nickel, thallium, and vanadium)

The maximum detected concentrations of 1,2-dichlorobenzene, dibenzofuran, endrin ketone, beryllium, mercury, and nickel exceed the screening levels (set at an HI of 0.1); however, they do not exceed the RSLs. 1,4-Dichlorobenzene, benzene, chlorobenzene, endrin, gamma-BHC, heptachlor epoxide, antimony, arsenic, beryllium, chromium, lead, and thallium were detected in groundwater samples at concentrations which exceeded the USEPA MCL. Benzo(a)pyrene equivalents, dibenzo(a,h)anthracene, indeno(1,2,3-c,d)pyrene, bis(2-ethylhexyl)phthalate, antimony, cobalt and thallium were only detected in one groundwater sample.

A comparison of maximum detected groundwater VOC, SVOC, and pesticide concentrations to screening levels for chemical migration from groundwater through building foundations and into indoor air is presented in Table 6-8A. The following chemicals were detected in groundwater at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for groundwater at Site 55.

- VOCs (1,2,4-trichlorobenzene, 1,4-dichlorobenzene, benzene, chlorobenzene, ethylbenzene, tetrachloroethene, and xylenes)
- SVOCs (1,1-biphenyl and naphthalene)

6.1.2.4 Summary

Table 6-9 and 6-9A summarize the chemicals retained as COPCs for soil and groundwater at Sites 27 and 55, respectively. RAGS Part D tables for COPC selection are included in Appendix G.3.

6.2 EXPOSURE ASSESSMENT – SITES 27 AND 55

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 Sites 27 and 55 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 CSM for Sites 27 and 55. 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/migration pathways
- Exposure routes
- Potential receptors

Details on the site background, physical setting, environmental setting, previous investigations, and hazard identification for Sites 27 and 55 are presented in Sections 1 and 2. This section summarizes the information in Sections 1 and 2 as it applies to the CMS. Figures 6-1 and 6-2 illustrate the CSM for Sites 27 and 55, 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 Sites 27 and 55, are discussed below. Sources of contamination, contaminant release mechanisms, transport and migration pathways, exposure routes, and potential receptors are defined. Tables 6-10 and 6-11 provide a site-specific summary of the potential receptors to be evaluated for Sites 27 and 55, respectively. A summary of the exposure routes that will be addressed quantitatively for each human receptor is provided in Tables 6-12 and 6-13 for Sites 27 and 55, respectively.

6.2.1.1 Site Sources of Environmental Contamination

Site 27 was a one-acre asphalt-covered area (Figure 1-3) formerly used as a parade ground and for storage of miscellaneous equipment. It was referred to as the Equipment Parade Deck. For an unknown length of time, this site was used for the temporary storage of out-of-service storage tanks, concrete cylinders, boilers, scrap metal, and piping. An unknown amount of hazardous materials were handled on the Parade Deck, possibly including waste petroleum products and metals. Transformers containing PCB oils were reportedly stored in the northern portion of the site; however, the exact location is not known. The asphalt was cracked or deteriorated in several areas, potentially allowing contaminants to enter underlying soil. MCRD Parris Island identified an operational need to construct the Motor Transportation Facility at Site 27 and construction is currently ongoing. Site 27 is now referred to as the "Motor T".

Site 55 consists of the exposure unit (EU) around the FOV, which is an oversized utility manhole used for the installation of fiber optic communications cables in this part of MCRD. Site 55 was historically only considered as the area that the FOV physically occupied; however, in this report any reference to Site 55 includes the EU around the actual physical FOV (Figure 1-3). The FOV was installed in September 2001 and is located approximately 20 feet east of Atsugi Street, 100 feet southwest of Building 401, and 140 feet northwest of Building 405 and is adjacent to Site 27 (Figure 1-3). There is no regular or routine access to the vault. The vault is composed of pre-cast concrete with inner dimensions of 12 feet long by 6 feet wide by 7 feet deep. The walls include blanked cutouts for fiber optic cables to enter the vault from the north, east, south, and west. The site is relatively flat with both grassy and paved areas. Overhead steam lines are present near the vault, and an underground sewer line is located approximately 70 feet to the northeast. When the FOV was being constructed, LNAPL was discovered floating on water in the vault interior. In September 2001, a soil sample was collected next to the vault and results indicated the presence of BTEX. The FOV was subsequently entered into the environmental restoration program and named Site 55 and is located just east of Site 27. Based on prior investigations, there is a high likelihood that contaminants from Site 55 have migrated to Site 27 and impacted subsurface soil and groundwater within Site 27.

6.2.1.2 Potential Contaminant Release Mechanisms and Transport/Migration Pathways

Past operations at Sites 27 and 55 have resulted in the release of contaminants to surface and subsurface soils. These contaminants have been (or may be) transported to adjoining soils and other environmental media (groundwater, air) by a variety of mechanisms.

- **Surface water / sediment runoff**. The topography of Sites 27 and 55 is generally flat to slightly sloping; surface water from the study area drains to the 3rd Battalion Pond approximately 200 feet to the northwest of the Site 27.

- **Surface soil contaminant transport via wind erosion and vaporization.** Chemicals adsorbed to the surface soil particulates at Sites 27 and 55 may be transported off-site by wind erosion. The particulates (fugitive dust) may then be deposited off-site if the grain size is small enough and the wind speed is great enough. Additionally, contaminants may be released from the soil by volatilization if present at significant concentrations. However, as noted above, Site 27 is currently paved and Site 55 is covered with vegetation. This significantly limits the potential for airborne emissions from the sites.

- **Downward migration to and transport with groundwater**. The groundwater underlying Sites 27 and 55 is primarily recharged through the infiltration of precipitation and subsurface flow from upgradient/adjacent areas. This allows for the migration of contaminants downward through the soil column to the shallow groundwater. The direction of the groundwater flow is anticipated to be to the northwest. Thus, soil contaminants may mobilize to groundwater based on properties described in Section 5.0 and migrate downgradient (northwest) with the groundwater to the 3rd Battalion Pond. Once in the pond, contaminants may impact the surface waters, sediments, and fish.

6.2.1.3 Potential Current and Future Receptors of Concern and Exposure Pathways

MCRD Parris Island is an active facility and will remain active for the foreseeable future. Current plans for Site 27 include installation of a sewer line, paving the entire site, and construction of a Motor Transportation Facility. Based on current and potential future land use, the following potential receptors may be exposed to contaminated environmental media at the Sites 27 and 55.

- **Trench Worker** – Current development plans for Site 27 include installation of a sewer line. The trench worker is the individual who constructs the sewer line. Trench workers could be exposed to surface and subsurface soils (incidental ingestion; dermal contact), shallow groundwater (dermal contact), as well as airborne contaminants emanating from these media (inhalation). Trench workers

are exposed to soils less frequently than the construction worker. Since the trench worker is assumed to be working in the trench the entire time they are at the site their exposure to groundwater would be greater than that of the construction worker.

- **Construction Worker** – At Site 27 the construction worker would be involved with construction of the planned Motor Transportation Facility. At Site 55 the construction worker would be involved with any future development of the site. Construction workers could be exposed to surface and subsurface soils (incidental ingestion; dermal contact), shallow groundwater (dermal contact), as well as airborne contaminants emanating from these media (inhalation). It should be noted that significant exposures by a construction worker to groundwater is unlikely because if a construction worker were to have prolonged contact with groundwater then he/she would most likely wear protective clothing such as rubber boots and/or hip waders, which would limit the receptor's exposure. In addition, most excavation activities would utilize construction equipment such as a back-hoe, which would limit a construction worker's exposure. Also, if significant groundwater was encountered during an excavation of a trench or foundation, the groundwater would most likely be pumped out of the excavation so that the construction activities could be completed.

- **Maintenance Worker** – An on-site receptor under current/future land use at Site 55. This includes adult military or civilian personnel assigned to work (primarily grounds keeping) at Site 55. However, grass mowing is the only on-going grounds keeping activity at the study area. This receptor is not a potential receptor at Site 27 based on the planned land use. The maintenance worker could be exposed to soil (incidental ingestion; dermal contact), and air (inhalation) during grounds keeping or maintenance activities. It is anticipated that the facility maintenance worker would not be routinely exposed to groundwater. This receptor is expected to be exposed to surface soils on a less frequent basis (i.e., in terms of days per year) than the typical industrial or construction worker. This receptor could also be exposed to subsurface soil if subsurface soils were excavated and deposited on existing surface soils.

- **Motor Transportation Facility Worker** – Current plans for Site 27 include the construction of a Motor Transportation Facility. The entire site will be paved so this receptor will not be exposed to soil. In addition, site-groundwater will not be used as public or industrial water supply; consequently this receptor will not have any direct contact exposures to groundwater. A vapor barrier will be installed underneath the building; consequently this receptor will not be exposed to VOCs migrating from contaminated groundwater to the indoor air of the building. Based on the development of Site 27, there are no complete exposure pathways for the Motor Transportation Facility worker; therefore this receptor is not quantitatively evaluated in this HHRA.

- **Industrial Worker** – This receptor is the standard default USEPA industrial worker. An industrial worker is a potential future receptor at Site 55. This receptor differs from the Motor Transportation Facility worker at Site 27 in that this receptor is assumed to have direct contact with soil. Although not a likely receptor under the planned development for Site 27, this receptor will be also evaluated for Site 27 to aid in risk management decisions. This receptor could be exposed to surface soil (incidental ingestion; dermal contact) and air (inhalation). It is anticipated that this receptor would not be routinely exposed to groundwater. This receptor is expected to be exposed to surface soils over a longer time frame (but less intensely) than the construction worker. Industrial worker exposure to subsurface soil is unlikely; however, because future construction could potentially bring subsurface soil to the surface, exposure to subsurface soil via incidental ingestion, dermal contact, and inhalation was evaluated for this receptor to aid in risk management decisions. If this receptor were to work in an on-site structure, this receptor could be exposed to VOCs migrating to the indoor air of a building from contaminated groundwater via vapor intrusion. However, industrial worker exposure to chemicals through vapor intrusion would likely be less intense than residential exposure to chemicals through vapor intrusion.

- **Adult Visitors**- Individuals who may cross Site 55 on their way to other places at the base. The adult visitor receptor is similar to the trespasser receptor. The adult visitor is being evaluated instead of an adult trespasser because access to the site is not restricted and the site is located in an area that is readily accessible by the public. This receptor could be exposed to surface soil (incidental ingestion; dermal contact) and air (inhalation). Adult visitor exposure to subsurface soil is unlikely; however, because future construction could potentially bring subsurface soil to the surface, exposure to subsurface soil via incidental ingestion, dermal contact, and inhalation was evaluated for this receptor to aid in risk management decisions. This receptor is not a potential receptor at Site 27 because the entire site will be paved thereby preventing exposure to soil.

- **Future On-site Residents** – Given the anticipated future land use for Sites 27 and 55, this is a very unlikely future receptor. However, the hypothetical 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), groundwater (ingestion, dermal contact), and air (inhalation). Also, hypothetical residents could be exposed to VOCs migrating from contaminated groundwater to the indoor air of a home. (Please note that receptor exposure to subsurface soil would only occur if subsurface soils were excavated and deposited on existing surface soils. Although this is an unlikely scenario, it is included in this HHRA for purposes of completeness and to aid the risk managers regarding the need for deed restrictions.)

6.2.2 Exposure Point Concentrations

The exposure point concentration (EPC), calculated for COPCs only, is an estimate of chemical concentrations in an EU, and is used to estimate exposure intakes. An EU is the area over which receptor activity is expected. As discussed in Section 6.2.1.3, land use is expected to be different at Site 27 and Site 55; therefore, Site 27 and Site 55 were evaluated as separate EUs. The following guidelines were used to calculate EPCs for the evaluation of COPC concentrations in these two EUs:

- For soil data sets, the 95-percent upper confidence limit (UCL) on the arithmetic mean, which is based on the distribution of the data set, was selected as the EPC unless the 95-percent UCL exceeded the maximum detected concentration. In this case, the maximum detected concentration was used as the EPC. The maximum concentration was also used as the EPC in the event of an insufficient number of detections (i.e., less than four positive detections in a data set), in accordance with USEPA guidance (2010b). EPCs were calculated following USEPA's Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (2002b) and using USEPA's ProUCL Version 4.1.00 (2010b).

- The sample quantitation limit was used as an input for non-detects to USEPA's ProUCL software to calculate the 95-percent UCL, in accordance with ProUCL guidance (USEPA, 2010b). Duplicates were averaged to calculate the EPCs for COPCs in environmental media.

- For groundwater data sets, the maximum detected groundwater concentration within each exposure unit was selected as the EPC and the basis for determining indoor air concentrations using the Johnson-Ettinger model.

- In accordance with USEPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model (2010a) and the Technical Review Workgroup (TRW) Adult Lead Model (USEPA, 2003a, 2009b), average lead concentrations were used to estimate blood-lead levels from exposure to lead. This is because the first step in the model calculations is to develop a central estimate of blood-lead concentrations, which requires an "appropriate average concentration" for an individual.

Table 6-14 summarizes the EPCs used in this HHRA. Appendix G.1 lists the samples that were used in the calculation of the EPCs. ProUCL Outputs are included in Appendix G.4. RAGS Part D Tables for the EPCs are presented in Appendix G.3.

6.2.3 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 and are presented in the risk assessment spreadsheets. Risk assessment results are presented using the format prescribed in the USEPA RAGS Part D Guidance. Assumptions regarding exposure are presented in Tables 6-15.

Non-carcinogenic intakes were estimated using the concept of an average annual exposure. Carcinogenic intakes were calculated as incremental lifetime exposures, which assume a life expectancy of 70 years. The exposure assumptions reflect current USEPA guidance. 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 1989, 1991, 1997b, and 2004b). The following paragraphs discuss the non-default receptor-specific exposure assumptions used in the risk assessment.

6.2.3.1 Incidental Ingestion of Soil

Direct physical contact with surface and/or subsurface soil at Sites 27 and 55 may result in the incidental ingestion of chemicals. Chemical intake for the incidental ingestion of soil is estimated in the following manner (USEPA, 1989):

$$\text{Intake} = \frac{(C_{soil})(IR)(FI)(EF)(ED)(CF)}{(BW)(AT)}$$

where:

Intake	=	intake of chemical from soil [milligrams per kilogram per day (mg/kg/day)]
C_{soil}	=	concentration of chemical in soil (mg/kg)
IR	=	ingestion rate (mg/day)
FI	=	fraction ingested from contaminated source (dimensionless)
EF	=	exposure frequency (days/yr)
ED	=	exposure duration (yr)
CF	=	conversion factor (1×10^{-6} kg/mg)
BW	=	body weight (kg)
AT	=	averaging time (days);
		for noncarcinogens, AT = ED x 365 days/yr;
		for carcinogens, AT = 70 yr x 365 days/yr

Most of the exposure assumptions that will be used to estimate chemical intakes from incidental ingestion of soil are based on default assumptions described in the standard USEPA guidance for the evaluation of the hypothetical future resident, typical industrial worker, or construction worker and are summarized in Table 6-15. The following paragraphs briefly discuss the non-default, receptor-specific exposure assumptions (for incidental ingestion of soil) that will be used in the HHRA.

There are no USEPA default recommendations for exposure frequency for the trench workers, construction workers, maintenance workers, or adult visitor potentially exposed to soil. Consequently values were derived based on site-specific information and professional judgment. The development plans for Site 27 indicate the trench worker will be at Site 27 for six weeks, therefore an exposure frequency of 30 days was used for the trench worker. Construction activities at Site 27 are planned to last seven months; therefore, an exposure frequency of 210 days was used for the construction worker at Site 27. Since Site 55 is approximately the same size as Site 27, an exposure frequency of 210 days was also used for the construction worker at Site 55. Maintenance workers and adult visitors are assumed to be exposed to soil 1 day per week (or 50 days a year).

6.2.3.2 Dermal Contact with Soil

Direct physical contact with soil may result in the dermal absorption of chemicals. Exposure associated with dermal contact with soil is estimated in the following manner (USEPA, 2004b):

$$\text{Intake} = \frac{(C_{soil})(SA)(AF)(ABS)(CF)(EV)(EF)(ED)}{(BW)(AT)}$$

where:

Intake	=	amount of chemical absorbed during contact with soil (mg/kg/day)
C_{soil}	=	concentration of chemical in soil (mg/kg)
SA	=	skin surface area available for contact [cubic centimeters (cm^2)]
AF	=	skin adherence factor (mg/cm^2/event)
ABS	=	absorption factor (dimensionless)
CF	=	conversion factor (1×10^{-6} kg/mg)
EV	=	event frequency (events/day)
EF	=	exposure frequency (days/yr)
ED	=	exposure duration (yr)
BW	=	body weight (kg)
AT	=	averaging time (days);
		for noncarcinogens, AT = ED x 365 days/yr;
		for carcinogens, AT = 70 yr x 365 days/yr

Most of the exposure assumptions that will be used to estimate chemical intakes from dermal contact with soil are based on the default assumptions described in the standard USEPA guidance for the evaluation of the hypothetical future resident, industrial worker, or construction worker. The following paragraphs briefly discuss non-default, receptor-specific exposure assumptions (for dermal contact with soil) that will be used in the HHRA.

A summary of the receptor-specific input values that will be used to estimate chemical intakes from dermal contact with soil are presented in Table 6-15. The same exposure frequencies and durations recommended for the evaluation of the incidental ingestion of soil are used to estimate chemical intakes for dermal contact with soil. The soil adherence factors presented are those listed in Exhibits 3.3 and 3.5 of RAGS Part E. To the extent possible, chemical specific dermal absorption factors provided in RAGS Part E and USEPA Region IV guidance were used to evaluate the COPCs for soil. The dermal absorption factors used in this HHRA are presented in Table 6-16.

6.2.3.3 Inhalation of Air Containing Fugitive Dust/Volatiles Emitted from Soil

Intakes of both particulates and vapors/gases are calculated using the same equation, as follows (USEPA, 2009a):

$$EC = \frac{(C_{air})(ET)(EF)(ED)}{(AT)(24\ \text{hours/day})}$$

where:

EC	=	exposure concentration [milligrams per cubic meter (mg/m^3)]
C_{air}	=	concentration of chemical in air (mg/m^3)
ET	=	exposure time (hours/day)
EF	=	exposure frequency (days/yr)
ED	=	exposure duration (yr)
AT	=	averaging time (hours);
	=	for noncarcinogens, AT = ED x 365 days/yr;
	=	for carcinogens, AT = 70 yr x 365 days/yr

Some of the exposure assumptions that will be used to estimate chemical intakes from inhalation of fugitive dusts/volatile emissions from surface and subsurface soils are based on default assumptions described in the standard USEPA Guidance and are summarized in Table 6-15. The same exposure frequencies and durations used to estimate incidental ingestion of soil intakes are used to estimate exposure via inhalation of fugitive dust/volatile emissions for surface and subsurface soils.

The concentrations of chemicals in air resulting from emissions from soil were developed following procedures presented in USEPA Soil Screening Guidance (USEPA, 2002c). The chemical concentration in air is calculated as follows:

$$C_{air} = C_{soil} \times \left[\frac{1}{PEF} + \frac{1}{VF}\right]$$

where:

C_a	=	chemical concentration in air, mg/m^3
C_s	=	chemical concentration in soil, mg/kg
PEF	=	Particulate emission factor, m^3/kg
VF	=	volatilization factor, m^3/kg

No volatile chemicals were retained as COPCs in surface and subsurface soil; therefore, the above equation reduces to:

$$C_{air} = C_{soil} \times \left[\frac{1}{PEF} \right]$$

The particulate emissions factor (PEF) relates the concentration of the chemical in soil with the concentration of dust particles in air. A PEF value of 9.63 x 10^{+9} m^3/kg was obtained from USEPA's Soil Screening Internet site located at http://rais.ornl.gov/. This is the default value for Charleston, South Carolina which is the closest city to Parris Island listed on the Internet site. Because air emissions resulting from fugitive dust emissions, settings will be different than dust emissions generated during construction activities, a separate PEF was used for construction activities. The PEF for construction workers (1.27 x 10^{+6} m^3/kg) was calculated using the equations presented in the supplemental SSL guidance document (USEPA, 2002c). Sample PEF calculations were calculated are presented in Appendix G.5.

6.2.3.4 Ingestion of Groundwater

Ingestion of groundwater at Sites 27 and 55 is expected to be limited to exposure that would occur under a future residential scenario. Hypothetical future on-base residential receptors are conservatively assumed to use groundwater as a potable water source and may be exposed to groundwater via direct ingestion. Groundwater exposure for hypothetical future on-site residents would occur on a daily basis. Intakes associated with ingestion of groundwater will be evaluated using the following equation (USEPA, 1989):

$$Intake = \frac{(C_{gw})(IR)(ED)}{(BW)}$$

where:

Intake	=	intake of chemical from groundwater (mg/kg/day)
C_{gw}	=	concentration of chemical in groundwater (mg/L)
IR	=	ingestion rate for groundwater (L/day)

EF	=	exposure frequency (days/yr)
ED	=	exposure duration (yr)
BW	=	body weight (kg)
AT	=	averaging time (days);
		for noncarcinogens, AT = ED x 365 days/yr;
		for carcinogens, AT = 70 yrs x 365 days/yr

All of the exposure assumptions that will be used to estimate chemical intakes from ingestion of groundwater are default assumptions described in the standard USEPA guidance and are summarized in Table 6-15.

6.2.3.5 Dermal Contact with Groundwater

Direct contact with groundwater at Sites 27 and 55 is expected to be limited to exposure that would occur under future on-site residential and construction scenarios. Hypothetical future on-site residential receptors are assumed to use groundwater for domestic purposes (i.e., bathing, showering, washing dishes), that can result in a dermal exposure. A trench worker or construction worker may be dermally exposed to shallow groundwater during potential future excavation activities at Sites 27 and 55 (e.g., shallow groundwater pooling at the bottom of an excavation pit.).

The following equation is used to assess exposures resulting from dermal contact with groundwater (USEPA, 2004b):

$$DAD = \frac{(DA_{event} \times SA \times EV \times ED \times EF)}{(BW \times AT)}$$

where:

DAD	=	dermally absorbed dose of chemical from water (mg/kg/day)
DA_{event}	=	dermally absorbed dose per event (mg/cm^2-event)
EV	=	event frequency (events/day)
ED	=	exposure duration (yr)
EF	=	exposure frequency (days/yr)
SA	=	skin surface area available for contact (cm^2)
BW	=	body weight (kg)
AT	=	averaging time (days);
		for noncarcinogens, AT = ED x 365 days/yr;
		for carcinogens, AT = 70 yrs x 365 days/yr

Most of the exposure assumptions that will be used to estimate chemical intakes from dermal contact with groundwater are based on default assumptions described in the standard USEPA guidance and are summarized in Table 6-15. Dermal intakes for residents will assume total body exposure on a daily basis.

There are no USEPA default assumptions for the exposure frequency for a trench worker or construction worker exposed to groundwater. Consequently values were derived based on site-specific information and professional judgment. The development plans for Site 27 indicate the trench worker will be at Site 27 for six weeks; therefore, it was assumed the trench worker would be exposed to groundwater 8 hours a day for 30 days over a 42 day period. Construction workers are assumed to be exposed to groundwater 4 hours per day for 30 days a year. A shorter exposure frequency is recommended for a construction worker exposed to groundwater than is recommended for exposure to soil because it is unlikely that a construction worker will have direct contact with groundwater on a daily basis during a construction project.

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:

$$DA_{event} = 2 \cdot K_p \cdot FA \cdot C_{wi} \cdot CF \cdot \sqrt{\frac{6 \tau t_{event}}{\pi}} \quad \text{for } t_{event} < t^*$$

$$DA_{event} = K_p \cdot FA \cdot C_{wi} \cdot CF \cdot \left(\frac{t_{event}}{1+B} + 2\tau \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right) \quad \text{for } t_{event} > t^*$$

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, FA, τ, and B) are obtained from the current dermal guidance (USEPA, 2004b, Exhibit B-3) and are presented in Table 6-16. If published values are not available for a particular compound, they were calculated using equations provided in the USEPA dermal

guidance. While the dermal guidance provides chemical specific values for PAHs, the guidance also recommends that dermal absorption of PAHs in water not be evaluated quantitatively in an HHRA because such evaluations are outside of the effective predictive domain of the model. Therefore, no chemical-specific parameters are included in Table 6-16 for PAHs, and dermal exposures to PAHs in groundwater were not evaluated in this HHRA.

The following steady-state equation is used to estimate DA_{event} for inorganics:

$$DA_{event} = (K_p)(C_{water})(t_{event})$$

The dermal permeability coefficient (K_p) values recommended in the USEPA dermal guidance (USEPA, July 2004b) were used to calculate DA_{event} for inorganic COPCs.

6.2.3.6 Inhalation of Volatiles in Groundwater

Groundwater exposure may also result in chemical intake through inhalation if the water resource is used as a domestic water supply or is exposed during construction activities, and VOCs are present in the groundwater. This exposure route is plausible for residential receptors that may be exposed while showering, bathing, washing dishes, etc., or for trench workers and construction workers contacting shallow groundwater during excavation activities. Per USEPA Region 4 risk assessment protocol, it will be assumed that the chemical intake resulting from a showering exposure is equivalent to the chemical intake from ingestion of two liters of water. Inhalation exposures for the construction worker shall be estimated using an air intake estimation model.

For trench workers and construction workers, chemical intakes from inhalation exposure due to the volatilization of COPCs in groundwater are estimated in the following manner (USEPA, 2009a):

$$EC = \frac{(C_{air})(ET)(EF)(ED)}{(AT)(24\ \text{hours/day})}$$

where:

EC	=	exposure concentration (mg/m^3)
C_{air}	=	concentration of chemical in air (mg/m^3)
ET	=	exposure time (hours/day)
EF	=	exposure frequency (days/yr)
ED	=	exposure duration (yr)
AT	=	averaging time (days);
	=	for noncarcinogens, AT = ED x 365 days/yr;
	=	for carcinogens, AT = 70 yr x 365 days/yr

Trench workers and construction workers may be exposed to COPCs that have volatilized from groundwater when excavation exposes the shallow water table. The same exposure frequency and exposure time used to estimate intake from dermal contact with groundwater will be used to evaluate intake from inhalation of VOCs from groundwater during construction activities.

There are no well-established models available for estimating migration of volatiles from groundwater into a construction/utility trench. To estimate the EPC for air in a construction trench, the HHRA will use an approach suggested by the Virginia Department of Environmental Quality (VDEQ, 2008), which 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). The VDEQ methodology is described in the following paragraphs.

The airborne concentration of a contaminant in a trench can be estimated using the following equation:

$$C_{air} = C_{GW} \times VF$$

where:

C_{air} = 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)

It is assumed that a construction project could result in an excavation of 15 feet bgs or less. If the depth to groundwater at a site is less than 15 feet, the VDEQ model assumes 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 is used to calculate the volatilization factor (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:

Ki = overall mass transfer coefficient of contaminant (cm/s)
A = area of the trench (m^2)
F = fraction of trench 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/hr)

Studies of urban canyons suggest that if the ratio of trench width, relative to wind direction, relative to trench depth, is less than or equal to 1, a circulation cell or cells will be set up within the trench that limits the degree of gas exchange with the atmosphere and, based upon measured ventilation rates of buildings, the air changes per hour (ACH) is assumed to be 2 per hour. Based upon the ratio of trench depth to the average wind speed, if the ratio of trench width to trench depth is greater than one, then the air exchange between the trench and above-ground atmosphere is not restricted, and the ACH is assumed to be 360 per hour. The exposure assessment performed for this HHRA will assume the width to trench depth ratio is greater than 1; therefore, the ACH is set at 360 per hour.

$$K_i = 1 / \{(1/k_iL) + [(RT) / (H_i\ k_iG)]\}$$

where:

k_iL = liquid-phase mass transfer coefficient of i (cm/s)
R = ideal gas constant ($atm\text{-}m^3/mole\text{-}°K$) = 8.2×10^{-5}
T = average system absolute temperature [degrees Kelvin (°K)] (Default = 298°K)
H_i = Henry's Law constant of i ($atm\text{-}m^3/mol$)
k_iG = gas-phase mass transfer coefficient of i (cm/s)

The formulas for calculating k_iL and k_iG are presented below:

$$k_iL = (MWO_2/MW_i)^{0.5} \times (T/298) \times kL,O_2$$

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 cm/s.

$$k_iG = (MWH_2O/MW_i)^{0.335} \times (T/298)^{1.005} \times kG,H_2O$$

where:

k_iG = 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 (Superfund Exposure Assessment Manual, USEPA, 1988).

Chemical properties were obtained from the USEPA RSL Table (2011c) and are presented in Table 6-17.

6.2.3.7 Assessing Cancer Risks from Early Life Exposures

USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005b) recommends making adjustments to the toxicity of carcinogenic chemicals that act via the mutagenic mode of action when evaluating early-life exposures. This guidance recommends using age-dependent adjustment factors (ADAFs) combined with age-specific exposure estimates when assessing cancer risks. In the absence of chemical-specific data, the supplemental guidance recommends the following default adjustments, which reflect the fact that cancer risks are generally higher from early-life exposures than from similar exposures later in life:

- For exposures before 2 years of age (i.e., spanning a 2-year interval from the first day of birth until a child's second birthday), a 10-fold adjustment.
- For exposures between 2 and 16 years of age (i.e., spanning a 14-year time interval from a child's second birthday until their sixteenth birthday), a three-fold adjustment.
- For exposures after turning 16 years of age, no adjustment.

The adjustments were applied using the same method as that used by ORNL in the development of RSLs. Children were evaluated as two age groups, ages 0 to 2 years and ages 2 to 6 years, and adults were evaluated as two age groups, ages 6 to 16, and ages greater than 16 years old. Using this approach, the intakes for child and adult hypothetical residents were calculated as follows:

$$\text{Intake}_{\text{Child}} = \text{Intake}_{(\text{ages } 0 - 2 \text{ years})} \times 10 + \text{Intake}_{(\text{ages } 2 - 6 \text{ years})} \times 3$$

$$\text{Intake}_{\text{Adult}} = \text{Intake}_{(\text{ages } 6 - 16 \text{ years})} \times 3 + \text{Intake}_{(\text{ages} > 16 \text{ years})}$$

The above approach was used only for those chemicals that are identified as mutagenic in the ORNL screening table (e.g., carcinogenic PAHs, hexavalent chromium). Sample calculations showing how this approach was applied are included in Appendix G.5.

6.2.3.8 Vapor Intrusion into Buildings

Future indoor industrial workers and hypothetical residents may be exposed to COPCs that have volatilized from groundwater and migrated through building foundations into indoor air. Indoor air concentrations resulting from vapor intrusion from groundwater were estimated using the Johnson and

Ettinger volatilization model (USEPA, 2004a). The model assumes that vapors of volatile chemicals are emitted from groundwater, migrate through subsurface soil, through cracks in the building foundation, and accumulate in air inside a building. The vapor intrusion pathway was evaluated for those chemicals detected at concentrations in groundwater exceeding the screening levels, which were discussed in Section 6.1.2.2. The Motor Transportation Facility that is scheduled to be built on Site 27 will have a vapor barrier; consequently vapor intrusion was not evaluated for this building. There are currently no buildings on Site 55. Therefore, the evaluation considered a hypothetical scenario where a residential building was constructed at Sites 27 and 55.

A review of the analytical data and site maps indicates that no building, other than the Motor-T facility are located within 100 feet of samples where groundwater concentrations are greater than VISLs or where LNAPL was located. Although LNAPL can serve as a source of vapor intrusion contaminants, EPA's vapor intrusion screening does not account for the presence of LNAPL.

Slab-on-grade construction was assumed for a hypothetical building. According to the boring and drilling logs, the Soil Conservation Services soil type was determined to be loamy sand. The depth to groundwater was assumed to be 6.9 feet bgs based on the 2010 groundwater measurements. The average groundwater temperature was assumed to be 20°C (USEPA, 2004a). Default values were used for the remaining model input parameters. Table 6-18 lists the input parameters used in the vapor intrusion modeling. Printouts of the vapor intrusion model are included in Appendix G.6

There are no default input parameters for evaluating industrial exposures from vapor intrusion. The risks for industrial exposures to vapor intrusion will depend on several factors including the building size, building layout, and air exchange rate. Without knowing these factors, there will be high uncertainty associated with any estimated risks. Therefore, industrial exposures from vapor intrusion were not quantitatively evaluated in this HHRA. Risks for industrial workers are expected to be less than those estimated for hypothetical residents since industrial workers would be exposed to volatiles in indoor air on a less frequent basis than residential receptors. In addition, industrial facilities are typically larger than residential housing units and have larger air exchange rates which would result in lower indoor air concentrations.

6.2.3.9 Exposure to Lead

The equations and methodology presented in the previous section cannot be used to evaluate exposure to lead because of the absence of published dose-response parameters. Thus, exposure to lead was assessed using the following models:

- USEPA's IEUBK Model for Lead, Version 1.1 Build 11 (2010a). This model is typically used to evaluate lead exposure assuming a residential land-use scenario.

- USEPA's TRW Model for Lead (2003a and 2009b). This model is typically used to evaluate lead exposure assuming a non-residential land-use scenario.

The IEUBK model for lead (USEPA, 2010a) is designed to estimate blood levels of lead in children less than 7 years old 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 a "concern."

The IEUBK model for lead was used to address exposure to lead in children when detected groundwater concentrations exceeded the 15 µg/L federal action level promulgated under the SDWA and when detected soil concentrations exceeded the OSWER SSL of 400 mg/kg for residential land use (USEPA, 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 to support this analysis and are included in Appendix G.7.

Non-residential adult exposure to lead in soil was evaluated using USEPA's TRW model for lead (2003a and 2009b). In this model, adult exposure to lead in soil is addressed by evaluating the relationship between lead concentrations in site soil and the blood-lead concentrations in the developing fetuses of adult women. The Adult Lead Model generates a spreadsheet for each exposure scenario evaluated (i.e., industrial). Model outputs are the probabilities that blood-lead concentrations in fetuses will exceed 10 µg/L. These probabilities were calculated in accordance with the following USEPA guidelines:

- Use of the TRW Interim Adult Lead-Methodology in Risk Assessment (2003a, 2009b)
- Frequently Asked Questions (FAQs) on the Adult Lead Model (2011b)

6.2.3.10 Summary of Exposure Parameters

Table 6-15 summarizes exposure input parameters for all exposure pathways for identified potential receptor groups at Sites 27 and 55. In general, standard default parameters (e.g., USEPA, 1989; 1991; 1997b; and 2004b), which combine mid-range and upper-end exposure factors, were used to assess reasonable maximum exposure (RME) conditions.

6.3 TOXICITY ASSESSMENT – SITES 27 AND 55

The toxicity assessment seeks to identify potential adverse health 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 constituents of concern. Quantitative toxicity values determined during this component of the risk assessment are integrated with exposure assessment outputs to characterize the potential occurrence of adverse health effects for each receptor group.

The RfD is the toxicity value used to evaluate non-carcinogenic health effects for ingestion and dermal exposures. The reference concentration (RfC) is used to evaluate non-carcinogenic health effects for inhalation exposures. The RfD and RfC estimate a daily exposure level for a human population that is unlikely to pose an appreciable risk during a portion or for all of a human lifetime. It is based on a review of animal and/or human toxicity data, with adjustments for various data uncertainties. Carcinogenic effects are quantified using the CSF for ingestion and dermal exposures, and using inhalation unit risks (IURs) for inhalation exposure that are plausible upper-bound estimates of the probability of the development of cancer per unit intake of the chemical over a lifetime. These are typically based on dose-response data from human and/or animal studies.

6.3.1 Toxicity Criteria for Oral and Inhalation Exposures

Oral RfDs and CSFs and inhalation RfCs and IURs used in this risk assessment were obtained from the following primary USEPA literature sources selected per USEPA guidance (2003):

- Tier 1 - Integrated Risk Information System (IRIS)
- Tier 2 – USEPA's 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 chemical-specific PPRTVs when requested by USEPA's Superfund program.
- Tier 3 - Other toxicity values — These sources include, but are not limited to, California Environmental Protection Agency (Cal EPA) toxicity values, Agency for Toxic Substances and Disease Registry (ATSDR) values, and the Annual Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997a).

Although toxicity criteria 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 its values are verified

by USEPA. Toxicity criteria for the constituents identified as COPCs for Sites 27 and 55 are presented in Tables 6-19 through 6-22.

6.3.2 Toxicity Criteria for Dermal Exposure

RfDs and CSFs in the scientific literature are typically expressed as "administered" (i.e., not absorbed) doses. Therefore, these values are considered inappropriate for estimating risks associated with dermal exposures. Oral dose-response parameters based on administered doses must be adjusted to absorbed doses before they can be compared to estimated dermal exposure intakes.

When oral absorption is essentially complete (i.e., 100 percent), an absorbed dose is equivalent to the administered dose, and therefore no toxicity adjustment is necessary. Conversely, when the gastrointestinal absorption of a chemical is poor (e.g., 1 percent), the absorbed dose is smaller than the administered dose; thus, toxicity factors based on absorbed dose should be adjusted to account for the difference in the absorbed dose relative to the administered dose. USEPA (2004b) recommends a 50-percent absorption cut-off to reflect the intrinsic variability in analyzing absorption studies. Therefore, the adjustment from administered to absorbed dose was only performed when the chemical-specific gastrointestinal absorption efficiency was less than 50 percent. The adjustment from administered to absorbed dose was made using chemical-specific gastrointestinal absorption efficiencies published in numerous sources of guidance [e.g., USEPA 2004b (the primary reference), IRIS, ATSDR toxicological profiles, etc.] using the following equations:

$$RfD_{dermal} = (RfD_{oral})(ABS_{GI})$$

$$CSF_{dermal} = (CSF_{oral})/(ABS_{GI})$$

where:

ABS_{GI}	=	absorption efficiency in the gastrointestinal tract
RfD_{dermal}	=	reference dose for dermal exposures
RfD_{oral}	=	reference dose for oral exposures
CSF_{dermal}	=	cancer slope factor for dermal exposures
CSF_{oral}	=	cancer slope factor of oral exposures

As noted, the preceding adjustment of the oral toxicity criteria (i.e., RfDs, CSFs) is necessary so that the dermal route of exposure may be quantitatively evaluated in the baseline risk assessment. Further explanation of this procedure and its necessity are presented in Appendix A of USEPA RAGS Part A.

6.3.3 Toxicity Criteria for Chromium

Toxicity criteria are available for different forms of chromium (trivalent and hexavalent), which is considered to be more toxic in the hexavalent state. Hexavalent chromium was not anticipated to be present in significant quantities at Sites 27 and 55. Therefore, environmental samples collected at Sites 27 and 55 were analyzed for total chromium only, not hexavalent chromium. However, risks were conservatively calculated assuming that all of the reported total chromium result is attributable to hexavalent chromium.

6.3.4 Toxicity Criteria for the Carcinogenic Effect 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 the 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 TEFs based on the potency of each compound relative to that of benzo(a)pyrene, as presented in current USEPA guidance (USEPA, 1993; USEPA Region IV, 2000). The TEFs are used to convert each individual carcinogenic PAH concentration into an equivalent concentration of benzo(a)pyrene. TEFs for the individual carcinogenic PAHs are as follows:

Compound	TEF
Benzo(a)anthracene	0.1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.01
Chrysene	0.001
Dibenzo(a,h)anthracene	1
Indeno(1,2,3-cd)pyrene	0.1

6.3.5 Mutagenic Chemicals

USEPA's Guidelines for Carcinogen Risk Assessment (2005a) and Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005b) specify the use of ADAFs for carcinogens that act via a mutagenic mode of action. Carcinogenic PAHs and hexavalent chromium are included in the group of chemicals that have been determined to act via the mutagenic mode of action. No chemical-specific ADAFs have been derived for carcinogenic PAHs and hexavalent chromium; therefore, the following defaults ADAFs were used: 10 for ages 0 to 2, 3 for ages 2 to 16, and 1 (no adjustment) for

ages 16 to 70. The ADAFs were used in evaluating exposures to carcinogenic PAHs and hexavalent chromium for hypothetical residents using the approach presented in Section 6.2.3.7.

6.4 RISK CHARACTERIZATION – SITES 27 AND 55

This section provides a characterization of the potential human health risks associated with the potential exposures to COPCs at Sites 27 and 55. Potential risks (noncarcinogenic and carcinogenic) for human receptors resulting from exposures outlined in the exposure assessment were quantitatively determined during the risk characterization component of this HHRA. Sections 6.4.1 and 6.4.2 outline the methods used to quantitatively estimate the type and magnitude of potential risks for human receptors. Summaries of the risk characterization for Sites 27 and 55 are provided in Section 6.4.3.

6.4.1 Quantitative Analysis of Constituents Other Than Lead

Quantitative estimates of risk for chemicals other than lead were calculated according to risk assessment methods outlined in USEPA guidance (1989). Lifetime cancer risks are expressed in the form of dimensionless probabilities referred to as ILCRs, based on CSFs and IURs. Non-carcinogenic risk estimates are presented in the form of HQs, which are determined by comparing intakes to published RfDs and RfCs.

ILCR estimates for ingestion and dermal exposures were generated for each COPC using estimated exposure intakes and published CSFs, as follows:

$$\text{ILCR} = (\text{Estimated Exposure Intake})(\text{CSF})$$

If the equation above produces an ILCR greater than 0.01, the following equation is used:

$$\text{ILCR} = 1\text{-}[\exp(\text{-Estimated Exposure Intake})(\text{CSF})]$$

ILCR estimates of inhalation exposures are generated for each COPC using estimated exposure concentrations and published IURs, as follows:

$$\text{ILCR} = (\text{IUR})(\text{Exposure Concentration})(1000\ \mu\text{g/mg})$$

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.

Non-carcinogenic risks were assessed using the concept of HQs and HIs. The HQ for a COPC is the ratio of the estimated intake to the RfD and is calculated for ingestion and dermal exposures as follows:

$$HQ = (\text{Estimated Exposure Intake})/(\text{RfD})$$

For inhalation exposures, the HQ is calculated as follows:

$$HQ = (\text{Exposure Concentration})/(\text{RfC})$$

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 non-carcinogenic (threshold) effects.

6.4.2 Interpretation of Risk Assessment Results

To interpret the quantitative risk estimates and to aid risk managers in determining the need for remediation, quantitative risk estimates were compared to typical USEPA risk benchmarks. Calculated ILCRs were interpreted using USEPA's target cancer risk range ($1x10^{-4}$ to $1x10^{-6}$). HIs were evaluated against a benchmark value of 1. Current USEPA policy regarding lead exposures is to limit the childhood risk of exceeding a 10 µg/dL blood-lead level to 5 percent.

USEPA defines the range of $1x10^{-4}$ to $1x10^{-6}$ as the ILCR target range for hazardous waste facilities addressed under CERCLA and RCRA. Individual or cumulative ILCRs greater than $1x10^{-4}$ are generally considered "unacceptable" by USEPA. Risk management decisions are necessary when the ILCR is within $1x10^{-4}$ to $1x10^{-6}$. USEPA typically does not require remediation when the cumulative ILCR is less than $1x10^{-6}$.

An HI exceeding unity (1) indicates that there may be non-carcinogenic health risks associated with exposure. If an HI exceeds unity, target organ effects associated with exposure to COPCs are considered. Only those HQs for chemicals that affect the same target organ(s) or exhibit similar critical effect(s) are regarded as truly additive. Consequently, it may be possible for the cumulative HI to exceed 1, but no adverse health effects are anticipated if the COPCs do not affect the same target organ or exhibit the same critical effect (i.e., target-organ/critical effect-specific HIs do not exceed 1).

6.4.3 Results of the Risk Characterization

This section contains a summary of the results of the risk characterization for Sites 27 and 55. Quantitative risk estimates for potential human receptors were 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 was discussed in Sections 6.2 and 6.3. Potential ILCRs and HIs were calculated for current trench workers, construction workers, and indoor workers. Potential ILCRs and HIs were also calculated for default industrial workers and hypothetical future child and adult residents to aid in risk management decisions. Potential ILCRs and HIs for Sites 27 and 55 are summarized in Tables 6-23 and 6-24. Sample calculations are presented in Appendix G.5, and the results of the risk assessment in RAGS Part D format are included in Appendix G.2.

6.4.3.1 Non-Carcinogenic Risks – Site 27

Table 6-23 presents the HIs for Site 27. Cumulative HIs for the construction worker and the industrial worker were less than or equal to unity (1), indicating that adverse noncarcinogenic health effects are not anticipated for these receptors under the defined exposure conditions. The cumulative HI for the trench worker exceeded unity, but target organ HIs were less than unity, as shown below. Therefore, adverse noncarcinogenic health effects are not anticipated for the trench worker. Cumulative HIs for hypothetical adult and child residents exposed to soil and groundwater exceeded unity.

Trench Worker- Subsurface Soil and Groundwater	
Target Organ	Hazard Index
Blood	0.1
Body Weight	0.02
Central Nervous System	1
Cardiovascular System	0.1

The HI for hypothetical child residents exposed to subsurface soil (HI = 7) exceeded unity. Thallium (HI = 6) was the major contributor to the HI for hypothetical child residents exposed to subsurface soil at Site 27. The HI for hypothetical child residents exposed to surface soil was equal to unity. The HI for hypothetical child residents using the groundwater as a domestic water source (HI = 46) exceeded unity. Benzene (HQ = 4), chlorobenzene, (HQ = 9), delta-BHC (HQ = 3), gamma-BHC (HQ = 6), arsenic (HQ = 7) and Iron (HQ=2) were the major contributors to the HI for hypothetical child residents at Site 27. The HI for hypothetical child residents (HI = 2) exposed to chemicals that have migrated from groundwater through building foundations into indoor air exceeded unity, primarily due to the presence of chlorobenzene.

HIs for hypothetical adult residents exposed to surface soil (HI = 0.2) and subsurface soil (HI = 0.7) were less than unity. The HI for hypothetical adult residents using the groundwater as a domestic water source was 21, Benzene (HQ = 1), chlorobenzene (HQ = 4), delta-BHC (HQ = 1), gamma-BHC (HQ = 3), arsenic

(HQ = 3) were the major contributors to the HI for hypothetical adult residents using the groundwater as a domestic source. The HI for hypothetical adult residents (HI = 2) exposed to chemicals that have migrated from groundwater through building foundations into indoor air exceeded unity, primarily due to chlorobenzene.

6.4.3.2 Carcinogenic Risks – Site 27

Table 6-23 presents the ILCRs for Site 27. Cumulative ILCRs for trench workers and construction workers exposed to soil and groundwater were within USEPA's target risk range. The ILCR for the default industrial worker exposed to surface soil was within USEPA's target risk range of 10^{-4} to 10^{-6}. The ILCR of $1x10^{-4}$ for default industrial workers exposed to subsurface soil was equal to the upper bound of USEPA's target risk range. However, the cumulative ILCR for the default industrial worker exceeded USEPA's target risk range (sum of ILCRs for exposure to surface and subsurface soil).

The cumulative and medium-specific ILCRs for hypothetical child, adult, and lifelong residents exposed to soil and groundwater exceeded USEPA's target risk range. Carcinogenic PAHs, Aroclor-1260, arsenic, and chromium were the major contributors to the ILCR in surface soil. 4,4'-DDD, alpha-BHC, delta-BHC, arsenic, and chromium were the major contributors to the ILCRs for subsurface soil. Benzene, ethylbenzene, 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, 1,1-biphenyl, heptachlor epoxide, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, 4,4'-DDD, 4,4'-DDT, aldrin, dieldrin, arsenic, and chromium were the major contributors to the ILCRs for groundwater. ILCRs for hypothetical child, adult, and lifelong residents exposed to chemicals that have migrated from groundwater through building foundations into indoor air were within USEPA's target risk range.

6.4.3.3 Non-Carcinogenic Risks – Site 55

Table 6-24 presents the HIs for Site 55. Cumulative HIs for maintenance workers, industrial workers, and adult visitors were less than or equal to unity (1), indicating that adverse noncarcinogenic health effects are not anticipated for these receptors under the defined exposure conditions. Cumulative HIs for the construction worker for each medium were less than or equal to unity; the cumulative HI for groundwater and surface soil exceeded unity with the target organ HI for the liver exceeding unity, due to 4,4'-DDT in surface soil and gamma-BHC in groundwater. Cumulative HIs for hypothetical and adult child residents exposed to soil and groundwater exceeded unity.

The HI for hypothetical child residents exposed to surface soil (HI = 4) exceeded unity. 4,4'-DDT (HQ = 3) was the major contributor to the HI for surface soil. The HI for hypothetical child residents exposed to subsurface soil (HI = 0.1) was less than unity. HIs for hypothetical child residents using the groundwater as a domestic water source (HI = 514) exceeded unity (1). Benzene (HQ = 4), chlorobenzene (HQ = 11),

2-methylnaphthalene (HQ = 9), naphthalene (HQ = 1), alpha-BHC (HQ = 7), delta-BHC (HQ = 10), gamma-BHC (HQ = 159), 4,4'-DDT (HQ = 205), heptachlor epoxide (HQ = 4), arsenic (HQ = 27), thallium (HQ = 20), and vanadium (HQ = 3) were the major contributors to the HI for hypothetical child residents at Site 55. The HI for hypothetical child residents (HI = 3) exposed to chemicals that have migrated from groundwater through building foundations into indoor air exceeded unity, primarily due to chlorobenzene.

HIs for hypothetical adult residents exposed to surface soil (HI = 0.4) and subsurface soil (HI = 0.01) were less than unity. The HI for hypothetical adult residents using the groundwater as a domestic water source was 218. Chlorobenzene (HQ = 5), delta-BHC (HQ = 4), gamma-BHC (HQ = 69), 4,4'-DDT (HQ = 88), heptachlor epoxide (HQ = 2), arsenic (HQ = 11), and thallium (HQ = 9) were the major contributors to the HI for hypothetical adult residents at Site 55. The HI for hypothetical adult residents (HI = 3) exposed to chemicals that have migrated from groundwater through building foundations into indoor air exceeded unity, primarily due to chlorobenzene.

6.4.3.4 Carcinogenic Risks – Site 55

Table 6-24 presents the ILCRs for Site 55. Cumulative ILCRs for construction workers exposed to soil and groundwater and maintenance workers, industrial workers and adult visitors exposed to soil were within USEPA's target risk range of 10^{-4} to 10^{-6}.

The cumulative ILCRs for hypothetical child, adult, and lifelong residents exposed to soil and groundwater exceeded USEPA's target risk range. Media specific ILCRs for exposures to surface soil by hypothetical adult residents and to subsurface soil by hypothetical child, adult, and lifelong residents were within the USEPA target risk range. The ILCR of $1x10^{-4}$ for hypothetical child residents exposed to surface soil was equal to the upper bound of USEPA's target risk range. ILCRs for hypothetical child, adult, and lifelong residents for direct contact exposures to groundwater exceeded USEPA's target risk range. Benzene, ethylbenzene, 1,2,4-trichlorobenzene, tetrachloroethene, carcinogenic PAHs, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Aldrin, Dieldrin, heptachlor, heptachlor epoxide, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, alpha-chlordane, gamma-chlordane, arsenic, and chromium were the major contributors to the ILCRs for groundwater. ILCRs for hypothetical child, and adult residents exposed to chemicals that have migrated from groundwater through building foundations into indoor air (i.e., exposure via the vapor intrusion pathway) were within USEPA's target risk range; the ILCR associated with vapor intrusion for the lifelong resident was at the high end of the USEPA's target risk range. Free product was observed in one monitoring well (PAI-27-MW11S) at Site 55 during the 2010 sampling. USEPA's Johnson and Ettinger model should not be used when there is product in the groundwater, consequently, there is uncertainty associated with the estimated risks from vapor intrusion.

6.4.3.5 Lead Risks

Lead was identified as a COPC in surface soil and groundwater at Site 55. The maximum detected concentration in surface soil (1,140 mg/kg) exceeded the OSWER soil screening level of 400 mg/kg for residential land use. The maximum detected concentration in groundwater (38.2 µg/L) exceeded the 15 µg/L federal Action Level promulgated under the SDWA.

Hypothetical residential exposures to lead in surface soil were evaluated using USEPA's IEUBK lead model (USEPA, 1994 and 2010a). The most recent version of this model (version 1.1, build 11) was used for the analysis. As recommended in the model's documentation, the average lead concentrations of 239 mg/kg for surface soil and 4.6 µg/L for groundwater were used as the EPCs at Site 55. Default values were used for the remaining model input parameters. IEUBK model outputs are included in Appendix G.7. A young child resident (0 to 6 years of age) is the receptor of concern. At Site 55 the lead concentrations of 239 mg/kg in surface soil and 4.6 µg/L in groundwater result in less than 1 percent of future on-site child residents having a blood-lead level greater than 10 µg/dL and results in a geometric mean blood-lead level of 3.1 µg/dL. These results of less than 1 percent of future on-site child residents having a blood-lead level greater than 10 µg/dL is not at variance with the USEPA goal as described in the 1994 OSWER Directive of no more than 5 percent of children exceeding a 10 µg/dL blood-lead level.

Risks to construction workers, industrial workers, and adult visitors exposed to lead in soil were evaluated using a slope factor approach developed by the USEPA TRW for lead (USEPA, 2003a and 2009b). As the model (often referred to as the Adult Lead Model) recommends, average lead concentrations in surface soil were used as the EPCs. Based on this information, the incidental soil ingestion rate was assumed to be 330 mg/day for the construction worker and 50 mg/day for industrial workers and adult visitors. An exposure frequency of 210 days per year was assumed for the construction worker, 219 days per year for the industrial worker, and an exposure frequency of 52 days per year was assumed for the adult visitor. Values of 1.8 and 1.0 µg/dL were used for the standard deviation and baseline blood-lead concentration, respectively, (USEPA, 2009b). Default parameters were used for the remaining model input parameters. Results of the model runs are included in Appendix G.7.

The fetus of a pregnant worker is the ultimate receptor of concern for the TRW model. Results of the modeling are shown below.

Receptor	Medium	Blood-Lead Geometric Mean Concentration (µg/dL)	Percent of Receptors with Blood-Lead Level Exceeding 10 µg/dL
Site 55			
Construction Workers	Surface Soil	2.6	0.62
Industrial Workers	Surface Soil	1.2	0.02
Adult Visitors	Surface Soil	1.1	0.004

The results for construction workers, industrial workers, and adult visitors are not at variance with the USEPA goal of no more than 5 percent of children (fetuses of exposed women) exceeding a 10 µg/dL blood-lead level.

6.4.3.6 LNAPL Risks

LNAPL underlies a portion of Site 55 and the eastern side of Site 27, adjacent to Site 55. The LNAPL is located below the thin clay layer estimated to be between 6 and 8 feet below ground surface. Hence, the future construction worker or trench worker could contact subsurface soil and shallow groundwater, potentially containing the LNAPL. Additionally, hypothetical future residents or other building occupants may be exposed to vapors from the LNAPL as a result of potential vapor intrusion.

EPA has not established guidance or methodology to evaluate LNAPL. Hence, the risks presented in this HHRA do not consider any risks associated with exposure to LNAPL. The HHRA has used maximum detected groundwater concentrations as exposure point concentrations to evaluate direct contact with groundwater and as a basis for modeling indoor air concentrations associated with vapor intrusion. The quantitative risk evaluation using maximum detected groundwater concentrations as exposure concentrations has indicated that chronic risks associated with exposure to groundwater exceed EPA's target risk range and hazard index. These risks, based on dissolved concentrations, clearly indicate that any long-term exposure to LNAPL, with greater concentrations than what was measured, would result in greater risks. Although direct exposures with LNAPL by a construction worker or trench worker would be more short-term, appropriate personal protective equipment and measures should be employed to minimize exposure.

Additionally, the LNAPL can be considered a Principal Threat Waste (PTW) as defined by the USEPA. PTW is defined as a source material considered to be "highly toxic" that would present a significant risk to human health or the environment if exposure would occur. Hence, the presence of PTW should serve as the basis for a remedial action rather the quantitative risks associated with exposure to the PTW.

6.4.3.7 Contaminants of Concern

COCs are those COPCs that are significant contributors to risk. For those media where the ILCR is greater than 1 x 10^{-4} or the total HI and target organ HI is greater than unity, the COCs are those chemicals with individual ILCRs greater than 1 x 10^{-6} or an HQ greater than 0.1.

At Site 27, surface soil, subsurface soil, and groundwater are the media which exceed the risk criterion for identifying COCs. The ILCRs for child, adult, and lifelong residents exceed 1 x 10^{-2} and the cumulative HIs for adult and child residents are 22 and 54, respectively. The surface soil COCs (Table 6-25) are:

- Carcinogenic PAHs
- Aroclor 1260
- Arsenic
- Chromium

The subsurface soil COCs (Table 6-25) are:

- Alpha-BHC
- Delta-BHC
- 4,4'-DDD
- Arsenic
- Chromium
- Thallium

The groundwater COCs (Table 6-25) are:

- Benzene
- Chlorobenzene
- Aldrin
- Dieldrin
- Alpha-BHC
- Beta-BHC
- Delta-BHC
- 1,1'-Biphenyl
- 1,2,4-Trichlorobenzene
- 1,4-Dichlorobenzene
- Ethylbenzene
- 4,4'-DDD
- 4,4'-DDT

- Heptachlor Epoxide
- Aluminum
- Arsenic
- Beryllium
- Chromium
- Iron
- Manganese

At Site 27, the ILCR for the industrial worker's exposure to surface and subsurface soil is 2×10^{-4}. The soil COCs are:

- Carcinogenic PAHs
- 4,4'-DDD
- Alpha-BHC
- Delta-BHC
- Arsenic
- Chromium

At Site 55, surface soil and groundwater are the media which exceed the risk criterion for identifying COCs. The ILCRs for the child, adult, and lifelong residents approximate 1×10^{-1} and the HIs for the adult and child resident are 221 and 517, respectively. The surface soil COCs (Table 6-25) are:

- Carcinogenic PAHs
- 4,4'-DDD
- 4,4'-DDE
- 4,4'-DDT
- Beta-BHC
- Arsenic
- Chromium

The groundwater COCs (Table 6-25) are:

- Benzene
- Chlorobenzene
- Ethylbenzene
- Xylenes

- 1,2,4-Trichlorobenzene
- 1,4-Dichlorobenzene
- Carcinogenic PAHs
- Naphthalene
- 2-Methyllnaphthalene
- 1,1'-Biphenyl
- Dibenzofuran
- 4,4'-DDD
- 4,4'-DDE
- 4,4'-DDT
- Aldrin
- Dieldrin
- Endrin
- Endrin Ketone
- Alpha-BHC
- Beta-BHC
- Delta-BHC
- Gamma-BHC
- Alpha-Chlordane
- Gamma-Chlordane
- Arochlor 1260
- Heptachlor
- Heptachlor Epoxide
- Aluminum
- Antimony
- Arsenic
- Beryllium
- Chromium
- Cobalt
- Iron
- Manganese
- Nickel
- Thallium
- Vanadium

6.5 UNCERTAINTY ANALYSIS – SITES 27 AND 55

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 HHRA for Sites 27 and 55 was performed in accordance with current USEPA guidance under the direction of the Navy. 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 assessment for Sites 27 and 55.

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 is 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 are 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 consider safety factors were made so that the final calculated risks were overestimated.

Generally, risk assessments carry 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 Sites 27 and 55 are the COPC screening levels used, the absence of screening levels for a few chemicals detected in the site media, and the lack of a background database. A brief discussion of each of these issues is provided in the remainder of this section.

COPC Screening Levels

The use of risk-based screening values based on conservative land use scenarios (i.e., residential land use for soil and ingestion of tap water for groundwater) corresponding to ILCRs of 10^{-6} and HIs 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 ILCRs less than 10^{-6} and HIs less than 0.1 should not affect the final conclusions of the risk assessment because those chemicals were not expected to cause a potential health concern at the detected concentrations.

Use of USEPA Generic SSLs for Transfers from Soil to Groundwater for COPC Selection

A number of chemicals were selected as COPCs because the maximum concentrations exceeded USEPA Generic SSLs for migration from soil to groundwater (DAF = 1.0), but these were not considered in the quantitative risk assessment because they were less than the risk-based screening concentrations for direct contact exposure. The elimination of these chemicals from the quantitative risk evaluation is not

considered significant because the maximum concentrations were less than the risk-based screening levels corresponding to target cancer risks of $1x10^{-6}$ or HQs of 0.1.

In addition, the USEPA's Soil Screening Guidance (USEPA, 1996a) states "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). 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)." The guidance further states, "A DAF of 20 is protective for sources up to 0.5 acres in size" and "can be protective of larger sources as well." Consequently, the use of SSLs based on a DAF of 1 is very conservative.

Chemicals without Established Screening Levels

Risk-based screening levels are currently not available for some constituents detected at Sites 27 and 55 [e.g., 1,3-dichlorobenzene, acenaphthylene, benzo(g,h,i)perylene, phenanthrene, alpha and gamma-chlordane, delta-BHC, Endosulfan I, Endosulfan II, Endosulfan Sulfate, Endrin Aldehyde, and Endrin Ketone]. Appropriate surrogates were selected for these chemicals based on similar chemical structures, if available. In the COPC screening, acenaphthene was used as a surrogate for acenaphthylene, pyrene was selected as a surrogate for benzo(g,h,i)perylene and phenanthrene, chlordane was used as a surrogate for alpha- and gamma-chlordane, alpha-BHC was used as a surrogate for delta-BHC, Endosulfan was used as a surrogate for Endosulfan I, Endosulfan II, and Endosulfan Sulfate, and Endrin was used as a surrogate for Endrin Aldehyde and Endrin Ketone. Applying toxicity values of one compound to another increases 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.

Lack of Background Data

Arsenic and chromium were retained as chemicals of concern (COCs) in surface and subsurface soil at Site 27 and in surface soil at Site 55. No background data was available for Parris Island; therefore, a comparison to background could not be performed. However, since the Draft Final RI Report was prepared in 2011, the Partnering Team has agreed to use background data from Marine Corps Air Station Beaufort (Tetra Tech, 2006), which are presented in the table below.

Chemical	MCAS Beaufort Representative Background Concentrations (mg/kg) [1]	Site 27		Site 55	
		Surface Soil (mg/kg)	Subsurface Soil (mg/kg)	Surface Soil (mg/kg)	Subsurface Soil (mg/kg)
Arsenic	1.16	0.46 J – 5.7	0.93 – 13.2	0.5 J – 17.5	Not Detected
Chromium	5.17	1.6 – 10.2	1.7 – 34.7	2.31 – 9.61	1.23 – 3.75

1-Tetra Tech, Inc. 2006. RCRA Facility Investigation Report for Solid Waste Management Unit 3, Borrow Pit Landfill, Appendix Z Basewide Background Report, Contract Task Order 0329, November.

Arsenic and chromium are naturally occurring elements in soil. Consequently, there is some uncertainty with retaining arsenic and chromium as COCs in soil at Sites 27 and 55.

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

Current land use patterns at the Sites 27 and 55 are well established; thereby limiting the uncertainty associated with land use assumptions. Site 27 is expected to be the site of a Motor Transportation Facility. At Site 55 land use is currently limited to industrial/commercial, and the area is expected to remain commercial/industrial in the future. Trench workers, construction workers, and workers at the Motor Transportation Facility are only anticipated workers for Site 27. Adult visitors are the only current receptors potentially contacting environmental media at Site 55. To be conservative, risks to industrial workers and on-site residents at Site 27, and potential and future construction workers, industrial workers, and on-site residents were evaluated at Site 55.

Exposure Point Concentrations

Uncertainty is associated with the use of the 95-percent UCL on the mean concentration as the EPC for soil and the use of maximum detected concentrations as the EPC for groundwater. 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.

There is uncertainty in assuming that current groundwater concentrations will not change in the future, and this introduces additional uncertainty in the EPC and risks for any groundwater COPC. Concentrations in groundwater may diminish over time due to natural attenuation processes involving source depletion and dilution.

EPCs for construction workers for VOCs in air were estimated by 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 input parameters. The use of model default values tended 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

Determination of various receptor groups and exposure routes of potential concern was based on current land use observed at the site and anticipated future land use. Therefore, uncertainty associated with selecting exposure routes and potential receptors is minimal because these are considered well defined. Although residential groundwater use was evaluated as an exposure scenario at Sites 27 and 55, groundwater is not currently used at the sites nor is it expected to be used in the future. Therefore, the evaluation of direct exposure to groundwater performed in this baseline HHRA was included primarily to aid in risk management decision-making.

Exposure Parameters

Each exposure factor 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 on 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.

Generally, the uncertainty can be assessed quantitatively for many assumptions made in determining factors for calculating exposures and intakes. 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, USEPA dermal guidance (2004b) 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.

Many of the exposure parameters used to calculate exposures and risks in this report were selected from a distribution of possible values including USEPA guidance (1991, 1997a, 2004b, 2000). For the RME scenario, the value representing the 95th percentile was generally selected for each parameter to ensure that the assessment bounds the majority of actual risks from a postulated exposure. This risk number is used in risk management decisions but does not indicate what a more average or typical exposure might be or what risk range might be expected for individuals in the exposed population.

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 COC 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 have reached 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, 2004b), risks for dermal absorption of chemicals in soil are quantitatively evaluated for arsenic, cadmium, chlordane, 2,4-dichlorophenoxyacetic acid, DDT, tetrachlorodibenzo-p-dioxin (TCDD) (and other dioxins), gamma-BHC, 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 (except for arsenic) were not quantified in the risk assessment. Consequently, potential risks may have been underestimated by excluding these constituents from the dermal risk assessment calculations.

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. Although there is no evidence to support the conclusion that hexavalent chromium is present at Sites 27 and 55, risks associated with this chemical were assessed by conservatively assuming that 100 percent of the reported total chromium result is attributable to hexavalent chromium. Chromium was retained as a COC in surface soil, subsurface soil, and groundwater at Site 27, and in surface soil and groundwater at Site 55. Chromium would not have been retained as a COC in any media at Sites 27 and 55 if it had been evaluated as trivalent chromium. Consequently, there is uncertainty associated with retaining chromium as a COC in soils and groundwater at Sites 27 and 55.

Use of Chronic Toxicity Values for Construction Workers

Under the guidelines established by the Superfund program, exposures to construction workers of one year or less are classified as subchronic exposures. Risks for noncarcinogenic effects associated with subchronic exposures should incorporate toxicity values for subchronic and not chronic effects. Subchronic toxicity values are not as widely available as chronic values. Subchronic toxicity values used in this HHRA were obtained from USEPA's PPRTV internet site if available. Also ATSDR Minimal Risk Levels (MRLs) were used as subchronic toxicity values when PPRTV values were not available. Chronic toxicity values were used when subchronic toxicity values were not available. Using chronic toxicity criteria to evaluate subchronic exposures for construction workers tends to overestimate potential noncarcinogenic risks. Although this overestimation of noncarcinogenic risks do not affect the conclusions of this HHRA since noncarcinogenic risks for construction workers were within acceptable levels.

6.5.4 <u>Uncertainty in the Risk Characterization</u>

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 be an appropriate assumption in all cases. However, the assumption of additivity was considered because in most cases it represented 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 be 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 could not be predicted, the likelihood for risks to be overpredicted or underpredicted could not be defined, but the methodology used was based on current USEPA guidance.

6.5.5 Uncertainty in the Evaluation of LNAPL

While LNAPL can be considered a separate medium for exposure, no methodology is available to quantitatively evaluate risks associated with direct exposure to LNAPL. The use of maximum detected groundwater concentrations as EPCs for quantifying risks associated with direct exposure or vapor intrusion can at best serve as a predictor of risk. At best, the significant risks associated with the groundwater at Site 55 indicates that risks associated with the LNAPL would also be significant.

6.6 REMEDIAL GOAL OPTIONS – SITES 27 AND 55

In accordance with USEPA Region 4 guidance, remedial goal options (RGOs) were developed for those media with ILCRs greater than $1x10^{-6}$ and total HIs greater than 1. RGOs are derived for the COCs that contribute significantly to the cancer risk and/or HI for each exposure pathway in a land use scenario for a receptor group. Chemicals are not considered as significant contributors to risk and therefore are not included as COCs if their individual carcinogenic risk contribution is less than $1x10^{-6}$ and their noncarcinogenic HQ is less than 1.0. RGOs for Sites 27 and 55 were developed according to guidance provided in the Region 4 Human Health Risk Assessment Bulletin. The RGOs were calculated using the following equation:

$$RGO[chemical\ i] = EPC[chemical\ i] \times Target\ Risk/Calculated\ Risk[chemical\ i]$$

where:

RGO[chemical i]	=	the chemical-specific remediation goal option
EPC[chemical i]	=	the exposure point concentration for the chemical used in risk assessment calculations
Target Risk	=	target ICLRs for carcinogens or the target HQs for noncarcinogens
Calculated Risk[chemical i]	=	the total risk calculated for a specific chemical in the risk assessment

In accordance to the Region 4 guidance, the target cancer risks to be used were $1x10^{-6}$, $1x10^{-5}$, and $1x10^{-4}$ and the target HQs were 0.1, 1, and 3. The chemicals retained as COCs for direct contact exposures are presented in Table 6-25. The chemical-specific RGOs for soil and groundwater are presented in Tables 6-26 and 6-27, respectively.

6.7 SUMMARY – SITES 27 AND 55

The baseline HHRA for the Sites 27 and 55 was performed to characterize potential risks to likely human receptors that could potentially be exposed to soil and groundwater under current and future land use. Current plans for Site 27 include installation of a sewer line and construction of a Motor Transportation Facility. Likely receptors at Site 27 include a trench worker involved in the installation of the sewer line; a construction worker involved in the development of the site; and a worker at the Motor Transportation Facility. Under the planned development of the site, the entire site will be paved with asphalt and the Motor Transportation Facility will have a vapor barrier to prevent exposures through vapor intrusion. As a result, there are no complete exposure pathways for the Motor Transportation Facility worker; consequently, this receptor was not quantitatively evaluated in the HHRA. A hypothetical resident and standard default industrial worker were also evaluated at Site 27 to aid in risk management decisions. At present, Site 55 is not being used. Under current land use the only potential receptor is an adult visitor. Future potential receptors at Site 55 include a construction worker, a maintenance worker, and an industrial worker. A hypothetical resident was also evaluated to aid in risk management decisions.

COPCs were selected for direct contact routes of exposure to environmental media, for the vapor intrusion pathway, and for the potential migration of chemicals from soil to groundwater pathway. COPCs for Sites 27 and 55 are listed in Table 6-9 and 6-9A.

Quantitative estimates of non-carcinogenic and carcinogenic risks (HIs and ILCRs, respectively) were developed for potential human receptors directly contacting site environmental media. Media with risk estimates exceeding the upper bound of USEPA's target risk range of 10^{-4} to 10^{-6}, or an HI of 1, are identified in the following table.

Summary of Risk Estimates

Site	Environmental Medium	Receptors With Risk Estimates Exceeding Risk Management Benchmarks	Chemicals of Concern
Site 27	Surface soil	Child resident(1) Adult resident(1) Lifelong resident(1)	cPAHs, Aroclor-1260, Chromium, Arsenic
	Subsurface soil	Child resident(1,2) Adult resident(1) Lifelong resident(1)	alpha-BHC, delta-BHC, DDD, Arsenic, Chromium, Thallium
	Surface and Subsurface soil	Industrial worker(1)	cPAHs, DDD, alpha-BHC, delta-BHC Arsenic, Chromium
	Groundwater – Direct Contact	Child resident(1,2) Adult resident(1,2) Lifelong resident(1)	Benzene, Chlorobenzene, Aldrin, Dieldrin, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, 1,1-Biphenyl, 1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, Ethylbenzene, DDD, DDT, Heptachlor Epoxide, Aluminum, Arsenic, Beryllium, Chromium, Iron, Manganese,
	Groundwater – Vapor Intrusion	Child resident(2) Adult resident(2)	Chlorobenzene
	LNAPL	Receptors with Direct Contact Exposure(3)	Benzene, Chlorobenzene, Aldrin, Dieldrin, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, 1,1-Biphenyl, 1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, Ethylbenzene, 4.4'-DDD, 4,4'-DDT, Heptachlor Epoxide

Summary of Risk Estimates (Continued)

Site	Environmental Medium	Receptors With Risk Estimates Exceeding Risk Management Benchmarks	Chemicals of Concern
Site 55	Surface soil	Child resident(2) Lifelong resident(1)	cPAHs, DDD, DDE, DDT, beta-BHC, Arsenic, Chromium
	Subsurface soil	None	No COCs
	Groundwater – Direct Contact	Child resident(1,2) Adult resident(1,2) Lifelong resident(1)	1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, 1,1-Biphenyl, Benzene, Chlorobenzene, Ethylbenzene, Xylenes, cPAHs, Naphthalene, 2-Methylnaphthalene, Dibenzofuran, DDD, DDE, DDT, Aldrin, Dieldrin, Endrin, Endrin Ketone, alpha-BHC, alpha-Chlordane, beta-BHC, delta-BHC, gamma-BHC, gamma-Chlordane, Heptachlor Epoxide, Heptachlor, Aluminum, Antimony, Arsenic, Beryllium, Chromium, Cobalt, Iron, Manganese, Nickel Thallium, Vanadium
	Groundwater – Vapor Intrusion	Child resident(2) Adult resident(2)	Chlorobenzene
	LNAPL	Receptors with Direct Contact Exposure(3)	Benzene, Chlorobenzene, Aldrin, Dieldrin, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, Arsenic, Chromium, 1,1-Biphenyl, 1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, Ethylbenzene, 4.4'-DDD, 4,4'-DDT, Heptachlor Epoxide

Notes:
carcinogenic PAHs (cPAHs)
1 - Receptor risks exceed $1x10^{-4}$ cancer risk benchmark.
2 - Receptor risks exceed non-cancer risk benchmark of target organ-specific HI greater than 1.
3 – Direct contact with LNAPL was not quantitatively evaluated in the risk assessment, but is recognized as a Principal Threat Waste as defined by the USEPA, which could be considered "highly toxic " and as a potential "other site risk".

Lead was identified as a COPC in surface soil and groundwater at Site 55. Hypothetical residential exposures to lead in surface soil and groundwater were evaluated using USEPA's IEUBK lead model. Risks to construction workers, industrial workers, and adult visitors at Site 55 exposed to lead in surface soil were evaluated using USEPA's Adult Lead Model. Results of the analysis conducted for these

receptors do not exceed the USEPA goal regarding lead exposures [i.e., no more than 5 percent of children (or fetuses of exposed woman) having blood-lead levels exceeding a 10 µg/L blood-lead level].

The HI for residential exposure from vapor intrusion at Sites 27 and 55 exceeded unity, primarily due to the presence of chlorobenzene. The ILCRs for residential exposures from vapor intrusion were within USEPA's target risk range, Product was observed in one monitoring well (PAI-27-MW11S) at Site 55 during the 2010 sampling. USEPA's Johnson and Ettinger model should not be used when there is product in the groundwater, consequently, there is uncertainty associated with the estimated risks from vapor intrusion.

6.8 DATA EVALUATION – SITES 9 AND 16

Data evaluation, the first component of a baseline HHRA, is a medium-specific task involving the compilation and evaluation of analytical data. The second step (and the main objective) of the data evaluation is to develop a medium-specific list of COPCs that will be used to quantitatively and/or qualitatively determine potential human health risks for site media. COPCs are selected primarily based on a toxicity screen (i.e., a comparison of site contaminant concentrations to conservative toxicity screening values). A background screen (i.e., a comparison of site concentrations to background concentrations) is usually performed as part of the data evaluation, but no background data is available for Parris Island, consequently the background screen was not performed.

6.8.1 Data Usability

Soil samples used in this HHRA were collected during field investigations in 1988, 1995, 2010, and 2011. Only soil samples collected from the unsaturated zone (less than 8 feet bgs) were used in this HHRA. Groundwater samples used in this HHRA were collected during field investigations in 1999, 2007, 2008, 2010, and 2011. Appendix G.8 lists the samples that were used in the HHRA. A data quality review was conducted on the Site 9 and 16 data used for the HHRA. The data quality review was conducted to determine if data reporting limits were sufficient to evaluate the data and present any laboratory issues that may eliminate any data in the HHRA. The data quality review is provided in Appendix I.

Sites 9 and 16 are contiguous, thus suggesting that any receptors at this location are more likely to be exposed to media across both sites. Therefore, the data from Sites 9 and 16 were combined to form one exposure unit.

6.8.2 Data Evaluation

6.8.2.1 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 RBC is used to focus the risk assessment on meaningful chemicals and exposure routes.

In general, a chemical is selected as a COPC and retained for further quantitative risk evaluation if the maximum detection in a sampled medium exceeds the lowest RBC. Chemicals eliminated from further evaluation are assumed to present minimal risks to potential human receptors. Medium-specific tables summarizing the selection of COPCs are included in the risk assessment.

6.8.2.2 Derivation of Screening Criteria

The primary COPC screening criteria for environmental media at Sites 9 and 16 are derived from USEPA RSLs developed by the U.S. Department of Energy's ORNL (USEPA, 2011c). These RSLs are based on exposure pathways for which generally accepted methods, models, and assumptions have been developed (i.e., ingestion, dermal contact, inhalation) for specific land use conditions (residential, industrial). The COPC screening levels used to evaluate soil and groundwater data are listed in Tables 6-28 and 6-29, respectively, and defined in the following narrative.

Screening Levels for Soil - Screening levels to select COPCs for direct human contact exposures to surface and subsurface soil are based on USEPA RSLs for Residential Soil (USEPA, 2011c). COPC screening levels based on the USEPA RSLs correspond to a systemic HQ of 0.1 for noncarcinogens or an ILCR of $1x10^{-6}$ for carcinogens. In contrast, USEPA RSLs for noncarcinogens are based on an HQ of 1. The COPC screening levels derived for soils are based on an HQ of 0.1, to account for the potential cumulative effects of several chemicals affecting the same target organ or producing the same adverse noncarcinogenic effect.

Maximum chemical concentrations in soil were also compared to SSLs for groundwater protection, which were designed to protect groundwater at most sites (as published in the USEPA RSL table). These groundwater protection SSLs allow an initial qualitative evaluation of the potential for chemical migration from soil to groundwater. Chemicals with concentrations exceeding the SSLs' criteria may potentially migrate from the soil to groundwater in sufficient quantities to pose groundwater quality problems. Chemicals detected at concentrations exceeding the SSL for groundwater protection, but at

concentrations less than COPC screening levels for direct-contact risk, were not evaluated quantitatively in this HHRA.

Screening Levels for Groundwater - To be conservative, groundwater at the site was evaluated assuming potential residential groundwater use. COPC screening levels for groundwater are based on USEPA RSLs for tap water (USEPA, 2011c) and the primary federal SDWA MCLs (USEPA, 2011a).

The COPC screening levels based on USEPA RSLs for tap water correspond to a systemic HQ of 0.1 for noncarcinogens or an ILCR of $1x10^{-6}$ for carcinogens.

Federal SDWA MCLs for public drinking water supplies are enforceable standards designed to protect human health and promulgated under the federal SDWA. Primary MCLs are based on laboratory or epidemiological studies and apply to public water systems. A public water system is defined as a system providing water to the public for human consumption that either has at least 15 service connections or regularly serves an average of 25 individuals daily for at least 60 days per year. Primary MCLs are designed to prevent adverse human health effects, but also reflect the technical feasibility of removing a contaminant from water.

Groundwater screening levels (GSL_{vapor}) for evaluating the vapor intrusion to indoor air were derived using USEPA's Vapor Intrusion Screening Level (VISL) Calculator (USEPA, 2012). VISLs were derived using the referenced spreadsheet tool in concert with the residential air USEPA RSLs presented in the 2011c RSL table. Criteria were derived for those chemicals which are listed to be sufficiently volatile and sufficiently toxic in Appendix A of the DoD Vapor Intrusion Handbook (2009). The values correspond to a target cancer risk level of $1x10^{-6}$, or a HI of 0.1 for carcinogens and noncarcinogens, respectively. The GSL_{vapor} were derived to identify chemical concentrations in groundwater that may adversely affect the indoor air quality of a building overlying subsurface VOC contamination. The GSL_{vapor} assume a subsurface attenuation factor of 0.001 from groundwater concentrations to indoor air concentrations. Methodology for calculating the criteria and a copy of the calculated screening criteria are included in Appendix G.9.

Screening Levels for Lead - Guidance from the USEPA Office of Prevention, Pesticides, and Toxic Substances and the OSWER recommend 400 mg/kg as the lowest screening level for lead contaminated soil in a residential setting, where children are frequently present (USEPA, 1994). To be conservative, 400 mg/kg will be used as the screening level for COPC selection for soil. However, guidance from the USEPA Technical Review Workgroup for Lead indicates that "a reasonable screening level for soil lead at commercial/industrial (i.e., non-residential) sites is 800 mg/kg" for a typical non-contact-intensive worker

(USEPA, 2011b); 800 mg/kg is also the current USEPA RSL for soils, assuming an industrial land use scenario. The SDWA action level of 15 µg/L will be used as the screening level for lead in groundwater.

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., acenaphthylene, benzo(g,h,i)perylene, carbazole, din-n-octylphthalate, phenanthrene, alpha and gamma-chlordane, delta-BHC, Endosulfan I, Endosulfan II, Endosulfan Sulfate, Endrin Aldehyde, and Endrin Ketone]. In the COPC screening, acenaphthene was used as a surrogate for acenaphthylene, pyrene was selected as a surrogate for benzo(g,h,i)perylene and phenanthrene, chlordane was used as a surrogate for alpha- and gamma-chlordane, alpha-BHC was used as a surrogate for delta-BHC, Endosulfan was used as a surrogate for Endosulfan I, Endosulfan II, and Endosulfan Sulfate, and Endrin was used as a surrogate for Endrin Aldehyde and Endrin Ketone.

The screening criteria used in the selection of COPCs are summarized in Tables 6-28 and 6-29 for soil and groundwater, respectively.

6.8.2.3 Decision Rules for Establishing COPCs

The following decision rules were used to select an initial list of COPCs for Sites 9 and 16, using a combined data set from Sites 9 and 16:

- A chemical detected in soil was selected as a COPC for soil if any detected chemical concentration exceeds the screening levels for soils.
- A chemical detected in groundwater was selected as a COPC for groundwater if the maximum detected concentration in any well exceeds screening levels for groundwater.

6.8.3 <u>COPCs Selected for HHRA</u>

COPCs were selected for surface soil, subsurface soil, and groundwater using the COPC screening concentrations described in Section 6.8.2.2 and the decision rules described in Section 6.8.2.3. 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 6-30 through 6-35. A summary of the chemicals retained as COPCs is presented in Table 6-36. The RAGS Part D tables for chemicals retained as COPCs are included in Appendix G.10.

6.8.3.1 Surface Soil

Ten VOCs, 5 SVOCs, 18 PAHs, 21 pesticides/PCBs, and 23 inorganics were detected in surface soil samples collected at Sites 9 and 16. A comparison of maximum detected surface soil concentrations to screening levels based on RSLs for residential exposures is presented in Table 6-30. The following chemicals were detected at maximum concentrations exceeding direct contact risk-based COPC screening levels and were retained as COPCs for surface soil at Sites 9 and 16.

- PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, and benzo(a)pyrene equivalents]
- Pesticides/PCBs (4,4'-DDE, 4,4'-DDT, alpha-chlordane, Aroclor-1260, beta-BHC, endrin, gamma-chlordane, and heptachlor)
- Inorganics (antimony, arsenic, chromium, cobalt, copper, iron, lead, nickel, thallium, and zinc)

The maximum detected concentrations of antimony, copper, iron, nickel, thallium, zinc, and endrin exceeded the COPC screening levels (set at an HI of 0.1); however they do not exceed the RSLs. Thallium was only detected in one surface soil sample.

A comparison of the maximum detected surface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater is presented in Table 6-31. The following chemicals were detected at maximum concentrations in surface soil that exceeded the COPC screening levels for migration from soil to groundwater and were retained as COPCs for surface soil at Sites 9 and 16.

- VOCs (benzene, carbon tetrachloride, chloroform, and tetrachloroethene)
- PAHs [1-methynaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and naphthalene]
- Pesticides/PCBs (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, aldrin, alpha-BHC, alpha-chlordane, Aroclor-1260, beta-BHC, delta-BHC, dieldrin, endrin, endrin aldehyde, gamma-BHC, gamma-chlordane, heptachlor, and heptachlor epoxide)
- Inorganics (antimony, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, thallium, and zinc)
- SVOCs (bis(2-ethylhexyl)phthalate and pentachlorophenol)

Also, it should be noted that benzene, carbon tetrachloride, chloroform, tetrachloroethene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-d,c)pyrene, aldrin, Aroclor-1260, endrin, endrin aldehyde, thallium, bis(2-ethylhexyl)phthalate, and pentachlorophenol were not detected in groundwater samples at Sites 9 and 16. Although 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha-chlordane, gamma-BHC, cobalt, copper, lead, mercury, nickel, selenium and zinc were detected at concentrations greater than the screening level for migration from soil to groundwater, but these contaminants were not identified as COPCs in groundwater.

6.8.3.2 Subsurface Soil

One VOC, 12 PAHs, 15 pesticides/PCBs, and 20 inorganics were detected in subsurface soil samples collected at Sites 9 and 16. A comparison of maximum detected subsurface soil concentrations to screening levels based on RSLs for residential exposures is presented in Table 6-32. The following chemicals were detected at maximum concentrations exceeding direct contact risk-based COPC screening levels and were retained as COPCs for subsurface soil at Sites 9 and 16.

- Inorganics (aluminum, antimony, arsenic, and chromium)

The maximum detected concentrations of aluminum and antimony exceeded the screening levels (set at an HI of 0.1); however, they do not exceed the RSLs.

A comparison of the maximum detected subsurface soil concentrations to USEPA SSLs for chemical migration from soil to groundwater is presented in Table 6-33. The following chemicals were detected at maximum concentrations in subsurface soil that exceeded the COPC screening levels for migration from soil to groundwater and were retained as COPCs for subsurface soil at Sites 9 and 16.

- PAHs (naphthalene)
- Pesticides/PCBs (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, aldrin, alpha-chlordane, beta-BHC, delta-BHC, dieldrin, gamma-chlordane, and heptachlor epoxide)
- Inorganics (antimony, arsenic, chromium, cobalt, iron, mercury)

Also it should be noted that aldrin was not detected in groundwater samples at Sites 9 and 16. Although 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha-chlordane, gamma-chlordane, cobalt, and mercury were detected at concentrations greater than the migration from soil to groundwater criteria, they were not identified as COPCs in groundwater.

6.8.3.3 Groundwater

Six VOCs, 1 SVOC, 8 PAHs, 12 pesticides, and 20 inorganics were detected in groundwater samples collected at Sites 9 and 16. A comparison of the maximum detected groundwater concentrations to screening levels based on the RSLs for ingestion of tap water and USEPA MCLs is presented in Table 6-34. The following chemicals were detected in groundwater at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for groundwater at Sites 9 and 16.

- PAHs (1-methylnaphthalene and naphthalene)
- Pesticides (alpha-BHC, beta-BHC, delta-BHC, dieldrin heptachlor, and heptachlor epoxide)
- Inorganics (antimony, arsenic, chromium, iron, manganese)

The maximum detected concentrations of antimony, and manganese exceeded the screening levels (set at an HI of 0.1); however, they do not exceed the RSLs. Only heptachlor epoxide was detected in groundwater at a concentration which exceeded the USEPA MCL. Arsenic, naphthalene, and beta-BHC were only detected in one groundwater sample.

A comparison of maximum detected groundwater VOC concentrations to screening levels for chemical migration from groundwater through building foundations and into indoor air is presented in Table 6-35. No chemicals were detected in groundwater at maximum concentrations exceeding the COPC screening levels. Therefore, vapor intrusion was not evaluated in this risk assessment.

6.8.3.4 Summary

Table 6-36 summarize the chemicals retained as COPCs for soil and groundwater at Sites 9 and 16, respectively. RAGS Part D tables for COPC selection are included in Appendix G.10.

6.9 EXPOSURE ASSESSMENT – SITES 9 AND 16

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 Sites 9 and 16 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.

6.9.1 Conceptual Site Model

This section discusses the CSM for Sites 9 and 16. 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/migration pathways
- Exposure routes
- Potential receptors

Details on the site background, physical setting, environmental setting, previous investigations, and hazard identification for Sites 9 and 16 are presented in Sections 1 and 2. This section summarizes the information in Sections 1 and 2 as it applies to the CMS. Figure 6-3 illustrates the CSM for Sites 9 and 16.

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 Sites 9 and 16, are discussed below. Sources of contamination, contaminant release mechanisms, transport and migration pathways, exposure routes, and potential receptors are defined. Table 6-37 provides a site-specific summary of the potential receptors to be evaluated for Sites 9 and 16. A summary of the exposure routes that will be addressed quantitatively for each human receptor is provided in Table 6-38 for Sites 9 and 16.

6.9.1.1 Site Sources of Environmental Contamination

Site 9, the former Paint Waste Storage Area and Site 16, the Pesticide Rinsate Disposal Area, are located in an industrialized area of MCRD Parris Island. During the period between 1969 and 1984, while Site 9 was active, personnel from the Paint Shop placed liquid paint wastes and paint strippers in the storage drums, transported them to a waste oil facility and discharged the contents into an underground storage tank. The practice continued until 1978, when a contractor began to dispose of the wastes at an off-base incinerator site. An unknown amount of paint wastes may have been spilled at the storage area. In 1984, a site cleanup was performed, and 6 inches of surface soil were removed and the area was covered by a concrete pad. Since 1984, wastes have not been stored at this site (NEESA, 1986).

At Site 16, rinse waters from pest control spray application containers and equipment were disposed of on a grassy area located between Quonset Huts N282 and N277 (adjacent to Site 9) from 1950 to 1977. During this time, the site received an estimated 5 to 10 gallons per week of pesticide rinsate. The disposal area was approximately 6 feet by 25 feet. Pesticides used at the depot during this period included: aldrin, baygon, chlordane, dursban, malathion, naled, and DDT. Assuming a disposal rate of 250 to 400 gallons per year from 1950 to 1977, an estimated 8,000 gallons of rinsate were disposed of at Site 16.

6.9.1.2 Potential Contaminant Release Mechanisms and Transport/Migration Pathways

Past operations at Sites 9 and 16 have resulted in the release of contaminants to surface and subsurface soils. These contaminants have been (or may be) transported to adjoining soils and other environmental media (groundwater, air) by a variety of mechanisms.

- **Surface soil contaminant transport via wind erosion and vaporization.** Chemicals adsorbed to the surface soil particulates at Sites 9 and 16 may be transported off-site by wind erosion. The particulates (fugitive dusts) may then be deposited off-site if the grain size is small enough and the wind speed is great enough. Additionally, contaminants may be released from the soil by volatilization if present at significant concentrations. However, as noted above, Site 9 is covered by a concrete pad and Site 16 is covered with vegetation. This significantly limits the potential for airborne emissions from the sites.

- **Downward migration to and transport with groundwater**. The groundwater underlying Sites 9 and 16 is primarily recharged through the infiltration of precipitation and subsurface flow from upgradient/adjacent areas. This allows for the migration of contaminants downward through the buried wastes/soil column to the shallow groundwater. It has been determined that groundwater at Sites 9 and 16 likely flows to the northeast; therefore, surface soil contaminants that may potentially

leach to the subsurface soil and to groundwater are likely moving in a side-gradient direction away from proximate Sites 55 and 27. Because of the presence of a slight topographic rise between Sites 9 and 16 and Site 55, it is unlikely that these sites are hydraulically connected.

6.9.1.3 Potential Current and Future Receptors of Concern and Exposure Pathways

MCRD Parris Island is an active Marine Corp base and will remain active for the foreseeable future. At present there are no plans to develop Sites 9 and 16. Based on current and potential future land use, the following potential receptors may be exposed to contaminated environmental media at the Sites 9 and 16:

- **Construction Worker** – At Sites 9 and 16, the construction worker would be involved with any future development of the site. Construction workers could be exposed to surface and subsurface soils (incidental ingestion; dermal contact), shallow groundwater (dermal contact), as well as airborne contaminants emanating from these media (inhalation). It should be noted that significant exposures by a construction worker to groundwater is unlikely because if a construction worker were to have prolonged contact with groundwater then he/she would most likely wear protective clothing such as rubber boots and/or hip waders, which would limit the receptor's exposure. In addition, most excavation activities would utilize construction equipment such as a back hoe, which would limit a construction worker's exposure. Also, if significant groundwater was encountered during an excavation of a trench or foundation, the groundwater would most likely be pumped out of the excavation so that the construction activities could be completed.

- **Maintenance Worker** – An on-site receptor under current/future land use at Sites 9 and 16. This includes adult military or civilian personnel assigned to work (primarily grounds keeping) at Sites 9 and 16. However, grass mowing is the only current grounds keeping activity on-going at the study area. The maintenance worker could be exposed to soil (incidental ingestion; dermal contact), and air (inhalation) during grounds keeping or maintenance activities. It is anticipated that the facility maintenance worker would not be routinely exposed to groundwater. This receptor is expected to be exposed to surface soils on a less frequent basis (i.e., in terms of days per year) than the typical industrial or construction worker. This receptor could also be exposed to subsurface soil if subsurface soils were excavated and deposited on existing surface soils.

- **Industrial Worker** – This receptor is the standard default USEPA industrial worker. An industrial worker is a current and potential future receptor at Sites 9 and 16. This receptor could be exposed to surface soil (incidental ingestion; dermal contact) and air (inhalation). It is anticipated that this receptor would not be routinely exposed to groundwater. This receptor is expected to be exposed to surface soils over a longer time frame (but less intensely) than the construction worker. Industrial worker exposure to subsurface soil is unlikely; however, because future construction could potentially bring

subsurface soil to the surface, exposure to subsurface soil via incidental ingestion, dermal contact, and inhalation was evaluated for this receptor to aid in risk management decisions. If this receptor were to work in an on-site structure, this receptor could be exposed to VOCs migrating to the indoor air of a building from contaminated groundwater via vapor intrusion. However, industrial worker exposure to chemicals through vapor intrusion would likely be less intense than residential exposure to chemicals through vapor intrusion. Moreover, no COPCs were identified for the vapor intrusion pathway.

- **Adult Visitors** are individuals who may cross Sites 9 and 16 on their way to other places at the base. The adult visitor receptor is similar to the trespasser receptor. The adult visitor is being evaluated instead of an adult trespasser because access to the site is not restricted and the site is located in an area that is readily accessible by the public. This receptor could be exposed to surface soil (incidental ingestion; dermal contact) and air (inhalation). Adult visitor exposure to subsurface soil is unlikely; however, because future construction could potentially bring subsurface soil to the surface, exposure to subsurface soil via incidental ingestion, dermal contact, and inhalation was evaluated for this receptor to aid in risk management decisions.

- **Future On-site Residents** – Given the anticipated future land use for Sites 9 and 16, this is a very unlikely future receptor. However, the hypothetical 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), groundwater (ingestion, dermal contact), and air (inhalation). Also, hypothetical residents could be exposed to VOCs migrating from contaminated groundwater to the indoor air of a home. However, no COPCs were identified for the vapor intrusion pathway. (Please note that receptor exposure to subsurface soil would only occur if subsurface soils were excavated and deposited on existing surface soils. Although this is an unlikely scenario, it is included in this HHRA for purposes of completeness and to aid the risk managers regarding the need for deed restrictions.)

6.9.2 Exposure Point Concentrations

The EPC, calculated for COPCs only, is an estimate of chemical concentrations in an EU, and is used to estimate exposure intakes. An EU is the area over which receptor activity is expected. Sites 9 and 16 were evaluated as one EU. The following guidelines were used to calculate EPCs for the evaluation of COPC concentrations in these two EUs

- For soil data sets, the 95-percent UCL on the arithmetic mean, which is based on the distribution of the data set, was selected as the EPC unless the UCL exceeded the maximum detected concentration. In this case, the maximum detected concentration was used as the EPC. The

maximum concentration was also used as the EPC in the event of an insufficient number of detections (i.e., less than four positive detections in a data set), in accordance with USEPA guidance (2010b). EPCs were calculated following USEPA's Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (2002b) and using USEPA's ProUCL Version 4.1.00 (2010b).

- The sample quantitation limit was used as an input for non-detects to USEPA's ProUCL software to calculate the 95-percent UCL, in accordance with ProUCL guidance (USEPA, 2010b). Duplicates were averaged to calculate the EPCs for COPCs in environmental media.

- For groundwater data sets, the maximum detected groundwater concentration was selected as the EPC and the basis for determining indoor air concentrations associated with vapor intrusion.

- In accordance with USEPA's IEUBK Model (2010a) and the TRW Adult Lead Model (USEPA, 2003a, 2009b), average lead concentrations were used to estimate blood-lead levels from exposure to lead. This is because the first step in the model calculations is to develop a central estimate of blood-lead concentrations, which requires an "appropriate average concentration" for an individual.

Table 6-39 summarizes the EPCs used in this HHRA. Appendix G.8 lists the samples that were used in the calculation of the EPCs. ProUCL Outputs are included in Appendix G.11. RAGS Part D Tables for the EPCs are presented in Appendix G.10.

6.9.3 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 and are presented in the risk assessment spreadsheets. Risk assessment results are presented using the USEPA RAGS Part D tables' format. Assumptions regarding exposure are presented in Tables 6-40.

Non-carcinogenic intakes were estimated using the concept of an average annual exposure. Carcinogenic intakes were calculated as incremental lifetime exposures, which assume a life expectancy of 70 years. The exposure assumptions reflect current USEPA guidance. 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 1989, 1991, 1997b, and July 2004b). The following paragraphs discuss the non-default receptor-specific exposure assumptions used in the risk assessment.

6.9.3.1 Incidental Ingestion of Soil

Direct physical contact with surface and/or subsurface soil at Sites 9 and 16 may result in the incidental ingestion of chemicals. Chemical intake for the incidental ingestion of soil is estimated in the following manner (USEPA, 1989):

$$\text{Intake} = \frac{(C_{soil})(IR)(FI)(EF)(ED)(CF)}{(BW)(AT)}$$

where:

Intake	=	intake of chemical from soil (mg/kg/day)
C_{soil}	=	concentration of chemical in soil (mg/kg)
IR	=	ingestion rate (mg/day)
FI	=	fraction ingested from contaminated source (dimensionless)
EF	=	exposure frequency (days/yr)
ED	=	exposure duration (yr)
CF	=	conversion factor (1×10^{-6} kg/mg)
BW	=	body weight (kg)
AT	=	averaging time (days);
		for noncarcinogens, AT = ED x 365 days/yr;
		for carcinogens, AT = 70 yr x 365 days/yr

Most of the exposure assumptions that will be used to estimate chemical intakes from incidental ingestion of soil are based on default assumptions described in the standard USEPA guidance for the evaluation of the hypothetical future resident, typical industrial worker, or construction worker and are summarized in Table 6-40. The following paragraphs briefly discuss the non-default, receptor-specific exposure assumptions (for incidental ingestion of soil) that will be used in the HHRA.

There are no USEPA default recommendations for exposure frequency for the construction workers, maintenance workers, or adult visitor potentially exposed to soil. Consequently values were derived based on site-specific information and professional judgment. Construction activities for neighboring Site 27 are planned to last seven months; therefore, an exposure frequency of 210 days was used for the construction worker at Site 27. Because Sites 9 and 16 are proximate to Site 27, an exposure frequency of 210 days was also used for the hypothetical construction worker at Sites 9 and 16. Maintenance workers and adult visitors are assumed to be exposed to soil 1 day per week (or 50 days a year).

6.9.3.2 Dermal Contact with Soil

Direct physical contact with soil may result in the dermal absorption of chemicals. Exposure associated with dermal contact with soil is estimated in the following manner (USEPA, 2004b):

$$\text{Intake} = \frac{(C_{soil})(SA)(AF)(ABS)(CD)(EV)(EF)(ED)}{(BW)(AT)}$$

where:

Intake	=	amount of chemical absorbed during contact with soil (mg/kg/day)
C_{soil}	=	concentration of chemical in soil (mg/kg)
SA	=	skin surface area available for contact (cm^2)
AF	=	skin adherence factor (mg/cm^2/event)
ABS	=	absorption factor (dimensionless)
CF	=	conversion factor (1×10^{-6} kg/mg)
EV	=	event frequency (events/day)
EF	=	exposure frequency (days/yr)
ED	=	exposure duration (yr)
BW	=	body weight (kg)
AT	=	averaging time (days);
		for noncarcinogens, AT = ED x 365 days/yr;
		for carcinogens, AT = 70 yr x 365 days/yr

Most of the exposure assumptions that will be used to estimate chemical intakes from dermal contact with soil are based on the default assumptions described in the standard USEPA guidance for the evaluation of the hypothetical future resident, industrial worker, or construction worker. The following paragraphs briefly discuss non-default, receptor-specific exposure assumptions (for dermal contact with soil) that will be used in the HHRA.

A summary of the receptor-specific input values that will be used to estimate chemical intakes from dermal contact with soil are presented in Table 6-40. The same exposure frequencies and durations recommended for the evaluation of the incidental ingestion of soil are used to estimate chemical intakes for dermal contact with soil. The soil adherence factors presented are those listed in Exhibits 3.3 and 3.5 of RAGS Part E. To the extent possible, chemical specific dermal absorption factors provided in RAGS Part E and USEPA Region IV guidance were used to evaluate the COPCs for soil. The dermal absorption factors used in this HHRA are presented in Table 6-41.

6.9.3.3 Inhalation of Air Containing Fugitive Dust/Volatiles Emitted from Soil

Intakes of both particulates and vapors/gases are calculated using the same equation, as follows (USEPA, 2009a):

$$EC = \frac{(C_{air})(ET)(EF)(ED)}{(AT)(24\ hours/day)}$$

where:

EC	=	exposure concentration (mg/m^3)
C_{air}	=	concentration of chemical in air (mg/m^3)
ET	=	exposure time (hours/day)
EF	=	exposure frequency (days/yr)
ED	=	exposure duration (yr)
AT	=	averaging time (hours);
	=	for noncarcinogens, AT = ED x 365 days/yr;
	=	for carcinogens, AT = 70 yr x 365 days/yr

Some of the exposure assumptions that will be used to estimate chemical intakes from inhalation of fugitive dusts/volatile emissions from surface and subsurface soils are based on default assumptions described in the standard USEPA guidance and are summarized in Table 6-40. The same exposure frequencies and durations used to estimate incidental ingestion of soil intakes are used to estimate exposure via inhalation of fugitive dust/volatile emissions for surface and subsurface soils.

The concentrations of chemicals in air resulting from emissions from soil were developed following procedures presented in USEPA Soil Screening Guidance (USEPA, 2002b). The chemical concentration in air is calculated as follows:

$$C_{air} = C_{soil} \times \left[\frac{1}{PEF} + \frac{1}{VF}\right]$$

where:

C_a	=	chemical concentration in air, mg/m^3
C_s	=	chemical concentration in soil, mg/kg
PEF	=	Particulate emission factor, m^3/kg
VF	=	volatilization factor, m^3/kg

No volatile chemicals were retained as COPCs in surface and subsurface soil; therefore, the above equation reduces to:

$$C_{air} = C_{soil} \times \left[\frac{1}{PEF} \right]$$

The particulate emissions factor, PEF, relates the concentration of the chemical in soil with the concentration of dust particles in air. A PEF value of 9.63 x 10^{+9} m^3/kg was obtained from USEPA's Soil Screening Internet site located at http://risk.lsd.ornl.gov/calc_start.htm. This is the default value for Charleston, South Carolina which is the closest city to Parris Island listed on the Internet site. Because air emissions resulting from fugitive dust emissions settings will be different than dust emissions generated during construction activities, a separate PEF was used for construction activities. The PEF for construction workers (1.27 x 10^{+6} m^3/kg) was calculated using the equations presented in the supplemental SSL guidance document (USEPA, 2002b). Sample PEF calculations were calculated are presented in Appendix G.12.

6.9.3.4 Ingestion of Groundwater

Ingestion of groundwater at Sites 9 and 16 is expected to be limited to exposure that would occur under a future residential scenario. Hypothetical future on-base residential receptors are conservatively assumed to use groundwater as a potable water source and may be exposed to groundwater via direct ingestion. Groundwater exposure for hypothetical future on-site residents would occur on a daily basis. Intakes associated with ingestion of groundwater will be evaluated using the following equation (USEPA, 1989):

$$\text{Intake} = \frac{(C_{gw})(IR)(EF)(ED)}{(BW)(AT)}$$

where:

Intake	=	intake of chemical from groundwater (mg/kg/day)
C_{gw}	=	concentration of chemical in groundwater (mg/L)
IR	=	ingestion rate for groundwater (L/day)
EF	=	exposure frequency (days/yr)
ED	=	exposure duration (yr)
BW	=	body weight (kg)
AT	=	averaging time (days);
		for noncarcinogens, AT = ED x 365 days/yr;
		for carcinogens, AT = 70 yrs x 365 days/yr

All of the exposure assumptions that will be used to estimate chemical intakes from ingestion of groundwater are default assumptions described in the standard USEPA guidance and are summarized in Table 6-40.

6.9.3.5 Dermal Contact with Groundwater

Direct contact with groundwater at Sites 9 and 16 is expected to be limited to exposure that would occur under future on-site residential and construction scenarios. Hypothetical future on-site residential receptors are assumed to use groundwater for domestic purposes (i.e., bathing, showering, washing dishes), that can result in a dermal exposure. A construction worker may be dermally exposed to shallow groundwater during potential future excavation activities at Sites 9 and 16 (e.g., shallow groundwater pooling at the bottom of an excavation pit.).

The following equation is used to assess exposures resulting from dermal contact with groundwater (USEPA, 2004b):

$$DAD = \frac{(DA_{event})(EV)(ED)(EF)(SA)}{(BW)(AT)}$$

where:

DAD	=	dermally absorbed dose of chemical from water (mg/kg/day)
DA_{event}	=	dermally absorbed dose per event (mg/cm^2-event)
EV	=	event frequency (events/day)
ED	=	exposure duration (yr)
EF	=	exposure frequency (days/yr)
SA	=	skin surface area available for contact (cm^2)
BW	=	body weight (kg)
AT	=	averaging time (days);
		for noncarcinogens, AT = ED x 365 days/yr;
		for carcinogens, AT = 70 yrs x 365 days/yr

Most of the exposure assumptions that will be used to estimate chemical intakes from dermal contact with groundwater are based on default assumptions described in the standard USEPA guidance and are summarized in Table 6-40. Dermal intakes for residents will assume total body exposure on a daily basis. There are no USEPA default assumptions for the exposure frequency for a construction worker exposed to groundwater. Consequently values were derived based on site-specific information and professional judgment. The development plans for neighboring Site 27 indicate that construction would last for 7 months. However, construction workers are assumed to be exposed to groundwater 4 hours/day for 30 days a year. A shorter exposure frequency is recommended for a construction worker exposed to groundwater than is recommended for exposure to soil because it is unlikely that a construction worker will have direct contact with groundwater on a daily basis during a construction project.

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:

$$\text{If } t_{event} < t^*, \text{ then: } DA_{event} = (2)(K_p)(FA)(C_{wi})(CF)\left(\sqrt{\frac{6\,\tau\, t_{event}}{\pi}}\right)$$

$$\text{If } t_{event} > t^*, \text{ then: } DA_{event} = (K_p)(FA)(C_w)(CF)\left(\frac{t_{event}}{1+B} + 2\,\tau\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right)$$

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, FA, τ, and B) are obtained from the current dermal guidance (USEPA, 2004b, Exhibit B-3) and are presented in Table 6-41. If published values are not available for a particular compound, they were calculated using equations provided in the USEPA dermal guidance. While the dermal guidance provides chemical specific values for PAHs, the guidance also recommends that dermal absorption of PAHs in water not be evaluated quantitatively in a HHRA because such evaluations are outside of the effective predictive domain of the model. Therefore, no chemical-specific parameters are included in Table 6-41 for PAHs and dermal exposures to PAHs in groundwater were not evaluated in this HHRA.

The following steady-state equation is used to estimate DA_{event} for inorganics:

$$DA_{event} = (K_p)(C_{wi})(t_{event})$$

The dermal permeability coefficient (K_p) values recommended in the USEPA dermal guidance (USEPA, 2004b) were used to calculate DA_{event} for inorganic COPCs.

6.9.3.6 Inhalation of Volatiles in Groundwater

Groundwater exposure may also result in chemical intake through inhalation if the water resource is used as a domestic water supply or is exposed during construction activities, and VOCs are present in the groundwater. This exposure route is plausible for residential receptors that may be exposed while showering, bathing, washing dishes, etc., or for construction workers contacting shallow groundwater during excavation activities. Per USEPA Region 4 risk assessment protocol, it will be assumed that the chemical intake resulting from a showering exposure is equivalent to the chemical intake from ingestion of two liters of water. Inhalation exposures for the construction worker shall be estimated using an air intake estimation model.

For construction workers, chemical intakes from inhalation exposure due to the volatilization of COPCs in groundwater are estimated in the following manner (USEPA, 2009a):

$$EC = \frac{(C_{air})(ET)(EF)(ED)}{(AT)(24\ \text{hours}/\text{day})}$$

where:

EC	=	exposure concentration (mg/m^3)
C_{air}	=	concentration of chemical in air (mg/m^3)
ET	=	exposure time (hours/day)
EF	=	exposure frequency (days/yr)
ED	=	exposure duration (yr)
AT	=	averaging time (days);
	=	for noncarcinogens, AT = ED x 365 days/yr;
	=	for carcinogens, AT = 70 yr x 365 days/yr

Construction workers may be exposed to COPCs that have volatilized from groundwater when excavation exposes the shallow water table. The same exposure frequency and exposure time used to estimate intake from dermal contact with groundwater will be used to evaluate intake from inhalation of VOCs from groundwater during construction activities.

There are no well-established models available for estimating migration of volatiles from groundwater into a construction/utility trench. To estimate the EPC for air in a construction trench, the HHRA will use an approach suggested by the VDEQ (2008), which 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). The VDEQ methodology is described in the following paragraphs.

The airborne concentration of a contaminant in a trench can be estimated using the following equation:

$$C_{air} = C_{GW} \times VF$$

where:

C_{air} = 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)

It is assumed that a construction project could result in an excavation of 15 feet bgs or less. If the depth to groundwater at a site is less than 15 feet, the VDEQ model assumes 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 is 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:

Ki = overall mass transfer coefficient of contaminant (cm/s)
A = area of the trench (m^2)
F = fraction of trench 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/hr)

Studies of urban canyons suggest that if the ratio of trench width, relative to wind direction, relative to trench depth, is less than or equal to 1, a circulation cell or cells will be set up within the trench that limits the degree of gas exchange with the atmosphere and, based upon measured ventilation rates of buildings, the ACH is assumed to be 2/hr. Based upon the ratio of trench depth to the average wind speed, if the ratio of trench width to trench depth is greater than one, then the air exchange between the trench and above-ground atmosphere is not restricted, and the ACH is assumed to be 360/hr. The exposure assessment performed for this HHRA will assume the width to trench depth ratio is greater than 1; therefore, the ACH is set at 360 per hour.

$$K_i = 1 / \{(1/k_iL) + [(RT) / (H_i\ k_iG)]\}$$

where:

k_iL = liquid-phase mass transfer coefficient of i (cm/s)

R = ideal gas constant (atm-m^3/mole-°K) = 8.2×10^{-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)

The formulas for calculating k_iL and k_iG are presented below:

$$k_iL = (MWO_2/MW_i)^{0.5} \times (T/298) \times kL,O_2$$

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 cm/s.

$$k_iG = (MWH_2O/MW_i)^{0.335} \times (T/298)^{1.005} \times kG,H_2O$$

where:

k_iG = 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 (Superfund Exposure Assessment Manual, USEPA, 1988).

Chemical properties were obtained from the USEPA RSL Table (2011c) and are presented in Table 6-42.

6.9.3.7 Assessing Cancer Risks from Early Life Exposures

USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005b) recommends making adjustments to the toxicity of carcinogenic chemicals that act via the mutagenic mode of action when evaluating early-life exposures. The guidance recommends using ADAFs combined with age-specific exposure estimates when assessing cancer risks. In the absence of

chemical-specific data, the supplement guidance recommends the following default adjustments, which reflect the fact that cancer risks are generally higher from early-life exposures than from similar exposures later in life:

- For exposures before 2 years of age (i.e., spanning a 2-year interval from the first day of birth until a child's second birthday), a 10-fold adjustment.
- For exposures between 2 and 16 years of age (i.e., spanning a 14-year time interval from a child's second birthday until their sixteenth birthday), a three-fold adjustment.
- For exposures after turning 16 years of age, no adjustment.

The adjustments were applied using the same method as that used by ORNL in the development of RSLs. Children were evaluated as two age groups, ages 0 to 2 years and ages 2 to 6 years, and adults were evaluated as two age groups, ages 6 to 16, and ages greater than 16 years old. Using this approach, the intakes for child and adult hypothetical residents were calculated as follows:

$$\text{Intake}_{\text{Child}} = \text{Intake}_{(\text{ages } 0 - 2 \text{ years})} \times 10 + \text{Intake}_{(\text{ages } 2 - 6 \text{ years})} \times 3$$
$$\text{Intake}_{\text{Adult}} = \text{Intake}_{(\text{ages } 6 - 16 \text{ years})} \times 3 + \text{Intake}_{(\text{ages} > 16 \text{ years})}$$

The above approach was used only for those chemicals that are identified as mutagenic in the ORNL screening table (e.g., carcinogenic PAHs, hexavalent chromium). Sample calculations showing how this approach was applied are included in Appendix G.12.

6.9.3.8 Vapor Intrusion into Buildings

Future industrial workers and hypothetical residents may be exposed to COPCs that have volatilized from groundwater and migrated through building foundations into indoor air. However, no COPCs were identified when concentrations were compared to the screening levels. Therefore, the vapor intrusion pathway was not evaluated in this HHRA.

6.9.3.9 Exposure to Lead

The equations and methodology presented in the previous section cannot be used to evaluate exposure to lead because of the absence of published dose-response parameters. Thus, exposure to lead was assessed using the following models:

- USEPA's IEUBK Model for Lead, Version 1.1 Build 11 (2010a). This model is typically used to evaluate lead exposure assuming a residential land-use scenario.

- USEPA's TRW Model for Lead (2003a and 2009b). This model is typically used to evaluate lead exposure assuming a non-residential land-use scenario.

The IEUBK model for lead (USEPA, 2010a) is designed to estimate blood levels of lead in children less than 7 years old 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 a "concern."

The IEUBK model for lead was used to address exposure to lead in children when detected groundwater concentrations exceeded the 15 µg/L federal action level promulgated under the SDWA and when detected soil concentrations exceeded the OSWER SSL 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 to support this analysis and are included in Appendix G.13.

Non-residential adult exposure to lead in soil was evaluated using USEPA's TRW model for lead (2003a and 2009b). In this model, adult exposure to lead in soil is addressed by evaluating the relationship between lead concentrations in site soil and the blood-lead concentrations in the developing fetuses of adult women. The Adult Lead Model generates a spreadsheet for each exposure scenario evaluated (i.e., industrial). Model outputs are the probabilities that blood-lead concentrations in fetuses will exceed 10 µg/L. These probabilities were calculated in accordance with the following USEPA guidelines:

- Use of the TRW Interim Adult Lead-Methodology in Risk Assessment (2003a, 2009b)
- Frequently Asked Questions (FAQs) on the Adult Lead Model (2011b)

6.9.3.10 Summary of Exposure Parameters

Table 6-40 summarizes exposure input parameters for all exposure pathways for identified potential receptor groups at Sites 27 and 55. In general, standard default parameters (e.g., USEPA, 1989; 1991; 1997b; and 2004b), which combine mid-range and upper-end exposure factors, were used to assess RME conditions.

6.10 TOXICITY ASSESSMENT – SITES 9 AND 16

The toxicity assessment seeks to identify potential adverse health 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 constituents of concern. Quantitative toxicity values determined during this component of the risk assessment are integrated with exposure assessment outputs to characterize the potential occurrence of adverse health effects for each receptor group.

The RfD is the toxicity value used to evaluate non-carcinogenic health effects for ingestion and dermal exposures. The RfC is used to evaluate non-carcinogenic health effects for inhalation exposures. The RfD and RfC estimate a daily exposure level for a human population that is unlikely to pose an appreciable risk during a portion or for all of a human lifetime. It is based on a review of animal and/or human toxicity data, with adjustments for various data uncertainties. Carcinogenic effects are quantified using the CSF for ingestion and dermal exposures, and using IURs for inhalation exposure that are plausible upper-bound estimates of the probability of the development of cancer per unit intake of the chemical over a lifetime. These are typically based on dose-response data from human and/or animal studies.

6.10.1 Toxicity Criteria for Oral and Inhalation Exposures

Oral RfDs and CSFs and inhalation RfCs and IURs used in this risk assessment were obtained from the following primary USEPA literature sources selected per USEPA guidance (2003b):

- Tier 1 - Integrated Risk Information System (IRIS)
- Tier 2 - USEPA's 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 chemical-specific PPRTVs when requested by USEPA's Superfund program.
- Tier 3 - Other toxicity values — These sources include, but are not limited to, California Environmental Protection Agency (Cal EPA) toxicity values, Agency for Toxic Substances and Disease Registry (ATSDR) values, and the Annual Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997a).

Although toxicity criteria 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 its values are verified

by USEPA. Toxicity criteria for the constituents identified as COPCs for Sites 9 and 16 are presented in Tables 6-43 through 6-46.

6.10.2 Toxicity Criteria for Dermal Exposure

RfDs and CSFs in the scientific literature are typically expressed as "administered" (i.e., not absorbed) doses. Therefore, these values are considered inappropriate for estimating risks associated with dermal exposures. Oral dose-response parameters based on administered doses must be adjusted to absorbed doses before they can be compared to estimated dermal exposure intakes.

When oral absorption is essentially complete (i.e., 100 percent), an absorbed dose is equivalent to the administered dose, and therefore no toxicity adjustment is necessary. Conversely, when the gastrointestinal absorption of a chemical is poor (e.g., 1 percent), the absorbed dose is smaller than the administered dose; thus, toxicity factors based on absorbed dose should be adjusted to account for the difference in the absorbed dose relative to the administered dose. USEPA (2004b) recommends a 50-percent absorption cut-off to reflect the intrinsic variability in analyzing absorption studies. Therefore, the adjustment from administered to absorbed dose was only performed when the chemical-specific gastrointestinal absorption efficiency was less than 50 percent. The adjustment from administered to absorbed dose was made using chemical-specific gastrointestinal absorption efficiencies published in numerous sources of guidance [e.g., USEPA 2004b (the primary reference), IRIS, ATSDR toxicological profiles, etc.] using the following equations:

$$RfD_{dermal} = (RfD_{oral})(ABS_{GI})$$

$$CSF_{dermal} = (CSF_{oral})/(ABS_{GI})$$

where:

ABS_{GI}	=	absorption efficiency in the gastrointestinal tract
RfD_{dermal}	=	reference dose for dermal exposures
RfD_{oral}	=	reference dose for oral exposures
CSF_{dermal}	=	cancer slope factor for dermal exposures
CSF_{oral}	=	cancer slope factor of oral exposures

As noted, the preceding adjustment of the oral toxicity criteria (i.e., RfDs, CSFs) is necessary so that the dermal route of exposure may be quantitatively evaluated in the baseline risk assessment. Further explanation of this procedure and its necessity are presented in Appendix A of USEPA RAGS Part A.

6.10.3 Toxicity Criteria for Chromium

Toxicity criteria are available for different forms of chromium (trivalent and hexavalent), which is considered to be more toxic in the hexavalent state. Hexavalent chromium was not anticipated to be present in significant quantities at Sites 9 and 16. Therefore, environmental samples collected at Sites 9 and 16 were analyzed for total chromium only, not hexavalent chromium. However, risks were conservatively calculated assuming that all of the reported total chromium result is attributable to hexavalent chromium.

6.10.4 Toxicity Criteria for the Carcinogenic Effect 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 the 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 TEFs based on the potency of each compound relative to that of benzo(a)pyrene, as presented in current USEPA guidance (USEPA, 1993; USEPA Region IV, 2000). The TEFs are used to convert each individual carcinogenic PAH concentration into an equivalent concentration of benzo(a)pyrene. TEFs for the individual carcinogenic PAHs are as follows:

Compound	TEF
Benzo(a)anthracene	0.1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.01
Chrysene	0.001
Dibenzo(a,h)anthracene	1
Indeno(1,2,3-cd)pyrene	0.1

6.10.5 Mutagenic Chemicals

USEPA's Guidelines for Carcinogen Risk Assessment (2005a) and Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005b) specify the use of ADAFs for carcinogens that act via a mutagenic mode of action. Carcinogenic PAHs and hexavalent chromium are included in the group of chemicals that have been determined to act via the mutagenic mode of action. No chemical-specific ADAFs have been derived for carcinogenic PAHs and hexavalent chromium; therefore, the following defaults ADAFs were used: 10 for ages 0 to 2, 3 for ages 2 to 16, and 1 (no adjustment) for

ages 16 to 70. The ADAFs were used in evaluating exposures to carcinogenic PAHs and hexavalent chromium for hypothetical residents using the approach presented in Section 6.9.3.7.

6.11 RISK CHARACTERIZATION – SITES 9 AND 16

This section provides a characterization of the potential human health risks associated with the potential exposures to COPCs at Sites 9 and 16. Potential risks (noncarcinogenic and carcinogenic) for human receptors resulting from exposures outlined in the exposure assessment were quantitatively determined during the risk characterization component of this HHRA. Sections 6.11.1 and 6.11.2 outline the methods used to quantitatively estimate the type and magnitude of potential risks for human receptors. Summaries of the risk characterization for Sites 9 and 16 are provided in Section 6.11.3.

6.11.1 Quantitative Analysis of Constituents Other Than Lead

Quantitative estimates of risk for chemicals other than lead were calculated according to risk assessment methods outlined in USEPA guidance (1989). Lifetime cancer risks are expressed in the form of dimensionless probabilities referred to as ILCRs, based on CSFs and IURs. Non-carcinogenic risk estimates are presented in the form of HQs, which are determined by comparing intakes to published RfDs and RfCs.

ILCR estimates for ingestion and dermal exposures were generated for each COPC using estimated exposure intakes and published CSFs, as follows:

$$\text{ILCR} = (\text{Estimated Exposure Intake})(\text{CSF})$$

If the equation above produces an ILCR greater than 0.01, the following equation is used:

$$\text{ILCR} = 1-[\exp(-\text{Estimated Exposure Intake})(\text{CSF})]$$

ILCR estimates of inhalation exposures are generated for each COPC using estimated exposure concentrations and published IURs, as follows:

$$\text{ILCR} = (\text{IUR})(\text{Exposure Concentration})(1000\ \mu\text{g/mg})$$

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.

Non-carcinogenic risks were assessed using the concept of HQs and HIs. The HQ for a COPC is the ratio of the estimated intake to the RfD and is calculated for ingestion and dermal exposures as follows:

$$HQ = (\text{Estimated Exposure Intake})/(\text{RfD})$$

For inhalation exposures, the HQ is calculated as follows:

$$HQ = (\text{Exposure Concentration})/(\text{RfC})$$

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 non-carcinogenic (threshold) effects.

6.11.2 Interpretation of Risk Assessment Results

To interpret the quantitative risk estimates and to aid risk managers in determining the need for remediation, quantitative risk estimates were compared to typical USEPA risk benchmarks. Calculated ILCRs were interpreted using USEPA's target cancer risk range ($1x10^{-4}$ to $1x10^{-6}$). HIs were evaluated against a benchmark value of 1. Current USEPA policy regarding lead exposures is to limit the childhood risk of exceeding a 10 µg/dL blood-lead level to 5 percent.

USEPA defines the range of $1x10^{-4}$ to $1x10^{-6}$ as the ILCR target range for hazardous waste facilities addressed under CERCLA and RCRA. Individual or cumulative ILCRs greater than $1x10^{-4}$ are generally considered "unacceptable" by USEPA. Risk management decisions are necessary when the ILCR is within $1x10^{-4}$ to $1x10^{-6}$. USEPA typically does not require remediation when the cumulative ILCR is less than $1x10^{-6}$.

An HI exceeding unity (1) indicates that there may be non-carcinogenic health risks associated with exposure. If an HI exceeds unity, target organ effects associated with exposure to COPCs are considered. Only those HQs for chemicals that affect the same target organ(s) or exhibit similar critical effect(s) are regarded as truly additive. Consequently, it may be possible for the cumulative HI to exceed 1, but no adverse health effects are anticipated if the COPCs do not affect the same target organ or exhibit the same critical effect (i.e., target-organ/critical effect-specific HIs do not exceed 1).

6.11.3 Results of the Risk Characterization

This section contains a summary of the results of the risk characterization for Sites 9 and 16. Quantitative risk estimates for potential human receptors were developed for those chemicals identified as COPCs.

Uncertainties associated with the risk estimates are discussed in Section 6.12. The methodology used to calculate the risks presented in this section was discussed in Sections 6.9 and 6.10. Potential ILCRs and HIs were calculated for construction workers, maintenance workers, default industrial workers, adult visitors, and hypothetical future child and adult residents to aid in risk management decisions. Potential ILCRs and HIs for Sites 9 and 16 are summarized in Tables 6-47. Sample calculations are presented in Appendix G.12, and the results of the risk assessment in RAGS Part D format are included in Appendix G.10.

6.11.3.1 Non-Carcinogenic Risks

Table 6-47 presents the HIs for Sites 9 and 16. Cumulative HIs for all receptors with the exception of hypothetical child and adult residents were less than or equal to unity (1), indicating that adverse noncarcinogenic health effects are not anticipated for these receptors under the defined exposure conditions. Cumulative HIs for hypothetical and adult child residents exposed to soil and groundwater exceeded unity.

The HI for hypothetical child residents exposed to surface soil (HI = 2) exceeded unity. However, the HIs for target organs were less than unity, as shown below.

Hypothetical Child Residents Surface Soil	
Target Organ	**Hazard Index**
Blood	0.2
Body Weight	0.1
Gastrointestinal System	0.2
Liver	0.7
Skin	0.2
Thyroid	0.2
Cardiovascular System	0.2

The HI for hypothetical child residents exposed to subsurface soil was less than unity. The HI for hypothetical child residents using the groundwater as a domestic water source (HI = 8) exceeded unity (1). HIs for hypothetical adult residents exposed to surface soil (HI = 0.3) and subsurface soil (HI = 0.05) were less than unity. The HI for hypothetical adult residents using the groundwater (HI = 4) as a domestic water source exceeded unity, primarily due to heptachlor epoxide (HQ = 2).

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6.11.3.2 Carcinogenic Risks

Table 6-47 presents the ILCRs for Sites 9 and 16. Cumulative ILCRs for construction workers, maintenance workers, industrial workers, and adult visitors exposed to soil and groundwater were within USEPA's target risk range of 10^{-4} to 10^{-6}.

The cumulative ILCRs for hypothetical child, adult, and lifelong residents exposed to soil and groundwater exceeded USEPA's target risk range. Media specific ILCRs for exposures to surface soil by hypothetical adult residents and to subsurface soil by hypothetical child, adult, and lifelong residents were within the USEPA target risk range. The ILCR for hypothetical child and lifelong residents exposed to surface soil exceeded the upper bound of USEPA's target risk range. ILCRs for hypothetical child, adult, and lifelong residents for direct contact exposures to groundwater exceeded USEPA's target risk range. Carcinogenic PAHs, 4,4'-DDE, 4,4'-DDT, Aroclor 1260, heptachlor, alpha-chlordane, gamma-chlordane, arsenic, and chromium were the major contributors to the ILCRs for soil. Alpha-BHC, beta-BHC, delta-BHC, heptachlor, heptachlor epoxide, arsenic, and chromium were the major contributors the ILCRs for groundwater.

6.11.3.3 Lead Risks

Lead was identified as a COPC in surface soil at Sites 9 and 16. The maximum detected concentration in surface soil (826 mg/kg) exceeded the OSWER soil screening level of 400 mg/kg for residential land use.

Hypothetical residential exposures to lead in surface soil were evaluated using USEPA's IEUBK lead model (USEPA, 1994 and 2010a). The most recent version of this model (version 1.1, build 11) was used for the analysis. As recommended in the model's documentation, the average lead concentration of 98.4 mg/kg for surface soil was used as the EPC at Sites 9 and 16. Default values were used for the remaining model input parameters. IEUBK model outputs are included in Appendix G.13. A young child resident (0 to 6 years of age) is the receptor of concern. At Sites 9 and 16, the lead concentration of 98.4 mg/kg in surface soil results in less than 1 percent of future on-site child residents having a blood-lead level greater than 10 µg/dL and results in a geometric mean blood-lead level of 1.7 µg/dL. These results of less than 1 percent of future on-site child residents having a blood-lead level greater than 10 µg/dL is not at variance with the USEPA goal as described in the 1994 OSWER Directive of no more than 5 percent of children exceeding a 10 µg/dL blood-lead level.

Risks to construction workers, industrial workers, and adult visitors exposed to lead in soil were evaluated using a slope factor approach developed by the USEPA TRW for lead (USEPA, 2003a and 2009b). As the model (often referred to as the Adult Lead Model) recommends, average lead concentrations in surface soil were used as the EPCs. Based on this information, the incidental soil ingestion rate was assumed to be 330 mg/day for the construction worker and 100 mg/day for industrial workers and

maintenance workers (USEPA, 2002c) and 50 mg/day for adult visitors (USEPA, 1989). An exposure frequency of 210 days per year was assumed for the construction worker, 250 days per year for the industrial worker, and an exposure frequency of 50 days per year was assumed for the maintenance worker and the adult visitor. Values of 1.8 and 1.0 µg/dL were used for the standard deviation and baseline blood-lead concentration, respectively, (USEPA, 2009b). Default parameters were used for the remaining model input parameters. Results of the model runs are included in Appendix G.13.

The fetus of a pregnant worker is the ultimate receptor of concern for the TRW model. Results of the modeling are shown below.

Receptor	Medium	Blood-Lead Geometric Mean Concentration (µg/dL)	Percent of Receptors with Blood-Lead Level Exceeding 10 µg/dL
Maintenance Workers	Surface Soil	1.1	0.003
Construction Workers	Surface Soil	1.9	0.132
Industrial Workers	Surface Soil	1.3	0.015
Adult Visitors	Surface Soil	1.0	0.003

The results for construction workers, industrial workers, and adult visitors are not at variance with the USEPA goal of no more than 5 percent of children (fetuses of exposed women) exceeding a 10 µg/dL blood-lead level.

6.11.3.4 Contaminants of Concern

COCs are those COPCs that are significant contributors to risk. For those media where the ILCR is greater than 1 x 10^{-4} or the total HI and target organ HI is greater than unity, the COCs are those chemicals with individual ILCRs greater than 1x 10^{-6} or an HQ greater than 0.1.

In this HHRA, surface soil and groundwater are the media which exceed the risk criterion for identifying COCs. The ILCRs for child and lifelong residents is 2 x 10^{-4} and the cumulative HI is 11. The surface soil COCs (Table 6-48) are:

- Carcinogenic PAHs
- 4,4'-DDE
- 4,4'-DDT
- Alpha-chlordane
- Aroclor 1260
- Gamma-chlordane
- Heptachlor

- Arsenic
- Chromium

The groundwater COCs (Table 6-48) are:

- Heptachlor
- Heptachlor Epoxide
- Alpha-BHC
- Beta-BHC
- Delta-BHC
- Arsenic
- Chromium

6.12 UNCERTAINTY ANALYSIS – SITES 9 AND 16

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 HHRA for Sites 9 and 16 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 assessment for Sites 9 and 16.

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 is 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 are 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 consider safety factors were made so that the final calculated risks were overestimated.

Generally, risk assessments carry 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.

6.12.1 Uncertainty in Selection of COPCs

The most significant issues related to uncertainty in COPC selection at Sites 9 and 16 are the COPC screening levels used, the absence of screening levels for a few chemicals detected in the site media, and the lack of a background database. A brief discussion of each of these issues is provided in the remainder of this section.

COPC Screening Levels

The use of risk-based screening values based on conservative land use scenarios (i.e., residential land use for soil and ingestion of tap water for groundwater) corresponding to ILCRs of 10^{-6} and HIs 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 ILCRs less than 10^{-6} and HIs less than 0.1 should not affect the final conclusions of the risk assessment because those chemicals were not expected to cause a potential health concern at the detected concentrations.

Use of USEPA Generic SSLs for Transfers from Soil to Groundwater for COPC Selection

A number of chemicals were selected as COPCs because the maximum concentrations exceeded USEPA Generic SSLs for migration from soil to groundwater (DAF = 1.0), but these were not considered in the quantitative risk assessment because they were less than the risk-based screening concentrations for direct contact exposure. The elimination of these chemicals from the quantitative risk evaluation is not considered significant because the maximum concentrations were less than the risk-based screening levels corresponding to target cancer risks of $1x10^{-6}$ or HQs of 0.1.

In addition, the USEPA's Soil Screening Guidance (USEPA, 1996a) states "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). 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)." The guidance further states, "A DAF of 20 is protective for sources up to 0.5 acres in size" and "can be protective of larger sources as well." Consequently, the use of SSLs based on a DAF of 1 is very conservative.

Chemicals without Established Screening Levels

Risk-based screening levels are currently not available for some constituents detected at Sites 9 and 16 [e.g., acenaphthylene, benzo(g,h,i)perylene, phenanthrene, alpha and gamma-chlordane, delta-BHC, Endosulfan I, Endosulfan II, Endosulfan Sulfate, Endrin Aldehyde, and Endrin Ketone]. Appropriate surrogates were selected for these chemicals based on similar chemical structures and toxicological properties, if available. In the COPC screening, acenaphthene was used as a surrogate for acenaphthylene, pyrene was selected as a surrogate for benzo(g,h,i)perylene and phenanthrene, chlordane was used as a surrogate for alpha- and gamma-chlordane, alpha-BHC was used as a surrogate for delta-BHC, Endosulfan was used as a surrogate for Endosulfan I, Endosulfan II, and Endosulfan Sulfate, and Endrin was used as a surrogate for Endrin Aldehyde and Endrin Ketone. Applying toxicity values of one compound to another increases 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.

Lack of Background Data

Arsenic and chromium were retained as COCs in surface soil at Sites 9 and 16. No background data was available for MCRD Parris Island; therefore, a comparison to background could not be performed. However, since the Draft Final RI Report was prepared in 2011, the Partnering Team has agreed to use background data from Marine Corps Air Station Beaufort (Tetra Tech, 2006), which are presented in the table below.

Chemical	MCAS Beaufort Representative Background Concentration (mg/kg) (1)	Sites 9 and 16	
		Surface Soil (mg/kg)	Subsurface Soil (mg/kg)
Arsenic	1.16	0.56 J – 8.4	0.148 – 8.91
Chromium	5.17	2.41 – 105	1.86 – 9.51

1-Tetra Tech, Inc. 2006. RCRA Facility Investigation Report for Solid Waste Management Unit 3, Borrow Pit Landfill, Appendix Z Basewide Background Report, Contract Task Order 0329, November.

Arsenic and chromium are naturally occurring elements in soil. Consequently, there is some uncertainty with retaining arsenic and chromium as COCs in soil at Sites 9 and 16.

6.12.2 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

Current land use patterns at the Sites 9 and 16 are well established; thereby limiting the uncertainty associated with land use assumptions. Land use is currently limited to industrial/commercial and the area is expected to remain commercial/industrial in the future. Industrial workers, maintenance workers, and adult visitors are the only current receptors potentially contacting environmental media at Sites 9 and 16. Construction workers are potential future receptors if there is a change in site use. To be conservative, risks to workers, adult visitors, and hypothetical 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 for soil and the use of maximum detected concentrations as the EPC for groundwater. 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.

There is uncertainty in assuming that current groundwater concentrations will not change in the future, and this introduces additional uncertainty in the EPC and risks for any groundwater COPC. Concentrations in groundwater may diminish over time due to natural attenuation processes involving source depletion and dilution.

EPCs for construction workers for VOCs in air were estimated by 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 input parameters. The use of model default values tended 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

Determination of various receptor groups and exposure routes of potential concern was based on current land use observed at the site and anticipated future land use. Therefore, uncertainty associated with selecting exposure routes and potential receptors is minimal because these are considered well defined. Although residential groundwater use was evaluated as an exposure scenario at Sites 9 and 16, groundwater is not currently used at the sites nor is it expected to be used in the future. Therefore, the evaluation of direct exposure to groundwater performed in this baseline HHRA was included primarily to aid in risk management decision-making.

Exposure Parameters

Each exposure factor 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 on 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.

Generally, the uncertainty can be assessed quantitatively for many assumptions made in determining factors for calculating exposures and intakes. 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, USEPA dermal guidance (2004b) 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.

Many of the exposure parameters used to calculate exposures and risks in this report were selected from a distribution of possible values including USEPA guidance (1991, 1997a, 2004b, 2000). For the RME scenario, the value representing the 95th percentile was generally selected for each parameter to ensure that the assessment bounds the majority of actual risks from a postulated exposure. This risk number is used in risk management decisions but does not indicate what a more average or typical exposure might be or what risk range might be expected for individuals in the exposed population.

6.12.3 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 COC 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 have reached 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, 2004b), risks for dermal absorption of chemicals in soil are quantitatively evaluated for arsenic, chromium, chlordane, DDE, DDT, beta-BHC, carcinogenic PAHs, PCBs, and heptachlor only because of the limited information guidance available to evaluate dermal exposure to other constituents. Therefore, risks from dermal exposure to other metals and VOCs in soil were not quantified in the risk assessment. Consequently, potential risks may have been underestimated by excluding these constituents from the dermal risk assessment calculations.

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. Although there is no evidence to support the conclusion that hexavalent chromium is present at Sites 9 and 16, risks associated with this chemical were assessed by conservatively assuming that 100 percent of the reported total chromium result is attributable to hexavalent chromium. Chromium was retained as a COC in surface soil at Sites 9 and 16. Chromium would not have been retained as a COC in any media if it had been evaluated as trivalent chromium. Consequently, there is uncertainty associated with retaining chromium as a COC in soils at Sites 9 and 16.

Use of Chronic Toxicity Values for Construction Workers

Under the guidelines established by the Superfund program, exposures to construction workers of one year or less are classified as subchronic exposures. Risks for noncarcinogenic effects associated with subchronic exposures should incorporate toxicity values for subchronic and not chronic effects. Subchronic toxicity values are not as widely available as chronic values. Subchronic toxicity values used in this HHRA were obtained from USEPA's PPRTV internet site if available. Also ATSDR MRLs were used as subchronic toxicity values when PPRTV values were not available. Chronic toxicity values were used when subchronic toxicity values were not available. Using chronic toxicity criteria to evaluate subchronic exposures for construction workers tends to overestimate potential noncarcinogenic risks. Although this overestimation of noncarcinogenic risks do not affect the conclusions of this HHRA since noncarcinogenic risks for construction workers were within acceptable levels.

6.12.4 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 be an appropriate assumption in all cases. However, the assumption of additivity was considered because in most cases it represented 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 be 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 could not be predicted, the likelihood for risks to be overpredicted or underpredicted could not be defined, but the methodology used was based on current USEPA guidance.

6.13 REMEDIAL GOAL OPTIONS – SITES 9 AND 16

In accordance with USEPA Region 4 guidance, RGOs were developed for those media with ILCRs greater than $1x10^{-4}$ and total HIs and target organ HIs greater than 1. RGOs are derived for the COCs that contribute significantly to the cancer risk and/or HI for each exposure pathway in a land use scenario for a receptor group. Chemicals are not considered as significant contributors to risk and therefore are not included as COCs if their individual carcinogenic risk contribution is less than $1x10^{-6}$ and their noncarcinogenic HQ is less than 1.0. RGOs for Sites 9 and 16 were developed according to guidance provided in the Region 4 Human Health Risk Assessment Bulletin. The RGOs were calculated using the following equation:

RGO[chemical i] = EPC[chemical i] x Target Risk/Calculated Risk[chemical i]

where:

RGO[chemical i]	=	the chemical-specific remediation goal option
EPC[chemical i]	=	the exposure point concentration for the chemical used in risk assessment calculations

Target Risk	=	target ICLRs for carcinogens or the target HQs for noncarcinogens
Calculated Risk[chemical i]	=	the total risk calculated for a specific chemical in the risk assessment

In accordance to the Region 4 guidance, the target cancer risks to be used were $1x10^{-6}$, $1x10^{-5}$, and $1x10^{-4}$ and the target HQs were 0.1, 1, and 3. The chemical-specific RGOs for soil and groundwater are presented in Tables 6-49 and 6-50, respectively.

6.14 SUMMARY – SITES 9 AND 16

The baseline HHRA for Sites 9 and 16 was performed to characterize potential risks to likely human receptors that could potentially be exposed to soil and groundwater under current and future land use. Sites 9 and 16 are likely to remain industrial. In light of this assumption, the current and future receptors are the industrial workers, maintenance workers, and the adult visitors. In the event the land use changes, the construction worker was evaluated as a future receptor. A hypothetical resident was also evaluated to aid in risk management decisions.

COPCs were selected for direct contact routes of exposure to environmental media and for the potential migration of chemicals from soil to groundwater pathway. COPCs for Sites 9 and 16 are listed in Table 6-36. No COPCs were identified for the vapor intrusion pathway.

Quantitative estimates of non-carcinogenic and carcinogenic risks (HIs and ILCRs, respectively) were developed for potential human receptors directly contacting site environmental media. Media with risk estimates exceeding the upper bound of USEPA's target risk range of 10^{-4} to 10^{-6}, or an HI of 1, are identified in the following table. No target organ HIs were greater than 1.

Summary of Risk Estimates

Site	Environmental Medium	Receptors With Risk Estimates Exceeding Risk Management Benchmarks	Chemicals of Concern
Sites 9 and 16	Surface soil	Child resident(1) Lifelong resident(1)	cPAHs, Chromium, 4,4'-DDE, 4,4'-DDT, alpha-Chlordane, Aroclor-1260, gamma-Chlordane, Heptachclor, Arsenic
	Subsurface soil	None	No COCs
	Groundwater – Direct Contact	Child resident(1,2) Adult resident(1,2) Lifelong resident(1)	Heptachlor Epoxide, Heptachlor, Arsenic, alpha-BHC, delta-BHC, Chromium

Notes:
carcinogenic PAHs (cPAHs)
1 - Receptor risks exceed $1x10^{-4}$ cancer risk benchmark.
2 - Receptor risks exceed non-cancer risk benchmark of target organ-specific HI greater than 1.

Lead was identified as a COPC in surface soil and groundwater at Sites 9 and 16. Hypothetical residential exposures to lead in surface soil were evaluated using USEPA's IEUBK lead model. Risks to construction workers, maintenance workers, default industrial workers, and adult workers exposed to lead in surface soil at Sites 9 and 16 were evaluated using USEPA's Adult Lead Model. Results of the analysis conducted for these receptors do not exceed the USEPA goal regarding lead exposures [i.e., no more than 5 percent of children (or fetuses of exposed woman) having blood-lead levels exceeding a 10 µg/L blood-lead level].

TABLE 6-1

SCREENING CRITERIA FOR SOIL
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

CAS No.	Parameter	USEPA Regional Screening Levels[1]	
		Direct Contact Residential	Protection of Groundwater
Volatile Organic Compounds (ug/kg)			
120-82-1	1,2,4-Trichlorobenzene	6,200 N[2]	2.9
95-50-1	1,2-Dichlorobenzene	190,000 N	270
541-73-1	1,3-Dichlorobenzene	2,400 C[3]	0.4 [3]
106-46-7	1,4-Dichlorobenzene	2,400 C	0.4
78-93-3	2-Butanone	2,800,000 N	1,000
591-78-6	2-Hexanone	21,000 N	7.9
67-64-1	Acetone	6,100,000 N	2,400
71-43-2	Benzene	1,100 C	0.2
75-15-0	Carbon Disulfide	82,000 N	210
56-23-5	Carbon Tetrachloride	610 C	0.15
108-90-7	Chlorobenzene	29,000 N	49
67-66-3	Chloroform	290 C	0.053
74-87-3	Chloromethane	12,000 N	49
110-82-7	Cyclohexane	700,000 N	13,000
100-41-4	Ethylbenzene	5,400 C	1.5
98-82-8	Isopropylbenzene	210,000 N	640
- -	m+p-Xylenes	59,000 N[4]	180 [4]
79-20-9	Methyl Acetate	7,800,000 N	3,200
108-87-2	Methyl Cyclohexane	NA	NA
75-09-2	Methylene Chloride	36,000 N[2][5]	1.2
95-47-6	o-Xylene	69,000 N	190
127-18-4	Tetrachloroethene	8,600 N[2][5]	0.033
108-88-3	Toluene	500,000 N	590
1330-20-7	Total Xylenes	63,000 N	190
Semivolatile Organic Compounds (ug/kg)			
90-12-0	1-Methylnaphthalene	22,000 C	5.1
91-57-6	2-Methylnaphthalene	31,000 N	140
83-32-9	Acenaphthene	340,000 N	4,100
98-86-2	Acetophenone	780,000 N	450
208-96-8	Acenaphthylene	340,000 N[6]	4,100 [6]
120-12-7	Anthracene	1,700,000 N	42,000
- -	Benzo(a)pyrene Equivalents	15 C	NA
100-52-7	Benzaldehyde	780,000 N	330
56-55-3	Benzo(a)anthracene	150 C	10
50-32-8	Benzo(a)pyrene	15 C	3.5
205-99-2	Benzo(b)fluoranthene	150 C	35
191-24-2	Benzo(g,h,i)perylene	170,000 N[7]	9,500 [7]
207-08-9	Benzo(k)fluoranthene	1,500 C	350
117-81-7	Bis(2-ethylhexyl)phthalate	35,000 C	17
86-74-8	Carbazole	NA	NA
218-01-9	Chrysene	15,000 C	1,100

TABLE 6-1

SCREENING CRITERIA FOR SOIL
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

CAS No.	Parameter	USEPA Regional Screening Levels[1]	
		Direct Contact Residential	Protection of Groundwater
Semivolatile Organic Compounds (ug/kg) (Continued)			
53-70-3	Dibenzo(a,h)anthracene	15 C	11
132-64-9	Dibenzofuran	7,800 N	110
206-44-0	Fluoranthene	230,000 N	70,000
86-73-7	Fluorene	230,000 N	4,000
193-39-5	Indeno(1,2,3-cd)pyrene	150 C	120
91-20-3	Naphthalene	3,600 C	0.47
85-01-8	Phenanthrene	170,000 N[7]	9,500 [7]
129-00-0	Pyrene	170,000 N	9,500
Pesticides/PCBs (ug/kg)			
72-54-8	4,4'-DDD	2,000 C	66
72-55-9	4,4'-DDE	1,400 C	46
50-29-3	4,4'-DDT	1,700 C	67
309-00-2	Aldrin	29 C	0.034
319-84-6	alpha-BHC	77 C	0.036
5103-71-9	alpha-Chlordane	1,600 C[8]	13 [8]
11096-82-5	Aroclor-1260	220 C	24
319-85-7	beta-BHC	270 C	0.13
319-86-8	delta-BHC	77 C[9]	0.036 [9]
60-57-1	Dieldrin	30 C	0.061
959-98-8	Endosulfan I	37,000 N[10]	1,100 [10]
33213-65-9	Endosulfan II	37,000 N[10]	1,100 [10]
1031-07-8	Endosulfan Sulfate	37,000 N[10]	1,100 [10]
72-20-8	Endrin	1,800 N	68
7421-93-4	Endrin Aldehyde	1,800 N[11]	68 [11]
53494-70-5	Endrin Ketone	1,800 N[11]	68 [11]
58-89-9	gamma-BHC (Lindane)	520 C	0.21
5103-74-2	gamma-Chlordane	1,600 C[8]	13 [8]
76-44-8	Heptachlor	110 C	0.14
1024-57-3	Heptachlor Epoxide	53 C	0.068
72-43-5	Methoxychlor	31,000 N	1,500
Metals (mg/kg)			
7429-90-5	Aluminum	7,700 N	23,000
7440-36-0	Antimony	3.1 N	0.27
7440-38-2	Arsenic	0.39 C	0.0013
7440-39-3	Barium	1,500 N	120
7440-41-7	Beryllium	16 N	13
7440-43-9	Cadmium	7 N	0.52
7440-70-2	Calcium	NA	NA
7440-47-3	Chromium	0.29 C[12]	0.00059 [12]
7440-48-4	Cobalt	2.3 N	0.21
7440-50-8	Copper	310 N	22

TABLE 6-1

SCREENING CRITERIA FOR SOIL
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

CAS No.	Parameter	USEPA Regional Screening Levels[1]	
		Direct Contact Residential	Protection of Groundwater
Metals (mg/kg) (Continued)			
7439-89-6	Iron	5,500 N	270
7439-92-1	Lead	400	14 [13]
7439-95-4	Magnesium	NA	NA
7439-96-5	Manganese	180 N	21
7439-97-6	Mercury	2.3 N[14]	0.033
7440-02-0	Nickel	150 N	20
7440-09-7	Potassium	NA	NA
7782-49-2	Selenium	39 N	0.4
7440-22-4	Silver	39 N	0.6
7440-23-5	Sodium	NA	NA
7440-28-0	Thallium	0.078 N	0.011
7440-62-2	Vanadium	39 N[15]	78
7440-66-6	Zinc	2,300 N	290

1 - USEPA Regional Screening Level, November 2011. Carcinogenic values represent an incremental cancer risk of 1E-06. The noncarcinogenic values are the RSL divided by 10 to correspond to a Target Hazard Quotient of 0.1. Protection of groundwater values are risk-based SSLs.
2 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
3 - Value is for 1,4-dichlorobenzene.
4 - Value is for m-xylene.
5 - The screening level was calculated using revised toxicity criteria from USEPA's Integrated Risk Information System.
6 - Acenaphthene is used as a surrogate for acenaphthylene.
7 - Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
8 - Value is for chlordane.
9 - Value is for alpha-BHC.
10 - Value is for Endosulfan.
11 - Value is for Endrin.
12 - Value is for hexavalent chromium.
13 - Value is MCL based soil screening level.
14 - Value is for mercuric chloride (and other mercury salts).
15 - Value is for vanadium and compounds.

TABLE 6-2

SCREENING CRITERIA FOR GROUNDWATER
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

CAS No.	Parameter	USEPA Regional Screening Level - Tap Water[1]	USEPA Maximum Contaminant Level[2]	Groundwater Volatilization Criteria[3]
Volatile Organic Compounds (ug/L)				
75-34-3	1,1-Dichloroethane	2.4 C	NA	6.6 C
120-82-1	1,2,4-Trichlorobenzene	0.39 N[4]	70	3.6 N
95-50-1	1,2-Dichlorobenzene	28 N	600	NA
541-73-1	1,3-Dichlorobenzene	0.42 C[5]	NA	2.2 C[5]
106-46-7	1,4-Dichlorobenzene	0.42 C	75	2.2 C
78-93-3	2-Butanone	490 N	NA	NA
67-64-1	Acetone	1,200 N	NA	NA
71-43-2	Benzene	0.39 C	5	1.4 C
75-15-0	Carbon Disulfide	72 N	NA	120 N
108-90-7	Chlorobenzene	7.2 N	100	41 N
67-66-3	Chloroform	0.19 C	80	0.71 C
74-87-3	Chloromethane	19 N	NA	26 N
156-59-2	cis-1,2-Dichloroethene	2.8 N	70	NA
110-82-7	Cyclohexane	1,300 N	NA	NA
75-71-8	Dichlorodifluoromethane	19 N	NA	0.74 N
100-41-4	Ethylbenzene	1.3 C	700	3 C
98-82-8	Isopropylbenzene	39 N	NA	NA
- -	m+p-Xylenes	19 N[6]	10,000	36 N[6]
108-87-2	Methyl Cyclohexane	NA	NA	NA
1634-04-4	Methyl Tert-Butyl Ether	12 C	NA	390 C
95-47-6	o-Xylene	19 N	10,000	49 N
127-18-4	Tetrachloroethene	3.5 N[4][7]	5	0.57 C
108-88-3	Toluene	86 N	1,000	NA
540-59-0	Total 1,2-Dichloroethene	13 N	NA	NA
1330-20-7	Total Xylenes	19 N	10,000	49 N
Semivolatile Organic Compounds (ug/L)				
92-52-4	1,1-Biphenyl	0.083 N	NA	3.3 N
90-12-0	1-Methylnaphthalene	0.97 C	NA	NA
95-57-8	2-Chlorophenol	7.1 N	NA	NA
91-57-6	2-Methylnaphthalene	2.7 N	NA	NA
83-32-9	Acenaphthene	40 N	NA	NA
208-96-8	Acenaphthylene	40 N[8]	NA	NA
120-12-7	Anthracene	130 N	NA	NA
- -	Benzo(a)pyrene Equivalents	0.0029 C	0.2	NA
191-24-2	Benzo(g,h,i)perylene	8.7 N[9]	NA	NA
117-81-7	Bis(2-ethylhexyl)phthalate	0.071 C	6	NA
86-74-8	Carbazole	NA	NA	NA
53-70-3	Dibenzo(a,h)anthracene	0.0029 C	NA	NA
132-64-9	Dibenzofuran	0.58 N	NA	NA
86-73-7	Fluorene	22 N	NA	NA
193-39-5	Indeno(1,2,3-cd)pyrene	0.029 C	NA	NA
91-20-3	Naphthalene	0.14 C	NA	3.9 C
85-01-8	Phenanthrene	8.7 N[9]	NA	NA
108-95-2	Phenol	450 N	NA	NA
129-00-0	Pyrene	8.7 N	NA	NA

TABLE 6-2

SCREENING CRITERIA FOR GROUNDWATER
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

CAS No.	Parameter	USEPA Regional Screening Level - Tap Water[1]	USEPA Maximum Contaminant Level[2]	Groundwater Volatilization Criteria[3]
Pesticides/PCBs (ug/L)				
72-54-8	4,4'-DDD	0.28 C	NA	NA
72-55-9	4,4'-DDE	0.2 C	NA	NA
50-29-3	4,4'-DDT	0.2 C	NA	NA
309-00-2	Aldrin	0.00021 C	NA	NA
319-84-6	alpha-BHC	0.0062 C	NA	NA
5103-71-9	alpha-Chlordane	0.19 C[10]	2	NA
319-85-7	beta-BHC	0.022 C	NA	NA
319-86-8	delta-BHC	0.0062 C[11]	NA	NA
60-57-1	Dieldrin	0.0015 C	NA	NA
959-98-8	Endosulfan I	7.8 N[12]	NA	NA
33213-65-9	Endosulfan II	7.8 N[12]	NA	NA
1031-07-8	Endosulfan Sulfate	7.8 N[12]	NA	NA
72-20-8	Endrin	0.17 N	2	NA
7421-93-4	Endrin Aldehyde	0.17 N[13]	NA	NA
53494-70-5	Endrin Ketone	0.17 N[13]	NA	NA
58-89-9	gamma-BHC (Lindane)	0.036 C	0.2	NA
5103-74-2	gamma-Chlordane	0.19 C[10]	2	NA
76-44-8	Heptachlor	0.0018 C	0.4	NA
1024-57-3	Heptachlor Epoxide	0.0033 C	0.2	NA
72-43-5	Methoxychlor	2.7 N	40	NA
Metals (ug/L)				
7429-90-5	Aluminum	1,600 N	NA	NA
7440-36-0	Antimony	0.6 N	6	NA
7440-38-2	Arsenic	0.045 C	10	NA
7440-39-3	Barium	290 N	2,000	NA
7440-41-7	Beryllium	1.6 N	4	NA
7440-70-2	Calcium	NA	NA	NA
7440-47-3	Chromium	0.031 C[14]	100	NA
7440-48-4	Cobalt	0.47 N	NA	NA
7440-50-8	Copper	62 N	1,300	NA
7439-89-6	Iron	1,100 N	NA	NA
7439-92-1	Lead	NA	15	NA
7439-95-4	Magnesium	NA	NA	NA
7439-96-5	Manganese	32 N	NA	NA
7439-97-6	Mercury	0.43 N[15]	2	NA
7440-02-0	Nickel	30 N	NA	NA
7440-09-7	Potassium	NA	NA	NA
7782-49-2	Selenium	7.8 N	50	NA
7440-22-4	Silver	7.1 N	NA	NA
7440-23-5	Sodium	NA	NA	NA
7440-28-0	Thallium	0.016 N	2	NA
7440-62-2	Vanadium	7.8 N[16]	NA	NA
7440-66-6	Zinc	470 N	NA	NA

TABLE 6-2

SCREENING CRITERIA FOR GROUNDWATER
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

CAS No.	Parameter	USEPA Regional Screening Level - Tap Water(1)	USEPA Maximum Contaminant Level(2)	Groundwater Volatilization Criteria(3)

1 - USEPA Regional Screening Level, November 2011. Carcinogenic values represent an incremental cancer risk of 1E-06. The noncarcinogenic values are the RSL divided by 10 to correspond to a Target Hazard Quotient of 0.1.
2 - 2011 Edition of the Drinking Water Standards and Health Advisories.
3 - Calculated using USEPA's Vapor Intrusion Screening Level (VISL) calculator (USEPA, March 2012) and toxicity criteria from USEPA's November 2011 Regional Screening Level table. Values correspond to a target cancer risk level of 1E-06 or HQ of 0.1 and an attenuation factor of 0.001.
4 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
5 - Value is for 1,4-dichlorobenzene.
6 - Value is for m-xylene.
7 - The screening level was calculated using revised toxicity criteria from USEPA's Integrated Risk Information System.
8 - Acenaphthene is used as a surrogate for acenaphthylene.
9 - Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
10 - Value is for chlordane.
11 - Value is for alpha-BHC.
12 - Value is for Endosulfan.
13 - Value is for Endrin.
14 - Value is for hexavalent chromium.
15 - Value is for mercuric chloride (and other mercury salts).
16 - Value is for vanadium and compounds.

TABLE 6-3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Residential Soil[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 27	**Volatile Organic Compounds**														
	78-93-3	2-Butanone	1.7 J	23 J	ug/kg	PAI-27-SB03-12	5/36	2.3 - 32	23	NA	2,800,000 N	NA	NA	No	BSL
	591-78-6	2-Hexanone	1.1 J	1.1 J	ug/kg	PAI-27-SO-48-01	1/37	2.1 - 32	1.1	NA	21,000 N	NA	NA	No	BSL
	67-64-1	Acetone	5.8 J	120	ug/kg	PAI-27-SO34-01-D	18/37	11 - 32	120	NA	6,100,000 N	NA	NA	No	BSL
	75-15-0	Carbon Disulfide	0.44 J	2 J	ug/kg	PAI-27-SB03-12	3/37	0.21 - 11.5	2	NA	82,000 N	NA	NA	No	BSL
	56-23-5	Carbon Tetrachloride	3 J	3 J	ug/kg	PI-027-02_47	1/37	0.85 - 11	3	NA	610 C	NA	NA	No	BSL
	108-90-7	Chlorobenzene	0.93 J	6	ug/kg	PAI-27-SS-029-01	3/37	0.21 - 11.5	6	NA	29,000 N	NA	NA	No	BSL
	67-66-3	Chloroform	5 J	5 J	ug/kg	PI-027-02_47	1/37	0.85 - 6	5	NA	290 C	NA	NA	No	BSL
	100-41-4	Ethylbenzene	3 J	3 J	ug/kg	PAI-27-SS05-01	1/37	2.1 - 11.5	3	NA	5,400 C	NA	NA	No	BSL
	--	m+p-Xylenes	0.24 J	12	ug/kg	PAI-27-SS05-01	7/36	0.43 - 13	12	NA	63,000 N[7]	NA	NA	No	BSL
	79-20-9	Methyl Acetate	24	24	ug/kg	PAI-27-SO41-01	1/36	2.1 - 6	24	NA	7,800,000 N	NA	NA	No	BSL
	75-09-2	Methylene Chloride	0.55 J	0.81 J	ug/kg	PAI-27-SO36-01	3/37	0.47 - 32	0.81	NA	36,000 N[8][9]	NA	NA	No	BSL
	95-47-6	o-Xylene	0.46 J	4 J	ug/kg	PAI-27-SS05-01	3/36	0.85 - 6	4	NA	69,000 N	NA	NA	No	BSL
	127-18-4	Tetrachloroethene	2 J	2 J	ug/kg	PI-027-02_47	1/37	2.1 - 11	2	NA	8,600 N[8][9]	NA	NA	No	BSL
	108-88-3	Toluene	0.35 J	9	ug/kg	PAI-27-SS05-01	7/37	0.4 - 11.5	9	NA	500,000 N	NA	NA	No	BSL
	1330-20-7	Total Xylenes	0.24 J	17	ug/kg	PAI-27-SS05-01	7/37	0.43 - 19	17	NA	63,000 N	NA	NA	No	BSL
	Semivolatile Organic Compounds														
	91-57-6	2-Methylnaphthalene	290 J	300 J	ug/kg	PAI-27-SS11-01	2/23	70 - 4000	300	NA	31,000 N	NA	NA	No	BSL
	83-32-9	Acenaphthene	1,000 J	1,000 J	ug/kg	PAI-27-SS12-01	1/15	79 - 4000	1,000	NA	340,000 N	NA	NA	No	BSL
	120-12-7	Anthracene	5,700	5,700	ug/kg	PAI-27-SS12-01	1/15	79 - 4000	5,700	NA	1,700,000 N	NA	NA	No	BSL
	--	**Benzo(a)pyrene Equivalents**	227	62,555	ug/kg	PAI-27-SS12-01	7/15	360 - 4000	62,555	NA	**15 C**	NA	NA	**Yes**	ASL
	56-55-3	**Benzo(a)anthracene**	110 J	50,000	ug/kg	PAI-27-SS12-01	3/15	360 - 4000	50,000	NA	**150 C**	NA	NA	**Yes**	ASL
	50-32-8	**Benzo(a)pyrene**	140 J	42,000	ug/kg	PAI-27-SS12-01	5/15	360 - 4000	42,000	NA	**15 C**	NA	NA	**Yes**	ASL
	205-99-2	**Benzo(b)fluoranthene**	210 J	60,000	ug/kg	PAI-27-SS12-01	6/15	360 - 4000	60,000	NA	**150 C**	NA	NA	**Yes**	ASL
	191-24-2	Benzo(g,h,i)perylene	42 J	16,000	ug/kg	PAI-27-SS12-01	3/15	360 - 4000	16,000	NA	170,000 N[10]	NA	NA	No	BSL
	207-08-9	**Benzo(k)fluoranthene**	650	20,000	ug/kg	PAI-27-SS12-01	2/15	360 - 4000	20,000	NA	**1,500 C**	NA	NA	**Yes**	ASL
	117-81-7	Bis(2-ethylhexyl)phthalate	340 J	340 J	ug/kg	PAI-27-SO38-01	2/35	70 - 4000	340	NA	35,000 C	NA	NA	No	BSL
	86-74-8	Carbazole	250 J	8,000	ug/kg	PAI-27-SS12-01	2/35	70 - 4000	8,000	NA	NA	NA	NA	No	NTX
	218-01-9	**Chrysene**	150 J	55,000	ug/kg	PAI-27-SS12-01	6/15	360 - 4000	55,000	NA	**15,000 C**	NA	NA	**Yes**	ASL
	53-70-3	**Dibenzo(a,h)anthracene**	39 J	6,700	ug/kg	PAI-27-SS12-01	3/15	360 - 4000	6,700	NA	**15 C**	NA	NA	**Yes**	ASL
	206-44-0	Fluoranthene	190 J	83,000	ug/kg	PAI-27-SS12-01	6/15	360 - 4000	83,000	NA	230,000 N	NA	NA	No	BSL
	86-73-7	Fluorene	1,000 J	1,000 J	ug/kg	PAI-27-SS12-01	1/15	79 - 4000	1,000	NA	230,000 N	NA	NA	No	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	96 J	26,000	ug/kg	PAI-27-SS12-01	3/15	360 - 4000	26,000	NA	**150 C**	NA	NA	**Yes**	ASL
	91-20-3	Naphthalene	180 J	780 J	ug/kg	PAI-27-SS12-01	3/15	79 - 4000	780	NA	3,600 C	NA	NA	No	BSL
	85-01-8	Phenanthrene	74 J	25,000	ug/kg	PAI-27-SS12-01	6/15	360 - 4000	25,000	NA	170,000 N[10]	NA	NA	No	BSL
	129-00-0	Pyrene	170 J	74,000	ug/kg	PAI-27-SS12-01	5/15	360 - 4000	74,000	NA	170,000 N	NA	NA	No	BSL
	Polycyclic Aromatic Hydrocarbons														
	90-12-0	1-Methylnaphthalene	0.95 J	150	ug/kg	PAI-27-SO38A-01	19/20	8.8 - 8.8	150	NA	22,000 C	NA	NA	No	BSL
	91-57-6	2-Methylnaphthalene	1.1 J	220 J	ug/kg	PAI-27-SO38A-01	20/20	-	220	NA	31,000 N	NA	NA	No	BSL
	83-32-9	Acenaphthene	0.74 J	15	ug/kg	PAI-27-SO38A-01	8/20	8.6 - 18	15	NA	340,000 N	NA	NA	No	BSL
	208-96-8	Acenaphthylene	0.97 J	69	ug/kg	PAI-27-SO34-01	19/20	8.7 - 11	69	NA	340,000 N[11]	NA	NA	No	BSL
	120-12-7	Anthracene	0.54 J	36	ug/kg	PAI-27-SO-44-01	17/20	8.6 - 11	36	NA	1,700,000 N	NA	NA	No	BSL

TABLE 6-3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Residential Soil[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 27	**Polycyclic Aromatic Hydrocarbons (continued)**														
	--	**Benzo(a)pyrene Equivalents**	9.79	724	ug/kg	PAI-27-SO34-01	20/20	-	724.29	NA	**15 C**	NA	NA	**Yes**	ASL
	56-55-3	**Benzo(a)anthracene**	1.7 J	410	ug/kg	PAI-27-SO34-01	20/20	-	410	NA	**150 C**	NA	NA	**Yes**	ASL
	50-32-8	**Benzo(a)pyrene**	5 J	560	ug/kg	PAI-27-SO34-01	13/20	8.6 - 11	560	NA	**15 C**	NA	NA	**Yes**	ASL
	205-99-2	**Benzo(b)fluoranthene**	9 J	560	ug/kg	PAI-27-SO34-01	16/20	8.7 - 11	560	NA	**150 C**	NA	NA	**Yes**	ASL
	191-24-2	Benzo(g,h,i)perylene	9.8	360	ug/kg	PAI-27-SO34-01	14/20	8.6 - 11	360	NA	170,000 N[10]	NA	NA	No	BSL
	207-08-9	Benzo(k)fluoranthene	4.6 J	430	ug/kg	PAI-27-SO33-01, PAI-27-SO-44-01	17/20	8.7 - 11	430	NA	1,500 C	NA	NA	No	BSL
	218-01-9	Chrysene	4 J	540	ug/kg	PAI-27-SO34-01	20/20	-	540	NA	15,000 C	NA	NA	No	BSL
	53-70-3	**Dibenzo(a,h)anthracene**	4.4 J	130	ug/kg	PAI-27-SO33-01	7/20	8.7 - 11	130	NA	**15 C**	NA	NA	**Yes**	ASL
	206-44-0	Fluoranthene	2.8 J	580	ug/kg	PAI-27-SO34-01	20/20	-	580	NA	230,000 N	NA	NA	No	BSL
	86-73-7	Fluorene	0.64 J	16	ug/kg	PAI-27-SO34-01	12/20	8.7 - 11	16	NA	230,000 N	NA	NA	No	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	6.4 J	580	ug/kg	PAI-27-SO34-01	18/20	8.7 - 11	580	NA	**150 C**	NA	NA	**Yes**	ASL
	91-20-3	Naphthalene	0.8 J	54	ug/kg	PAI-27-SO38A-01	16/20	1.5 - 9	54	NA	3,600 C	NA	NA	No	BSL
	85-01-8	Phenanthrene	2.7 J	170	ug/kg	PAI-27-SO34-01	20/20	-	170	NA	170,000 N[10]	NA	NA	No	BSL
	129-00-0	Pyrene	4.1 J	750	ug/kg	PAI-27-SO33-01	20/20	-	750	NA	170,000 N	NA	NA	No	BSL
	Pesticides/PCBs														
	72-54-8	4,4'-DDD	0.32 J	47 J	ug/kg	PAI-27-SS09-01	25/37	0.17 - 4	47	NA	2,000 C	NA	NA	No	BSL
	72-55-9	4,4'-DDE	0.34 J	61	ug/kg	PAI-27-SS09-01	33/37	0.17 - 3.9	61	NA	1,400 C	NA	NA	No	BSL
	50-29-3	4,4'-DDT	0.92 J	58 J	ug/kg	PAI-27-SS08-01-D	30/37	0.45 - 4	58	NA	1,700 C	NA	NA	No	BSL
	309-00-2	Aldrin	0.4 J	2.7	ug/kg	PAI-27-SO-44-01	4/37	0.21 - 3	2.7	NA	29 C	NA	NA	No	BSL
	319-84-6	alpha-BHC	0.14 J	2.2 J	ug/kg	PAI-27-SO46-01	9/37	0.21 - 3	2.2	NA	77 C	NA	NA	No	BSL
	5103-71-9	alpha-Chlordane	0.1 J	2.2	ug/kg	PAI-27-SS09-01	13/37	0.21 - 2.7	2.2	NA	1,600 C[12]	NA	NA	No	BSL
	11096-82-5	**Aroclor-1260**	460 J	510 J	ug/kg	PAI-27-SS08-01	1/35	6.2 - 57.5	510	NA	**220 C**	NA	NA	**Yes**	ASL
	319-85-7	beta-BHC	0.15 J	2.7	ug/kg	PAI-27-SO41-01	9/37	0.21 - 3	2.7	NA	270 C	NA	NA	No	BSL
	319-86-8	delta-BHC	0.084 J	4.7 J	ug/kg	PAI-27-SS-029-01, PAI-27-SO46-01	14/37	0.21 - 3	4.7	NA	77 C[13]	NA	NA	No	BSL
	60-57-1	Dieldrin	0.075 J	1.3 J	ug/kg	PAI-27-SO-44-01	14/37	0.17 - 5.75	1.3	NA	30 C	NA	NA	No	BSL
	959-98-8	Endosulfan I	0.08001 J	2.1	ug/kg	PAI-27-SO-44-01	14/37	0.21 - 3.3	2.1	NA	37,000 N[14]	NA	NA	No	BSL
	33213-65-9	Endosulfan II	0.12 J	1.8 J	ug/kg	PAI-27-SS06-01	17/37	0.17 - 5.75	1.8	NA	37,000 N[14]	NA	NA	No	BSL
	1031-07-8	Endosulfan Sulfate	0.084 J	4.5	ug/kg	PAI-27-SO-44-01	15/37	0.17 - 5.75	4.5	NA	37,000 N[14]	NA	NA	No	BSL
	72-20-8	Endrin	0.058 J	44	ug/kg	PAI-27-SO-44-01	11/37	0.1 - 5.75	44	NA	1,800 N	NA	NA	No	BSL
	7421-93-4	Endrin Aldehyde	0.2 J	4.8 J	ug/kg	PAI-27-SO34-01-D	18/37	0.42 - 5.75	4.8	NA	1,800 N[15]	NA	NA	No	BSL
	53494-70-5	Endrin Ketone	0.06 J	5.9	ug/kg	PAI-27-SO-44-01	13/37	0.17 - 5.75	5.9	NA	1,800 N[15]	NA	NA	No	BSL
	58-89-9	gamma-BHC (Lindane)	0.28 J	2.6	ug/kg	PAI-27-SS13-01	5/37	0.065 - 3	2.6	NA	520 C	NA	NA	No	BSL
	5103-74-2	gamma-Chlordane	0.092 J	3.1	ug/kg	PAI-27-SS09-01	11/37	0.092 - 2.7	3.1	NA	1,600 C[12]	NA	NA	No	BSL
	76-44-8	Heptachlor	0.21 J	0.42 J	ug/kg	PAI-27-SO35-01	6/37	0.15 - 3	0.42	NA	110 C	NA	NA	No	BSL
	1024-57-3	Heptachlor Epoxide	0.066 J	1.4	ug/kg	PAI-27-SO34-01	15/37	0.15 - 3	1.4	NA	53 C	NA	NA	No	BSL
	72-43-5	Methoxychlor	0.43 J	7.8 J	ug/kg	PAI-27-SO34-01	11/37	3.5 - 30	7.8	NA	31,000 N	NA	NA	No	BSL

TABLE 6-3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Residential Soil[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 27	**Metals**														
	7429-90-5	**Aluminum**	1,480	8,620	mg/kg	PAI-27-SS11-01	35/35	-	8,620	NA	**7,700 N**	NA	NA	**Yes**	ASL
	7440-36-0	Antimony	0.59	2.4 J	mg/kg	PAI-27-SO36-01	10/35	0.06 - 2.35	2.4	NA	3.1 N	NA	NA	No	BSL
	7440-38-2	**Arsenic**	0.46 J	5.7	mg/kg	PAI-27-SS08-01	30/35	0.52 - 1.2	5.7	NA	**0.39 C**	NA	NA	**Yes**	ASL
	7440-39-3	Barium	7.6	42.1	mg/kg	PAI-27-SS10-01	35/35	-	42.1	NA	1,500 N	NA	NA	No	BSL
	7440-41-7	Beryllium	0.09	0.33	mg/kg	PAI-27-SS04-01-D	20/35	0.2 - 0.58	0.33	NA	16 N	NA	NA	No	BSL
	7440-43-9	Cadmium	0.07	0.47	mg/kg	PAI-27-SS08-01	13/35	0.01 - 0.32	0.47	NA	7 N	NA	NA	No	BSL
	7440-70-2	Calcium	319 J	232,000	mg/kg	PAI-27-SS03-01	35/35	-	232,000	NA	NA	NA	NA	No	NUT
	7440-47-3	**Chromium**	1.6	10.2	mg/kg	PAI-27-SS11-01	35/35	-	10.2	NA	**0.29 C**	NA	NA	**Yes**	ASL
	7440-48-4	Cobalt	0.13	1.8	mg/kg	PAI-27-SS03-01	18/35	0.26 - 1.48	1.8	NA	2.3 N	NA	NA	No	BSL
	7440-50-8	Copper	1.06	25	mg/kg	PAI-27-SS13-01	33/35	0.5 - 1.1	25	NA	310 N	NA	NA	No	BSL
	7439-89-6	**Iron**	930	10,600	mg/kg	PAI-27-SS08-01	35/35	-	10,600	NA	**5,500 N**	NA	NA	**Yes**	ASL
	7439-92-1	Lead	2.9	64.5	mg/kg	PI-027-02_47	35/35	-	64.5	NA	400	NA	NA	No	BSL
	7439-95-4	Magnesium	61.8	2,940	mg/kg	PAI-27-SS03-01	35/35	-	2,940	NA	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	12.5	183	mg/kg	PAI-27-SS08-01-D	35/35	-	183	NA	**180 N**	NA	NA	**Yes**	ASL
	7439-97-6	Mercury	0.01	0.15	mg/kg	PAI-27-SS10-01	32/35	0.01 - 0.04	0.15	NA	2.3 N[17]	NA	NA	No	BSL
	7440-02-0	Nickel	0.36	11.3	mg/kg	PAI-27-SO45A-01	35/35	-	11.3	NA	150 N	NA	NA	No	BSL
	7440-09-7	Potassium	46.5	909	mg/kg	PAI-27-SS08-01-D	34/35	417 - 417	909	NA	NA	NA	NA	No	NUT
	7782-49-2	Selenium	0.25 J	0.55	mg/kg	PI-027-02_47	6/35	0.1 - 0.39	0.55	NA	39 N	NA	NA	No	BSL
	7440-22-4	Silver	0.04	0.39	mg/kg	PI-027-02_47	6/35	0.03 - 0.62	0.39	NA	39 N	NA	NA	No	BSL
	7440-23-5	Sodium	24	203 J	mg/kg	PAI-27-SO33-01	26/35	14 - 241	203	NA	NA	NA	NA	No	NUT
	7440-28-0	**Thallium**	0.88 J	0.88 J	mg/kg	PAI-27-SO45B-01	1/35	0.05 - 0.64	0.88	NA	**0.078 N**	NA	NA	**Yes**	ASL
	7440-62-2	Vanadium	2.24	21.2	mg/kg	PAI-27-SS08-01-D	35/35	-	21.2	NA	39 N[18]	NA	NA	No	BSL
	7440-66-6	Zinc	3.2	131	mg/kg	PI-027-02_47	35/35	-	131	NA	2,300 N	NA	NA	No	BSL

TABLE 6-3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	Adjusted USEPA RSL Residential Soil(5)	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background data is available.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2011. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for m-xylene.
8 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
9 - The screening level was calculated using revised toxicity criteria from USEPA's Integrated Risk Information System.
10 - Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
11 - Acenaphthene is used as a surrogate for acenaphthylene.
12 - Value is for chlordane.
13 - Value is for alpha-BHC.
14 - Value is for Endosulfan.
15 - Value is for Endrin.
16 - Value is for hexavalent chromium.
17 - Value is for mercuric chloride (and other Mercury salts).
18 - Value is for vanadium and compounds.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

Associated Samples

PAI-27-SS01-01	PAI-27-SS10-01	PAI-27-SO37-01	PAI-27-SO45A-01
PAI-27-SS02-01	PAI-27-SS11-01	PAI-27-SO38-01	PAI-27-SO45B-01
PAI-27-SB03-12	PAI-27-SS12-01	PAI-27-SO38A-01	PAI-27-SO46-01
PAI-27-SS03-01	PAI-27-SS13-01	PAI-27-SO39-01	PAI-27-SO47-01
PAI-27-SS04-01	PAI-27-SS-028-01	PAI-27-SO40-01	PAI-27-SO-48-01
PAI-27-SS04-01-D	PAI-27-SS-029-01	PAI-27-SO41-01	PAI-27-SS-03-01
PAI-27-SS05-01	PAI-27-SS-029-01-D	PAI-27-SO42-01	PAI-27-SS-04-01
PAI-27-SS06-01	PAI-27-SO33-01	PAI-27-SO42-01-D	PAI-27-SS-05-01
PAI-27-SS07-01	PAI-27-SO34-01	PAI-27-SO-43-01	PAI-55-SO02A-01
PAI-27-SS08-01	PAI-27-SO34-01-D	PAI-27-SO-44-01	PI-027-01_46
PAI-27-SS08-01-D	PAI-27-SO35-01	PAI-27-SO45-01	PI-027-02_47
PAI-27-SS09-01	PAI-27-SO36-01	PAI-27-SO45-01-D	PI-027-02_47-D

TABLE 6-3A
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Residential Soil[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 55	**Volatile Organic Compounds**														
	120-82-1	1,2,4-Trichlorobenzene	3 J	3 J	ug/kg	PAI-27-SS-014-01	1/47	0.84 - 8	3	NA	6,200 N[7]	NA	NA	No	BSL
	95-50-1	1,2-Dichlorobenzene	2 J	2 J	ug/kg	PAI-27-SS-014-01	1/47	0.84 - 8	2	NA	190,000 N	NA	NA	No	BSL
	106-46-7	1,4-Dichlorobenzene	0.53 J	3 J	ug/kg	PAI-27-SS-014-01	2/47	0.21 - 8	3	NA	2,400 C	NA	NA	No	BSL
	78-93-3	2-Butanone	2.1 J	16 J	ug/kg	PAI-55-SO07B-01	14/45	2.2 - 41	16	NA	2,800,000 N	NA	NA	No	BSL
	67-64-1	Acetone	11 J	660	ug/kg	PAI-55-SO07B-01	29/47	6.7 - 41	660	NA	6,100,000 N	NA	NA	No	BSL
	108-90-7	Chlorobenzene	0.31 J	5.4 J	ug/kg	PAI-55-SO07-01-D	8/47	0.22 - 8	5.4	NA	29,000 N	NA	NA	No	BSL
	74-87-3	Chloromethane	7.8	7.8	ug/kg	PAI-55-SO17B-01	1/47	0.84 - 8	7.8	NA	12,000 N	NA	NA	No	BSL
	100-41-4	Ethylbenzene	1 J	4 J	ug/kg	PAI-27-SS-014-01	2/47	2.1 - 8	4	NA	5,400 C	NA	NA	No	BSL
	- -	m+p-Xylenes	0.53 J	11 J	ug/kg	PAI-27-SS-014-01	3/47	0.42 - 16	11	NA	59,000 N[8]	NA	NA	No	BSL
	79-20-9	Methyl Acetate	1.7 J	250 J	ug/kg	PAI-55-SO17B-01	11/47	2.2 - 8	250	NA	7,800,000 N	NA	NA	No	BSL
	75-09-2	Methylene Chloride	0.5 J	0.5 J	ug/kg	PAI-55-SO16-01	1/47	0.53 - 41	0.5	NA	36,000 N[7][9]	NA	NA	No	BSL
	95-47-6	o-Xylene	0.81 J	6 J	ug/kg	PAI-27-SS-014-01	2/47	0.84 - 8	6	NA	69,000 N	NA	NA	No	BSL
	108-88-3	Toluene	0.46 J	1.9 J	ug/kg	PAI-55-SO04-01	2/47	0.39 - 8	1.9	NA	500,000 N	NA	NA	No	BSL
	1330-20-7	Total Xylenes	0.53 J	17 J	ug/kg	PAI-27-SS-014-01	3/47	0.42 - 25	17	NA	63,000 N	NA	NA	No	BSL
	Semivolatile Organic Compounds														
	91-57-6	2-Methylnaphthalene	31 J	52 J	ug/kg	PAI-55-SO12-01	2/6	69 - 72	52	NA	31,000 N	NA	NA	No	BSL
	208-96-8	Acenaphthylene	40 J	75 J	ug/kg	PAI-55-SO10-01	4/6	69 - 71	75	NA	340,000 N[10]	NA	NA	No	BSL
	98-86-2	Acetophenone	18 J	23 J	ug/kg	PAI-55-SO17A-01	2/31	33 - 46	23	NA	780,000 N	NA	NA	No	BSL
	120-12-7	Anthracene	30 J	73 J	ug/kg	PAI-55-SO08-01	2/6	69 - 72	73	NA	1,700,000 N	NA	NA	No	BSL
	- -	**Benzo(a)pyrene Equivalents**	247	930	ug/kg	PAI-55-SO12-01	6/6	-	930.24	NA	**15 C**	NA	NA	**Yes**	ASL
	100-52-7	Benzaldehyde	33 J	110 J	ug/kg	PAI-55-SO17D-01	3/31	69 - 94	110	NA	780,000 N	NA	NA	No	BSL
	56-55-3	**Benzo(a)anthracene**	110 J	450	ug/kg	PAI-55-SO08-01	6/6	-	450	NA	**150 C**	NA	NA	**Yes**	ASL
	50-32-8	**Benzo(a)pyrene**	170 J	770	ug/kg	PAI-55-SO12-01	6/6	-	770	NA	**15 C**	NA	NA	**Yes**	ASL
	205-99-2	**Benzo(b)fluoranthene**	200	820	ug/kg	PAI-55-SO12-01	6/6	-	820	NA	**150 C**	NA	NA	**Yes**	ASL
	191-24-2	Benzo(g,h,i)perylene	86 J	580	ug/kg	PAI-55-SO03-01	5/6	70 - 70	580	NA	170,000 N[11]	NA	NA	No	BSL
	207-08-9	Benzo(k)fluoranthene	180	810	ug/kg	PAI-55-SO12-01	6/6	-	810	NA	1,500 C	NA	NA	No	BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	72 J	770	ug/kg	PAI-55-SO10B-01	7/31	69 - 180	770	NA	35,000 C	NA	NA	No	BSL
	86-74-8	Carbazole	39 J	100 J	ug/kg	PAI-55-SO08-01	2/31	69 - 94	100	NA	NA	NA	NA	No	NTX
	218-01-9	Chrysene	160 J	640	ug/kg	PAI-55-SO12-01	6/6	-	640	NA	15,000 C	NA	NA	No	BSL
	53-70-3	**Dibenzo(a,h)anthracene**	61 J	190	ug/kg	PAI-55-SO03-01	4/6	69 - 70	190	NA	**15 C**	NA	NA	**Yes**	ASL
	132-64-9	Dibenzofuran	29 J	41 J	ug/kg	PAI-55-SO08-01	2/31	69 - 94	41	NA	7,800 N	NA	NA	No	BSL
	206-44-0	Fluoranthene	140 J	660	ug/kg	PAI-55-SO08-01	6/6	-	660	NA	230,000 N	NA	NA	No	BSL
	86-73-7	Fluorene	26 J	26 J	ug/kg	PAI-55-SO08-01	1/6	69 - 72	26	NA	230,000 N	NA	NA	No	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	100 J	540 J	ug/kg	PAI-55-SO08-01	5/6	70 - 70	540	NA	**150 C**	NA	NA	**Yes**	ASL
	91-20-3	Naphthalene	20 J	41 J	ug/kg	PAI-55-SO08-01	2/6	69 - 72	41	NA	3,600 C	NA	NA	No	BSL
	85-01-8	Phenanthrene	54 J	710	ug/kg	PAI-55-SO08-01	6/6	-	710	NA	170,000 N[11]	NA	NA	No	BSL
	129-00-0	Pyrene	210	970	ug/kg	PAI-55-SO08-01	6/6	-	970	NA	170,000 N	NA	NA	No	BSL
	Polycyclic Aromatic Hydrocarbons														
	90-12-0	1-Methylnaphthalene	0.8 J	52	ug/kg	PAI-55-SO18A-01	25/25	-	52	NA	22,000 C	NA	NA	No	BSL
	91-57-6	2-Methylnaphthalene	0.9 J	61	ug/kg	PAI-55-SO18A-01	25/25	-	61	NA	31,000 N	NA	NA	No	BSL
	83-32-9	Acenaphthene	0.7 J	6.2 J	ug/kg	PAI-55-SO17D-01	20/25	8.7 - 11	6.2	NA	340,000 N	NA	NA	No	BSL
	208-96-8	Acenaphthylene	0.58 J	69	ug/kg	PAI-55-SO18A-01	25/25	-	69	NA	340,000 N[10]	NA	NA	No	BSL
	120-12-7	Anthracene	0.47 J	48	ug/kg	PAI-55-SO17B-01	25/25	-	48	NA	1,700,000 N	NA	NA	No	BSL
	- -	**Benzo(a)pyrene Equivalents**	10.2	287	ug/kg	PAI-55-SO18A-01	25/25	-	287	NA	**15 C**	NA	NA	**Yes**	ASL
	56-55-3	**Benzo(a)anthracene**	4.5 J	160	ug/kg	PAI-55-SO18A-01	25/25	-	160	NA	**150 C**	NA	NA	**Yes**	ASL

TABLE 6-3A
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Residential Soil[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 55	**Polycyclic Aromatic Hydrocarbons (Continued)**														
	50-32-8	**Benzo(a)pyrene**	8.6 J	200	ug/kg	PAI-55-SO18A-01	21/25	8.6 - 8.8	200	NA	**15 C**	NA	NA	**Yes**	ASL
	205-99-2	**Benzo(b)fluoranthene**	8.4 J	340	ug/kg	PAI-55-SO17A-01	22/25	8.6 - 8.8	340	NA	**150 C**	NA	NA	**Yes**	ASL
	191-24-2	Benzo(g,h,i)perylene	5.4 J	170	ug/kg	PAI-55-SO18A-01	22/25	8.6 - 8.8	170	NA	170,000 N[11]	NA	NA	No	BSL
	207-08-9	Benzo(k)fluoranthene	8 J	190	ug/kg	PAI-55-SO18A-01	22/25	8.6 - 8.8	190	NA	1,500 C	NA	NA	No	BSL
	218-01-9	Chrysene	7.5 J	190	ug/kg	PAI-55-SO18A-01	25/25	-	190	NA	15,000 C	NA	NA	No	BSL
	53-70-3	**Dibenzo(a,h)anthracene**	5.1 J	54 J	ug/kg	PAI-55-SO17B-01	15/25	8.5 - 9	54	NA	**15 C**	NA	NA	**Yes**	ASL
	206-44-0	Fluoranthene	2.8 J	290	ug/kg	PAI-55-SO18A-01	25/25	-	290	NA	230,000 N	NA	NA	No	BSL
	86-73-7	Fluorene	0.55 J	5.7 J	ug/kg	PAI-55-SO18A-01	21/25	0.75 - 8.8	5.7	NA	230,000 N	NA	NA	No	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	6.3 J	180	ug/kg	PAI-55-SO18A-01	22/25	8.6 - 8.8	180	NA	**150 C**	NA	NA	**Yes**	ASL
	91-20-3	Naphthalene	0.92 J	34	ug/kg	PAI-55-SO18A-01	24/25	2.1 - 2.1	34	NA	3,600 C	NA	NA	No	BSL
	85-01-8	Phenanthrene	3.4 J	160	ug/kg	PAI-55-SO18A-01	25/25	-	160	NA	170,000 N[11]	NA	NA	No	BSL
	129-00-0	Pyrene	9.9	330	ug/kg	PAI-55-SO17A-01	25/25	-	330	NA	170,000 N	NA	NA	No	BSL
	Pesticides/PCBs														
	72-54-8	**4,4'-DDD**	0.81 J	440,000	ug/kg	PAI-27-SS-016-01	43/48	0.16 - 53	440,000	NA	**2,000 C**	NA	NA	**Yes**	ASL
	72-55-9	**4,4'-DDE**	0.13 J	34,000 J	ug/kg	PAI-27-SS-016-01	45/48	3.4 - 4.3	34,000	NA	**1,400 C**	NA	NA	**Yes**	ASL
	50-29-3	**4,4'-DDT**	0.2653 J	290,000	ug/kg	PAI-27-SS-017-01	48/48	3.9 - 3.9	290,000	NA	**1,700 C**	NA	NA	**Yes**	ASL
	309-00-2	Aldrin	0.072 J	1.1 J	ug/kg	PAI-55-SO10C-01	11/48	0.2 - 17000	1.1	NA	29 C	NA	NA	No	BSL
	319-84-6	**alpha-BHC**	0.11 J	92 J	ug/kg	PAI-27-SS-030-01	18/48	0.2 - 17000	92	NA	**77 C**	NA	NA	**Yes**	ASL
	5103-71-9	alpha-Chlordane	0.34 J	30	ug/kg	PAI-55-SO17-01	19/48	0.2 - 17000	30	NA	1,600 C[12]	NA	NA	No	BSL
	319-85-7	**beta-BHC**	0.33 J	2,300 J	ug/kg	PAI-27-SS-018-01	25/48	0.2 - 17000	2,300	NA	**270 C**	NA	NA	**Yes**	ASL
	319-86-8	**delta-BHC**	0.089 J	120 J	ug/kg	PAI-27-SS-030-01	29/48	0.21 - 17000	120	NA	**77 C[13]**	NA	NA	**Yes**	ASL
	60-57-1	Dieldrin	0.12 J	19 J	ug/kg	PAI-55-SO10C-01	26/48	0.16 - 34000	19	NA	30 C	NA	NA	No	BSL
	959-98-8	Endosulfan I	0.07888 J	3	ug/kg	PAI-55-SO12-01	21/48	0.2 - 17000	3	NA	37,000 N[14]	NA	NA	No	BSL
	33213-65-9	Endosulfan II	0.11 J	5.6 J	ug/kg	PAI-55-SO07B-01	27/48	0.16 - 34000	5.6	NA	37,000 N[14]	NA	NA	No	BSL
	1031-07-8	Endosulfan Sulfate	0.076 J	4.6 J	ug/kg	PAI-55-SO17B-01	29/48	0.16 - 34000	4.6	NA	37,000 N[14]	NA	NA	No	BSL
	72-20-8	Endrin	0.053 J	10	ug/kg	PAI-55-SO04-01	14/48	0.16 - 34000	10	NA	1,800 N	NA	NA	No	BSL
	7421-93-4	Endrin Aldehyde	0.18 J	5.5	ug/kg	PAI-55-SO17-01	22/48	0.4 - 34000	5.5	NA	1,800 N[15]	NA	NA	No	BSL
	53494-70-5	Endrin Ketone	0.11 J	9.4 J	ug/kg	PAI-55-SO17-01	21/48	0.16 - 34000	9.4	NA	1,800 N[15]	NA	NA	No	BSL
	58-89-9	gamma-BHC (Lindane)	0.083 J	83 J	ug/kg	PAI-27-SS-030-01	12/48	0.064 - 17000	83	NA	520 C	NA	NA	No	BSL
	5103-74-2	gamma-Chlordane	0.13 J	29	ug/kg	PAI-55-SO17-01	24/48	0.18 - 17000	29	NA	1,600 C[12]	NA	NA	No	BSL
	76-44-8	Heptachlor	0.13 J	26 J	ug/kg	PAI-27-SS-024-01	15/48	0.2 - 17000	26	NA	110 C	NA	NA	No	BSL
	1024-57-3	Heptachlor Epoxide	0.077 J	3.1	ug/kg	PAI-27-SS-024-01	29/48	0.2 - 17000	3.1	NA	53 C	NA	NA	No	BSL
	72-43-5	Methoxychlor	0.36 J	9.2	ug/kg	PAI-55-SO12-01	28/48	3.4 - 170000	9.2	NA	31,000 N	NA	NA	No	BSL
	Metals														
	7429-90-5	Aluminum	2,310	5,680	mg/kg	PAI-55-SO09-01	31/31	-	5,680	NA	7,700 N	NA	NA	No	BSL
	7440-36-0	**Antimony**	1 J	5.05 J	mg/kg	PAI-55-SO07B-01	10/31	0.56 - 2.36	5.05	NA	**3.1 N**	NA	NA	**Yes**	ASL
	7440-38-2	**Arsenic**	0.5 J	17.5	mg/kg	PAI-55-SO07B-01	22/31	0.51 - 1.27	17.5	NA	**0.39 C**	NA	NA	**Yes**	ASL
	7440-39-3	Barium	12 J	162	mg/kg	PAI-55-SO15-01	31/31	-	162	NA	1,500 N	NA	NA	No	BSL
	7440-41-7	Beryllium	0.03 J	0.49 J	mg/kg	PAI-55-SO12-01	17/31	0.1 - 0.87	0.49	NA	16 N	NA	NA	No	BSL
	7440-43-9	Cadmium	0.07 J	0.28 J	mg/kg	PAI-55-SO13-01, PAI-55-SO14-01-D	7/31	0.07 - 0.35	0.28	NA	7 N	NA	NA	No	BSL
	7440-70-2	Calcium	182 J	93,300	mg/kg	PAI-55-SO10B-01	31/31	-	93,300	NA	NA	NA	NA	No	NUT
	7440-47-3	**Chromium**	2.31	9.61	mg/kg	PAI-55-SO07B-01	31/31	-	9.61	NA	**0.29 C[16]**	NA	NA	**Yes**	ASL
	7440-48-4	**Cobalt**	0.25 J	3.04	mg/kg	PAI-55-SO07B-01	12/31	0.25 - 0.81	3.04	NA	**2.3 N**	NA	NA	**Yes**	ASL

TABLE 6-3A
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Residential Soil[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 55	**Metals (Continued)**														
	7440-50-8	Copper	1.39	80.6	mg/kg	PAI-55-SO17A-01	30/31	1.08 - 1.08	80.6	NA	310 N	NA	NA	No	BSL
	7439-89-6	**Iron**	1,240	7,330	mg/kg	PAI-55-SO07B-01	31/31	-	7,330	NA	**5,500 N**	NA	NA	**Yes**	ASL
	7439-92-1	**Lead**	3.7	1,140	mg/kg	PAI-55-SO15-01	31/31	-	1,140	NA	**400**	NA	NA	**Yes**	ASL
	7439-95-4	Magnesium	138 J	1,120	mg/kg	PAI-55-SO10B-01	31/31	-	1,120	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	14.8	123	mg/kg	PAI-55-SO07B-01	31/31	-	123	NA	180 N	NA	NA	No	BSL
	7439-97-6	Mercury	0.0162 J	0.344	mg/kg	PAI-55-SO10C-01	30/31	0.01 - 0.01	0.344	NA	2.3 N[17]	NA	NA	No	BSL
	7440-02-0	Nickel	1.17	7.2	mg/kg	PAI-55-SO17A-01	31/31	-	7.2	NA	150 N	NA	NA	No	BSL
	7440-09-7	Potassium	58.6 J	560	mg/kg	PAI-55-SO17-01	23/31	159 - 281	560	NA	NA	NA	NA	No	NUT
	7782-49-2	Selenium	0.24 J	1.31	mg/kg	PAI-55-SO07B-01	15/31	0.222 - 0.33	1.31	NA	39 N	NA	NA	No	BSL
	7440-22-4	Silver	0.19 J	0.19 J	mg/kg	PAI-55-SO12-01	1/31	0.05 - 0.35	0.19	NA	39 N	NA	NA	No	BSL
	7440-23-5	Sodium	41.5 J	280 J	mg/kg	PAI-55-SO07B-01	21/31	34.2 - 271	280	NA	NA	NA	NA	No	NUT
	7440-28-0	**Thallium**	0.3 J	0.3 J	mg/kg	PAI-55-SO07B-01	1/31	0.179 - 0.69	0.3	NA	**0.078 N**	NA	NA	**Yes**	ASL
	7440-62-2	Vanadium	2.35	19.7	mg/kg	PAI-55-SO07B-01	31/31	-	19.7	NA	39 N[18]	NA	NA	No	BSL
	7440-66-6	Zinc	5.67	2,060	mg/kg	PAI-55-SO07B-01	31/31	-	2,060	NA	2,300 N	NA	NA	No	BSL

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background data is available.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2011. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
8 - Value is for m-xylene.
9 - The screening level was calculated using revised toxicity criteria from USEPA's Integrated Risk Information System.
10 - Acenaphthene is used as a surrogate for acenaphthylene.
11 - Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
12 - Value is for chlordane.
13 - Value is for alpha-BHC.
14 - Value is for Endosulfan.
15 - Value is for Endrin.
16 - Value is for hexavalent chromium.
17 - Value is for mercuric chloride (and other Mercury salts).
18 - Value is for vanadium and compounds.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 6-3A
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Residential Soil[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Associated Samples															
PAI-27-SS-014-01		PAI-27-SS-025-01	PAI-55-SO05-01		PAI-55-SO11-01		PAI-55-SO17B-01								
PAI-27-SS-015-01		PAI-27-SS-026-01	PAI-55-SO06-01		PAI-55-SO12-01		PAI-55-SO17C-01								
PAI-27-SS-016-01		PAI-27-SS-027-01	PAI-55-SO07-01		PAI-55-SO13-01		PAI-55-SO17D-01								
PAI-27-SS-017-01		PAI-27-SS-030-01	PAI-55-SO07-01-D		PAI-55-SO14-01		PAI-55-SO18-01								
PAI-27-SS-018-01		PAI-27-SS-031-01	PAI-55-SO07A-01		PAI-55-SO14-01-D		PAI-55-SO18A-01								
PAI-27-SS-019-01		PAI-27-SS-032-01	PAI-55-SO07B-01		PAI-55-SO14A-01										
PAI-27-SS-020-01		FOVSFB-0803	PAI-55-SO08-01		PAI-55-SO14B-01										
PAI-27-SS-021-01		PAI-55-SO01-01	PAI-55-SO09-01		PAI-55-SO14C-01										
PAI-27-SS-022-01		PAI-55-SO01-01-D	PAI-55-SO10-01		PAI-55-SO15-01										
PAI-27-SS-023-01		PAI-55-SO02-01	PAI-55-SO10A-01		PAI-55-SO16-01										
PAI-27-SS-024-01		PAI-55-SO03-01	PAI-55-SO10B-01		PAI-55-SO17-01										
PAI-27-SS-024-01-D		PAI-55-SO04-01	PAI-55-SO10C-01		PAI-55-SO17A-01										

TABLE 6-4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SURFACE SOIL TO GROUNDWATER
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL Protection of Groundwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 27	**Volatile Organic Compounds**														
	78-93-3	2-Butanone	1.7 J	23 J	ug/kg	PAI-27-SB03-12	5/36	2.3 - 32	23	NA	1,000	NA	NA	No	BSL
	591-78-6	2-Hexanone	1.1 J	1.1 J	ug/kg	PAI-27-SO-48-01	1/37	2.1 - 32	1.1	NA	7.9	NA	NA	No	BSL
	67-64-1	Acetone	5.8 J	120	ug/kg	PAI-27-SO34-01-D	18/37	11 - 32	120	NA	2,400	NA	NA	No	BSL
	75-15-0	Carbon Disulfide	0.44 J	2 J	ug/kg	PAI-27-SB03-12	3/37	0.21 - 11.5	2	NA	210	NA	NA	No	BSL
	56-23-5	**Carbon Tetrachloride**	3 J	3 J	ug/kg	PI-027-02_47	1/37	0.85 - 11	3	NA	**0.15**	NA	NA	**Yes**	ASL
	108-90-7	Chlorobenzene	0.93 J	6	ug/kg	PAI-27-SS-029-01	3/37	0.21 - 11.5	6	NA	49	NA	NA	No	BSL
	67-66-3	**Chloroform**	5 J	5 J	ug/kg	PI-027-02_47	1/37	0.85 - 6	5	NA	**0.053**	NA	NA	**Yes**	ASL
	100-41-4	**Ethylbenzene**	3 J	3 J	ug/kg	PAI-27-SS05-01	1/37	2.1 - 11.5	3	NA	**1.5**	NA	NA	**Yes**	ASL
	- -	m+p-Xylenes	0.24 J	12	ug/kg	PAI-27-SS05-01	7/36	0.43 - 13	12	NA	180 [7]	NA	NA	No	BSL
	79-20-9	Methyl Acetate	24	24	ug/kg	PAI-27-SO41-01	1/36	2.1 - 6	24	NA	3,200	NA	NA	No	BSL
	75-09-2	Methylene Chloride	0.55 J	0.81 J	ug/kg	PAI-27-SO36-01	3/37	0.47 - 32	0.81	NA	1.2	NA	NA	No	BSL
	95-47-6	o-Xylene	0.46 J	4 J	ug/kg	PAI-27-SS05-01	3/36	0.85 - 6	4	NA	190	NA	NA	No	BSL
	127-18-4	**Tetrachloroethene**	2 J	2 J	ug/kg	PI-027-02_47	1/37	2.1 - 11	2	NA	**0.033**	NA	NA	**Yes**	ASL
	108-88-3	Toluene	0.35 J	9	ug/kg	PAI-27-SS05-01	7/37	0.4 - 11.5	9	NA	590	NA	NA	No	BSL
	1330-20-7	Total Xylenes	0.24 J	17	ug/kg	PAI-27-SS05-01	7/37	0.43 - 19	17	NA	190	NA	NA	No	BSL
	Semivolatile Organic Compounds														
	91-57-6	**2-Methylnaphthalene**	290 J	300 J	ug/kg	PAI-27-SS11-01	2/23	70 - 4000	300	NA	**140**	NA	NA	**Yes**	ASL
	83-32-9	Acenaphthene	1,000 J	1,000 J	ug/kg	PAI-27-SS12-01	1/15	79 - 4000	1,000	NA	4,100	NA	NA	No	BSL
	120-12-7	Anthracene	5,700	5,700	ug/kg	PAI-27-SS12-01	1/15	79 - 4000	5,700	NA	42,000	NA	NA	No	BSL
	- -	Benzo(a)pyrene Equivalents	227	62,555	ug/kg	PAI-27-SS12-01	7/15	360 - 4000	62,555	NA	NA	NA	NA	No	NTX
	56-55-3	**Benzo(a)anthracene**	110 J	50,000	ug/kg	PAI-27-SS12-01	3/15	360 - 4000	50,000	NA	**10**	NA	NA	**Yes**	ASL
	50-32-8	**Benzo(a)pyrene**	140 J	42,000	ug/kg	PAI-27-SS12-01	5/15	360 - 4000	42,000	NA	**3.5**	NA	NA	**Yes**	ASL
	205-99-2	**Benzo(b)fluoranthene**	210 J	60,000	ug/kg	PAI-27-SS12-01	6/15	360 - 4000	60,000	NA	**35**	NA	NA	**Yes**	ASL
	191-24-2	**Benzo(g,h,i)perylene**	42 J	16,000	ug/kg	PAI-27-SS12-01	3/15	360 - 4000	16,000	NA	**9,500** [8]	NA	NA	**Yes**	ASL
	207-08-9	**Benzo(k)fluoranthene**	650	20,000	ug/kg	PAI-27-SS12-01	2/15	360 - 4000	20,000	NA	**350**	NA	NA	**Yes**	ASL
	117-81-7	**Bis(2-ethylhexyl)phthalate**	340 J	340 J	ug/kg	PAI-27-SO38-01	2/35	70 - 4000	340	NA	**17**	NA	NA	**Yes**	ASL
	86-74-8	Carbazole	250 J	8,000	ug/kg	PAI-27-SS12-01	2/35	70 - 4000	8,000	NA	NA	NA	NA	No	NTX
	218-01-9	**Chrysene**	150 J	55,000	ug/kg	PAI-27-SS12-01	6/15	360 - 4000	55,000	NA	**1,100**	NA	NA	**Yes**	ASL
	53-70-3	**Dibenzo(a,h)anthracene**	39 J	6,700	ug/kg	PAI-27-SS12-01	3/15	360 - 4000	6,700	NA	**11**	NA	NA	**Yes**	ASL
	206-44-0	**Fluoranthene**	190 J	83,000	ug/kg	PAI-27-SS12-01	6/15	360 - 4000	83,000	NA	**70,000**	NA	NA	**Yes**	ASL
	86-73-7	Fluorene	1,000 J	1,000 J	ug/kg	PAI-27-SS12-01	1/15	79 - 4000	1,000	NA	4,000	NA	NA	No	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	96 J	26,000	ug/kg	PAI-27-SS12-01	3/15	360 - 4000	26,000	NA	**120**	NA	NA	**Yes**	ASL
	91-20-3	**Naphthalene**	180 J	780 J	ug/kg	PAI-27-SS12-01	3/15	79 - 4000	780	NA	**0.47**	NA	NA	**Yes**	ASL
	85-01-8	**Phenanthrene**	74 J	25,000	ug/kg	PAI-27-SS12-01	6/15	360 - 4000	25,000	NA	**9,500** [8]	NA	NA	**Yes**	ASL
	129-00-0	**Pyrene**	170 J	74,000	ug/kg	PAI-27-SS12-01	5/15	360 - 4000	74,000	NA	**9,500**	NA	NA	**Yes**	ASL
	Polycyclic Aromatic Hydrocarbons														
	90-12-0	**1-Methylnaphthalene**	0.95 J	150	ug/kg	PAI-27-SO38A-01	19/20	8.8 - 8.8	150	NA	**5.1**	NA	NA	**Yes**	ASL
	91-57-6	**2-Methylnaphthalene**	1.1 J	220 J	ug/kg	PAI-27-SO38A-01	20/20	-	220	NA	**140**	NA	NA	**Yes**	ASL
	83-32-9	Acenaphthene	0.74 J	15	ug/kg	PAI-27-SO38A-01	8/20	8.6 - 18	15	NA	4,100	NA	NA	No	BSL
	208-96-8	Acenaphthylene	0.97 J	69	ug/kg	PAI-27-SO34-01	19/20	8.7 - 11	69	NA	4,100 [9]	NA	NA	No	BSL
	120-12-7	Anthracene	0.54 J	36	ug/kg	PAI-27-SO-44-01	17/20	8.6 - 11	36	NA	42,000	NA	NA	No	BSL

TABLE 6-4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SURFACE SOIL TO GROUNDWATER
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL Protection of Groundwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 27	**Polycyclic Aromatic Hydrocarbons (continued)**														
	- -	Benzo(a)pyrene Equivalents	9.79	724	ug/kg	PAI-27-SO34-01	20/20	-	724.29	NA	NA	NA	NA	No	NTX
	56-55-3	**Benzo(a)anthracene**	1.7 J	410	ug/kg	PAI-27-SO34-01	20/20	-	410	NA	**10**	NA	NA	**Yes**	ASL
	50-32-8	**Benzo(a)pyrene**	5 J	560	ug/kg	PAI-27-SO34-01	13/20	8.6 - 11	560	NA	**3.5**	NA	NA	**Yes**	ASL
	205-99-2	**Benzo(b)fluoranthene**	9 J	560	ug/kg	PAI-27-SO34-01	16/20	8.7 - 11	560	NA	**35**	NA	NA	**Yes**	ASL
	191-24-2	Benzo(g,h,i)perylene	9.8	360	ug/kg	PAI-27-SO34-01	14/20	8.6 - 11	360	NA	9,500 [8]	NA	NA	No	BSL
	207-08-9	**Benzo(k)fluoranthene**	4.6 J	430	ug/kg	PAI-27-SO33-01, PAI-27-SO-44-01	17/20	8.7 - 11	430	NA	**350**	NA	NA	**Yes**	ASL
	218-01-9	Chrysene	4 J	540	ug/kg	PAI-27-SO34-01	20/20	-	540	NA	1,100	NA	NA	No	BSL
	53-70-3	**Dibenzo(a,h)anthracene**	4.4 J	130	ug/kg	PAI-27-SO33-01	7/20	8.7 - 11	130	NA	**11**	NA	NA	**Yes**	ASL
	206-44-0	Fluoranthene	2.8 J	580	ug/kg	PAI-27-SO34-01	20/20	-	580	NA	70,000	NA	NA	No	BSL
	86-73-7	Fluorene	0.64 J	16	ug/kg	PAI-27-SO34-01	12/20	8.7 - 11	16	NA	4,000	NA	NA	No	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	6.4 J	580	ug/kg	PAI-27-SO34-01	18/20	8.7 - 11	580	NA	**120**	NA	NA	**Yes**	ASL
	91-20-3	**Naphthalene**	0.8 J	54	ug/kg	PAI-27-SO38A-01	16/20	1.5 - 9	54	NA	**0.47**	NA	NA	**Yes**	ASL
	85-01-8	Phenanthrene	2.7 J	170	ug/kg	PAI-27-SO34-01	20/20	-	170	NA	9,500 [8]	NA	NA	No	BSL
	129-00-0	Pyrene	4.1 J	750	ug/kg	PAI-27-SO33-01	20/20	-	750	NA	9,500	NA	NA	No	BSL
	Pesticides/PCBs														
	72-54-8	4,4'-DDD	0.32 J	47 J	ug/kg	PAI-27-SS09-01	25/37	0.17 - 4	47	NA	66	NA	NA	No	BSL
	72-55-9	**4,4'-DDE**	0.34 J	61	ug/kg	PAI-27-SS09-01	33/37	0.17 - 3.9	61	NA	**46**	NA	NA	**Yes**	ASL
	50-29-3	4,4'-DDT	0.92 J	58 J	ug/kg	PAI-27-SS08-01-D	30/37	0.45 - 4	58	NA	67	NA	NA	No	BSL
	309-00-2	**Aldrin**	0.4 J	2.7	ug/kg	PAI-27-SO-44-01	4/37	0.21 - 3	2.7	NA	**0.034**	NA	NA	**Yes**	ASL
	319-84-6	**alpha-BHC**	0.14 J	2.2 J	ug/kg	PAI-27-SO46-01	9/37	0.21 - 3	2.2	NA	**0.036**	NA	NA	**Yes**	ASL
	5103-71-9	alpha-Chlordane	0.1 J	2.2	ug/kg	PAI-27-SS09-01	13/37	0.21 - 2.7	2.2	NA	13 [10]	NA	NA	No	BSL
	11096-82-5	**Aroclor-1260**	460 J	510 J	ug/kg	PAI-27-SS08-01	1/35	6.2 - 57.5	510	NA	**24**	NA	NA	**Yes**	ASL
	319-85-7	**beta-BHC**	0.15 J	2.7	ug/kg	PAI-27-SO41-01	9/37	0.21 - 3	2.7	NA	**0.13**	NA	NA	**Yes**	ASL
	319-86-8	**delta-BHC**	0.084 J	4.7 J	ug/kg	PAI-27-SS-029-01, PAI-27-SO46-01	14/37	0.21 - 3	4.7	NA	**0.036** [11]	NA	NA	**Yes**	ASL
	60-57-1	**Dieldrin**	0.075 J	1.3 J	ug/kg	PAI-27-SO-44-01	14/37	0.17 - 5.75	1.3	NA	**0.061**	NA	NA	**Yes**	ASL
	959-98-8	Endosulfan I	0.08001 J	2.1	ug/kg	PAI-27-SO-44-01	14/37	0.21 - 3.3	2.1	NA	1,100 [12]	NA	NA	No	BSL
	33213-65-9	Endosulfan II	0.12 J	1.8 J	ug/kg	PAI-27-SS06-01	17/37	0.17 - 5.75	1.8	NA	1,100 [12]	NA	NA	No	BSL
	1031-07-8	Endosulfan Sulfate	0.084 J	4.5	ug/kg	PAI-27-SO-44-01	15/37	0.17 - 5.75	4.5	NA	1,100 [12]	NA	NA	No	BSL
	72-20-8	Endrin	0.058 J	44	ug/kg	PAI-27-SO-44-01	11/37	0.1 - 5.75	44	NA	68	NA	NA	No	BSL
	7421-93-4	Endrin Aldehyde	0.2 J	4.8 J	ug/kg	PAI-27-SO34-01-D	18/37	0.42 - 5.75	4.8	NA	68 [13]	NA	NA	No	BSL
	53494-70-5	Endrin Ketone	0.06 J	5.9	ug/kg	PAI-27-SO-44-01	13/37	0.17 - 5.75	5.9	NA	68 [13]	NA	NA	No	BSL
	58-89-9	**gamma-BHC (Lindane)**	0.28 J	2.6	ug/kg	PAI-27-SS13-01	5/37	0.065 - 3	2.6	NA	**0.21**	NA	NA	**Yes**	ASL
	5103-74-2	gamma-Chlordane	0.092 J	3.1	ug/kg	PAI-27-SS09-01	11/37	0.092 - 2.7	3.1	NA	13 [10]	NA	NA	No	BSL
	76-44-8	**Heptachlor**	0.21 J	0.42 J	ug/kg	PAI-27-SO35-01	6/37	0.15 - 3	0.42	NA	**0.14**	NA	NA	**Yes**	ASL
	1024-57-3	**Heptachlor Epoxide**	0.066 J	1.4	ug/kg	PAI-27-SO34-01	15/37	0.15 - 3	1.4	NA	**0.068**	NA	NA	**Yes**	ASL
	72-43-5	Methoxychlor	0.43 J	7.8 J	ug/kg	PAI-27-SO34-01	11/37	3.5 - 30	7.8	NA	1,500	NA	NA	No	BSL

TABLE 6-4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SURFACE SOIL TO GROUNDWATER
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL Protection of Groundwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 27	**Metals**														
	7429-90-5	Aluminum	1,480	8,620	mg/kg	PAI-27-SS11-01	35/35	-	8,620	NA	23,000	NA	NA	No	BSL
	7440-36-0	**Antimony**	0.59	2.4 J	mg/kg	PAI-27-SO36-01	10/35	0.06 - 2.35	2.4	NA	**0.27**	NA	NA	**Yes**	ASL
	7440-38-2	**Arsenic**	0.46 J	5.7	mg/kg	PAI-27-SS08-01	30/35	0.52 - 1.2	5.7	NA	**0.0013**	NA	NA	**Yes**	ASL
	7440-39-3	Barium	7.6	42.1	mg/kg	PAI-27-SS10-01	35/35	-	42.1	NA	120	NA	NA	No	BSL
	7440-41-7	Beryllium	0.09	0.33	mg/kg	PAI-27-SS04-01-D	20/35	0.2 - 0.58	0.33	NA	13	NA	NA	No	BSL
	7440-43-9	Cadmium	0.07	0.47	mg/kg	PAI-27-SS08-01	13/35	0.01 - 0.32	0.47	NA	0.52	NA	NA	No	BSL
	7440-70-2	Calcium	319 J	232,000	mg/kg	PAI-27-SS03-01	35/35	-	232,000	NA	NA	NA	NA	No	NUT
	7440-47-3	**Chromium**	1.6	10.2	mg/kg	PAI-27-SS11-01	35/35	-	10.2	NA	**0.00059** [14]	NA	NA	**Yes**	ASL
	7440-48-4	**Cobalt**	0.13	1.8	mg/kg	PAI-27-SS03-01	18/35	0.26 - 1.48	1.8	NA	**0.21**	NA	NA	**Yes**	ASL
	7440-50-8	**Copper**	1.06	25	mg/kg	PAI-27-SS13-01	33/35	0.5 - 1.1	25	NA	**22**	NA	NA	**Yes**	ASL
	7439-89-6	**Iron**	930	10,600	mg/kg	PAI-27-SS08-01	35/35	-	10,600	NA	**270**	NA	NA	**Yes**	ASL
	7439-92-1	**Lead**	2.9	64.5	mg/kg	PI-027-02_47	35/35	-	64.5	NA	**14** [15]	NA	NA	**Yes**	ASL
	7439-95-4	Magnesium	61.8	2,940	mg/kg	PAI-27-SS03-01	35/35	-	2,940	NA	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	12.5	183	mg/kg	PAI-27-SS08-01-D	35/35	-	183	NA	**21**	NA	NA	**Yes**	ASL
	7439-97-6	**Mercury**	0.01	0.15	mg/kg	PAI-27-SS10-01	32/35	0.01 - 0.04	0.15	NA	**0.033**	NA	NA	**Yes**	ASL
	7440-02-0	Nickel	0.36	11.3	mg/kg	PAI-27-SO45A-01	35/35	-	11.3	NA	20	NA	NA	No	BSL
	7440-09-7	Potassium	46.5	909	mg/kg	PAI-27-SS08-01-D	34/35	417 - 417	909	NA	NA	NA	NA	No	NUT
	7782-49-2	**Selenium**	0.25 J	0.55	mg/kg	PI-027-02_47	6/35	0.1 - 0.39	0.55	NA	**0.4**	NA	NA	**Yes**	ASL
	7440-22-4	Silver	0.04	0.39	mg/kg	PI-027-02_47	6/35	0.03 - 0.62	0.39	NA	0.6	NA	NA	No	BSL
	7440-23-5	Sodium	24	203 J	mg/kg	PAI-27-SO33-01	26/35	14 - 241	203	NA	NA	NA	NA	No	NUT
	7440-28-0	**Thallium**	0.88 J	0.88 J	mg/kg	PAI-27-SO45B-01	1/35	0.05 - 0.64	0.88	NA	**0.011**	NA	NA	**Yes**	ASL
	7440-62-2	Vanadium	2.24	21.2	mg/kg	PAI-27-SS08-01-D	35/35	-	21.2	NA	78 [16]	NA	NA	No	BSL
	7440-66-6	Zinc	3.2	131	mg/kg	PI-027-02_47	35/35	-	131	NA	290	NA	NA	No	BSL

TABLE 6-4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SURFACE SOIL TO GROUNDWATER
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	USEPA RSL Protection of Groundwater(5)	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background data is available.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2011.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for m-xylene.
8 - Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
9 - Acenaphthene is used as a surrogate for acenaphthylene.
10 - Value is for chlordane.
11 - Value is for alpha-BHC.
12 - Value is for Endosulfan.
13 - Value is for Endrin.
14 - Value is for hexavalent chromium.
15 - Value is MCL based soil screening level.
16 - Value is for vanadium and compounds.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

Associated Samples

PAI-27-SS01-01	PAI-27-SS13-01	PAI-27-SO42-01	PI-027-01_46
PAI-27-SS02-01	PAI-27-SS-028-01	PAI-27-SO42-01-D	PI-027-02_47
PAI-27-SB03-12	PAI-27-SS-029-01	PAI-27-SO-43-01	PI-027-02_47-D
PAI-27-SS03-01	PAI-27-SS-029-01-D	PAI-27-SO-44-01	
PAI-27-SS04-01	PAI-27-SO33-01	PAI-27-SO45-01	
PAI-27-SS04-01-D	PAI-27-SO34-01	PAI-27-SO45-01-D	
PAI-27-SS05-01	PAI-27-SO34-01-D	PAI-27-SO45A-01	
PAI-27-SS06-01	PAI-27-SO35-01	PAI-27-SO45B-01	
PAI-27-SS07-01	PAI-27-SO36-01	PAI-27-SO46-01	
PAI-27-SS08-01	PAI-27-SO37-01	PAI-27-SO47-01	
PAI-27-SS08-01-D	PAI-27-SO38-01	PAI-27-SO-48-01	
PAI-27-SS09-01	PAI-27-SO38A-01	PAI-27-SS-03-01	
PAI-27-SS10-01	PAI-27-SO39-01	PAI-27-SS-04-01	
PAI-27-SS11-01	PAI-27-SO40-01	PAI-27-SS-05-01	
PAI-27-SS12-01	PAI-27-SO41-01	PAI-55-SO02A-01	

TABLE 6-4A
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SURFACE SOIL
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL Protection of Groundwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 55	**Volatile Organic Compounds**														
	120-82-1	**1,2,4-Trichlorobenzene**	3 J	3 J	ug/kg	PAI-27-SS-014-01	1/47	0.84 - 8	3	NA	**2.9**	NA	NA	**Yes**	ASL
	95-50-1	1,2-Dichlorobenzene	2 J	2 J	ug/kg	PAI-27-SS-014-01	1/47	0.84 - 8	2	NA	270	NA	NA	No	BSL
	106-46-7	**1,4-Dichlorobenzene**	0.53 J	3 J	ug/kg	PAI-27-SS-014-01	2/47	0.21 - 8	3	NA	**0.4**	NA	NA	**Yes**	ASL
	78-93-3	2-Butanone	2.1 J	16 J	ug/kg	PAI-55-SO07B-01	14/45	2.2 - 41	16	NA	1,000	NA	NA	No	BSL
	67-64-1	Acetone	11 J	660	ug/kg	PAI-55-SO07B-01	29/47	6.7 - 41	660	NA	2,400	NA	NA	No	BSL
	108-90-7	Chlorobenzene	0.31 J	5.4 J	ug/kg	PAI-55-SO07-01-D	8/47	0.22 - 8	5.4	NA	49	NA	NA	No	BSL
	74-87-3	Chloromethane	7.8	7.8	ug/kg	PAI-55-SO17B-01	1/47	0.84 - 8	7.8	NA	49	NA	NA	No	BSL
	100-41-4	**Ethylbenzene**	1 J	4 J	ug/kg	PAI-27-SS-014-01	2/47	2.1 - 8	4	NA	**1.5**	NA	NA	**Yes**	ASL
	- -	m+p-Xylenes	0.53 J	11 J	ug/kg	PAI-27-SS-014-01	3/47	0.42 - 16	11	NA	180 [7]	NA	NA	No	BSL
	79-20-9	Methyl Acetate	1.7 J	250 J	ug/kg	PAI-55-SO17B-01	11/47	2.2 - 8	250	NA	3,200	NA	NA	No	BSL
	75-09-2	Methylene Chloride	0.5 J	0.5 J	ug/kg	PAI-55-SO16-01	1/47	0.53 - 41	0.5	NA	1.2	NA	NA	No	BSL
	95-47-6	o-Xylene	0.81 J	6 J	ug/kg	PAI-27-SS-014-01	2/47	0.84 - 8	6	NA	190	NA	NA	No	BSL
	108-88-3	Toluene	0.46 J	1.9 J	ug/kg	PAI-55-SO04-01	2/47	0.39 - 8	1.9	NA	590	NA	NA	No	BSL
	1330-20-7	Total Xylenes	0.53 J	17 J	ug/kg	PAI-27-SS-014-01	3/47	0.42 - 25	17	NA	190	NA	NA	No	BSL
	Semivolatile Organic Compounds														
	91-57-6	2-Methylnaphthalene	31 J	52 J	ug/kg	PAI-55-SO12-01	2/6	69 - 72	52	NA	140	NA	NA	No	BSL
	208-96-8	Acenaphthylene	40 J	75 J	ug/kg	PAI-55-SO10-01	4/6	69 - 71	75	NA	4,100 [8]	NA	NA	No	BSL
	98-86-2	Acetophenone	18 J	23 J	ug/kg	PAI-55-SO17A-01	2/31	33 - 46	23	NA	450	NA	NA	No	BSL
	120-12-7	Anthracene	30 J	73 J	ug/kg	PAI-55-SO08-01	2/6	69 - 72	73	NA	42,000	NA	NA	No	BSL
	- -	Benzo(a)pyrene Equivalents	247.46	930.24	ug/kg	PAI-55-SO12-01	6/6	-	930.24	NA	NA	NA	NA	No	NTX
	100-52-7	Benzaldehyde	33 J	110 J	ug/kg	PAI-55-SO17D-01	3/31	69 - 94	110	NA	330	NA	NA	No	BSL
	56-55-3	**Benzo(a)anthracene**	110 J	450	ug/kg	PAI-55-SO08-01	6/6	-	450	NA	**10**	NA	NA	**Yes**	ASL
	50-32-8	**Benzo(a)pyrene**	170 J	770	ug/kg	PAI-55-SO12-01	6/6	-	770	NA	**3.5**	NA	NA	**Yes**	ASL
	205-99-2	**Benzo(b)fluoranthene**	200	820	ug/kg	PAI-55-SO12-01	6/6	-	820	NA	**35**	NA	NA	**Yes**	ASL
	191-24-2	Benzo(g,h,i)perylene	86 J	580	ug/kg	PAI-55-SO03-01	5/6	70 - 70	580	NA	9,500 [9]	NA	NA	No	BSL
	207-08-9	**Benzo(k)fluoranthene**	180	810	ug/kg	PAI-55-SO12-01	6/6	-	810	NA	**350**	NA	NA	**Yes**	ASL
	117-81-7	**Bis(2-ethylhexyl)phthalate**	72 J	770	ug/kg	PAI-55-SO10B-01	7/31	69 - 180	770	NA	**17**	NA	NA	**Yes**	ASL
	86-74-8	Carbazole	39 J	100 J	ug/kg	PAI-55-SO08-01	2/31	69 - 94	100	NA	NA	NA	NA	No	NTX
	218-01-9	Chrysene	160 J	640	ug/kg	PAI-55-SO12-01	6/6	-	640	NA	1,100	NA	NA	No	BSL
	53-70-3	**Dibenzo(a,h)anthracene**	61 J	190	ug/kg	PAI-55-SO03-01	4/6	69 - 70	190	NA	**11**	NA	NA	**Yes**	ASL
	132-64-9	Dibenzofuran	29 J	41 J	ug/kg	PAI-55-SO08-01	2/31	69 - 94	41	NA	110	NA	NA	No	BSL
	206-44-0	Fluoranthene	140 J	660	ug/kg	PAI-55-SO08-01	6/6	-	660	NA	70,000	NA	NA	No	BSL
	86-73-7	Fluorene	26 J	26 J	ug/kg	PAI-55-SO08-01	1/6	69 - 72	26	NA	4,000	NA	NA	No	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	100 J	540 J	ug/kg	PAI-55-SO08-01	5/6	70 - 70	540	NA	**120**	NA	NA	**Yes**	ASL
	91-20-3	**Naphthalene**	20 J	41 J	ug/kg	PAI-55-SO08-01	2/6	69 - 72	41	NA	**0.47**	NA	NA	**Yes**	ASL
	85-01-8	Phenanthrene	54 J	710	ug/kg	PAI-55-SO08-01	6/6	-	710	NA	9,500 [9]	NA	NA	No	BSL
	129-00-0	Pyrene	210	970	ug/kg	PAI-55-SO08-01	6/6	-	970	NA	9,500	NA	NA	No	BSL
	Polycyclic Aromatic Hydrocarbons														
	90-12-0	**1-Methylnaphthalene**	0.8 J	52	ug/kg	PAI-55-SO18A-01	25/25	-	52	NA	**5.1**	NA	NA	**Yes**	ASL
	91-57-6	2-Methylnaphthalene	0.9 J	61	ug/kg	PAI-55-SO18A-01	25/25	-	61	NA	140	NA	NA	No	BSL
	83-32-9	Acenaphthene	0.7 J	6.2 J	ug/kg	PAI-55-SO17D-01	20/25	8.7 - 11	6.2	NA	4,100	NA	NA	No	BSL
	208-96-8	Acenaphthylene	0.58 J	69	ug/kg	PAI-55-SO18A-01	25/25	-	69	NA	4,100 [8]	NA	NA	No	BSL
	120-12-7	Anthracene	0.47 J	48	ug/kg	PAI-55-SO17B-01	25/25	-	48	NA	42,000	NA	NA	No	BSL
	- -	Benzo(a)pyrene Equivalents	10.2	287	ug/kg	PAI-55-SO18A-01	25/25	-	287	NA	NA	NA	NA	No	NTX
	56-55-3	**Benzo(a)anthracene**	4.5 J	160	ug/kg	PAI-55-SO18A-01	25/25	-	160	NA	**10**	NA	NA	**Yes**	ASL
	50-32-8	**Benzo(a)pyrene**	8.6 J	200	ug/kg	PAI-55-SO18A-01	21/25	8.6 - 8.8	200	NA	**3.5**	NA	NA	**Yes**	ASL
	205-99-2	**Benzo(b)fluoranthene**	8.4 J	340	ug/kg	PAI-55-SO17A-01	22/25	8.6 - 8.8	340	NA	**35**	NA	NA	**Yes**	ASL

TABLE 6-4A
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SURFACE SOIL
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL Protection of Groundwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 55	**Polycyclic Aromatic Hydrocarbons (Continued)**														
	191-24-2	Benzo(g,h,i)perylene	5.4 J	170	ug/kg	PAI-55-SO18A-01	22/25	8.6 - 8.8	170	NA	9,500 [9]	NA	NA	No	BSL
	207-08-9	Benzo(k)fluoranthene	8 J	190	ug/kg	PAI-55-SO18A-01	22/25	8.6 - 8.8	190	NA	350	NA	NA	No	BSL
	218-01-9	Chrysene	7.5 J	190	ug/kg	PAI-55-SO18A-01	25/25	-	190	NA	1,100	NA	NA	No	BSL
	53-70-3	**Dibenzo(a,h)anthracene**	5.1 J	54 J	ug/kg	PAI-55-SO17B-01	15/25	8.5 - 9	54	NA	**11**	NA	NA	**Yes**	ASL
	206-44-0	Fluoranthene	2.8 J	290	ug/kg	PAI-55-SO18A-01	25/25	-	290	NA	70,000	NA	NA	No	BSL
	86-73-7	Fluorene	0.55 J	5.7 J	ug/kg	PAI-55-SO18A-01	21/25	0.75 - 8.8	5.7	NA	4,000	NA	NA	No	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	6.3 J	180	ug/kg	PAI-55-SO18A-01	22/25	8.6 - 8.8	180	NA	**120**	NA	NA	**Yes**	ASL
	91-20-3	**Naphthalene**	0.92 J	34	ug/kg	PAI-55-SO18A-01	24/25	2.1 - 2.1	34	NA	**0.47**	NA	NA	**Yes**	ASL
	85-01-8	Phenanthrene	3.4 J	160	ug/kg	PAI-55-SO18A-01	25/25	-	160	NA	9,500 [9]	NA	NA	No	BSL
	129-00-0	Pyrene	9.9	330	ug/kg	PAI-55-SO17A-01	25/25	-	330	NA	9,500	NA	NA	No	BSL
	Pesticides/PCBs														
	72-54-8	**4,4'-DDD**	0.81 J	440,000	ug/kg	PAI-27-SS-016-01	43/48	0.16 - 53	440,000	NA	**66**	NA	NA	**Yes**	ASL
	72-55-9	**4,4'-DDE**	0.13 J	34,000 J	ug/kg	PAI-27-SS-016-01	45/48	3.4 - 4.3	34,000	NA	**46**	NA	NA	**Yes**	ASL
	50-29-3	**4,4'-DDT**	0.2653 J	290,000	ug/kg	PAI-27-SS-017-01	48/48	3.9 - 3.9	290,000	NA	**67**	NA	NA	**Yes**	ASL
	309-00-2	**Aldrin**	0.072 J	1.1 J	ug/kg	PAI-55-SO10C-01	11/48	0.2 - 17000	1.1	NA	**0.034**	NA	NA	**Yes**	ASL
	319-84-6	**alpha-BHC**	0.11 J	92 J	ug/kg	PAI-27-SS-030-01	18/48	0.2 - 17000	92	NA	**0.036**	NA	NA	**Yes**	ASL
	5103-71-9	**alpha-Chlordane**	0.34 J	30	ug/kg	PAI-55-SO17-01	19/48	0.2 - 17000	30	NA	**13** [10]	NA	NA	**Yes**	ASL
	319-85-7	**beta-BHC**	0.33 J	2,300 J	ug/kg	PAI-27-SS-018-01	25/48	0.2 - 17000	2,300	NA	**0.13**	NA	NA	**Yes**	ASL
	319-86-8	**delta-BHC**	0.089 J	120 J	ug/kg	PAI-27-SS-030-01	29/48	0.21 - 17000	120	NA	**0.036** [11]	NA	NA	**Yes**	ASL
	60-57-1	**Dieldrin**	0.12 J	19 J	ug/kg	PAI-55-SO10C-01	26/48	0.16 - 34000	19	NA	**0.061**	NA	NA	**Yes**	ASL
	959-98-8	Endosulfan I	0.07888 J	3	ug/kg	PAI-55-SO12-01	21/48	0.2 - 17000	3	NA	1,100 [12]	NA	NA	No	BSL
	33213-65-9	Endosulfan II	0.11 J	5.6 J	ug/kg	PAI-55-SO07B-01	27/48	0.16 - 34000	5.6	NA	1,100 [12]	NA	NA	No	BSL
	1031-07-8	Endosulfan Sulfate	0.076 J	4.6 J	ug/kg	PAI-55-SO17B-01	29/48	0.16 - 34000	4.6	NA	1,100 [12]	NA	NA	No	BSL
	72-20-8	Endrin	0.053 J	10	ug/kg	PAI-55-SO04-01	14/48	0.16 - 34000	10	NA	68	NA	NA	No	BSL
	7421-93-4	Endrin Aldehyde	0.18 J	5.5	ug/kg	PAI-55-SO17-01	22/48	0.4 - 34000	5.5	NA	68 [13]	NA	NA	No	BSL
	53494-70-5	Endrin Ketone	0.11 J	9.4 J	ug/kg	PAI-55-SO17-01	21/48	0.16 - 34000	9.4	NA	68 [13]	NA	NA	No	BSL
	58-89-9	**gamma-BHC (Lindane)**	0.083 J	83 J	ug/kg	PAI-27-SS-030-01	12/48	0.064 - 17000	83	NA	**0.21**	NA	NA	**Yes**	ASL
	5103-74-2	**gamma-Chlordane**	0.13 J	29	ug/kg	PAI-55-SO17-01	24/48	0.18 - 17000	29	NA	**13** [10]	NA	NA	**Yes**	ASL
	76-44-8	**Heptachlor**	0.13 J	26 J	ug/kg	PAI-27-SS-024-01	15/48	0.2 - 17000	26	NA	**0.14**	NA	NA	**Yes**	ASL
	1024-57-3	**Heptachlor Epoxide**	0.077 J	3.1	ug/kg	PAI-27-SS-024-01	29/48	0.2 - 17000	3.1	NA	**0.068**	NA	NA	**Yes**	ASL
	72-43-5	Methoxychlor	0.36 J	9.2	ug/kg	PAI-55-SO12-01	28/48	3.4 - 170000	9.2	NA	1,500	NA	NA	No	BSL
	Metals														
	7429-90-5	Aluminum	2,310	5,680	mg/kg	PAI-55-SO09-01	31/31	-	5,680	NA	23,000	NA	NA	No	BSL
	7440-36-0	**Antimony**	1 J	5.05 J	mg/kg	PAI-55-SO07B-01	10/31	0.56 - 2.36	5.05	NA	**0.27**	NA	NA	**Yes**	ASL
	7440-38-2	**Arsenic**	0.5 J	17.5	mg/kg	PAI-55-SO07B-01	22/31	0.51 - 1.27	17.5	NA	**0.0013**	NA	NA	**Yes**	ASL
	7440-39-3	**Barium**	12 J	162	mg/kg	PAI-55-SO15-01	31/31	-	162	NA	**120**	NA	NA	**Yes**	ASL
	7440-41-7	Beryllium	0.03 J	0.49 J	mg/kg	PAI-55-SO12-01	17/31	0.1 - 0.87	0.49	NA	13	NA	NA	No	BSL
	7440-43-9	Cadmium	0.07 J	0.28 J	mg/kg	PAI-55-SO13-01, PAI-55-SO14-01-D	7/31	0.07 - 0.35	0.28	NA	0.52	NA	NA	No	BSL
	7440-70-2	Calcium	182 J	93,300	mg/kg	PAI-55-SO10B-01	31/31	-	93,300	NA	NA	NA		No	NUT
	7440-47-3	**Chromium**	2.31	9.61	mg/kg	PAI-55-SO07B-01	31/31	-	9.61	NA	**0.00059** [14]	NA	NA	**Yes**	ASL
	7440-48-4	**Cobalt**	0.25 J	3.04	mg/kg	PAI-55-SO07B-01	12/31	0.25 - 0.81	3.04	NA	**0.21**	NA	NA	**Yes**	ASL
	7440-50-8	**Copper**	1.39	80.6	mg/kg	PAI-55-SO17A-01	30/31	1.08 - 1.08	80.6	NA	**22**	NA	NA	**Yes**	ASL
	7439-89-6	**Iron**	1,240	7,330	mg/kg	PAI-55-SO07B-01	31/31	-	7,330	NA	**270**	NA	NA	**Yes**	ASL
	7439-92-1	**Lead**	3.7	1,140	mg/kg	PAI-55-SO15-01	31/31	-	1,140	NA	**14** [15]	NA	NA	**Yes**	ASL
	7439-95-4	Magnesium	138 J	1,120	mg/kg	PAI-55-SO10B-01	31/31	-	1,120	NA	NA	NA		No	NUT

TABLE 6-4A
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SURFACE SOIL
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	USEPA RSL Protection of Groundwater(5)	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Site 55	**Metals (Continued)**														
	7439-96-5	**Manganese**	14.8	123	mg/kg	PAI-55-SO07B-01	31/31	-	123	NA	**21**	NA	NA	**Yes**	ASL
	7439-97-6	**Mercury**	0.0162 J	0.344	mg/kg	PAI-55-SO10C-01	30/31	0.01 - 0.01	0.344	NA	**0.033**	NA	NA	**Yes**	ASL
	7440-02-0	Nickel	1.17	7.2	mg/kg	PAI-55-SO17A-01	31/31	-	7.2	NA	20	NA	NA	No	BSL
	7440-09-7	Potassium	58.6 J	560	mg/kg	PAI-55-SO17-01	23/31	159 - 281	560	NA	NA	NA		No	NUT
	7782-49-2	**Selenium**	0.24 J	1.31	mg/kg	PAI-55-SO07B-01	15/31	0.222 - 0.33	1.31	NA	**0.4**	NA	NA	**Yes**	ASL
	7440-22-4	Silver	0.19 J	0.19 J	mg/kg	PAI-55-SO12-01	1/31	0.05 - 0.35	0.19	NA	0.6	NA	NA	No	BSL
	7440-23-5	Sodium	41.5 J	280 J	mg/kg	PAI-55-SO07B-01	21/31	34.2 - 271	280	NA	NA	NA		No	NUT
	7440-28-0	**Thallium**	0.3 J	0.3 J	mg/kg	PAI-55-SO07B-01	1/31	0.179 - 0.69	0.3	NA	**0.011**	NA	NA	**Yes**	ASL
	7440-62-2	Vanadium	2.35	19.7	mg/kg	PAI-55-SO07B-01	31/31	-	19.7	NA	78 (16)	NA	NA	No	BSL
	7440-66-6	**Zinc**	5.67	2,060	mg/kg	PAI-55-SO07B-01	31/31	-	2,060	NA	**290**	NA	NA	**Yes**	ASL

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background data is available.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2011.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for m-xylene.
8 - Acenaphthene is used as a surrogate for acenaphthylene.
9 - Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
10 - Value is for chlordane.
11 - Value is for alpha-BHC.
12 - Value is for Endosulfan.
13 - Value is for Endrin.
14 - Value is for hexavalent chromium.
15 - Value is MCL based soil screening level.
16 - Value is for vanadium and compounds.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
COPC = Chemical Of Potential Concern
J = Estimated value
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

Associated Samples

PAI-27-SS-014-01	PAI-27-SS-030-01	PAI-55-SO08-01	PAI-55-SO16-01
PAI-27-SS-015-01	PAI-27-SS-031-01	PAI-55-SO09-01	PAI-55-SO17-01
PAI-27-SS-016-01	PAI-27-SS-032-01	PAI-55-SO10-01	PAI-55-SO17A-01
PAI-27-SS-017-01	FOVSFB-0803	PAI-55-SO10A-01	PAI-55-SO17B-01
PAI-27-SS-018-01	PAI-55-SO01-01	PAI-55-SO10B-01	PAI-55-SO17C-01
PAI-27-SS-019-01	PAI-55-SO01-01-D	PAI-55-SO10C-01	PAI-55-SO17D-01
PAI-27-SS-020-01	PAI-55-SO02-01	PAI-55-SO11-01	PAI-55-SO18-01
PAI-27-SS-021-01	PAI-55-SO03-01	PAI-55-SO12-01	PAI-55-SO18A-01
PAI-27-SS-022-01	PAI-55-SO04-01	PAI-55-SO13-01	
PAI-27-SS-023-01	PAI-55-SO05-01	PAI-55-SO14-01	
PAI-27-SS-024-01	PAI-55-SO06-01	PAI-55-SO14-01-D	
PAI-27-SS-024-01-D	PAI-55-SO07-01	PAI-55-SO14A-01	
PAI-27-SS-025-01	PAI-55-SO07-01-D	PAI-55-SO14B-01	
PAI-27-SS-026-01	PAI-55-SO07A-01	PAI-55-SO14C-01	
PAI-27-SS-027-01	PAI-55-SO07B-01	PAI-55-SO15-01	

TABLE 6-5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Residential Soil[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 27	**Volatile Organic Compounds**														
	120-82-1	1,2,4-Trichlorobenzene	430	430	ug/kg	PAI-27-SB-028-06	1/16	0.4 - 6	430	NA	6,200 N[7]	NA	NA	No	BSL
	95-50-1	1,2-Dichlorobenzene	190	190	ug/kg	PAI-27-SB-028-06	1/16	0.87 - 6	190	NA	190,000 N	NA	NA	No	BSL
	541-73-1	1,3-Dichlorobenzene	18	18	ug/kg	PAI-27-SB-028-06	1/16	0.87 - 6	18	NA	2,400 C[8]	NA	NA	No	BSL
	106-46-7	1,4-Dichlorobenzene	360	360	ug/kg	PAI-27-SB-028-06	1/16	0.22 - 6	360	NA	2,400 C	NA	NA	No	BSL
	78-93-3	2-Butanone	2.5 J	28	ug/kg	PAI-27-SB-028-06	2/16	2.2 - 29	28	NA	2,800,000 N	NA	NA	No	BSL
	67-64-1	Acetone	8.7 J	79	ug/kg	PAI-27-SB-028-06	6/14	6 - 29	79	NA	6,100,000 N	NA	NA	No	BSL
	71-43-2	Benzene	26	26	ug/kg	PAI-27-SB-028-06	1/16	0.87 - 6	26	NA	1,100 C	NA	NA	No	BSL
	108-90-7	Chlorobenzene	0.33 J	380	ug/kg	PAI-27-SB-028-06	2/16	0.22 - 6	380	NA	29,000 N	NA	NA	No	BSL
	110-82-7	Cyclohexane	5	5	ug/kg	PAI-27-SB-028-06	1/16	0.87 - 6	5	NA	700,000 N	NA	NA	No	BSL
	100-41-4	Ethylbenzene	57	57	ug/kg	PAI-27-SB-028-06	1/16	2.2 - 6	57	NA	5,400 C	NA	NA	No	BSL
	98-82-8	Isopropylbenzene	53	53	ug/kg	PAI-27-SB-028-06	1/16	0.22 - 6	53	NA	210,000 N	NA	NA	No	BSL
	- -	m+p-Xylenes	0.2 J	0.33 J	ug/kg	PAI-27-SO-43-05	2/16	0.43 - 12	0.33	NA	59,000 N[9]	NA	NA	No	BSL
	108-87-2	Methyl Cyclohexane	50	50	ug/kg	PAI-27-SB-028-06	1/16	0.87 - 6	50	NA	NA	NA	NA	No	NTX
	75-09-2	Methylene Chloride	0.58 J	0.82 J	ug/kg	PAI-27-SO41-05	3/16	0.62 - 29	0.82	NA	36,000 N[10][11]	NA	NA	No	BSL
	95-47-6	o-Xylene	1 J	1 J	ug/kg	PAI-27-SB-028-06	1/16	0.87 - 6	1	NA	69,000 N	NA	NA	No	BSL
	127-18-4	Tetrachloroethene	6	6	ug/kg	PAI-27-SB-028-06	1/16	2.2 - 6	6	NA	8,600 N[10][11]	NA	NA	No	BSL
	108-88-3	Toluene	0.46 J	2.2 J	ug/kg	PAI-27-SO-43-05	5/16	0.39 - 6	2.2	NA	500,000 N	NA	NA	No	BSL
	1330-20-7	Total Xylenes	0.2 J	1 J	ug/kg	PAI-27-SB-028-06	3/16	0.43 - 18	1	NA	63,000 N	NA	NA	No	BSL
	Polycyclic Aromatic Hydrocarbons														
	90-12-0	1-Methylnaphthalene	49	49	ug/kg	PAI-27-SO38A-05	1/14	8.6 - 11	49	NA	22,000 C	NA	NA	No	BSL
	91-57-6	2-Methylnaphthalene	0.94 J	74	ug/kg	PAI-27-SO38A-05	2/14	8.6 - 10	74	NA	31,000 N	NA	NA	No	BSL
	83-32-9	Acenaphthene	4.8 J	4.8 J	ug/kg	PAI-27-SO38A-05	1/14	8.6 - 11	4.8	NA	340,000 N	NA	NA	No	BSL
	208-96-8	Acenaphthylene	1.5 J	1.5 J	ug/kg	PAI-27-SO34-05	1/14	8.6 - 11	1.5	NA	340,000 N[12]	NA	NA	No	BSL
	120-12-7	Anthracene	0.54 J	0.92 J	ug/kg	PAI-27-SO34-05	3/14	8.6 - 11	0.92	NA	1,700,000 N	NA	NA	No	BSL
	- -	**Benzo(a)pyrene Equivalents**	3.43	19.3	ug/kg	PAI-27-SO34-05	4/14	8.6 - 11	19.3	NA	**15 C**	NA	NA	**Yes**	ASL
	56-55-3	Benzo(a)anthracene	0.66 J	8.6 J	ug/kg	PAI-27-SO34-05	4/14	8.6 - 11	8.6	NA	150 C	NA	NA	No	BSL
	50-32-8	Benzo(a)pyrene	1.1 J	11	ug/kg	PAI-27-SO34-05	3/14	8.6 - 11	11	NA	15 C	NA	NA	No	BSL
	205-99-2	Benzo(b)fluoranthene	1 J	11	ug/kg	PAI-27-SO34-05	4/14	8.6 - 11	11	NA	150 C	NA	NA	No	BSL
	191-24-2	Benzo(g,h,i)perylene	2.3 J	6.9 J	ug/kg	PAI-27-SO34-05	2/14	8.6 - 11	6.9	NA	170,000 N[13]	NA	NA	No	BSL
	207-08-9	Benzo(k)fluoranthene	0.73 J	7.8 J	ug/kg	PAI-27-SO34-05	4/14	8.6 - 11	7.8	NA	1,500 C	NA	NA	No	BSL
	218-01-9	Chrysene	0.76 J	11	ug/kg	PAI-27-SO34-05	4/14	8.6 - 11	11	NA	15,000 C	NA	NA	No	BSL
	53-70-3	Dibenzo(a,h)anthracene	2 J	2 J	ug/kg	PAI-27-SO45A-05	1/14	8.6 - 11	2	NA	15 C	NA	NA	No	BSL
	206-44-0	Fluoranthene	1.7 J	13	ug/kg	PAI-27-SO34-05	3/14	8.6 - 11	13	NA	230,000 N	NA	NA	No	BSL
	86-73-7	Fluorene	0.73 J	5.4 J	ug/kg	PAI-27-SO38A-05	2/14	8.6 - 11	5.4	NA	230,000 N	NA	NA	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	0.6 J	13	ug/kg	PAI-27-SO34-05	3/14	8.6 - 11	13	NA	150 C	NA	NA	No	BSL
	91-20-3	Naphthalene	17	17	ug/kg	PAI-27-SO38A-05	1/14	0.96 - 11	17	NA	3,600 C	NA	NA	No	BSL
	85-01-8	Phenanthrene	5.2 J	8.8 J	ug/kg	PAI-27-SO38A-05	2/14	8.6 - 11	8.8	NA	170,000 N[13]	NA	NA	No	BSL
	129-00-0	Pyrene	1.4 J	13	ug/kg	PAI-27-SO34-05	4/14	8.6 - 11	13	NA	170,000 N	NA	NA	No	BSL

TABLE 6-5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Residential Soil[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 27	**Pesticides/PCBs**														
	72-54-8	**4,4'-DDD**	0.13 J	270,000	ug/kg	PAI-27-SB-028-06	11/16	0.11 - 0.2	270,000	NA	**2,000 C**	NA	NA	**Yes**	ASL
	72-55-9	4,4'-DDE	0.1 J	12	ug/kg	PAI-27-SO47-05	7/16	0.17 - 38000	12	NA	1,400 C	NA	NA	No	BSL
	Pesticides/PCBs (continued)														
	50-29-3	4,4'-DDT	0.29 J	64	ug/kg	PAI-27-SO-44-05	9/16	0.44 - 38000	64	NA	1,700 C	NA	NA	No	BSL
	319-84-6	**alpha-BHC**	0.22 J	14,000 J	ug/kg	PAI-27-SB-028-06	6/16	0.17 - 0.27	14,000	NA	**77 C**	NA	NA	**Yes**	ASL
	5103-71-9	alpha-Chlordane	0.15 J	1	ug/kg	PAI-27-SO-48-05	5/16	0.21 - 20000	1	NA	1,600 C[14]	NA	NA	No	BSL
	319-85-7	beta-BHC	0.73 J	4.3	ug/kg	PAI-27-SO-44-05	5/16	0.21 - 20000	4.3	NA	270 C	NA	NA	No	BSL
	319-86-8	**delta-BHC**	0.16 J	20,000 J	ug/kg	PAI-27-SB-028-06	12/16	0.22 - 0.25	20,000	NA	**77 C**	NA	NA	**Yes**	ASL
	60-57-1	Dieldrin	0.071 J	0.071 J	ug/kg	PAI-27-SO47-05	1/16	0.17 - 38000	0.071	NA	30 C	NA	NA	No	BSL
	959-98-8	Endosulfan I	0.13 J	1.3 J	ug/kg	PAI-27-SO47-05	3/16	0.21 - 20000	1.3	NA	37,000 N[16]	NA	NA	No	BSL
	1031-07-8	Endosulfan Sulfate	0.43 J	0.43 J	ug/kg	PAI-27-SO-44-05	1/16	0.17 - 38000	0.43	NA	37,000 N[16]	NA	NA	No	BSL
	72-20-8	Endrin	0.14 J	0.47 J	ug/kg	PAI-27-SO47-05	4/16	0.17 - 38000	0.47	NA	1,800 N	NA	NA	No	BSL
	7421-93-4	Endrin Aldehyde	0.16 J	1.5 J	ug/kg	PAI-27-SO34-05	5/16	0.17 - 38000	1.5	NA	1,800 N[17]	NA	NA	No	BSL
	53494-70-5	Endrin Ketone	0.0607 J	0.47 J	ug/kg	PAI-27-SO47-05	3/16	0.17 - 38000	0.47	NA	1,800 N[17]	NA	NA	No	BSL
	58-89-9	gamma-BHC (Lindane)	0.061 J	0.96 J	ug/kg	PAI-27-SB-029-06	7/16	0.067 - 20000	0.96	NA	520 C	NA	NA	No	BSL
	5103-74-2	gamma-Chlordane	0.17 J	0.9 J	ug/kg	PAI-27-SO-48-05	4/16	0.13 - 20000	0.9	NA	1,600 C[14]	NA	NA	No	BSL
	76-44-8	Heptachlor	0.14 J	1.2	ug/kg	PAI-27-SO-48-05	5/16	0.21 - 20000	1.2	NA	110 C	NA	NA	No	BSL
	1024-57-3	Heptachlor Epoxide	0.083 J	0.43 J	ug/kg	PAI-27-SO-44-05	6/16	0.21 - 20000	0.43	NA	53 C	NA	NA	No	BSL
	Metals														
	7429-90-5	**Aluminum**	1,460	24,000	mg/kg	PAI-27-SO41-05	14/14	-	24,000	NA	**7,700 N**	NA	NA	**Yes**	ASL
	7440-36-0	Antimony	1.39 J	1.74 J	mg/kg	PAI-27-SO34-05	3/14	0.51 - 2.22	1.74	NA	3.1 N	NA	NA	No	BSL
	7440-38-2	**Arsenic**	0.93 J	13.2	mg/kg	PAI-27-SO41-05	4/14	0.52 - 1.34	13.2	NA	**0.39 C**	NA	NA	**Yes**	ASL
	7440-39-3	Barium	8.2 J	38.7	mg/kg	PAI-27-SO41-05	14/14	-	38.7	NA	1,500 N	NA	NA	No	BSL
	7440-41-7	Beryllium	0.03 J	0.08 J	mg/kg	PAI-27-SO-48-05	3/14	0.05 - 0.7	0.08	NA	16 N	NA	NA	No	BSL
	7440-70-2	Calcium	117 J	2,200	mg/kg	PAI-27-SO41-05	10/14	149 - 286	2,200	NA	NA	NA	NA	No	NUT
	7440-47-3	**Chromium**	1.7	34.7	mg/kg	PAI-27-SO41-05	14/14	-	34.7	NA	**0.29 C**	NA	NA	**Yes**	ASL
	7440-48-4	Cobalt	0.39 J	0.39 J	mg/kg	PAI-27-SO38A-05	1/14	0.27 - 1.36	0.39	NA	2.3 N	NA	NA	No	BSL
	7440-50-8	Copper	0.15 J	2.63	mg/kg	PAI-27-SO41-05	8/14	0.68 - 1.11	2.63	NA	310 N	NA	NA	No	BSL
	7439-89-6	**Iron**	770	32,100	mg/kg	PAI-27-SO41-05	14/14	-	32,100	NA	**5,500 N**	NA	NA	**Yes**	ASL
	7439-92-1	Lead	1.63	20.2	mg/kg	PAI-27-SO41-05	14/14	-	20.2	NA	400	NA	NA	No	BSL
	7439-95-4	Magnesium	69.9 J	1,370	mg/kg	PAI-27-SO41-05	14/14	-	1,370	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	3.01	17.1	mg/kg	PAI-27-SO41-05	14/14	-	17.1	NA	180 N	NA	NA	No	BSL
	7439-97-6	Mercury	0.0088 J	0.12	mg/kg	PAI-27-SO41-05	10/14	0.0104 - 0.0109	0.12	NA	2.3 N[19]	NA	NA	No	BSL
	7440-02-0	Nickel	0.66 J	4.63	mg/kg	PAI-27-SO41-05	12/14	0.71 - 1.41	4.63	NA	150 N	NA	NA	No	BSL
	7440-09-7	Potassium	46 J	947	mg/kg	PAI-27-SO41-05	12/14	118 - 140	947	NA	NA	NA	NA	No	NUT
	7782-49-2	Selenium	0.47 J	1.81	mg/kg	PAI-27-SO41-05	4/14	0.26 - 0.32	1.81	NA	39 N	NA	NA	No	BSL
	7440-23-5	Sodium	43 J	301 J	mg/kg	PAI-27-SO34-05	7/14	39.7 - 118	301	NA	NA	NA	NA	No	NUT
	7440-28-0	**Thallium**	4.51 J	4.51 J	mg/kg	PAI-27-SO38A-05	1/14	0.52 - 0.63	4.51	NA	**0.078 N**	NA	NA	**Yes**	ASL
	7440-62-2	**Vanadium**	1.29 J	52	mg/kg	PAI-27-SO41-05	14/14	-	52	NA	**39 N**	NA	NA	**Yes**	ASL
	7440-66-6	Zinc	1.25 J	23	mg/kg	PAI-27-SO41-05	14/14	-	23	NA	2,300 N	NA	NA	No	BSL

TABLE 6-5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	Adjusted USEPA RSL Residential Soil(5)	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background data is available.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2011. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
8 - Value is for 1,4-dichlorobenzene.
9 - Value is for m-xylene.
10 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
11 - The screening level was calculated using revised toxicity criteria from USEPA's Integrated Risk Information System.
12 - Acenaphthene is used as a surrogate for acenaphthylene.
13 - Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
14 - Value is for chlordane.
15 - Value is for alpha-BHC.
16 - Value is for Endosulfan.
17 - Value is for Endrin.
18 - Value is for hexavalent chromium.
19 - Value is for mercuric chloride (and other Mercury salts).
20 - Value is for vanadium and compounds.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

PAI-27-SB-028-06	PAI-27-SO-44-05
PAI-27-SB-029-06	PAI-27-SO45-05
PAI-27-SO34-05	PAI-27-SO45A-05
PAI-27-SO38-05	PAI-27-SO45B-05
PAI-27-SO38A-05	PAI-27-SO46-05
PAI-27-SO39-05	PAI-27-SO47-05
PAI-27-SO41-05	PAI-27-SO-48-05
PAI-27-SO-43-05	PAI-55-SO02A-05

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 6-5A
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Residential Soil[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 55	**Volatile Organic Compounds**														
	78-93-3	2-Butanone	2.2 J	2.2 J	ug/kg	PAI-55-SO14C-05	1/15	2.5 - 43	2.2	NA	2,800,000 N	NA	NA	No	BSL
	67-64-1	Acetone	11 J	49	ug/kg	PAI-27-SB-027-06	3/15	6.3 - 43	49	NA	6,100,000 N	NA	NA	No	BSL
	74-87-3	Chloromethane	7.7	7.7	ug/kg	PAI-55-SO14C-05	1/16	0.99 - 9	7.7	NA	12,000 N	NA	NA	No	BSL
	110-82-7	Cyclohexane	2 J	2 J	ug/kg	PAI-27-SB-027-06	1/16	0.99 - 9	2	NA	700,000 N	NA	NA	No	BSL
	- -	m+p-Xylenes	0.18 J	0.24 J	ug/kg	PAI-55-SO04-05	2/16	0.5 - 17	0.24	NA	59,000 N[7]	NA	NA	No	BSL
	79-20-9	Methyl Acetate	4.1 J	20	ug/kg	PAI-55-SO14C-05	2/16	2.5 - 9	20	NA	7,800,000 N	NA	NA	No	BSL
	108-88-3	Toluene	1.1 J	1.1 J	ug/kg	PAI-55-SO04-05	1/16	0.43 - 9	1.1	NA	500,000 N	NA	NA	No	BSL
	1330-20-7	Total Xylenes	0.18 J	0.24 J	ug/kg	PAI-55-SO04-05	2/16	0.5 - 26	0.24	NA	63,000 N	NA	NA	No	BSL
	Polycyclic Aromatic Hydrocarbons														
	90-12-0	1-Methylnaphthalene	0.63 J	2.2 J	ug/kg	PAI-55-SO18A-05	2/9	8.6 - 11	2.2	NA	22,000 C	NA	NA	No	BSL
	91-57-6	2-Methylnaphthalene	0.83 J	3.5 J	ug/kg	PAI-55-SO18A-05	2/9	8.6 - 11	3.5	NA	31,000 N	NA	NA	No	BSL
	83-32-9	Acenaphthene	1 J	1 J	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	1	NA	340,000 N	NA	NA	No	BSL
	208-96-8	Acenaphthylene	33	33	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	33	NA	340,000 N[8]	NA	NA	No	BSL
	120-12-7	Anthracene	5.7 J	5.7 J	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	5.7	NA	1,700,000 N	NA	NA	No	BSL
	- -	**Benzo(a)pyrene Equivalents**	17.9	17.9	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	17.9	NA	**15 C**	NA	NA	**Yes**	ASL
	56-55-3	Benzo(a)anthracene	5.5 J	5.5 J	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	5.5	NA	150 C	NA	NA	No	BSL
	50-32-8	Benzo(a)pyrene	10	10	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	10	NA	15 C	NA	NA	No	BSL
	205-99-2	Benzo(b)fluoranthene	12	12	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	12	NA	150 C	NA	NA	No	BSL
	191-24-2	Benzo(g,h,i)perylene	22	22	ug/kg	PAI-55-SO18A-05	1/9	0.43 - 11	22	NA	170,000 N[9]	NA	NA	No	BSL
	207-08-9	Benzo(k)fluoranthene	8 J	8 J	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	8	NA	1,500 C	NA	NA	No	BSL
	218-01-9	Chrysene	9.2 J	9.2 J	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	9.2	NA	15,000 C	NA	NA	No	BSL
	206-44-0	Fluoranthene	13	13	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	13	NA	230,000 N	NA	NA	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	13	13	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	13	NA	150 C	NA	NA	No	BSL
	91-20-3	Naphthalene	1.8 J	1.8 J	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	1.8	NA	3,600 C	NA	NA	No	BSL
	85-01-8	Phenanthrene	9.4 J	9.4 J	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	9.4	NA	170,000 N[9]	NA	NA	No	BSL
	129-00-0	Pyrene	23	23	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	23	NA	170,000 N	NA	NA	No	BSL
	Pesticides/PCBs														
	72-54-8	4,4'-DDD	0.55 J	520	ug/kg	PAI-27-SB-022-05	12/16	0.17 - 3.4	520	NA	2,000 C	NA	NA	No	BSL
	72-55-9	4,4'-DDE	0.088 J	250 J	ug/kg	PAI-27-SB-022-05	10/16	0.17 - 3.5	250	NA	1,400 C	NA	NA	No	BSL
	50-29-3	**4,4'-DDT**	0.28 J	2,700 J	ug/kg	PAI-27-SB-022-05	15/16	0.46 - 0.46	2,700	NA	**1,700 C**	NA	NA	**Yes**	ASL
	319-84-6	alpha-BHC	0.82 J	61 J	ug/kg	PAI-27-SB-022-05	3/16	0.21 - 1.8	61	NA	77 C	NA	NA	No	BSL
	5103-71-9	alpha-Chlordane	0.18 J	0.51 J	ug/kg	PAI-55-SO04-05	2/16	0.21 - 180	0.51	NA	1,600 C[10]	NA	NA	No	BSL
	319-85-7	beta-BHC	0.49 J	0.73 J	ug/kg	PAI-55-SO04-05	4/16	0.21 - 180	0.73	NA	270 C	NA	NA	No	BSL
	319-86-8	**delta-BHC**	0.13 J	86 J	ug/kg	PAI-27-SB-022-05	9/16	0.21 - 1.8	86	NA	**77 C[11]**	NA	NA	**Yes**	ASL
	60-57-1	Dieldrin	0.12 J	0.66 J	ug/kg	PAI-55-SO04-05	2/16	0.17 - 340	0.66	NA	30 C	NA	NA	No	BSL
	33213-65-9	Endosulfan II	0.81 J	0.81 J	ug/kg	PAI-55-SO18A-05	1/16	0.17 - 340	0.81	NA	37,000 N[12]	NA	NA	No	BSL
	72-20-8	Endrin	0.85 J	0.85 J	ug/kg	PAI-55-SO18A-05	1/16	0.17 - 340	0.85	NA	1800 N	NA	NA	No	BSL
	7421-93-4	Endrin Aldehyde	0.16 J	1.3 J	ug/kg	PAI-55-SO04-05	3/16	0.21 - 340	1.3	NA	1800 N[13]	NA	NA	No	BSL
	58-89-9	gamma-BHC (Lindane)	0.055 J	24	ug/kg	PAI-27-SB-030-06	3/16	0.065 - 180	24	NA	520 C	NA	NA	No	BSL
	5103-74-2	gamma-Chlordane	0.097 J	0.42 J	ug/kg	PAI-55-SO04-05	3/16	0.091 - 180	0.42	NA	1,600 C[10]	NA	NA	No	BSL
	1024-57-3	Heptachlor Epoxide	0.11 J	0.11 J	ug/kg	PAI-55-SO01-05	1/16	0.21 - 180	0.11	NA	53 C	NA	NA	No	BSL
	Metals														
	7429-90-5	Aluminum	564	3,180	mg/kg	PAI-55-SO14C-05	9/9	-	3,180	NA	7700 N	NA	NA	No	BSL
	7440-36-0	Antimony	1.64 J	1.64 J	mg/kg	PAI-55-SO01-05	1/9	0.84 - 2.1	1.64	NA	3.1 N	NA	NA	No	BSL
	7440-39-3	Barium	3.97 J	12.7 J	mg/kg	PAI-55-SO04-05	9/9	-	12.7	NA	1500 N	NA	NA	No	BSL
	7440-41-7	Beryllium	0.03 J	0.03 J	mg/kg	PAI-55-SO14C-05	1/9	0.03 - 0.34	0.03	NA	16 N	NA	NA	No	BSL

TABLE 6-5A
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Residential Soil[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 55	**Metals (Continued)**														
	7440-70-2	Calcium	63.6 J	980	mg/kg	PAI-55-SO14C-05	5/9	187 - 223	980	NA	NA	NA	NA	No	NUT
	7440-47-3	**Chromium**	1.23	3.75	mg/kg	PAI-55-SO14C-05	9/9	-	3.75	NA	**0.29 C[14]**	NA	NA	**Yes**	ASL
	7440-50-8	Copper	0.26 J	2.77	mg/kg	PAI-55-SO04-05	8/9	0.43 - 0.43	2.77	NA	310 N	NA	NA	No	BSL
	7439-89-6	Iron	115	1,430	mg/kg	PAI-55-SO16-05	9/9	-	1,430	NA	5500 N	NA	NA	No	BSL
	7439-92-1	Lead	1.33	3.13	mg/kg	PAI-55-SO04-05	9/9	-	3.13	NA	400	NA	NA	No	BSL
	7439-95-4	Magnesium	35.7 J	114 J	mg/kg	PAI-55-SO04-05	9/9	-	114	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	1.33	6.88	mg/kg	PAI-55-SO01-05	9/9	-	6.88	NA	180 N	NA	NA	No	BSL
	7439-97-6	Mercury	0.0101 J	0.0114 J	mg/kg	PAI-55-SO16-05	2/9	0.0094 - 0.0131	0.0114	NA	2.3 N[15]	NA	NA	No	BSL
	7440-02-0	Nickel	0.29 J	1.26 J	mg/kg	PAI-55-SO04-05, PAI-55-SO17A-05	8/9	0.81 - 0.81	1.26	NA	150 N	NA	NA	No	BSL
	7440-09-7	Potassium	30 J	55.2 J	mg/kg	PAI-55-SO04-05	4/9	107 - 153	55.2	NA	NA	NA	NA	No	NUT
	7440-23-5	Sodium	50.7 J	128 J	mg/kg	PAI-55-SO07A-05	7/9	37.9 - 38.5	128	NA	NA	NA	NA	No	NUT
	7440-62-2	Vanadium	0.64 J	2.4 J	mg/kg	PAI-55-SO04-05	9/9	-	2.4	NA	39 N[16]	NA	NA	No	BSL
	7440-66-6	Zinc	0.74 J	10.2	mg/kg	PAI-55-SO17A-05	8/9	1.03 - 1.03	10.2	NA	2300 N	NA	NA	No	BSL

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background data is available.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2011. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for m-xylene.
8 - Acenaphthene is used as a surrogate for acenaphthylene.
9 - Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
10 - Value is for chlordane.
11 - Value is for alpha-BHC.
12 - Value is for Endosulfan.
13 - Value is for Endrin.
14 - Value is for hexavalent chromium.
15 - Value is for mercuric chloride (and other Mercury salts).
16- Value is for vanadium and compounds.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

PAI-27-SB-021-04	FOVSFB-0204	FOVSFB-1204	FOVSFB-2104	PAI-55-SO17A-05
PAI-27-SB-022-05	FOVSFB-0206	FOVSFB-1305	PAI-55-SO01-05	PAI-55-SO18A-05
PAI-27-SB-023-04	FOVSFB-0305	FOVSFB-1405	PAI-55-SO04-05	
PAI-27-SB-027-06	FOVSFB-0406	FOVSFB-1505	PAI-55-SO06-05	
PAI-27-SB-030-06	FOVSFB-0505	FOVSFB-1605	PAI-55-SO07A-05	
PAI-27-SB-031-04	FOVSFB-0605	FOVSFB-1704	PAI-55-SO10A-05	
PAI-27-SB-032-04	FOVSFB-1005	FOVSFB-1804	PAI-55-SO14C-05	
FOVSFB-0106	FOVSFB-1105	FOVSFB-1904	PAI-55-SO16-05	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 6-6
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL Protection of Groundwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 27	**Volatile Organic Compounds**														
	120-82-1	**1,2,4-Trichlorobenzene**	430	430	ug/kg	PAI-27-SB-028-06	1/16	0.4 - 6	430	NA	**2.9**	NA	NA	**Yes**	ASL
	95-50-1	1,2-Dichlorobenzene	190	190	ug/kg	PAI-27-SB-028-06	1/16	0.87 - 6	190	NA	270	NA	NA	No	BSL
	541-73-1	**1,3-Dichlorobenzene**	18	18	ug/kg	PAI-27-SB-028-06	1/16	0.87 - 6	18	NA	**0.4** [7]	NA	NA	**Yes**	ASL
	106-46-7	**1,4-Dichlorobenzene**	360	360	ug/kg	PAI-27-SB-028-06	1/16	0.22 - 6	360	NA	**0.4**	NA	NA	**Yes**	ASL
	78-93-3	2-Butanone	2.5 J	28	ug/kg	PAI-27-SB-028-06	2/16	2.2 - 29	28	NA	1,000	NA	NA	No	BSL
	67-64-1	Acetone	8.7 J	79	ug/kg	PAI-27-SB-028-06	6/14	6 - 29	79	NA	2,400	NA	NA	No	BSL
	71-43-2	**Benzene**	26	26	ug/kg	PAI-27-SB-028-06	1/16	0.87 - 6	26	NA	**0.2**	NA	NA	**Yes**	ASL
	108-90-7	**Chlorobenzene**	0.33 J	380	ug/kg	PAI-27-SB-028-06	2/16	0.22 - 6	380	NA	**49**	NA	NA	**Yes**	ASL
	110-82-7	Cyclohexane	5	5	ug/kg	PAI-27-SB-028-06	1/16	0.87 - 6	5	NA	13,000	NA	NA	No	BSL
	100-41-4	**Ethylbenzene**	57	57	ug/kg	PAI-27-SB-028-06	1/16	2.2 - 6	57	NA	**1.5**	NA	NA	**Yes**	ASL
	98-82-8	Isopropylbenzene	53	53	ug/kg	PAI-27-SB-028-06	1/16	0.22 - 6	53	NA	640	NA	NA	No	BSL
	- -	m+p-Xylenes	0.2 J	0.33 J	ug/kg	PAI-27-SO-43-05	2/16	0.43 - 12	0.33	NA	180 [8]	NA	NA	No	BSL
	108-87-2	Methyl Cyclohexane	50	50	ug/kg	PAI-27-SB-028-06	1/16	0.87 - 6	50	NA	NA	NA	NA	No	NTX
	75-09-2	Methylene Chloride	0.58 J	0.82 J	ug/kg	PAI-27-SO41-05	3/16	0.62 - 29	0.82	NA	1.2	NA	NA	No	BSL
	95-47-6	o-Xylene	1 J	1 J	ug/kg	PAI-27-SB-028-06	1/16	0.87 - 6	1	NA	190	NA	NA	No	BSL
	127-18-4	**Tetrachloroethene**	6	6	ug/kg	PAI-27-SB-028-06	1/16	2.2 - 6	6	NA	**0.033**	NA	NA	**Yes**	ASL
	108-88-3	Toluene	0.46 J	2.2 J	ug/kg	PAI-27-SO-43-05	5/16	0.39 - 6	2.2	NA	590	NA	NA	No	BSL
	1330-20-7	Total Xylenes	0.2 J	1 J	ug/kg	PAI-27-SB-028-06	3/16	0.43 - 18	1	NA	190	NA	NA	No	BSL
	Polycyclic Aromatic Hydrocarbons														
	90-12-0	**1-Methylnaphthalene**	49	49	ug/kg	PAI-27-SO38A-05	1/14	8.6 - 11	49	NA	**5.1**	NA	NA	**Yes**	ASL
	91-57-6	2-Methylnaphthalene	0.94 J	74	ug/kg	PAI-27-SO38A-05	2/14	8.6 - 10	74	NA	140	NA	NA	No	BSL
	83-32-9	Acenaphthene	4.8 J	4.8 J	ug/kg	PAI-27-SO38A-05	1/14	8.6 - 11	4.8	NA	4,100	NA	NA	No	BSL
	208-96-8	Acenaphthylene	1.5 J	1.5 J	ug/kg	PAI-27-SO34-05	1/14	8.6 - 11	1.5	NA	4,100 [9]	NA	NA	No	BSL
	120-12-7	Anthracene	0.54 J	0.92 J	ug/kg	PAI-27-SO34-05	3/14	8.6 - 11	0.92	NA	42,000	NA	NA	No	BSL
	- -	Benzo(a)pyrene Equivalents	3.43	19.3	ug/kg	PAI-27-SO34-05	4/14	8.6 - 11	19.3	NA	NA	NA	NA	No	NTX
	56-55-3	Benzo(a)anthracene	0.66 J	8.6 J	ug/kg	PAI-27-SO34-05	4/14	8.6 - 11	8.6	NA	10	NA	NA	No	BSL
	50-32-8	**Benzo(a)pyrene**	1.1 J	11	ug/kg	PAI-27-SO34-05	3/14	8.6 - 11	11	NA	**3.5**	NA	NA	**Yes**	ASL
	205-99-2	Benzo(b)fluoranthene	1 J	11	ug/kg	PAI-27-SO34-05	4/14	8.6 - 11	11	NA	35	NA	NA	No	BSL
	191-24-2	Benzo(g,h,i)perylene	2.3 J	6.9 J	ug/kg	PAI-27-SO34-05	2/14	8.6 - 11	6.9	NA	9,500 [10]	NA	NA	No	BSL
	207-08-9	Benzo(k)fluoranthene	0.73 J	7.8 J	ug/kg	PAI-27-SO34-05	4/14	8.6 - 11	7.8	NA	350	NA	NA	No	BSL
	218-01-9	Chrysene	0.76 J	11	ug/kg	PAI-27-SO34-05	4/14	8.6 - 11	11	NA	1,100	NA	NA	No	BSL
	53-70-3	Dibenzo(a,h)anthracene	2 J	2 J	ug/kg	PAI-27-SO45A-05	1/14	8.6 - 11	2	NA	11	NA	NA	No	BSL
	206-44-0	Fluoranthene	1.7 J	13	ug/kg	PAI-27-SO34-05	3/14	8.6 - 11	13	NA	70,000	NA	NA	No	BSL
	86-73-7	Fluorene	0.73 J	5.4 J	ug/kg	PAI-27-SO38A-05	2/14	8.6 - 11	5.4	NA	4,000	NA	NA	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	0.6 J	13	ug/kg	PAI-27-SO34-05	3/14	8.6 - 11	13	NA	120	NA	NA	No	BSL
	91-20-3	**Naphthalene**	17	17	ug/kg	PAI-27-SO38A-05	1/14	0.96 - 11	17	NA	**0.47**	NA	NA	**Yes**	ASL
	85-01-8	Phenanthrene	5.2 J	8.8 J	ug/kg	PAI-27-SO38A-05	2/14	8.6 - 11	8.8	NA	9,500 [10]	NA	NA	No	BSL
	129-00-0	Pyrene	1.4 J	13	ug/kg	PAI-27-SO34-05	4/14	8.6 - 11	13	NA	9,500	NA	NA	No	BSL

TABLE 6-6
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL Protection of Groundwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 27	**Pesticides/PCBs**														
	72-54-8	**4,4'-DDD**	0.13 J	270,000	ug/kg	PAI-27-SB-028-06	11/16	0.11 - 0.2	270,000	NA	**66**	NA	NA	**Yes**	ASL
	72-55-9	4,4'-DDE	0.1 J	12	ug/kg	PAI-27-SO47-05	7/16	0.17 - 38000	12	NA	46	NA	NA	No	BSL
	50-29-3	4,4'-DDT	0.29 J	64	ug/kg	PAI-27-SO-44-05	9/16	0.44 - 38000	64	NA	67	NA	NA	No	BSL
	319-84-6	**alpha-BHC**	0.22 J	14,000 J	ug/kg	PAI-27-SB-028-06	6/16	0.17 - 0.27	14,000	NA	**0.036**	NA	NA	**Yes**	ASL
	5103-71-9	alpha-Chlordane	0.15 J	1	ug/kg	PAI-27-SO-48-05	5/16	0.21 - 20000	1	NA	13 [11]	NA	NA	No	BSL
	319-85-7	**beta-BHC**	0.73 J	4.3	ug/kg	PAI-27-SO-44-05	5/16	0.21 - 20000	4.3	NA	**0.13**	NA	NA	**Yes**	ASL
	319-86-8	**delta-BHC**	0.16 J	20,000 J	ug/kg	PAI-27-SB-028-06	12/16	0.22 - 0.25	20,000	NA	**0.036** [12]	NA	NA	**Yes**	ASL
	60-57-1	**Dieldrin**	0.071 J	0.071 J	ug/kg	PAI-27-SO47-05	1/16	0.17 - 38000	0.071	NA	**0.061**	NA	NA	**Yes**	ASL
	959-98-8	Endosulfan I	0.13 J	1.3 J	ug/kg	PAI-27-SO47-05	3/16	0.21 - 20000	1.3	NA	1,100 [13]	NA	NA	No	BSL
	1031-07-8	Endosulfan Sulfate	0.43 J	0.43 J	ug/kg	PAI-27-SO-44-05	1/16	0.17 - 38000	0.43	NA	1,100 [13]	NA	NA	No	BSL
	72-20-8	Endrin	0.14 J	0.47 J	ug/kg	PAI-27-SO47-05	4/16	0.17 - 38000	0.47	NA	68	NA	NA	No	BSL
	7421-93-4	Endrin Aldehyde	0.16 J	1.5 J	ug/kg	PAI-27-SO34-05	5/16	0.17 - 38000	1.5	NA	68 [14]	NA	NA	No	BSL
	53494-70-5	Endrin Ketone	0.0607 J	0.47 J	ug/kg	PAI-27-SO47-05	3/16	0.17 - 38000	0.47	NA	68 [14]	NA	NA	No	BSL
	58-89-9	**gamma-BHC (Lindane)**	0.061 J	0.96 J	ug/kg	PAI-27-SB-029-06	7/16	0.067 - 20000	0.96	NA	**0.21**	NA	NA	**Yes**	ASL
	5103-74-2	gamma-Chlordane	0.17 J	0.9 J	ug/kg	PAI-27-SO-48-05	4/16	0.13 - 20000	0.9	NA	13 [11]	NA	NA	No	BSL
	76-44-8	**Heptachlor**	0.14 J	1.2	ug/kg	PAI-27-SO-48-05	5/16	0.21 - 20000	1.2	NA	**0.14**	NA	NA	**Yes**	ASL
	1024-57-3	**Heptachlor Epoxide**	0.083 J	0.43 J	ug/kg	PAI-27-SO-44-05	6/16	0.21 - 20000	0.43	NA	**0.068**	NA	NA	**Yes**	ASL
	Metals														
	7429-90-5	**Aluminum**	1,460	24,000	mg/kg	PAI-27-SO41-05	14/14	-	24,000	NA	**23,000**	NA	NA	**Yes**	ASL
	7440-36-0	**Antimony**	1.39 J	1.74 J	mg/kg	PAI-27-SO34-05	3/14	0.51 - 2.22	1.74	NA	**0.27**	NA	NA	**Yes**	ASL
	7440-38-2	**Arsenic**	0.93 J	13.2	mg/kg	PAI-27-SO41-05	4/14	0.52 - 1.34	13.2	NA	**0.0013**	NA	NA	**Yes**	ASL
	7440-39-3	Barium	8.2 J	38.7	mg/kg	PAI-27-SO41-05	14/14	-	38.7	NA	120	NA	NA	No	BSL
	7440-41-7	Beryllium	0.03 J	0.08 J	mg/kg	PAI-27-SO-48-05	3/14	0.05 - 0.7	0.08	NA	13	NA	NA	No	BSL
	7440-70-2	Calcium	117 J	2,200	mg/kg	PAI-27-SO41-05	10/14	149 - 286	2,200	NA	NA	NA	NA	No	NUT
	7440-47-3	**Chromium**	1.7	34.7	mg/kg	PAI-27-SO41-05	14/14	-	34.7	NA	**0.00059** [15]	NA	NA	**Yes**	ASL
	7440-48-4	**Cobalt**	0.39 J	0.39 J	mg/kg	PAI-27-SO38A-05	1/14	0.27 - 1.36	0.39	NA	**0.21**	NA	NA	**Yes**	ASL
	7440-50-8	Copper	0.15 J	2.63	mg/kg	PAI-27-SO41-05	8/14	0.68 - 1.11	2.63	NA	22	NA	NA	No	BSL
	7439-89-6	**Iron**	770	32,100	mg/kg	PAI-27-SO41-05	14/14	-	32,100	NA	**270**	NA	NA	**Yes**	ASL
	7439-92-1	**Lead**	1.63	20.2	mg/kg	PAI-27-SO41-05	14/14	-	20.2	NA	**14** [16]	NA	NA	**Yes**	ASL
	7439-95-4	Magnesium	69.9 J	1,370	mg/kg	PAI-27-SO41-05	14/14	-	1,370	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	3.01	17.1	mg/kg	PAI-27-SO41-05	14/14	-	17.1	NA	21	NA	NA	No	BSL
	7439-97-6	**Mercury**	0.0088 J	0.12	mg/kg	PAI-27-SO41-05	10/14	0.0104 - 0.0109	0.12	NA	**0.033**	NA	NA	**Yes**	ASL
	7440-02-0	Nickel	0.66 J	4.63	mg/kg	PAI-27-SO41-05	12/14	0.71 - 1.41	4.63	NA	20	NA	NA	No	BSL
	7440-09-7	Potassium	46 J	947	mg/kg	PAI-27-SO41-05	12/14	118 - 140	947	NA	NA	NA	NA	No	NUT
	7782-49-2	**Selenium**	0.47 J	1.81	mg/kg	PAI-27-SO41-05	4/14	0.26 - 0.32	1.81	NA	**0.4**	NA	NA	**Yes**	ASL
	7440-23-5	Sodium	43 J	301 J	mg/kg	PAI-27-SO34-05	7/14	39.7 - 118	301	NA	NA	NA	NA	No	NUT
	7440-28-0	**Thallium**	4.51 J	4.51 J	mg/kg	PAI-27-SO38A-05	1/14	0.52 - 0.63	4.51	NA	**0.011**	NA	NA	**Yes**	ASL
	7440-62-2	Vanadium	1.29 J	52	mg/kg	PAI-27-SO41-05	14/14	-	52	NA	78 [17]	NA	NA	No	BSL
	7440-66-6	Zinc	1.25 J	23	mg/kg	PAI-27-SO41-05	14/14	-	23	NA	290	NA	NA	No	BSL

TABLE 6-6
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	USEPA RSL Protection of Groundwater(5)	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background data is available.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2011.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for 1,4-dichlorobenzene.
8 - Value is for m-xylene.
9 - Acenaphthene is used as a surrogate for acenaphthylene.
10 - Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
11 - Value is for chlordane.
12 - Value is for alpha-BHC.
13 - Value is for Endosulfan.
14 - Value is for Endrin.
15 - Value is for hexavalent chromium.
16 - Value is MCL based soil screening level.
17- Value is for vanadium and compounds.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
COPC = Chemical Of Potential Concern
J = Estimated value
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 6-6
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL Protection of Groundwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Associated Samples															
PAI-27-SB-028-06		PAI-27-SO-44-05													
PAI-27-SB-029-06		PAI-27-SO45-05													
PAI-27-SO34-05		PAI-27-SO45A-05													
PAI-27-SO38-05		PAI-27-SO45B-05													
PAI-27-SO38A-05		PAI-27-SO46-05													
PAI-27-SO39-05		PAI-27-SO47-05													
PAI-27-SO41-05		PAI-27-SO-48-05													
PAI-27-SO-43-05		PAI-55-SO02A-05													

TABLE 6-6A
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL Protection of Groundwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 55	**Volatile Organic Compounds**														
	78-93-3	2-Butanone	2.2 J	2.2 J	ug/kg	PAI-55-SO14C-05	1/15	2.5 - 43	2.2	NA	1,000	NA	NA	No	BSL
	67-64-1	Acetone	11 J	49	ug/kg	PAI-27-SB-027-06	3/15	6.3 - 43	49	NA	2,400	NA	NA	No	BSL
	74-87-3	Chloromethane	7.7	7.7	ug/kg	PAI-55-SO14C-05	1/16	0.99 - 9	7.7	NA	49	NA	NA	No	BSL
	110-82-7	Cyclohexane	2 J	2 J	ug/kg	PAI-27-SB-027-06	1/16	0.99 - 9	2	NA	13,000	NA	NA	No	BSL
	- -	m+p-Xylenes	0.18 J	0.24 J	ug/kg	PAI-55-SO04-05	2/16	0.5 - 17	0.24	NA	180 [7]	NA	NA	No	BSL
	79-20-9	Methyl Acetate	4.1 J	20	ug/kg	PAI-55-SO14C-05	2/16	2.5 - 9	20	NA	3,200	NA	NA	No	BSL
	108-88-3	Toluene	1.1 J	1.1 J	ug/kg	PAI-55-SO04-05	1/16	0.43 - 9	1.1	NA	590	NA	NA	No	BSL
	1330-20-7	Total Xylenes	0.18 J	0.24 J	ug/kg	PAI-55-SO04-05	2/16	0.5 - 26	0.24	NA	190	NA	NA	No	BSL
	Polycyclic Aromatic Hydrocarbons														
	90-12-0	1-Methylnaphthalene	0.63 J	2.2 J	ug/kg	PAI-55-SO18A-05	2/9	8.6 - 11	2.2	NA	5.1	NA	NA	No	BSL
	91-57-6	2-Methylnaphthalene	0.83 J	3.5 J	ug/kg	PAI-55-SO18A-05	2/9	8.6 - 11	3.5	NA	140	NA	NA	No	BSL
	83-32-9	Acenaphthene	1 J	1 J	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	1	NA	4,100	NA	NA	No	BSL
	208-96-8	Acenaphthylene	33	33	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	33	NA	4,100 [8]	NA	NA	No	BSL
	120-12-7	Anthracene	5.7 J	5.7 J	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	5.7	NA	42,000	NA	NA	No	BSL
	- -	Benzo(a)pyrene Equivalents	17.9	17.9	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	17.9	NA	NA	NA	NA	No	NTX
	56-55-3	Benzo(a)anthracene	5.5 J	5.5 J	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	5.5	NA	10	NA	NA	No	BSL
	50-32-8	**Benzo(a)pyrene**	10	10	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	10	NA	**3.5**	NA	NA	**Yes**	ASL
	205-99-2	Benzo(b)fluoranthene	12	12	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	12	NA	35	NA	NA	No	BSL
	191-24-2	Benzo(g,h,i)perylene	22	22	ug/kg	PAI-55-SO18A-05	1/9	0.43 - 11	22	NA	9,500 [9]	NA	NA	No	BSL
	207-08-9	Benzo(k)fluoranthene	8 J	8 J	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	8	NA	350	NA	NA	No	BSL
	218-01-9	Chrysene	9.2 J	9.2 J	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	9.2	NA	1,100	NA	NA	No	BSL
	206-44-0	Fluoranthene	13	13	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	13	NA	70,000	NA	NA	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	13	13	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	13	NA	120	NA	NA	No	BSL
	91-20-3	**Naphthalene**	1.8 J	1.8 J	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	1.8	NA	**0.47**	NA	NA	**Yes**	ASL
	85-01-8	Phenanthrene	9.4 J	9.4 J	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	9.4	NA	9,500 [9]	NA	NA	No	BSL
	129-00-0	Pyrene	23	23	ug/kg	PAI-55-SO18A-05	1/9	8.6 - 11	23	NA	9,500	NA	NA	No	BSL
	Pesticides/PCBs														
	72-54-8	**4,4'-DDD**	0.55 J	520	ug/kg	PAI-27-SB-022-05	12/16	0.17 - 3.4	520	NA	**66**	NA	NA	**Yes**	ASL
	72-55-9	**4,4'-DDE**	0.088 J	250 J	ug/kg	PAI-27-SB-022-05	10/16	0.17 - 3.5	250	NA	**46**	NA	NA	**Yes**	ASL
	50-29-3	**4,4'-DDT**	0.28 J	2,700 J	ug/kg	PAI-27-SB-022-05	15/16	0.46 - 0.46	2,700	NA	**67**	NA	NA	**Yes**	ASL
	319-84-6	**alpha-BHC**	0.82 J	61 J	ug/kg	PAI-27-SB-022-05	3/16	0.21 - 1.8	61	NA	**0.036**	NA	NA	**Yes**	ASL
	5103-71-9	alpha-Chlordane	0.18 J	0.51 J	ug/kg	PAI-55-SO04-05	2/16	0.21 - 180	0.51	NA	13 [10]	NA	NA	No	BSL
	319-85-7	**beta-BHC**	0.49 J	0.73 J	ug/kg	PAI-55-SO04-05	4/16	0.21 - 180	0.73	NA	**0.13**	NA	NA	**Yes**	ASL
	319-86-8	**delta-BHC**	0.13 J	86 J	ug/kg	PAI-27-SB-022-05	9/16	0.21 - 1.8	86	NA	**0.036** [11]	NA	NA	**Yes**	ASL
	60-57-1	**Dieldrin**	0.12 J	0.66 J	ug/kg	PAI-55-SO04-05	2/16	0.17 - 340	0.66	NA	**0.061**	NA	NA	**Yes**	ASL
	33213-65-9	Endosulfan II	0.81 J	0.81 J	ug/kg	PAI-55-SO18A-05	1/16	0.17 - 340	0.81	NA	1,100 [12]	NA	NA	No	BSL
	72-20-8	Endrin	0.85 J	0.85 J	ug/kg	PAI-55-SO18A-05	1/16	0.17 - 340	0.85	NA	68	NA	NA	No	BSL
	7421-93-4	Endrin Aldehyde	0.16 J	1.3 J	ug/kg	PAI-55-SO04-05	3/16	0.21 - 340	1.3	NA	68 [13]	NA	NA	No	BSL
	58-89-9	**gamma-BHC (Lindane)**	0.055 J	24	ug/kg	PAI-27-SB-030-06	3/16	0.065 - 180	24	NA	**0.21**	NA	NA	**Yes**	ASL
	5103-74-2	gamma-Chlordane	0.097 J	0.42 J	ug/kg	PAI-55-SO04-05	3/16	0.091 - 180	0.42	NA	13 [10]	NA	NA	No	BSL
	1024-57-3	**Heptachlor Epoxide**	0.11 J	0.11 J	ug/kg	PAI-55-SO01-05	1/16	0.21 - 180	0.11	NA	**0.068**	NA	NA	**Yes**	ASL
	Metals														
	7429-90-5	Aluminum	564	3,180	mg/kg	PAI-55-SO14C-05	9/9	-	3,180	NA	23,000	NA	NA	No	BSL
	7440-36-0	**Antimony**	1.64 J	1.64 J	mg/kg	PAI-55-SO01-05	1/9	0.84 - 2.1	1.64	NA	**0.27**	NA	NA	**Yes**	ASL
	7440-39-3	Barium	3.97 J	12.7 J	mg/kg	PAI-55-SO04-05	9/9	-	12.7	NA	120	NA	NA	No	BSL
	7440-41-7	Beryllium	0.03 J	0.03 J	mg/kg	PAI-55-SO14C-05	1/9	0.03 - 0.34	0.03	NA	13	NA	NA	No	BSL

TABLE 6-6A
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL TO GROUNDWATER
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL Protection of Groundwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 55	**Metals (Continued)**														
	7440-70-2	Calcium	63.6 J	980	mg/kg	PAI-55-SO14C-05	5/9	187 - 223	980	NA	NA	NA	NA	No	NUT
	7440-47-3	**Chromium**	1.23	3.75	mg/kg	PAI-55-SO14C-05	9/9	-	3.75	NA	**0.00059** [14]	NA	NA	**Yes**	ASL
	7440-50-8	Copper	0.26 J	2.77	mg/kg	PAI-55-SO04-05	8/9	0.43 - 0.43	2.77	NA	22	NA	NA	No	BSL
	7439-89-6	**Iron**	115	1,430	mg/kg	PAI-55-SO16-05	9/9	-	1,430	NA	**270**	NA	NA	**Yes**	ASL
	7439-92-1	Lead	1.33	3.13	mg/kg	PAI-55-SO04-05	9/9	-	3.13	NA	14 [15]	NA	NA	No	BSL
	7439-95-4	Magnesium	35.7 J	114 J	mg/kg	PAI-55-SO04-05	9/9	-	114	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	1.33	6.88	mg/kg	PAI-55-SO01-05	9/9	-	6.88	NA	21	NA	NA	No	BSL
	7439-97-6	Mercury	0.0101 J	0.0114 J	mg/kg	PAI-55-SO16-05	2/9	0.0094 - 0.0131	0.0114	NA	0.033	NA	NA	No	BSL
	7440-02-0	Nickel	0.29 J	1.26 J	mg/kg	PAI-55-SO04-05, PAI-55-SO17A-05	8/9	0.81 - 0.81	1.26	NA	20	NA	NA	No	BSL
	7440-09-7	Potassium	30 J	55.2 J	mg/kg	PAI-55-SO04-05	4/9	107 - 153	55.2	NA	NA	NA	NA	No	NUT
	7440-23-5	Sodium	50.7 J	128 J	mg/kg	PAI-55-SO07A-05	7/9	37.9 - 38.5	128	NA	NA	NA	NA	No	NUT
	7440-62-2	Vanadium	0.64 J	2.4 J	mg/kg	PAI-55-SO04-05	9/9	-	2.4	NA	78 [16]	NA	NA	No	BSL
	7440-66-6	Zinc	0.74 J	10.2	mg/kg	PAI-55-SO17A-05	8/9	1.03 - 1.03	10.2	NA	290	NA	NA	No	BSL

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background data is available.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2011.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for m-xylene.
8 - Acenaphthene is used as a surrogate for acenaphthylene.
9 - Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
10 - Value is for chlordane.
11 - Value is for alpha-BHC.
12 - Value is for Endosulfan.
13 - Value is for Endrin.
14 - Value is for hexavalent chromium.
15 - Value is MCL based soil screening level.
16 - Value is for vanadium and compounds.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
COPC = Chemical Of Potential Concern
J = Estimated value
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

Associated Samples

PAI-27-SB-021-04	FOVSFB-0305	FOVSFB-1605	PAI-55-SO14C-05
PAI-27-SB-022-05	FOVSFB-0406	FOVSFB-1704	PAI-55-SO16-05
PAI-27-SB-023-04	FOVSFB-0505	FOVSFB-1804	PAI-55-SO17A-05
PAI-27-SB-027-06	FOVSFB-0605	FOVSFB-1904	PAI-55-SO18A-05
PAI-27-SB-030-06	FOVSFB-1005	FOVSFB-2104	
PAI-27-SB-031-04	FOVSFB-1105	PAI-55-SO01-05	
PAI-27-SB-032-04	FOVSFB-1204	PAI-55-SO04-05	
FOVSFB-0106	FOVSFB-1305	PAI-55-SO06-05	
FOVSFB-0204	FOVSFB-1405	PAI-55-SO07A-05	
FOVSFB-0206	FOVSFB-1505	PAI-55-SO10A-05	

TABLE 6-7
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - SITE 27
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Tap Water[5]	USEPA MCL[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
Site 27	**Volatile Organic Compounds**													
	120-82-1	**1,2,4-Trichlorobenzene**	0.15 J	6.4 J	ug/L	PAI-27-TW65S-01	5/43	0.08 - 5	6.4	NA	**0.39 N[8]**	70	**Yes**	ASL
	95-50-1	1,2-Dichlorobenzene	0.061 J	26	ug/L	PAI-27-TW65S-01	21/43	0.08 - 5	26	NA	28 N	600	No	BSL
	106-46-7	**1,4-Dichlorobenzene**	0.27 J	69	ug/L	PAI-27-TW65S-01	23/43	0.08 - 5	69	NA	**0.42 C**	75	**Yes**	ASL
	67-64-1	Acetone	0.47 J	6	ug/L	PAI-27-GW-49S-01	9/34	0.52 - 5	6	NA	1200 N	NA	No	BSL
	71-43-2	**Benzene**	0.039 J	190	ug/L	PAI-27-TW65S-01	12/43	0.08 - 5	190	NA	**0.39 C**	**5**	**Yes**	ASL
	75-15-0	Carbon Disulfide	0.021 J	4	ug/L	PAI-27-GW-50I-01	4/43	0.046 - 5	4	NA	72 N	NA	No	BSL
	108-90-7	**Chlorobenzene**	0.079 J	2,000	ug/L	PAI-27-TW65S-01	32/43	0.08 - 5	2,000	NA	**7.2 N**	**100**	**Yes**	ASL
	67-66-3	**Chloroform**	0.051 J	0.73	ug/L	PAI-27-GW53S-02	3/43	0.08 - 5	0.73	NA	**0.19 C**	80	**Yes**	ASL
	75-71-8	Dichlorodifluoromethane	0.088 J	0.088 J	ug/L	PAI-27-GW58S-02	1/43	0.08 - 5	0.088	NA	19 N	NA	No	BSL
	100-41-4	**Ethylbenzene**	0.8 J	42	ug/L	PAI-27-TW65S-01	2/43	0.08 - 5	42	NA	**1.3 C**	700	**Yes**	ASL
	98-82-8	Isopropylbenzene	0.5 J	3.3 J	ug/L	PAI-27-TW65S-01	4/43	0.08 - 5	3.3	NA	39 N	NA	No	BSL
	- -	m+p-Xylenes	17 J	17 J	ug/L	PAI-27-TW65S-01	1/43	0.16 - 10	17	NA	19 N[9]	10,000	No	BSL
	1634-04-4	Methyl Tert-Butyl Ether	0.11 J	0.11 J	ug/L	PAI-27-GW57S-02	1/43	0.08 - 5	0.11	NA	12 C	NA	No	BSL
	108-88-3	Toluene	0.087 J	1.3 J	ug/L	PAI-27-GW19S-03	3/43	0.072 - 7.9	1.3	NA	86 N	1,000	No	BSL
	1330-20-7	Total Xylenes	17 J	17 J	ug/L	PAI-27-TW65S-01	1/43	0.08 - 15	17	NA	19 N	10,000	No	BSL
	Semivolatile Organic Compounds													
	92-52-4	**1,1-Biphenyl**	1.7 J	6.4	ug/L	PAI-27-TW65S-01	3/27	1.5 - 10	6.4	NA	**0.083 N**	NA	**Yes**	ASL
	91-57-6	2-Methylnaphthalene	0.11 J	0.11 J	ug/L	PAI-27-TW-42I	1/10	0.2 - 2.2	0.11	NA	2.7 N	NA	No	BSL
	83-32-9	Acenaphthene	1.8 J	1.8 J	ug/L	PAI-27-TW65S-01	1/10	0.2 - 0.21	1.8	NA	40 N	NA	No	BSL
	86-74-8	Carbazole	1.7 J	1.7 J	ug/L	PAI-27-TW65S-01	1/27	2 - 10	1.7	NA	NA	NA	No	NTX
	132-64-9	**Dibenzofuran**	2.6 J	2.6 J	ug/L	PAI-27-TW65S-01	1/27	2 - 10	2.6	NA	**0.58 N**	NA	**Yes**	ASL
	86-73-7	Fluorene	0.11 J	2.3 J	ug/L	PAI-27-TW65S-01	2/10	0.2 - 0.21	2.3	NA	22 N	NA	No	BSL
	91-20-3	**Naphthalene**	24	24	ug/L	PAI-27-TW65S-01	1/10	0.2 - 0.21	24	NA	**0.14 C**	NA	**Yes**	ASL
	85-01-8	Phenanthrene	1.1 J	1.1 J	ug/L	PAI-27-TW65S-01	1/10	0.2 - 0.21	1.1	NA	8.7 N[10]	NA	No	BSL
	Polycyclic Aromatic Hydrocarbons													
	90-12-0	1-Methylnaphthalene	0.013 J	0.068 J	ug/L	PAI-27-TW66I-01	3/17	0.2 - 0.22	0.068	NA	0.97 C	NA	No	BSL
	91-57-6	2-Methylnaphthalene	0.016 J	0.092 J	ug/L	PAI-27-TW66I-01	4/17	0.2 - 0.22	0.092	NA	2.7 N	NA	No	BSL
	83-32-9	Acenaphthene	0.084 J	0.084 J	ug/L	PAI-27-GW-50I-02	1/17	0.2 - 0.22	0.084	NA	40 N	NA	No	BSL
	208-96-8	Acenaphthylene	0.017 J	0.017 J	ug/L	PAI-27-GW19S-03	1/17	0.2 - 0.22	0.017	NA	40 N[11]	NA	No	BSL
	120-12-7	Anthracene	0.051 J	0.051 J	ug/L	PAI-27-GW-50I-02	1/17	0.2 - 0.22	0.051	NA	130 N	NA	No	BSL
	86-73-7	Fluorene	0.052 J	0.052 J	ug/L	PAI-27-GW19S-03	1/17	0.2 - 0.22	0.052	NA	22 N	NA	No	BSL
	91-20-3	**Naphthalene**	0.042 J	0.17 J	ug/L	PAI-27-GW18I-03	3/17	0.2 - 0.22	0.17	NA	**0.14 C**	NA	**Yes**	ASL
	85-01-8	Phenanthrene	0.035 J	0.035 J	ug/L	PAI-27-GW-50I-02	1/17	0.2 - 0.22	0.035	NA	8.7 N[10]	NA	No	BSL
	129-00-0	Pyrene	0.013 J	0.013 J	ug/L	PAI-27-TW66I-01	1/17	0.2 - 0.22	0.013	NA	8.7 N	NA	No	BSL
	Pesticides/PCBs													
	72-54-8	**4,4'-DDD**	0.0076 J	2.4	ug/L	PAI-27-TW65S-01	8/43	0.011 - 4.8	2.4	NA	**0.28 C**	NA	**Yes**	ASL
	72-55-9	4,4'-DDE	0.0089 J	0.087 J	ug/L	PAI-27-TW65S-01	3/43	0.011 - 4.8	0.087	NA	0.2 C	NA	No	BSL
	50-29-3	**4,4'-DDT**	0.023 J	0.43 J	ug/L	PAI-27-TW65S-01	7/43	0.011 - 4.8	0.43	NA	**0.2 C**	NA	**Yes**	ASL

TABLE 6-7
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - SITE 27
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Tap Water[5]	USEPA MCL[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
Site 27	**Pesticides/PCBs (Continued)**													
	309-00-2	**Aldrin**	0.011 J	0.011 J	ug/L	PAI-27-GW18I-03	1/43	0.0045 - 2.4	0.011	NA	**0.00021 C**	NA	**Yes**	ASL
	319-84-6	**alpha-BHC**	0.0043 J	46	ug/L	PAI-27-TW-30S	33/43	0.0045 - 0.062	46	NA	**0.0062 C**	NA	**Yes**	ASL
	5103-71-9	alpha-Chlordane	0.002 J	0.014 J	ug/L	PAI-27-GW18I-03, PAI-27-GW-50I-02	6/43	0.0045 - 2.4	0.014	NA	0.19 C[12]	2	No	BSL
	319-85-7	**beta-BHC**	0.014 J	12 J	ug/L	PAI-27-TW65S-01	17/43	0.01 - 0.5	12	NA	**0.022 C**	NA	**Yes**	ASL
	319-86-8	**delta-BHC**	0.0053 J	180	ug/L	PAI-27-TW65S-01	32/43	0.013 - 0.062	180	NA	**0.0062 C[13]**	NA	**Yes**	ASL
	60-57-1	**Dieldrin**	0.0076 J	0.0076 J	ug/L	PAI-27-GW-49S-02	1/43	0.011 - 4.8	0.0076	NA	**0.0015 C**	NA	**Yes**	ASL
	959-98-8	Endosulfan I	0.0075 J	0.01 J	ug/L	PAI-27-GW18I-03	2/43	0.0045 - 2.4	0.01	NA	7.8 N[14]	NA	No	BSL
	33213-65-9	Endosulfan II	0.015 J	0.055 J	ug/L	PAI-27-GW-50I-02	2/43	0.011 - 4.8	0.055	NA	7.8 N[14]	NA	No	BSL
	1031-07-8	Endosulfan Sulfate	0.0069 J	0.01 J	ug/L	PAI-27-GW18I-03	2/43	0.011 - 4.8	0.01	NA	7.8 N[14]	NA	No	BSL
	72-20-8	Endrin	0.038 J	0.038 J	ug/L	PAI-27-GW-49S-02	1/43	0.011 - 4.8	0.038	NA	0.17 N	2	No	BSL
	7421-93-4	Endrin Aldehyde	0.017 J	0.017 J	ug/L	PAI-27-GW18I-03	1/43	0.019 - 4.8	0.017	NA	0.17 N[15]	NA	No	BSL
	53494-70-5	Endrin Ketone	0.084	0.084	ug/L	PAI-27-GW-49S-02	1/43	0.011 - 4.8	0.084	NA	0.17 N[15]	NA	No	BSL
	58-89-9	**gamma-BHC (Lindane)**	0.004 J	21	ug/L	PAI-27-TW-28S	21/43	0.0045 - 0.099	21	NA	**0.036 C**	**0.2**	**Yes**	ASL
	5103-74-2	gamma-Chlordane	0.0084 J	0.024 J	ug/L	PAI-27-GW-49S-02	3/43	0.0045 - 2.4	0.024	NA	0.19 C[12]	2	No	BSL
	76-44-8	**Heptachlor**	0.0029 J	0.0029 J	ug/L	PAI-27-GW57S-02	1/43	0.0045 - 2.4	0.0029	NA	**0.0018 C**	0.4	**Yes**	ASL
	1024-57-3	**Heptachlor Epoxide**	0.0047 J	0.034 J	ug/L	PAI-27-GW-49S-02	7/43	0.0045 - 2.4	0.034	NA	**0.0033 C**	0.2	**Yes**	ASL
	72-43-5	Methoxychlor	0.025 J	0.025 J	ug/L	PAI-27-GW-49S-02	1/43	0.025 - 24	0.025	NA	2.7 N	40	No	BSL
	Metals													
	7429-90-5	**Aluminum**	102 J	4,890	ug/L	PAI-27-TW65S-01	12/18	35.3 - 118	4,890	NA	**1600 N**	NA	**Yes**	ASL
	7440-38-2	**Arsenic**	7.89 J	32.7	ug/L	PAI-27-GW59I-02	2/18	2.94 - 6.08	32.7	NA	**0.045 C**	**10**	**Yes**	ASL
	7440-39-3	Barium	16.6 J	115 J	ug/L	PAI-27-GW56I-02	16/18	100 - 100	115	NA	290 N	2,000	No	BSL
	7440-41-7	**Beryllium**	4.16 J	4.16 J	ug/L	PAI-27-GW-50I-02	1/18	2.5 - 2.5	4.16	NA	**1.6 N**	**4**	**Yes**	ASL
	7440-70-2	Calcium	628 J	57,200	ug/L	PAI-27-GW-10S-03	18/18	-	57,200	NA	NA	NA	No	NUT
	7440-47-3	**Chromium**	1.12 J	14.7	ug/L	PAI-27-TW65S-01	7/18	1.1 - 5	14.7	NA	**0.031 C[16]**	100	**Yes**	ASL
	7440-50-8	Copper	1.79 J	5.05	ug/L	PAI-27-GW62S-02	2/18	1.55 - 4.72	5.05	NA	62 N	1,300	No	BSL
	7439-89-6	**Iron**	260 J	21,000	ug/L	PAI-27-GW56I-02	18/18	-	21,000	NA	**1100 N**	NA	**Yes**	ASL
	7439-92-1	Lead	1.65 J	4.14 J	ug/L	PAI-27-TW65S-01	8/18	5 - 5	4.14	NA	NA	15	No	BSL
	7439-95-4	Magnesium	347 J	13,700	ug/L	PAI-27-GW56I-02	18/18	-	13,700	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	2.71 J	408	ug/L	PAI-27-GW56I-02	17/18	1.14 - 1.14	408	NA	**32 N**	NA	**Yes**	ASL
	7439-97-6	Mercury	0.122 J	0.413	ug/L	PAI-27-GW-49S-02	7/18	0.18 - 0.18	0.413	NA	0.43 N[17]	2	No	BSL
	7440-09-7	Potassium	5,660	8,210	ug/L	PAI-27-GW-49S-02	2/18	1660 - 3580	8,210	NA	NA	NA	No	NUT
	7782-49-2	Selenium	2.25 J	3.39 J	ug/L	PAI-27-GW-50I-02	3/18	2.5 - 2.5	3.39	NA	7.8 N	50	No	BSL
	7440-22-4	Silver	0.7 J	1.32 J	ug/L	PAI-27-GW-50I-02	2/18	1.29 - 2.5	1.32	NA	7.1 N	NA	No	BSL
	7440-23-5	Sodium	6,500	136,000	ug/L	PAI-27-GW56I-02	18/18	-	136,000	NA	NA	NA	No	NUT
	7440-62-2	**Vanadium**	1.65 J	10.7 J	ug/L	PAI-27-TW65S-01	8/18	10 - 10	10.7	NA	**7.8 N[18]**	NA	**Yes**	ASL
	7440-66-6	Zinc	4.22 J	377	ug/L	PAI-27-GW59I-02	10/18	10 - 10	377	NA	470 N	NA	No	BSL

TABLE 6-7
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - SITE 27
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	Adjusted USEPA RSL Tap Water(5)	USEPA MCL(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background groundwater data is available.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2011. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
6 - 2011 Edition of the Drinking Water Standards and Health Advisories (USEPA, January 2011).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
8 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
9 - Value is for m-xylene.
10 - Pyrene is used as a surrogate for phenanthrene.
11 - Acenaphthene is used as a surrogate for acenaphthylene.
12 - Value is for chlordane.
13 - Value is for alpha-BHC.
14 - Value is for Endosulfan.
15 - Value is for Endrin.
16 - Value is for hexavalent chromium.
17 - Value is for mercuric chloride (and other mercury salts).
18 - Value is for vanadium and compounds.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 6-7
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - SITE 27
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Tap Water[5]	USEPA MCL[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

PAI-27-GW-10S-02	PAI-27-GW53S-02	PAI-27-TW-29I
PAI-27-GW-10S-03	PAI-27-GW-54I-01	PAI-27-TW-30S
PAI-27-GW-17S-02	PAI-27-GW54I-02	PAI-27-TW-31I
PAI-27-GW17S-03	PAI-27-GW-55S-01	PAI-27-TW-41S
PAI-27-GW-18I-02	PAI-27-GW-55S-01-D	PAI-27-TW-42I
PAI-27-GW18I-03	PAI-27-GW55S-02	PAI-27-TW-43S
PAI-27-GW-19S-02	PAI-27-GW-56I-01	PAI-27-TW-44I
PAI-27-GW19S-03	PAI-27-GW56I-02	PAI-27-TW-45D
PAI-27-GW-20S-02	PAI-27-GW-57S-01	PAI-27-TW65S-01
PAI-27-GW20S-03	PAI-27-GW57S-02	PAI-27-TW66I-01
PAI-27-GW-21S-02	PAI-27-GW-58S-01	
PAI-27-GW21S-03	PAI-27-GW58S-02	
PAI-27-GW-49S-01	PAI-27-GW-59I-01	
PAI-27-GW-49S-02	PAI-27-GW59I-02	
PAI-27-GW-50I-01	PAI-27-GW-62S-01	
PAI-27-GW-50I-02	PAI-27-GW62S-02	
PAI-27-GW-53S-01	PAI-27-TW-28S	

TABLE 6-7A
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - SITE 55
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Tap Water[5]	USEPA MCL[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
Site 55	**Volatile Organic Compounds**													
	75-34-3	1,1-Dichloroethane	0.036 J	0.036 J	ug/L	PAI-27-GW52I-02	1/64	0.08 - 5	0.036	NA	2.4 C	NA	No	BSL
	120-82-1	**1,2,4-Trichlorobenzene**	0.13 J	9	ug/L	PAI-27-GW-6-01	16/64	0.072 - 5	9	NA	**0.39 N[8]**	70	**Yes**	ASL
	95-50-1	**1,2-Dichlorobenzene**	0.065 J	33	ug/L	PAI-27-TW-26S	28/64	0.08 - 5	33	NA	**28 N**	600	**Yes**	ASL
	541-73-1	**1,3-Dichlorobenzene**	0.4 J	1	ug/L	PAI-27-GW-12I-02	4/64	0.08 - 5	1	NA	**0.42 C[9]**	NA	**Yes**	ASL
	106-46-7	**1,4-Dichlorobenzene**	0.049 J	82	ug/L	PAI-27-TW-26S	33/64	0.08 - 5	82	NA	**0.42 C**	**75**	**Yes**	ASL
	78-93-3	2-Butanone	0.35 J	52	ug/L	PAI-27-GW-06S-02	4/51	0.4 - 13	52	NA	490 N	NA	No	BSL
	67-64-1	Acetone	1.1 J	25	ug/L	PAI-27-GW-06S-02	16/54	0.62 - 8	25	NA	1,200 N	NA	No	BSL
	71-43-2	**Benzene**	0.043 J	230	ug/L	PAI-27-TW-26S	25/64	0.08 - 5	230	NA	**0.39 C**	**5**	**Yes**	ASL
	75-15-0	Carbon Disulfide	0.028 J	2	ug/L	PAI-27-GW-06S-02	6/64	0.08 - 5	2	NA	72 N	NA	No	BSL
	108-90-7	**Chlorobenzene**	0.3 J	2,500	ug/L	PAI-27-TW-26S	37/64	0.08 - 5	2,500	NA	**7.2 N**	**100**	**Yes**	ASL
	67-66-3	Chloroform	0.042 J	0.083 J	ug/L	PAI-27-GW-01S-03	2/64	0.08 - 5	0.083	NA	0.19 C	80	No	BSL
	74-87-3	Chloromethane	0.6 J	0.9 J	ug/L	PAI-27-GW-63S-01	3/64	0.3 - 15	0.9	NA	19 N	NA	No	BSL
	156-59-2	cis-1,2-Dichloroethene	0.13 J	0.6 J	ug/L	PAI-27-TW-26S	2/64	0.08 - 5	0.6	NA	2.8 N	70	No	BSL
	110-82-7	Cyclohexane	0.042 J	1 J	ug/L	PAI-27-TW-26S	3/64	0.08 - 5	1	NA	1,300 N	NA	No	BSL
	100-41-4	**Ethylbenzene**	0.3 J	120	ug/L	PAI-27-TW-26S	14/64	0.08 - 5	120	NA	**1.3 C**	700	**Yes**	ASL
	98-82-8	Isopropylbenzene	0.064 J	10	ug/L	PAI-27-TW-26S	17/64	0.08 - 5	10	NA	39 N	NA	No	BSL
	- -	**m+p-Xylenes**	0.095 J	280	ug/L	PAI-27-TW-26S	9/64	0.16 - 10	280	NA	**19 N[10]**	10,000	**Yes**	ASL
	108-87-2	Methyl Cyclohexane	0.082 J	1.6 J	ug/L	PAI-27-GW-06S-03	5/64	0.08 - 5	1.6	NA	NA	NA	No	NTX
	1634-04-4	Methyl Tert-Butyl Ether	0.16 J	1 J	ug/L	PAI-27-GW-02I-02, PAI-27-GW-2I-01	11/64	0.08 - 5	1	NA	12 C	NA	No	BSL
	95-47-6	**o-Xylene**	0.14 J	150	ug/L	PAI-27-TW-26S	10/64	0.08 - 5	150	NA	**19 N**	10,000	**Yes**	ASL
	127-18-4	Tetrachloroethene	0.6 J	0.6 J	ug/L	PAI-27-GW-63S-01	1/64	0.08 - 5	0.6	NA	3.5 N[8][11]	5	No	BSL
	108-88-3	Toluene	0.08 J	18	ug/L	PAI-27-TW-26S	10/64	0.066 - 5.9	18	NA	86 N	1,000	No	BSL
	540-59-0	Total 1,2-Dichloroethene	0.6 J	0.6 J	ug/L	PAI-27-TW-26S	1/41	2 - 10	0.6	NA	13 N	NA	No	BSL
	1330-20-7	**Total Xylenes**	0.24 J	430	ug/L	PAI-27-TW-26S	10/64	0.08 - 15	430	NA	**19 N**	10,000	**Yes**	ASL
	Semivolatile Organic Compounds													
	92-52-4	**1,1-Biphenyl**	3.1 J	12	ug/L	PAI-27-TW67S-01	6/45	1.5 - 10	12	NA	**0.083 N**	NA	**Yes**	ASL
	95-57-8	2-Chlorophenol	1 J	1.6 J	ug/L	PAI-27-GW-15I-03	2/45	2 - 10	1.6	NA	7.1 N	NA	No	BSL
	91-57-6	**2-Methylnaphthalene**	0.11 J	240	ug/L	PAI-27-GW-6-01	9/25	0.2 - 2.1	240	NA	**2.7 N**	NA	**Yes**	ASL
	83-32-9	Acenaphthene	0.62	3 J	ug/L	PAI-27-TW67S-01	7/25	0.2 - 0.21	3	NA	40 N	NA	No	BSL
	- -	**Benzo(a)pyrene Equivalents**	0.260	0.260	ug/L	PAI-27-TW-26S	1/25	0.2 - 2.1	0.260	NA	**0.0029 C**	NA	**Yes**	ASL
	191-24-2	Benzo(g,h,i)perylene	0.14 J	0.14 J	ug/L	PAI-27-TW-26S	1/25	0.2 - 3.2	0.14	NA	8.7 N[12]	NA	No	BSL
	117-81-7	**Bis(2-ethylhexyl)phthalate**	3.2 J	3.2 J	ug/L	PAI-27-GW-15I-03	1/45	4 - 10	3.2	NA	**0.071 C**	6	**Yes**	ASL
	86-74-8	Carbazole	1.9 J	1.9 J	ug/L	PAI-27-TW67S-01	1/45	2 - 10	1.9	NA	NA	NA	No	NTX
	53-70-3	**Dibenzo(a,h)anthracene**	0.12 J	0.12 J	ug/L	PAI-27-TW-26S	1/25	0.2 - 3.2	0.12	NA	**0.0029 C**	NA	**Yes**	ASL
	132-64-9	**Dibenzofuran**	3.3 J	4.5 J	ug/L	PAI-27-TW67S-01	4/45	2 - 10	4.5	NA	**0.58 N**	NA	**Yes**	ASL
	86-73-7	Fluorene	0.58	4.2 J	ug/L	PAI-27-TW67S-01	6/25	0.2 - 2.1	4.2	NA	22 N	NA	No	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	0.13 J	0.13 J	ug/L	PAI-27-TW-26S	1/25	0.2 - 1.6	0.13	NA	**0.029 C**	NA	**Yes**	ASL
	91-20-3	**Naphthalene**	0.24	250	ug/L	PAI-27-GW-6-01	10/25	0.2 - 0.2	250	NA	**0.14 C**	NA	**Yes**	ASL
	85-01-8	Phenanthrene	0.33	6.2	ug/L	PAI-27-GW-6-01	7/25	0.2 - 0.21	6.2	NA	8.7 N[12]	NA	No	BSL
	108-95-2	Phenol	4.6 J	4.6 J	ug/L	PAI-27-GW-06S-03	1/45	1.5 - 10	4.6	NA	450 N	NA	No	BSL
	129-00-0	Pyrene	0.36 J	0.36 J	ug/L	PAI-27-GW-6-01	1/25	0.2 - 3.2	0.36	NA	8.7 N	NA	No	BSL

TABLE 6-7A
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - SITE 55
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Tap Water[5]	USEPA MCL[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
Site 55	**Polycyclic Aromatic Hydrocarbons**													
	90-12-0	1-Methylnaphthalene	0.013 J	0.5	ug/L	PAI-27-GW03S-03	7/20	0.2 - 0.22	0.5	NA	0.97 C	NA	No	BSL
	91-57-6	2-Methylnaphthalene	0.017 J	0.56	ug/L	PAI-27-GW03S-03	7/20	0.2 - 0.22	0.56	NA	2.7 N	NA	No	BSL
	83-32-9	Acenaphthene	0.048 J	0.048 J	ug/L	PAI-27-GW-15I-03	1/20	0.2 - 0.22	0.048	NA	40 N	NA	No	BSL
	120-12-7	Anthracene	0.02 J	0.03 J	ug/L	PAI-27-GW-07I-03	3/20	0.2 - 0.22	0.03	NA	130 N	NA	No	BSL
	91-20-3	**Naphthalene**	0.062 J	0.51	ug/L	PAI-27-GW03S-03	5/20	0.2 - 0.22	0.51	NA	**0.14 C**	NA	**Yes**	ASL
	Pesticides/PCBs													
	72-54-8	**4,4'-DDD**	0.016 J	3,400	ug/L	PAI-27-GW-6-01	41/64	0.011 - 1	3,400	NA	**0.28 C**	NA	**Yes**	ASL
	72-55-9	**4,4'-DDE**	0.0047 J	36 J	ug/L	PAI-27-GW-06S-02	16/64	0.011 - 190	36	NA	**0.2 C**	NA	**Yes**	ASL
	50-29-3	**4,4'-DDT**	0.0053 J	1,600	ug/L	PAI-27-GW-6-01	30/64	0.011 - 1	1,600	NA	**0.2 C**	NA	**Yes**	ASL
	309-00-2	**Aldrin**	0.0065 J	0.011 J	ug/L	PAI-27-GW-01S-03	3/64	0.0045 - 96	0.011	NA	**0.00021 C**	NA	**Yes**	ASL
	319-84-6	**alpha-BHC**	0.0029 J	470	ug/L	PAI-27-GW-6-01	34/64	0.0045 - 2.7	470	NA	**0.0062 C**	NA	**Yes**	ASL
	5103-71-9	**alpha-Chlordane**	0.0066 J	0.3 J	ug/L	PAI-27-GW-11S-03	6/64	0.0045 - 96	0.3	NA	**0.19 C[13]**	2	**Yes**	ASL
	319-85-7	**beta-BHC**	0.016 J	130	ug/L	PAI-27-GW-6-01	36/64	0.01 - 0.053	130	NA	**0.022 C**	NA	**Yes**	ASL
	319-86-8	**delta-BHC**	0.0037 J	700	ug/L	PAI-27-GW-6-01	47/64	0.0045 - 0.052	700	NA	**0.0062 C[14]**	NA	**Yes**	ASL
	60-57-1	**Dieldrin**	0.0053 J	0.013 J	ug/L	PAI-27-GW-15I-03	3/64	0.011 - 190	0.013	NA	**0.0015 C**	NA	**Yes**	ASL
	959-98-8	Endosulfan I	0.0051 J	0.042 J	ug/L	PAI-27-GW-15I-03	6/64	0.0045 - 96	0.042	NA	7.8 N[15]	NA	No	BSL
	33213-65-9	Endosulfan II	0.0074 J	0.49 J	ug/L	PAI-27-GW-06S-03	8/64	0.011 - 190	0.49	NA	7.8 N[15]	NA	No	BSL
	1031-07-8	Endosulfan Sulfate	0.01 J	0.052 J	ug/L	PAI-27-GW-15I-03	2/64	0.011 - 190	0.052	NA	7.8 N[15]	NA	No	BSL
	72-20-8	**Endrin**	0.0082 J	2.2 J	ug/L	PAI-27-GW-11S-03	9/64	0.011 - 190	2.2	NA	**0.17 N**	**2**	**Yes**	ASL
	7421-93-4	Endrin Aldehyde	0.022 J	0.022 J	ug/L	PAI-27-GW02I-03	1/64	0.019 - 190	0.022	NA	0.17 N[16]	NA	No	BSL
	53494-70-5	**Endrin Ketone**	0.015 J	0.78 J	ug/L	PAI-27-GW-06S-03	4/64	0.011 - 190	0.78	NA	**0.17 N[16]**	NA	**Yes**	ASL
	58-89-9	**gamma-BHC (Lindane)**	0.0035 J	540	ug/L	PAI-27-GW-6-01	24/64	0.0045 - 2.7	540	NA	**0.036 C**	**0.2**	**Yes**	ASL
	5103-74-2	**gamma-Chlordane**	0.0028 J	1.6 J	ug/L	PAI-27-GW-11S-03	8/64	0.0045 - 96	1.6	NA	**0.19 C[13]**	2	**Yes**	ASL
	76-44-8	**Heptachlor**	0.0031 J	0.098 J	ug/L	PAI-27-GW-15I-03	3/64	0.0045 - 96	0.098	NA	**0.0018 C**	0.4	**Yes**	ASL
	1024-57-3	**Heptachlor Epoxide**	0.0045 J	0.31 J	ug/L	PAI-27-GW-11S-03	8/64	0.0045 - 96	0.31	NA	**0.0033 C**	**0.2**	**Yes**	ASL
	Metals													
	7429-90-5	**Aluminum**	36.3 J	64,800	ug/L	PAI-27-GW-15I-03	17/24	37.5 - 171	64,800	NA	**1,600 N**	NA	**Yes**	ASL
	7440-36-0	**Antimony**	29 J	29 J	ug/L	PAI-27-GW03S-03	1/24	2.8 - 16.6	29	NA	**0.6 N**	**6**	**Yes**	ASL
	7440-38-2	**Arsenic**	2.7 J	125	ug/L	PAI-27-GW-15I-03	6/24	2.53 - 7.34	125	NA	**0.045 C**	**10**	**Yes**	ASL
	7440-39-3	Barium	16.9 J	164 J	ug/L	PAI-27-GW-15I-03	16/24	100 - 100	164	NA	290 N	2,000	No	BSL
	7440-41-7	**Beryllium**	1.49 J	7.4	ug/L	PAI-27-GW-15I-03	2/24	2.5 - 2.5	7.4	NA	**1.6 N**	**4**	**Yes**	ASL
	7440-70-2	Calcium	1,850 J	79,300	ug/L	PAI-27-GW09S-03	24/24	-	79,300	NA	NA	NA	No	NUT
	7440-47-3	**Chromium**	0.86 J	146	ug/L	PAI-27-GW-15I-03	17/24	1 - 5	146	NA	**0.031 C[17]**	**100**	**Yes**	ASL
	7440-48-4	**Cobalt**	46.4	46.4	ug/L	PAI-27-GW-15I-03	1/24	1.69 - 9.21	46.4	NA	**0.47 N**	NA	**Yes**	ASL
	7440-50-8	Copper	1.15 J	23.5	ug/L	PAI-27-GW-15I-03	8/24	1.42 - 2.5	23.5	NA	62 N	1,300	No	BSL
	7439-89-6	**Iron**	40.2 J	70,600	ug/L	PAI-27-GW-15I-03	22/24	32.5 - 80.9	70,600	NA	**1,100 N**	NA	**Yes**	ASL
	7439-92-1	**Lead**	1.79 J	38.2	ug/L	PAI-27-GW-15I-03	14/24	5 - 5	38.2	NA	NA	**15**	**Yes**	ASL
	7439-95-4	Magnesium	486 J	12,600	ug/L	PAI-27-GW-15I-03	24/24	-	12,600	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	6.85 J	461	ug/L	PAI-27-GW-15I-03	18/24	0.39 - 2.15	461	NA	**32 N**	NA	**Yes**	ASL
	7439-97-6	**Mercury**	0.116 J	0.555	ug/L	PAI-27-GW-15I-03	11/24	0.18 - 0.18	0.555	NA	**0.43 N[18]**	2	**Yes**	ASL
	7440-02-0	**Nickel**	12.8 J	70.4	ug/L	PAI-27-GW-15I-03	2/24	0.76 - 4.06	70.4	NA	**30 N**	NA	**Yes**	ASL
	7440-09-7	Potassium	3,940 J	7,140	ug/L	PAI-27-GW-15I-03	3/24	1280 - 3670	7,140	NA	NA	NA	No	NUT

TABLE 6-7A
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER - SITE 55
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	Adjusted USEPA RSL Tap Water(5)	USEPA MCL(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
Site 55	**Metals (Continued)**													
	7782-49-2	Selenium	2.07 J	7.13 J	ug/L	PAI-27-GW-15I-03	7/24	2.5 - 2.5	7.13	NA	7.8 N	50	No	BSL
	7440-23-5	Sodium	1,930 J	72,400	ug/L	PAI-27-TW68I-01	24/24	-	72,400	NA	NA	NA	No	NUT
	7440-28-0	**Thallium**	3.11 J	3.11 J	ug/L	PAI-27-GW-15I-03	1/24	5 - 5	3.11	NA	**0.016 N**	**2**	**Yes**	ASL
	7440-62-2	**Vanadium**	1.88 J	200	ug/L	PAI-27-GW-15I-03	11/24	10 - 10	200	NA	**7.8 N(19)**	NA	**Yes**	ASL
	7440-66-6	Zinc	4.76 J	188	ug/L	PAI-27-GW-15I-03	8/24	10 - 10	188	NA	470 N	NA	No	BSL

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background groundwater data is available.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2011. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
6 - 2011 Edition of the Drinking Water Standards and Health Advisories (USEPA, January 2011).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
8 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
9 - Value is for 1,4-dichlorobenzene.
10 - Value is for m-xylene.
11 - The screening level was calculated using revised toxicity criteria from USEPA's Integrated Risk Information System.
12 - Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
13 - Value is for chlordane.
14 - Value is for alpha-BHC.
15 - Value is for Endosulfan.
16 - Value is for Endrin.
17 - Value is for hexavalent chromium.
18 - Value is for mercuric chloride (and other mercury salts).
19 - Value is for vanadium and compounds.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

Associated Samples

PAI-27-GW-01S-02	PAI-27-GW-05I-02	PAI-27-GW-08D-03	PAI-27-GW-14-01	PAI-27-GW-51S-01	PAI-27-GW-64S-01-D	PAI-27-TW-34I
PAI-27-GW-01S-03	PAI-27-GW05I-03	PAI-27-GW-08D-03-D	PAI-27-GW-14S-02	PAI-27-GW51S-02	PAI-27-GW64S-02	PAI-27-TW-39S
PAI-27-GW-02I-02	PAI-27-GW-5I-01	PAI-27-GW09S-03	PAI-27-GW-14S-03	PAI-27-GW51S-02-D	PAI-27-TW-22S	PAI-27-TW-40I
PAI-27-GW02I-03	PAI-27-GW-06S-02	PAI-27-GW-9-01	PAI-27-GW-15I-01	PAI-27-GW-52I-01	PAI-27-TW-23I	PAI-27-TW-46S
PAI-27-GW-2I-01	PAI-27-GW-06S-03	PAI-27-GW-11S-02	PAI-27-GW-15I-02	PAI-27-GW52I-02	PAI-27-TW-24S	PAI-27-TW-47I
PAI-27-GW03S-03	PAI-27-GW-6-01	PAI-27-GW-11S-03	PAI-27-GW-15I-03	PAI-27-GW-60I-01	PAI-27-TW-24S-D	PAI-27-TW67S-01
PAI-27-GW-3-01	PAI-27-GW-07I-02	PAI-27-GW-12I-02	PAI-27-GW-16-01	PAI-27-GW60I-02	PAI-27-TW-25I	PAI-27-TW68I-01
PAI-27-GW-04S-02	PAI-27-GW-07I-03	PAI-27-GW-12I-03	PAI-27-GW-16S-02	PAI-27-GW60I-02-D	PAI-27-TW-26S	PAI-27-TW68I-01-1008042
PAI-27-GW-04S-02-D	PAI-27-GW-07I-03-D	PAI-27-GW-12I-03-D	PAI-27-GW16S-03	PAI-27-GW-63S-01	PAI-27-TW-27I	
PAI-27-GW04S-03	PAI-27-GW-08D-02	PAI-27-GW-13D-02	PAI-27-GW-48I-01	PAI-27-GW63S-02	PAI-27-TW-32I	
PAI-27-GW-4-01	PAI-27-GW-08D-02-D	PAI-27-GW-13D-03	PAI-27-GW48I-02	PAI-27-GW-64S-01	PAI-27-TW-33S	

TABLE 6-8
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION FROM GROUNDWATER - SITE 27
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Vapor Intrusion Criteria[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 27	**Volatile Organic Compounds**														
	120-82-1	**1,2,4-Trichlorobenzene**	0.15 J	6.4 J	ug/L	PAI-27-TW65S-01	5/43	0.08 - 5	6.4	NA	**3.6 N**	NA	NA	**Yes**	ASL
	95-50-1	1,2-Dichlorobenzene	0.061 J	26	ug/L	PAI-27-TW65S-01	21/43	0.08 - 5	26	NA	NA	NA	NA	No	NTX
	106-46-7	**1,4-Dichlorobenzene**	0.27 J	69	ug/L	PAI-27-TW65S-01	23/43	0.08 - 5	69	NA	**2.2 C**	NA	NA	**Yes**	ASL
	67-64-1	Acetone	0.47 J	6	ug/L	PAI-27-GW-49S-01	9/34	0.52 - 5	6	NA	NA	NA	NA	No	NTX
	71-43-2	**Benzene**	0.039 J	190	ug/L	PAI-27-TW65S-01	12/43	0.08 - 5	190	NA	**1.4 C**	NA	NA	**Yes**	ASL
	75-15-0	Carbon Disulfide	0.021 J	4	ug/L	PAI-27-GW-50I-01	4/43	0.046 - 5	4	NA	120 N	NA	NA	No	BSL
	108-90-7	**Chlorobenzene**	0.079 J	2,000	ug/L	PAI-27-TW65S-01	32/43	0.08 - 5	2,000	NA	**41 N**	NA	NA	**Yes**	ASL
	67-66-3	**Chloroform**	0.051 J	0.73	ug/L	PAI-27-GW53S-02	3/43	0.08 - 5	0.73	NA	**0.71 C**	NA	NA	**Yes**	ASL
	75-71-8	Dichlorodifluoromethane	0.088 J	0.088 J	ug/L	PAI-27-GW58S-02	1/43	0.08 - 5	0.088	NA	0.74 N	NA	NA	No	BSL
	100-41-4	**Ethylbenzene**	0.8 J	42	ug/L	PAI-27-TW65S-01	2/43	0.08 - 5	42	NA	**3 C**	NA	NA	**Yes**	ASL
	98-82-8	Isopropylbenzene	0.5 J	3.3 J	ug/L	PAI-27-TW65S-01	4/43	0.08 - 5	3.3	NA	NA	NA	NA	No	NTX
	- -	m+p-Xylenes	17 J	17 J	ug/L	PAI-27-TW65S-01	1/43	0.16 - 10	17	NA	36 N[7]	NA	NA	No	BSL
	1634-04-4	Methyl Tert-Butyl Ether	0.11 J	0.11 J	ug/L	PAI-27-GW57S-02	1/43	0.08 - 5	0.11	NA	390 C	NA	NA	No	BSL
	108-88-3	Toluene	0.087 J	1.3 J	ug/L	PAI-27-GW19S-03	3/43	0.072 - 7.9	1.3	NA	NA	NA	NA	No	NTX
	1330-20-7	Total Xylenes	17 J	17 J	ug/L	PAI-27-TW65S-01	1/43	0.08 - 15	17	NA	49 N	NA	NA	No	BSL
	Semivolatile Organic Compounds														
	92-52-4	**1,1-Biphenyl**	1.7 J	6.4	ug/L	PAI-27-TW65S-01	3/27	1.5 - 10	6.4	NA	**3.3 N**	NA	NA	**Yes**	ASL
	91-57-6	2-Methylnaphthalene	0.11 J	0.11 J	ug/L	PAI-27-TW-42I	1/10	0.2 - 2.2	0.11	NA	NA	NA	NA	No	NTX
	83-32-9	Acenaphthene	1.8 J	1.8 J	ug/L	PAI-27-TW65S-01	1/10	0.2 - 0.21	1.8	NA	NA	NA	NA	No	NTX
	86-74-8	Carbazole	1.7 J	1.7 J	ug/L	PAI-27-TW65S-01	1/27	2 - 10	1.7	NA	NA	NA	NA	No	NTX
	132-64-9	Dibenzofuran	2.6 J	2.6 J	ug/L	PAI-27-TW65S-01	1/27	2 - 10	2.6	NA	NA	NA	NA	No	NTX
	86-73-7	Fluorene	0.11 J	2.3 J	ug/L	PAI-27-TW65S-01	2/10	0.2 - 0.21	2.3	NA	NA	NA	NA	No	NTX
	91-20-3	**Naphthalene**	24	24	ug/L	PAI-27-TW65S-01	1/10	0.2 - 0.21	24	NA	**3.9 C**	NA	NA	**Yes**	ASL
	85-01-8	Phenanthrene	1.1 J	1.1 J	ug/L	PAI-27-TW65S-01	1/10	0.2 - 0.21	1.1	NA	NA	NA	NA	No	NTX
	Polycyclic Aromatic Hydrocarbons														
	90-12-0	1-Methylnaphthalene	0.013 J	0.068 J	ug/L	PAI-27-TW66I-01	3/17	0.2 - 0.22	0.068	NA	NA	NA	NA	No	NTX
	91-57-6	2-Methylnaphthalene	0.016 J	0.092 J	ug/L	PAI-27-TW66I-01	4/17	0.2 - 0.22	0.092	NA	NA	NA	NA	No	NTX
	83-32-9	Acenaphthene	0.084 J	0.084 J	ug/L	PAI-27-GW-50I-02	1/17	0.2 - 0.22	0.084	NA	NA	NA	NA	No	NTX
	208-96-8	Acenaphthylene	0.017 J	0.017 J	ug/L	PAI-27-GW19S-03	1/17	0.2 - 0.22	0.017	NA	NA	NA	NA	No	NTX
	120-12-7	Anthracene	0.051 J	0.051 J	ug/L	PAI-27-GW-50I-02	1/17	0.2 - 0.22	0.051	NA	NA	NA	NA	No	NTX
	86-73-7	Fluorene	0.052 J	0.052 J	ug/L	PAI-27-GW19S-03	1/17	0.2 - 0.22	0.052	NA	NA	NA	NA	No	NTX
	91-20-3	Naphthalene	0.042 J	0.17 J	ug/L	PAI-27-GW18I-03	3/17	0.2 - 0.22	0.17	NA	3.9 C	NA	NA	No	BSL
	85-01-8	Phenanthrene	0.035 J	0.035 J	ug/L	PAI-27-GW-50I-02	1/17	0.2 - 0.22	0.035	NA	NA	NA	NA	No	NTX
	129-00-0	Pyrene	0.013 J	0.013 J	ug/L	PAI-27-TW66I-01	1/17	0.2 - 0.22	0.013	NA	NA	NA	NA	No	NTX
	Pesticides/PCBs														
	72-54-8	4,4'-DDD	0.0076 J	2.4	ug/L	PAI-27-TW65S-01	8/43	0.011 - 4.8	2.4	NA	NA	NA	NA	No	NTX
	72-55-9	4,4'-DDE	0.0089 J	0.087 J	ug/L	PAI-27-TW65S-01	3/43	0.011 - 4.8	0.087	NA	NA	NA	NA	No	NTX
	50-29-3	4,4'-DDT	0.023 J	0.43 J	ug/L	PAI-27-TW65S-01	7/43	0.011 - 4.8	0.43	NA	NA	NA	NA	No	NTX
	309-00-2	Aldrin	0.011 J	0.011 J	ug/L	PAI-27-GW18I-03	1/43	0.0045 - 2.4	0.011	NA	NA	NA	NA	No	NTX
	319-84-6	alpha-BHC	0.0043 J	46	ug/L	PAI-27-TW-30S	33/43	0.0045 - 0.062	46	NA	NA	NA	NA	No	NTX

TABLE 6-8
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION FROM GROUNDWATER - SITE 27
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Vapor Intrusion Criteria[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 27	**Pesticides/PCBs (continued)**														
	5103-71-9	alpha-Chlordane	0.002 J	0.014 J	ug/L	PAI-27-GW18I-03, PAI-27-GW-50I-02	6/43	0.0045 - 2.4	0.014	NA	NA	NA	NA	No	NTX
	319-85-7	beta-BHC	0.014 J	12 J	ug/L	PAI-27-TW65S-01	17/43	0.01 - 0.5	12	NA	NA	NA	NA	No	NTX
	319-86-8	delta-BHC	0.0053 J	180	ug/L	PAI-27-TW65S-01	32/43	0.013 - 0.062	180	NA	NA	NA	NA	No	NTX
	60-57-1	Dieldrin	0.0076 J	0.0076 J	ug/L	PAI-27-GW-49S-02	1/43	0.011 - 4.8	0.0076	NA	NA	NA	NA	No	NTX
	959-98-8	Endosulfan I	0.0075 J	0.01 J	ug/L	PAI-27-GW18I-03	2/43	0.0045 - 2.4	0.01	NA	NA	NA	NA	No	NTX
	33213-65-9	Endosulfan II	0.015 J	0.055 J	ug/L	PAI-27-GW-50I-02	2/43	0.011 - 4.8	0.055	NA	NA	NA	NA	No	NTX
	1031-07-8	Endosulfan Sulfate	0.0069 J	0.01 J	ug/L	PAI-27-GW18I-03	2/43	0.011 - 4.8	0.01	NA	NA	NA	NA	No	NTX
	72-20-8	Endrin	0.038 J	0.038 J	ug/L	PAI-27-GW-49S-02	1/43	0.011 - 4.8	0.038	NA	NA	NA	NA	No	NTX
	7421-93-4	Endrin Aldehyde	0.017 J	0.017 J	ug/L	PAI-27-GW18I-03	1/43	0.019 - 4.8	0.017	NA	NA	NA	NA	No	NTX
	53494-70-5	Endrin Ketone	0.084	0.084	ug/L	PAI-27-GW-49S-02	1/43	0.011 - 4.8	0.084	NA	NA	NA	NA	No	NTX
	58-89-9	gamma-BHC (Lindane)	0.004 J	21	ug/L	PAI-27-TW-28S	21/43	0.0045 - 0.099	21	NA	NA	NA	NA	No	NTX
	5103-74-2	gamma-Chlordane	0.0084 J	0.024 J	ug/L	PAI-27-GW-49S-02	3/43	0.0045 - 2.4	0.024	NA	NA	NA	NA	No	NTX
	76-44-8	Heptachlor	0.0029 J	0.0029 J	ug/L	PAI-27-GW57S-02	1/43	0.0045 - 2.4	0.0029	NA	NA	NA	NA	No	NTX
	1024-57-3	Heptachlor Epoxide	0.0047 J	0.034 J	ug/L	PAI-27-GW-49S-02	7/43	0.0045 - 2.4	0.034	NA	NA	NA	NA	No	NTX
	72-43-5	Methoxychlor	0.025 J	0.025 J	ug/L	PAI-27-GW-49S-02	1/43	0.025 - 24	0.025	NA	NA	NA	NA	No	NTX
	Metals														
	7429-90-5	Aluminum	102 J	4,890	ug/L	PAI-27-TW65S-01	12/18	35.3 - 118	4,890	NA	NA	NA	NA	No	NTX
	7440-38-2	Arsenic	7.89 J	32.7	ug/L	PAI-27-GW59I-02	2/18	2.94 - 6.08	32.7	NA	NA	NA	NA	No	NTX
	7440-39-3	Barium	16.6 J	115 J	ug/L	PAI-27-GW56I-02	16/18	100 - 100	115	NA	NA	NA	NA	No	NTX
	7440-41-7	Beryllium	4.16 J	4.16 J	ug/L	PAI-27-GW-50I-02	1/18	2.5 - 2.5	4.16	NA	NA	NA	NA	No	NTX
	7440-70-2	Calcium	628 J	57,200	ug/L	PAI-27-GW-10S-03	18/18	-	57,200	NA	NA	NA	NA	No	NUT
	7440-47-3	Chromium	1.12 J	14.7	ug/L	PAI-27-TW65S-01	7/18	1.1 - 5	14.7	NA	NA	NA	NA	No	NTX
	7440-50-8	Copper	1.79 J	5.05	ug/L	PAI-27-GW62S-02	2/18	1.55 - 4.72	5.05	NA	NA	NA	NA	No	NTX
	7439-89-6	Iron	260 J	21,000	ug/L	PAI-27-GW56I-02	18/18	-	21,000	NA	NA	NA	NA	No	NTX
	7439-92-1	Lead	1.65 J	4.14 J	ug/L	PAI-27-TW65S-01	8/18	5 - 5	4.14	NA	NA	NA	NA	No	NTX
	7439-95-4	Magnesium	347 J	13,700	ug/L	PAI-27-GW56I-02	18/18	-	13,700	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	2.71 J	408	ug/L	PAI-27-GW56I-02	17/18	1.14 - 1.14	408	NA	NA	NA	NA	No	NTX
	7439-97-6	Mercury	0.122 J	0.413	ug/L	PAI-27-GW-49S-02	7/18	0.18 - 0.18	0.413	NA	NA	NA	NA	No	NTX
	7440-09-7	Potassium	5,660	8,210	ug/L	PAI-27-GW-49S-02	2/18	1660 - 3580	8,210	NA	NA	NA	NA	No	NUT
	7782-49-2	Selenium	2.25 J	3.39 J	ug/L	PAI-27-GW-50I-02	3/18	2.5 - 2.5	3.39	NA	NA	NA	NA	No	NTX
	7440-22-4	Silver	0.7 J	1.32 J	ug/L	PAI-27-GW-50I-02	2/18	1.29 - 2.5	1.32	NA	NA	NA	NA	No	NTX
	7440-23-5	Sodium	6,500	136,000	ug/L	PAI-27-GW56I-02	18/18	-	136,000	NA	NA	NA	NA	No	NUT
	7440-62-2	Vanadium	1.65 J	10.7 J	ug/L	PAI-27-TW65S-01	8/18	10 - 10	10.7	NA	NA	NA	NA	No	NTX
	7440-66-6	Zinc	4.22 J	377	ug/L	PAI-27-GW59I-02	10/18	10 - 10	377	NA	NA	NA	NA	No	NTX

TABLE 6-8
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION FROM GROUNDWATER - SITE 27
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Vapor Intrusion Criteria[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background groundwater data is available.
5 - Calculated using USEPA's Vapor Intrusion Screening Level (VISL) calculator (USEPA, March 2012) and toxicity criteria from USEPA's November 2011 Regional Screening Level table. Values correspond to a target cancer risk level of 1E-06 or HQ of 0.1 and an attenuation factor of 0.001.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for m-xylene.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

PAI-27-GW-10S-02	PAI-27-GW53S-02	PAI-27-TW-29I
PAI-27-GW-10S-03	PAI-27-GW-54I-01	PAI-27-TW-30S
PAI-27-GW-17S-02	PAI-27-GW54I-02	PAI-27-TW-31I
PAI-27-GW17S-03	PAI-27-GW-55S-01	PAI-27-TW-41S
PAI-27-GW-18I-02	PAI-27-GW-55S-01-D	PAI-27-TW-42I
PAI-27-GW18I-03	PAI-27-GW55S-02	PAI-27-TW-43S
PAI-27-GW-19S-02	PAI-27-GW-56I-01	PAI-27-TW-44I
PAI-27-GW19S-03	PAI-27-GW56I-02	PAI-27-TW-45D
PAI-27-GW-20S-02	PAI-27-GW-57S-01	PAI-27-TW65S-01
PAI-27-GW20S-03	PAI-27-GW57S-02	PAI-27-TW66I-01
PAI-27-GW-21S-02	PAI-27-GW-58S-01	
PAI-27-GW21S-03	PAI-27-GW58S-02	
PAI-27-GW-49S-01	PAI-27-GW-59I-01	
PAI-27-GW-49S-02	PAI-27-GW59I-02	
PAI-27-GW-50I-01	PAI-27-GW-62S-01	
PAI-27-GW-50I-02	PAI-27-GW62S-02	
PAI-27-GW-53S-01	PAI-27-TW-28S	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
CAS = Chemical Abstracts Service
COPC = Chemical Of Potential Concern
J = Estimated value
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 6-8A
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION FROM GROUNDWATER - SITE 55
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Vapor Intrusion Criteria[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 55	**Volatile Organic Compounds**														
	75-34-3	1,1-Dichloroethane	0.036 J	0.036 J	ug/L	PAI-27-GW52I-02	1/64	0.08 - 5	0.036	NA	6.6 C	NA	NA	No	BSL
	120-82-1	**1,2,4-Trichlorobenzene**	0.13 J	9	ug/L	PAI-27-GW-6-01	16/64	0.072 - 5	9	NA	**3.6 N**	NA	NA	**Yes**	ASL
	95-50-1	1,2-Dichlorobenzene	0.065 J	33	ug/L	PAI-27-TW-26S	28/64	0.08 - 5	33	NA	NA	NA	NA	No	NTX
	541-73-1	1,3-Dichlorobenzene	0.4 J	1	ug/L	PAI-27-GW-12I-02	4/64	0.08 - 5	1	NA	2.2 C[7]	NA	NA	No	BSL
	106-46-7	**1,4-Dichlorobenzene**	0.049 J	82	ug/L	PAI-27-TW-26S	33/64	0.08 - 5	82	NA	**2.2 C**	NA	NA	**Yes**	ASL
	78-93-3	2-Butanone	0.35 J	52	ug/L	PAI-27-GW-06S-02	4/51	0.4 - 13	52	NA	NA	NA	NA	No	NTX
	67-64-1	Acetone	1.1 J	25	ug/L	PAI-27-GW-06S-02	16/54	0.62 - 8	25	NA	NA	NA	NA	No	NTX
	71-43-2	**Benzene**	0.043 J	230	ug/L	PAI-27-TW-26S	25/64	0.08 - 5	230	NA	**1.4 C**	NA	NA	**Yes**	ASL
	75-15-0	Carbon Disulfide	0.028 J	2	ug/L	PAI-27-GW-06S-02	6/64	0.08 - 5	2	NA	120 N	NA	NA	No	BSL
	108-90-7	**Chlorobenzene**	0.3 J	2,500	ug/L	PAI-27-TW-26S	37/64	0.08 - 5	2,500	NA	**41 N**	NA	NA	**Yes**	ASL
	67-66-3	Chloroform	0.042 J	0.083 J	ug/L	PAI-27-GW-01S-03	2/64	0.08 - 5	0.083	NA	0.71 C	NA	NA	No	BSL
	74-87-3	Chloromethane	0.6 J	0.9 J	ug/L	PAI-27-GW-63S-01	3/64	0.3 - 15	0.9	NA	26 N	NA	NA	No	BSL
	156-59-2	cis-1,2-Dichloroethene	0.13 J	0.6 J	ug/L	PAI-27-TW-26S	2/64	0.08 - 5	0.6	NA	NA	NA	NA	No	NTX
	110-82-7	Cyclohexane	0.042 J	1 J	ug/L	PAI-27-TW-26S	3/64	0.08 - 5	1	NA	NA	NA	NA	No	NTX
	100-41-4	**Ethylbenzene**	0.3 J	120	ug/L	PAI-27-TW-26S	14/64	0.08 - 5	120	NA	**3 C**	NA	NA	**Yes**	ASL
	98-82-8	Isopropylbenzene	0.064 J	10	ug/L	PAI-27-TW-26S	17/64	0.08 - 5	10	NA	NA	NA	NA	No	NTX
	- -	**m+p-Xylenes**	0.095 J	280	ug/L	PAI-27-TW-26S	9/64	0.16 - 10	280	NA	**36 N[8]**	NA	NA	**Yes**	ASL
	108-87-2	Methyl Cyclohexane	0.082 J	1.6 J	ug/L	PAI-27-GW-06S-03	5/64	0.08 - 5	1.6	NA	NA	NA	NA	No	NTX
	1634-04-4	Methyl Tert-Butyl Ether	0.16 J	1 J	ug/L	PAI-27-GW-02I-02, PAI-27-GW-2I-01	11/64	0.08 - 5	1	NA	390 C	NA	NA	No	BSL
	95-47-6	**o-Xylene**	0.14 J	150	ug/L	PAI-27-TW-26S	10/64	0.08 - 5	150	NA	**49 N**	NA	NA	**Yes**	ASL
	127-18-4	**Tetrachloroethene**	0.6 J	0.6 J	ug/L	PAI-27-GW-63S-01	1/64	0.08 - 5	0.6	NA	**0.57 C**	NA	NA	**Yes**	ASL
	108-88-3	Toluene	0.08 J	18	ug/L	PAI-27-TW-26S	10/64	0.066 - 5.9	18	NA	NA	NA	NA	No	NTX
	540-59-0	Total 1,2-Dichloroethene	0.6 J	0.6 J	ug/L	PAI-27-TW-26S	1/41	2 - 10	0.6	NA	NA	NA	NA	No	NTX
	1330-20-7	**Total Xylenes**	0.24 J	430	ug/L	PAI-27-TW-26S	10/64	0.08 - 15	430	NA	**49 N**	NA	NA	**Yes**	ASL
	Semivolatile Organic Compounds														
	92-52-4	**1,1-Biphenyl**	3.1 J	12	ug/L	PAI-27-TW67S-01	6/45	1.5 - 10	12	NA	**3.3 N**	NA	NA	**Yes**	ASL
	95-57-8	2-Chlorophenol	1 J	1.6 J	ug/L	PAI-27-GW-15I-03	2/45	2 - 10	1.6	NA	NA	NA	NA	No	NTX
	91-57-6	2-Methylnaphthalene	0.11 J	240	ug/L	PAI-27-GW-6-01	9/25	0.2 - 2.1	240	NA	NA	NA	NA	No	NTX
	83-32-9	Acenaphthene	0.62	3 J	ug/L	PAI-27-TW67S-01	7/25	0.2 - 0.21	3	NA	NA	NA	NA	No	NTX
	- -	Benzo(a)pyrene Equivalents	0.260	0.260	ug/L	PAI-27-TW-26S	1/25	0.2 - 2.1	0.260	NA	NA	NA	NA	No	NTX
	191-24-2	Benzo(g,h,i)perylene	0.14 J	0.14 J	ug/L	PAI-27-TW-26S	1/25	0.2 - 3.2	0.14	NA	NA	NA	NA	No	NTX
	117-81-7	Bis(2-ethylhexyl)phthalate	3.2 J	3.2 J	ug/L	PAI-27-GW-15I-03	1/45	4 - 10	3.2	NA	NA	NA	NA	No	NTX
	86-74-8	Carbazole	1.9 J	1.9 J	ug/L	PAI-27-TW67S-01	1/45	2 - 10	1.9	NA	NA	NA	NA	No	NTX
	53-70-3	Dibenzo(a,h)anthracene	0.12 J	0.12 J	ug/L	PAI-27-TW-26S	1/25	0.2 - 3.2	0.12	NA	NA	NA	NA	No	NTX
	132-64-9	Dibenzofuran	3.3 J	4.5 J	ug/L	PAI-27-TW67S-01	4/45	2 - 10	4.5	NA	NA	NA	NA	No	NTX
	86-73-7	Fluorene	0.58	4.2 J	ug/L	PAI-27-TW67S-01	6/25	0.2 - 2.1	4.2	NA	NA	NA	NA	No	NTX
	193-39-5	Indeno(1,2,3-cd)pyrene	0.13 J	0.13 J	ug/L	PAI-27-TW-26S	1/25	0.2 - 1.6	0.13	NA	NA	NA	NA	No	NTX
	91-20-3	**Naphthalene**	0.24	250	ug/L	PAI-27-GW-6-01	10/25	0.2 - 0.2	250	NA	**3.9 C**	NA	NA	**Yes**	ASL
	85-01-8	Phenanthrene	0.33	6.2	ug/L	PAI-27-GW-6-01	7/25	0.2 - 0.21	6.2	NA	NA	NA	NA	No	NTX
	108-95-2	Phenol	4.6 J	4.6 J	ug/L	PAI-27-GW-06S-03	1/45	1.5 - 10	4.6	NA	NA	NA	NA	No	NTX
	129-00-0	Pyrene	0.36 J	0.36 J	ug/L	PAI-27-GW-6-01	1/25	0.2 - 3.2	0.36	NA	NA	NA	NA	No	NTX
	Polycyclic Aromatic Hydrocarbons														
	90-12-0	1-Methylnaphthalene	0.013 J	0.5	ug/L	PAI-27-GW03S-03	7/20	0.2 - 0.22	0.5	NA	NA	NA	NA	No	NTX
	91-57-6	2-Methylnaphthalene	0.017 J	0.56	ug/L	PAI-27-GW03S-03	7/20	0.2 - 0.22	0.56	NA	NA	NA	NA	No	NTX
	83-32-9	Acenaphthene	0.048 J	0.048 J	ug/L	PAI-27-GW-15I-03	1/20	0.2 - 0.22	0.048	NA	NA	NA	NA	No	NTX
	120-12-7	Anthracene	0.02 J	0.03 J	ug/L	PAI-27-GW-07I-03	3/20	0.2 - 0.22	0.03	NA	NA	NA	NA	No	NTX
	91-20-3	Naphthalene	0.062 J	0.51	ug/L	PAI-27-GW03S-03	5/20	0.2 - 0.22	0.51	NA	3.9 C	NA	NA	No	BSL

TABLE 6-8A
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION FROM GROUNDWATER - SITE 55
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Vapor Intrusion Criteria[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 55	**Pesticides/PCBs**														
	72-54-8	4,4'-DDD	0.016 J	3,400	ug/L	PAI-27-GW-6-01	41/64	0.011 - 1	3,400	NA	NA	NA	NA	No	NTX
	72-55-9	4,4'-DDE	0.0047 J	36 J	ug/L	PAI-27-GW-06S-02	16/64	0.011 - 190	36	NA	NA	NA	NA	No	NTX
	50-29-3	4,4'-DDT	0.0053 J	1,600	ug/L	PAI-27-GW-6-01	30/64	0.011 - 1	1,600	NA	NA	NA	NA	No	NTX
	309-00-2	Aldrin	0.0065 J	0.011 J	ug/L	PAI-27-GW-01S-03	3/64	0.0045 - 96	0.011	NA	NA	NA	NA	No	NTX
	319-84-6	alpha-BHC	0.0029 J	470	ug/L	PAI-27-GW-6-01	34/64	0.0045 - 2.7	470	NA	NA	NA	NA	No	NTX
	5103-71-9	alpha-Chlordane	0.0066 J	0.3 J	ug/L	PAI-27-GW-11S-03	6/64	0.0045 - 96	0.3	NA	NA	NA	NA	No	NTX
	319-85-7	beta-BHC	0.016 J	130	ug/L	PAI-27-GW-6-01	36/64	0.01 - 0.053	130	NA	NA	NA	NA	No	NTX
	319-86-8	delta-BHC	0.0037 J	700	ug/L	PAI-27-GW-6-01	47/64	0.0045 - 0.052	700	NA	NA	NA	NA	No	NTX
	60-57-1	Dieldrin	0.0053 J	0.013 J	ug/L	PAI-27-GW-15I-03	3/64	0.011 - 190	0.013	NA	NA	NA	NA	No	NTX
	959-98-8	Endosulfan I	0.0051 J	0.042 J	ug/L	PAI-27-GW-15I-03	6/64	0.0045 - 96	0.042	NA	NA	NA	NA	No	NTX
	33213-65-9	Endosulfan II	0.0074 J	0.49 J	ug/L	PAI-27-GW-06S-03	8/64	0.011 - 190	0.49	NA	NA	NA	NA	No	NTX
	1031-07-8	Endosulfan Sulfate	0.01 J	0.052 J	ug/L	PAI-27-GW-15I-03	2/64	0.011 - 190	0.052	NA	NA	NA	NA	No	NTX
	72-20-8	Endrin	0.0082 J	2.2 J	ug/L	PAI-27-GW-11S-03	9/64	0.011 - 190	2.2	NA	NA	NA	NA	No	NTX
	7421-93-4	Endrin Aldehyde	0.022 J	0.022 J	ug/L	PAI-27-GW02I-03	1/64	0.019 - 190	0.022	NA	NA	NA	NA	No	NTX
	53494-70-5	Endrin Ketone	0.015 J	0.78 J	ug/L	PAI-27-GW-06S-03	4/64	0.011 - 190	0.78	NA	NA	NA	NA	No	NTX
	58-89-9	gamma-BHC (Lindane)	0.0035 J	540	ug/L	PAI-27-GW-6-01	24/64	0.0045 - 2.7	540	NA	NA	NA	NA	No	NTX
	5103-74-2	gamma-Chlordane	0.0028 J	1.6 J	ug/L	PAI-27-GW-11S-03	8/64	0.0045 - 96	1.6	NA	NA	NA	NA	No	NTX
	76-44-8	Heptachlor	0.0031 J	0.098 J	ug/L	PAI-27-GW-15I-03	3/64	0.0045 - 96	0.098	NA	NA	NA	NA	No	NTX
	1024-57-3	Heptachlor Epoxide	0.0045 J	0.31 J	ug/L	PAI-27-GW-11S-03	8/64	0.0045 - 96	0.31	NA	NA	NA	NA	No	NTX
	Metals														
	7429-90-5	Aluminum	36.3 J	64,800	ug/L	PAI-27-GW-15I-03	17/24	37.5 - 171	64,800	NA	NA	NA	NA	No	NTX
	7440-36-0	Antimony	29 J	29 J	ug/L	PAI-27-GW03S-03	1/24	2.8 - 16.6	29	NA	NA	NA	NA	No	NTX
	7440-38-2	Arsenic	2.7 J	125	ug/L	PAI-27-GW-15I-03	6/24	2.53 - 7.34	125	NA	NA	NA	NA	No	NTX
	7440-39-3	Barium	16.9 J	164 J	ug/L	PAI-27-GW-15I-03	16/24	100 - 100	164	NA	NA	NA	NA	No	NTX
	7440-41-7	Beryllium	1.49 J	7.4	ug/L	PAI-27-GW-15I-03	2/24	2.5 - 2.5	7.4	NA	NA	NA	NA	No	NTX
	7440-70-2	Calcium	1,850 J	79,300	ug/L	PAI-27-GW09S-03	24/24	-	79,300	NA	NA	NA	NA	No	NUT
	7440-47-3	Chromium	0.86 J	146	ug/L	PAI-27-GW-15I-03	17/24	1 - 5	146	NA	NA	NA	NA	No	NTX
	7440-48-4	Cobalt	46.4	46.4	ug/L	PAI-27-GW-15I-03	1/24	1.69 - 9.21	46.4	NA	NA	NA	NA	No	NTX
	7440-50-8	Copper	1.15 J	23.5	ug/L	PAI-27-GW-15I-03	8/24	1.42 - 2.5	23.5	NA	NA	NA	NA	No	NTX
	7439-89-6	Iron	40.2 J	70,600	ug/L	PAI-27-GW-15I-03	22/24	32.5 - 80.9	70,600	NA	NA	NA	NA	No	NTX
	7439-92-1	Lead	1.79 J	38.2	ug/L	PAI-27-GW-15I-03	14/24	5 - 5	38.2	NA	NA	NA	NA	No	NTX
	7439-95-4	Magnesium	486 J	12,600	ug/L	PAI-27-GW-15I-03	24/24	-	12,600	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	6.85 J	461	ug/L	PAI-27-GW-15I-03	18/24	0.39 - 2.15	461	NA	NA	NA	NA	No	NTX
	7439-97-6	Mercury	0.116 J	0.555	ug/L	PAI-27-GW-15I-03	11/24	0.18 - 0.18	0.555	NA	NA	NA	NA	No	NTX
	7440-02-0	Nickel	12.8 J	70.4	ug/L	PAI-27-GW-15I-03	2/24	0.76 - 4.06	70.4	NA	NA	NA	NA	No	NTX
	7440-09-7	Potassium	3,940 J	7,140	ug/L	PAI-27-GW-15I-03	3/24	1280 - 3670	7,140	NA	NA	NA	NA	No	NUT
	7782-49-2	Selenium	2.07 J	7.13 J	ug/L	PAI-27-GW-15I-03	7/24	2.5 - 2.5	7.13	NA	NA	NA	NA	No	NTX
	7440-23-5	Sodium	1,930 J	72,400	ug/L	PAI-27-TW68I-01	24/24	-	72,400	NA	NA	NA	NA	No	NUT
	7440-28-0	Thallium	3.11 J	3.11 J	ug/L	PAI-27-GW-15I-03	1/24	5 - 5	3.11	NA	NA	NA	NA	No	NTX
	7440-62-2	Vanadium	1.88 J	200	ug/L	PAI-27-GW-15I-03	11/24	10 - 10	200	NA	NA	NA	NA	No	NTX
	7440-66-6	Zinc	4.76 J	188	ug/L	PAI-27-GW-15I-03	8/24	10 - 10	188	NA	NA	NA	NA	No	NTX

TABLE 6-8A
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION FROM GROUNDWATER - SITE 55
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	Vapor Intrusion Criteria(5)	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background groundwater data is available.
5 - Calculated using USEPA's Vapor Intrusion Screening Level (VISL) calculator (USEPA, March 2012) and toxicity criteria from USEPA's November 2011 Regional Screening Level table. Values correspond to a target cancer risk level of 1E-06 or HQ of 0.1 and an attenuation factor of 0.001.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for 1,4-dichlorobenzene.
8 - Value is for m-xylene.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

PAI-27-GW-01S-02	PAI-27-GW-13D-02	PAI-27-TW-26S
PAI-27-GW-01S-03	PAI-27-GW-13D-03	PAI-27-TW-27I
PAI-27-GW-02I-02	PAI-27-GW-14-01	PAI-27-TW-32I
PAI-27-GW02I-03	PAI-27-GW-14S-02	PAI-27-TW-33S
PAI-27-GW-2I-01	PAI-27-GW-14S-03	PAI-27-TW-34I
PAI-27-GW03S-03	PAI-27-GW-15I-01	PAI-27-TW-39S
PAI-27-GW-3-01	PAI-27-GW-15I-02	PAI-27-TW-40I
PAI-27-GW-04S-02	PAI-27-GW-15I-03	PAI-27-TW-46S
PAI-27-GW-04S-02-D	PAI-27-GW-16-01	PAI-27-TW-47I
PAI-27-GW04S-03	PAI-27-GW-16S-02	PAI-27-TW67S-01
PAI-27-GW-4-01	PAI-27-GW16S-03	PAI-27-TW68I-01
PAI-27-GW-05I-02	PAI-27-GW-48I-01	PAI-27-TW68I-01-1008042
PAI-27-GW05I-03	PAI-27-GW48I-02	
PAI-27-GW-5I-01	PAI-27-GW-51S-01	
PAI-27-GW-06S-02	PAI-27-GW51S-02	
PAI-27-GW-06S-03	PAI-27-GW51S-02-D	
PAI-27-GW-6-01	PAI-27-GW-52I-01	
PAI-27-GW-07I-02	PAI-27-GW52I-02	
PAI-27-GW-07I-03	PAI-27-GW-60I-01	
PAI-27-GW-07I-03-D	PAI-27-GW60I-02	
PAI-27-GW-08D-02	PAI-27-GW60I-02-D	
PAI-27-GW-08D-02-D	PAI-27-GW-63S-01	
PAI-27-GW-08D-03	PAI-27-GW63S-02	
PAI-27-GW-08D-03-D	PAI-27-GW-64S-01	
PAI-27-GW09S-03	PAI-27-GW-64S-01-D	
PAI-27-GW-9-01	PAI-27-GW64S-02	
PAI-27-GW-11S-02	PAI-27-TW-22S	
PAI-27-GW-11S-03	PAI-27-TW-23I	
PAI-27-GW-12I-02	PAI-27-TW-24S	
PAI-27-GW-12I-03	PAI-27-TW-24S-D	
PAI-27-GW-12I-03-D	PAI-27-TW-25I	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
CAS = Chemical Abstracts Service
COPC = Chemical Of Potential Concern
J = Estimated value
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 6-9

CHEMICALS RETAINED AS COPCS
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Parameter	Surface Soil		Subsurface Soil		Groundwater	
	Direct Contact	Soil to Groundwater	Direct Contact	Soil to Groundwater	Direct Contact	Vapor Intrusion
Volatile Organic Compounds						
1,2,4-Trichlorobenzene				X	X	X
1,3-Dichlorobenzene				X		
1,4-Dichlorobenzene				X	X	X
Benzene				X	X	X
Carbon Tetrachloride		X				
Chlorobenzene				X	X	X
Chloroform		X			X	X
Ethylbenzene		X		X	X	X
Tetrachloroethene		X		X		
Semivolatile Organic Compounds						
1,1-Biphenyl					X	X
1-Methylnaphthalene		X		X		
2-Methylnaphthalene		X				
Benzo(a)anthracene	X	X				
Benzo(a)pyrene Equivalents	X		X			
Benzo(a)pyrene	X	X		X		
Benzo(b)fluoranthene	X	X				
Benzo(g,h,i)perylene		X				
Benzo(k)fluoranthene	X	X				
Bis(2-ethylhexyl)phthalate		X				
Chrysene	X	X				
Dibenzo(a,h)anthracene	X	X				
Fluoranthene		X				
Indeno(1,2,3-cd)pyrene	X	X				
Naphthalene		X		X	X	X
Dibenzofuran					X	
Phenanthrene		X				
Pyrene		X				
Pesticides/PCBs						
4,4'-DDD			X	X	X	
4,4'-DDE		X				
4,4'-DDT					X	
Aldrin		X			X	
alpha-BHC		X	X	X	X	
Aroclor-1260	X	X				
beta-BHC		X		X	X	
delta-BHC		X	X	X	X	
Dieldrin		X		X	X	
gamma-BHC (Lindane)		X		X	X	
Heptachlor		X		X	X	
Heptachlor Epoxide		X		X	X	
Inorganics						
Aluminum	X		X	X	X	
Antimony		X		X		
Arsenic	X	X	X	X	X	
Beryllium					X	
Chromium	X	X	X	X	X	
Cobalt		X		X		
Copper		X				
Iron	X	X	X	X	X	
Lead		X		X		
Manganese	X	X			X	
Mercury		X		X		
Selenium		X		X		
Thallium	X	X	X	X		
Vanadium			X		X	

X - Indicates chemical was retained as a COPC.
RAGS Part D tables are included in Appendix G.

TABLE 6-9A

CHEMICALS RETAINED AS COPCS
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Parameter	Surface Soil		Subsurface Soil		Groundwater	
	Direct Contact	Soil to Groundwater	Direct Contact	Soil to Groundwater	Direct Contact	Vapor Intrusion
Volatile Organic Compounds						
1,2,4-Trichlorobenzene		X			X	X
1,2-Dichlorobenzene					X	
1,3-Dichlorobenzene					X	
1,4-Dichlorobenzene		X			X	X
Benzene					X	X
Chlorobenzene					X	X
Ethylbenzene		X			X	X
Tetrachloroethene						X
Total Xylenes					X	X
Semivolatile Organic Compounds						
1,1-Biphenyl					X	X
1-Methylnaphthalene		X				
2-Methylnaphthalene					X	
Benzo(a)anthracene	X	X				
Benzo(a)pyrene Equivalents	X		X		X	
Benzo(a)pyrene	X	X		X		
Benzo(b)fluoranthene	X	X				
Benzo(k)fluoranthene		X				
Bis(2-ethylhexyl)phthalate		X			X	
Dibenzo(a,h)anthracene	X	X			X	
Indeno(1,2,3-cd)pyrene	X	X			X	
Naphthalene		X		X	X	X
Dibenzofuran					X	
Pesticides/PCBs						
4,4'-DDD	X	X		X	X	
4,4'-DDE	X	X		X	X	
4,4'-DDT	X	X	X	X	X	
Aldrin		X			X	
alpha-BHC	X	X		X	X	
alpha-Chlordane		X			X	
beta-BHC	X	X		X	X	
delta-BHC	X	X	X	X	X	
Dieldrin		X		X	X	
Endrin					X	
Endrin Ketone					X	
gamma-BHC (Lindane)		X		X	X	
gamma-Chlordane		X			X	
Heptachlor		X			X	
Heptachlor Epoxide		X		X	X	
Inorganics						
Aluminum					X	
Antimony	X	X		X	X	
Arsenic	X	X			X	
Barium		X				
Beryllium					X	
Chromium	X	X	X	X	X	
Cobalt	X	X			X	
Copper		X				
Iron	X	X		X	X	
Lead	X	X			X	
Manganese		X			X	
Mercury		X			X	
Nickel					X	
Selenium		X				
Thallium	X	X			X	
Vanadium					X	
Zinc		X				

X - Indicates chemical was retained as a COPC.
RAGS Part D tables are included in Appendix G.

TABLE 6-10

SELECTION OF EXPOSURE PATHWAYS
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface Soil	Surface Soil	Site 27	Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with surface soil during excavation activities.
				Trench Workers	Adult	Ingestion Dermal	Quant Quant	Trench workers may have contact with surface soil during excavation activities.
				Motor Transport Facility Workers	Adult	Ingestion Dermal	None None	Entire site will be paved, therefore there are no potential exposures pathways for soil.
				Default Industrial Workers	Adult	Ingestion Dermal	Quant Quant	Although this scenario is not likely based on planned future site use, this scenario was included to aid in future risk management decisions.
				Residents	Child	Ingestion Dermal	Quant Quant	Although a future residential scenario is considered unlikely at the site, this scenario was included to aid in future risk management decisions.
					Adult	Ingestion Dermal	Quant Quant	
		Air	Site 27	Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to fugitive dust and volatile emissions during construction activities.
				Trench Workers	Adult	Inhalation	Quant	Trench workers may be exposed to fugitive dust and volatile emissions during construction activities.
				Motor Transport Facility Workers	Adult	Inhalation	None	Entire site will be paved, therefore there are no potential exposures pathways for soil.
				Default Industrial Workers	Adult	Inhalation	Quant	Although this scenario is not likely based on planned future site use, this scenario was included to aid in future risk management decisions.
				Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site, this scenario was included to aid in future risk management decisions.
					Adult	Inhalation	Quant	
	Subsurface Soil	Subsurface Soil	Site 27	Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Trench Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Motor Transport Facility Workers	Adult	Ingestion Dermal	None None	Entire site will be paved, therefore there are no potential exposures pathways for soil.
				Default Industrial Workers	Adult	Ingestion Dermal	Quant Quant	Although this scenario is not likely based on planned future site use, this scenario was included to aid in future risk management decisions.
				Residents	Child	Ingestion Dermal	Quant Quant	Although a future residential scenario is considered unlikely at the site, this scenario was included to aid in future risk management decisions.
					Adult	Ingestion Dermal	Quant Quant	
		Air	Site 27	Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to fugitive dust and volatile emissions during construction activities.
				Trench Workers	Adult	Inhalation	Quant	Trench workers may be exposed to fugitive dust and volatile emissions during construction activities.
				Motor Transport Facility Workers	Adult	Inhalation	None	Entire site will be paved, therefore there are no potential exposures pathways for soil.
				Default Industrial Workers	Adult	Inhalation	Quant	Although this scenario is not likely based on planned future site use, this scenario was included to aid in future risk management decisions.

TABLE 6-10

SELECTION OF EXPOSURE PATHWAYS
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Subsurface Soil	Air	Site 27	Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site, this scenario was included to aid in future risk management decisions.
					Adult	Inhalation	Quant	
	Groundwater	Groundwater	Site 27	Construction Workers	Adult	Ingestion Dermal	None Quant	Construction workers may have contact with groundwater during excavation activities.
				Trench Workers	Adult	Ingestion Dermal	None Quant	Trench workers may have contact with groundwater during excavation activities.
				Motor Transport Facility Workers	Adult	Ingestion Dermal	None None	Motor transport facility workers are not expected to have contact with groundwater.
				Default Industrial Workers	Adult	Ingestion Dermal	None None	Industrial workers are not expected to have contact with groundwater.
				Residents	Child	Ingestion Dermal	Quant Quant	Although a future residential scenario is considered unlikely at the site, this scenario was included to aid in future risk management decisions.
					Adult	Ingestion Dermal	Quant Quant	
		Air	Site 27	Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to COPCs that have volatilized from groundwater during excavation activities.
				Trench Workers	Adult	Inhalation	Quant	Trench workers may be exposed to COPCs that have volatilized from groundwater during excavation activities.
				Motor Transport Facility Workers	Adult	Inhalation	None	Motor transport facility are not expected to be exposed to COPCs that have volatilized from groundwater.
				Default Industrial Workers	Adult	Inhalation	None	Industrial workers may be exposed to COPCs that have volatilized from groundwater and migrated through building foundations into indoor air
				Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site, this scenario was included to aid in future risk management decisions.
					Adult	Inhalation	Quant	
	`		Vapor Intrusion	Motor Transport Facility Workers	Adult	Inhalation	None	The Motor Transportation Facility will have a vapor barrier therefore this is not a complete exposure pathway.
	`			Default Industrial Workers	Adult	Inhalation	Qual	Industrial workers may be exposed to COPCs that have volatilized from groundwater and migrated through building foundations into indoor air
				Residents	Child	Inhalation	Quant	Although a future residential scenario is considered unlikely at the site, this scenario was included to aid in future risk management decisions.
					Adult	Inhalation	Quant	

Notes:
Quant - Quantitative.
Qual - Qualitative.

TABLE 6-11

SELECTION OF EXPOSURE PATHWAYS
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Surface Soil	Surface Soil	Site 55	Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with surface soil during excavation activities.
				Maintenance Workers	Adult	Ingestion Dermal	Quant Quant	Maintenance workers may contact surface soil during normal work activities.
				Industrial Workers	Adult	Ingestion Dermal	Quant Quant	Industrial workers may contact surface soil during normal work activities.
				Adult Visitors	Adult	Ingestion Dermal	Quant Quant	Adult visitors users may contact surface soil while at the site.
		Air	Site 55	Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to fugitive dust and volatile emissions during construction activities.
				Maintenance Workers	Adult	Inhalation	Quant	Maintenance workers may be exposed to fugitive dust and volatile emissions from surface soil.
				Industrial Workers	Adult	Inhalation	Quant	Industrial workers may be exposed to fugitive dust and volatile emissions from surface soil.
				Adult Visitors	Adult	Inhalation	Quant	Adult visitors may be exposed to fugitive dust and volatile emissions from surface soil.
	Subsurface Soil	Subsurface Soil	Site 55	Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Maintenance Workers	Adult	Ingestion Dermal	Quant Quant	Although exposures to subsurface soil by maintenance workers are considered unlikely at the site, this scenario was included to aid in future risk management decisions.
				Industrial Workers	Adult	Ingestion Dermal	Quant Quant	Although exposures to subsurface soil by industrial workers are considered unlikely at the site, this scenario was included to aid in future risk management decisions.
				Adult Visitors	Adult	Ingestion Dermal	Quant Quant	Although exposures to subsurface soil by adult visitors are considered unlikely at the site, this scenario was included to aid in future risk management decisions.
		Air	Site 55	Construction Workers	Adult	Inhalation	Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Maintenance Workers	Adult	Inhalation	Quant	Although exposures to subsurface soil by maintenance workers are considered unlikely at the site, this scenario was included to aid in future risk management decisions.
				Industrial Workers	Adult	Inhalation	Quant	Although exposures to subsurface soil by industrial workers are considered unlikely at the site, this scenario was included to aid in future risk management decisions.
				Adult Visitors	Adult	Inhalation	Quant	Although exposures to subsurface soil by adult visitors are considered unlikely at the site, this scenario was included to aid in future risk management decisions.
	Groundwater	Groundwater	Site 55	Construction Workers	Adult	Ingestion Dermal	None Quant	Construction workers may have contact with groundwater during excavation activities.
				Maintenance Workers	Adult	Ingestion Dermal	None None	Maintenance workers are not expected to have contact with groundwater.
				Industrial Workers	Adult	Ingestion Dermal	None None	Industrial workers are not expected to have contact with groundwater.
				Adult Visitors	Adult	Ingestion Dermal	None None	Adult visitors are not expected to be exposed to groundwater.
		Air	Site 55	Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to COPCs that have volatilized from groundwater during excavation activities.
				Maintenance Workers	Adult	Inhalation	None	Maintenance workers are not expected to be exposed to COPCs that have volatilized from groundwater.

TABLE 6-11

SELECTION OF EXPOSURE PATHWAYS
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Groundwater	Air	Site 55	Industrial Workers	Adult	Inhalation	None	Industrial workers are not expected to be exposed to COPCs that have volatilized from groundwater.
				Adult Visitors	Adult	Inhalation	None	Adult visitors are not expected to be exposed to COPCs that have volatilized from groundwater.
	`		Vapor Intrusion	Industrial Worker	Adult	Inhalation	Quant	Industrial workers may be exposed to COPCs that have volatilized from groundwater and migrated through building foundations into indoor air
Future	Surface Soil	Surface Soil	Site 55	Residents	Child	Ingestion Dermal	Quant Quant	Although a future residential scenario is considered unlikely at the site, this scenario was included to aid in future risk management decisions.
					Adult	Ingestion Dermal	Quant Quant	
		Air	Site 55	Residents	Child	Inhalation	Quant	
					Adult	Inhalation	Quant	
	Subsurface Soil	Subsurface Soil	Site 55	Residents	Child	Ingestion Dermal	Quant Quant	
					Adult	Ingestion Dermal	Quant Quant	
		Air	Site 55	Residents	Child	Inhalation	Quant	
					Adult	Inhalation	Quant	
	Groundwater	Groundwater	Site 55	Residents	Child	Ingestion Dermal	Quant Quant	
					Adult	Ingestion Dermal	Quant Quant	
		Air	Site 55	Residents	Child	Inhalation	Quant	
					Adult	Inhalation	Quant	
			Vapor Intrusion	Residents	Child	Inhalation	Quant	
					Adult	Inhalation	Quant	

Notes:
Quant - Quantitative.
Qual - Qualitative.

TABLE 6-12

RECEPTORS AND EXPOSURE ROUTES FOR QUANTITATIVE EVALUATION
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Receptors	Exposure Routes
Trench Workers (current/future land use)	• Soil dermal contact (surface/subsurface) • Soil incidental ingestion (surface/subsurface) • Inhalation of air/dust/emissions (surface/subsurface) • Groundwater dermal contact (during excavation) • Groundwater inhalation of volatile organics (during excavation)
Construction Workers (current/future land use)	• Soil dermal contact (surface/subsurface) • Soil incidental ingestion (surface/subsurface) • Inhalation of air/dust/emissions (surface/subsurface) • Groundwater dermal contact (during excavation) • Groundwater inhalation of volatile organics (during excavation)
Hypothetical Industrial Workers (future land use)	• Soil dermal contact (surface/subsurface) • Soil ingestion (surface/subsurface) • Inhalation of air/dust/emissions (surface/subsurface soil)
Hypothetical Residents (children and adults) (future land use)	• Soil dermal contact (surface/subsurface) • Soil ingestion (surface/subsurface) • Inhalation of air/dust/emissions (surface/subsurface soil) • Groundwater Ingestion • Groundwater dermal contact (showering/bathing) • Inhalation of volatiles in groundwater (showering/bathing) • Inhalation of vapors intruding into a building from the groundwater

TABLE 6-13

RECEPTORS AND EXPOSURE ROUTES FOR QUANTITATIVE EVALUATION
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Receptors	Exposure Routes
Construction Workers (current/future land use)	• Soil dermal contact (surface/subsurface) • Soil incidental ingestion (surface/subsurface) • Inhalation of air/dust/emissions (surface/subsurface) • Groundwater dermal contact (during excavation) • Groundwater inhalation of volatile organics (during excavation)
Maintenance Workers (future land use)	• Soil dermal contact (surface/subsurface[1]) • Soil ingestion (surface/subsurface[1]) • Inhalation of air/dust/emissions (surface/subsurface soil[1])
Industrial Workers (future land use)	• Soil dermal contact (surface/subsurface[1]) • Soil ingestion (surface/subsurface[1]) • Inhalation of air/dust/emissions (surface/subsurface soil[1])
Adult Visitor (current/future land use)	• Soil dermal contact (surface/subsurface[1]) • Soil ingestion (surface/subsurface[1]) • Inhalation of air/dust/emissions (surface/subsurface soil)[1]
Hypothetical Residents (children and adults) (future land use)	• Soil dermal contact (surface/subsurface[1]) • Soil ingestion (surface/subsurface[1]) • Inhalation of air/dust/emissions (surface/subsurface soil)[1] • Groundwater Ingestion • Groundwater dermal contact (showering/bathing) • Inhalation of volatiles in groundwater (showering/bathing) • Inhalation of vapors intruding into a building from the groundwater

1 – These receptors are not expected to be exposed to subsurface soil, but exposure to subsurface was evaluated to aid in risk management decisions.

TABLE 6-14

EXPOSURE POINT CONCENTRATIONS
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Parameter	Site 27			Site 55		
	Surface Soil (mg/kg)	Subsurface Soil (mg/kg)	Groundwater (ug/L)	Surface Soil (mg/kg)	Subsurface Soil (mg/kg)	Groundwater (ug/L)
Volatile Organic Compounds						
1,2,4-Trichlorobenzene	NA	NA	6.4[1]	NA	NA	9[1]
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	33[1]
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	1[1]
1,4-Dichlorobenzene	NA	NA	69[1]	NA	NA	82[1]
Benzene	NA	NA	190[1]	NA	NA	230[1]
Chlorobenzene	NA	NA	2000[1]	NA	NA	2500[1]
Chloroform	NA	NA	0.73[1]	NA	NA	NA
Ethylbenzene	NA	NA	42[1]	NA	NA	120[1]
Tetrachloroethene	NA	NA	NA	NA	NA	0.6[1]
Total Xylenes	NA	NA	NA	NA	NA	430[1]
Semivolatile Organic Compounds						
1,1-Biphenyl	NA	NA	6.4[1]	NA	NA	12[1]
2-Methylnaphthalene	NA	NA	NA	NA	NA	240[1]
Benzo(a)pyrene Equivalents	18.8[3]	0.0082[4]	NA	0.29[5]	0.018[1]	0.26[1]
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	3.2[1]
Dibenzofuran	NA	NA	2.6[1]	NA	NA	4.5[1]
Naphthalene	NA	NA	24[1]	NA	NA	250[1]
Pesticides/PCBs						
Aroclor-1260	0.51[1]	NA	NA	NA	NA	NA
4,4'-DDD	NA	187[3]	2.4[1]	134[3]	NA	3400[1]
4,4'-DDE	NA	NA	NA	14.2[3]	NA	36[1]
4,4'-DDT	NA	NA	0.43[1]	104[8]	1.9[3]	1600[1]
Aldrin	NA	NA	0.011[1]	NA	NA	0.011[1]
alpha-BHC	NA	10.1[3]	46[1]	0.012[9]	NA	470[1]
alpha-Chlordane	NA	NA	NA	NA	NA	0.3[1]
beta-BHC	NA	NA	12[1]	0.58[3]	NA	130[1]
delta-BHC	NA	13.8[3]	180[1]	0.022[6]	0.063[3]	700[1]
Dieldrin	NA	NA	0.0076[1]	NA	NA	0.013[1]
Endrin	NA	NA	NA	NA	NA	2.2[1]
Endrin Ketone	NA	NA	NA	NA	NA	0.78[1]
gamma-BHC (Lindane)	NA	NA	21[1]	NA	NA	540[1]
gamma-Chlordane	NA	NA	NA	NA	NA	1.6[1]
Heptachlor	NA	NA	0.0029[1]	NA	NA	0.098[1]
Heptachlor Epoxide	NA	NA	0.034[1]	NA	NA	0.31[1]
Inorganics						
Aluminum	5,000[10]	11,200[5]	4890[1]	NA	NA	64,800[1]
Antimony	NA	NA	NA	1.5[11]	NA	29[1]
Arsenic	2.4[9]	3.9[4]	32.7[1]	2.7[7]	NA	125[1]
Beryllium	NA	NA	4.16[1]	NA	NA	7.4[1]
Chromium	5.8[5]	18[12]	14.7[1]	4.6[5]	3.2[10]	146[1]
Cobalt	NA	NA	NA	0.63[4]	NA	46.4[1]
Iron	3,871[12]	16,100[13]	21,000[1]	2,803[14]	NA	70,600[1]
Lead	NA	NA	NA	239[2]	NA	4.6[2]
Manganese	63.8[5]	NA	408[1]	NA	NA	461[1]
Nickel	NA	NA	NA	NA	NA	70.4[1]
Thallium	0.88[1]	4.51[1]	NA	0.3[1]	NA	3.11[1]
Vanadium	NA	27.1[13]	10.7[1]	NA	NA	200[1]

TABLE 6-14

EXPOSURE POINT CONCENTRATIONS
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Notes:
NA - Not applicable. Not a COPC for this medium.
1 - Maximum Detected Concentration
2 - Arithmetic Mean Concentration
3 - 99% KM (Chebyshev) UCL
4 - 95% KM (t) UCL
5 - 95% Approximate Gamma UCL
6 - 97.5% KM (Chebyshev) UCL
7 - 95% KM(BCA)
8 - 99% Chebyshev(Mean, Sd)
9 - 95% KM (Chebyshev) UCL
10 - 95% Student's-t UCL
11 - 95% KM (Percentile Bootstrap) UCL
12 - 95% H-UCL
13 - 95% Chebyshev(Mean, Sd)
14 - 95% Modified-t UCL

Risk Assessment Guidance for Superfund (RAGS) Part D tables for the exposure point concentrations and ProUCL printouts are included in Appendix G.
See ProUCL guidance (USEPA, May 2010) for statistics listed above.

TABLE 6-15

SUMMARY OF EXPOSURE INPUT PARAMETERS
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Parameter Code	Exposure Parameter	Trench Worker	Construction Worker	Maintenance Worker	Industrial Worker	Adult Visitor	Child Resident	Adult Resident
All Exposures								
ED	Exposure Duration (years)	1[1]	1[1]	25[2]	25[2]	25[2]	6[3]	24[3]
BW	Body Weight (kg)	70[4]	70[4]	70[4]	70[4]	70[4]	15[4]	70[4]
AT-N	Averaging Time (Non-Cancer) (days)	42[5]	365[4]	9,125[4]	9,125[4]	9,125[4]	2,190[4]	8,760[4]
AT-C	Averaging Time (Cancer) (days)	25,550[4]	25,550[4]	25,550[4]	25,550[4]	25,550[4]	25,550[4]	25,550[4]
Incidental Ingestion/Dermal Contact with Soil								
C_{soil}	Chemical concentration in soil (mg/kg)	Maximum or 95% UCL[6]	Maximum or 95% UCL[6]	Maximum or 95% UCL[6]	Maximum or 95% UCL[6]	Maximum or 95% UCL[6]	Maximum or 95% UCL[6]	Maximum or 95% UCL[6]
IR-S	Ingestion Rate (mg/day)	330[2]	330[2]	100[2]	100[2]	50[4]	200[4]	100[4]
EF	Exposure Frequency (days/year)	30[5]	210[1]	50[7]	250[2]	50[7]	350[3]	350[3]
FI	Fraction Ingested (unitless)	1[2]	1[2]	1[2]	1[2]	1[2]	1[3]	1[3]
SA	Skin Surface Available for Contact (cm^2)	3,300[2]	3,300[2]	3,300[2]	3,300[2]	3,300[2]	2,800[8]	5,700[8]
SSAF	Soil to Skin Adherence Factor (mg/cm^2/event)	0.3[2]	0.3[2]	0.2[2]	0.2[2]	0.07[8]	0.2[8]	0.07[8]
EV	Events Frequency (events/day)	1	1	1	1	1	1	1
DABS	Absorption Factor (unitless)	chemical-specific[8]	chemical-specific[8]	chemical-specific[8]	chemical-specific[8]	chemical-specific[8]	chemical-specific[8]	chemical-specific[8]
CF	Conversion Factor (kg/mg)	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06
Inhalation Fugitive Dust/Volatile Emissions from Soil								
C_{air}	Chemical concentration in air (mg/m^3)	calculated[2]	calculated[2]	calculated[2]	calculated[2]	calculated[2]	calculated[2]	calculated[2]
ET	Exposure Time (hours/day)	8[9]	8[9]	8[9]	8[9]	1[10]	24[4]	24[4]
EF	Exposure Frequency (days/year)	30[5]	210[1]	50[7]	250[2]	50[7]	350[3]	350[3]
PEF	Particulate Emission Factor (m^3/kg)	1.27E+06[2]	1.27E+06[2]	9.63E+09[11]	9.63E+09[11]	9.63E+09[11]	9.63E+09[11]	9.63E+09[11]
Ingestion/Dermal Contact with Groundwater								
C_{gw}	Chemical concentration in groundwater (µg/L)	Average[12]	Average[12]	NA	NA	NA	Average[12]	Average[12]
IR	Ingestion Rate (L/day)	NA	NA	NA	NA	NA	1.0[3]	2.0[3]
EF	Exposure Frequency (days/year)	30[5]	30[1]	NA	NA	NA	350[3]	350[3]
ET	Exposure Time (hours/day)	8[1]	4[1]	NA	NA	NA	1[8]	0.58[8]
EV	Event Frequency (events/day)	1[2]	1[2]	NA	NA	NA	1[8]	1[8]
SA	Skin Surface Available for Contact (cm^2)	3,300[2]	3,300[2]	NA	NA	NA	6,600[8]	18,000[8]
	Kp (cm/hour), t* (hour/event), τ (hour), and B (unitless)	chemical-specific[8]	chemical-specific[8]	NA	NA	NA	chemical-specific[8]	chemical-specific[8]
Inhalation of Volatile Emissions from Groundwater								
C_{air}	Chemical concentration in air (mg/m^3)	calculated[13]	calculated[13]	NA	NA	NA	NA	NA
ET	Exposure Time (hours/day)	8[1]	4[1]	NA	NA	NA	NA	NA
EF	Exposure Frequency (days/year)	30[5]	30[5]	NA	NA	NA	NA	NA
VF	Volatilization Factor (L/m^3)	Calculated[13]	Calculated[13]	NA	NA	NA	NA	NA

TABLE 6-15

SUMMARY OF EXPOSURE INPUT PARAMETERS
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

1 - Development of Site 27 is scheduled to take place over seven months. Exposures to groundwater are assumed to occur for 4 hours a day for 30 days.
2 - USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9365.4-24.
3 - USEPA, 1991: Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. OSWER Directive 9285.6-03.
4 - USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.
5 - Under current site development plans the trench worker is anticipated to be at Site 27 for approximately six weeks.
6 - USEPA, 2002. Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.
7 - Assumes one day a week for 50 weeks a year.
8 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. PA/540/R/99/005.
9 - Assume an 8-hour work shift.
10 - Professional judgment.
11 - USEPA, 2011: Soil Screening Guidance calculation Internet site at http://rais.ornl.gov/epa/ssl1.shtml. Site-specific values for Charleston, South Carolina.
12 - USEPA. 2000. Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment Bulletins.
13 - VDEQ September 2008. Virginia Department of Environmental Quality (VDEQ, online - http://www.deq.state.va.us/vrprisk/raguide.html).

TABLE 6-16

INTERMEDIATE VARIABLES FOR CALCULATING DERMAL ABSORPTION (EVENT)
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Chemical of Potential Concern	Media	Dermal Absorption Fraction (soil)	FA	Kp		T(event)		Tau		T*		B
			Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Volatile Organic Compounds												
1,2,4-Trichlorobenzene	Groundwater	0.01	1	6.6E-02	cm/hr	(1)	hr	1.1E+00	hr	2.7E+00	hr	3.4E-01
1,2-Dichlorobenzene	Groundwater	0.01	1	4.13E-02	cm/hr	(1)	hr	7.11E-01	hr	1.71E+00	hr	1.93E-01
1,3-Dichlorobenzene	Groundwater	0.01	1	5.8E-02	cm/hr	(1)	hr	7.1E-01	hr	1.7E+00	hr	2.7E-01
1,4-Dichlorobenzene	Groundwater	0.01	1	4.2E-02	cm/hr	(1)	hr	7.1E-01	hr	1.7E+00	hr	2.0E-01
Benzene	Groundwater	0.01	1	1.5E-02	cm/hr	(1)	hr	2.9E-01	hr	7.0E-01	hr	5.1E-02
Chlorobenzene	Groundwater	0.01	1	2.8E-02	cm/hr	(1)	hr	4.6E-01	hr	1.1E+00	hr	1.2E-01
Chloroform	Groundwater	0.01	1	6.8E-03	cm/hr	(1)	hr	5.0E-01	hr	1.2E+00	hr	2.9E-02
Ethylbenzene	Groundwater	0.01	1	4.9E-02	cm/hr	(1)	hr	4.2E-01	hr	1.0E+00	hr	2.0E-01
Tetrachloroethene	Groundwater	0.01	1	3.3E-02	cm/hr	(1)	hr	9.1E-01	hr	2.2E+00	hr	1.7E-01
Total Xylenes	Groundwater	0.01	1	4.6E-02	cm/hr	(1)	hr	4.1E-01	hr	9.9E-01	hr	1.8E-01
Semivolatile Organic Compounds												
1,1-Biphenyl	Groundwater	0.1	1	9.2E-02	cm/hr	(1)	hr	7.7E-01	hr	1.8E+00	hr	4.4E-01
2-Methylnaphthalene	Groundwater	0.1	1	8.9E-02	cm/hr	(1)	hr	6.6E-01	hr	1.6E+00	hr	4.1E-01
Benzo(a)pyrene	Soil, Groundwater	0.13	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Bis(2-ethylhexyl)phthalate	Groundwater	0.1	0.8	2.49E-02	cm/hr	(1)	hr	1.66E+01	hr	3.99E+01	hr	1.90E-01
Dibenzofuran	Groundwater	0.1	1	9.5E-02	cm/hr	(1)	hr	9.2E-01	hr	2.2E+00	hr	4.7E-01
Naphthalene	Groundwater	0.13	1	4.7E-02	cm/hr	(1)	hr	5.6E-01	hr	1.3E+00	hr	2.0E-01
Pesticides/PCBs												
Aroclor-1260	Soil	0.14	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
4,4'-DDD	Soil, Groundwater	0.03	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
4,4'-DDE	Soil, Groundwater	0.03	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
4,4'-DDT	Soil, Groundwater	0.03	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)	NA(2)
Aldrin	Groundwater	0.1	1	1.4E-03	cm/hr	(1)	hr	1.2E+01	hr	2.9E+01	hr	1.0E-02
alpha-BHC	Soil, Groundwater	0.1	1	2.0E-02	cm/hr	(1)	hr	4.5E+00	hr	1.1E+01	hr	1.3E-01
alpha-Chlordane	Groundwater	0.04	0.7	3.4E-02	cm/hr	(1)	hr	2.1E+01	hr	5.1E+01	hr	2.6E-01
beta-BHC	Soil, Groundwater	0.1	1	2.0E-02	cm/hr	(1)	hr	4.5E+00	hr	1.1E+01	hr	1.3E-01
delta-BHC	Soil, Groundwater	0.1	1	2.0E-02	cm/hr	(1)	hr	4.5E+00	hr	1.1E+01	hr	1.3E-01
Dieldrin	Groundwater	0.1	0.8	1.2E-02	cm/hr	(1)	hr	1.5E+01	hr	3.5E+01	hr	9.2E-02
Endrin	Groundwater	0.1	0.8	1.2E-02	cm/hr	(1)	hr	1.5E+01	hr	3.5E+01	hr	9.2E-02
Endrin Ketone	Groundwater	0.1	0.8	2.29E-02	cm/hr	(1)	hr	1.43E+01	hr	3.43E+01	hr	1.72E-01
gamma-BHC (Lindane)	Groundwater	0.04	0.9	1.1E-02	cm/hr	(1)	hr	4.6E+00	hr	1.1E+01	hr	7.1E-02
gamma-Chlordane	Groundwater	0.04	0.7	3.4E-02	cm/hr	(1)	hr	2.1E+01	hr	5.1E+01	hr	2.6E-01
Heptachlor	Groundwater	0.1	0.8	8.6E-03	cm/hr	(1)	hr	1.3E+01	hr	3.2E+01	hr	6.4E-02
Heptachlor Epoxide	Groundwater	0.1	1	2.0E-02	cm/hr	(1)	hr	1.6E+01	hr	3.8E+01	hr	1.5E-01
Inorganics												
Aluminum	Soil, Groundwater	0.001	1	1.0E-03	cm/hr	(1)	hr	NA	NA	NA	NA	NA
Antimony	Soil, Groundwater	0.001	1	1.0E-03	cm/hr	(1)	hr	NA	NA	NA	NA	NA
Arsenic	Soil, Groundwater	0.03	1	1.0E-03	cm/hr	(1)	hr	NA	NA	NA	NA	NA
Barium	Soil	0.001	1	1.0E-03	cm/hr	(1)	hr	NA	NA	NA	NA	NA
Beryllium	Groundwater	0.001	1	1.0E-03	cm/hr	(1)	hr	NA	NA	NA	NA	NA
Chromium	Soil, Groundwater	0.001	1	2.0E-03	cm/hr	(1)	hr	NA	NA	NA	NA	NA
Cobalt	Soil, Groundwater	0.001	1	4.0E-04	cm/hr	(1)	hr	NA	NA	NA	NA	NA
Copper	Soil	0.001	1	1.0E-03	cm/hr	(1)	hr	NA	NA	NA	NA	NA
Iron	Soil, Groundwater	0.001	1	1.0E-03	cm/hr	(1)	hr	NA	NA	NA	NA	NA
Manganese	Soil, Groundwater	0.001	1	1.0E-03	cm/hr	(1)	hr	NA	NA	NA	NA	NA
Mercury	Groundwater	0.001	1	1.0E-03	cm/hr	NA	NA	NA	NA	NA	NA	NA
Nickel	Groundwater	0.001	1	2.0E-04	cm/hr	NA	NA	NA	NA	NA	NA	NA
Thallium	Soil, Groundwater	0.001	1	1.0E-03	cm/hr	(1)	hr	NA	NA	NA	NA	NA
Vanadium	Soil, Groundwater	0.001	1	1.0E-03	cm/hr	(1)	hr	NA	NA	NA	NA	NA
Zinc	Soil	0.001	1	6.0E-04	cm/hr	NA	hr	NA	NA	NA	NA	NA

Notes:
All values from EPA's Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final, July 2004.
1 - T(event) is 4 hours for the construction worker; 8 hours for the trench worker, 1 hour for hypothetical child residents and 0.58 hours for hypothetical and adult residents.
2 - RAGS Part E recommends not attempting to quantify risk because contaminants are outside the effective predictive domain of the model.
FA = Fraction Absorbed Water T* = Time to Reach Steady-State

TABLE 6-16

INTERMEDIATE VARIABLES FOR CALCULATING DERMAL ABSORPTION (EVENT)
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Kp = Dermal Permeability Coefficient of Compound in Water
T(event) = Event Duration
Tau = Lag Time
B = Dimensionless Ratio of the Permeability Coefficient of a Compound Through the Stratum Corneum Relative to its Permeability Coefficient Across the Viable Epidermis
NA = Not applicable.

TABLE 6-17

CHEMICAL PROPERTIES FOR VOLATILIZATION FROM SOIL/GROUNDWATER TO OUTDOOR AIR MODELS
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Chemical	Molecular Weight (g/mole)	Organic Carbon Partition Coefficient (cm^3/g)	Air Diffusivity (cm^2/sec)	Water Diffusivity (cm^2/sec)	Solubility Limit (mg/L)	Henry's Law Constant	
						(Dimensionless)	(atm-m^3/mol)
1,2,4-Trichlorobenzene	1.81E+02	1.36E+03	3.96E-02	8.40E-06	4.90E+01	5.81E-02	1.42E-03
1,2-Dichlorobenzene	1.47E+02	3.83E+02	5.62E-02	8.92E-06	1.56E+02	7.85E-02	1.92E-03
1,3-Dichlorobenzene(1)	1.47E+02	3.75E+02	5.58E-02	8.85E-06	1.25E+02	1.08E-01	2.63E-03
1,4-Dichlorobenzene	1.47E+02	3.75E+02	5.50E-02	8.68E-06	8.13E+01	9.85E-02	2.41E-03
Benzene	7.81E+01	1.46E+02	8.95E-02	1.03E-05	1.79E+03	2.27E-01	5.55E-03
Chlorobenzene	1.13E+02	2.34E+02	7.21E-02	9.48E-06	4.98E+02	1.27E-01	3.11E-03
Chloroform	1.19E+02	3.18E+01	7.69E-02	1.09E-05	7.95E+03	1.50E-01	3.67E-03
Ethylbenzene	1.06E+02	4.46E+02	6.85E-02	8.46E-06	1.69E+02	3.22E-01	7.88E-03
Tetrachloroethene	1.66E+02	9.49E+01	5.05E-02	9.46E-06	2.06E+02	7.24E-01	1.77E-02
Total Xylenes	1.06E+02	3.83E+02	8.47E-02	9.90E-06	1.06E+02	2.12E-01	5.18E-03
2-Methylnaphthalene	1.42E+02	2.48E+03	5.24E-02	7.78E-06	2.46E+01	2.12E-02	5.18E-04
Benzo(a)pyrene	2.52E+02	5.87E+05	NV	NV	1.62E-03	1.87E-05	4.57E-07
Dibenzofuran	1.68E+02	9.16E+03	4.10E-02	7.38E-06	3.10E+00	8.71E-03	2.13E-04
Naphthalene	1.28E+02	1.54E+03	6.05E-02	8.38E-06	3.10E+01	1.80E-02	4.40E-04
Aroclor-1260	3.95E+02	3.50E+05	NV	NV	1.44E-02	1.37E-02	3.36E-04
4,4'-DDD	3.20E+02	1.18E+05	NV	NV	9.00E-02	2.70E-04	6.60E-06
4,4'-DDE	3.18E+02	1.18E+05	NV	NV	4.00E-02	1.70E-03	4.16E-05
4,4'-DDT	3.54E+02	1.69E+05	NV	NV	5.50E-03	3.40E-04	8.32E-06
Aldrin	3.65E+02	8.20E+04	NV	NV	1.70E-02	1.80E-03	4.40E-05
alpha-BHC	2.91E+02	2.81E+03	NV	NV	2.00E+00	2.10E-04	5.14E-06
alpha-Chlordane(1)	4.10E+02	1.99E-03	NV	NV	5.60E-02	1.99E-03	4.85E-05
beta-BHC	2.91E+02	2.81E+03	NV	NV	2.40E-01	2.10E-04	5.14E-06
delta-BHC(1)	2.91E+02	2.81E+03	NV	NV	3.14E+01	2.10E-04	5.12E-06
Dieldrin	3.81E+02	2.01E+04	NV	NV	1.95E-01	4.09E-04	1.00E-05
Endrin	3.81E+02	2.01E+04	NV	NV	2.50E-01	4.09E-04	1.00E-05
gamma-BHC (Lindane)	2.91E+02	2.81E+03	NV	NV	7.30E+00	2.10E-04	5.14E-06
gamma-Chlordane(1)	4.10E+02	1.99E-03	NV	NV	5.60E-02	1.99E-03	4.85E-05
Heptachlor	3.73E+02	4.13E+04	NV	NV	1.80E-01	1.20E-02	2.94E-04
Heptachlor Epoxide	3.89E+02	1.01E+04	NV	NV	2.00E-01	8.59E-04	2.10E-05

Source:
USEPA, 2011: USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November.
1 - Values from Risk Assessment Information System Internet site (http://rais.ornl.gov/).
NV - No value available.

TABLE 6-18
INPUT PARAMETERS FOR VAPOR INTRUSION MODEL
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Parameter	Definition	Value	Reference
T_S	Average groundwater temperature (^oC)	20	Site-specific (USEPA, 2004)
L_F	Depth below grade to bottom of enclosed floor space (cm)	15	Default(1)
L_{WT}	Depth below grade to water table (cm)	210	Site-specific
h_A	Thickness of soil stratum A (cm)	210	Site-specific
- -	Stratum A SCS soil type	LS	Site-specific
ρ_b^A	Stratum A soil dry bulk density (g/cm^3)	1.62	Default
n^A	soil total porosity (unitless)	0.39	Default
θ_W^A	Stratum A soil water-filled porosity (cm^3/cm^3)	0.076	Default
AT_C	Average time for carcinogens (years)	70	Default
AT_N	Average time for noncarcinogens (years)	30	Default
ED	Exposure duration (years)	30	Default
EF	Exposure Frequency (days/year)	350	Default

Notes:
USEPA, 2004: User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings.
1 - Assumes slab-on-grade construction.

TABLE 6-19
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, 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) (MM/DD/YYYY)
Volatile Organic Compounds										
1,2,4-Trichlorobenzene	Subchronic	9.0E-02	mg/kg/day	1	9.0E-02	mg/kg/day	Liver	100/1	PPRTV	6/16/2009
	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Kidney	1000/1	IRIS	4/19/2012
1,2-Dichlorobenzene	Subchronic	6.0E-01	mg/kg/day	1	6.0E-01	mg/kg/day	Liver	100/1	ATSDR	7/2006
	Chronic	9.0E-02	mg/kg/day	1	9.0E-02	mg/kg/day	NA	1000/1	IRIS	4/19/2012
1,3-Dichlorobenzene[3]	Chronic	7.0E-02	mg/kg/day	1	7.0E-02	mg/kg/day	Liver	100/1	ATSDR	7/2006
1,4-Dichlorobenzene	Subchronic	7.0E-02	mg/kg/day	1	7.0E-02	mg/kg/day	Liver	100/1	ATSDR	7/2006
	Chronic	7.0E-02	mg/kg/day	1	7.0E-02	mg/kg/day	Liver	100/1	ATSDR	7/2006
Benzene	Subchronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Blood	100/1	PPRTV	9/29/2009
	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Blood	300/1	IRIS	4/19/2012
Chlorobenzene	Subchronic	7.0E-02	mg/kg/day	1	7.0E-02	mg/kg/day	Liver, Kidney	300/1	PPRTV	8/12/2006
	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Liver	1000/1	IRIS	4/19/2012
Chloroform	Subchronic	1.0E-01	mg/kg/day	1	1.0E-01	mg/kg/day	Liver	100/1	ATSDR	9/1997
	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Liver	100/1	IRIS	4/19/2012
Ethylbenzene	Chronic	1.0E-01	mg/kg/day	1	1.0E-01	mg/kg/day	Liver, Kidney	1000/1	IRIS	4/19/2012
Total Xylenes	Subchronic	4.0E-01	mg/kg/day	1	4.0E-01	mg/kg/day	Body Weight	1000/1	PPRTV	9/30/2009
	Chronic	2.0E-01	mg/kg/day	1	2.0E-01	mg/kg/day	Body Weight	1000/1	IRIS	4/19/2012
Semivolatile Organic Compounds										
1,1-Biphenyl	Subchronic	1.0E-01	mg/kg/day	1	1.0E-01	mg/kg/day	Developmental	100/1	PPRTV	4/4/2011
	Chronic	5.0E-02	mg/kg/day	1	5.0E-02	mg/kg/day	Kidney	100/10	IRIS	4/19/2012
2-Methylnaphthalene	Subchronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Respiratory	1000/1	PPRTV	9/18/2007
	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Respiratory	1000/1	IRIS	4/19/2012
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	Subchronic	1.0E-01	mg/kg/day	1	1.0E-01	mg/kg/day	Reproductive	100/1	ATSDR	9/2002
	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Liver	1000/1	IRIS	4/19/2012
Dibenzofuran	Subchronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Body Weight	3000/1	PPRTV	6/7/2011
	Chronic	1.0E-03	mg/kg/day	1	1.0E-03	mg/kg/day	Body Weight	NA	PPRTV	6/11/2007
Naphthalene	Subchronic	6.0E-01	mg/kg/day	1	6.0E-01	mg/kg/day	CNS	90/1	ATSDR	9/2005
	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Body Weight	3000/1	IRIS	4/19/2012
Pesticides/PCBs										
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	Subchronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Liver	100/1	ATSDR	9/2002
	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Liver	100/1	IRIS	4/19/2012
Aldrin	Subchronic	4.0E-05	mg/kg/day	1	4.0E-05	mg/kg/day	Kidney	1000/1	PPRTV	3/14/2005
	Chronic	3.0E-05	mg/kg/day	1	3.0E-05	mg/kg/day	Liver	1000/1	IRIS	4/19/2012
alpha-BHC	Chronic	8.0E-03	mg/kg/day	1	8.0E-03	mg/kg/day	Liver	100/1	ATSDR	9/2005
alpha-Chlordane[4]	Subchronic	6.0E-04	mg/kg/day	1	6.0E-04	mg/kg/day	Liver	100/1	ATSDR	5/1994
	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Liver	300/1	IRIS	4/19/2012
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC[5]	Chronic	8.0E-03	mg/kg/day	1	8.0E-03	mg/kg/day	Liver	100/1	ATSDR	9/2005
Dieldrin	Subchronic	1.0E-04	mg/kg/day	1	1.0E-04	mg/kg/day	CNS	100/1	ATSDR	9/2002
	Chronic	5.0E-05	mg/kg/day	1	5.0E-05	mg/kg/day	Liver	100/1	IRIS	4/19/2012
Endrin	Subchronic	2.0E-03	mg/kg/day	1	2.0E-03	mg/kg/day	CNS	100/1	ATSDR	8/1996
	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Liver	100/1	IRIS	4/19/2012
Endrin Ketone	Subchronic	2.0E-03	mg/kg/day	1	2.0E-03	mg/kg/day	CNS	100/1	ATSDR	8/1996
	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Liver	100/1	IRIS	4/19/2012
gamma-BHC (Lindane)	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Liver, Kidney	1000/1	IRIS	4/19/2012
gamma-Chlordane[4]	Subchronic	6.0E-04	mg/kg/day	1	6.0E-04	mg/kg/day	Liver	100/1	ATSDR	5/1994
	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Liver	300/1	IRIS	4/19/2012
Heptachlor	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Liver	300/1	IRIS	4/19/2012
Heptachlor Epoxide	Chronic	1.3E-05	mg/kg/day	1	1.3E-05	mg/kg/day	Liver	1000/1	IRIS	4/19/2012

TABLE 6-19
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, 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) (MM/DD/YYYY)
Inorganics										
Aluminum	Subchronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	CNS	30/1	ATSDR	9/2008
	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	CNS	100	PPRTV	10/23/2006
Antimony	Chronic	4.0E-04	mg/kg/day	0.15	6.0E-05	mg/kg/day	Blood	1000/1	IRIS	4/19/2012
Arsenic	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, CVS	3/1	IRIS	4/19/2012
Beryllium	Subchronic	5.0E-03	mg/kg/day	0.007	3.5E-05	mg/kg/day	None Reported	100/1	HEAST	9/1997
	Chronic	2.0E-03	mg/kg/day	0.007	1.4E-05	mg/kg/day	Gastrointestinal System	300/1	IRIS	4/19/2012
Chromium[6]	Subchronic	2.0E-02	mg/kg/day	0.025	5.0E-04	mg/kg/day	None Reported	100/3	HEAST	9/1997
	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	None Reported	300/3	IRIS	4/19/2012
Cobalt	Subchronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Thyroid	300/1	PPRTV	8/25/208
	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Thyroid	3000/1	PPRTV	8/25/208
Iron	Subchronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	Gastrointestinal System	1.5	PPRTV	9/11/2006
	Chronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	Gastrointestinal System	1.5	PPRTV	9/11/2006
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese[7]	Chronic	2.4E-02	mg/kg/day	0.04	9.6E-04	mg/kg/day	CNS	1	IRIS	4/19/2012
Mercury[8]	Subchronic	2.0E-03	mg/kg/day	0.07	1.4E-04	mg/kg/day	Kidney	100/1	ATSDR	3/1999
	Chronic	3.0E-04	mg/kg/day	0.07	2.1E-05	mg/kg/day	Autoimmune	1000/1	IRIS	4/19/2012
Nickel	Chronic	2.0E-02	mg/kg/day	0.04	8.0E-04	mg/kg/day	Body Weight	300/1	IRIS	4/19/2012
Thallium	Subchronic	4.0E-05	mg/kg/day	1	4.0E-05	mg/kg/day	Skin	1000/1	PPRTV	10/8/2010
	Chronic	1.0E-05	mg/kg/day	1	1.0E-05	mg/kg/day	Skin	3000/1	PPRTV	10/8/2010
Vanadium	Subchronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Blood	100	ATSDR	9/2009
	Chronic	5.0E-03	mg/kg/day	1	5.0E-03	mg/kg/day	Kidney	300	ORNL	11/2010

Notes:

1 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.

2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.

3 - Values are for 1,4-dichlorobenzene.

4 - Values are for chlordane.

5 - Values are for alpha-BHC.

6 - Values are for hexavalent chromium.

7 - Adjusted IRIS value in accordance with IRIS.

8 - Values are for mercuric chloride.

Definitions:

CNS = Central Nervous System

CVS = Cardiovascular system

HEAST = Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System

NA = Not Available.

ATSDR = Agency for Toxic Substances and Disease Registry.

ORNL = USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2011.

PPRTV = Provisional Peer Reviewed Toxicity Value.

TABLE 6-20
NON-CANCER TOXICITY DATA -- INHALATION
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, 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) (MM/DD/YYYY)
Volatile Organic Compounds									
1,2,4-Trichlorobenzene	Subchronic	2.0E-02	mg/m^3	5.7E-03	(mg/kg/day)	Urinary	300/1	PPRTV	6/16/2009
	Chronic	2.0E-03	mg/m^3	5.7E-04	(mg/kg/day)	Urinary	3000/1	PPRTV	6/16/2009
1,2-Dichlorobenzene	Subchronic	2.0E+00	mg/m^3	5.7E-01	(mg/kg/day)	NA	NA	HEAST	7/1997
	Chronic	2.0E-01	mg/m^3	5.7E-02	(mg/kg/day)	NA	NA	HEAST	7/1997
1,3-Dichlorobenzene[2]	Subchronic	1.2E+00	mg/m^3	3.4E-01	(mg/kg/day)	Liver	100/1	ATSDR	7/2006
	Chronic	8.0E-01	mg/m^3	2.3E-01	(mg/kg/day)	Liver	100/1	IRIS	4/19/2011
1,4-Dichlorobenzene	Subchronic	1.2E+00	mg/m^3	3.4E-01	(mg/kg/day)	Liver	100/1	ATSDR	7/2006
	Chronic	8.0E-01	mg/m^3	2.3E-01	(mg/kg/day)	Liver	100/1	IRIS	4/19/2011
Benzene	Subchronic	8.0E-02	mg/m^3	2.3E-02	(mg/kg/day)	Blood	100/1	PPRTV	9/29/2009
	Chronic	3.0E-02	mg/m^3	8.6E-03	(mg/kg/day)	Blood	300/1	IRIS	4/19/2011
Chlorobenzene	Subchronic	5.0E-01	mg/m^3	1.4E-01	(mg/kg/day)	Liver, Kidney	100/1	PPRTV	8/16/2006
	Chronic	5.0E-02	mg/m^3	1.4E-02	(mg/kg/day)	Liver, Kidney	1000/1	PPRTV	8/16/2006
Chloroform	Subchronic	2.4E-01	mg/m^3	7.0E-02	(mg/kg/day)	Liver	300/1	ATSDR	9/1997
	Chronic	9.8E-02	mg/m^3	2.8E-02	(mg/kg/day)	Liver	NA	ATSDR	9/1997
Ethylbenzene	Subchronic	9.0E+00	mg/m^3	2.6E+00	(mg/kg/day)	Ear	100/1	PPRTV	9/10/2009
	Chronic	1.0E+00	mg/m^3	2.9E-01	(mg/kg/day)	Developmental	300/1	IRIS	4/19/2011
Total Xylenes	Subchronic	4.0E-01	mg/m^3	1.1E-01	(mg/kg/day)	Body Weight	100/1	PPRTV	9/30/2009
	Chronic	1.0E-01	mg/m^3	2.9E-02	(mg/kg/day)	CNS	300/1	IRIS	4/19/2011
Semivolatile Organic Compounds									
1,1-Biphenyl	Subchronic	4.0E-03	mg/m^3	1.1E-03	(mg/kg/day)	Respiratory	3000/1	PPRTV	4/4/2011
	Chronic	4.0E-04	mg/m^3	1.1E-04	(mg/kg/day)	Respiratory	300/1	PPRTV	4/4/2011
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	Chronic	3.0E-03	mg/m^3	8.6E-04	(mg/kg/day)	Respiratory	3000/1	IRIS	4/19/2011
Pesticides/PCBs									
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-Chlordane[3]	Chronic	7.0E-04	mg/m^3	2.0E-04	(mg/kg/day)	Liver	1000/1	IRIS	4/19/2011
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 6-20
NON-CANCER TOXICITY DATA -- INHALATION
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, 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) (MM/DD/YYYY)
Pesticides/PCBs (continued)									
delta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin Ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane[3]	Chronic	7.0E-04	mg/m^3	2.0E-04	(mg/kg/day)	Liver	1000/1	IRIS	4/19/2011
Heptachlor	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor Epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics									
Aluminum	Chronic	5.0E-03	mg/m^3	1.4E-03	(mg/kg/day)	CNS	300/1	PPRTV	10/23/2006
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	Chronic	1.5E-05	mg/m^3	4.3E-06	(mg/kg/day)	NA	NA	Cal EPA(1)	9/2009
Beryllium	Chronic	2.0E-05	mg/m^3	5.7E-06	(mg/kg/day)	Respiratory	10/1	IRIS	4/19/2011
Chromium[4]	Chronic	1.0E-04	mg/m^3	2.9E-05	(mg/kg/day)	Respiratory	300/1	IRIS	4/19/2011
Cobalt	Subchronic	2.0E-05	mg/m^3	5.7E-06	(mg/kg/day)	Respiratory	100/1	PPRTV	8/25/208
	Chronic	6.0E-06	mg/m^3	1.7E-06	(mg/kg/day)	Respiratory	300/1	PPRTV	8/25/208
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	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	4/19/2012
Mercury[5]	Chronic	3.0E-05	mg/m^3	8.6E-06	(mg/kg/day)	Autoimmune	NA	Cal EPA(1)	9/2009
Nickel	Chronic	9.0E-05	mg/m^3	2.6E-05	(mg/kg/day)	Respiratory	30/1	ATSDR	9/2005
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 6-20
NON-CANCER TOXICITY DATA -- INHALATION
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, 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) (MM/DD/YYYY)

Notes:
1 - Extrapolated RfD = RfC *20m^3/day / 70 kg
2 - Values are for 1,4-dichlorobenzene.
3 - Values are for chlordane.
4 - Values are for hexavalent chromium.
5 - Values are for mercuric chloride.

Definitions:
CNS = Central Nervous System
IRIS = Integrated Risk Information System
NA = Not Applicable
ATSDR = Agency for Toxic Substances and Disease Registry.
Cal EPA(1) = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.
Cal EPA(2) = Technical Support Document For the Derivation of Noncancer Reference Exposure Levels, December 2008.
HEAST = Health Effects Assessment Summary Tables
PPRTV = Provisional Peer Reviewed Toxicity Value.

TABLE 6-21
CANCER TOXICITY DATA -- ORAL/DERMAL
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, 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								
1,2,4-Trichlorobenzene	2.9E-02	$(mg/kg/day)^{-1}$	1	2.9E-02	$(mg/kg/day)^{-1}$	D / Not classifiable as to human carcinogenicity	PPRTV	6/16/2009
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene[3]	5.4E-03	$(mg/kg/day)^{-1}$	1	5.4E-03	$(mg/kg/day)^{-1}$	NA	Cal EPA(1)	9/2009
1,4-Dichlorobenzene	5.4E-03	$(mg/kg/day)^{-1}$	1	5.4E-03	$(mg/kg/day)^{-1}$	NA	Cal EPA(1)	9/2009
Benzene	5.5E-02	$(mg/kg/day)^{-1}$	1	5.5E-02	$(mg/kg/day)^{-1}$	A / Known human carcinogen	IRIS	4/19/2012
Chlorobenzene	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	4/19/2012
Chloroform	3.1E-02	$(mg/kg/day)^{-1}$	1	3.1E-02	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	Cal EPA(1)	9/2009
Ethylbenzene	1.1E-02	$(mg/kg/day)^{-1}$	1	1.1E-02	$(mg/kg/day)^{-1}$	D / Not classifiable as to human carcinogenicity	Cal EPA(2)	11/2007
Total Xylenes	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds								
1,1'-Biphenyl	8.0E-03	$(mg/kg/day)^{-1}$	1	8.0E-03	$(mg/kg/day)^{-1}$	D / Not classifiable as to human carcinogenicity	PPRTV	4/4/2011
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	7.3E+00	$(mg/kg/day)^{-1}$	1	7.3E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
Bis(2-ethylhexyl)phthalate	1.4E-02	$(mg/kg/day)^{-1}$	1	1.4E-02	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	C / Inadequate data of carcinogenicity in humans	IRIS	4/19/2012
Pesticides/PCBs								
4,4'-DDD	2.4E-01	$(mg/kg/day)^{-1}$	1	2.4E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
4,4'-DDE	3.4E-01	$(mg/kg/day)^{-1}$	1	3.4E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
4,4'-DDT	3.4E-01	$(mg/kg/day)^{-1}$	1	3.4E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
Aldrin	1.7E+01	$(mg/kg/day)^{-1}$	1	1.7E+01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
alpha-BHC	6.3E+00	$(mg/kg/day)^{-1}$	1	6.3E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
alpha-Chlordane[4]	3.5E-01	$(mg/kg/day)^{-1}$	1	3.5E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
Aroclor-1260	2.0E+00	$(mg/kg/day)^{-1}$	1	2.0E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	USEPA(1)	9/1996
beta-BHC	1.8E+00	$(mg/kg/day)^{-1}$	1	1.8E+00	$(mg/kg/day)^{-1}$	C / Possible Human Carcinogen	IRIS	4/19/2012
delta-BHC[5]	6.3E+00	$(mg/kg/day)^{-1}$	1	6.3E+00	$(mg/kg/day)^{-1}$	D / Not classifiable as to human carcinogenicity	IRIS	4/19/2012
Dieldrin	1.6E+01	$(mg/kg/day)^{-1}$	1	1.6E+01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
Endrin	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	4/19/2012
Endrin Ketone	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	1.1E+00	$(mg/kg/day)^{-1}$	1	1.1E+00	$(mg/kg/day)^{-1}$	NA	Cal EPA(1)	9/2009
gamma-Chlordane[4]	3.5E-01	$(mg/kg/day)^{-1}$	1	3.5E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
Heptachlor	4.5E+00	$(mg/kg/day)^{-1}$	1	4.5E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
Heptachlor Epoxide	9.1E+00	$(mg/kg/day)^{-1}$	1	9.1E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012

TABLE 6-21
CANCER TOXICITY DATA -- ORAL/DERMAL
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, 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)
Inorganics								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A / Known human carcinogen	IRIS	4/19/2012
Beryllium	NA	NA	NA	NA	NA	Carcinogenic potential cannot be determined	IRIS	4/19/2012
Chromium[6]	5.0E-01	$(mg/kg/day)^{-1}$	0.025	2.0E+01	$(mg/kg/day)^{-1}$	D (Not classifiable as to human carcinogenicity)	NJDEP	4/8/2009
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	B2 / Probable human carcinogen	IRIS	4/19/2012
Manganese	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	IRIS	4/19/2012
Mercury	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

1 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.

2 - Adjusted cancer slope factor for dermal = Oral cancer slope factor / Oral absorption efficiency for dermal.

3 - Values are for 1,4-dichlorobenzene.

4 - Values are for chlordane.

5 - Values are for alpha-BHC.

6 - Values are for hexavalent chromium.

IRIS = Integrated Risk Information System.

NA = Not Available.

Cal EPA(1) = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.

Cal EPA(2) = Notice of Adoption of Unit Risk Values for Ethylbenzene, November 2007.

NJDEP = New Jersey Department of Environmental Protection.

PPRTV = Provisional Peer Reviewed Toxicity Value.

USEPA(1) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

TABLE 6-22
CANCER TOXICITY DATA -- INHALATION
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, 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							
1,2,4-Trichlorobenzene	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	4/19/2012
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene[2]	1.1E-05	$(ug/m^3)^{-1}$	3.9E-02	$(mg/kg/day)^{-1}$	NA	Cal EPA(1)	9/2009
1,4-Dichlorobenzene	1.1E-05	$(ug/m^3)^{-1}$	3.9E-02	$(mg/kg/day)^{-1}$	NA	Cal EPA(1)	9/2009
Benzene	7.8E-06	$(ug/m^3)^{-1}$	2.7E-02	$(mg/kg/day)^{-1}$	A / Known human carcinogen	IRIS	4/19/2012
Chlorobenzene	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	4/19/2012
Chloroform	2.3E-05	$(ug/m^3)^{-1}$	8.1E-02	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
Ethylbenzene	2.5E-06	NA	8.8E-03	NA	D / Not classifiable as to human carcinogenicity	Cal EPA(2)	11/2007
Total Xylenes	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds							
1,1-Biphenyl	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	4/19/2012
2-Methylnaphthaene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	1.1E-03	$(ug/m^3)^{-1}$	3.9E+00	$(mg/kg/day)^{-1}$	NA	Cal EPA(1)	9/2009
Bis(2-ethylhexyl)phthalate	2.4E-06	$(ug/m^3)^{-1}$	8.4E-03	$(mg/kg/day)^{-1}$	NA	Cal EPA (1)	9/2009
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA
Naphthalene	3.4E-05	$(ug/m^3)^{-1}$	1.2E-01	$(mg/kg/day)^{-1}$	C / Possible Human Carcinogen	Cal EPA(3)	8/2004
Pesticides/PCBs							
4,4'-DDD	6.9E-05	$(ug/m^3)^{-1}$	2.4E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	Cal EPA(1)	9/2009
4,4'-DDE	9.7E-05	$(ug/m3)^{-1}$	3.4E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	Cal EPA(1)	9/2009
4,4'-DDT	9.7E-05	$(ug/m^3)^{-1}$	3.4E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
Aldrin	4.9E-03	$(ug/m^3)^{-1}$	1.7E+01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
alpha-BHC	1.8E-03	$(ug/m^3)^{-1}$	6.3E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
alpha-Chlordane[3]	1.0E-04	$(ug/m3)^{-1}$	3.5E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
Aroclor-1260	5.7E-04	$(ug/m^3)^{-1}$	2.0E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	USEPA(1)	9/1996
beta-BHC	5.3E-04	$(ug/m^3)^{-1}$	1.9E+00	$(mg/kg/day)^{-1}$	C/ Possible Human Carcinogen	IRIS	4/19/2012
delta-BHC[4]	1.8E-03	$(ug/m^3)^{-1}$	6.3E+00	$(mg/kg/day)^{-1}$	D / Not classifiable as to human carcinogenicity	IRIS	4/19/2012
Dieldrin	4.6E-03	$(ug/m^3)^{-1}$	1.6E+01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
Endrin	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	4/19/2012
Endrin Ketone	NA	NA	NA	NA	NA	NA	NA

TABLE 6-22
CANCER TOXICITY DATA -- INHALATION
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, 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)
Pesticides/PCBs (continued)							
gamma-BHC (Lindane)	3.1E-04	$(ug/m^3)^{-1}$	1.1E+00	$(mg/kg/day)^{-1}$	NA	Cal EPA(2)	9/2009
gamma-Chlordane[3]	1.0E-04	$(ug/m3)^{-1}$	3.5E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
Heptachlor	1.3E-03	$(ug/m3)^{-1}$	4.6E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
Heptachlor Epoxide	2.6E-03	$(ug/m^3)^{-1}$	9.1E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/19/2012
Inorganics							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Arsenic	4.3E-03	$(ug/m^3)^{-1}$	1.5E+01	$(mg/kg/day)^{-1}$	A / Known human carcinogen	IRIS	4/19/2012
Beryllium	2.4E-03	$(ug/m^3)^{-1}$	8.4E+00	$(mg/kg/day)^{-1}$	B1 /Known/likely human carcinogen	IRIS	4/19/2012
Chromium[5]	8.4E-02	$(ug/m^3)^{-1}$	2.9E+02	$(mg/kg/day)^{-1}$	A / Known human carcinogen	IRIS	4/19/2012
Cobalt	9.0E-03	$(ug/m^3)^{-1}$	3.2E+01	$(mg/kg/day)^{-1}$	NA	PPRTV	8/25/208
Iron	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	B2 / Probable human carcinogen	IRIS	4/19/2012
Manganese	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	4/19/2012
Mercury	NA	NA	NA	NA	NA	NA	NA
Nickel	2.6E-04	$(ug/m^3)^{-1}$	9.1E-01	$(mg/kg/day)^{-1}$	NA	Cal EPA(1)	9/2009
Thallium	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA

Notes:
1 - Inhalation CSF = Unit Risk * 70 kg / $20m^3$/day.
2 - Values are for 1,4-dichlorobenzene.
3 - Values are for chlordane.
4 - Values are for alpha-BHC.
5 - Values are for hexavalent chromium.

Definitions:
HEAST = Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System.
NA = Not Available.
Cal EPA(1) = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.
Cal EPA(2) = Notice of Adoption of Unit Risk Values for Ethylbenzene, November 2007.
Cal EPA(3) = Adoption of Unit Risk Values for Naphthalene, August 2004.
PPRTV = Provisional Peer Reviewed Toxicity Value.

TABLE 6-23

SUMMARY OF CANCER RISKS AND HAZARD INDICES
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10^{-4}	Chemicals with Cancer Risks > 10^{-5} and ≤ 10^{-4}	Chemicals with Cancer Risks > 10^{-6} and ≤ 10^{-5}	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Trench Workers	Surface Soil	Incidental Ingestion	8E-07	--	--	--	0.1	--
		Dermal Contact	3E-07	--	--	--	0.004	--
		Inhalation	2E-07	--	--	--	0.5	--
		Total	1E-06	--	--	--	0.6	--
	Subsurface Soil	Incidental Ingestion	1E-06	--	--	--	0.6	--
		Dermal Contact	3E-07	--	--	--	0.01	--
		Inhalation	5E-07	--	--	--	0.5	--
		Total	2E-06	--	--	--	1	--
	Groundwater	Dermal Contact	3E-05	--	delta-BHC	alpha-BHC	1	--
		Inhalation	4E-08	--	--	--	0.1	--
		Total	3E-05	--	delta-BHC	alpha-BHC	1	--
	Total Surface Soil and Groundwater		3E-05				2	
	Total Surface Soil, Subsurface Soil, and Groundwater		3E-05				3	
Construction Workers	Surface Soil	Incidental Ingestion	6E-06	--	--	cPAHs	0.1	--
		Dermal Contact	2E-06	--	--	cPAHs	0.003	--
		Inhalation	1E-06	--	--	--	0.4	--
		Total	9E-06	--	--	cPAHs	0.5	--
	Subsurface Soil	Incidental Ingestion	8E-06	--	--	4,4'-DDD, alpha-BHC, delta-BHC	0.5	--
		Dermal Contact	2E-06	--	--	--	0.007	--
		Inhalation	3E-06	--	--	Chromium	0.4	--
		Total	1E-05	--	--	4,4'-DDD, alpha-BHC, delta-BHC, Chromium	0.9	--
	Groundwater	Dermal Contact	2E-05	--	--	alpha-BHC, delta-BHC	0.10	--
		Inhalation	2E-08	--	--	--	0.007	--
		Total	2E-05	--	--	alpha-BHC, delta-BHC	0.10	--
	Total Surface Soil and Groundwater		3E-05				0.6	
	Total Surface Soil, Subsurface Soil, and Groundwater		4E-05				1	
Industrial Workers	Surface Soil	Incidental Ingestion	5E-05	--	cPAHs	--	0.1	--
		Dermal Contact	4E-05	--	cPAHs	--	0.003	--
		Inhalation	4E-09	--	--	--	0.00006	--
		Total	9E-05	--	cPAHs	Arsenic	0.1	--
	Subsurface Soil	Incidental Ingestion	7E-05	--	4,4'-DDD, alpha-BHC, delta-BHC	Arsenic, Chromium	0.5	--
		Dermal Contact	4E-05	--	delta-BHC	4,4'-DDD, alpha-BHC	0.009	--
		Inhalation	1E-08	--	--	--	0.00006	--
		Total	1E-04	--	4,4'-DDD, alpha-BHC, delta-BHC	Arsenic, Chromium	0.5	--
	Total Surface Soil and Subsurface Soil		2E-04				0.6	

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Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10^{-4}	Chemicals with Cancer Risks > 10^{-5} and ≤ 10^{-4}	Chemicals with Cancer Risks > 10^{-6} and ≤ 10^{-5}	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Child Residents	Surface Soil	Incidental Ingestion	8E-04	cPAHs	Chromium	Arsenic	1	--
		Dermal Contact	3E-04	cPAHs	--	Chromium	0.02	--
		Inhalation	2E-08	--	--	--	0.0002	--
		Total	1E-03	cPAHs	Chromium	Aroclor-1260, Arsenic	1	--
	Subsurface Soil	Incidental Ingestion	3E-04	--	4,4'-DDD, alpha-BHC, delta-BHC, Chromium	Arsenic	7	Arsenic, Thallium
		Dermal Contact	6E-05	--	alpha-BHC, delta-BHC	4,4'-DDD, Chromium	0.05	--
		Inhalation	7E-08	--	--	--	0.0003	--
		Total	3E-04	--	4,4'-DDD, alpha-BHC, delta-BHC, Chromium	Arsenic	7	Arsenic, Thallium
	Groundwater	Incidental Ingestion	9E-03	alpha-BHC, delta-BHC, Arsenic, Chromium	Benzene, beta-BHC, gamma-BHC	1,4-Dichlorobenzene, Ethylbenzene, 4,4'-DDD, Heptachlor Epoxide	27	Benzene, Arsenic, Iron, gamma-BHC, Chlorobenzene, alpha-BHC, delta-BHC, Heptachlor Epoxide
		Dermal Contact	6E-03	alpha-BHC, delta-BHC	beta-BHC, gamma-BHC, Chromium	Benzene, Heptachlor Epoxide, Arsenic	7	Chlorobenzene, alpha-BHC, delta-BHC, gamma-BHC, Heptachlor Epoxide
		Inhalation	6E-05	--	Benzene	1,4-Dichlorobenzene, Ethylbenzene	10	Benzene, Chlorobenzene
		Vapor Intrusion	1E-05	--	--	1,4-Dichlorobenzene, Benzene	2	Chlorobenzene
		Total	1E-02	alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, Arsenic, Chromium	Benzene	1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, Ethylbenzene, 4,4'-DDD, Heptachlor Epoxide	46	Benzene, Aluminum, Manganese, Arsenic, Beryllium, Iron, Chlorobenzene, gamma-BHC, 1,4-Dichlorobenzene, alpha-BHC, delta-BHC, Heptachlor Epoxide
	Total Surface Soil and Groundwater		2E-02				47	
	Total Surface Soil, Subsurface Soil, and Groundwater		2E-02				54	
Adult Residents	Surface Soil	Incidental Ingestion	1E-04	--	cPAHs	Arsenic, Chromium	0.2	--
		Dermal Contact	6E-05	--	cPAHs	--	0.003	--
		Inhalation	3E-08	--	--	--	0.0002	--
		Total	2E-04	cPAHs	--	Arsenic, Chromium	0.2	--
	Subsurface Soil	Incidental Ingestion	1E-04	--	4,4'-DDD, alpha-BHC, delta-BHC	Arsenic, Chromium	0.7	--
		Dermal Contact	3E-05	--	delta-BHC	4,4'-DDD, alpha-BHC	0.008	--
		Inhalation	1E-07	--	--	--	0.0003	--
		Total	1E-04	--	4,4'-DDD, alpha-BHC, delta-BHC	Arsenic, Chromium	0.7	--
	Groundwater	Incidental Ingestion	1E-02	alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, Arsenic	Benzene, Chromium	1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, Ethyhlbenzene, 4,4'-DDD, Aldrin, Heptachlor Epoxide	12	Chlorobenzene, alpha-BHC, delta-BHC, gamma-BHC, Arsenic
		Dermal Contact	1E-02	alpha-BHC, beta-BHC, delta-BHC	gamma-BHC	1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, Benzene, Ethylbenzene, Heptachlor Epoxide, Arsenic	3	Chlorobenzene, delta-BHC, gamma-BHC
		Inhalation	1E-04	--	Benzene	1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, Ethylbenzene	4	Chlorobenzene
		Vapor Intrusion	5E-05	--	Benzene	1,4-Dichlorobenzene, Ethylbenzene	2	Chlorobenzene
		Total	3E-02	Benzene, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, Arsenic, Chromium	1,4-Dichlorobenzene	1,2,4-Trichlorobenzene, Ethylbenzene, 1,1-Biphenyl, 4,4'-DDD, Aldrin, Dieldrin, Heptachlor Epoxide	21	Benzene, Chlorobenzene, alpha-BHC, delta-BHC, gamma-BHC, Heptachlor Epoxide, Arsenic
	Total Surface Soil and Groundwater		3E-02				21	
	Total Surface Soil, Subsurface Soil, and Groundwater		3E-02				22	

TABLE 6-23

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SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10^{-4}	Chemicals with Cancer Risks > 10^{-5} and ≤ 10^{-4}	Chemicals with Cancer Risks > 10^{-6} and ≤ 10^{-5}	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Lifelong Residents	Surface Soil	Incidental Ingestion	1E-03	cPAHs	Chromium	Aroclor-1260, Arsenic	NA	--
		Dermal Contact	4E-04	cPAHs	--	Chromium	NA	--
		Inhalation	6E-08	--	--	--	NA	--
		Total	1E-03	cPAHs	Chromium	Aroclor-1260, Arsenic	NA	--
	Subsurface Soil	Incidental Ingestion	4E-04	--	4,4'-DDD, alpha-BHC, delta-BHC, Chromium	Arsenic	NA	--
		Dermal Contact	9E-05	--	alpha-BHC, delta-BHC	4,4'-DDD, Chromium	NA	--
		Inhalation	2E-07	--	--	--	NA	--
		Total	5E-04	delta-BHC	4,4'-DDD, alpha-BHC, Chromium	Arsenic	NA	--
	Groundwater	Incidental Ingestion	2E-02	Benzene, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, Arsenic, Chromium	--	1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, Ethylbenzene, 4,4'-DDD, 4,4'-DDT, Aldrin, Dieldrin, Heptachlor Epoxide	NA	--
		Dermal Contact	2E-02	alpha-BHC, beta, BHC, delta-BHC, Chromium	Benzene, gamma-BHC	1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, Ethylbenzene, Heptachlor Epoxide, Arsenic	NA	--
		Inhalation	2E-04	Benzene	--	1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, Ethylbenzene	NA	--
		Vapor Intrusion	7E-05		Benzene	1,4-Dichlorobenzene, Ethylbenzene	NA	--
		Total	4E-02	Benzene, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, Arsenic, Chromium	1,4-Dichlorobenzene, Ethylbenzene	1,2,4-Trichlorobenzene, Ethylbenzene, 1,1-Biphenyl, 4,4'-DDD, 4,4'-DDT, Aldrin, Dieldrin, Heptachlor Epoxide	NA	--
	Total Surface Soil and Groundwater		4E-02				NA	
	Total Surface Soil, Subsurface Soil, and Groundwater		4E-02				NA	

TABLE 6-24

SUMMARY OF CANCER RISKS AND HAZARD INDICES
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10^{-4}	Chemicals with Cancer Risks > 10^{-5} and ≤ 10^{-4}	Chemicals with Cancer Risks > 10^{-6} and ≤ 10^{-5}	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Construction Workers	Surface Soil	Incidental Ingestion	3E-06	--	--	--	0.6	--
		Dermal Contact	3E-07	--	--	--	0.05	--
		Inhalation	9E-07	--	--	--	0.04	--
		Total	4E-06	--	--	4,4'-DDT	0.7	--
	Subsurface Soil	Incidental Ingestion	1E-07	--	--	--	0.01	--
		Dermal Contact	2E-08	--	--	--	0.0010	--
		Inhalation	6E-07	--	--	--	0.005	--
		Total	7E-07	--	--	--	0.02	--
	Groundwater	Dermal Contact	1E-04	--	alpha-BHC, delta-BHC	beta-BHC, gamma-BHC	1	--
		Inhalation	7E-08	--	--	--	0.04	--
		Total	1E-04	--	alpha-BHC, delta-BHC	beta-BHC, gamma-BHC	1	--
	Total Surface Soil and Groundwater		1E-04				2	
	Total Surface Soil, Subsurface Soil, and Groundwater		1E-04				2	
Maintenance Workers	Surface Soil	Incidental Ingestion	6E-06	--	--	4,4'-DDD, 4,4'-DDT	0.05	--
		Dermal Contact	1E-06	--	--	--	0.009	--
		Inhalation	7E-10	--	--	--	0.000002	--
		Total	7E-06	--	--	4,4'-DDD, 4,4'-DDT	0.06	--
	Subsurface Soil	Incidental Ingestion	2E-07	--	--	--	0.001	--
		Dermal Contact	6E-08	--	--	--	0.0002	--
		Inhalation	5E-10	--	--	--	0.0000002	--
		Total	3E-07	--	--	--	0.001	--
	Total Surface Soil and Subsurface Soil		7E-06				0.06	
Industrial Workers	Surface Soil	Incidental Ingestion	3E-05	--	--	4,4'-DDD, 4,4'-DDE, 4,4'-DDT	0.3	--
		Dermal Contact	6E-06	--	--	4,4'-DDD, 4,4'-DDT	0.04	--
		Inhalation	4E-09	--	--	--	0.000008	--
		Total	4E-05	--	--	4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Arsenic	0.3	--
	Subsurface Soil	Incidental Ingestion	1E-06	--	--	--	0.005	--
		Dermal Contact	3E-07	--	--	--	0.001	--
		Inhalation	2E-09	--	--	--	0.0000008	--
		Total	1E-06	--	--	--	0.006	--
	Total Surface Soil and Subsurface Soil		4E-05				0.3	
Adult Visitors	Surface Soil	Incidental Ingestion	3E-06	--	--	--	0.03	--
		Dermal Contact	4E-07	--	--	--	0.003	--
		Inhalation	1E-10	--	--	--	0.0000008	--
		Total	3E-06	--	--	--	0.03	--
	Subsurface Soil	Incidental Ingestion	1E-07	--	--	--	0.0005	--
		Dermal Contact	2E-08	--	--	--	0.00007	--
		Inhalation	9E-11	--	--	--	0.00000008	--
		Total	1E-07	--	--	--	0.0005	--
	Total Surface Soil and Subsurface Soil		3E-06				0.03	

TABLE 6-24

SUMMARY OF CANCER RISKS AND HAZARD INDICES
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10^{-4}	Chemicals with Cancer Risks > 10^{-5} and ≤ 10^{-4}	Chemicals with Cancer Risks > 10^{-6} and ≤ 10^{-5}	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Child Residents	Surface Soil	Incidental Ingestion	1E-04	--	4,4'-DDD, 4,4'-DDT	cPAHs, 4,4'-DDE, Arsenic, Chromium	3	4,4'-DDT
		Dermal Contact	1E-05	--	--	cPAHs, 4,4'-DDD, 4,4'-DDT, Chromium	0.2	--
		Inhalation	2E-08	--	--	--	0.00003	--
		Total	1E-04	--	cPAHs, 4,4'-DDD, 4,4'-DDT	4,4'-DDE, Arsenic, Chromium	4	4,4'-DDT
	Subsurface Soil	Incidental Ingestion	1E-05	--	--	Chromium	0.06	--
		Dermal Contact	2E-06	--	--	--	0.006	--
		Inhalation	1E-08	--	--	--	0.000003	--
		Total	1E-05	--	--	Chromium	0.07	--
	Groundwater	Incidental Ingestion	6E-02	4,4'-DDD, 4,4'-DDT, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, Arsenic, Chromium	Benzene, cPAHs, 4,4'-DDE, Heptachlor Epoxide	1,4-Dichlorobenzene, Ethylbenzene, gamma-Chlordane, Heptachlor	428	Benzene, Chlorobenzene, 2-Methylnaphthalene, gamma-BHC, 4,4'-DDT, alpha-BHC, delta-BHC, Endrin, Endrin Ketone, gamma-Chlordane, Heptachlor Epoxide, Aluminum, Antimony, Arsenic, Beryllium, Chromium, Cobalt, Iron, Manganese, Thallium, Vanadium
		Dermal Contact	3E-02	alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, Chromium	Heptachlor Epoxide	1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, Benzene, Ethylbenzene, gamma-Chlordane, Arsenic	67	Chlorobenzene, 2-Methylnaphthalene, alpha-BHC, delta-BHC, Endrin, Endrin Ketone, gamma-BHC, gamma-Chlordane, Heptachlor Epoxide, Chromium
		Inhalation	8E-05	--	Benzene	1,4-Dichlorobenzene, Ethylbenzene	17	Benzene, Chlorobenzene, 2-Methylnaphthalene
		Vapor Intrusion	2E-05	--	--	1,4-Dichlorobenzene, Benzene, Ethylbenzene, Naphthalene	3	Chlorobenzene
		Total	9E-02	Benzene, 4,4'-DDD, 4,4'-DDT, alpha-BHC, beta-BHC, delta-BHC, Arsenic, Chromium	Ethylbenzene, cPAHs, 4,4'-DDE, gamma-BHC, Heptachlor Epoxide	1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, 1,1-Biphenyl, alpha-Chlordane, Dieldrin, gamma-Chlordane, Heptachlor, Naphthalene	514	Benzene, Chlorobenzene, Xylenes, 2-Methylnaphthalene, Dibenzofuran, Naphthalene, gamma-BHC, 4,4'-DDT, alpha-BHC, delta-BHC, Endrin, Endrin Ketone, gamma-Chlordane, Heptachlor Epoxide, Aluminum, Antimony, Arsenic, Beryllium, Chromium, Cobalt, Iron, Manganese, Nickel, Thallium, Vanadium
	Total Surface Soil and Groundwater		9E-02				517	
	Total Surface Soil, Subsurface Soil, and Groundwater		9E-02				517	
Adult Residents	Surface Soil	Incidental Ingestion	4E-05	--	4,4'-DDD, 4,4'-DDT	cPAHs, 4,4'-DDE, Arsenic, Chromium	0.4	--
		Dermal Contact	6E-06	--	--	4,4'-DDD, 4,4'-DDT	0.04	--
		Inhalation	3E-08	--	--	--	0.00003	--
		Total	5E-05	--	4,4'-DDD, 4,4'-DDT	cPAHs, 4,4'-DDE, Arsenic, Chromium	0.4	--
	Subsurface Soil	Incidental Ingestion	2E-06	--	--	--	0.007	--
		Dermal Contact	4E-07	--	--	--	0.0009	--
		Inhalation	2E-08	--	--	--	0.000003	--
		Total	2E-06	--	--	Chromium	0.008	--
	Groundwater	Incidental Ingestion	9E-02	4,4'-DDD, 4,4'-DDT, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, Arsenic, Chromium	Benzene, cPAHs, 4,4'-DDE, Heptachlor Epoxide	1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, Ethylbenzene, Aldrin, Dieldrin, gamma-Chlordane, Heptachlor	183	Benzene, Antimony, Aluminum, Manganese, Arsenic, Iron, gamma-BHC, Chlorobenzene, 4,4'-DDT, alpha-BHC, delta-BHC, Endrin, Heptachlor Epoxide, 2-Methylnaphthalene, Thallium, Cobalt, Vanadium

TABLE 6-24

SUMMARY OF CANCER RISKS AND HAZARD INDICES
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10^{-4}	Chemicals with Cancer Risks > 10^{-5} and ≤ 10^{-4}	Chemicals with Cancer Risks > 10^{-6} and ≤ 10^{-5}	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
		Dermal Contact	6E-02	alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, Chromium	Benzene, Heptachlor Epoxide	1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, Ethylbenzene, alpha-Chlordane, gamma-Chlordane, Heptachlor, Arsenic	29	gamma-BHC, Chlorobenzene, alpha-BHC, delta-BHC, gamma-Chlordane, Heptachlor Epoxide, 2-Methylnaphthalene
		Inhalation	1E-04	--	Benzene	1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, Ethylbenzene	5	1,1-Biphenyl, Naphthalene
		Vapor Intrusion	8E-05	--	Benzene	1,4-Dichlorobenzene, Ethylbenzene, Naphthalene	3	Chlorobenzene
		Total	2E-01	Benzene, 4,4'-DDD, 4,4'-DDT, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, Arsenic, Chromium	1,4-Dichlorobenzene, Ethylbenzene, cPAHs, 4,4'-DDE, gamma-Chlordane, Heptachlor Epoxide	1,2,4-Trichlorobenzene, 1,1-Biphenyl, Aldrin, alpha-Chlordane, Dieldrin, Heptachlor, Naphthalene	221	Benzene, Antimony, Aluminum, Manganese, Arsenic, Beryllium, Iron, Chlorobenzene, gamma-BHC, 4,4'-DDT, alpha-BHC, delta-BHC, Endrin, Endrin Ketone, gamma-Chlordane, Heptachlor Epoxide, 1,1-Biphenyl, 2-Methylnaphthalene, Chromium, Thallium, Cobalt, Vanadium
	Total Surface Soil and Groundwater		2E-01				221	
	Total Surface Soil, Subsurface Soil, and Groundwater		2E-01				221	

TABLE 6-24

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SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10^{-4}	Chemicals with Cancer Risks > 10^{-5} and ≤ 10^{-4}	Chemicals with Cancer Risks > 10^{-6} and ≤ 10^{-5}	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Lifelong Residents	Surface Soil	Incidental Ingestion	2E-04	--	4,4'-DDD, 4,4'-DDT, Chromium	cPAHs, 4,4'-DDE, beta-BHC, Arsenic	NA	--
		Dermal Contact	2E-05	--	--	cPAHs, 4,4'-DDD, 4,4'-DDT, Chromium	NA	--
		Inhalation	4E-08	--	--	--	NA	--
		Total	2E-04	--	cPAHs, 4,4'-DDD, 4,4'-DDT, Chromium	4,4'-DDE, beta-BHC, Arsenic	NA	--
	Subsurface Soil	Incidental Ingestion	1E-05	--	--	Chromium	NA	--
		Dermal Contact	2E-06	--	--	--	NA	--
		Inhalation	3E-08	--	--	--	NA	--
		Total	2E-05	--	--	Chromium	NA	--
	Groundwater	Incidental Ingestion	1E-01	Benzene, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, Arsenic, Chromium	Ethylbenzene, cPAHs, Heptachlor Epoxide	1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, Aldrin, alpha-Chlordane, Dieldrin, gamma-Chlordane, Heptachlor	NA	--
		Dermal Contact	9E-02	alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, Chromium	Benzene, gamma-Chlordane, Heptachlor Epoxide, Arsenic	1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene, Ethylbenzene, 1,1,-Biphenyl, alpha-Chlordane, Dliedrin, Heptachlor	NA	--
		Inhalation	2E-04	Benzene	Ethylbenzene	1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene	NA	--
		Vapor Intrusion	1E-04	--	Benzene	1,4-Dichlorobenzene, Ethylbenzene, Naphthalene	NA	--
		Total	2E-01	Benzene, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, Arsenic, Chromium	1,4-Dichlorobenzne, Ethylbenzene, cPAHs, gamma-Chlordane, Heptachlor Epoxide	1,2,4-Trichlorobenzene, 1,1-Biphenyl, Bis(2-ethylhexyl)phthalate, Aldrin, alpha-Chlordane, Dieldrin, Heptachlor, Naphthalene	NA	--
	Total Surface Soil and Groundwater		2E-01				NA	
	Total Surface Soil, Subsurface Soil, and Groundwater		2E-01				NA	

TABLE 6-25

CHEMICALS RETAINED AS COCs FOR DIRECT CONTACT EXPOSURES
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

	Site 27			Site 55		
Parameter	**Surface Soil**	**Subsurface Soil**	**Groundwater**	**Surface Soil**	**Subsurface Soil**	**Groundwater**
Volatile Organic Compounds						
1,2,4-Trichlorobenzene			X			X
1,4-Dichlorobenzene			X			X
Benzene			X			X
Chlorobenzene			X			X
Ethylbenzene			X			X
Xylenes						X
Semivolatile Organic Compounds						
Carcinogenic PAHs	X			X		X
Naphthalene						X
2-Methylnaphthalene						X
1,1-Biphenyl			X			X
Dibenzofuran						X
Pesticides/PCBs						
4,4'-DDD		X	X	X		X
4,4'-DDE				X		X
4,4'-DDT			X	X		X
Aldrin			X			X
alpha-BHC		X	X			X
alpha-Chlordane						X
Aroclor-1260	X					
beta-BHC			X	X		X
delta-BHC		X	X			X
Endrin						X
Endrin Ketone						X
Dieldrin			X			X
gamma-BHC			X			X
gamma-Chlordane						X
Heptachlor						X
Heptachlor Epoxide			X			X
Inorganics						
Aluminum			X			X
Antimony						X
Arsenic	X	X	X	X		X
Beryllium			X			X
Chromium	X	X	X	X		X
Cobalt						X
Iron			X			X
Manganese			X			X
Nickel						X
Thallium		X				X
Vanadium						X

Notes
X - Chemical was retained as a COC for direct contact exposures.
A chemical is retained as a COC if it contributed to a total cancer risk greater than $1x10^{-4}$ or to a target organ hazard index greater than 1.

TABLE 6-26

REMEDIAL GOAL OPTIONS - SOIL
SITE 27 - MOTOR TRANSPORTATION FACILITY, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

CHILD RESIDENTS							
Chemical	**USEPA RSL[1] (mg/kg)**	**Target Cancer Risk Level**			**Target Hazard Index**		
		10^{-6} (mg/kg)	**10^{-5} (mg/kg)**	**10^{-4} (mg/kg)**	**0.1 (mg/kg)**	**1 (mg/kg)**	**3 (mg/kg)**
Benzo(a)pyrene Equivalents	0.015	0.017	0.17	1.7	NA	NA	NA
4,4'-DDD	2.0	3.5	35	351	NA	NA	NA
4,4'-DDE	1.4	2.5	25	248	NA	NA	NA
4,4'-DDT	1.7	2.5	25	248	3.6	36	108
alpha-BHC	0.077	0.11	1.1	11	49	490	1,470
beta-BHC	0.27	0.40	4.0	40	NA	NA	NA
Aroclor-1260	0.22	0.33	3.3	33	NA	NA	NA
delta-BHC	0.077[2]	0.11	1.1	11	49	490	1,470
Arsenic	0.39	0.56	5.6	56	2.2	22	65
Chromium	0.29[3]	0.31	3.1	31	21	210	630
Thallium	0.78	NA	NA	NA	0.078	0.78	2.3

ADULT RESIDENTS							
Chemical	**USEPA RSL[1] (mg/kg)**	**Target Cancer Risk Level**			**Target Hazard Index**		
		10^{-6} (mg/kg)	**10^{-5} (mg/kg)**	**10^{-4} (mg/kg)**	**0.1 (mg/kg)**	**1 (mg/kg)**	**3 (mg/kg)**
Benzo(a)pyrene Equivalents	0.015	0.10	1.0	10	NA	NA	NA
4,4'-DDD	2.0	7.9	79	792	NA	NA	NA
4,4'-DDE	1.4	5.6	56	559	NA	NA	NA
4,4'-DDT	1.7	5.6	56	559	33	326	978
alpha-BHC	0.077	0.24	2.4	24	418	4,175	12,525
beta-BHC	0.27	0.85	8.5	85	NA	NA	NA
Aroclor-1260	0.22	0.68	6.8	68	NA	NA	NA
delta-BHC	0.077[2]	0.24	2.4	24	418	4,175	12,525
Arsenic	0.39	1.3	13	127	20	195	586
Chromium	0.29[3]	2.0	20	198	189	1,885	5,655

LIFELONG RESIDENTS							
Chemical	**USEPA RSL[1] (mg/kg)**	**Target Cancer Risk Level**			**Target Hazard Index[4]**		
		10^{-6} (mg/kg)	**10^{-5} (mg/kg)**	**10^{-4} (mg/kg)**	**0.1 (mg/kg)**	**1 (mg/kg)**	**3 (mg/kg)**
Benzo(a)pyrene Equivalents	0.015	0.015	0.15	1.5	NA	NA	NA
4,4'-DDD	2.0	2.4	24	243	NA	NA	NA
4,4'-DDE	1.4	1.7	17	172	NA	NA	NA
4,4'-DDT	1.7	1.7	17	172	3.6	36	108
alpha-BHC	0.077	0.077	0.77	7.7	49	490	1,470
beta-BHC	0.27	0.22	2.2	22	NA	NA	NA
Aroclor-1260	0.22	0.22	2.2	22	NA	NA	NA
delta-BHC	0.077[2]	0.077	0.77	7.7	49	490	1,470
Arsenic	0.39	0.39	3.9	39	2.2	22	65
Chromium	0.29[3]	0.27	2.7	27	21	210	630

INDUSTRIAL WORKER							
Chemical	**USEPA RSL[5] (mg/kg)**	**Target Cancer Risk Level**			**Target Hazard Index**		
		10^{-6} (mg/kg)	**10^{-5} (mg/kg)**	**10^{-4} (mg/kg)**	**0.1 (mg/kg)**	**1 (mg/kg)**	**3 (mg/kg)**
Benzo(a)pyrene Equivalents	0.21	0.210	2.1	21	NA	NA	NA
4,4'-DDD	7.2	9.4	94	940	NA	NA	NA
alpha-BHC	0.27	0.27	2.7	27	505	5050	15150
delta-BHC	0.27[2]	0.27	2.7	27	460	4600	13800
Arsenic	1.6	2.0	20	200	19.5	195	585
Chromium	5.6[3]	4.5	45	450	257.1	2571	7713

Notes:
1 - USEPA Residential Regional Screening Levels for Chemical Contaminants at Superfund Sites, June 2011. [Cancer benchmark value = 1E-06, Hazard index (HI) = 1].
2 - Value is for alpha-BHC.
3 - Value is for hexavalent chromium.
4 - Value is for child resident.
5 - USEPA Industrial Regional Screening Levels for Chemical Contaminants at Superfund Sites, June 2011. [Cancer benchmark value = 1E-06, Hazard index (HI) = 1].
NA - Not applicable/not available.

TABLE 6-27
REMEDIAL GOAL OPTIONS - GROUNDWATER
SITE 27 - EQUIPMENT PARADE DECK, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

CHILD RESIDENTS								
Chemical	**USEPA RSL[1] (ug/L)**	**USEPA MCL[2] (ug/L)**	**Target Cancer Risk Level**			**Target Hazard Index**		
			10^{-6} (ug/L)	**10^{-5} (ug/L)**	**10^{-4} (ug/L)**	**0.1 (ug/L)**	**1 (ug/L)**	**3 (ug/L)**
1,2,4-Trichlorobenzene	0.99	70	2.3	23	225	4.5	45	135
1,4-Dichlorobenzene	0.42	75	13.7	137	1367	41.0	410	1230
Benzene	0.39	5	1.5	15	153	2.9	29	86
Chlorobenzene	72	100	NA	NA	NA	13	132	395
Ethylbenzene	1.3	700	7.1	71	706	60	600	1,800
Xylenes	190	10000	NA	NA	NA	143.3	1433	4300
Benzo(a)pyrene	0.0029	0.2	0.004	0.04	0.43	NA	NA	NA
Naphthalene	0.14	NA	NA	NA	NA	13	125	375
2-Methylnaphthalene	27	NA	NA	NA	NA	2	18	55
1,1-Biphenyl	0.83	NA	8.000	80.00	800.00	30	300	900
Dibenzofuran	5.8	NA	NA	NA	NA	1	6	17
4,4'-DDD	0.28	NA	0.85	8.5	85	NA	NA	NA
4,4'-DDE	0.2	NA	0.51	5.1	51	NA	NA	NA
4,4'-DDT	0.2	NA	0.53	5.3	53	0.78	7.8	23
Aldrin	0.00021	NA	0.11	1.10	11.0	0.37	3.67	11.0
alpha-BHC	0.0062	NA	0.016	0.16	1.6	6.7	67	201
alpha-Chlordane	0.19[3]	2	0.15	1.5	15	0.30	3.0	9.0
beta-BHC	0.022	NA	0.065	0.65	6.5	NA	NA	NA
delta-BHC	0.0062[4]	NA	0.018	0.18	1.8	7.0	70	210
Dieldrin	0.0015	NA	0.007	0.065	0.65	0.04	0.43	1.3
Endrin	1.7	2	NA	NA	NA	0.28	2.8	8.3
Endrin Ketone	1.7	NA	NA	NA	NA	0.20	2.0	5.9
gamma-BHC	0.036	0.2	0.14	1.4	14	0.34	3.4	10
gamma-Chlordane	0.19[3]	2	0.18	1.8	18	0.27	2.7	8.0
Heptachlor	0.0018	0.4	0.025	0.25	2.5	0.49	4.9	15
Heptachlor Epoxide	0.0033	0.2	0.008	0.08	0.78	0.008	0.08	0.23
Aluminum	16000	NA	NA	NA	NA	1620	16200	48600
Antimony	6	6	NA	NA	NA	0.58	5.8	17
Arsenic	0.045	10	0.13	1.3	13	0.46	4.6	14
Beryllium	16	4	NA	NA	NA	1.48	14.8	44.4
Chromium	0.031[5]	100	0.05	0.49	4.9	2.9	29	88
Cobalt	4.7	NA	NA	NA	NA	0.464	4.64	13.92
Iron	11000	NA	NA	NA	NA	1177	11767	35300
Manganese	320	NA	NA	NA	NA	46.1	461	1383
Nickel	300	NA	NA	NA	NA	35	350	1050
Thallium	0.16	2	NA	NA	NA	0.02	0.16	0.47
Vanadium	78	NA	NA	NA	NA	7	67	200

TABLE 6-27
REMEDIAL GOAL OPTIONS - GROUNDWATER
SITE 27 - EQUIPMENT PARADE DECK, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

ADULT RESIDENTS								
Chemical	**USEPA RSL[1] (ug/L)**	**USEPA MCL[2] (ug/L)**	**Target Cancer Risk Level**			**Target Hazard Index**		
			10^{-6} (ug/L)	**10^{-5} (ug/L)**	**10^{-4} (ug/L)**	**0.1 (ug/L)**	**1 (ug/L)**	**3 (ug/L)**
1,2,4-Trichlorobenzene	0.99	70	1.1	11	113	4.5	45	135
1,4-Dichlorobenzene	0.42	75	8.2	82	820	164	1640	4920
Benzene	0.39	5	1.2	12	115	12	115	345
Chlorobenzene	72	100	NA	NA	NA	42	417	1250
Ethylbenzene	1.3	700	4.0	40	400	240	2400	7,200
Xylenes	190	10000	NA	NA	NA	215	2150	6450
Benzo(a)pyrene	0.0029	0.2	0.009	0.09	0.87	NA	NA	NA
Naphthalene	0.14	NA	NA	NA	NA	8	83	250
2-Methylnaphthalene	27	NA	NA	NA	NA	6	60	180
1,1-Biphenyl	0.83	NA	6.000	60.00	600.00	2	15	45
Dibenzofuran	5.8	NA	NA	NA	NA	2	15	45
4,4'-DDD	0.28	NA	0.43	4.3	43	NA	NA	NA
4,4'-DDE	0.2	NA	0.36	3.6	36	NA	NA	NA
4,4'-DDT	0.2	NA	0.32	3.2	32	1.8	18	55
Aldrin	0.00021	NA	0.06	0.55	5.5	1.1	11	33
alpha-BHC	0.0062	NA	0.009	0.09	0.9	16	157	470
alpha-Chlordane	0.19[3]	2	0.10	1.0	10	0.6	6	18
beta-BHC	0.022	NA	0.033	0.33	3.3	NA	NA	NA
delta-BHC	0.0062[4]	NA	0.010	0.10	1.0	18	175	525
Dieldrin	0.0015	NA	0.004	0.043	0.43	0.1	1.3	3.9
Endrin	1.7	2	NA	NA	NA	0.7	7.3	22
Endrin Ketone	1.7	NA	NA	NA	NA	0.4	3.9	12
gamma-BHC	0.036	0.2	0.07	0.7	7	0.8	7.8	23
gamma-Chlordane	0.19[3]	2	0.08	0.8	8	0.5	5.3	16
Heptachlor	0.0018	0.4	0.016	0.16	1.6	1.2	12	37
Heptachlor Epoxide	0.0033	0.2	0.004	0.04	0.44	0.02	0.2	0.5
Aluminum	16000	NA	NA	NA	NA	3240	32400	97200
Antimony	6	6	NA	NA	NA	1.5	15	44
Arsenic	0.045	10	0.06	0.6	6	1.1	11	34
Beryllium	16	4	NA	NA	NA	3.7	37	111
Chromium	0.031[5]	100	0.07	0.73	7.3	7.3	73	219
Cobalt	4.7	NA	NA	NA	NA	1.2	12	35
Iron	11000	NA	NA	NA	NA	2353	23533	70600
Manganese	320	NA	NA	NA	NA	77	768	2305
Nickel	300	NA	NA	NA	NA	70	700	2100
Thallium	0.16	2	NA	NA	NA	0.03	0.3	1.0
Vanadium	78	NA	NA	NA	NA	20	200	600

TABLE 6-27
REMEDIAL GOAL OPTIONS - GROUNDWATER
SITE 27 - EQUIPMENT PARADE DECK, SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA

LIFELONG RESIDENTS								
Chemical	**USEPA RSL[1] (ug/L)**	**USEPA MCL[2] (ug/L)**	**Target Cancer Risk Level**			**Target Hazard Index**		
			10^{-6} (ug/L)	**10^{-5} (ug/L)**	**10^{-4} (ug/L)**	**0.1 (ug/L)**	**1 (ug/L)**	**3 (ug/L)**
1,2,4-Trichlorobenzene	0.99	70	0.9	9	90	4.5	45	135
1,4-Dichlorobenzene	0.42	75	4.8	48	482	41.0	410	1230
Benzene	0.39	5	1.2	12	115	2.9	29	86
Chlorobenzene	72	100	NA	NA	NA	13	132	395
Ethylbenzene	1.3	700	2.4	24	240	60	600	1,800
Xylenes	190	10000	NA	NA	NA	143.3	1433	4300
Benzo(a)pyrene	0.0029	0.2	0.003	0.03	0.29	NA	NA	NA
Naphthalene	0.14	NA	NA	NA	NA	13	125	375
2-Methylnaphthalene	27	NA	NA	NA	NA	2	18	55
1,1-Biphenyl	0.83	NA	2.667	26.67	266.67	30	300	900
Dibenzofuran	5.8	NA	NA	NA	NA	1	6	17
4,4'-DDD	0.28	NA	0.34	3.4	34	NA	NA	NA
4,4'-DDE	0.2	NA	0.18	1.8	18	NA	NA	NA
4,4'-DDT	0.2	NA	0.20	2.0	20	0.78	7.8	23
Aldrin	0.00021	NA	0.04	0.37	3.7	0.37	3.67	11.0
alpha-BHC	0.0062	NA	0.006	0.06	0.6	6.7	67	201
alpha-Chlordane	0.19[3]	2	0.06	0.6	6	0.30	3.0	9.0
beta-BHC	0.022	NA	0.022	0.22	2.2	NA	NA	NA
delta-BHC	0.0062[4]	NA	0.007	0.07	0.7	7.0	70	210
Dieldrin	0.0015	NA	0.003	0.026	0.26	0.04	0.43	1.3
Endrin	1.7	2	NA	NA	NA	0.28	2.8	8.3
Endrin Ketone	1.7	NA	NA	NA	NA	0.20	2.0	5.9
gamma-BHC	0.036	0.2	0.05	0.5	5	0.34	3.4	10
gamma-Chlordane	0.19[3]	2	0.05	0.5	5	0.27	2.7	8.0
Heptachlor	0.0018	0.4	0.010	0.10	1.0	0.49	4.9	15
Heptachlor Epoxide	0.0033	0.2	0.003	0.03	0.31	0.008	0.08	0.23
Aluminum	16000	NA	NA	NA	NA	1620	16200	48600
Antimony	6	6	NA	NA	NA	0.58	5.8	17
Arsenic	0.045	10	0.04	0.4	4	0.46	4.6	14
Beryllium	16	4	NA	NA	NA	1.48	14.8	44.4
Chromium	0.031[5]	100	0.03	0.29	2.9	2.9	29	88
Cobalt	4.7	NA	NA	NA	NA	0.464	4.64	13.92
Iron	11000	NA	NA	NA	NA	1177	11767	35300
Manganese	320	NA	NA	NA	NA	46.1	461	1383
Nickel	300	NA	NA	NA	NA	35	350	1050
Thallium	0.16	2	NA	NA	NA	0.02	0.16	0.47
Vanadium	78	NA	NA	NA	NA	7	67	200

Notes:
1 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, June, 2011. [Cancer benchmark value = 1E-06, Hazard index (HI) = 1].
2 - 2011 Edition of the Drinking Water Standards and Health Advisories (USEPA, January 2011).
3 - Value is for chlordane.
4 - Value is for alpha-BHC.
5 - Value is for hexavalent chromium.
6 - Value is for vanadium and compounds.
7 - Value is for child resident.
NA - Not applicable/not available.

TABLE 6-28

SCREENING CRITERIA FOR SOIL
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

CAS No.	Parameter	USEPA Regional Screening Levels[1]	
		Direct Contact Residential	Protection of Groundwater
Volatile Organic Compounds (ug/kg)			
120-82-1	1,2,4-Trichlorobenzene	6,200 N[2]	2.9
95-50-1	1,2-Dichlorobenzene	190,000 N	270
541-73-1	1,3-Dichlorobenzene	2,400 C[3]	0.4 [3]
106-46-7	1,4-Dichlorobenzene	2,400 C	0.4
78-93-3	2-Butanone	2,800,000 N	1,000
591-78-6	2-Hexanone	21,000 N	7.9
67-64-1	Acetone	6,100,000 N	2,400
71-43-2	Benzene	1,100 C	0.2
75-15-0	Carbon Disulfide	82,000 N	210
56-23-5	Carbon Tetrachloride	610 C	0.15
108-90-7	Chlorobenzene	29,000 N	49
67-66-3	Chloroform	290 C	0.053
74-87-3	Chloromethane	12,000 N	49
110-82-7	Cyclohexane	700,000 N	13,000
100-41-4	Ethylbenzene	5,400 C	1.5
98-82-8	Isopropylbenzene	210,000 N	640
- -	m+p-Xylenes	59,000 N[4]	180 [4]
79-20-9	Methyl Acetate	7,800,000 N	3,200
108-87-2	Methyl Cyclohexane	NA	NA
75-09-2	Methylene Chloride	36,000 N[2][5]	1.2
95-47-6	o-Xylene	69,000 N	190
127-18-4	Tetrachloroethene	8,600 N[2][5]	0.033
108-88-3	Toluene	500,000 N	590
1330-20-7	Total Xylenes	63,000 N	190
Semivolatile Organic Compounds (ug/kg)			
90-12-0	1-Methylnaphthalene	22,000 C	5.1
91-57-6	2-Methylnaphthalene	31,000 N	140
83-32-9	Acenaphthene	340,000 N	4,100
98-86-2	Acetophenone	780,000 N	450
208-96-8	Acenaphthylene	340,000 N[6]	4,100 [6]
120-12-7	Anthracene	1,700,000 N	42,000
- -	Benzo(a)pyrene Equivalents	15 C	NA
100-52-7	Benzaldehyde	780,000 N	330
56-55-3	Benzo(a)anthracene	150 C	10
50-32-8	Benzo(a)pyrene	15 C	3.5
205-99-2	Benzo(b)fluoranthene	150 C	35
191-24-2	Benzo(g,h,i)perylene	170,000 N[7]	9,500 [7]
207-08-9	Benzo(k)fluoranthene	1,500 C	350
117-81-7	Bis(2-ethylhexyl)phthalate	35,000 C	17
86-74-8	Carbazole	NA	NA
218-01-9	Chrysene	15,000 C	1,100

TABLE 6-28

SCREENING CRITERIA FOR SOIL
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

CAS No.	Parameter	USEPA Regional Screening Levels[1]	
		Direct Contact Residential	Protection of Groundwater
Semivolatile Organic Compounds (ug/kg) (Continued)			
53-70-3	Dibenzo(a,h)anthracene	15 C	11
132-64-9	Dibenzofuran	7,800 N	110
117-84-0	di-n-Octyl Phthalate	NA	NA
206-44-0	Fluoranthene	230,000 N	70,000
86-73-7	Fluorene	230,000 N	4,000
193-39-5	Indeno(1,2,3-cd)pyrene	150 C	120
91-20-3	Naphthalene	3,600 C	0.47
87-86-5	Pentachlorophenol		
85-01-8	Phenanthrene	170,000 N[7]	9,500 [7]
129-00-0	Pyrene	170,000 N	9,500
Pesticides/PCBs (ug/kg)			
72-54-8	4,4'-DDD	2,000 C	66
72-55-9	4,4'-DDE	1,400 C	46
50-29-3	4,4'-DDT	1,700 C	67
309-00-2	Aldrin	29 C	0.034
319-84-6	alpha-BHC	77 C	0.036
5103-71-9	alpha-Chlordane	1,600 C[8]	13 [8]
11096-82-5	Aroclor-1260	220 C	24
319-85-7	beta-BHC	270 C	0.13
319-86-8	delta-BHC	77 C[9]	0.036 [9]
60-57-1	Dieldrin	30 C	0.061
959-98-8	Endosulfan I	37,000 N[10]	1,100 [10]
33213-65-9	Endosulfan II	37,000 N[10]	1,100 [10]
1031-07-8	Endosulfan Sulfate	37,000 N[10]	1,100 [10]
72-20-8	Endrin	1,800 N	68
7421-93-4	Endrin Aldehyde	1,800 N[11]	68 [11]
53494-70-5	Endrin Ketone	1,800 N[11]	68 [11]
58-89-9	gamma-BHC (Lindane)	520 C	0.21
5103-74-2	gamma-Chlordane	1,600 C[8]	13 [8]
76-44-8	Heptachlor	110 C	0.14
1024-57-3	Heptachlor Epoxide	53 C	0.068
72-43-5	Methoxychlor	31,000 N	1,500
Metals (mg/kg)			
7429-90-5	Aluminum	7,700 N	23,000
7440-36-0	Antimony	3.1 N	0.27
7440-38-2	Arsenic	0.39 C	0.0013
7440-39-3	Barium	1,500 N	120
7440-41-7	Beryllium	16 N	13
7440-43-9	Cadmium	7 N	0.52
7440-70-2	Calcium	NA	NA
7440-47-3	Chromium	0.29 C[12]	0.00059 [12]

TABLE 6-28

SCREENING CRITERIA FOR SOIL
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

CAS No.	Parameter	USEPA Regional Screening Levels[1]	
		Direct Contact Residential	Protection of Groundwater
Metals (mg/kg) (Continued)			
7440-48-4	Cobalt	2.3 N	0.21
7440-50-8	Copper	310 N	22
7439-89-6	Iron	5,500 N	270
7439-92-1	Lead	400	14 [13]
7439-95-4	Magnesium	NA	NA
7439-96-5	Manganese	180 N	21
7439-97-6	Mercury	2.3 N[14]	0.033
7440-02-0	Nickel	150 N	20
7440-09-7	Potassium	NA	NA
7782-49-2	Selenium	39 N	0.4
7440-22-4	Silver	39 N	0.6
7440-23-5	Sodium	NA	NA
7440-28-0	Thallium	0.078 N	0.011
7440-62-2	Vanadium	39 N[15]	78
7440-66-6	Zinc	2,300 N	290

1 - USEPA Regional Screening Level, November 2011. Carcinogenic values represent an incremental cancer risk of 1E-06. The noncarcinogenic values are the RSL divided by 10 to correspond to a Target Hazard Quotient of 0.1. Protection of groundwater values are risk-based SSLs.
2 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
3 - Value is for 1,4-dichlorobenzene.
4 - Value is for m-xylene.
5 - The screening level was calculated using revised toxicity criteria from USEPA's Integrated Risk Information System.
6 - Acenaphthene is used as a surrogate for acenaphthylene.
7 - Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
8 - Value is for chlordane.
9 - Value is for alpha-BHC.
10 - Value is for Endosulfan.
11 - Value is for Endrin.
12 - Value is for hexavalent chromium.
13 - Value is MCL based soil screening level.
14 - Value is for mercuric chloride (and other mercury salts).
15 - Value is for vanadium and compounds.

TABLE 6-29

SCREENING CRITERIA FOR GROUNDWATER
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

CAS No.	Parameter	USEPA Regional Screening Level - Tap Water[1]	USEPA Maximum Contaminant Level[2]	Groundwater Volatilization Criteria[3]
Volatile Organic Compounds (ug/L)				
67-64-1	Acetone	1,200 N	NA	NA
75-15-0	Carbon Disulfide	72 N	NA	120 N
100-41-4	Ethylbenzene	1.3 C	700	3 C
- -	m+p-Xylenes	19 N[4]	10,000	36 N[4]
95-47-6	o-Xylene	19 N	10,000	49 N
1330-20-7	Total Xylenes	19 N	10,000	49 N
Semivolatile Organic Compounds (ug/L)				
90-12-0	1-Methylnaphthalene	0.97 C	NA	NA
91-57-6	2-Methylnaphthalene	2.7 N	NA	NA
83-32-9	Acenaphthene	40 N	NA	NA
206-44-0	Fluoranthene	63 N	NA	NA
86-73-7	Fluorene	22 N	NA	NA
91-20-3	Naphthalene	0.14 C	NA	3.9 C
85-01-8	Phenanthrene	8.7 N[5]	NA	NA
129-00-0	Pyrene	8.7 N	NA	NA
Pesticides/PCBs (ug/L)				
72-54-8	4,4'-DDD	0.28 C	NA	NA
72-55-9	4,4'-DDE	0.2 C	NA	NA
50-29-3	4,4'-DDT	0.2 C	NA	NA
319-84-6	alpha-BHC	0.0062 C	NA	NA
5103-71-9	alpha-Chlordane	0.19 C[6]	2	NA
319-85-7	beta-BHC	0.022 C	NA	NA
319-86-8	delta-BHC	0.0062 C[7]	NA	NA
60-57-1	Dieldrin	0.0015 C	NA	NA
58-89-9	gamma-BHC (Lindane)	0.036 C	0.2	NA
5103-74-2	gamma-Chlordane	0.19 C[6]	2	NA
76-44-8	Heptachlor	0.0018 C	0.4	NA
1024-57-3	Heptachlor Epoxide	0.0033 C	0.2	NA
Metals (ug/L)				
7429-90-5	Aluminum	1,600 N	NA	NA
7440-36-0	Antimony	0.6 N	6	NA
7440-38-2	Arsenic	0.045 C	10	NA
7440-39-3	Barium	290 N	2,000	NA
7440-41-7	Beryllium	1.6 N	4	NA
7440-43-9	Cadmium	0.69 N	5	NA
7440-70-2	Calcium	NA	NA	NA
7440-47-3	Chromium	0.031 C[8]	100	NA
7440-48-4	Cobalt	0.47 N	NA	NA
7440-50-8	Copper	62 N	1,300	NA
7439-89-6	Iron	1,100 N	NA	NA
7439-92-1	Lead	NA	15	NA
7439-95-4	Magnesium	NA	NA	NA
7439-96-5	Manganese	32 N	NA	NA
7439-97-6	Mercury	0.43 N[9]	2	NA
7440-02-0	Nickel	30 N	NA	NA
7440-09-7	Potassium	NA	NA	NA

TABLE 6-29

SCREENING CRITERIA FOR GROUNDWATER
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

CAS No.	Parameter	USEPA Regional Screening Level - Tap Water[1]	USEPA Maximum Contaminant Level[2]	Groundwater Volatilization Criteria[3]
Metals (ug/L) (continued)				
7782-49-2	Selenium	7.8 N	50	NA
7440-23-5	Sodium	NA	NA	NA
7440-62-2	Vanadium	7.8 N[10]	NA	NA
7440-66-6	Zinc	470 N	NA	NA

1 - USEPA Regional Screening Level, November 2011. Carcinogenic values represent an incremental cancer risk of 1E-06. The noncarcinogenic values are the RSL divided by 10 to correspond to a Target Hazard Quotient of 0.1.
2 - 2011 Edition of the Drinking Water Standards and Health Advisories.
3 - Calculated using USEPA's Vapor Intrusion Screening Level (VISL) calculator (USEPA, March 2012) and toxicity criteria from USEPA's November 2011 Regional Screening Level table. Values correspond to a target cancer risk level of 1E-06 or HQ of 0.1 and an attenuation factor of 0.001.
4 - Value is for m-xylene.
5 - Pyrene is used as a surrogate for phenanthrene.
6 - Value is for chlordane.
7 - Value is for alpha-BHC.
8 - Value is for hexavalent chromium.
9 - Value is for mercuric chloride (and other mercury salts).
10 - Value is for vanadium and compounds.

TABLE 6-30
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Residential Soil[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 9 and 16	**METALS**														
	7429-90-5	Aluminum	1620	5550	MG/KG	PAI-9/16MW05-0001	18/18	-	5550	NA	7700 N	NA	NA	No	BSL
	7440-36-0	**Antimony**	0.34 J	4.7	MG/KG	PI-009-02_33	2/18	0.36 - 1.32	4.7	NA	**3.1 N**	NA	NA	**Yes**	ASL
	7440-38-2	**Arsenic**	0.56 J	8.4	MG/KG	PI-009-02_33	15/18	0.99 - 2.39	8.4	NA	**0.39 C**	NA	NA	**Yes**	ASL
	7440-39-3	Barium	10.3 J	104	MG/KG	PI-009-02_33	18/18	-	104	NA	1500 N	NA	NA	No	BSL
	7440-41-7	Beryllium	0.04 J	3.7	MG/KG	PI-009-02_33	12/18	0.04 - 0.32	3.7	NA	16 N	NA	NA	No	BSL
	7440-43-9	Cadmium	0.62 J	3.1	MG/KG	PI-009-02_33	3/18	0.08 - 0.49	3.1	NA	7 N	NA	NA	No	BSL
	7440-70-2	Calcium	339 J	188000	MG/KG	PAI-9/16-SO03-01	18/18	-	188000	NA	NA	NA	NA	No	NUT
	7440-47-3	**Chromium**	2.41	105	MG/KG	PI-009-02_33	18/18	-	105	NA	**0.29 C[7]**	NA	NA	**Yes**	ASL
	7440-48-4	**Cobalt**	0.28 J	23.5	MG/KG	PI-009-02_33	7/18	0.25 - 1.14	23.5	NA	**2.3 N**	NA	NA	**Yes**	ASL
	7440-50-8	**Copper**	1.09	615	MG/KG	PI-009-02_33	18/18	-	615	NA	**310 N**	NA	NA	**Yes**	ASL
	7439-89-6	**Iron**	1160	16700	MG/KG	PI-009-02_33	18/18	-	16700	NA	**5500 N**	NA	NA	**Yes**	ASL
	7439-92-1	**Lead**	6.58	826	MG/KG	PI-009-02_33	17/18	12.7 - 12.7	826	NA	**400**	NA	NA	**Yes**	ASL
	7439-95-4	Magnesium	105	2300	MG/KG	PAI-9/16-SO03-01	18/18	-	2300	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	8.99	178	MG/KG	PI-009-02_33	18/18	-	178	NA	180 N	NA	NA	No	BSL
	7439-97-6	Mercury	0.0166 J	0.4	MG/KG	PI-009-02_33	15/18	0.00993 - 0.05	0.4	NA	2.3 N[8]	NA	NA	No	BSL
	7440-02-0	**Nickel**	1.01 J	253	MG/KG	PI-009-02_33	16/18	1.35 - 1.45	253	NA	**150 N**	NA	NA	**Yes**	ASL
	7440-09-7	Potassium	71.3	662	MG/KG	PI-009-01_32	8/18	183 - 381	662	NA	NA	NA	NA	No	NUT
	7782-49-2	Selenium	0.23 J	0.91	MG/KG	PI-009-02_33	9/18	0.25 - 0.41	0.91	NA	39 N	NA	NA	No	BSL
	7440-22-4	Silver	0.07 J	0.56	MG/KG	PI-009-02_33	2/18	0.1 - 0.32	0.56	NA	39 N	NA	NA	No	BSL
	7440-23-5	Sodium	42.7 J	715	MG/KG	PI-009-02_33	15/18	102 - 109	715	NA	NA	NA	NA	No	NUT
	7440-28-0	**Thallium**	0.42 J	0.42 J	MG/KG	PAI-9/16-SO03-01	1/18	0.26 - 0.63	0.42	NA	**0.078 N**	NA	NA	**Yes**	ASL
	7440-62-2	Vanadium	2.24	12.9	MG/KG	PI-009-02_33	18/18	-	12.9	NA	39 N[9]	NA	NA	No	BSL
	7440-66-6	**Zinc**	10.4	3490	MG/KG	PI-009-02_33	18/18	-	3490	NA	**2300 N**	NA	NA	**Yes**	ASL
	SEMIVOLATILES														
	100-52-7	Benzaldehyde	29 J	29 J	UG/KG	PAI-9/16-SO02B-01	1/15	69 - 260	29	NA	780000 N	NA	NA	No	BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	70 J	110 J	UG/KG	PAI-9/16-SO02A-01	3/18	69 - 360	110	NA	35000 C	NA	NA	No	BSL
	86-74-8	Carbazole	34 J	34 J	UG/KG	PI-009-03_34	1/18	69 - 360	34	NA	NA	NA	NA	No	NTX
	117-84-0	di-n-Octyl Phthalate	80 J	80 J	UG/KG	PAI-9/16-SO05A-01	1/18	69 - 360	80	NA	NA	NA	NA	No	NTX
	87-86-5	Pentachlorophenol	23 J	23 J	UG/KG	PI-009-01_32	1/18	69 - 910	23	NA	890 C	NA	NA	No	BSL
	VOLATILES														
	120-82-1	1,2,4-Trichlorobenzene	1.9 J	1.9 J	UG/KG	PAI-9/16MW05-0001	1/16	0.95 - 3	1.9	NA	6200 N[10]	NA	NA	No	BSL
	78-93-3	2-Butanone	2.5 J	11 J	UG/KG	PAI-9/16MW05-0001	9/19	2.4 - 11	11	NA	2800000 N	NA	NA	No	BSL
	67-64-1	Acetone	17	140	UG/KG	PAI-9/16-SO04C-01	16/19	10 - 11	140	NA	6100000 N	NA	NA	No	BSL
	71-43-2	Benzene	0.32 J	0.32 J	UG/KG	PAI-9/16-SO04A-01	1/19	0.95 - 11	0.32	NA	1100 C	NA	NA	No	BSL
	75-15-0	Carbon Disulfide	2.5 J	2.5 J	UG/KG	PAI-9/16MW05-0001	1/19	0.24 - 11	2.5	NA	82000 N	NA	NA	No	BSL
	56-23-5	Carbon Tetrachloride	6 J	6 J	UG/KG	PI-009-02_33	1/19	0.95 - 10	6	NA	610 C	NA	NA	No	BSL
	108-90-7	Chlorobenzene	0.88 J	1.3 J	UG/KG	PAI-9/16-SO04A-01	3/19	0.24 - 11	1.3	NA	29000 N	NA	NA	No	BSL
	67-66-3	Chloroform	11	11	UG/KG	PI-009-02_33	1/19	0.95 - 10	11	NA	290 C	NA	NA	No	BSL
	79-20-9	Methyl Acetate	1.5 J	53	UG/KG	PAI-9/16-SO02-01	12/16	2.6 - 3.6	53	NA	7800000 N	NA	NA	No	BSL
	127-18-4	Tetrachloroethene	2 J	2 J	UG/KG	PI-009-02_33, PI-009-03_34	2/19	2.4 - 10	2	NA	8600 N[10][11]	NA	NA	No	BSL
	POLYCYCLIC AROMATIC HYDROCARBONS														
	90-12-0	1-Methylnaphthalene	0.63 J	35	UG/KG	PAI-9/16-SO02B-01	14/16	10 - 10	35	NA	22000 C	NA	NA	No	BSL
	91-57-6	2-Methylnaphthalene	0.79 J	43	UG/KG	PAI-9/16-SO02B-01	14/19	10 - 360	43	NA	31000 N	NA	NA	No	BSL
	83-32-9	Acenaphthene	0.79 J	8.7 J	UG/KG	PAI-9/16-SO04A-01	10/19	8.5 - 360	8.7	NA	340000 N	NA	NA	No	BSL
	208-96-8	Acenaphthylene	0.68 J	9.8	UG/KG	PAI-9/16-SO06-01	11/19	8.7 - 360	9.8	NA	340000 N[12]	NA	NA	No	BSL

TABLE 6-30
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Residential Soil[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 9 and 16	**POLYCYCLIC AROMATIC HYDROCARBONS (continued)**														
	120-12-7	Anthracene	0.49 J	17 J	UG/KG	PAI-9/16-SO04A-01	12/19	8.7 - 360	17	NA	1700000 N	NA	NA	No	BSL
	-	**Bap Equivalent**	9.3278	905.02	UG/KG	PI-009-02_33	16/17	350 - 350	905.02	NA	**15 C**	NA	NA	**Yes**	ASL
	56-55-3	**Benzo(a)anthracene**	2.2 J	310 J	UG/KG	PI-009-02_33	18/19	350 - 350	310	NA	**150 C**	NA	NA	**Yes**	ASL
	50-32-8	**Benzo(a)pyrene**	4.5 J	580	UG/KG	PI-009-02_33	17/19	8.8 - 350	580	NA	**15 C**	NA	NA	**Yes**	ASL
	205-99-2	**Benzo(b)fluoranthene**	7 J	610	UG/KG	PI-009-02_33	15/19	8.8 - 350	610	NA	**150 C**	NA	NA	**Yes**	ASL
	191-24-2	Benzo(g,h,i)perylene	5.9 J	380	UG/KG	PI-009-02_33	16/19	8.8 - 350	380	NA	170000 N[13]	NA	NA	No	BSL
	207-08-9	Benzo(k)fluoranthene	5.1 J	560	UG/KG	PI-009-02_33	15/19	8.8 - 350	560	NA	1500 C	NA	NA	No	BSL
	218-01-9	Chrysene	6.8 J	420	UG/KG	PI-009-02_33	16/19	3.3 - 350	420	NA	15000 C	NA	NA	No	BSL
	53-70-3	Dibenzo(a,h)anthracene	1.6 J	14	UG/KG	PAI-9/16-SO02B-01	8/19	8.5 - 360	14	NA	15 C	NA	NA	No	BSL
	206-44-0	Fluoranthene	5.3 J	300 J	UG/KG	PI-009-02_33	18/19	350 - 350	300	NA	230000 N	NA	NA	No	BSL
	86-73-7	Fluorene	0.59 J	7 J	UG/KG	PAI-9/16-SO04A-01	11/19	8.5 - 360	7	NA	230000 N	NA	NA	No	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	5.1 J	470	UG/KG	PI-009-02_33	15/19	8.5 - 350	470	NA	**150 C**	NA	NA	**Yes**	ASL
	91-20-3	Naphthalene	0.78 J	30	UG/KG	PAI-9/16-SO02B-01	12/19	9 - 360	30	NA	3600 C	NA	NA	No	BSL
	85-01-8	Phenanthrene	3.4 J	99	UG/KG	PAI-9/16-SO04A-01	18/19	350 - 350	99	NA	170000 N[13]	NA	NA	No	BSL
	129-00-0	Pyrene	5.1 J	460	UG/KG	PI-009-02_33	18/19	350 - 350	460	NA	170000 N	NA	NA	No	BSL
	PESTICIDES/PCBS														
	72-54-8	4,4'-DDD	0.34 J	640 JJ	UG/KG	PAI-9/16MW05-0001	15/18	35 - 110	640	NA	2000 C	NA	NA	No	BSL
	72-55-9	**4,4'-DDE**	2 J	8400	UG/KG	PAI-9/16MW05-0001	18/18	-	8400	NA	**1400 C**	NA	NA	**Yes**	ASL
	50-29-3	**4,4'-DDT**	2.6 J	12000	UG/KG	PAI-9/16MW05-0001	18/18	-	12000	NA	**1700 C**	NA	NA	**Yes**	ASL
	309-00-2	Aldrin	0.08 J	6.8	UG/KG	PAI-9/16-SO06-01	7/18	0.2 - 170	6.8	NA	29 C	NA	NA	No	BSL
	319-84-6	alpha-BHC	0.11 J	57 J	UG/KG	PAI-9/16MW05-0001	5/18	0.2 - 36	57	NA	77 C	NA	NA	No	BSL
	5103-71-9	**alpha-Chlordane**	0.2 J	16000 J	UG/KG	PAI-9/16MW05-0001	16/18	42 - 62	16000	NA	**1600 C[14]**	NA	NA	**Yes**	ASL
	11096-82-5	**Aroclor-1260**	810 J	810 J	UG/KG	PI-009-02_33	1/17	6.1 - 700	810	NA	**220 C**	NA	NA	**Yes**	ASL
	319-85-7	**beta-BHC**	0.19 J	580	UG/KG	PAI-9/16MW05-0001	8/18	0.15 - 36	580	NA	**270 C**	NA	NA	**Yes**	ASL
	319-86-8	delta-BHC	0.082 J	73 J	UG/KG	PAI-9/16MW05-0001	7/18	0.21 - 36	73	NA	77 C[15]	NA	NA	No	BSL
	60-57-1	Dieldrin	0.078 J	15	UG/KG	PAI-9/16-SO06-01	9/18	0.16 - 340	15	NA	30 C	NA	NA	No	BSL
	959-98-8	Endosulfan I	0.16 J	3.8 J	UG/KG	PAI-9/16-SO06-01	6/17	0.2 - 36	3.8	NA	37000 N[16]	NA	NA	No	BSL
	33213-65-9	Endosulfan II	0.13 J	4 J	UG/KG	PAI-9/16-SO06-01	9/18	0.16 - 340	4	NA	37000 N[16]	NA	NA	No	BSL
	1031-07-8	Endosulfan Sulfate	0.079 J	6.6 J	UG/KG	PAI-9/16-SO05-01	10/18	0.16 - 70	6.6	NA	37000 N[16]	NA	NA	No	BSL
	72-20-8	**Endrin**	0.058 J	3700 J	UG/KG	PAI-9/16MW05-0001	9/18	0.16 - 70	3700	NA	**1800 N**	NA	NA	**Yes**	ASL
	7421-93-4	Endrin Aldehyde	0.14 J	1600 J	UG/KG	PAI-9/16MW05-0001	14/18	0.42 - 70	1600	NA	1800 N[17]	NA	NA	No	BSL
	53494-70-5	Endrin Ketone	0.066 J	50 J	UG/KG	PAI-9/16MW05-0001	10/18	0.16 - 70	50	NA	1800 N[17]	NA	NA	No	BSL
	58-89-9	gamma-BHC (Lindane)	0.13 J	14 J	UG/KG	PAI-9/16MW05-0001	2/18	0.064 - 36	14	NA	520 C	NA	NA	No	BSL
	5103-74-2	**gamma-Chlordane**	0.18 J	14000	UG/KG	PAI-9/16MW05-0001	15/18	0.2 - 0.25	14000	NA	**1600 C[14]**	NA	NA	**Yes**	ASL
	76-44-8	**Heptachlor**	0.13 J	930	UG/KG	PAI-9/16MW05-0001	6/18	0.2 - 36	930	NA	**110 C**	NA	NA	**Yes**	ASL
	1024-57-3	Heptachlor Epoxide	0.063 J	8.8	UG/KG	PAI-9/16-SO06-01	11/18	0.2 - 36	8.8	NA	53 C	NA	NA	No	BSL
	72-43-5	Methoxychlor	0.54 J	80 J	UG/KG	PAI-9/16MW05-0001	6/18	3.4 - 360	80	NA	31000 N	NA	NA	No	BSL

TABLE 6-30
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	Adjusted USEPA RSL Residential Soil(5)	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background data is available.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2011. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for hexavalent chromium.
8 - Value is for mercuric chloride (and other Mercury salts).
9 - Value is for vanadium and compounds.
10 - Ten percent of noncarcinogenic screening level is less then the carcinogenic screening level, therefore the noncarcinogenic value is presented.
11 - The screening level was calculated using revised toxicity criteria from USEPA's Integrated Risk Information System.
12 - Acenaphthene is used as a surrogate for acenaphthylene.
13 - Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
14 - Value is for chlordane.
15 - Value is for alpha-BHC.
16 - Value is for Endosulfan.
17 - Value is for Endrin.
Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

Associated Samples
PI-009-01_32
PI-009-02_33
PI-009-03_34
PAI-9/16MW05-0001
PAI-9/16MW05-0001RA
PAI-9/16-SO01-01
PAI-9/16-SO02-01
PAI-9/16-SO02A-01
PAI-9/16-SO02B-01
PAI-9/16-SO03-01
PAI-9/16-SO04-01
PAI-9/16-SO04A-01
PAI-9/16-SO04B-01
PAI-9/16-SO04B-01-AVG
PAI-9/16-SO04B-01-D
PAI-9/16-SO04C-01
PAI-9/16-SO05-01
PAI-9/16-SO05A-01
PAI-9/16-SO06-01
PAI-9/16-SO06A-01
PAI-9/16-SO07-01

TABLE 6-31
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SURFACE SOIL TO GROUNDWATER
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL Protection of Groundwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 9 and 16	**METALS**														
	7429-90-5	Aluminum	1620	5550	MG/KG	PAI-9/16MW05-0001	18/18	-	5550	NA	23000	NA	NA	No	BSL
	7440-36-0	**Antimony**	0.34 J	4.7	MG/KG	PI-009-02_33	2/18	0.36 - 1.32	4.7	NA	**0.27**	NA	NA	**Yes**	ASL
	7440-38-2	**Arsenic**	0.56 J	8.4	MG/KG	PI-009-02_33	15/18	0.99 - 2.39	8.4	NA	**0.0013**	NA	NA	**Yes**	ASL
	7440-39-3	Barium	10.3 J	104	MG/KG	PI-009-02_33	18/18	-	104	NA	120	NA	NA	No	BSL
	7440-41-7	Beryllium	0.04 J	3.7	MG/KG	PI-009-02_33	12/18	0.04 - 0.32	3.7	NA	13	NA	NA	No	BSL
	7440-43-9	**Cadmium**	0.62 J	3.1	MG/KG	PI-009-02_33	3/18	0.08 - 0.49	3.1	NA	**0.52**	NA	NA	**Yes**	ASL
	7440-70-2	Calcium	339 J	188000	MG/KG	PAI-9/16-SO03-01	18/18	-	188000	NA	NA	NA	NA	No	NUT
	7440-47-3	**Chromium**	2.41	105	MG/KG	PI-009-02_33	18/18	-	105	NA	**0.00059** [7]	NA	NA	**Yes**	ASL
	7440-48-4	**Cobalt**	0.28 J	23.5	MG/KG	PI-009-02_33	7/18	0.25 - 1.14	23.5	NA	**0.21**	NA	NA	**Yes**	ASL
	7440-50-8	**Copper**	1.09	615	MG/KG	PI-009-02_33	18/18	-	615	NA	**22**	NA	NA	**Yes**	ASL
	7439-89-6	**Iron**	1160	16700	MG/KG	PI-009-02_33	18/18	-	16700	NA	**270**	NA	NA	**Yes**	ASL
	7439-92-1	**Lead**	6.58	826	MG/KG	PI-009-02_33	17/18	12.7 - 12.7	826	NA	**14** [8]	NA	NA	**Yes**	ASL
	7439-95-4	Magnesium	105	2300	MG/KG	PAI-9/16-SO03-01	18/18	-	2300	NA	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	8.99	178	MG/KG	PI-009-02_33	18/18	-	178	NA	**21**	NA	NA	**Yes**	ASL
	7439-97-6	**Mercury**	0.0166 J	0.4	MG/KG	PI-009-02_33	15/18	0.00993 - 0.05	0.4	NA	**0.033**	NA	NA	**Yes**	ASL
	7440-02-0	**Nickel**	1.01 J	253	MG/KG	PI-009-02_33	16/18	1.35 - 1.45	253	NA	**20**	NA	NA	**Yes**	ASL
	7440-09-7	Potassium	71.3	662	MG/KG	PI-009-01_32	8/18	183 - 381	662	NA	NA	NA	NA	No	NUT
	7782-49-2	**Selenium**	0.23 J	0.91	MG/KG	PI-009-02_33	9/18	0.25 - 0.41	0.91	NA	**0.4**	NA	NA	**Yes**	ASL
	7440-22-4	Silver	0.07 J	0.56	MG/KG	PI-009-02_33	2/18	0.1 - 0.32	0.56	NA	0.6	NA	NA	No	BSL
	7440-23-5	Sodium	42.7 J	715	MG/KG	PI-009-02_33	15/18	102 - 109	715	NA	NA	NA	NA	No	NUT
	7440-28-0	**Thallium**	0.42 J	0.42 J	MG/KG	PAI-9/16-SO03-01	1/18	0.26 - 0.63	0.42	NA	**0.011**	NA	NA	**Yes**	ASL
	7440-62-2	Vanadium	2.24	12.9	MG/KG	PI-009-02_33	18/18	-	12.9	NA	78 [9]	NA	NA	No	BSL
	7440-66-6	**Zinc**	10.4	3490	MG/KG	PI-009-02_33	18/18	-	3490	NA	**290**	NA	NA	**Yes**	ASL
	SEMIVOLATILES														
	100-52-7	Benzaldehyde	29 J	29 J	UG/KG	PAI-9/16-SO02B-01	1/15	69 - 260	29	NA	330	NA	NA	No	BSL
	117-81-7	**Bis(2-ethylhexyl)phthalate**	70 J	110 J	UG/KG	PAI-9/16-SO02A-01	3/18	69 - 360	110	NA	**17**	NA	NA	**Yes**	ASL
	86-74-8	Carbazole	34 J	34 J	UG/KG	PI-009-03_34	1/18	69 - 360	34	NA	NA	NA	NA	No	NTX
	117-84-0	di-n-Octyl Phthalate	80 J	80 J	UG/KG	PAI-9/16-SO05A-01	1/18	69 - 360	80	NA	NA	NA	NA	No	NTX
	87-86-5	**Pentachlorophenol**	23 J	23 J	UG/KG	PI-009-01_32	1/18	69 - 910	23	NA	**1.7**	NA	NA	**Yes**	ASL
	VOLATILES														
	120-82-1	1,2,4-Trichlorobenzene	1.9 J	1.9 J	UG/KG	PAI-9/16MW05-0001	1/16	0.95 - 3	1.9	NA	2.9	NA	NA	No	BSL
	78-93-3	2-Butanone	2.5 J	11 J	UG/KG	PAI-9/16MW05-0001	9/19	2.4 - 11	11	NA	1000	NA	NA	No	BSL
	67-64-1	Acetone	17	140	UG/KG	PAI-9/16-SO04C-01	16/19	10 - 11	140	NA	2400	NA	NA	No	BSL
	71-43-2	**Benzene**	0.32 J	0.32 J	UG/KG	PAI-9/16-SO04A-01	1/19	0.95 - 11	0.32	NA	**0.2**	NA	NA	**Yes**	ASL
	75-15-0	Carbon Disulfide	2.5 J	2.5 J	UG/KG	PAI-9/16MW05-0001	1/19	0.24 - 11	2.5	NA	210	NA	NA	No	BSL
	56-23-5	**Carbon Tetrachloride**	6 J	6 J	UG/KG	PI-009-02_33	1/19	0.95 - 10	6	NA	**0.15**	NA	NA	**Yes**	ASL
	108-90-7	Chlorobenzene	0.88 J	1.3 J	UG/KG	PAI-9/16-SO04A-01	3/19	0.24 - 11	1.3	NA	49	NA	NA	No	BSL
	67-66-3	**Chloroform**	11	11	UG/KG	PI-009-02_33	1/19	0.95 - 10	11	NA	**0.053**	NA	NA	**Yes**	ASL
	79-20-9	Methyl Acetate	1.5 J	53	UG/KG	PAI-9/16-SO02-01	12/16	2.6 - 3.6	53	NA	3200	NA	NA	No	BSL
	127-18-4	**Tetrachloroethene**	2 J	2 J	UG/KG	PI-009-02_33, PI-009-03_34	2/19	2.4 - 10	2	NA	**0.033**	NA	NA	**Yes**	ASL
	POLYCYCLIC AROMATIC HYDROCARBONS														
	90-12-0	**1-Methylnaphthalene**	0.63 J	35	UG/KG	PAI-9/16-SO02B-01	14/16	10 - 10	35	NA	**5.1**	NA	NA	**Yes**	ASL
	91-57-6	2-Methylnaphthalene	0.79 J	43	UG/KG	PAI-9/16-SO02B-01	14/19	10 - 360	43	NA	140	NA	NA	No	BSL
	83-32-9	Acenaphthene	0.79 J	8.7 J	UG/KG	PAI-9/16-SO04A-01	10/19	8.5 - 360	8.7	NA	4100	NA	NA	No	BSL

TABLE 6-31
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SURFACE SOIL TO GROUNDWATER
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL Protection of Groundwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 9 and 16	**POLYCYCLIC AROMATIC HYDROCARBONS (continued)**														
	208-96-8	Acenaphthylene	0.68 J	9.8	UG/KG	PAI-9/16-SO06-01	11/19	8.7 - 360	9.8	NA	4100 [10]	NA	NA	No	BSL
	120-12-7	Anthracene	0.49 J	17 J	UG/KG	PAI-9/16-SO04A-01	12/19	8.7 - 360	17	NA	42000	NA	NA	No	BSL
	-	Bap Equivalent	9.3278	905.02	UG/KG	PI-009-02_33	16/17	350 - 350	905.02	NA	NA	NA	NA	No	NTX
	56-55-3	**Benzo(a)anthracene**	2.2 J	310 J	UG/KG	PI-009-02_33	18/19	350 - 350	310	NA	**10**	NA	NA	**Yes**	ASL
	50-32-8	**Benzo(a)pyrene**	4.5 J	580	UG/KG	PI-009-02_33	17/19	8.8 - 350	580	NA	**3.5**	NA	NA	**Yes**	ASL
	205-99-2	**Benzo(b)fluoranthene**	7 J	610	UG/KG	PI-009-02_33	15/19	8.8 - 350	610	NA	**35**	NA	NA	**Yes**	ASL
	191-24-2	Benzo(g,h,i)perylene	5.9 J	380	UG/KG	PI-009-02_33	16/19	8.8 - 350	380	NA	9500 [11]	NA	NA	No	BSL
	207-08-9	**Benzo(k)fluoranthene**	5.1 J	560	UG/KG	PI-009-02_33	15/19	8.8 - 350	560	NA	**350**	NA	NA	**Yes**	ASL
	218-01-9	Chrysene	6.8 J	420	UG/KG	PI-009-02_33	16/19	3.3 - 350	420	NA	1100	NA	NA	No	BSL
	53-70-3	**Dibenzo(a,h)anthracene**	1.6 J	14	UG/KG	PAI-9/16-SO02B-01	8/19	8.5 - 360	14	NA	**11**	NA	NA	**Yes**	ASL
	206-44-0	Fluoranthene	5.3 J	300 J	UG/KG	PI-009-02_33	18/19	350 - 350	300	NA	70000	NA	NA	No	BSL
	86-73-7	Fluorene	0.59 J	7 J	UG/KG	PAI-9/16-SO04A-01	11/19	8.5 - 360	7	NA	4000	NA	NA	No	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	5.1 J	470	UG/KG	PI-009-02_33	15/19	8.5 - 350	470	NA	**120**	NA	NA	**Yes**	ASL
	91-20-3	**Naphthalene**	0.78 J	30	UG/KG	PAI-9/16-SO02B-01	12/19	9 - 360	30	NA	**0.47**	NA	NA	**Yes**	ASL
	85-01-8	Phenanthrene	3.4 J	99	UG/KG	PAI-9/16-SO04A-01	18/19	350 - 350	99	NA	9500 [11]	NA	NA	No	BSL
	129-00-0	Pyrene	5.1 J	460	UG/KG	PI-009-02_33	18/19	350 - 350	460	NA	9500	NA	NA	No	BSL
	PESTICIDES/PCBS														
	72-54-8	**4,4'-DDD**	0.34 J	640 JJ	UG/KG	PAI-9/16MW05-0001	15/18	35 - 110	640	NA	**66**	NA	NA	**Yes**	ASL
	72-55-9	**4,4'-DDE**	2 J	8400	UG/KG	PAI-9/16MW05-0001	18/18	-	8400	NA	**46**	NA	NA	**Yes**	ASL
	50-29-3	**4,4'-DDT**	2.6 J	12000	UG/KG	PAI-9/16MW05-0001	18/18	-	12000	NA	**67**	NA	NA	**Yes**	ASL
	309-00-2	**Aldrin**	0.08 J	6.8	UG/KG	PAI-9/16-SO06-01	7/18	0.2 - 170	6.8	NA	**0.034**	NA	NA	**Yes**	ASL
	319-84-6	**alpha-BHC**	0.11 J	57 J	UG/KG	PAI-9/16MW05-0001	5/18	0.2 - 36	57	NA	**0.036**	NA	NA	**Yes**	ASL
	5103-71-9	**alpha-Chlordane**	0.2 J	16000 J	UG/KG	PAI-9/16MW05-0001	16/18	42 - 62	16000	NA	**13** [12]	NA	NA	**Yes**	ASL
	11096-82-5	**Aroclor-1260**	810 J	810 J	UG/KG	PI-009-02_33	1/17	6.1 - 700	810	NA	**24**	NA	NA	**Yes**	ASL
	319-85-7	**beta-BHC**	0.19 J	580	UG/KG	PAI-9/16MW05-0001	8/18	0.15 - 36	580	NA	**0.13**	NA	NA	**Yes**	ASL
	319-86-8	**delta-BHC**	0.082 J	73 J	UG/KG	PAI-9/16MW05-0001	7/18	0.21 - 36	73	NA	**0.036** [13]	NA	NA	**Yes**	ASL
	60-57-1	**Dieldrin**	0.078 J	15	UG/KG	PAI-9/16-SO06-01	9/18	0.16 - 340	15	NA	**0.061**	NA	NA	**Yes**	ASL
	959-98-8	Endosulfan I	0.16 J	3.8 J	UG/KG	PAI-9/16-SO06-01	6/17	0.2 - 36	3.8	NA	1100 [14]	NA	NA	No	BSL
	33213-65-9	Endosulfan II	0.13 J	4 J	UG/KG	PAI-9/16-SO06-01	9/18	0.16 - 340	4	NA	1100 [14]	NA	NA	No	BSL
	1031-07-8	Endosulfan Sulfate	0.079 J	6.6 J	UG/KG	PAI-9/16-SO05-01	10/18	0.16 - 70	6.6	NA	1100 [14]	NA	NA	No	BSL
	72-20-8	**Endrin**	0.058 J	3700 J	UG/KG	PAI-9/16MW05-0001	9/18	0.16 - 70	3700	NA	**68**	NA	NA	**Yes**	ASL
	7421-93-4	**Endrin Aldehyde**	0.14 J	1600 J	UG/KG	PAI-9/16MW05-0001	14/18	0.42 - 70	1600	NA	**68** [15]	NA	NA	**Yes**	ASL
	53494-70-5	Endrin Ketone	0.066 J	50 J	UG/KG	PAI-9/16MW05-0001	10/18	0.16 - 70	50	NA	68 [15]	NA	NA	No	BSL
	58-89-9	**gamma-BHC (Lindane)**	0.13 J	14 J	UG/KG	PAI-9/16MW05-0001	2/18	0.064 - 36	14	NA	**0.21**	NA	NA	**Yes**	ASL
	5103-74-2	**gamma-Chlordane**	0.18 J	14000	UG/KG	PAI-9/16MW05-0001	15/18	0.2 - 0.25	14000	NA	**13** [12]	NA	NA	**Yes**	ASL
	76-44-8	**Heptachlor**	0.13 J	930	UG/KG	PAI-9/16MW05-0001	6/18	0.2 - 36	930	NA	**0.14**	NA	NA	**Yes**	ASL
	1024-57-3	**Heptachlor Epoxide**	0.063 J	8.8	UG/KG	PAI-9/16-SO06-01	11/18	0.2 - 36	8.8	NA	**0.068**	NA	NA	**Yes**	ASL
	72-43-5	Methoxychlor	0.54 J	80 J	UG/KG	PAI-9/16MW05-0001	6/18	3.4 - 360	80	NA	1500	NA	NA	No	BSL

TABLE 6-31
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SURFACE SOIL TO GROUNDWATER
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	USEPA RSL Protection of Groundwater(5)	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background data is available.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2011.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for hexavalent chromium.
8 - Value is MCL based soil screening level.
9 - Value is for vanadium and compounds.
10 - Acenaphthene is used as a surrogate for acenaphthylene.
11 - Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
12 - Value is for chlordane.
13 - Value is for alpha-BHC.
14 - Value is for Endosulfan.
15 - Value is for Endrin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

PI-009-01_32	PAI-9/16-SO03-01	PAI-9/16-SO06-01
PI-009-02_33	PAI-9/16-SO04-01	PAI-9/16-SO06A-01
PI-009-03_34	PAI-9/16-SO04A-01	PAI-9/16-SO07-01
PAI-9/16MW05-0001	PAI-9/16-SO04B-01	
PAI-9/16MW05-0001RA	PAI-9/16-SO04B-01-AVG	
PAI-9/16-SO01-01	PAI-9/16-SO04B-01-D	
PAI-9/16-SO02-01	PAI-9/16-SO04C-01	
PAI-9/16-SO02A-01	PAI-9/16-SO05-01	
PAI-9/16-SO02B-01	PAI-9/16-SO05A-01	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 6-32
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Residential Soil[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 9 and 16	**METALS**														
	7429-90-5	**Aluminum**	2290	8670	MG/KG	PAI-9/16-SO04-05-D	8/8	-	8670	NA	**7700 N**	NA	NA	**Yes**	ASL
	7440-36-0	**Antimony**	0.08 J	3.25 J	MG/KG	PAI-9/16-SO06-05	2/8	0.41 - 2.1	3.25	NA	**3.1 N**	NA	NA	**Yes**	ASL
	7440-38-2	**Arsenic**	0.148	8.91	MG/KG	PAI-9/16-SO01-05	6/10	0.58 - 0.81	8.91	NA	**0.39 C**	NA	NA	**Yes**	ASL
	7440-39-3	Barium	5.7	21.5 J	MG/KG	PAI-9/16-SO04-05	8/8	-	21.5	NA	1500 N	NA	NA	No	BSL
	7440-41-7	Beryllium	0.03 J	0.1 J	MG/KG	PAI-9/16MW05-0709	3/8	0.03 - 0.3	0.1	NA	16 N	NA	NA	No	BSL
	7440-70-2	Calcium	244 J	959	MG/KG	PAI-9/16-SO04-05-D	8/8	-	959	NA	NA	NA	NA	No	NUT
	7440-47-3	**Chromium**	1.86	9.51	MG/KG	PAI-9/16-SO04-05-D	10/10	-	9.51	NA	**0.29 C[7]**	NA	NA	**Yes**	ASL
	7440-48-4	Cobalt	0.46 J	0.53 J	MG/KG	PAI-9/16-SO04-05	2/8	0.28 - 0.3	0.53	NA	2.3 N	NA	NA	No	BSL
	7440-50-8	Copper	0.75 J	1.68	MG/KG	PAI-9/16-SO02-05	4/8	0.36 - 1.16	1.68	NA	310 N	NA	NA	No	BSL
	7439-89-6	Iron	460	2640	MG/KG	PAI-9/16-SO07-05	8/8	-	2640	NA	5500 N	NA	NA	No	BSL
	7439-92-1	Lead	1.4	8.4	MG/KG	PAI16-SB1-3	10/10	-	8.4	NA	400	NA	NA	No	BSL
	7439-95-4	Magnesium	89 J	363 J	MG/KG	PAI-9/16-SO04-05-D	8/8	-	363	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	1.86	5.07	MG/KG	PAI-9/16-SO07-05	8/8	-	5.07	NA	180 N	NA	NA	No	BSL
	7439-97-6	Mercury	0.007 J	0.047	MG/KG	PAI-9/16-SO04-05	7/8	0.0114 - 0.0114	0.047	NA	2.3 N[8]	NA	NA	No	BSL
	7440-02-0	Nickel	0.86 J	1.7 J	MG/KG	PAI-9/16MW05-0709	5/8	0.5 - 1.47	1.7	NA	150 N	NA	NA	No	BSL
	7440-09-7	Potassium	71.3 J	381 J	MG/KG	PAI-9/16-SO04-05-D	5/8	159 - 388	381	NA	NA	NA	NA	No	NUT
	7782-49-2	Selenium	0.19 J	0.28 J	MG/KG	PAI-9/16-SO04-05	2/8	0.28 - 0.3	0.28	NA	39 N	NA	NA	No	BSL
	7440-23-5	Sodium	15.7 J	163 J	MG/KG	PAI-9/16-SO06-05	4/8	66.8 - 134	163	NA	NA	NA	NA	No	NUT
	7440-62-2	Vanadium	1.16 J	7.58	MG/KG	PAI-9/16-SO07-05	8/8	-	7.58	NA	39 N[9]	NA	NA	No	BSL
	7440-66-6	Zinc	1.3 J	4.97	MG/KG	PAI-9/16-SO07-05	8/8	-	4.97	NA	2300 N	NA	NA	No	BSL
	VOLATILES														
	67-64-1	Acetone	7.7 J	16	UG/KG	PAI-9/16-SO05-05	5/8	6 - 7.4	16	NA	6100000 N	NA	NA	No	BSL
	POLYCYCLIC AROMATIC HYDROCARBONS														
	90-12-0	1-Methylnaphthalene	0.64 J	0.64 J	UG/KG	PAI-9/16-SO04-05	1/8	9.3 - 12	0.64	NA	22000 C	NA	NA	No	BSL
	-	Bap Equivalent	6.20	6.30	UG/KG	PAI-9/16-SO04-05	2/7	9.3 - 10	6.30	NA	15 C	NA	NA	No	BSL
	56-55-3	Benzo(a)anthracene	0.85 J	0.85 J	UG/KG	PAI-9/16-SO04-05	1/8	9.3 - 12	0.85	NA	150 C	NA	NA	No	BSL
	50-32-8	Benzo(a)pyrene	0.65 J	0.66 J	UG/KG	PAI-9/16-SO04-05	2/8	9.3 - 12	0.66	NA	15 C	NA	NA	No	BSL
	205-99-2	Benzo(b)fluoranthene	0.78 J	1 J	UG/KG	PAI-9/16-SO04-05	2/8	9.3 - 12	1	NA	150 C	NA	NA	No	BSL
	191-24-2	Benzo(g,h,i)perylene	0.74 J	0.74 J	UG/KG	PAI-9/16-SO01-05	1/8	9.3 - 12	0.74	NA	170000 N[10]	NA	NA	No	BSL
	207-08-9	Benzo(k)fluoranthene	0.7 J	0.71 J	UG/KG	PAI-9/16-SO01-05	2/8	9.3 - 12	0.71	NA	1500 C	NA	NA	No	BSL
	218-01-9	Chrysene	0.78 J	1.4 J	UG/KG	PAI-9/16-SO04-05	2/8	9.3 - 12	1.4	NA	15000 C	NA	NA	No	BSL
	206-44-0	Fluoranthene	1.7 J	1.7 J	UG/KG	PAI-9/16-SO04-05	1/8	9.3 - 12	1.7	NA	230000 N	NA	NA	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	0.74 J	0.74 J	UG/KG	PAI-9/16-SO01-05	1/8	9.3 - 12	0.74	NA	150 C	NA	NA	No	BSL
	91-20-3	Naphthalene	4.8 J	4.8 J	UG/KG	PAI-9/16-SO04-05	1/8	9.3 - 12	4.8	NA	3600 C	NA	NA	No	BSL
	85-01-8	Phenanthrene	2.2 J	2.2 J	UG/KG	PAI-9/16-SO04-05	1/8	9.3 - 12	2.2	NA	170000 N[10]	NA	NA	No	BSL
	129-00-0	Pyrene	1.1 J	1.5 J	UG/KG	PAI-9/16-SO04-05	2/8	9.3 - 12	1.5	NA	170000 N	NA	NA	No	BSL
	PESTICIDES/PCBS														
	72-54-8	4,4'-DDD	0.16 JJ	486	UG/KG	PAI16-SB1-3	6/10	0.19 - 330	486	NA	2000 C	NA	NA	No	BSL
	72-55-9	4,4'-DDE	0.2 J	421	UG/KG	PAI16-SB1-3	8/10	0.19 - 330	421	NA	1400 C	NA	NA	No	BSL
	50-29-3	4,4'-DDT	0.19 J	1380	UG/KG	PAI16-SB1-3	8/10	0.46 - 330	1380	NA	1700 C	NA	NA	No	BSL
	309-00-2	Aldrin	1.8 J	1.8 J	UG/KG	PAI-9/16-SO06-05	1/10	0.2 - 330	1.8	NA	29 C	NA	NA	No	BSL
	5103-71-9	alpha-Chlordane	0.27 J	280 J	UG/KG	PAI-9/16-SO06-05	3/8	0.23 - 0.24	280	NA	1600 C[11]	NA	NA	No	BSL
	319-85-7	beta-BHC	0.22 J	0.31 J	UG/KG	PAI-9/16-SO05-05	3/10	0.2 - 330	0.31	NA	270 C	NA	NA	No	BSL
	319-86-8	delta-BHC	0.095 J	0.41 J	UG/KG	PAI-9/16-SO01-05	4/10	0.2 - 330	0.41	NA	77 C[12]	NA	NA	No	BSL
	60-57-1	Dieldrin	0.092 J	8.2 J	UG/KG	PAI-9/16-SO06-05	3/10	0.18 - 330	8.2	NA	30 C	NA	NA	No	BSL
	33213-65-9	Endosulfan II	6.1 J	6.1 J	UG/KG	PAI-9/16-SO06-05	1/10	0.18 - 330	6.1	NA	37000 N[13]	NA	NA	No	BSL

TABLE 6-32
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	Adjusted USEPA RSL Residential Soil(5)	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Site 9 and 16	**PESTICIDES/PCBS (continued)**														
	72-20-8	Endrin	11 J	11 J	UG/KG	PAI-9/16-SO06-05	1/10	0.18 - 330	11	NA	1800 N	NA	NA	No	BSL
	7421-93-4	Endrin Aldehyde	0.23 J	0.23 J	UG/KG	PAI-9/16-SO02-05	1/10	0.39 - 330	0.23	NA	1800 N(14)	NA	NA	No	BSL
	53494-70-5	Endrin Ketone	0.092 J	0.69 J	UG/KG	PAI-9/16-SO06-05	2/8	0.18 - 0.39	0.69	NA	1800 N(14)	NA	NA	No	BSL
	5103-74-2	gamma-Chlordane	0.085 J	390	UG/KG	PAI-9/16-SO06-05	4/8	0.23 - 0.24	390	NA	1600 C(11)	NA	NA	No	BSL
	1024-57-3	Heptachlor Epoxide	0.09 J	5 J	UG/KG	PAI-9/16-SO06-05	4/10	0.1 - 330	5	NA	53 C	NA	NA	No	BSL
	72-43-5	Methoxychlor	2.7 J	2.7 J	UG/KG	PAI-9/16-SO06-05	1/8	2 - 4	2.7	NA	31000 N	NA	NA	No	BSL

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background data is available.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2011. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for hexavalent chromium.
8 - Value is for mercuric chloride (and other Mercury salts).
9 - Value is for vanadium and compounds.
10 - Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
11 - Value is for chlordane.
12 - Value is for alpha-BHC.
13 - Value is for Endosulfan.
14 - Value is for Endrin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

PAI16-SB1-3	PAI-9/16-SO04-05
PAI16-SB2-3	PAI-9/16-SO04-05-AVG
PAI16-SB2-3-AVG	PAI-9/16-SO04-05-D
PAI16-SB2-3-D	PAI-9/16-SO05-05
PAI-9/16MW05-0709	PAI-9/16-SO05-05-AVG
PAI-9/16-SO01-05	PAI-9/16-SO05-05-D
PAI-9/16-SO02-05	PAI-9/16-SO06-05
PAI-9/16-SO03-05	PAI-9/16-SO07-05

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 6-33
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	USEPA RSL Protection of Groundwater[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
Site 9 and 16	**METALS**														
	7429-90-5	Aluminum	2290	8670	MG/KG	PAI-9/16-SO04-05-D	8/8	-	8670	NA	23000	NA	NA	No	BSL
	7440-36-0	**Antimony**	0.08 J	3.25 J	MG/KG	PAI-9/16-SO06-05	2/8	0.41 - 2.1	3.25	NA	**0.27**	NA	NA	**Yes**	ASL
	7440-38-2	**Arsenic**	0.148	8.91	MG/KG	PAI-9/16-SO01-05	6/10	0.58 - 0.81	8.91	NA	**0.0013**	NA	NA	**Yes**	ASL
	7440-39-3	Barium	5.7	21.5 J	MG/KG	PAI-9/16-SO04-05	8/8	-	21.5	NA	120	NA	NA	No	BSL
	7440-41-7	Beryllium	0.03 J	0.1 J	MG/KG	PAI-9/16MW05-0709	3/8	0.03 - 0.3	0.1	NA	13	NA	NA	No	BSL
	7440-70-2	Calcium	244 J	959	MG/KG	PAI-9/16-SO04-05-D	8/8	-	959	NA	NA	NA	NA	No	NUT
	7440-47-3	**Chromium**	1.86	9.51	MG/KG	PAI-9/16-SO04-05-D	10/10	-	9.51	NA	**0.00059** [7]	NA	NA	**Yes**	ASL
	7440-48-4	**Cobalt**	0.46 J	0.53 J	MG/KG	PAI-9/16-SO04-05	2/8	0.28 - 0.3	0.53	NA	**0.21**	NA	NA	**Yes**	ASL
	7440-50-8	Copper	0.75 J	1.68	MG/KG	PAI-9/16-SO02-05	4/8	0.36 - 1.16	1.68	NA	22	NA	NA	No	BSL
	7439-89-6	**Iron**	460	2640	MG/KG	PAI-9/16-SO07-05	8/8	-	2640	NA	**270**	NA	NA	**Yes**	ASL
	7439-92-1	Lead	1.4	8.4	MG/KG	PAI16-SB1-3	10/10	-	8.4	NA	14 [8]	NA	NA	No	BSL
	7439-95-4	Magnesium	89 J	363 J	MG/KG	PAI-9/16-SO04-05-D	8/8	-	363	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	1.86	5.07	MG/KG	PAI-9/16-SO07-05	8/8	-	5.07	NA	21	NA	NA	No	BSL
	7439-97-6	**Mercury**	0.007 J	0.047	MG/KG	PAI-9/16-SO04-05	7/8	0.0114 - 0.0114	0.047	NA	**0.033**	NA	NA	**Yes**	ASL
	7440-02-0	Nickel	0.86 J	1.7 J	MG/KG	PAI-9/16MW05-0709	5/8	0.5 - 1.47	1.7	NA	20	NA	NA	No	BSL
	7440-09-7	Potassium	71.3 J	381 J	MG/KG	PAI-9/16-SO04-05-D	5/8	159 - 388	381	NA	NA	NA	NA	No	NUT
	7782-49-2	Selenium	0.19 J	0.28 J	MG/KG	PAI-9/16-SO04-05	2/8	0.28 - 0.3	0.28	NA	0.4	NA	NA	No	BSL
	7440-23-5	Sodium	15.7 J	163 J	MG/KG	PAI-9/16-SO06-05	4/8	66.8 - 134	163	NA	NA	NA	NA	No	NUT
	7440-62-2	Vanadium	1.16 J	7.58	MG/KG	PAI-9/16-SO07-05	8/8	-	7.58	NA	78 [9]	NA	NA	No	BSL
	7440-66-6	Zinc	1.3 J	4.97	MG/KG	PAI-9/16-SO07-05	8/8	-	4.97	NA	290	NA	NA	No	BSL
	VOLATILES														
	67-64-1	Acetone	7.7 J	16	UG/KG	PAI-9/16-SO05-05	5/8	6 - 7.4	16	NA	2400	NA	NA	No	BSL
	POLYCYCLIC AROMATIC HYDROCARBONS														
	90-12-0	1-Methylnaphthalene	0.64 J	0.64 J	UG/KG	PAI-9/16-SO04-05	1/8	9.3 - 12	0.64	NA	5.1	NA	NA	No	BSL
	-	Bap Equivalent	6.20	6.30	UG/KG	PAI-9/16-SO04-05	2/7	9.3 - 10	6.30	NA	NA	NA	NA	No	NTX
	56-55-3	Benzo(a)anthracene	0.85 J	0.85 J	UG/KG	PAI-9/16-SO04-05	1/8	9.3 - 12	0.85	NA	10	NA	NA	No	BSL
	50-32-8	Benzo(a)pyrene	0.65 J	0.66 J	UG/KG	PAI-9/16-SO04-05	2/8	9.3 - 12	0.66	NA	3.5	NA	NA	No	BSL
	205-99-2	Benzo(b)fluoranthene	0.78 J	1 J	UG/KG	PAI-9/16-SO04-05	2/8	9.3 - 12	1	NA	35	NA	NA	No	BSL
	191-24-2	Benzo(g,h,i)perylene	0.74 J	0.74 J	UG/KG	PAI-9/16-SO01-05	1/8	9.3 - 12	0.74	NA	9500 [10]	NA	NA	No	BSL
	207-08-9	Benzo(k)fluoranthene	0.7 J	0.71 J	UG/KG	PAI-9/16-SO01-05	2/8	9.3 - 12	0.71	NA	350	NA	NA	No	BSL
	218-01-9	Chrysene	0.78 J	1.4 J	UG/KG	PAI-9/16-SO04-05	2/8	9.3 - 12	1.4	NA	1100	NA	NA	No	BSL
	206-44-0	Fluoranthene	1.7 J	1.7 J	UG/KG	PAI-9/16-SO04-05	1/8	9.3 - 12	1.7	NA	70000	NA	NA	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	0.74 J	0.74 J	UG/KG	PAI-9/16-SO01-05	1/8	9.3 - 12	0.74	NA	120	NA	NA	No	BSL
	91-20-3	**Naphthalene**	4.8 J	4.8 J	UG/KG	PAI-9/16-SO04-05	1/8	9.3 - 12	4.8	NA	**0.47**	NA	NA	**Yes**	ASL
	85-01-8	Phenanthrene	2.2 J	2.2 J	UG/KG	PAI-9/16-SO04-05	1/8	9.3 - 12	2.2	NA	9500 [10]	NA	NA	No	BSL
	129-00-0	Pyrene	1.1 J	1.5 J	UG/KG	PAI-9/16-SO04-05	2/8	9.3 - 12	1.5	NA	9500	NA	NA	No	BSL
	PESTICIDES/PCBS														
	72-54-8	**4,4'-DDD**	0.16 JJ	486	UG/KG	PAI16-SB1-3	6/10	0.19 - 330	486	NA	**66**	NA	NA	**Yes**	ASL
	72-55-9	**4,4'-DDE**	0.2 J	421	UG/KG	PAI16-SB1-3	8/10	0.19 - 330	421	NA	**46**	NA	NA	**Yes**	ASL
	50-29-3	**4,4'-DDT**	0.19 J	1380	UG/KG	PAI16-SB1-3	8/10	0.46 - 330	1380	NA	**67**	NA	NA	**Yes**	ASL
	309-00-2	**Aldrin**	1.8 J	1.8 J	UG/KG	PAI-9/16-SO06-05	1/10	0.2 - 330	1.8	NA	**0.034**	NA	NA	**Yes**	ASL
	5103-71-9	**alpha-Chlordane**	0.27 J	280 J	UG/KG	PAI-9/16-SO06-05	3/8	0.23 - 0.24	280	NA	**13** [11]	NA	NA	**Yes**	ASL
	319-85-7	**beta-BHC**	0.22 J	0.31 J	UG/KG	PAI-9/16-SO05-05	3/10	0.2 - 330	0.31	NA	**0.13**	NA	NA	**Yes**	ASL
	319-86-8	**delta-BHC**	0.095 J	0.41 J	UG/KG	PAI-9/16-SO01-05	4/10	0.2 - 330	0.41	NA	**0.036** [12]	NA	NA	**Yes**	ASL
	60-57-1	**Dieldrin**	0.092 J	8.2 J	UG/KG	PAI-9/16-SO06-05	3/10	0.18 - 330	8.2	NA	**0.061**	NA	NA	**Yes**	ASL

TABLE 6-33
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	USEPA RSL Protection of Groundwater(5)	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
Site 9 and 16	**PESTICIDES/PCBS (continued)**														
	33213-65-9	Endosulfan II	6.1 J	6.1 J	UG/KG	PAI-9/16-SO06-05	1/10	0.18 - 330	6.1	NA	1100 (13)	NA	NA	No	BSL
	72-20-8	Endrin	11 J	11 J	UG/KG	PAI-9/16-SO06-05	1/10	0.18 - 330	11	NA	68	NA	NA	No	BSL
	7421-93-4	Endrin Aldehyde	0.23 J	0.23 J	UG/KG	PAI-9/16-SO02-05	1/10	0.39 - 330	0.23	NA	68 (14)	NA	NA	No	BSL
	53494-70-5	Endrin Ketone	0.092 J	0.69 J	UG/KG	PAI-9/16-SO06-05	2/8	0.18 - 0.39	0.69	NA	68 (14)	NA	NA	No	BSL
	5103-74-2	**gamma-Chlordane**	0.085 J	390	UG/KG	PAI-9/16-SO06-05	4/8	0.23 - 0.24	390	NA	**13 (11)**	NA	NA	**Yes**	ASL
	1024-57-3	**Heptachlor Epoxide**	0.09 J	5 J	UG/KG	PAI-9/16-SO06-05	4/10	0.1 - 330	5	NA	**0.068**	NA	NA	**Yes**	ASL
	72-43-5	Methoxychlor	2.7 J	2.7 J	UG/KG	PAI-9/16-SO06-05	1/8	2 - 4	2.7	NA	1500	NA	NA	No	BSL

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background data is available.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2011.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
7 - Value is for hexavalent chromium.
8 - Value is MCL based soil screening level.
9- Value is for vanadium and compounds.
10 - Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
11 - Value is for chlordane.
12 - Value is for alpha-BHC.
13 - Value is for Endosulfan.
14 - Value is for Endrin.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

PAI16-SB1-3	PAI-9/16-SO04-05
PAI16-SB2-3	PAI-9/16-SO04-05-AVG
PAI16-SB2-3-AVG	PAI-9/16-SO04-05-D
PAI16-SB2-3-D	PAI-9/16-SO05-05
PAI-9/16MW05-0709	PAI-9/16-SO05-05-AVG
PAI-9/16-SO01-05	PAI-9/16-SO05-05-D
PAI-9/16-SO02-05	PAI-9/16-SO06-05
PAI-9/16-SO03-05	PAI-9/16-SO07-05

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
COPC = Chemical Of Potential Concern
J = Estimated value
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 6-34
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Adjusted USEPA RSL Tap Water[5]	USEPA MCL[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
Site 9 and 16	**METALS**													
	7429-90-5	Aluminum	27.3 J	1300	UG/L	PAI-9/16-TW01S-01	8/9	661 - 661	1300	NA	1600 N	NA	No	BSL
	7440-36-0	**Antimony**	1.9 J	5.9	UG/L	PAI-09-GW-02-01	3/9	3.28 - 5.55	5.9	NA	**0.6 N**	6	**Yes**	ASL
	7440-38-2	**Arsenic**	7.9 J	7.9 J	UG/L	PAI-9/16GW06I	1/9	3.9 - 7.04	7.9	NA	**0.045 C**	10	**Yes**	ASL
	7440-39-3	Barium	10.6 J	48.2 J	UG/L	PAI-9/16-TW04I-01	8/9	10.9 - 10.9	48.2	NA	290 N	2000	No	BSL
	7440-43-9	Cadmium	0.07 J	0.07 J	UG/L	PAI-9/16GW05S, PAI-9/16GW06I	2/9	0.4 - 3	0.07	NA	0.69 N	5	No	BSL
	7440-70-2	Calcium	16400	42500	UG/L	PAI-09-GW-01-01	9/9	-	42500	NA	NA	NA	No	NUT
	7440-47-3	**Chromium**	0.44 J	0.7	UG/L	PAI-09-GW-01-01	3/9	0.88 - 5	0.7	NA	**0.031 C[8]**	100	**Yes**	ASL
	7440-48-4	Cobalt	0.27 J	0.4 J	UG/L	PAI-9/16GW05S-D	2/9	0.9 - 7.49	0.4	NA	0.47 N	NA	No	BSL
	7440-50-8	Copper	0.88 J	8.76	UG/L	PAI-9/16-TW03S-01	2/9	2 - 10	8.76	NA	62 N	1300	No	BSL
	7439-89-6	**Iron**	9.7 J	12900	UG/L	PAI-27-GW61I-02	7/9	206 - 338	12900	NA	**1100 N**	NA	**Yes**	ASL
	7439-92-1	Lead	1.95 J	1.95 J	UG/L	PAI-9/16-TW01S-01	1/9	2.2 - 5	1.95	NA	NA	15	No	BSL
	7439-95-4	Magnesium	1330	5170	UG/L	PAI-27-GW61I-02	9/9	-	5170	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	2.3 J	94.6	UG/L	PAI-9/16-TW01S-01	6/9	2.2 - 7.4	94.6	NA	**32 N**	NA	**Yes**	ASL
	7439-97-6	Mercury	0.117 J	0.405	UG/L	PAI-27-GW61I-02	2/9	0.1 - 0.18	0.405	NA	0.43 N[9]	2	No	BSL
	7440-02-0	Nickel	0.3 J	0.34 J	UG/L	PAI-9/16GW06I	2/9	0.68 - 2.5	0.34	NA	30 N	NA	No	BSL
	7440-09-7	Potassium	1610	4310 J	UG/L	PAI-27-GW61I-02	5/9	2760 - 3690	4310	NA	NA	NA	No	NUT
	7782-49-2	Selenium	2.63 J	2.63 J	UG/L	PAI-9/16-TW03S-01	1/9	2.5 - 7	2.63	NA	7.8 N	50	No	BSL
	7440-23-5	Sodium	2780 J	40100	UG/L	PAI-9/16-TW02I-01	8/9	2370 - 2370	40100	NA	NA	NA	No	NUT
	7440-62-2	Vanadium	2.1 J	7.8 J	UG/L	PAI-9/16GW06I	5/9	1 - 10	7.8	NA	7.8 N[10]	NA	No	BSL
	7440-66-6	Zinc	1.1 J	15.6 J	UG/L	PAI-9/16-TW01S-01	6/9	6 - 10	15.6	NA	470 N	NA	No	BSL
	SEMIVOLATILES													
	105-60-2	Caprolactam	3.7 J	3.7 J	UG/L	PAI-9/16-TW02I-01	1/7	7.1 - 10	3.7	NA	770 N	NA	No	BSL
	VOLATILES													
	67-64-1	Acetone	5 J	5 J	UG/L	PAI-27-GW-61I-01	1/11	0.76 - 5	5	NA	1200 N	NA	No	BSL
	75-15-0	Carbon Disulfide	0.054 J	0.054 J	UG/L	PAI-9/16-TW03S-01	1/14	0.08 - 5	0.054	NA	72 N	NA	No	BSL
	100-41-4	Ethylbenzene	0.058 J	0.098 J	UG/L	PAI-9/16-TW03S-01	3/14	0.08 - 5	0.098	NA	1.3 C	700	No	BSL
	- -	m+p-Xylenes	0.093 J	0.25 J	UG/L	PAI-9/16-TW01S-01, PAI-9/16-TW03S-01	4/12	0.16 - 10	0.25	NA	19 N[11]	10000	No	BSL
	95-47-6	o-Xylene	0.031 J	0.084 J	UG/L	PAI-9/16-TW03S-01	4/12	0.08 - 5	0.084	NA	19 N	NA	No	BSL
	1330-20-7	Total Xylenes	0.12 J	0.33 J	UG/L	PAI-9/16-TW01S-01, PAI-9/16-TW03S-01	4/12	0.08 - 15	0.33	NA	19 N	10000	No	BSL
	POLYCYCLIC AROMATIC HYDROCARBONS													
	90-12-0	**1-Methylnaphthalene**	1.4	1.4	UG/L	PAI-9/16-TW04I-01	1/7	0.094 - 0.21	1.4	NA	**0.97 C**	NA	**Yes**	ASL
	91-57-6	2-Methylnaphthalene	1.6	1.6	UG/L	PAI-9/16-TW04I-01	1/11	0.094 - 0.21	1.6	NA	2.7 N	NA	No	BSL
	83-32-9	Acenaphthene	0.047 J	0.047 J	UG/L	PAI-9/16-TW04I-01	1/11	0.094 - 0.21	0.047	NA	40 N	NA	No	BSL
	206-44-0	Fluoranthene	0.018 J	0.018 J	UG/L	PAI-9/16-TW01S-01	1/11	0.094 - 0.21	0.018	NA	63 N	NA	No	BSL
	86-73-7	Fluorene	0.072 J	0.072 J	UG/L	PAI-9/16-TW04I-01	1/11	0.094 - 0.21	0.072	NA	22 N	NA	No	BSL
	91-20-3	**Naphthalene**	1.3	1.3	UG/L	PAI-9/16-TW04I-01	1/11	0.094 - 0.21	1.3	NA	**0.14 C**	NA	**Yes**	ASL
	85-01-8	Phenanthrene	0.054 J	0.054 J	UG/L	PAI-9/16-TW04I-01	1/11	0.094 - 0.21	0.054	NA	8.7 N[12]	NA	No	BSL
	129-00-0	Pyrene	0.02 J	0.02 J	UG/L	PAI-9/16-TW01S-01	1/11	0.094 - 0.21	0.02	NA	8.7 N	NA	No	BSL

TABLE 6-34
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH GROUNDWATER
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	Adjusted USEPA RSL Tap Water(5)	USEPA MCL(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
Site 9 and 16	**PESTICIDES/PCBS**													
	72-54-8	4,4'-DDD	0.028 J	0.21	UG/L	PAI-9/16-TW03S-01	3/12	0.0094 - 0.1	0.21	NA	0.28 C	NA	No	BSL
	72-55-9	4,4'-DDE	0.0025 J	0.026 J	UG/L	PAI-9/16-TW01S-01	3/12	0.0094 - 0.1	0.026	NA	0.2 C	NA	No	BSL
	50-29-3	4,4'-DDT	0.022 J	0.068 J	UG/L	PAI-9/16-TW03S-01	4/12	0.0094 - 0.1	0.068	NA	0.2 C	NA	No	BSL
	319-84-6	**alpha-BHC**	0.0086 J	0.018 J	UG/L	PAI-9/16-TW04I-01	2/12	0.0045 - 0.053	0.018	NA	**0.0062 C**	NA	**Yes**	ASL
	5103-71-9	alpha-Chlordane	0.0021 J	0.0059 J	UG/L	PAI-9/16GW06I	3/12	0.0045 - 0.053	0.0059	NA	0.19 C(13)	2	No	BSL
	319-85-7	**beta-BHC**	0.05	0.05	UG/L	PAI-9/16-TW04I-01	1/12	0.0047 - 0.053	0.05	NA	**0.022 C**	NA	**Yes**	ASL
	319-86-8	**delta-BHC**	0.0046 J	0.14	UG/L	PAI-9/16-TW04I-01	3/12	0.0045 - 0.053	0.14	NA	**0.0062 C(14)**	NA	**Yes**	ASL
	60-57-1	**Dieldrin**	0.0026 J	0.0026 J	UG/L	PAI-9/16GW05S	1/12	0.0094 - 0.1	0.0026	NA	**0.0015 C**	NA	**Yes**	ASL
	58-89-9	gamma-BHC (Lindane)	0.0034 J	0.012 J	UG/L	PAI-9/16-TW03S-01	3/12	0.0045 - 0.053	0.012	NA	0.036 C	0.2	No	BSL
	5103-74-2	gamma-Chlordane	0.0033 J	0.0045 J	UG/L	PAI-9/16GW06I	2/12	0.0045 - 0.053	0.0045	NA	0.19 C(13)	2	No	BSL
	76-44-8	**Heptachlor**	0.012 J	0.019 J	UG/L	PAI-9/16-TW01S-01	2/12	0.0045 - 0.053	0.019	NA	**0.0018 C**	0.4	**Yes**	ASL
	1024-57-3	**Heptachlor Epoxide**	0.003 J	0.35 J	UG/L	PAI-27-TW-37S	3/12	0.0045 - 0.053	0.35	NA	**0.0033 C**	**0.2**	**Yes**	ASL

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background groundwater data is available.
5 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2011. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).
6 - 2011 Edition of the Drinking Water Standards and Health Advisories (USEPA, January 2011).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
8 - Value is for hexavalent chromium.
9 - Value is for mercuric chloride (and other mercury salts).
10 - Value is for vanadium and compounds.
11 - Value is for m-xylene.
12 - Pyrene is used as a surrogate for phenanthrene.
13 - Value is for chlordane.
14 - Value is for alpha-BHC.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

PAI-09-GW-01-01	PAI-9/16GW05S
PAI-09-GW-02-01	PAI-9/16GW05S-AVG
PAI-27-GW-61I-01	PAI-9/16GW05S-D
PAI-27-GW61I-02	PAI-9/16GW06I
PAI-27-TW-35S	PAI-9/16-TW01S-01
PAI-27-TW-36I	PAI-9/16-TW02I-01
PAI-27-TW-37S	PAI-9/16-TW03S-01
PAI-27-TW-38I	PAI-9/16-TW04I-01

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 6-35
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION FROM GROUNDWATER
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	Is Chemical Sufficiently Volatile and Toxic?[5]	Vapor Intrusion Criteria[6]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
Site 9 and 16	**METALS**															
	7429-90-5	Aluminum	27.3 J	1300	UG/L	PAI-9/16-TW01S-01	8/9	661 - 661	1300	NA	No	NA	NA	NA	No	NTX
	7440-36-0	Antimony	1.9 J	5.9	UG/L	PAI-09-GW-02-01	3/9	3.28 - 5.55	5.9	NA	No	NA	NA	NA	No	NTX
	7440-38-2	Arsenic	7.9 J	7.9 J	UG/L	PAI-9/16GW06I	1/9	3.9 - 7.04	7.9	NA	No	NA	NA	NA	No	NTX
	7440-39-3	Barium	10.6 J	48.2 J	UG/L	PAI-9/16-TW04I-01	8/9	10.9 - 10.9	48.2	NA	No	NA	NA	NA	No	NTX
	7440-43-9	Cadmium	0.07 J	0.07 J	UG/L	PAI-9/16GW05S, PAI-9/16GW06I	2/9	0.4 - 3	0.07	NA	No	NA	NA	NA	No	NTX
	7440-70-2	Calcium	16400	42500	UG/L	PAI-09-GW-01-01	9/9	-	42500	NA	No	NA	NA	NA	No	NUT
	7440-47-3	Chromium	0.44 J	0.7	UG/L	PAI-09-GW-01-01	3/9	0.88 - 5	0.7	NA	No	NA	NA	NA	No	NTX
	7440-48-4	Cobalt	0.27 J	0.4 J	UG/L	PAI-9/16GW05S-D	2/9	0.9 - 7.49	0.4	NA	No	NA	NA	NA	No	NTX
	7440-50-8	Copper	0.88 J	8.76	UG/L	PAI-9/16-TW03S-01	2/9	2 - 10	8.76	NA	No	NA	NA	NA	No	NTX
	7439-89-6	Iron	9.7 J	12900	UG/L	PAI-27-GW61I-02	7/9	206 - 338	12900	NA	No	NA	NA	NA	No	NTX
	7439-92-1	Lead	1.95 J	1.95 J	UG/L	PAI-9/16-TW01S-01	1/9	2.2 - 5	1.95	NA	No	NA	NA	NA	No	NTX
	7439-95-4	Magnesium	1330	5170	UG/L	PAI-27-GW61I-02	9/9	-	5170	NA	No	NA	NA	NA	No	NUT
	7439-96-5	Manganese	2.3 J	94.6	UG/L	PAI-9/16-TW01S-01	6/9	2.2 - 7.4	94.6	NA	No	NA	NA	NA	No	NTX
	7439-97-6	Mercury	0.117 J	0.405	UG/L	PAI-27-GW61I-02	2/9	0.1 - 0.18	0.405	NA	No	NA	NA	NA	No	NTX
	7440-02-0	Nickel	0.3 J	0.34 J	UG/L	PAI-9/16GW06I	2/9	0.68 - 2.5	0.34	NA	No	NA	NA	NA	No	NTX
	7440-09-7	Potassium	1610	4310 J	UG/L	PAI-27-GW61I-02	5/9	2760 - 3690	4310	NA	No	NA	NA	NA	No	NUT
	7782-49-2	Selenium	2.63 J	2.63 J	UG/L	PAI-9/16-TW03S-01	1/9	2.5 - 7	2.63	NA	No	NA	NA	NA	No	NTX
	7440-23-5	Sodium	2780 J	40100	UG/L	PAI-9/16-TW02I-01	8/9	2370 - 2370	40100	NA	No	NA	NA	NA	No	NUT
	7440-62-2	Vanadium	2.1 J	7.8 J	UG/L	PAI-9/16GW06I	5/9	1 - 10	7.8	NA	No	NA	NA	NA	No	NTX
	7440-66-6	Zinc	1.1 J	15.6 J	UG/L	PAI-9/16-TW01S-01	6/9	6 - 10	15.6	NA	No	NA	NA	NA	No	NTX
	SEMIVOLATILES															
	105-60-2	Caprolactam	3.7 J	3.7 J	UG/L	PAI-9/16-TW02I-01	1/7	7.1 - 10	3.7	NA	No	NA	NA	NA	No	NTX
	VOLATILES															
	67-64-1	Acetone	5 J	5 J	UG/L	PAI-27-GW-61I-01	1/11	0.76 - 5	5	NA	Yes	NA	NA	NA	No	BSL
	75-15-0	Carbon Disulfide	0.054 J	0.054 J	UG/L	PAI-9/16-TW03S-01	1/14	0.08 - 5	0.054	NA	Yes	120 N	NA	NA	No	BSL
	100-41-4	Ethylbenzene	0.058 J	0.098 J	UG/L	PAI-9/16-TW03S-01	3/14	0.08 - 5	0.098	NA	Yes	3 C	NA	NA	No	BSL
	- -	m+p-Xylenes	0.093 J	0.25 J	UG/L	PAI-9/16-TW01S-01, PAI-9/16-TW03S-01	4/12	0.16 - 10	0.25	NA	Yes	36 N[8]	NA	NA	No	BSL
	95-47-6	o-Xylene	0.031 J	0.084 J	UG/L	PAI-9/16-TW03S-01	4/12	0.08 - 5	0.084	NA	Yes	49 N	NA	NA	No	BSL
	1330-20-7	Total Xylenes	0.12 J	0.33 J	UG/L	PAI-9/16-TW01S-01, PAI-9/16-TW03S-01	4/12	0.08 - 15	0.33	NA	Yes	49 N	NA	NA	No	BSL
	POLYCYCLIC AROMATIC HYDROCARBONS															
	90-12-0	1-Methylnaphthalene	1.4	1.4	UG/L	PAI-9/16-TW04I-01	1/7	0.094 - 0.21	1.4	NA	No	NA	NA	NA	No	NTX
	91-57-6	2-Methylnaphthalene	1.6	1.6	UG/L	PAI-9/16-TW04I-01	1/11	0.094 - 0.21	1.6	NA	No	NA	NA	NA	No	NTX
	83-32-9	Acenaphthene	0.047 J	0.047 J	UG/L	PAI-9/16-TW04I-01	1/11	0.094 - 0.21	0.047	NA	No	NA	NA	NA	No	NTX
	206-44-0	Fluoranthene	0.018 J	0.018 J	UG/L	PAI-9/16-TW01S-01	1/11	0.094 - 0.21	0.018	NA	No	NA	NA	NA	No	NTX
	86-73-7	Fluorene	0.072 J	0.072 J	UG/L	PAI-9/16-TW04I-01	1/11	0.094 - 0.21	0.072	NA	No	NA	NA	NA	No	NTX
	91-20-3	Naphthalene	1.3	1.3	UG/L	PAI-9/16-TW04I-01	1/11	0.094 - 0.21	1.3	NA	Yes	3.9 C	NA	NA	No	BSL
	85-01-8	Phenanthrene	0.054 J	0.054 J	UG/L	PAI-9/16-TW04I-01	1/11	0.094 - 0.21	0.054	NA	No	NA	NA	NA	No	NTX
	129-00-0	Pyrene	0.02 J	0.02 J	UG/L	PAI-9/16-TW01S-01	1/11	0.094 - 0.21	0.02	NA	No	NA	NA	NA	No	NTX

TABLE 6-35
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - VAPOR INTRUSION FROM GROUNDWATER
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondetects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	Is Chemical Sufficiently Volatile and Toxic?(5)	Vapor Intrusion Criteria(6)	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
Site 9 and 16	**PESTICIDES/PCBS**															
	72-54-8	4,4'-DDD	0.028 J	0.21	UG/L	PAI-9/16-TW03S-01	3/12	0.0094 - 0.1	0.21	NA	Yes	NA	NA	NA	No	NTX
	72-55-9	4,4'-DDE	0.0025 J	0.026 J	UG/L	PAI-9/16-TW01S-01	3/12	0.0094 - 0.1	0.026	NA	Yes	NA	NA	NA	No	NTX
	50-29-3	4,4'-DDT	0.022 J	0.068 J	UG/L	PAI-9/16-TW03S-01	4/12	0.0094 - 0.1	0.068	NA	Yes	NA	NA	NA	No	NTX
	319-84-6	alpha-BHC	0.0086 J	0.018 J	UG/L	PAI-9/16-TW04I-01	2/12	0.0045 - 0.053	0.018	NA	Yes	NA	NA	NA	No	NTX
	5103-71-9	alpha-Chlordane	0.0021 J	0.0059 J	UG/L	PAI-9/16GW06I	3/12	0.0045 - 0.053	0.0059	NA	No	NA	NA	NA	No	NTX
	319-85-7	beta-BHC	0.05	0.05	UG/L	PAI-9/16-TW04I-01	1/12	0.0047 - 0.053	0.05	NA	Yes	NA	NA	NA	No	NTX
	319-86-8	delta-BHC	0.0046 J	0.14	UG/L	PAI-9/16-TW04I-01	3/12	0.0045 - 0.053	0.14	NA	No	NA	NA	NA	No	NTX
	60-57-1	Dieldrin	0.0026 J	0.0026 J	UG/L	PAI-9/16GW05S	1/12	0.0094 - 0.1	0.0026	NA	Yes	NA	NA	NA	No	NTX
	58-89-9	gamma-BHC (Lindane)	0.0034 J	0.012 J	UG/L	PAI-9/16-TW03S-01	3/12	0.0045 - 0.053	0.012	NA	Yes	NA	NA	NA	No	NTX
	5103-74-2	gamma-Chlordane	0.0033 J	0.0045 J	UG/L	PAI-9/16GW06I	2/12	0.0045 - 0.053	0.0045	NA	No	NA	NA	NA	No	NTX
	76-44-8	Heptachlor	0.012 J	0.019 J	UG/L	PAI-9/16-TW01S-01	2/12	0.0045 - 0.053	0.019	NA	Yes	NA	NA	NA	No	NTX
	1024-57-3	Heptachlor Epoxide	0.003 J	0.35 J	UG/L	PAI-27-TW-37S	3/12	0.0045 - 0.053	0.35	NA	Yes	NA	NA	NA	No	NTX

Footnotes:
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - No background groundwater data is available.
5 - Appendix A of DoD Vapor Intrusion Handbook, January 2009.
6 - Calculated using USEPA's Vapor Intrusion Screening Level (VISL) calculator (USEPA, March 2012) and toxicity criteria from USEPA's November 2011 Regional Screening Level table. Values correspond to a target cancer risk level of 1E-06 or HQ of 0.1 and an attenuation factor of 0.001.
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
8 - Value is for m-xylene.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

PAI-09-GW-01-01	PAI-9/16GW05S
PAI-09-GW-02-01	PAI-9/16GW05S-AVG
PAI-27-GW-61I-01	PAI-9/16GW05S-D
PAI-27-GW61I-02	PAI-9/16GW06I
PAI-27-TW-35S	PAI-9/16-TW01S-01
PAI-27-TW-36I	PAI-9/16-TW02I-01
PAI-27-TW-37S	PAI-9/16-TW03S-01
PAI-27-TW-38I	PAI-9/16-TW04I-01

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
CAS = Chemical Abstracts Service
COPC = Chemical Of Potential Concern
J = Estimated value
NA = Not Applicable/Not Available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level.

For elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 6-36

CHEMICALS RETAINED AS COPCS
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Parameter	Surface Soil		Subsurface Soil		Groundwater	
	Direct Contact	Soil to Groundwater	Direct Contact	Soil to Groundwater	Direct Contact	Vapor Intrusion
Volatile Organic Compounds						
Benzene		X				
Carbon Tetrachloride		X				
Chloroform		X				
Tetrachloroethene		X				
Semivolatile Organic Compounds						
1-Methylnaphthalene		X			X	
Benzo(a)pyrene Equivalents	X					
Benzo(a)anthracene	X	X				
Benzo(a)pyrene	X	X				
Benzo(b)fluoranthene	X	X				
Benzo(k)fluoranthene		X				
Bis(2-ethylhexyl)phthalate		X				
Dibenzo(a,h)anthracene		X				
Indeno(1,2,3-cd)pyrene	X	X				
Naphthalene		X		X	X	
Pentachlorophenol		X				
Pesticides/PCBs						
4,4'-DDD		X		X		
4,4'-DDE	X	X		X		
4,4'-DDT	X	X		X		
Aldrin		X		X		
alpha-BHC		X			X	
alpha-Chlordane	X	X		X		
Aroclor-1260	X	X				
beta-BHC	X	X		X	X	
delta-BHC		X		X	X	
Dieldrin		X		X	X	
Endrin	X	X				
Endrin Aldehyde		X				
gamma-BHC (Lindane)		X				
gamma-Chlordane	X	X		X		
Heptachlor	X	X			X	
Heptachlor Epoxide		X		X	X	
Metals						
Aluminum			X			
Antimony	X	X	X	X	X	
Arsenic	X	X	X	X	X	
Cadmium		X				
Chromium	X	X	X	X	X	
Cobalt	X	X		X		
Copper	X	X				
Iron	X	X		X	X	
Lead	X	X				
Manganese		X			X	
Mercury		X		X		
Nickel	X	X				
Selenium		X				
Thallium	X	X				
Zinc	X	X				

X - Indicates chemical was retained as a COPC.
RAGS Part D tables are included in Appendix G.

TABLE 6-37

SELECTION OF EXPOSURE PATHWAYS
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Surface Soil	Surface Soil	Site 9 and 16	Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with surface soil during excavation activities.
				Maintenance Workers	Adult	Ingestion Dermal	Quant Quant	Maintenance workers may contact surface soil during normal work activities.
				Industrial Workers	Adult	Ingestion Dermal	Quant Quant	Industrial workers may contact surface soil during normal work activities.
				Adult Visitors	Adult	Ingestion Dermal	Quant Quant	Adult visitors users may contact surface soil while at the site.
		Air	Site 9 and 16	Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to fugitive dust and volatile emissions during construction activities.
				Maintenance Workers	Adult	Inhalation	Quant	Maintenance workers may be exposed to fugitive dust and volatile emissions from surface soil.
				Industrial Workers	Adult	Inhalation	Quant	Industrial workers may be exposed to fugitive dust and volatile emissions from surface soil.
				Adult Visitors	Adult	Inhalation	Quant	Adult visitors may be exposed to fugitive dust and volatile emissions from surface soil.
	Subsurface Soil	Subsurface Soil	Site 9 and 16	Construction Workers	Adult	Ingestion Dermal	Quant Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Maintenance Workers	Adult	Ingestion Dermal	Quant Quant	Although exposures to subsurface soil by maintenance workers are considered unlikely at the site, this scenario was included to aid in future risk management decisions.
				Industrial Workers	Adult	Ingestion Dermal	Quant Quant	Although exposures to subsurface soil by industrial workers are considered unlikely at the site, this scenario was included to aid in future risk management decisions.
				Adult Visitors	Adult	Ingestion Dermal	Quant Quant	Although exposures to subsurface soil by adult visitors are considered unlikely at the site, this scenario was included to aid in future risk management decisions.
		Air	Site 9 and 16	Construction Workers	Adult	Inhalation	Quant	Construction workers may have contact with subsurface soil during excavation activities.
				Maintenance Workers	Adult	Inhalation	Quant	Although exposures to subsurface soil by maintenance workers are considered unlikely at the site, this scenario was included to aid in future risk management decisions.
				Industrial Workers	Adult	Inhalation	Quant	Although exposures to subsurface soil by industrial workers are considered unlikely at the site, this scenario was included to aid in future risk management decisions.
				Adult Visitors	Adult	Inhalation	Quant	Although exposures to subsurface soil by adult visitors are considered unlikely at the site, this scenario was included to aid in future risk management decisions.
	Groundwater	Groundwater	Site 9 and 16	Construction Workers	Adult	Ingestion Dermal	None Quant	Construction workers may have contact with groundwater during excavation activities.
				Maintenance Workers	Adult	Ingestion Dermal	None None	Maintenance workers are not expected to have contact with groundwater.
				Industrial Workers	Adult	Ingestion Dermal	None None	Industrial workers are not expected to have contact with groundwater.
				Adult Visitors	Adult	Ingestion Dermal	None None	Adult visitors are not expected to be exposed to groundwater.
		Air	Site 9 and 16	Construction Workers	Adult	Inhalation	Quant	Construction workers may be exposed to COPCs that have volatilized from groundwater during excavation activities.
				Maintenance Workers	Adult	Inhalation	None	Maintenance workers are not expected to be exposed to COPCs that have volatilized from groundwater.

TABLE 6-37

SELECTION OF EXPOSURE PATHWAYS
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Groundwater	Air	Site 9 and 16	Industrial Workers	Adult	Inhalation	None	Industrial workers are not expected to be exposed to COPCs that have volatilized from groundwater.
				Adult Visitors	Adult	Inhalation	None	Adult visitors are not expected to be exposed to COPCs that have volatilized from groundwater.
	`		Vapor Intrusion	Industrial Workers	Adult	Inhalation	None[1]	Industrial workers may be exposed to COPCs that have volatilized from groundwater and migrated through building foundations into indoor air
Future	Surface Soil	Surface Soil	Site 9 and 16	Residents	Child	Ingestion Dermal	Quant Quant	Although a future residential scenario is considered unlikely at the site, this scenario was included to aid in future risk management decisions.
					Adult	Ingestion Dermal	Quant Quant	
		Air	Site 9 and 16	Residents	Child	Inhalation	Quant	
					Adult	Inhalation	Quant	
	Subsurface Soil	Subsurface Soil	Site 9 and 16	Residents	Child	Ingestion Dermal	Quant Quant	
					Adult	Ingestion Dermal	Quant Quant	
		Air	Site 9 and 16	Residents	Child	Inhalation	Quant	
					Adult	Inhalation	Quant	
	Groundwater	Groundwater	Site 9 and 16	Residents	Child	Ingestion Dermal	Quant Quant	
					Adult	Ingestion Dermal	Quant Quant	
		Air	Site 9 and 16	Residents	Child	Inhalation	Quant	
					Adult	Inhalation	Quant	
			Vapor Intrusion	Residents	Child	Inhalation	None[1]	
					Adult	Inhalation	None[1]	

Notes:
Quant - Quantitative.
Qual - Qualitative.
1 - No chemicals were selected as COPCs for the vapor intrusion pathway.

TABLE 6-38

RECEPTORS AND EXPOSURE ROUTES FOR QUANTITATIVE EVALUATION
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Receptors	Exposure Routes
Construction Workers (future land use)	• Soil dermal contact (surface/subsurface) • Soil incidental ingestion (surface/subsurface) • Inhalation of air/dust/emissions (surface/subsurface) • Groundwater dermal contact (during excavation) • Groundwater inhalation of volatile organics (during excavation)
Maintenance Workers (future land use)	• Soil dermal contact (surface/subsurface[1]) • Soil ingestion (surface/subsurface[1]) • Inhalation of air/dust/emissions (surface/subsurface soil[1])
Industrial Workers (future land use)	• Soil dermal contact (surface/subsurface[1]) • Soil ingestion (surface/subsurface[1]) • Inhalation of air/dust/emissions (surface/subsurface soil[1])
Adult Visitor (current/future land use)	• Soil dermal contact (surface/subsurface[1]) • Soil ingestion (surface/subsurface[1]) • Inhalation of air/dust/emissions (surface/subsurface soil)[1]
Hypothetical Residents (children and adults) (future land use)	• Soil dermal contact (surface/subsurface[1]) • Soil ingestion (surface/subsurface[1]) • Inhalation of air/dust/emissions (surface/subsurface soil)[1] • Groundwater Ingestion • Groundwater dermal contact (showering/bathing) • Inhalation of volatiles in groundwater (showering/bathing)

1 – These receptors are not expected to be exposed to subsurface soil, but exposure to subsurface was evaluated to aid in risk management decisions.

TABLE 6-39

EXPOSURE POINT CONCENTRATIONS
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Parameter	Site 9 and 16		
	Surface Soil (mg/kg)	Subsurface Soil (mg/kg)	Groundwater (ug/L)
Semivolatile Organic Compounds			
1-Methylnaphthalene	NA	NA	1.4[6]
Benzo(a)pyrene Equivalents	0.43[1]	NA	NA
Naphthalene	NA	NA	1.3[6]
Pesticides/PCBs			
4,4'-DDE	5.4[3]	NA	NA
4,4'-DDT	3.1[4]	NA	NA
alpha-BHC	NA	NA	0.018[6]
alpha-Chlordane	9.8[5]	NA	NA
Aroclor-1260	0.81[6]	NA	NA
beta-BHC	0.37[5]	NA	0.05[6]
delta-BHC	NA	NA	0.14[6]
Dieldrin	NA	NA	0.0026[6]
Endrin	2.3[5]	NA	NA
gamma-Chlordane	8.6[5]	NA	NA
Heptachlor	0.60[5]	NA	0.019[6]
Heptachlor Epoxide	NA	NA	0.35[6]
Inorganics			
Aluminum	NA	6470[7]	NA
Antimony	2.7[1]	5.7[5]	5.9[6]
Arsenic	4.8[8]	4.4[9]	7.9[6]
Chromium	36.4[10]	6.3[7]	0.70[6]
Cobalt	4.7[11]	NA	NA
Copper	393[3]	NA	NA
Iron	7320[10]	NA	12,900[6]
Lead	98.4[2]	NA	NA
Manganese	NA	NA	94.6[6]
Nickel	164[5]	NA	NA
Thallium	0.42[6]	NA	NA
Zinc	2280[3]	NA	NA

Notes:
NA - Not applicable. Not a COPC for this medium.
1 - 97.5% KM (Chebyshev) UCL
2 - Arithmetic Mean Concentration
3 - 99% Chebyshev(Mean, Sd) UCL
4 - Adjusted Gamma UCL
5 - 99% KM (Chebyshev) UCL
6 - Maximum Detected Concentration
7 - 95% Student's-t UCL
8 - 95% KM (Chebyshev) UCL
9 - 95% KM (BCA) UCL
10 - 95% Chebyshev(Mean, Sd) UCL
11 - 95% KM (t) UCL

Risk Assessment Guidance for Superfund (RAGS) Part D tables for the exposure point concentrations and ProUCL printouts are included in Appendix G.
See ProUCL guidance (USEPA, May 2010) for statistics listed above.

TABLE 6-40

SUMMARY OF EXPOSURE INPUT PARAMETERS
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Parameter Code	Exposure Parameter	Construction Worker	Maintenance Worker	Industrial Worker	Adult Visitor	Child Resident	Adult Resident
All Exposures							
ED	Exposure Duration (years)	1[1]	25[2]	25[2]	25[2]	6[3]	24[3]
BW	Body Weight (kg)	70[4]	70[4]	70[4]	70[4]	15[4]	70[4]
AT-N	Averaging Time (Non-Cancer) (days)	365[4]	9,125[4]	9,125[4]	9,125[4]	2,190[4]	8,760[4]
AT-C	Averaging Time (Cancer) (days)	25,550[4]	25,550[4]	25,550[4]	25,550[4]	25,550[4]	25,550[4]
Incidental Ingestion/Dermal Contact with Soil							
C_{soil}	Chemical concentration in soil (mg/kg)	Maximum or 95% UCL[5]	Maximum or 95% UCL[5]	Maximum or 95% UCL[5]	Maximum or 95% UCL[5]	Maximum or 95% UCL[5]	Maximum or 95% UCL[5]
IR-S	Ingestion Rate (mg/day)	330[2]	100[2]	100[2]	50[4]	200[4]	100[4]
EF	Exposure Frequency (days/year)	210[1]	50[6]	250[2]	50[6]	350[3]	350[3]
FI	Fraction Ingested (unitless)	1[2]	1[2]	1[2]	1[2]	1[3]	1[3]
SA	Skin Surface Available for Contact (cm^2)	3,300[2]	3,300[2]	3,300[2]	3,300[2]	2,800[7]	5,700[7]
SSAF	Soil to Skin Adherence Factor (mg/cm^2/event)	0.3[2]	0.2[2]	0.2[2]	0.07[7]	0.2[7]	0.07[7]
EV	Events Frequency (events/day)	1	1	1	1	1	1
DABS	Absorption Factor (unitless)	chemical-specific[7]	chemical-specific[7]	chemical-specific[7]	chemical-specific[7]	chemical-specific[7]	chemical-specific[7]
CF	Conversion Factor (kg/mg)	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06
Inhalation Fugitive Dust/Volatile Emissions from Soil							
C_{air}	Chemical concentration in air (mg/m^3)	calculated[2]	calculated[2]	calculated[2]	calculated[2]	calculated[2]	calculated[2]
ET	Exposure Time (hours/day)	8[8]	8[8]	8[8]	1[9]	24[4]	24[4]
EF	Exposure Frequency (days/year)	210[1]	50[6]	250[2]	50[6]	350[3]	350[3]
PEF	Particulate Emission Factor (m^3/kg)	1.27E+06[2]	9.63E+09[10]	9.63E+09[10]	9.63E+09[10]	9.63E+09[10]	9.63E+09[10]
Ingestion/Dermal Contact with Groundwater							
C_{gw}	Chemical concentration in groundwater (µg/L)	Average[11]	NA	NA	NA	Average[11]	Average[11]
IR	Ingestion Rate (L/day)	NA	NA	NA	NA	1.0[3]	2.0[3]
EF	Exposure Frequency (days/year)	30[1]	NA	NA	NA	350[3]	350[3]
ET	Exposure Time (hours/day)	4[1]	NA	NA	NA	1[7]	0.58[7]
EV	Event Frequency (events/day)	1[2]	NA	NA	NA	1[7]	1[7]
SA	Skin Surface Available for Contact (cm^2)	3,300[2]	NA	NA	NA	6,600[7]	18,000[7]
	Kp (cm/hour), t* (hour/event), τ (hour), and B (unitless)	chemical-specific[7]	NA	NA	NA	chemical-specific[7]	chemical-specific[7]
Inhalation of Volatile Emissions from Groundwater							
C_{air}	Chemical concentration in air (mg/m^3)	calculated[12]	NA	NA	NA	NA	NA
ET	Exposure Time (hours/day)	4[1]	NA	NA	NA	NA	NA
EF	Exposure Frequency (days/year)	30[5]	NA	NA	NA	NA	NA
VF	Volatilization Factor (L/m^3)	calculated[12]	NA	NA	NA	NA	NA

TABLE 6-40

SUMMARY OF EXPOSURE INPUT PARAMETERS
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

1 - Development of Site 27 is scheduled to take place over seven months. Exposures to groundwater are assumed to occur for 4 hours a day for 30 days.
2 - USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9365.4-24.
3 - USEPA, 1991: Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. OSWER Directive 9285.6-03.
4 - USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.
5 - USEPA, 2002. Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.
6 - Assumes one day a week for 50 weeks a year.
7 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. PA/540/R/99/005.
8 - Assume an 8-hour work shift.
9 - Professional judgment.
10 - USEPA, 2011: Soil Screening Guidance calculation Internet site at http://rais.ornl.gov/epa/ssl1.shtml. Site-specific values for Charleston, South Carolina.
11 - USEPA. 2000. Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment Bulletins.
12 - VDEQ September 2008. Virginia Department of Environmental Quality (VDEQ, online - http://www.deq.state.va.us/vrprisk/raguide.html).

TABLE 6-41

INTERMEDIATE VARIABLES FOR CALCULATING DERMAL ABSORPTION (EVENT)
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Chemical of Potential Concern	Media	Dermal Absorption Fraction (soil)	FA	Kp		T(event)		Tau		T*		B
			Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Semivolatile Organic Compounds												
1-Methylnaphthalene	Groundwater	0.1	1	9.08E-02	cm/hr	(1)	hr	6.57E-01	hr	1.58E+00	hr	4.16E-01
Benzo(a)pyrene	Soil	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	Groundwater	0.13	1	4.7E-02	cm/hr	(1)	hr	5.6E-01	hr	1.3E+00	hr	2.0E-01
Pesticides/PCBs												
Aroclor-1260	Soil	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	Soil	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	Soil	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	Groundwater	0.1	1	2.0E-02	cm/hr	(1)	hr	4.5E+00	hr	1.1E+01	hr	1.3E-01
alpha-Chlordane	Soil	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	Soil, Groundwater	0.1	1	2.0E-02	cm/hr	(1)	hr	4.5E+00	hr	1.1E+01	hr	1.3E-01
delta-BHC	Groundwater	0.1	1	2.0E-02	cm/hr	(1)	hr	4.5E+00	hr	1.1E+01	hr	1.3E-01
Dieldrin	Groundwater	0.1	0.8	1.22E-02	cm/hr	(1)	hr	1.46E+01	hr	3.51E+01	hr	9.18E-02
Endrin	Soil	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	Soil	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	Soil, Groundwater	0.1	0.8	8.6E-03	cm/hr	(1)	hr	1.3E+01	hr	3.2E+01	hr	6.4E-02
Heptachlor Epoxide	Groundwater	0.1	1	2.0E-02	cm/hr	(1)	hr	1.6E+01	hr	3.8E+01	hr	1.5E-01
Inorganics												
Aluminum	Soil	0.001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	Soil, Groundwater	0.001	1	1.0E-03	cm/hr	(1)	hr	NA	NA	NA	NA	NA
Arsenic	Soil, Groundwater	0.03	1	1.0E-03	cm/hr	(1)	hr	NA	NA	NA	NA	NA
Chromium	Soil, Groundwater	0.001	1	2.0E-03	cm/hr	(1)	hr	NA	NA	NA	NA	NA
Cobalt	Soil	0.001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	Soil	0.001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	Soil, Groundwater	0.001	1	1.0E-03	cm/hr	(1)	hr	NA	NA	NA	NA	NA
Manganese	Groundwater	0.001	1	1.0E-03	cm/hr	(1)	hr	NA	NA	NA	NA	NA
Nickel	Soil	0.001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	Soil	0.001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	Soil	0.001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All values from EPA's Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final, July 2004.
1 - T(event) is 4 hours for the construction worker, 1 hour for the hypothetical child resident, and 0.58 hours for the hypothetical adult resident.

FA = Fraction Absorbed Water
Kp = Dermal Permeability Coefficient of Compound in Water
T(event) = Event Duration
Tau = Lag Time

T* = Time to Reach Steady-State
B = Dimensionless Ratio of the Permeability Coefficient of a Compound Through the Stratum Corneum Relative to its Permeability Coefficient Across the Viable Epidermis
NA = Not applicable.

TABLE 6-42

CHEMICAL PROPERTIES FOR VOLATILIZATION FROM SOIL/GROUNDWATER TO OUTDOOR AIR MODELS
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Chemical	Molecular Weight (g/mole)	Organic Carbon Partition Coefficient (cm^3/g)	Air Diffusivity (cm^2/sec)	Water Diffusivity (cm^2/sec)	Solubility Limit (mg/L)	Henry's Law Constant	
						(Dimensionless)	(atm-m^3/mol)
1-Methylnaphthalene	1.42E+02	2.53E+03	5.28E-02	7.85E-06	2.58E+01	2.10E-02	5.14E-04
Naphthalene	1.28E+02	1.54E+03	6.05E-02	8.38E-06	3.10E+01	1.80E-02	4.40E-04

Source:
USEPA, 2011: USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November.

TABLE 6-43
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, 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) (MM/DD/YYYY)
Semivolatile Organic Compounds										
1-Methylnaphthalene	Chronic	7.0E-02	mg/kg/day	1	7.0E-02	mg/kg/day	Respiratory	1000/1	ATSDR	9/2005
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	Subchronic	6.0E-01	mg/kg/day	1	6.0E-01	mg/kg/day	CNS	90/1	ATSDR	9/2005
	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Body Weight	3000/1	IRIS	4/11/2012
Pesticides/PCBs										
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Liver	100/1	IRIS	4/11/2012
alpha-Chlordane[3]	Subchronic	6.0E-04	mg/kg/day	1	6.0E-04	mg/kg/day	Liver	100/1	ATSDR	5/1994
	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Liver	300/1	IRIS	4/11/2012
alpha-BHC	Chronic	8.0E-03	mg/kg/day	1	8.0E-03	mg/kg/day	Liver	100/1	ATSDR	9/2005
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC[4]	Chronic	8.0E-03	mg/kg/day	1	8.0E-03	mg/kg/day	Liver	100/1	ATSDR	9/2005
Dieldrin	Subchronic	1.0E-04	mg/kg/day	1	1.0E-04	mg/kg/day	CNS	100/1	ATSDR	9/2002
	Chronic	5.0E-05	mg/kg/day	1	5.0E-05	mg/kg/day	Liver	100/1	IRIS	4/11/2012
Endrin	Subchronic	2.0E-03	mg/kg/day	1	2.0E-03	mg/kg/day	CNS	100/1	ATSDR	8/1996
	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Liver	100/1	IRIS	4/11/2012
gamma-Chlordane[3]	Subchronic	6.0E-04	mg/kg/day	1	6.0E-04	mg/kg/day	Liver	100/1	ATSDR	5/1994
	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Liver	300/1	IRIS	4/11/2012
Heptachlor	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Liver	300/1	IRIS	4/11/2012
Heptachlor Epoxide	Chronic	1.3E-05	mg/kg/day	1	1.3E-05	mg/kg/day	Liver	1000/1	IRIS	4/11/2012
Inorganics										
Aluminum	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	CNS	100	PPRTV	10/23/2006
Antimony	Chronic	4.0E-04	mg/kg/day	0.15	6.0E-05	mg/kg/day	Blood	1000/1	IRIS	4/11/2012
Arsenic	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, CVS	3/1	IRIS	4/11/2012
Chromium[5]	Subchronic	2.0E-02	mg/kg/day	0.025	5.0E-04	mg/kg/day	None Reported	100/3	HEAST	9/1997
	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	None Reported	300/3	IRIS	4/11/2012
Cobalt	Subchronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Thyroid	300/1	PPRTV	8/25/2008
	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Thyroid	3000/1	PPRTV	8/25/2008
Copper	Chronic	4.0E-02	mg/kg/day	1	4.0E-02	mg/kg/day	Gastrointestinal System	NA	HEAST	7/1997
Iron	Chronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	Gastrointestinal System	1.5	PPRTV	9/11/2006
Manganese[6]	Chronic	2.4E-02	mg/kg/day	0.04	9.6E-04	mg/kg/day	CNS	1	IRIS	4/11/2012
Nickel	Chronic	2.0E-02	mg/kg/day	0.04	8.0E-04	mg/kg/day	Body Weight	300/1	IRIS	4/11/2012
Zinc	Chronic	3.0E-01	mg/kg/day	1.00	3.0E-01	mg/kg/day	Blood	3/1	IRIS	4/11/2012

Notes:

1 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.

2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.

3 - Values are for chlordane.

4 - Values are for alpha-BHC.

5 - Values are for hexavalent chromium.

6 - Adjusted IRIS value in accordance with IRIS.

Definitions:

CNS = Central Nervous System

CVS = Cardiovascular system

HEAST = Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System

NA = Not Available.

ATSDR = Agency for Toxic Substances and Disease Registry.

PPRTV = Provisional Peer Reviewed Toxicity Value.

TABLE 6-44
NON-CANCER TOXICITY DATA -- INHALATION
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, 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) (MM/DD/YYYY)
Semivolatile Organic Compounds									
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	Chronic	3.0E-03	mg/m^3	8.6E-04	(mg/kg/day)	Respiratory	3000/1	IRIS	4/11/2012
Pesticides/PCBs									
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-Chlordane[2]	Chronic	7.0E-04	mg/m^3	2.0E-04	(mg/kg/day)	Liver	1000/1	IRIS	4/11/2012
alpha-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane[2]	Chronic	7.0E-04	mg/m^3	2.0E-04	(mg/kg/day)	Liver	1000/1	IRIS	4/11/2012
Heptachlor	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor Epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics									
Aluminum	Chronic	5.0E-03	mg/m3	1.4E-03	(mg/kg/day)	CNS	300/1	PPRTV	10/23/2006
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	Chronic	1.5E-05	mg/m3	4.3E-06	(mg/kg/day)	NA	NA	Cal EPA(1)	9/2009
Chromium[3]	Chronic	1.0E-04	mg/m3	2.9E-05	(mg/kg/day)	Respiratory	300/1	IRIS	4/11/2012
Cobalt	Subchronic	2.0E-05	mg/m3	5.7E-06	(mg/kg/day)	Respiratory	100/1	PPRTV	8/25/2008
	Chronic	6.0E-06	mg/m3	1.7E-06	(mg/kg/day)	Respiratory	300/1	PPRTV	8/25/2008
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	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	4/11/2012
Nickel	Subchronic	2.0E-04	mg/m3	5.7E-05	(mg/kg/day)	Respiratory	30/1	ATSDR	9/2005
	Chronic	9.0E-05	mg/m^3	2.6E-05	(mg/kg/day)	Respiratory	30/1	ATSDR	9/2005
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 6-44
NON-CANCER TOXICITY DATA -- INHALATION
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, 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) (MM/DD/YYYY)

Notes:
1 - Extrapolated RfD = RfC *20m^{-3}/day / 70 kg
2 - Values are for chlordane.
3 - Values are for hexavalent chromium.

Definitions:
CNS = Central Nervous System
IRIS = Integrated Risk Information System
NA = Not Applicable
ATSDR = Agency for Toxic Substances and Disease Registry.
Cal EPA(1) = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.
PPRTV = Provisional Peer Reviewed Toxicity Value.

TABLE 6-45
CANCER TOXICITY DATA -- ORAL/DERMAL
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, 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)
Semivolatile Organic Compounds								
1-Methylnaphthalene	2.9E-02	$(mg/kg/day)^{-1}$	1	2.9E-02	$(mg/kg/day)^{-1}$	NA	PPRTV	1/8/2010
Benzo(a)pyrene	7.3E+00	$(mg/kg/day)^{-1}$	1	7.3E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/11/2012
Naphthalene	NA	NA	NA	NA	NA	C / Inadequate data of carcinogenicity in humans	IRIS	4/11/2012
Pesticides/PCBs								
4,4'-DDE	3.4E-01	$(mg/kg/day)^{-1}$	1	3.4E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/11/2012
4,4'-DDT	3.4E-01	$(mg/kg/day)^{-1}$	1	3.4E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/11/2012
alpha-BHC	6.3E+00	$(mg/kg/day)^{-1}$	1	6.3E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/11/2012
alpha-Chlordane[3]	3.5E-01	$(mg/kg/day)^{-1}$	1	3.5E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/11/2012
Aroclor-1260	2.0E+00	$(mg/kg/day)^{-1}$	1	2.0E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	USEPA(1)	9/1996
beta-BHC	1.8E+00	$(mg/kg/day)^{-1}$	1	1.8E+00	$(mg/kg/day)^{-1}$	C / Possible Human Carcinogen	IRIS	4/11/2012
delta-BHC[4]	6.3E+00	$(mg/kg/day)^{-1}$	1	6.3E+00	$(mg/kg/day)^{-1}$	D / Not classifiable as to human carcinogenicity	IRIS	4/11/2012
Dieldrin	1.6E+01	$(mg/kg/day)^{-1}$	1	1.6E+01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/11/2012
Endrin	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	4/11/2012
gamma-Chlordane[3]	3.5E-01	$(mg/kg/day)^{-1}$	1	3.5E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/11/2012
Heptachlor	4.5E+00	$(mg/kg/day)^{-1}$	1	4.5E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/11/2012
Heptachlor Epoxide	9.1E+00	$(mg/kg/day)^{-1}$	1	9.1E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/11/2012
Inorganics								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A / Known human carcinogen	IRIS	4/11/2012
Chromium[5]	5.0E-01	$(mg/kg/day)^{-1}$	0.025	2.0E+01	$(mg/kg/day)^{-1}$	D (Not classifiable as to human carcinogenicity)	NJDEP	4/8/2009
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	IRIS	4/11/2012
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 6-45

CANCER TOXICITY DATA -- ORAL/DERMAL

SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA

MCRD PARRIS ISLAND, 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)

Notes:
1 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.
2 - Adjusted cancer slope factor for dermal = Oral cancer slope factor / Oral absorption efficiency for dermal.
3- Values are for chlordane.
4 - Values are for alpha-BHC.
5 - Values are for hexavalent chromium.

IRIS = Integrated Risk Information System.
NA = Not Available.
NJDEP = New Jersey Department of Environmental Protection.
PPRTV = Provisional Peer Reviewed Toxicity Value.
USEPA(1) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

TABLE 6-46
CANCER TOXICITY DATA -- INHALATION
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, 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)
Semivolatile Organic Compounds							
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	1.1E-03	$(ug/m^3)^{-1}$	3.9E+00	$(mg/kg/day)^{-1}$	NA	Cal EPA(1)	9/2009
Naphthalene	3.4E-05	$(ug/m3)^{-1}$	1.2E-01	$(mg/kg/day)^{-1}$	C / Possible Human Carcinogen	Cal EPA(2)	8/2004
Pesticides/PCBs							
4,4'-DDE	9.7E-05	$(ug/m3)^{-1}$	3.4E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	Cal EPA(1)	9/2009
4,4'-DDT	9.7E-05	$(ug/m3)^{-1}$	3.4E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/11/2012
alpha-Chlordane[2]	1.0E-04	$(ug/m3)^{-1}$	3.5E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/11/2012
alpha-BHC	1.8E-03	$(ug/m3)^{-1}$	6.3E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/11/2012
Aroclor-1260	5.7E-04	$(ug/m3)^{-1}$	2.0E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	USEPA(1)	9/1996
beta-BHC	5.3E-04	$(ug/m3)^{-1}$	1.9E+00	$(mg/kg/day)^{-1}$	C/ Possible Human Carcinogen	IRIS	4/11/2012
delta-BHC[3]	1.8E-03	$(ug/m3)^{-1}$	6.3E+00	$(mg/kg/day)^{-1}$	D / Not classifiable as to human carcinogenicity	IRIS	4/11/2012
Dieldrin	4.6E-03	$(ug/m3)^{-1}$	1.6E+01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/11/2012
Endrin	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	4/11/2012
gamma-Chlordane[2]	1.0E-04	$(ug/m3)^{-1}$	3.5E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/11/2012
Heptachlor	1.3E-03	$(ug/m3)^{-1}$	4.6E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/11/2012
Heptachlor Epoxide	2.6E-03	$(ug/m3)^{-1}$	9.1E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	4/11/2012
Inorganics							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Arsenic	4.3E-03	$(ug/m^3)^{-1}$	1.5E+01	$(mg/kg/day)^{-1}$	A / Known human carcinogen	IRIS	4/11/2012
Chromium[4]	8.4E-02	$(ug/m^3)^{-1}$	2.9E+02	$(mg/kg/day)^{-1}$	A / Known human carcinogen	IRIS	4/11/2012
Cobalt	9.0E-03	$(ug/m^3)^{-1}$	3.2E+01	$(mg/kg/day)^{-1}$	NA	PPRTV	8/25/2008
Copper	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	10/20/2011
Nickel	2.6E-04	$(ug/m^3)^{-1}$	9.1E-01	$(mg/kg/day)^{-1}$	NA	Cal EPA(1)	9/2009
Zinc	NA	NA	NA	NA	NA	NA	NA

TABLE 6-46
CANCER TOXICITY DATA -- INHALATION
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, 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)

Notes:
1 - Inhalation CSF = Unit Risk * 70 kg / 20m^3/day.
2- Values are for chlordane.
3 - Values are for alpha-BHC.
4 - Values are for hexavalent chromium.

Definitions:
HEAST = Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System.
NA = Not Available.
Cal EPA(1) = California Environmental Protection Agency, Technical Support Document for Describing Available Cancer Slope Factors, September 2009.
Cal EPA(2) = Adoption of Unit Risk Values for Naphthalene, August 2004.
PPRTV = Provisional Peer Reviewed Toxicity Value.
USEPA(1) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

TABLE 6-47

SUMMARY OF CANCER RISKS AND HAZARD INDICES
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks $> 10^{-4}$	Chemicals with Cancer Risks $> 10^{-5}$ and $\leq 10^{-4}$	Chemicals with Cancer Risks $> 10^{-6}$ and $\leq 10^{-5}$	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Construction Workers	Surface Soil	Incidental Ingestion	2E-06	--	--	--	0.3	--
		Dermal Contact	3E-07	--	--	--	0.02	--
		Inhalation	7E-06	--	--	Chromium	0.3	--
		Total	9E-06	--	--	Chromium	0.6	--
	Subsurface Soil	Incidental Ingestion	4E-07	--	--	--	0.1	--
		Dermal Contact	4E-08	--	--	--	0.005	--
		Inhalation	1E-06	--	--	--	0.2	--
		Total	2E-06	--	--	--	0.4	--
	Groundwater	Dermal Contact	1E-07	--	--	--	0.050	
		Inhalation	3E-10	--	--	--	0.00017	--
		Total	1E-07	--	--	--	0.051	--
	Total Surface Soil and Groundwater		9E-06				0.6	
	Total Surface Soil, Subsurface Soil, and Groundwater		1E-05				1	
Maintenance Workers	Surface Soil	Incidental Ingestion	3E-06	--	--	--	0.04	--
		Dermal Contact	1E-06	--	--	--	0.005	--
		Inhalation	5E-09	--	--	--	0.00002	--
		Total	4E-06	--	--	Chromium	0.04	--
	Subsurface Soil	Incidental Ingestion	7E-07	--	--	--	0.007	--
		Dermal Contact	1E-07	--	--	--	0.0008	--
		Inhalation	9E-10	--	--	--	0.000008	--
		Total	8E-07	--	--	--	0.008	--
	Total Surface Soil and Subsurface Soil		5E-06				0.05	
Industrial Workers	Surface Soil	Incidental Ingestion	1E-05	--	--	Arsenic, Chromium	0.2	--
		Dermal Contact	5E-06	--	--	Chromium	0.02	--
		Inhalation	3E-08	--	--	--	0.00008	--
		Total	2E-05	--	--	Benzo(a)pyrene Equivalents, alpha-Chlordane, Heptachlor, Arsenic, Chromium	0.2	--
	Subsurface Soil	Incidental Ingestion	3E-06	--	--	Arsenic	0.04	--
		Dermal Contact	7E-07	--	--	--	0.004	--
		Inhalation	5E-09	--	--	--	0.00004	--
		Total	4E-06	--	--	Arsenic	0.04	--
	Total Surface Soil and Subsurface Soil		2E-05				0.2	
Adult Visitors	Surface Soil	Incidental Ingestion	1E-06	--	--	--	0.02	--
		Dermal Contact	4E-07	--	--	--	0.002	--
		Inhalation	3E-10	--	--	--	0.000002	--
		Total	2E-06	--	--	--	0.02	--
	Subsurface Soil	Incidental Ingestion	3E-07	--	--	--	0.004	--
		Dermal Contact	5E-08	--	--	--	0.0003	--
		Inhalation	5E-11	--	--	--	0.000001	--
		Total	4E-07	--	--	--	0.004	--
	Total Surface Soil and Subsurface Soil		2E-06				0.02	

TABLE 6-47

SUMMARY OF CANCER RISKS AND HAZARD INDICES
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10^{-4}	Chemicals with Cancer Risks > 10^{-5} and ≤ 10^{-4}	Chemicals with Cancer Risks > 10^{-6} and ≤ 10^{-5}	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Child Residents	Surface Soil	Incidental Ingestion	1E-04	--	Benzo(a)pyrene Equivalents, Chromium	4,4'-DDE, alpha-Chlordane, Aroclor-1260, gamma-Chlordane, Heptachlor, Arsenic	2	Target organ HI < 1
		Dermal Contact	2E-05	--	--	Benzo(a)pyrene Equivalents, Chromium	0.1	--
		Inhalation	1E-07	--	--	--	0.0003	--
		Total	2E-04	--	Benzo(a)pyrene Equivalents, Chromium	4,4'-DDE, alpha-Chlordane, Aroclor-1260, gamma-Chlordane, Heptachlor, Arsenic	2	Target organ HI < 1
	Subsurface Soil	Incidental Ingestion	3E-05	--	Chromium	Arsenic	0.5	--
		Dermal Contact	3E-06	--	--	Chromium	0.02	--
		Inhalation	2E-08	--	--	--	0.0002	--
		Total	3E-05	--	Chromium	Arsenic	0.5	--
	Groundwater	Incidental Ingestion	1E-04	--	Heptachlor Epoxide, Arsenic	delta-BHC, Chromium	6	Heptachlor Epoxide, Arsenic
		Dermal Contact	4E-05	--	Heptachlor Epoxide	delta-BHC, Chromium	3	Heptachlor Epoxide
		Inhalation	2E-07	--	--	--	0.005	--
		Total	1E-04	--	Heptachlor Epoxide, Arsenic, Chromium	delta-BHC	8	Heptachlor Epoxide, Arsenic
	Total Surface Soil and Groundwater		3E-04				10	
	Total Surface Soil, Subsurface Soil, and Groundwater		3E-04				11	
Adult Residents	Surface Soil	Incidental Ingestion	3E-05	--	Chromium	Benzo(a)pyrene Equivalents, alpha-Chlordane, Arsenic	0.2	--
		Dermal Contact	6E-06	--	--	Chromium	0.02	--
		Inhalation	2E-07	--	--	--	0.0003	--
		Total	3E-05	--	Chromium	Benzo(a)pyrene Equivalents, alpha-Chlordane, gamma-Chlordane, Heptachlor, Arsenic	0.3	--
	Subsurface Soil	Incidental Ingestion	6E-06	--	--	Arsenic, Chromium	0.05	--
		Dermal Contact	8E-07	--	--	--	0.003	--
		Inhalation	3E-08	--	--	--	0.0002	--
		Total	7E-06	--	--	Arsenic, Chromium	0.05	--
	Groundwater	Incidental Ingestion	2E-04	--	Heptachlor Epoxide, Arsenic	delta-BHC, Chromium	2	Target organ HI < 1
		Dermal Contact	6E-05	--	Heptachlor Epoxide	delta-BHC, Chromium	1	--
		Inhalation	4E-07	--	--	--	0.002	--
		Total	2E-04	--	Heptachlor Epoxide, Arsenic	alpha-BHC, beta-BHC, delta-BHC, Chromium	4	Heptachlor Epoxide
	Total Surface Soil and Groundwater		3E-04				4	
	Total Surface Soil, Subsurface Soil, and Groundwater		3E-04				4	

TABLE 6-47

SUMMARY OF CANCER RISKS AND HAZARD INDICES
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 10^{-4}	Chemicals with Cancer Risks > 10^{-5} and ≤ 10^{-4}	Chemicals with Cancer Risks > 10^{-6} and ≤ 10^{-5}	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Lifelong Residents	Surface Soil	Incidental Ingestion	2E-04	--	Benzo(a)pyrene Equivalents, Chromium	4,4'-DDE, 4,4'-DDT, alpha-Chlordane, Aroclor-1260, gamma-Chlordane, Heptachlor, Arsenic	NA	--
		Dermal Contact	3E-05	--	--	Benzo(a)pyrene Equivalents, Chromium	NA	--
		Inhalation	3E-07	--	--	--	NA	--
		Total	2E-04	--	Benzo(a)pyrene Equivalents, Chromium	4,4'-DDE, 4,4'-DDT, alpha-Chlordane, Aroclor-1260, gamma-Chlordane, Heptachlor, Arsenic	NA	--
	Subsurface Soil	Incidental Ingestion	3E-05	--	Chromium	Arsenic	NA	--
		Dermal Contact	3E-06	--	--	Chromium	NA	--
		Inhalation	6E-08	--	--	--	NA	--
		Total	3E-05	--	Chromium	Arsenic	NA	--
	Groundwater	Incidental Ingestion	3E-04	Arsenic	Heptachlor Epoxide, Chromium	alpha-BHC, delta-BHC	NA	--
		Dermal Contact	1E-04	--	Heptachlor Epoxide	delta-BHC, Chromium	NA	--
		Inhalation	6E-07	--	--	--	NA	--
		Total	4E-04	Arsenic	delta-BHC, Heptachlor Epoxide, Chromium	alpha-BHC, beta-BHC, Heptachlor	NA	--
	Total Surface Soil and Groundwater		6E-04				NA	
	Total Surface Soil, Subsurface Soil, and Groundwater		6E-04				NA	

TABLE 6-48

CHEMICALS RETAINED AS COCs FOR DIRECT CONTACT EXPOSURES
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

Parameter	Sites 9/16		
	Surface Soil	Subsurface Soil	Groundwater
Semivolatile Organic Compounds			
Carcinogenic PAHs	X		
Pesticides/PCBs			
4,4'-DDE	X		
4,4'-DDT	X		
alpha-Chlordane	X		
Aroclor-1260	X		
gamma-Chlordane	X		
alpha-BHC			X
beta-BHC			X
delta-BHC			X
Heptachlor	X		X
Heptachlor Epoxide			X
Inorganics			
Arsenic	X		X
Chromium	X		X

Notes
X - Chemical was retained as a COC for direct contact exposures.
A chemical is retained as a COC if it contributed to a total cancer risk greater than $1x10^{-4}$ or to a target organ hazard index greater than 1.

TABLE 6-49

REMEDIAL GOAL OPTIONS - SOIL
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

CHILD RESIDENTS							
Chemical	**USEPA RSL[1] (mg/kg)**	**Target Cancer Risk Level**			**Target Hazard Index**		
		10^{-6} (mg/kg)	**10^{-5} (mg/kg)**	**10^{-4} (mg/kg)**	**0.1 (mg/kg)**	**1 (mg/kg)**	**3 (mg/kg)**
Benzo(a)pyrene Equivalents	0.015	0.017	0.17	1.7	NA	NA	NA
4,4'-DDE	1.4	2.5	25	248	NA	NA	NA
4,4'-DDT	1.7	2.5	25	248	3.6	36	108
alpha-Chlordane	1.6[2]	2.3	23	234	3.5	35	106
Aroclor-1260	0.22	0.33	3.3	33	NA	NA	NA
gamma-Chlordane	1.6[2]	2.3	23	234	3.5	35	106
Heptachlor	0.11	0.16	1.6	16	3.1	31	92
Arsenic	0.39	0.56	5.6	56	2.2	22	65
Chromium	0.29[3]	0.31	3.1	31	21	210	630

LIFELONG RESIDENTS							
Chemical	**USEPA RSL[1] (mg/kg)**	**Target Cancer Risk Level**			**Target Hazard Index[4]**		
		10^{-6} (mg/kg)	**10^{-5} (mg/kg)**	**10^{-4} (mg/kg)**	**0.1 (mg/kg)**	**1 (mg/kg)**	**3 (mg/kg)**
Benzo(a)pyrene Equivalents	0.015	0.015	0.15	1.5	NA	NA	NA
4,4'-DDE	1.4	1.7	17	172	NA	NA	NA
4,4'-DDT	1.7	1.7	17	172	3.6	36	108
alpha-Chlordane	1.6[2]	1.6	16	162	3.5	35	106
Aroclor-1260	0.22	0.22	2.2	22	NA	NA	NA
gamma-Chlordane	1.6[2]	1.6	16	162	3.5	35	106
Heptachlor	0.11	0.11	1.1	11	3.1	31	92
Arsenic	0.39	0.39	3.9	39	2.2	22	65
Chromium	0.29[3]	0.27	2.7	27	21	210	630

Notes:
1 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, June 2011. [Cancer benchmark value = 1E-06, Hazard index (HI) = 1].
2 - Value is for chlordane.
3 - Value is for hexavalent chromium.
4 - Value is for child resident.
NA - Not applicable/not available.

TABLE 6-50

REMEDIAL GOAL OPTIONS - GROUNDWATER
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA

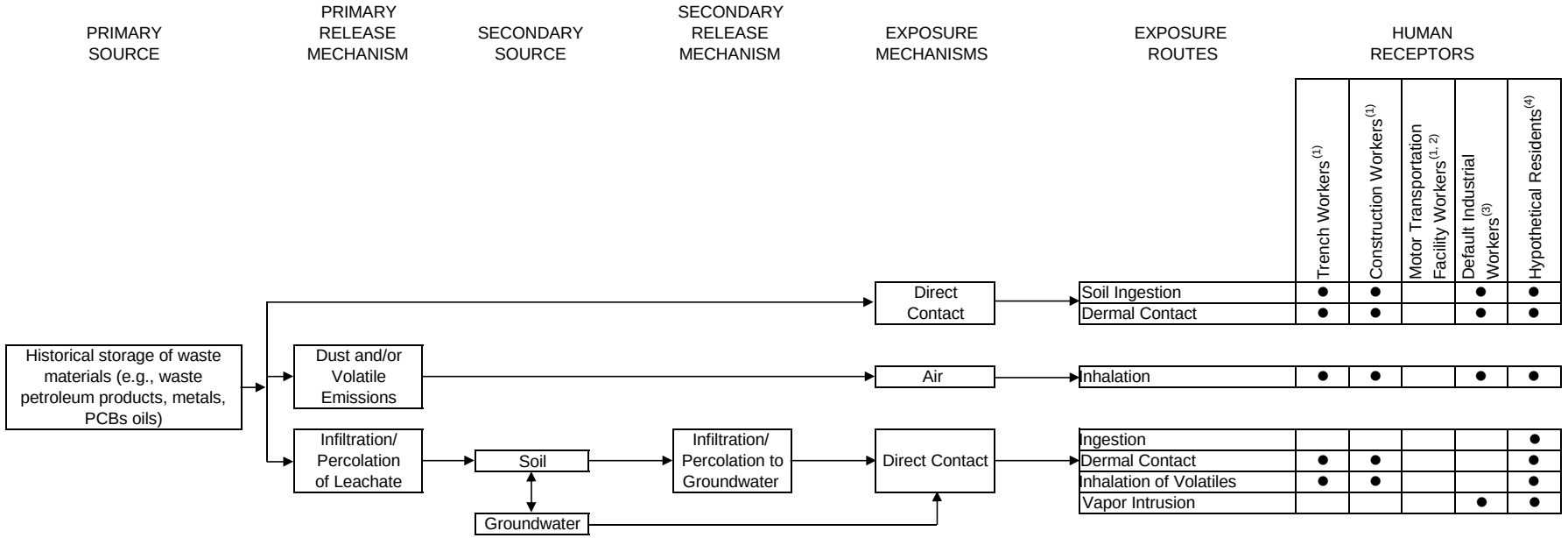
CHILD RESIDENTS								
Chemical	**USEPA RSL[1] (ug/L)**	**USEPA MCL[2] (ug/L)**	**Target Cancer Risk Level**			**Target Hazard Index**		
			10^{-6} (ug/L)	**10^{-5} (ug/L)**	**10^{-4} (ug/L)**	**0.1 (ug/L)**	**1 (ug/L)**	**3 (ug/L)**
alpha-BHC	0.0062	NA	0.018	0.18	1.8	6.0	60	180
delta-BHC	0.0062[3]	NA	0.016	0.16	1.6	7.0	70	210
Heptachlor	0.0018	0.4	0.003	0.03	0.3	0.05	0.5	1
Heptachlor Epoxide	0.0033	0.2	0.009	0.09	0.88	0.009	0.09	0.26
Arsenic	0.045	10	0.11	1.1	11	0.40	4.0	12
Chromium	0.031[4]	100	0.04	0.35	3.5	3.5	35	105

ADULT RESIDENTS								
Chemical	**USEPA RSL[1] (ug/L)**	**USEPA MCL[2] (ug/L)**	**Target Cancer Risk Level**			**Target Hazard Index**		
			10^{-6} (ug/L)	**10^{-5} (ug/L)**	**10^{-4} (ug/L)**	**0.1 (ug/L)**	**1 (ug/L)**	**3 (ug/L)**
alpha-BHC	0.0062	NA	0.009	0.09	0.90	18	180	540
beta-BHC	0.022	NA	0.033	0.33	3.3	NA	NA	NA
delta-BHC	0.0062[3]	NA	0.014	0.14	1.4	16	156	467
Heptachlor	0.0018	0.4	0.002	0.02	0.2	0.1	1	3
Heptachlor Epoxide	0.0033	0.2	0.004	0.044	0.44	0.02	0.18	0.53
Arsenic	0.045	10	0.079	0.79	7.9	1.1	11	34
Chromium	0.031[4]	100	0.078	0.78	7.8	7.8	78	233

LIFELONG RESIDENTS								
Chemical	**USEPA RSL[1] (ug/L)**	**USEPA MCL[2] (ug/L)**	**Target Cancer Risk Level**			**Target Hazard Index[5]**		
			10^{-6} (ug/L)	**10^{-5} (ug/L)**	**10^{-4} (ug/L)**	**0.1 (ug/L)**	**1 (ug/L)**	**3 (ug/L)**
alpha-BHC	0.0062	NA	0.006	0.060	0.60	6.0	60	180
beta-BHC	0.022	NA	0.021	0.21	2.1	NA	NA	NA
delta-BHC	0.0062[3]	NA	0.007	0.070	0.70	7.0	70	210
Heptachlor	0.0018	0.4	0.001	0.01	0.1	0.05	0.5	1
Heptachlor Epoxide	0.0033	0.2	0.004	0.035	0.35	0.009	0.09	0.26
Arsenic	0.045	10	0.040	0.40	4.0	0.40	4.0	12
Chromium	0.031[4]	100	0.035	0.35	3.5	3.5	35	105

Notes:
1 - USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites, November, 2011. [Cancer benchmark value = 1E-06, Hazard index (HI) = 1].
2 - 2011 Edition of the Drinking Water Standards and Health Advisories (USEPA, January 2011).
3 - Value is for alpha-BHC.
4 - Value is for hexavalent chromium.
5 - Value is for child resident.
NA - Not applicable/not available.

FIGURE 6-1
CONCEPTUAL SITE MODEL
SITE 27 - MOTOR TRANSPORTATION FACILITY
MCRD PARRIS ISLAND, SOUTH CAROLINA



LEGEND

● = Complete exposure pathway.

A blank space indicates that the exposure route is not complete for this receptor.

KEY

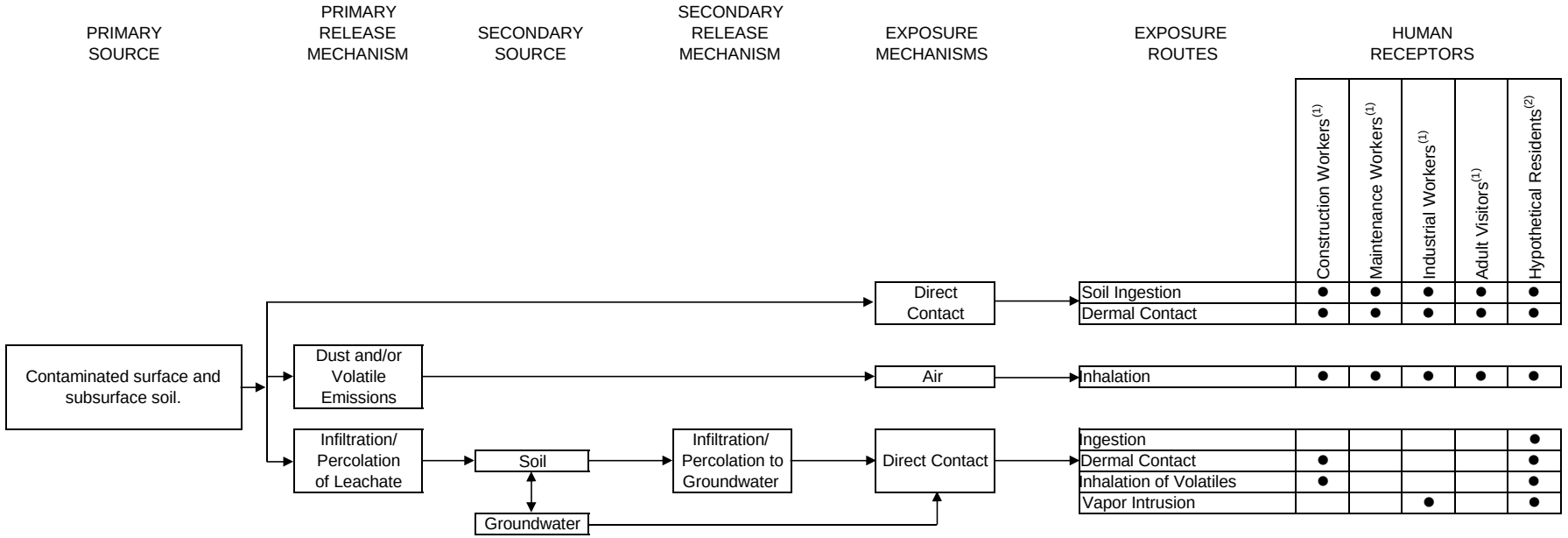
1 Likely receptor based on expected site use.

2 The site development plans call for the entire site to be paved therefore there are no complete exposure pathways.

3 Not a likely receptor based on expected site use. Evaluated for risk management decision-making purposes only.

4 Residential development of Site 27 is not anticipated. Evaluated for risk management decision-making purposes only.

FIGURE 6-2
CONCEPTUAL SITE MODEL
SITE 55 - FIBER OPTIC VAULT
MCRD PARRIS ISLAND, SOUTH CAROLINA



LEGEND

● = Complete exposure pathway.

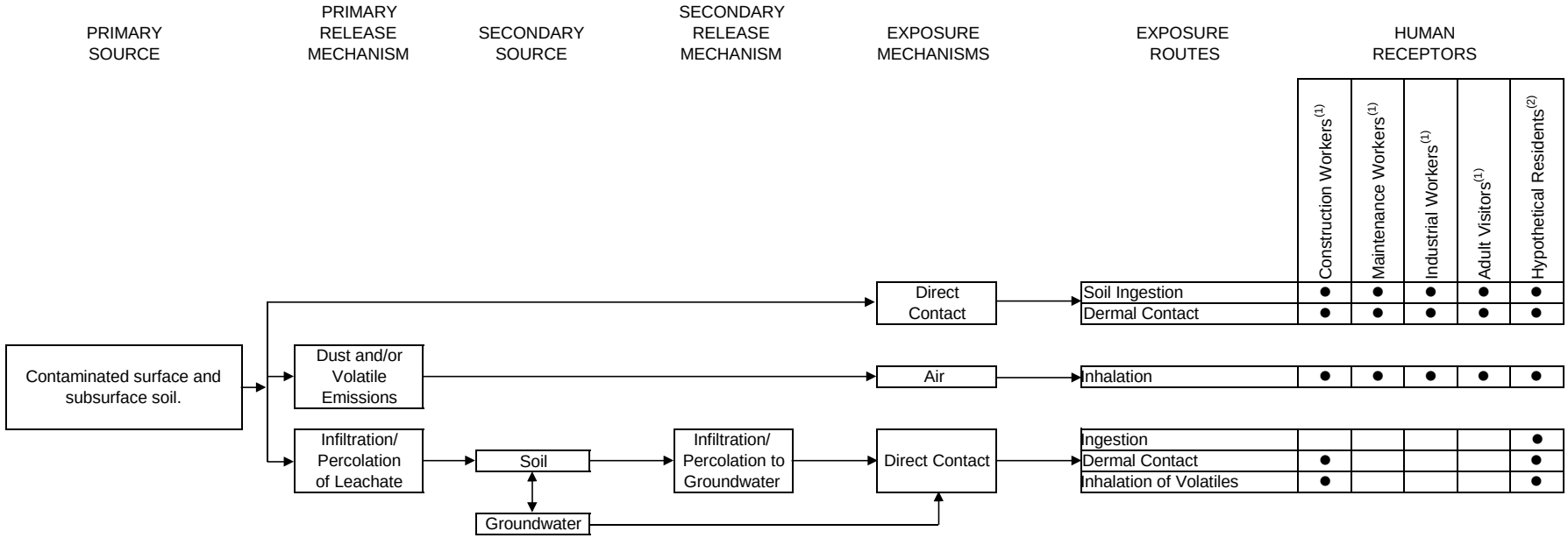
A blank space indicates that the exposure route is not complete for this receptor.

KEY

1 Potential receptor under current and future site use.

2 Residential development of Site 27 is not anticipated. Evaluated for risk management decision-making purposes only.

FIGURE 6-3
CONCEPTUAL SITE MODEL
SITE 9 - PAINT WASTE STORAGE AREA, SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
MCRD PARRIS ISLAND, SOUTH CAROLINA



LEGEND

● = Complete exposure pathway.

A blank space indicates that the exposure route is not complete for this receptor.

KEY

1 Potential receptor under current and future site use.

2 Residential development of Site 9 and 16 is not anticipated. Evaluated for risk management decision-making purposes only.

7.0 CONCLUSIONS AND RECOMMENDATIONS

This section provides a summary of the conclusions drawn during the RI and recommendations for future activities related to the sites.

7.1 CONCLUSIONS

This section briefly summarizes the conclusions based on RI field activities, the analytical surface, subsurface, and groundwater sampling results, and the HHRA.

Sites 27 and 55

The RI field sampling activities were completed at Sites 27 and 55 at Parris Island during three Phases occurring in 2007, 2008, and 2010. Site 27 was historically referred to as the Equipment Parade Deck where out-of-service storage tanks, concrete cylinders, boilers, scrap metal, and piping were temporarily stored. MCRD Parris Island identified an operational need to construct a new Motor-T Facility at Site 27. Construction began in April 2011 and is ongoing. Site 55 is the EU around the FOV, an oversized utility manhole used for the installation of fiber optic communications cables. Site 55 was historically only considered as the area that the FOV physically occupied. When the FOV was being constructed, LNAPL was discovered floating on water in the vault interior. The details related to the number of detects and exceedances of criteria for each analyte and medium are presented in Section 4. The details of the HHRA are presented in Section 6. The generalized conclusions are as follows:

- VOCs were detected at concentrations less than the lowest screening criteria in surface soil. Although VOCs were detected more frequently in subsurface soil, only one VOC, 1,4'-dichlorobenzene, exceeded the lowest screening criteria in subsurface soil in two samples. In groundwater, chlorobenzenes and BTEX compounds were the VOCs that exceeded the lowest screening criteria with the highest concentrations identified in sampling locations downgradient of the FOV.

- SVOCs were detected in surface soil samples with PAHs as BaP equivalents exceeding the lowest screening criteria in a majority of the samples collected from Sites 27 and 55. However, the presence of these contaminants is likely attributed to the asphalt paving at Site 27. Sadler et al. (1999) reports that a significant amount of PAHs can enter the environment through leaching from asphalt surfaces. The Agency for Toxic Substances and Disease Registry (ATSDR) reports that one of the principal sources of PAHs along roads is asphalt (ATSDR, 1995). Naphthalene exceeded the screening

criteria in two samples. In groundwater, all SVOCs were detected at concentrations below screening criteria, except for BaP equivalents, which exceeded the lowest screening criteria in only one sample.

- Pesticides, primarily DDTs and BHCs, were detected frequently in surface soil, subsurface soil, and groundwater. Several samples in surface soil had exceedances of the lowest screening criteria. Intermediate subsurface soil samples only had two samples with exceedances for DDTs and BHCs; however, the deep soil samples had a very high percentage of exceedances of the lowest screening criteria for DDTs and BHCs. Likewise, many groundwater samples at all depths had exceedances of the lowest screening criteria with many of the exceedances downgradient of the FOV.

- Metals, particularly arsenic, chromium, and thallium, were detected at concentrations that exceeded the lowest screening criteria throughout Sites 27 and 55 with no apparent distribution pattern. In subsurface soil, arsenic exceeded the lowest screening criteria in all intermediate and deep samples, and thallium exceeded the lowest screening criteria in all intermediate and one deep sample. Iron also exceeded the lowest screening criteria in one deep sample. Aluminum, iron, lead, and antimony exceeded the lowest screening criteria in one sample each in shallow groundwater while arsenic exceeded the lowest criteria in two samples. In intermediate samples, nine metals (aluminum, arsenic, beryllium, chromium, cobalt, iron, lead, thallium, and vanadium) exceeded the lowest criteria in one or more samples. No metals exceeded the screening criteria in samples collected from deep soil.

- LNAPL was discovered in the FOV during its installation. Subsequently, LNAPL was also found in two monitoring wells near the FOV, and LNAPL sheen was also detected in several other wells near the FOV. To date, the source of the free product has not been clearly identified. Based on the hydrology observed during the 2008, 2010, and 2011 investigations, groundwater flows to the north, west, and south from the area of the FOV making it unlikely that a source outside the FOV is contributing the LNAPL found at Site 55.

- The HHRA identified COCs that would contribute to the risks of child, adult, and lifelong residents at both Site 27 and Site 55 associated with direct contact to surface soil, subsurface soil (Site 27 only), and groundwater. The HHRA also identified COCs that would contribute to the risks of the industrial worker at Site 27 associated with direct contact to surface and subsurface soil. COCs were retained if the receptor risk exceeded the $1x10^{-4}$ cancer risk benchmark or the receptor risk exceeded the non-cancer risk benchmark of target organ-specific HI greater than 1.

- At Site 27, the following COCs were retained for surface soil: carcinogenic PAHs, Aroclor-1260, chromium, and arsenic; for subsurface soil: alpha-BHC, delta-BHC, 4,4'- DDD, arsenic, chromium, and thallium; for direct contact with groundwater: benzene, chlorobenzene, aldrin, dieldrin, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, 1,1-biphenyl, 1,2,4-trichlorobenzene, 1,4-dichlorobenzene,

ethylbenzene, 4.4'-DDD, 4,4'-DDT, heptachlor epoxide, aluminum, arsenic, beryllium, chromium, iron, and manganese; for vapor intrusion: chlorobenzene; and for LNAPL: benzene, chlorobenzene, aldrin, dieldrin, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, 1,1-biphenyl, 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, ethylbenzene, 4.4'-DDD, 4,4'-DDT, and heptachlor epoxide. The conceptual site model at Site 27 has changed since the construction of the Motor-T facility began. Surface soil at Site 27 has been disturbed and replaced with clean fill. A cross section showing the depth of fill will be presented in the FS.

- At Site 55 the following COCs were retained for surface soil: carcinogenic PAHs, 4,4'-DDD, 4,4'-DDE, 4,4'- DDT, beta-BHC, arsenic, and chromium; for direct contact with groundwater: 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, 1,1-biphenyl, benzene, chlorobenzene, ethylbenzene, xylenes, carcinogenic PAHs, naphthalene, 2-methylnaphthalene, dibenzofuran, 4,4'-DDD, 4,4'- DDE, 4,4'-DDT, aldrin, dieldrin, endrin, endrin ketone, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, alpha-chlordane, gamma-chlordane, heptachlor epoxide, heptachlor, aluminum, antimony, arsenic, beryllium, chromium, cobalt, iron, manganese, nickel, thallium, and vanadium; for vapor intrusion: chlorobenzene; and for LNAPL: benzene, chlorobenzene, aldrin, dieldrin, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, arsenic, chromium, 1,1-biphenyl, 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, ethylbenzene, 4,4'-DDD, 4,4'-DDT, and heptachlor epoxide.

- No chemicals were retained as COCs for trench workers or construction workers at Site 27. No chemicals were retained as COCs for construction workers, maintenance workers, or industrial workers at Site 55.

- Risks associated with direct contact with LNAPL were not quantitatively evaluated in this risk assessment. However, the quantitative risk evaluation using maximum detect groundwater concentrations as exposure concentrations has indicated that chronic risks associated with exposure to groundwater exceeds EPA's target risk range and hazard index. Although direct exposure to LNAPL by a worker would be more short-term, appropriate personal protective equipment and measures should be employed to minimize exposure.

Sites 9 and 16

The RI field sampling activities were completed at Sites 9 and 16 in August 2010 and September 2011. Site 9, the Former Paint Waste Storage Area, was historically used to store paint waste (mineral spirits, kerosene, diesel fuels, and methylene chloride) in 55-gallon and 330-gallon drums. Site 16, the Pesticide Rinsate Disposal Area, was historically used to discharge rinse water from pest control application containers. The details related to the number of detections and exceedances of criteria for each analyte and medium are presented in Section 4. The details of the HHRA are presented in Section 6. The generalized conclusions are as follows:

- VOCs were detected at concentrations less than the lowest USEPA screening criteria in surface soil, subsurface soil, and groundwater.

- SVOCs were detected in surface soil, subsurface soil, and groundwater samples. Measured concentrations of PAHs as BaP equivalents exceeded the lowest USEPA screening criteria at Sites 9 and 16. Additionally, naphthalene exceeded the screening criteria in one intermediate groundwater sample (PAI-9/16-TW-04I).

- Pesticides, primarily DDTs and BHCs, were detected frequently in surface soil, subsurface soil, and groundwater. In shallow groundwater, the pesticides delta-BHC, heptachlor epoxide, and heptachlor were detected above the lowest USEPA screening criteria. In intermediate groundwater, the pesticides alpha-BHC, beta-BHC, and delta-BHC were detected above the lowest USEPA screening criteria. In surface soils, the pesticides 4,4'-DDE, 4,4;-DDT, alpha-chlordane, beta-BHC, gamma-chlordane, and heptachlor were detected above the lowest USEPA screening criteria.

- Arsenic was detected in surface and subsurface soils at concentrations that exceeded the lowest USEPA screening criteria throughout Sites 9 and 16 with no apparent distribution pattern (Figure 4-14). Arsenic was also detected in one intermediate groundwater sample (PAI-9/16-MW-06I) above the lowest USEPA screening criteria. No other metals were detected exceeding the lowest USEPA screening criteria in soils or groundwater.

- The HHRA identified several COCs for risks to child and lifelong residents at both Site 9 and Site 16 in surface soil. COCs were retained if the receptor risk exceeded the $1x10^{-4}$ cancer risk benchmark or the receptor risk exceeded the non-cancer risk benchmark of target organ-specific HI greater than 1.

- At Sites 9 and 16 the following COCs were retained for surface soil: carcinogenic PAHs, 4,4'-DDE, 4,4'-DDT, alpha-chlordane, gamma-chlordane, Aroclor-1260, heptachlor, arsenic, and chromium; and for direct contact with groundwater: heptachlor epoxide, heptachlor, alpha-BHC, beta-BHC, delta-BHC, arsenic, and chromium.

- No COCs were retained for vapor intrusion from groundwater for any receptor at Sites 9 and 16.

- No chemicals were retained as COCs for construction workers, maintenance workers, or industrial workers at Sites 9 and 16.

7.2 RECOMMENDATIONS

The following future actions are recommended for Sites 27 and 55:

- Based on the results of the RI, no additional investigation at the site is needed beyond limited in situ sampling that could be conducted as part of the remedial action design phase to refine the extent of the LNAPL free product.

- Enough information is available to proceed to an FS to evaluate remedial options. Because of the unacceptable risks posed from consumption of groundwater at the sites, the LNAPL identified as PTW and the presence of highly contaminated soils in the clay layer (acting as a smear zone) remedial alternatives to address these media will be developed and evaluated in the FS.

- The HI for residential exposure from vapor intrusion at Sites 27 and 55 exceeded unity, primarily due to the presence of chlorobenzene. The ILCRs for residential exposures from vapor intrusion were within USEPA's target risk range. No buildings, other than the Motor-T Facility, which was constructed with a vapor barrier, are located within 100 feet from locations where groundwater concentrations exceeded vapor intrusion screening criteria or where LNAPL was identified.

- A screening of potential technologies for soil and groundwater remediation is presented in Appendix H describing a number of available technologies, effectiveness, limitations, and concerns for each technology. Based on the results of the RI, draft Remedial Action Objectives, COCs, and Preliminary Remediation Goals will be developed for LNAPL at Site 55 in preparation for FS scoping.

The following future actions are recommended for Sites 9 and 16:

- Based on the results of the RI, no additional investigation at the site is needed.

- Based on the recommendations in the SI/CS (Tetra Tech, 2010a), Sites 9 and 16 should be jointly excavated to address risk driven chemicals in the surface soil if unlimited site use is preferred.

- Enough information is available to proceed to a Focused FS to evaluate remedial options.

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APPENDIX A

FIELD PAPERWORK – PREVIOUS INVESTIGATIONS

A-1 1988 REMEDIAL INVESTIGATION VERIFICATION STEP – SITE 16

A-2 1995 RELATIVE SITE RANKING - SITES 9 AND 27

A-3 1999 SITE INSPECTION/CONFIRMATORY SAMPLING – SITES 9 AND 27

A-4 2002 SOIL AND GROUNDWATER FIELD SCREENING – SITE 55

A-5 2003 GROUNDWATER INVESTIGATION – SITE 55

A-1

BORING LOGS
1988 REMEDIAL INVESTIGATION VERIFICATION STEP
SITE 16

LOG OF BORING NO. PAI 16-1

Site 16 - Pesticide Rinsate Desposal Area
Marine Corps Recruit Depot
Beaufort County, South Carolina

Location: See Plate >

Surface Elevation: --

Depth, Ft	Samples	Penetration Resistance, Blows/Ft	MATERIAL DESCRIPTION	Shear Strength, ksf: Penetrometer (P) Torvane (T)	Shear Strength, ksf: Unconfined Compression	Shear Strength, ksf: Triaxial Compression	Confining Pressure, ksf	Unit Dry Weight pcf	Water Content, %	Liquid Limit	Plastic Limit	Percent Passing No. 200 Sieve
			FILL: ASPHALT AND GRAVEL (0.5')									
			SILTY SAND, light brown - with clay seams, 3.5' to 4.0' (6.5')									
5			CLAY, light gray, and brown (7.5')									
10												
15												
20												
25												
30												
35												
40												
45												
50												
55												

See Key for Terms and Symbols.

Completion Depth: 15.0'
Water First Noticed: --
Date: February 23, 1988
Depth to Water: --
Caved: --
Date: --

Job No.: 1387-3606
Drilled By: A. Clark
Logged By: J. Byars
Dry Auger: 0' to 7.5'
Wet Rotary: --
Boring Sealed: Grouted

McCLELLAND ENGINEERS

PLATE >

LOG OF BORING NO. PAI 16-2

Site 16 - Pesticide Rinsate Desposal Area
Marine Corps Recruit Depot
Beaufort County, South Carolina

Location: See Plate >

Surface Elevation: --

Depth, Ft	Samples	Penetration Resistance, Blows/Ft	MATERIAL DESCRIPTION	Shear Strength, ksf: Penetrometer (P) Torvane (T)	Shear Strength, ksf: Unconfined Compression	Shear Strength, ksf: Triaxial Compression	Confining Pressure, ksf	Unit Dry Weight pcf	Water Content, %	Liquid Limit	Plastic Limit	Percent Passing No. 200 Sieve
			FILL: SAND AND RUBBLE (0.5')									
			SILTY SAND, light brown									
5			- with clayey sand seam, 4.5' to 5.0'									
			- with clayey sand seam, 7.3' to 7.5' (7.5')									
			SANDY CLAY with sand pockets (8.5')									
10												
15												
20												
25												
30												
35												
40												
45												
50												
55												

See Key for Terms and Symbols.

Completion Depth: 8.5'
Water First Noticed: 3.0'
Date: February 23, 1988
Depth to Water: --
Caved: --
Date: --

Job No.: 1387-3606
Drilled By: A. Clark
Logged By: J. Byars
Dry Auger: 0' to 8.5'
Wet Rotary: --
Boring Sealed: Grouted

McCLELLAND ENGINEERS

PLATE >

LOG OF BORING NO. PAI 16-3

Site 16 - Pesticide Rinsate Desposal Area
Marine Corps Recruit Depot
Beaufort County, South Carolina

Location: See Plate >

Surface Elevation: --

Depth, Ft	Samples	Penetration Resistance, Blows/Ft	MATERIAL DESCRIPTION	Shear Strength, ksf: Penetrometer (P) Torvane (T)	Shear Strength, ksf: Unconfined Compression	Shear Strength, ksf: Triaxial Compression	Confining Pressure, ksf	Unit Dry Weight pcf	Water Content, %	Liquid Limit	Plastic Limit	Percent Passing No. 200 Sieve
			FILL: GRAVEL AND ASPHALT (0.5')									
			SILTY SAND, light brown									
5			(7.5')									
			CLAY, gray, with a few sand pockets (8.0')									
10												
15												
20												
25												
30												
35												
40												
45												
50												
55												

See Key for Terms and Symbols.

Completion Depth: 8.0'
Water First Noticed: --
Date: February 23, 1988
Depth to Water: --
Caved: --
Date: --

Job No.: 1387-3606
Drilled By: A. Clark
Logged By: J. Byars
Dry Auger: 0' to 8'
Wet Rotary: --
Boring Sealed: Grouted

McCLELLAND ENGINEERS

PLATE >

A-2

SAMPLE LOG SHEETS

1995 RELATIVE SITE RANKING

SITE 9

SITE 27

SINGLE SAMPLE LOG SHEET

Page ___ of ___

Project Site Name: PARRIS IS., MCRD

Sample ID No.: PI-009-01(32)

Project No.: 7115 CTO-009

Sample Location: SITE 9

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other _____
- [ ] QA Sample Type: _____

Sampled By: TOM DICKSON/TERRY ROJAHN

C.O.C. No.: 000053

Sample Method: S.S. TROWEL

Depth Sampled: 0-6" UNDER CONCRETE PAD

Sample Date and Time: 12/12/95 1010

Type of Sample
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite
- [ ] High Concentration
- [x] Low Concentration

Composite Sample Data		
Sample	Time	Color/Description
	NA	

Grab Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)
BRN	FINE GRAIN W/ GRAVEL

Analysis	Container Requirements	Collected (✓)
TCL VOLATILES	2oz JAR	✓
TCL SEMIVOLATILES	(8oz JAR)	✓
TCL PESTICIDE/PCBs		✓
TAL METALS/CYANIDE	8oz JAR	✓

Map:

Observations/Notes: CONCRETE 6"
TOTAL DEPTH OF HOLE = 12"

Circle if Applicable:

MS/MSD | Duplicate ID No:

Signature(s): Terry Rojahn

JJB 12/16/95

SINGLE SAMPLE LOG SHEET

Page ___ of ___

Project Site Name: PARRIS IS., MCRD

Sample ID No.: PI-009-0X2(33)

Project No.: 7115 CTO-009

Sample Location: SITE 9

- ■ Surface Soil
- ☐ Subsurface Soil
- ☐ Sediment
- ☐ Other _____
- ☐ QA Sample Type: _____

Sampled By: TOM DICKSON / TERRY ROJAHN

C.O.C. No.: 000003

Sample Method: S.S. TROWEL

Depth Sampled: 0-6"

Sample Date and Time: 12/12/95 1035

Type of Sample
- ■ Grab
- ☐ Composite
- ☐ Grab-Composite
- ☐ High Concentration
- ■ Low Concentration

Composite Sample Data		
Sample	Time	Color/Description
	NA	

Grab Sample Data	
Color	Description: (Sand) Clay, Dry (Moist) Wet, etc.)
DARK BRN	Fine

Analysis	Container Requirements	Collected (✓)
TCL VOLATILES	2oz JAR	✓
TCL SEMIVOLATILES	(8oz JAR)	✓
TCL PESTICIDE/PCBs		✓
TAL METALS/CYANIDE	8oz JAR	✓

Map:

Observations/Notes:

SAMPLE ON SMALL MOUNDED AREA W/ POSSIBLE DRIED PAINT CHIPS

SAMPLE COLLECTED AGAINST CURB

Circle if Applicable:	
MS/MSD	Duplicate ID No:

Signature(s): [signature]

IJB 12/6/00

SINGLE SAMPLE LOG SHEET

Page ___ of ___

Project Site Name: PARRIS IS. MCRD

Sample ID No.: PI-009-0X3 (34)

Project No.: 7115 CTO-009

Sample Location: Site 9

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other _____
- [ ] QA Sample Type: _____

Sampled By: TOM DICKSON / TERRY ROJAHN

C.O.C. No.: 000003

Sample Method: (TA) ~~0-6"~~ S.S. TROWEL

Depth Sampled: 0-6"

Sample Date and Time: 12/12/95 1040

Type of Sample
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite
- [ ] High Concentration
- [x] Low Concentration

Composite Sample Data

Sample	Time	Color/Description
	NA	

Grab Sample Data

Color	Description (Sand, Clay, Dry, Moist, Wet, etc.)
BRN - Yellow BRN	FINE GRAIN SOME ROOTS

Analysis	Container Requirements	Collected (✓)
TCL VOLATILES	2oz JAR	✓
TCL SEMIVOLATILES	(8oz JAR)	✓
TCL PESTICIDE/PCBS		✓
TAL METALS/CYANIDE	8oz JAR	✓

Map: Picked out some metalic objects.

Observations/Notes: Sample collected in small drainage swale at the southern most corner

Circle if Applicable:

MS/MSD | Duplicate ID No:

Signature(s): Terry Rojahn

C-1d

SINGLE SAMPLE LOG SHEET

Page ___ of ___

Project Site Name: PARRIS IS., MCRD

Sample ID No.: PI- 027-01 (46)

Project No.: 7115 CTO-009

Sample Location: SITE 27

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other _____
- [ ] QA Sample Type: _____

Sampled By: TOM DICKSON / TERRY ROJAHN

C.O.C. No.: 000003

Sample Method: S.S. TROWEL

Depth Sampled: 0-6"

Sample Date and Time: 12/13/95 0753

Type of Sample
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite
- [ ] High Concentration
- [x] Low Concentration

Composite Sample Data		
Sample	Time	Color/Description
	NA	

Grab Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)
Yellow BRN - DARK (Grey)	SAND trace clay

Analysis	Container Requirements	Collected (✓)
TCL VOLATILES	2oz JAR	✓
TCL SEMIVOLATILES	(8OZ JAR)	✓
TCL PESTICIDE/PCBS		✓
TAL METALS/CYANIDE	8OZ JAR	✓

Map:

Observations/Notes: SAMPLE COLLECT AT AN AREA OF BROKEN/MISSING ASPHALT. WITHIN THE PAVED PARKING LOT/YARD. SAMPLE MAY CONTAIN DETERIORATED ASPHALT.

Circle if Applicable:

MS/MSD | Duplicate ID No:

Signature(s): Terry Rojahn

SINGLE SAMPLE LOG SHEET

Page ___ of ___

Project Site Name: PARRIS IS., MCRD

Sample ID No.: PI-027-02(47)

Project No.: 7115 CTO-009

Sample Location: SITE 27

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other _____
- [ ] QA Sample Type: _____

Sampled By: TOM DICKSON/TERRY ROJAHN

C.O.C. No.: 0000003

Sample Method: S.S. TROWEL	Composite Sample Data		
	Sample	Time	Color/Description
Depth Sampled: 0-6"			
		NA	
Sample Date and Time: 12/13/95 0806			
Type of Sample			
[x] Grab			
[ ] Composite			
[ ] Grab-Composite			
[ ] High Concentration			
[x] Low Concentration			

Grab Sample Data	
Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)
Pink Grey	Fine Grain Some Roots

Analysis	Container Requirements	Collected (✓)
TCL VOLATILES	2oz JAR	✓
TCL SEMIVOLATILES	(8oz JAR)	✓
TCL PESTICIDE/PCBs		✓
TAL METALS/CYANIDE	8oz JAR	✓

Map:

Observations/Notes: SAMPLE NEAR TRANSFORMER STORAGE AREA IN GRASSY/HERB. VEG. MINOR SWALE OFF ASPHALT LAY DOWN AREA.

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No: PI-D01-121395	Tony Rojahn

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BORING LOGS

SAMPLE LOG SHEETS

1999 SITE INSPECTION/CONFIRMATORY SAMPLING

SITE 9

SITE 27

BORING LOG

Tetra Tech NUS, Inc.

Page ___ of ___

PROJECT NAME/No.: Parris Island/0095
GEOLOGIST: -
DRILLER/Co.: Columbia Technology
DRILLING RIG: DPT

BORING NO.: PAI-09-MW-01 (S)
DATE START: 12/14/99
GEOLOGIST: G GUNTER
DRILLER: R. Brand.

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*	Time	Remarks	PID/FID Reading (ppm)
1	0-4	- -	4'	1		BLK	F/Co SAND	SW			.3
		- -		2		Brn	F SAND	SP			
		- -									
		- -									
2	4-8	- -	4'				SAME	SP		Water 4.5 TOB	0
		- -									
		- -		6							
		- -				Gra	CLAY	CL			
		- -								6" Gr. FSA @ 7 FT	
3	8-12	- -	4'	8			NO RECOVERY	-		SAND in Sleeve	0
		- -									
				12							

* When rock coring, enter rock brokeness.

Background (ppm): 0

Remarks: Converted to Temporary well using 3/4 PVC in DPT boring. Abandoned by grouting to surface AFTER sampling.

Converted to Well: Yes ✓ No ___ Well I.D. #: PAI-09-MW-01 (S)

BORING LOG

Tetra Tech NUS, Inc.

Page ___ of ___

PROJECT NAME/No.: Parris Island / 0095
BORING NO.: PAI-09-MW-02(S)
GEOLOGIST: —
DATE START: 12/14/99
DRILLER/Co.: Columbia TECHNOLOGY
GEOLOGIST: G GUNTER
DRILLING RIG: DPT
DRILLER: RANDY Brand.

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*	Time	Remarks	PID/FID Reading (ppm)
1	0-4	— —	4'				6" Concrete underlain			Fill	0
		— —		-2-			by 6" gravel			1 FT Grey 9/CO SA	0.3
		— —				Brn	F Sand	SP			
		— —	—								
2	4-8	— —	4'				SAME	SP			0.9
										water @ 8'	
3	8-12	— —	4'				SAME	SP			0
		— —									
		— —									
		— —									
				-12-							

* When rock coring, enter rock brokeness.

Background (ppm): 0

Remarks: Converted to Temporary well using 3/4 PVC in DPT boring. Abandoned by grouting to Surface after Sampling.

Converted to Well: Yes ✓ No _____ Well I.D. #: PAI-09-MW-01(S)

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Parris Island
Project No.:

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Well Point (Temp)
[] QA Sample Type:

Sample ID No.: PAI-09-GW-01-01
Sample Location: PAI-09-MW-01(S)
Sampled By: JRN
C.O.C. No.: 02284
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 12-14-99	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: 1450	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method: Pump	Clear	7.01	.202	19.3	8	2.26	0	

PURGE DATA:

Date: 12-14-99	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Slow Purge.	Initial	6.44	.209	20.2	999	2.20	0	
Monitor Reading (ppm):	1	6.94	.197	19.9	36	2.08	0	
Well Casing Diameter & Material	2	6.92	.197	19.8	8	1.90	0	
Type: ~~1~~ 3/4 PVC	3							
Total Well Depth (TD): 9.64'								
Static Water Level (WL): 4.32 TOC								
One Casing Volume(gal/L): ~~4.64~~ .0308	.122 gal							
Start Purge (hrs): 1400								
End Purge (hrs): 1450								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): 2.4 L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC + Addl. Appen IX	HCl	3 x 40 ml	12-14-99
Metals + Tin	HNO3	50 ml plastic	"

OBSERVATIONS / NOTES:

5.32 w.c.
.0308 gal per ft.
x 3 = ~~0.616~~ .119

$(3/4 in \div 2 \div 12)^2 \pi \; 5.32 \times 7.48 = 0.122 gal = 1 vol$

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): [signature] for Rob Hell

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

Well No.: PAI-09-MW-01(S)

PROJECT: Parris Island
PROJECT NUMBER: 10095
SITE: Site 9

DATE: 12-14-99
WEATHER: Clear High of 69°F
PERSONNEL: R. Hill

Well Screen Depth: 4.64 / 9.64 ft.
Initial Water Level: 4.32 @ 1357 hrs.

Pump Type/Material: Geopump II
Pump Intake Depth: 8.64

Tide Cycle: ☐ High @ ☐ Low @ ☐ Not Affected

Total Purge Volume= 2400 ml (gal / L)
Total Purge Time= 50 (min)

Time	Water Level feet below TOC	Volume mL	Flow Rate mL/min	Pump Settings	Temp °C	pH	Sp Cond mS/cm	DO mg/L	Turbidity NTU	Salinity ppt	Eh mV	Comments
1408	N/A	600ml	~75ml		20.2	6.94	.209	2.20	999	0		
1419	4.66	1200ml	~75ml		19.9	6.94	.197	2.08	31	0		
1429	4.66	1800ml	~75ml		19.8	6.92	.197	1.90	8	0		
1446	4.66	2400ml	~75ml		19.3	7.01	.202	2.26	8	0		

Water Quality Meter (S/N): Horiba U-10 water check
Control Box Type (S/N):
Turbidimeter (S/N):

Notes:

Page ___ of ___

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GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Parris Island
Project No.: 0095

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: DPT
[] QA Sample Type:

Sample ID No.: PAI-09-GW-02-01
Sample Location: PAI-09-MW-02(S)
Sampled By: GGumley
C.O.C. No.: 02284
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 12/14/99	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Time: 1550								
Method: Low Flow	Clear	7.04	0.187	20.6	1	5.16	0.00	—

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Date: 12/14/99								
Method: Low Flow	Initial	8.44	0.240	26.3	>999	3.24	0.00	—
Monitor Reading (ppm): - 0 -	1	SEE	LOW	FLOW	PURGE	DATA	SHEET	
Well Casing Diameter & Material	2							
Type: 3/4" PVC	3	7.04	0.187	20.6	1	5.16	0.00	—
Total Well Depth (TD): 11.8	Final							
Static Water Level (WL): 9.35								
One Casing Volume(gal/L): 0.27 L								
Start Purge (hrs): 1409								
End Purge (hrs): 1544								
Total Purge Time (min): 95								
Total Vol. Purged (gal/L): 7.5 L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TAL metals (TOT)	HNO3	1-1LP	✓
TCL VOCs	HCL	3-40ml VOA	✓
Cyanide	NaOH	1-500ml P.	✓

OBSERVATIONS / NOTES:

$[.75/12/2]^2 \pi h \times 7.48 \times 3.785 = \text{Vol} = .21\ L$

Circle if Applicable:

MS/MSD	Duplicate ID No.:
	—

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

Well No.: PAI-07-MW-02(S)

PROJECT: Plum Island Sc.
PROJECT NUMBER: 0095
SITE: SWMU-9

DATE: 12/14/99
WEATHER: Clear & Cool
PERSONNEL: G. Oconlin

Well Screen Depth: 6.8 / 11.8 ft.
Initial Water Level: 9.35 @ 1409 hrs.
Pump Type/Material: Peristaltic
Pump Intake Depth: ≈ 11.6 FT bgs
Tide Cycle: ☐ High @ ☐ Low @ ☐ Not Affected
Total Purge Volume= ~~9.35~~ 8 (gal / L) 7.5 L
Total Purge Time= 95 (min)

Time	Water Level feet below TOC	Volume mL	Flow Rate mL/min	Pump Settings	Temp °C	pH	Sp Cond mS/cm	DO mg/L	Turbidity NTU	Salinity ppt	Eh mV	Comments
1409	9.35											
1415	—	600	100	Sl > 1/4	21.3	8.44	0.240	3.24	>999	0.00	—	
1423	—	700	87.5	Sl > 1/4	20.8	7.83	0.204	3.44	>999	0.00		
1432	—	700	78	Sl > 1/4	21.2	7.98	0.204	5.10	864	0.00		
1446	—	700	50	Sl > 1/4	20.7	7.82	0.200	5.62	~~[illegible]~~ 36	0.00		
1452	Dry	—	—	—	—	—	—	—	—	—		Pump [illegible] in [illegible] reduced Speed
1456	—	700	175	Sl > 1/4	20.9	7.58	0.200	4.24	11	0.00		
1505	—	700	78	Sl > 1/4	20.9	7.39	0.197	5.83	5	0.00		
1515	—	700	70	Sl > 1/4	20.8	7.27	0.190	5.24	6	0.00		
1523	—	700	87	Sl > 1/4	20.8	7.23	0.190	5.38	6	0.00		
1529	—	600	100	Sl > 1/4	20.8	7.13	0.189	6.06	3	0.00		
1536	—	700	100	Sl > 1/4	20.6	7.08	0.188	5.11	1	0.00		
1544	—	700	87	Sl > 1/4	20.6	7.04	0.187	5.16	1	0.00		
1550												

Water Quality Meter (S/N): Horiba U-S0008
Control Box Type (S/N):
Turbidimeter (S/N):

Notes: TD 11.8, TW going dry
~~[illegible]~~ Vol = 0.2 L

Page ___ of ___

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Parris Island
Project No.: 0095

Sample ID No.: PAI-27-SS-03-0
Sample Location: PAI-27-SS-03
Sampled By: G GUNTER
C.O.C. No.: 022217

- [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: 12/16/99 Time: 1000 Method: Grab Monitor Reading (ppm): -0-	0-1'	Blk	F/Med Sand w/ Organics

COMPOSITE SAMPLE DATA:

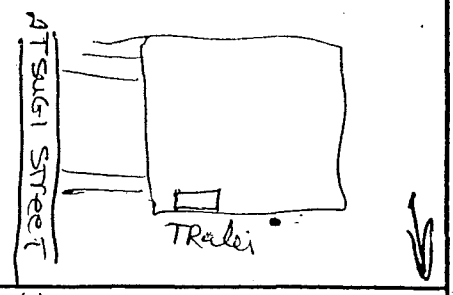
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL PCBs	1-16 oz	✓	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Gary Gunter

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: Parris Island / SWMU 27
Project No.: 0095

Sample ID No.: PAI-27-SS-04-01
Sample Location: PAI-27-SS-04
Sampled By: GC
C.O.C. No.: 02227

[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: 12/16/99	0 - 1'	BLR	F/med Sand w/ organics
Time: 1020			
Method: Grab			
Monitor Reading (ppm): -0-			

COMPOSITE SAMPLE DATA:

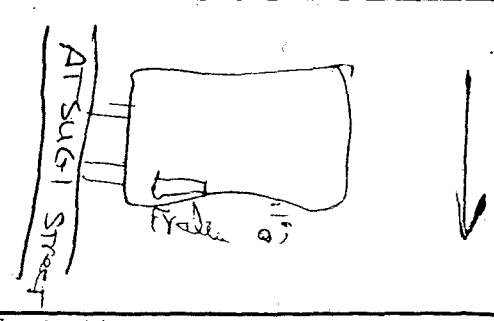
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL PCB-0	1 - 16 oz	✓	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

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SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Parris Island/SWMU 27
Project No.: 0095

Sample ID No.: PAI-27-SS-05-01
Sample Location: PAI-27-SS-05
Sampled By: G. Gunter
C.O.C. No.: 09227

[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: 12/16/99			
Time: 1010	2"		Asphalt
Method: Grab	6"	Brn Blk	base
Monitor Reading (ppm): -0-	8"-20"		Brn Blk F/C SAND

COMPOSITE SAMPLE DATA:

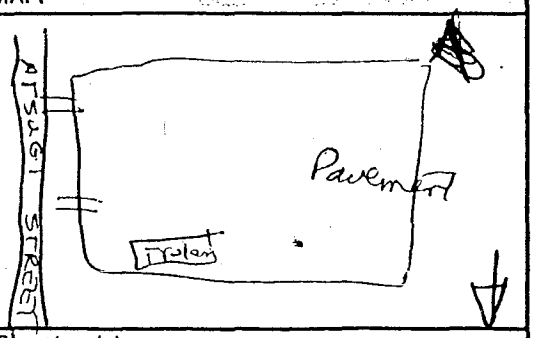
Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL PCBs	1-16oz	✓	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Gary Gunter

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SOIL BORING LOGS

2002 SOIL AND GROUNDWATER FIELD SCREENING

SITE 55

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Columbia
DRILLING RIG: 6610 DT

BORING No.: FDP01
DATE: 7/25/02
GEOLOGIST: BDH
DRILLER: RB

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**
			2.2										
S-1 @										48			
0847	4												
						tr	Sand, fine						
			3.2						moist	57			
S-2 @ 0900							Sand, med to fine		H2O @ 2.7'				
	8					Gray				37			
									water level @ 7.0' bgs				

* 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:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N2411
DRILLING COMPANY: Columbia
DRILLING RIG: 6610DT

BORING No.: FDP02
DATE: 7/25/02
GEOLOGIST: BDH
DRILLER: RB

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.-0.7	loose	red brn	topsoil, silty, grass @ sfc		dry				
S-1			3.2	0.7-1.2	loose	dk gray to blk	cinder, sand		fill, dry	130			
@ 0952				1.2-3.0'	loose	tan	Sand fine to v.f. w/ oyster shells @ top		dry to sl moist				
	4												
									moist @ ~6'	37			
S-2			3.1						wet @ ~7'				
@ 0954	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):

Remarks:

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Columbia
DRILLING RIG: 6610DT

BORING No.: FDP03
DATE: 7/25/02
GEOLOGIST: BDH
DRILLER: RB

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**
				0-4"			asphalt						
			1.5			soil brn	0.6' ak						
S-1 @ 1100H						tan	sand, fine to v.f.		dry				
						to light gray							
				4.8'									
					fin to med	light gray	Clay, sl silty						
S-2 @ 1104			3.9	6.7'			sandy @ base		sl moist				
	8					mottled orange							
						lt gray	6.7-8.0 Sand, silty		moist to wet				

* 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: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Tiba O-gin Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Columbia
DRILLING RIG: 6610 DT

BORING No.: FDP04
DATE: 7/25/02
GEOLOGIST: BPH
DRILLER: RB

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'	loose	med br	Silt w/roots		grass @ sfc.				
			3.0'						sl. moist				
5-1 @ 1327					loose	dk br	Sand, v.f., silty		moist				
	4					dk br				50			
5-2 @ 1334			4.0'	6.3'					wet @ top of clay				
					firm	gnish gray	Clay, sl. silty						
	8			8.0'	firm			slight	petroleum odor @ 8.0'				
5-3 @ 1348			4'	10.4'						243			
					8'-10.4'		Sand, fine to v.f.		wet				
	12												
					fir 10.4'-10.6'	gnish gray	Clay, sl silty		sl moist				
					10.6'-12'		Sand, v.f., silty		wet				
					gnish	gray	petroleum odor						

* 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:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Columbia
DRILLING RIG: 6610 DT

BORING No.: FP05
DATE: 7/25/02
GEOLOGIST: BDH
DRILLER: RB

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**
				1.2'	loose	red brn	gravel @ sfc, fine sand		dry				
S-1 @ 1435			3.5		loose	yellow	Sand, f. to v.f.		sl moist	<1			
	4												
									not @ ~ 5.3				
				5.7'						2			
S-2 @ 1438			4		fine to med	gnd gray mottled orange	Clay, sl silty		sl. moist				
	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):

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Columbia
DRILLING RIG: 6610 PT

BORING No.: FDP06
DATE: 7/25/02
GEOLOGIST: BDH
DRILLER: RB

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**
						red brn	Grav @ sfc; sod		dry				
S-1 @ 1557			3.8'			tan	piece of concrete near sfc Sand, V.f.						
	4					tan			sl. moist				
						red brn	from 4'-6.4'						
S-2 @ 1601				6.4'					moist to wet @ 6.3'				
	8		4'			gnish gray	clay, silty ~~mottled red & lt brn~~		sl. moist				
				8.2'									
						gnish gray	Sand, clayey fine to V.f.		wet @ 8.2'				
S-3 @ 1610	12		2.5										

* 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:

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Columbia
DRILLING RIG: 6610DT

BORING No.: FDP08
DATE: 7/25/02
GEOLOGIST: BPH
DRILLER: RB

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**
				0.8		Brgd br	asphalt						
S-1 @ 1754			2.7				fill, sandy		sl. moist				
						tan	fand, fine to v.f.		moist				
	4												
S-2 @ 1759			3.2						wet @ ~ 4.3'				
	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):

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Columbia
DRILLING RIG: 6610 DT

BORING No.: FDP10
DATE: 7/26/02
GEOLOGIST: BPH
DRILLER: RB

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**
				0.5		red br	Gravel @ sfc, Sand						
S-1 @ 0758										<1			
			2.5										
	4												
						tan	Sand, f to v.f.		moist				
										<1			
S-2 @ 0805			2.8						moist to wet				
	8			7.5	fine grnd	gray	Clay, silty						
					tan		Sand, f to v.f.		wet	520			
S-3 @ 0825			4		to grnd	gray			petroleum odor				
	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):

Remarks:

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Columbia
DRILLING RIG: 6610 DT

BORING No.: FDP11
DATE: 7/26/02
GEOLOGIST: BDH
DRILLER:

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**
				0.6		not Cr	topsoil, Sand		sl moist				
S-1 @ 0800													
			3	3		tan	Sand, f. to v.f.		moist				
	4												
									wet @ ~7'				
S-2 @ 0803			2.6										
	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):

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Columbia
DRILLING RIG: 6610DT

BORING No.: FDP12
DATE: 7/26/02
GEOLOGIST: BDH
DRILLER: RB

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**
				1.3		red-brn	Topsoil, Sand		dry				
						tan	Sand, f. to v.f.		dry to sl. moist				
S-1 @ 0853			3.1							<1			
	4								sl. petroleum odor @ base				
									moist				
				5.2									
				6.0		gnish gray	Clay, sandy		petroleum odor, sl. moist				
S-2 @ 0856			3.6			gnish gray	Sand, f. to v.f.		petroleum odor, wet				
	8			7.6						247			
						gnish gray	Clay, silty		petroleum odor				
									sl. moist				
									water sample @ product gathered				

* 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:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Columbia
DRILLING RIG: 6610 PT

BORING No.: FDPB
DATE: 7/26/02
GEOLOGIST: BDH
DRILLER:

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**
				0.6		reddish	Topsoil		dry				
S-1 @ 0852				1.8			Fill, Sand, f, w/ cinders		dry				
			2.4							<1			
	4					tan	Sand, f to v.f.		sl moist				
									moist				
									petroleum odor	42			
S-2 @ 0855			2.8						wet @ ~ 6-7'				
	8								strong petroleum odor				
				9.8'						193			
S-3 @ 0910			4	10.5	firm	dark gray	Clay, silty, grade into sandy below		sl. moist petroleum odor				
	12												
						dark gray	Sand, f. to v.f.		wet				
								strong	petroleum odor				
							free product in this boring						

* 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:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Columbia
DRILLING RIG: 6610 DT

BORING No.: FDP14
DATE: 7/26/02
GEOLOGIST: BDH
DRILLER: RB

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**
				0.6		rock	Ln topsoil		dry				
S-1 @ 1028			2.5										
							Sand, f. to v.f		sl moist to moist				
			3						wet @ ~7'				
S-2 @ 1033													
	8			7.4	fin	gnt gray	Clay, sl silty		sl. moist, sl petroleum odor				
						lt brn	Sand, f to v.f.		wet				
			4										
S-3 @ 1040				10.4 / 11									
	12				fin	gnt gray	Clay, silty		sl. moist				
								↖	sl petroleum odor				
						gnt gray	Sand, f. to v.f.						
							silty if loose		sl. petroleum odor				

* 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:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Columbia
DRILLING RIG: 6610DT

BORING No.: FDP15
DATE: 7/26/02
GEOLOGIST: BDH
DRILLER:

	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**
					0.8'		red brn	topsoil, sand w/ some cinders		dry				
S-1 @ 1000							brn	Sand, f. to m/f		dry to moist @ ~4'				
				3.1			to tan							
		4								wet @ ~5'				
S-2 @ 1005														
				3.8	6.8'									
		8			7.9'	fine	dark gray	Clay, silty sandy lens		sl moist				
								←		wet				

* 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:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiba Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Columbia
DRILLING RIG: 6610 DT

BORING No.: FDP16
DATE: 7/26/02
GEOLOGIST: BDH
DRILLER: RB

	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**
					0.6			topsoil, sandy f.						
					1.6			Sand, f. w/ wood chips, frags, some gravel (fill)		dry				
S-1 @ 1128				3.2						dry				
		4						Sand, f. to v.f.		dry				
										moist @ ~7'				
S-2 @ 1132							orange	lm (crushed)						
				2.3				Clayey @ 8-8.5'		wet @ ~8'				
		8												
S-3 @ 1140				4.0										
		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):

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Columbia
DRILLING RIG: 6610DT

BORING No.: FDP17
DATE: 7/26/02
GEOLOGIST: BDH
DRILLER:

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**
				0.3		yellow	Sand, fine		dry				
						tan	Sand, f to v.f.						
S-1 @ 1218			3.2						moist @ ~5'				
	4												
									wet @ ~7'				
S-2 @ 1222			3.8										
	8			7.6		dark gray	Clay, silty		sl moist				
				8.0		tan	Sand, f.		wet				
						to dark gray							
S-3 @ 1227			4.0	10.6' 11.0									
	12				fine	dark gray	Clay, silty		sl moist				
							Sand, clayey @ top becomes silty		wet				

* 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:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Columbia
DRILLING RIG: 6610 DT

BORING No.: FDP18
DATE: 7/26/02
GEOLOGIST: BDH
DRILLER: RB

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**
				0.7		soil	topsoil						
						tan	Sand f to v.f		moist @ 4'				
S-1 @ 1345			2.9										
	4												
S-2 @ 1350			4										
	8			7.5 / 8.0	fine	grey	clay, silty		sl moist				
						tan	Sand, f to v.f.						
									wet				
S-3 @ 1400			4										
	12			11.2	fine	grey	clay, silty		sl moist				

* 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:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Columbia
DRILLING RIG: 6610 DT

BORING No.: FDP19
DATE: 7/26/02
GEOLOGIST: BDH
DRILLER:

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**
						mod br	Topsoil, sand, f w/ concrete frags, gravel		dry (fill)				
				1.2									
S-1 @ 1355			3.5			tan	Sand, f to v f,		sl moist				
	4												
									moist @ 5'				
									wet @ 7.5'				
S-2 @ 1405			4	7.6'									
	8				fin sand	gray	clay, sl silty		sl. moist				
					fg 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):

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Filha O. Spic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Columbia
DRILLING RIG: 6610 DT

BORING No.: FDP21
DATE: 7/26/02
GEOLOGIST: BDH
DRILLER: RB

	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 @ 1605							tan	Sand, f.						
				2.4						moist @ 5'				
		4												
S-2 @ 1612				4	6.3		gmt gray	Clay, sl. silty		sl moist				
		8			7.8'									
							gmt gray	Sand, clayey @ top f.		moist to wet				

* 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:

Converted to Well: Yes _____ No _____ Well I.D. #: _____

A-5

BORING LOGS

MONITORING WELL CONSTRUCTION SHEETS

MONITORING WELL DEVELOPMENT RECORDS

GROUNDWATER SAMPLE LOG SHEETS

2003 GROUNDWATER INVESTIGATION

SITE 55

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Miller
DRILLING RIG: B-59

BORING No.: PAI-FOV-1
DATE: 12/11/02
GEOLOGIST: BDH
DRILLER: JGW

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**
				1.0'		~~rdl~~ brn	Sand, fine		grass @ sfc				
						lt	Sand, fine to v.f.						
						brn			wet ~ 5'				
						~~to~~							
5'						~~tor~~							
				~7'									
						~~rdl~~ gray	clay, silty						
				~8'									
						~~tor~~	Sand, fine to v.f.		wet				
10'													
							TD 12.5'						

* 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 _____ Well I.D. #: PAI-FOV-1

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Miller
DRILLING RIG: B-59

BORING No.: PAI-FOV-2I
DATE: 12/17/02
GEOLOGIST: BDH
DRILLER: JGW

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**
				1.0'		med brn	Sand, fine						
						lt brn to gr	Sand, fine to v.f.						
									wet @ ~5'				
5'													
				~7'									
				~8'		gray	clay, silty						
						tan	Sand, fine to v.f						
10'													
				~13.5'									
				~14.5'		firm	clay, silty						
15'													
						med gray	Sand, fine, silty		wet				
20'													
25'							TD 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:

Converted to Well: Yes ✓ No _____ Well I.D. #: PAI-FOV-2I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N42A
DRILLING COMPANY: Miller
DRILLING RIG: B-59

BORING No.: PAI-FOV-3
DATE: 12/11/02
GEOLOGIST: BPH
DRILLER: JGW

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 ~~fin~~ to ~~brown~~ gray	Sand, fine		next to Bldg	401			
									sl. moist				
5'													
				~6'									
				~7.5'	firm	med gray	Clay, silty						
						~~tan~~	Sand, fine ~~to v.f.~~		wet				
10'													
							TD 14.15'						

* 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 _____ Well I.D. #: PAI-FOV-3

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N42P
DRILLING COMPANY: Miller
DRILLING RIG: B-59

BORING No.: PAI-FOV-4
DATE: 12/12/02
GEOLOGIST: BDH
DRILLER: JGW

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	Brn	Sand, fine to v.f.		dry	0			
									sl. moist to moist				
5'													
										4			
				~6.5'	fir	gnish gray	Clay, silty						
				~7.5'									
					ex fir		Sand, fine to v.f.		wet, petroleum like odor				
										59			
10'													
				~10.5'	fir	gnish gray	clay, silty						
				~11.0'									
						gnish gray	Sand, fine to v.f., silty		wet, sl. petroleum odor				
							TD 14'						

* 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. #: PAI-FOV-4

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Driller
DRILLING RIG: B-59

BORING No.: PAI-FOV-5I
DATE: 12/13/02
GEOLOGIST: BDH
DRILLER: JGW

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 brn	Sand, fine to v.f.		dry	0			
5'													
				~6.5'	firm	dark gray	clay, silty			4			
				~7.5'									
							Sand, fine to v.f.		wet, petroleum odor	like 59			
10'													
				~10.5' ~11'	firm	dark gray	clay, silty						
						dark gray	Sand, fine to v.f., silty		wet, sl. petroleum odor				
15'													
20'	20'												
SP @ 0850	22'	2/2 3/3	2'			clear gray	Sand, fine to v.f., silty clayey @ top		wet	2			
SP @ 0910	24'	0/0 2/3	2'	23'		clear gray	Sand, fine to med w/ shell frag, clayey		wet	<1			
25' SP @ 0927	26'	4/2 2/2		24.8'	firm	blue gray	clay, silty		sl moist	<1			

* When rock cored, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes ✓ No ____ Well I.D. #: PAI-FOV-5I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber optic vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Miller
DRILLING RIG: B-59

BORING No.: PAI-FOV-8D
DATE: 12/15/02
GEOLOGIST: BDH
DRILLER: JGW

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 brn to dk brn	Sand, fine to v.f.		dry				
							↓		sl. moist petroleum odor				
5'													
				~6'					wet @ ~6'				
				~7'		dark gray	Clay, silty		petroleum odor				
						dark gray	Sand, fine to v.f.		wet petroleum odor				
10'													
							↓						
15'													
20'													
							↓						
SP	24'	0 / 0				med gray	Sand, fine, silty, sl. clayey		wet				
		0 / 1	2'				clayey @ base						
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:

Converted to Well: Yes ✓ No

Well I.D. #: PAI-FOV-8D

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Miller
DRILLING RIG: B-59

BORING No.: PAI-FOV-8D
DATE: 12/15/02
GEOLOGIST: BDH
DRILLER: JGW

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**
	26					red gray	Sand, fine		wet				
SP		0/0	2/2										
	28	1/1		27.7'									
		0/0	1.8/2			Blue gray	Clay, silty		sl. moist				
SP	30	1/1		29.3'									
30'				29.7'		red to dk br	Peat, wood frag., clayey, sandy		moist to wet				
		0/0		30'			Sand, clayey		wet				
						Blue gray	Clay, sandy		sl moist to wet @ bas				
	32	1/1		31.5'									
				32'		"	Sand, clayey to silty		wet				
		2/3	1.3/2			to red gray	fine						
	34	3/2											
35'		1/2	1.8/2										
	36	1/2		36'									
		0/1			firm	Blue gray	Clay, sl. silty		sl. moist				
	37.5	1					w/ ~1" lk sd, med to coarse		wet				

* 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:

Converted to Well: Yes ✓ No ____ Well I.D. #: PAI-FOV-8D

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4291
DRILLING COMPANY: Foiller
DRILLING RIG: B-59

BORING No.: PAI-FOV-9
DATE: 12/10/02
GEOLOGIST: BDH
DRILLER: JGW

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**
						~~tan~~	Sand, fine to vf.						
									sl. moist				
5'													
				~7.5'									
				~8.0'	firm	gmish gray	clay, silty						
						~~tan~~	Sand, fine to vf.		wet				
10'													
							TD 14'						

* 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:

Converted to Well: Yes ✓ No _____ Well I.D. #: PAI-FOV-9

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber O site Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Driller
DRILLING RIG: B-59

BORING No.: PAI-FOV-10
DATE: 12/12/02
GEOLOGIST: BDH
DRILLER: JGW

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**
				1.0'		red brn	Sand, fine		dry				
						tan	Sand, fine to v.f.		sl. moist				
5'							↓						
				~6'									
				~7'	fine	gmt gray	Clay, silty						
						tan	Sand, fine to v.f.						
10'							↓						
							TD 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):

Converted to Well: Yes ✓ No

Well I.D. #: PAI-FOV-10

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Driller
DRILLING RIG: B-59

BORING No.: PAI-FOV-13D
DATE: 12/14/02
GEOLOGIST: BDH
DRILLER: JGW

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**
						tan	Sand, fine to v.f. silty		Grass at sfc				
							↓						
5'													
				6.5'					wet @ top clay				
						gnd gray	clay						
				8.0'									
							Sand, fine to v.f.		wet	20			
10'													
							augered to 26' and began split spoons to determine clay depth						
15'													
20'													
25'													

* 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. #: PAI-FOV-13D

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Driller
DRILLING RIG: B-59

BORING No.: PAI-FOV-13D
DATE: 12/14/02
GEOLOGIST: BPH
DRILLER: JGW

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								wood plug in	2			
SP			0.2'/2						shoe blocks recovery				
	28					med gray	Sand, med to fine, silty		wet				
SP			2/2'	29.2'									
	30			30'	firm	gnd gray	Clay, silty		sl. moist				
	31			31.1			↓						
SP			0.1/2'										
	33					med gray	Sand, fine		wet				
SP			1.7/2'							<1			
	35												
							36'						

* 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. #: PAI-FOV-13D

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Driller
DRILLING RIG: B-59

BORING No.: PAI-FOV-14
DATE: 12/13/02
GEOLOGIST: BDH
DRILLER: JGW

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**
				0.6'		med brn	topsoil		dry				
							Sand, fine to v.f.		sl. moist to moist				
5'													
									wet @ ~7'				
				7.4' / 8.1'	firm	gnish gray	clay, sl. silty		sl. moist, sl. petroleum odor	17			
							Sand, fine to v.f.		wet				
10'				10.4' / 11'	firm	gnish gray	clay, silty		sl. moist sl. petroleum odor				
						gnish gray	Sand, fine to v.f.		sl. petroleum odor				
							TD 14'						

* 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. #: PAI-FOV-14

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Grillbi
DRILLING RIG: B-59

BORING No.: PAI-FOV-15I
DATE: 12/13/02
GEOLOGIST: BDH
DRILLER: JGW

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**
				0.6'		red brn	topsoil		dry				
							Sand, fine to v.f.		sl. moist to moist				
5'													
				7.4'									
				8.1'	fim	gnish gray	Clay, sl. silty		sl. moist, sl. petroleum odor	17			
10'									wet				
				10.4'									
				11'	fim	gnish gray	clay, silty		sl. moist sl. petroleum odor				
						gnish gray	Sand, fine to v.f. silty		wet, sl. petroleum odor				
15'													
20'													
	22					med gray	Sand, fine, silty		wet				
SP	↓		2'				↓						
	24												
SP	↓		2'	24.6'			TD 24' w/ auger		sl. moist				
25'	26				fim		clay, silty blish gray						

* 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:

Converted to Well: Yes ✓ No

Well I.D. #: PAI-FOV-15I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Geoller
DRILLING RIG: B-59

BORING No.: PAI-FOV-16
DATE: 12/18/02
GEOLOGIST: BDH
DRILLER: JGW

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**
				0.2'			asphalt						
							crushed stone		In parking lot @				
						tan	Sand, fine to v.f.		Bldg 852				
						to			sl. moist				
						med							
						brn.							
5'													
									moist to wet				
				~6.5'									
					fin	gnsh gray	clay, silty		sl. moist				
				~7.5'									
						gnsh gray	Sandy clayey, fine to v.f.		wet				
10'													
							↓						
							TD 14'						

* 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:

Converted to Well: Yes ✓ No _____ Well I.D. #: PAI-FOV-16

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Miller
DRILLING RIG: B-59

BORING No.: PAI-FOV-17
DATE: 12/11/02
GEOLOGIST: BDH
DRILLER: JGW

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**
				0.3'			asphalt, crushed stone		asphalt - old	parade			
						to to brown	Sand, fine to v.f.		dry	deck			
				~5'									
5'				~6.5'	firm to hard	Dk gray to gray	Clay, sl. silty		sl. moist				
						to gray	Sand, fine		wet				
10'													
							TD 14'						
15'													

* 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. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Milba
DRILLING RIG: B-59

BORING No.: PAI-FOV-18I
DATE: 12/12/02
GEOLOGIST: BDH
DRILLER: JGW

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**
				0.3'			asphalt, crushed stone						
						tan to brown	Sand, fine to v.f.		dry				
5'				5'									
						brown	clay, sl. silty		sl. moist				
				6.5'		dark gray							
						lt gray	Sand, fine		wet				
10'													
15'													
20'	20												
S-1 @ 1027		3 / 0	1.8/2			med gray	Sand, fine, silty		wet	2			
	22	0 / 1					clayey 21.4' - 21.6'						
S-2 @ 1030		1 / 1	0.7/2				Sand, fine to v.f.		wet	0			
	24	1 / 1											
				24.4'									
25' S-3 @ 1033	28	3 / 1	1.6/2	25'	fine	olive gray	clay, silty w/ wood, plant matter		sl. moist	2			
						med lt to olive gray	Sand, fine, silty, sl clayey		wet				
									auger to 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:

Converted to Well: Yes ✓ No ____ Well I.D. #: PAI-FOV-18I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Smith
DRILLING RIG: B-59

BORING No.: PAI-FOV-19
DATE: 12/10/02
GEOLOGIST: BDH
DRILLER: JGN

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**
				0.3'			asphalt, crushed stone						
						tan	Sand, fine to v.f.						
							silty		sl moist				
5'				~5.5'									
						gray	clay, silty						
				~6.5'									
						tan to gray	Sand, fine to v.f.		wet				
10'													
							TD 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):

Converted to Well: Yes ✓ No

Well I.D. #: PAI-FOV-19

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Drilla
DRILLING RIG: B-59

BORING No.: PAI-FOV-20
DATE: 12/11/02
GEOLOGIST: BDH
DRILLER: JGW

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**
						tan	Sand, fine to v.f.		Grass @ sfc				
							↓						
5'													
							↓		wet @ ~6'				
				~7'									
						grnish gray	clay, silty						
				~9'									
10'													
						tan	Sand, fine						
							↓						
15'							TD 15						

* 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:

Converted to Well: Yes ✓ No _____ Well I.D. #: PAI-FOV-20

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Fiber Optic Vault
PROJECT NUMBER: N4211
DRILLING COMPANY: Driller
DRILLING RIG: B-59

BORING No.: PAI-FOV-21
DATE: 12/11/02
GEOLOGIST: BDH
DRILLER: JGW

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**
						~~tan~~	Sand, fine to v.f.		Glass @ surface				
							↓						
5'									wet @ ~6'-7'				
							↓						
				~7'									
						gresh gray	Clay, silty						
10'				~9.5'									
						~~tan~~ to ~~dk gray~~	Sand, fine						
							↓						
15'							TD 12.4'						

* 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):

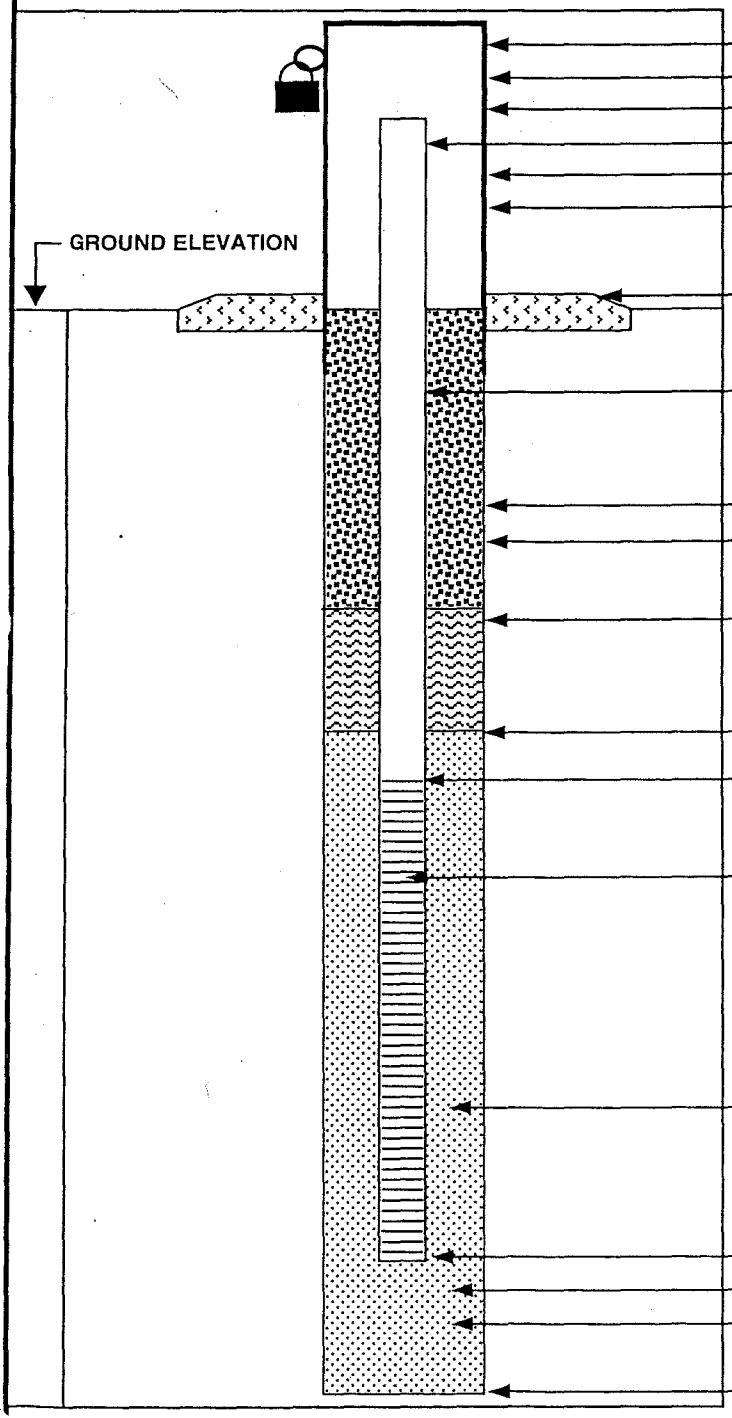
Remarks:

Converted to Well: Yes ✓ No ____ Well I.D. #: PAI-FOV-21

WELL NO.: PAI-FOV-1

OVERBURDEN MONITORING WELL SHEET

PROJECT	Fiber Optic Vault	LOCATION	MCRD Parris Island	DRILLER	JGW
PROJECT NO.	N4211	BORING		METHOD:	
ELEVATION		DATE	12/11/02	DRILLING	HSA
FIELD GEOLOGIST	BDH			DEVELOPMENT	



ELEVATION OF TOP OF SURFACE CASING:

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING: 2.99'

STICK-UP OF RISER PIPE: 2.88'

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING: Steel

TYPE OF SURFACE SEAL: concrete

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 8.25"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: 0.5'

TYPE OF SEAL: bentonite

DEPTH - TOP OF SAND PACK: 1.0'

ELEVATION / DEPTH - TOP OF SCREEN: 2.0'

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 X 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #2

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 12.1'

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 12.5'

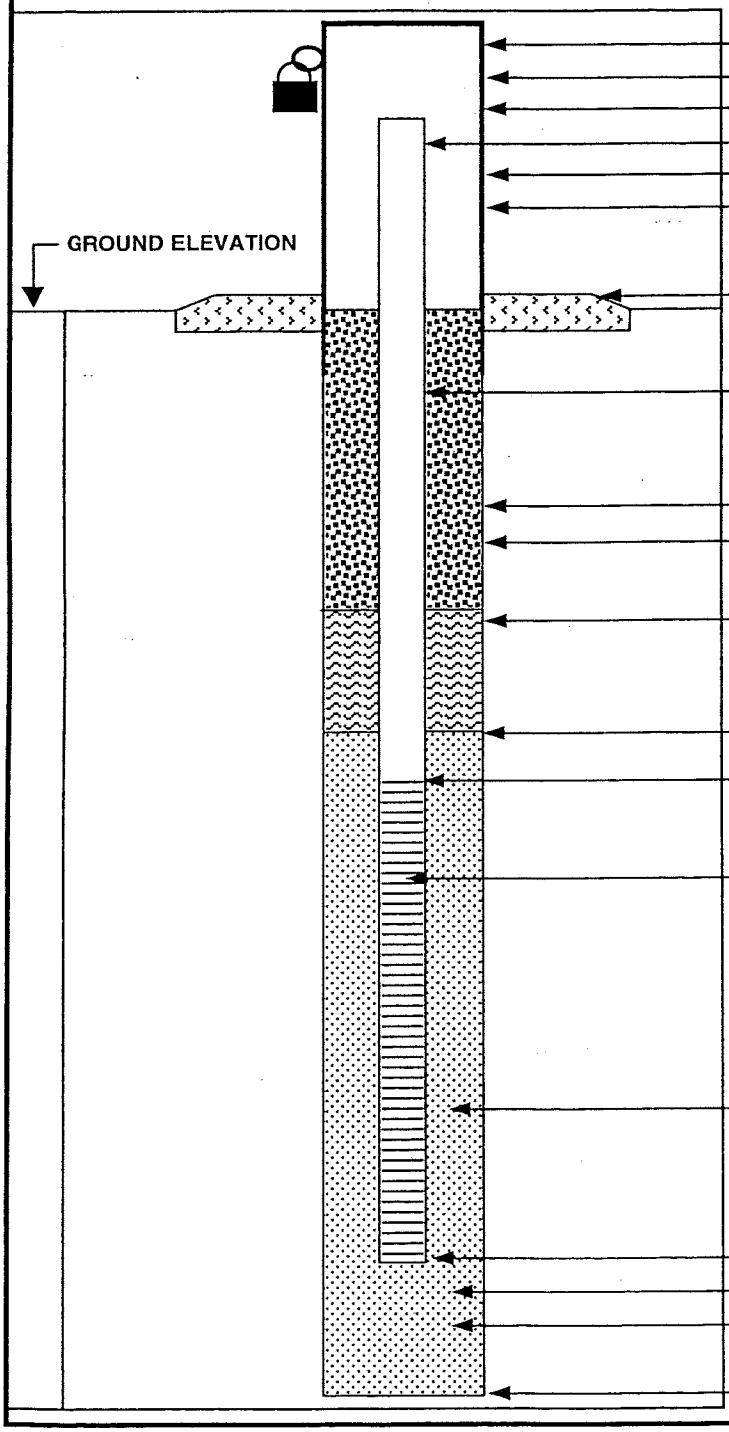
TYPE OF BACKFILL BELOW MONITORING WELL: Sand

ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 12.5'

WELL NO.: PAI-FOV-2I

OVERBURDEN MONITORING WELL SHEET

PROJECT	Fiber Optic Vault	LOCATION	MCRD Parris Island	DRILLER	JGW
PROJECT NO.	N4211	BORING		METHOD:	
ELEVATION		DATE	12/17/02	DRILLING	HSA
FIELD GEOLOGIST	BDH			DEVELOPMENT	



ELEVATION OF TOP OF SURFACE CASING:

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING: 2.93'

STICK-UP OF RISER PIPE: 2.81'

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING: Steel

TYPE OF SURFACE SEAL: Concrete

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 8.25"

TYPE OF SEAL: grout

ELEVATION / DEPTH OF SEAL: 16'

TYPE OF SEAL: Bentonite

DEPTH - TOP OF SAND PACK: 19.3'

ELEVATION / DEPTH - TOP OF SCREEN: 21.8'

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 X 3'

I.D. OF SCREEN: 2

TYPE OF SAND PACK: #2

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 24.8'

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 25'

TYPE OF BACKFILL BELOW MONITORING WELL: Sand

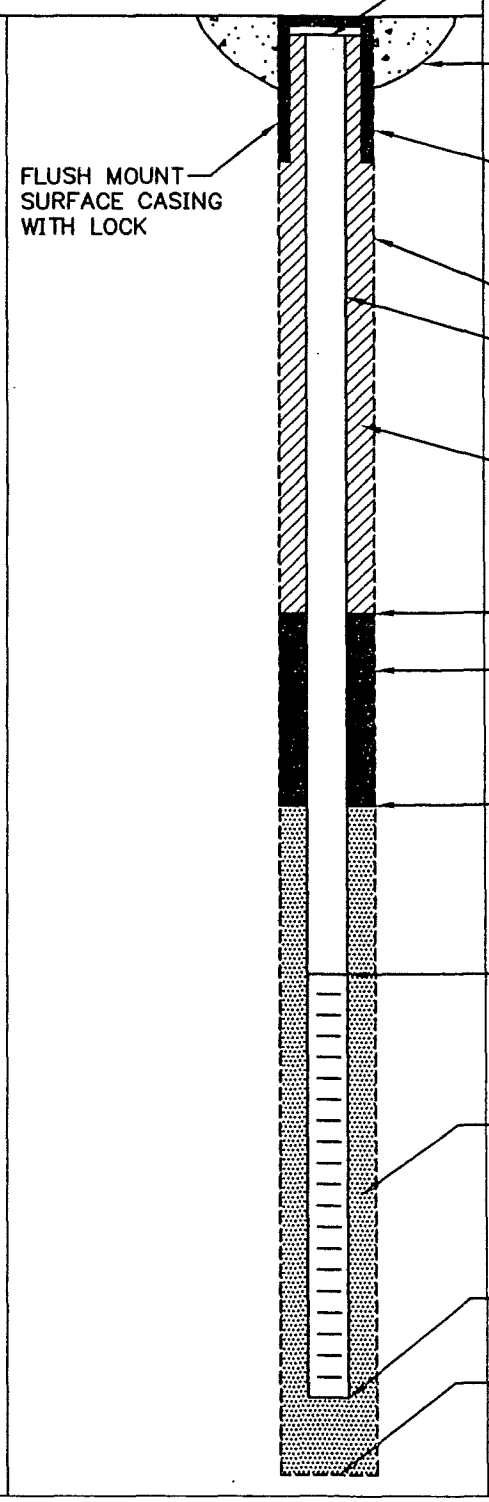
ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 25'

WELL NO.: PAI-FOV-3

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT Fiber Optic Vault	LOCATION MCRD Parris Island	DRILLER JGW
PROJECT NO. N4211	BORING	DRILLING METHOD HSA
DATE BEGUN 12/11/02	DATE COMPLETED 12/11/02	
FIELD GEOLOGIST BPH		DEVELOPMENT METHOD
GROUND ELEVATION	DATUM	



ELEVATION TOP OF RISER: -0.15'

TYPE OF SURFACE SEAL: Concrete

TYPE OF PROTECTIVE CASING: Steel

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 8.25"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: NA

ELEVATION/DEPTH TOP OF SEAL: 10.5'

TYPE OF SEAL: Bentonite

ELEVATION/DEPTH TOP OF SAND: 12'

ELEVATION/DEPTH TOP OF SCREEN: 14.15

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 10 X 10'

TYPE OF SAND PACK: #2

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: 14.15

ELEVATION / DEPTH BOTTOM OF SAND: 14.15

ELEVATION/DEPTH BOTTOM OF HOLE: 14.15

BACKFILL MATERIAL BELOW SAND: Sand

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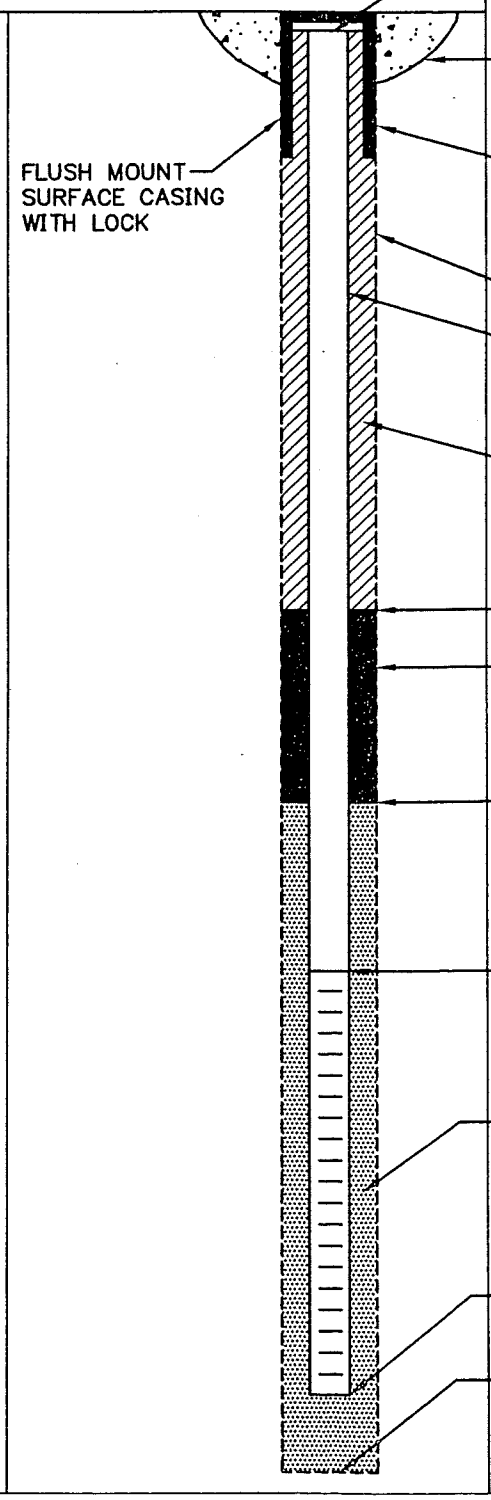
WELL NO.: PAI-FOV-4

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT Fiber Optic Vault	LOCATION MCRD Parris Island	DRILLER JGW
PROJECT NO. N4291	BORING	DRILLING METHOD HSA
DATE BEGUN 12/12/02	DATE COMPLETED 12/12/02	
FIELD GEOLOGIST BDH		DEVELOPMENT METHOD
GROUND ELEVATION	DATUM	



ELEVATION TOP OF RISER:

TYPE OF SURFACE SEAL: Concrete

TYPE OF PROTECTIVE CASING: Steel

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 8.25"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: NA

ELEVATION/DEPTH TOP OF SEAL: 10.5

TYPE OF SEAL: Bentonite

ELEVATION/DEPTH TOP OF SAND: 12'

ELEVATION/DEPTH TOP OF SCREEN: 13.3'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 10 X 10'

TYPE OF SAND PACK: #2

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: 13.3'

ELEVATION / DEPTH BOTTOM OF SAND: 14

ELEVATION/DEPTH BOTTOM OF HOLE: 14'

BACKFILL MATERIAL BELOW SAND: Sand

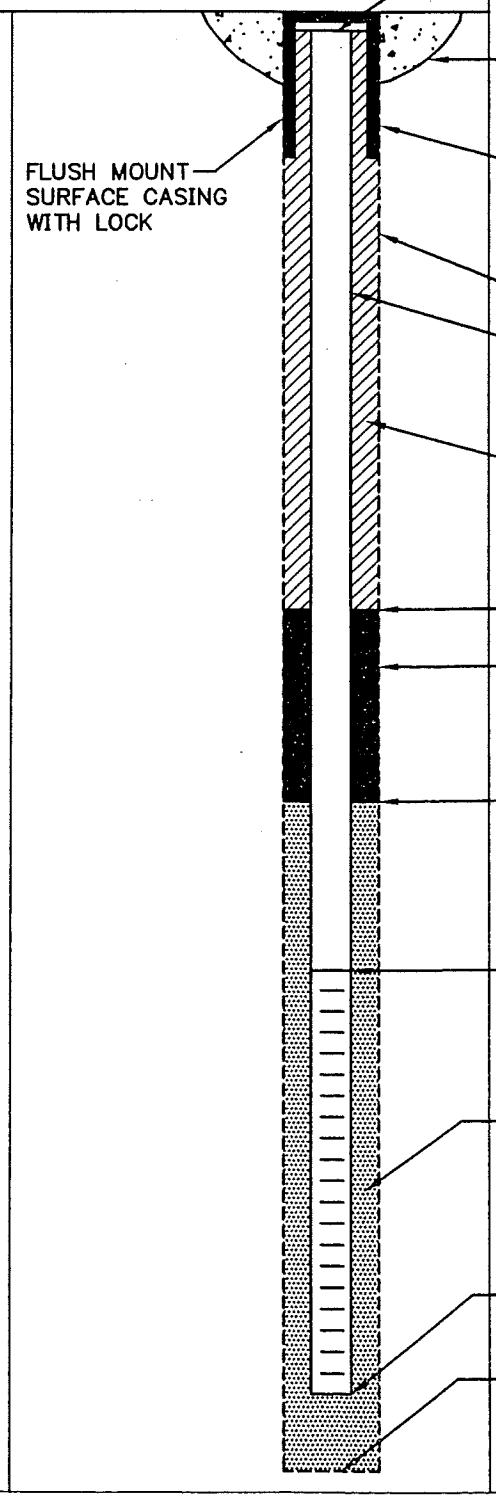
ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: PAI-FOV-5I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT Fiber Optic Vault	LOCATION MCRD Parris Island	DRILLER JGW
PROJECT NO. N42110	BORING	DRILLING METHOD HSA
DATE BEGUN 12/13/02	DATE COMPLETED 12/13/02	
FIELD GEOLOGIST BDH		DEVELOPMENT METHOD
GROUND ELEVATION	DATUM	



ELEVATION TOP OF RISER:

TYPE OF SURFACE SEAL: Concrete

TYPE OF PROTECTIVE CASING: Steel

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 8.25"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: Grout

ELEVATION/DEPTH TOP OF SEAL: 115'

TYPE OF SEAL: Bentonite

ELEVATION/DEPTH TOP OF SAND: 119'

ELEVATION/DEPTH TOP OF SCREEN: 120.55'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 10 X 3'

TYPE OF SAND PACK: #2

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: 123.55

ELEVATION / DEPTH BOTTOM OF SAND: 124'

ELEVATION/DEPTH BOTTOM OF HOLE: 124'

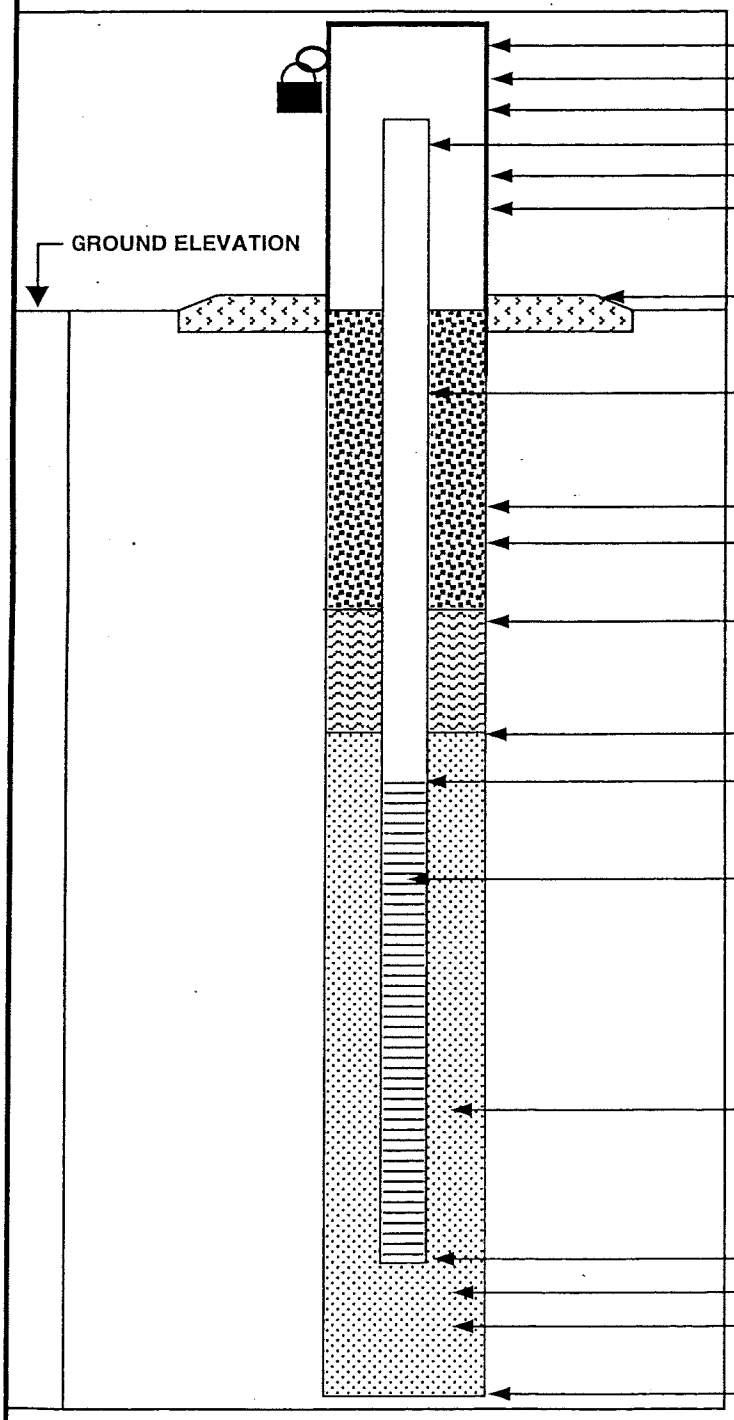
BACKFILL MATERIAL BELOW SAND: Sand

ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: PAI-FOV-6

OVERBURDEN MONITORING WELL SHEET

PROJECT	Fiber Optic Vault	LOCATION	MCRD Parris Island	DRILLER	JGW
PROJECT NO.	N4211	BORING		METHOD:	
ELEVATION		DATE	12/16/02	DRILLING	HSA
FIELD GEOLOGIST	BDH			DEVELOPMENT	



ELEVATION OF TOP OF SURFACE CASING:

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING: 2.99'

STICK-UP OF RISER PIPE: 2.85'

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING: Steel

TYPE OF SURFACE SEAL: Concrete

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 8.25"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: 0.5'

TYPE OF SEAL: Bentonite

DEPTH - TOP OF SAND PACK: 2'

ELEVATION / DEPTH - TOP OF SCREEN: 4'

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 X 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #2

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 14'

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 14'

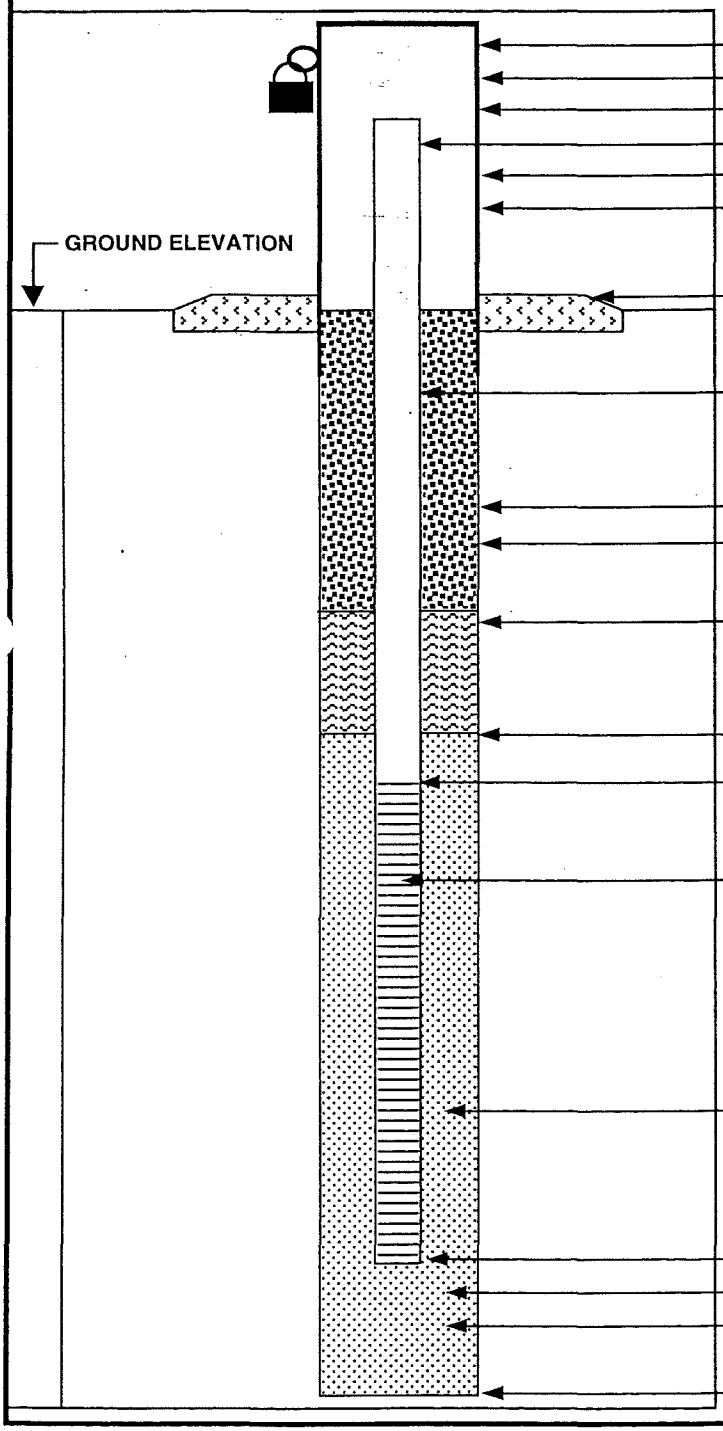
TYPE OF BACKFILL BELOW MONITORING WELL: Sand

ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 14'

WELL NO.: PAI-FOV-7I

OVERBURDEN MONITORING WELL SHEET

PROJECT	Fiber Optic Vault	LOCATION	MCRD Parris Island	DRILLER	JGW
PROJECT NO.	N4211	BORING		METHOD:	
ELEVATION		DATE	12/16/02	DRILLING	HSA
FIELD GEOLOGIST	BDH			DEVELOPMENT	



ELEVATION OF TOP OF SURFACE CASING:

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING: 2.97'

STICK-UP OF RISER PIPE: 2.86'

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING: Steel

TYPE OF SURFACE SEAL: Concrete

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 8.25'

TYPE OF SEAL: Grout

ELEVATION / DEPTH OF SEAL: 19.5'

TYPE OF SEAL: Bentonite

DEPTH - TOP OF SAND PACK: 22'

ELEVATION / DEPTH - TOP OF SCREEN: 23.8'

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 X 3'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #2

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 26.8'

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 27'

TYPE OF BACKFILL BELOW MONITORING WELL: Sand

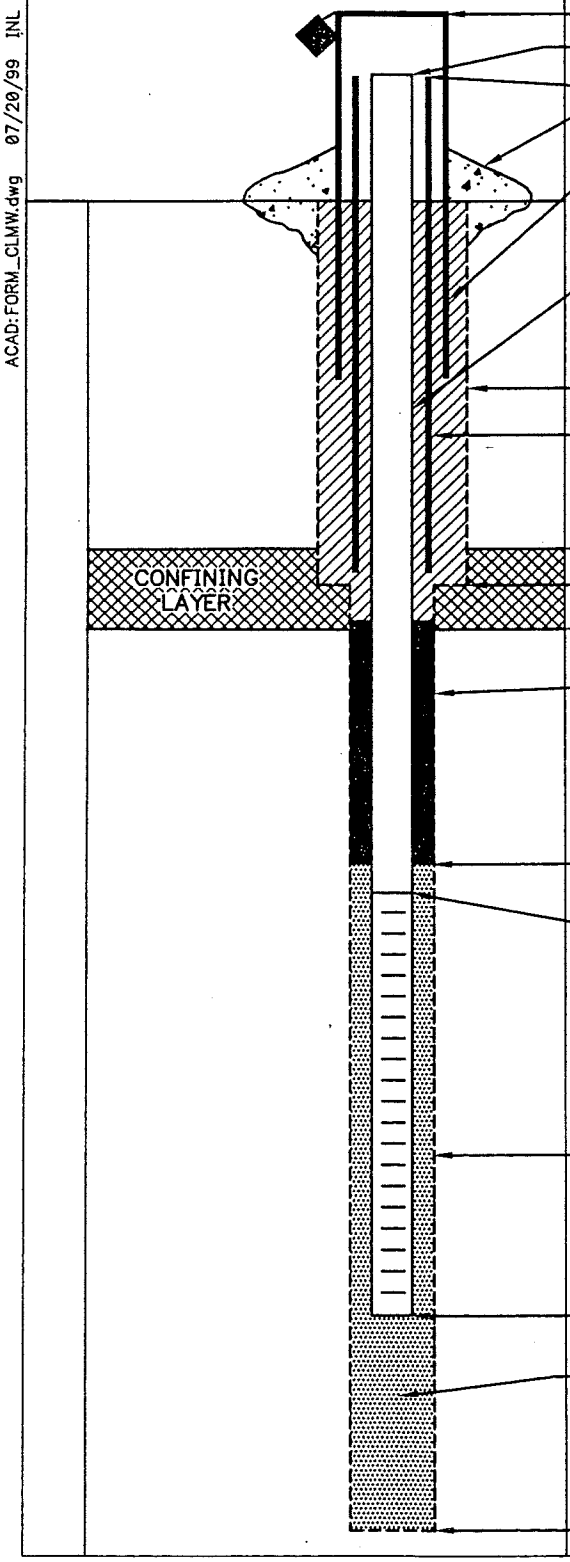
ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 27'

WELL NO.: PAI-FOV-8D

CONFINING LAYER
MONITORING WELL SHEET

Tetra Tech NUS, Inc.

PROJECT Fiber Optic Fault	LOCATION MCRD Parris Island	DRILLER JGW
PROJECT NO. N42011	BORING	DRILLING METHOD HSA / mud rotary
DATE BEGUN 12/15/02	DATE COMPLETED 12/17/02	
FIELD GEOLOGIST BDH		DEVELOPMENT METHOD
GROUND ELEVATION	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 12.88'
ELEVATION/HEIGHT OF TOP OF RISER PIPE: 12.78'
ELEVATION/HEIGHT OF TOP OF PERM. CASING: 10
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING: Steel

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 12"
PERM. CASING I.D.: 6"
TYPE OF CASING AND BACKFILL: Steel Grout

ELEVATION/DEPTH TOP CONFINING LAYER: 129'
ELEVATION/DEPTH BOTTOM OF CASING: 130.
ELEVATION/DEPTH BOTTOM CONFINING LAYER: 131.5'

ELEVATION/DEPTH TOP OF SEAL: 125'
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 30.8'

ELEVATION/DEPTH TOP OF SCREEN: 133'
TYPE OF SCREEN: PVC

TYPE OF SAND PACK: #2

BOREHOLE DIA. BELOW CASING: 5.15"

ELEVATION/DEPTH BOTTOM OF SCREEN: 136'

ELEVATION/DEPTH BOTTOM OF SAND PACK: 136'
BACKFILL MATERIAL BELOW SAND: Sand

ELEVATION/DEPTH OF HOLE: 136'

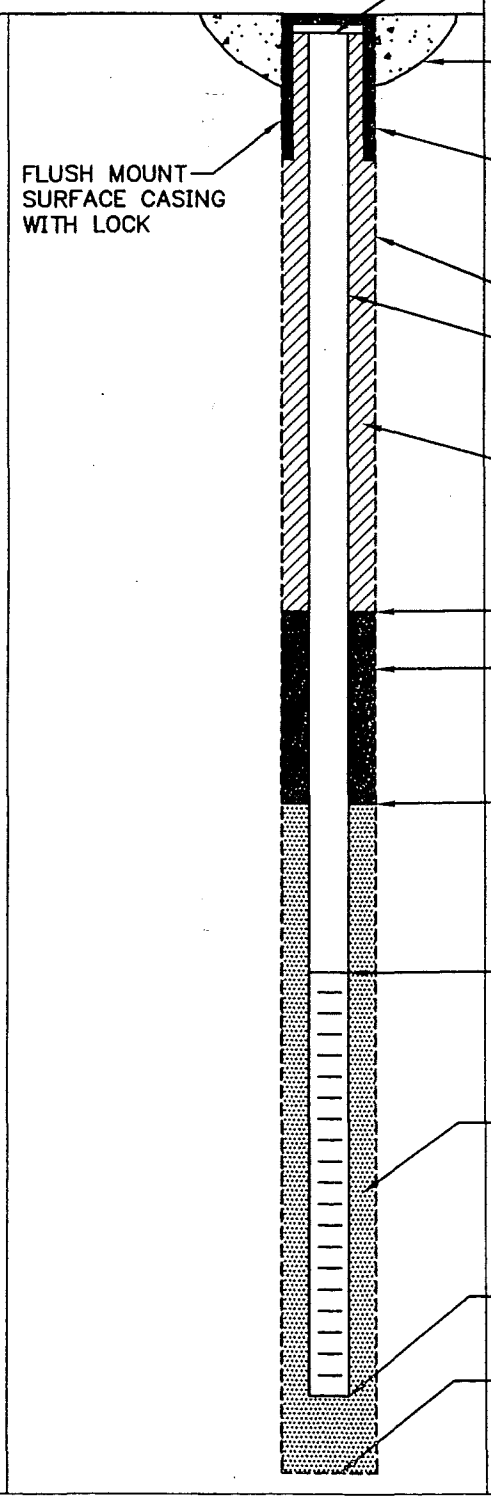
ACAD:FORM_CLMW.dwg 07/20/99 INL

WELL NO.: PA I-FOV-9

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT Fiber Optic Vault	LOCATION MCRD Parris Island	DRILLER JGW
PROJECT NO. N4211	BORING	DRILLING METHOD HSA
DATE BEGUN 12/10/02	DATE COMPLETED 12/10/02	
FIELD GEOLOGIST BDH		DEVELOPMENT METHOD
GROUND ELEVATION	DATUM	



ELEVATION TOP OF RISER:

TYPE OF SURFACE SEAL: Concrete

TYPE OF PROTECTIVE CASING: Steel

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 8.25"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: NA

ELEVATION/DEPTH TOP OF SEAL: 10.5'

TYPE OF SEAL: Bentonite

ELEVATION/DEPTH TOP OF SAND: 12'

ELEVATION/DEPTH TOP OF SCREEN: 14'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 10 X 10'

TYPE OF SAND PACK: #2

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: 14'

ELEVATION / DEPTH BOTTOM OF SAND: 14'

ELEVATION/DEPTH BOTTOM OF HOLE: 14'

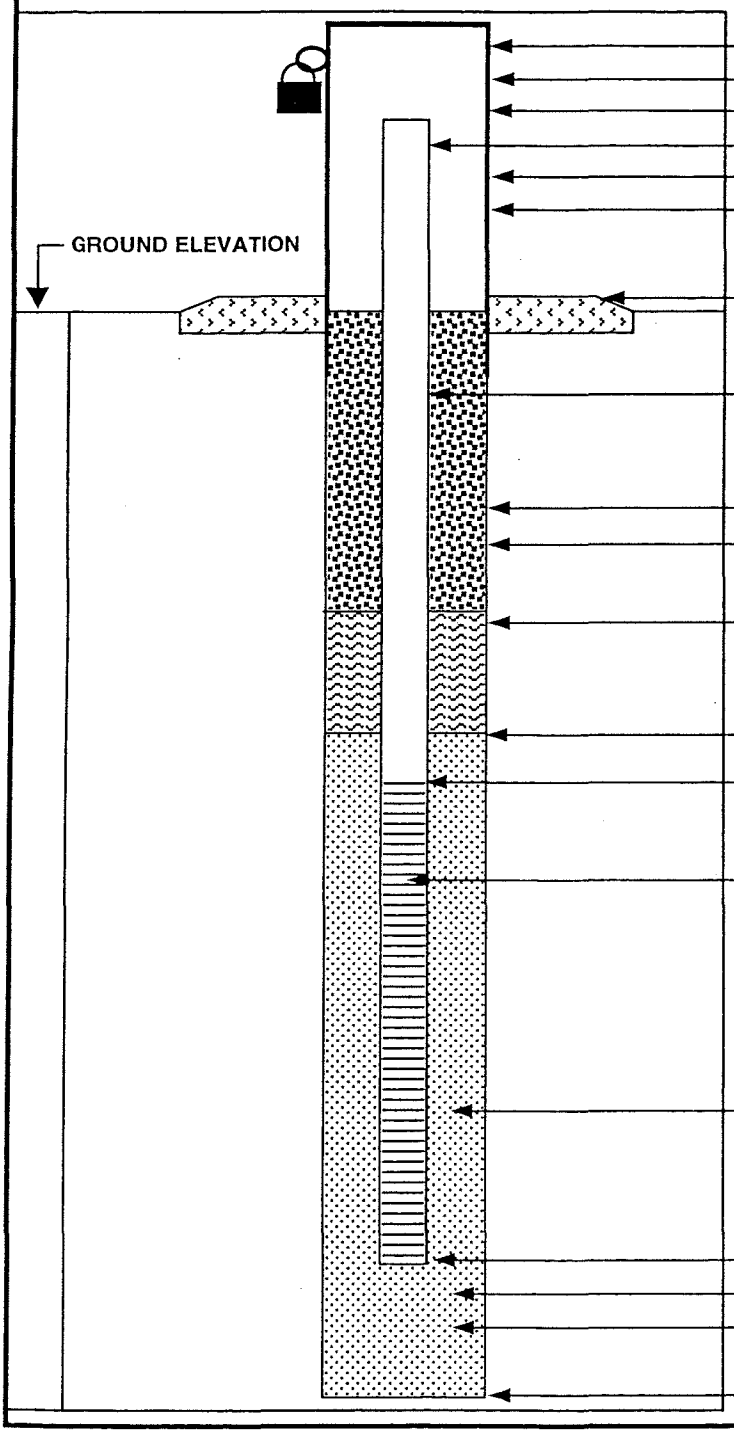
BACKFILL MATERIAL BELOW SAND: Sand

ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: PAI-FOV-10

OVERBURDEN MONITORING WELL SHEET

PROJECT	Fiber Optic Vault	LOCATION	MCRD Parris Island	DRILLER	JGW
PROJECT NO.	N4211	BORING		METHOD:	
ELEVATION		DATE	12/12/02	DRILLING	HSA
FIELD GEOLOGIST	BDH			DEVELOPMENT	



ELEVATION OF TOP OF SURFACE CASING:

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING: 2.99'

STICK-UP OF RISER PIPE: 2.87'

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING: Steel

TYPE OF SURFACE SEAL: Concrete

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 8.25"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: 0.5'

TYPE OF SEAL: Bentonite

DEPTH - TOP OF SAND PACK: 1'

ELEVATION / DEPTH - TOP OF SCREEN: 2'

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 X 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #2

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 12'

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 12'

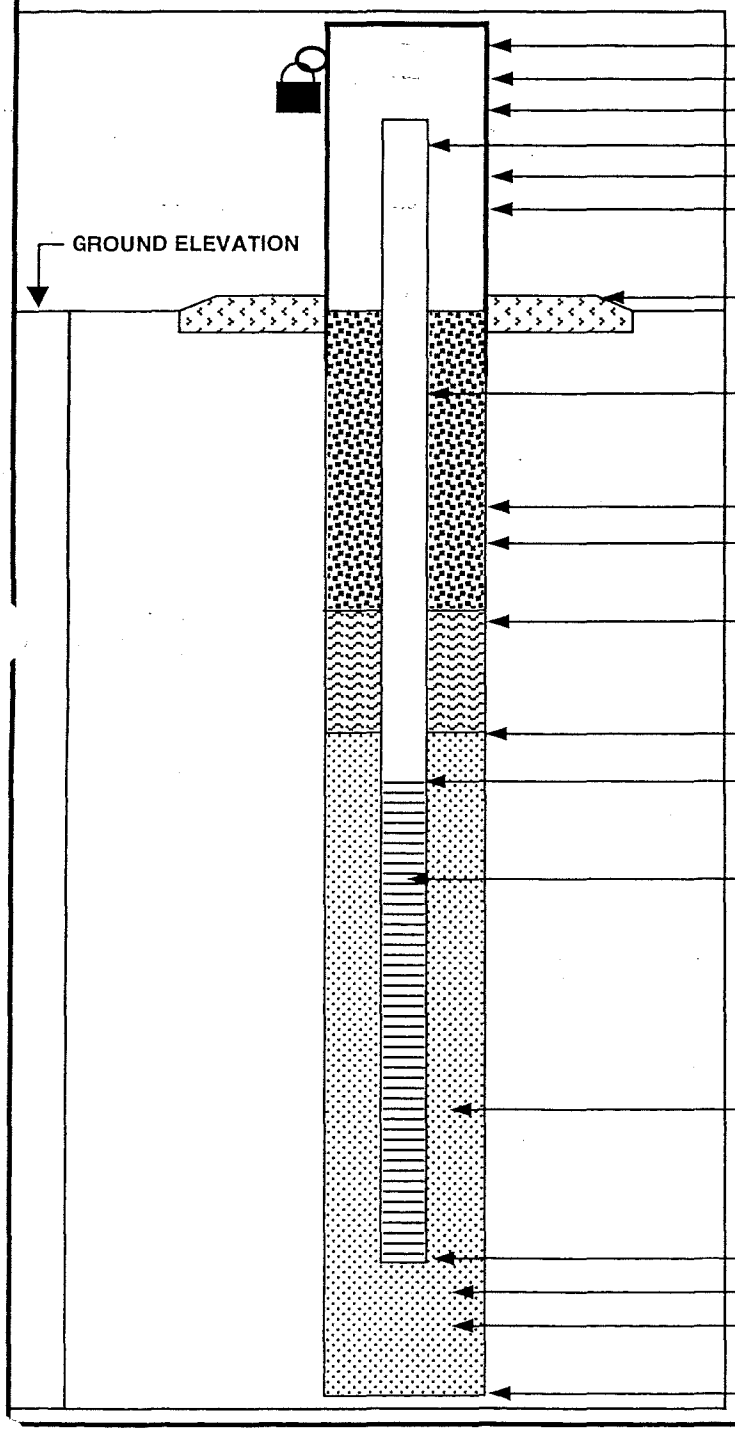
TYPE OF BACKFILL BELOW MONITORING WELL: Sand

ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 12'

WELL NO.: PAI-FOV-11

OVERBURDEN MONITORING WELL SHEET

PROJECT	Fiber Optic Vault	LOCATION	MCRD Parris Island	DRILLER	JGW
PROJECT NO.	N4211	BORING		METHOD:	
ELEVATION		DATE	12/14/02	DRILLING	HSA
FIELD GEOLOGIST	BDH			DEVELOPMENT	



ELEVATION OF TOP OF SURFACE CASING:

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING: 3.01'

STICK-UP OF RISER PIPE: 2.84'

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING: Steel

TYPE OF SURFACE SEAL: Concrete

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 8.25"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: 0.5'

TYPE OF SEAL: Bentonite

DEPTH - TOP OF SAND PACK: 2'

ELEVATION / DEPTH - TOP OF SCREEN: 4.1'

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 X 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #2

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 14.1

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 14.1

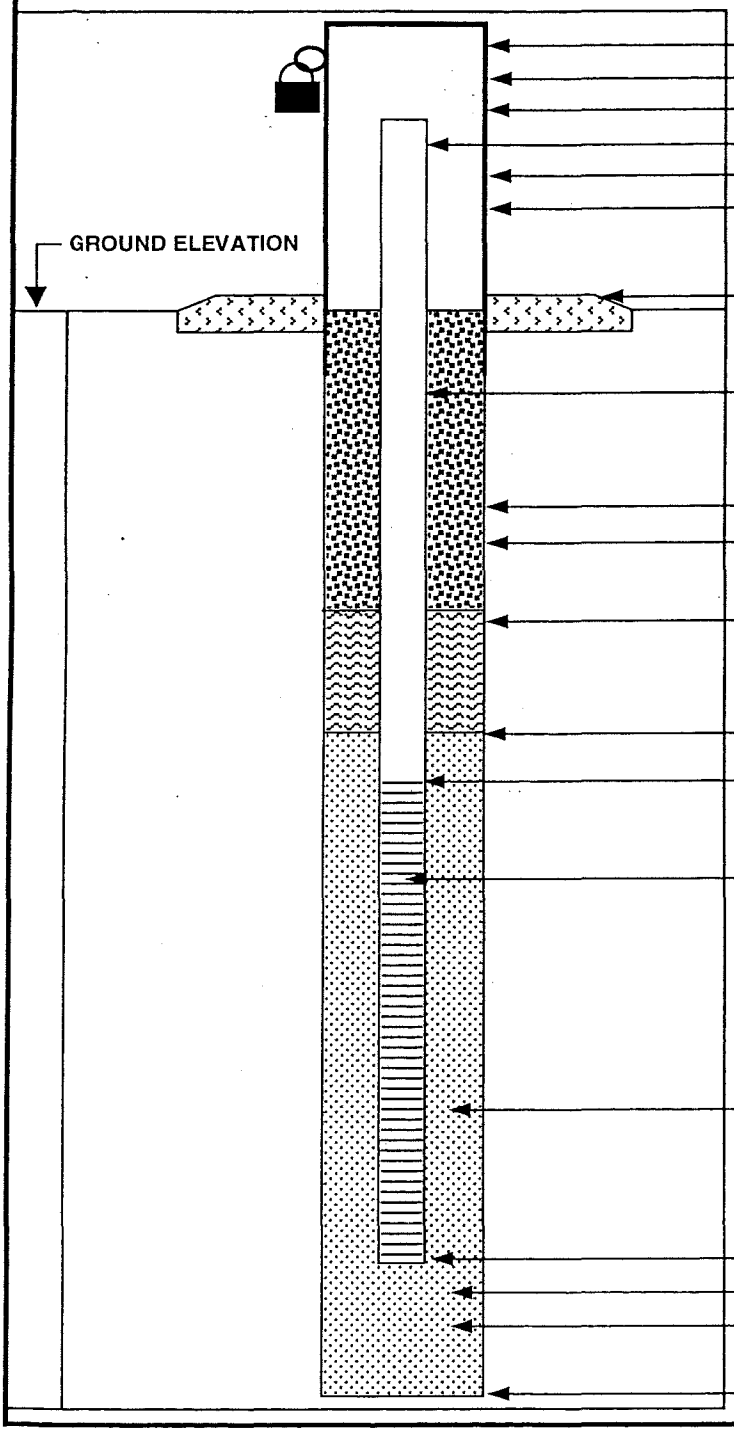
TYPE OF BACKFILL BELOW MONITORING WELL: Sand

ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 14.1

WELL NO.: PAI-FOV-12I

OVERBURDEN MONITORING WELL SHEET

PROJECT	Fiber Optic Vault	LOCATION	MCRD Parris Island	DRILLER	JGW
PROJECT NO.	N4211	BORING		METHOD:	
ELEVATION		DATE	12/13/02	DRILLING	HSA
FIELD GEOLOGIST	BDH			DEVELOPMENT	



ELEVATION OF TOP OF SURFACE CASING:

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING: 2.96'

STICK-UP OF RISER PIPE: 2.78'

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING:

TYPE OF SURFACE SEAL: Concrete

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 8.25"

TYPE OF SEAL: Grout

ELEVATION / DEPTH OF SEAL: 15'

TYPE OF SEAL: Bentonite

DEPTH - TOP OF SAND PACK: 19'

ELEVATION / DEPTH - TOP OF SCREEN: 18.7'

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 X 3'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #2

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 21.7'

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 24'

TYPE OF BACKFILL BELOW MONITORING WELL: Sand

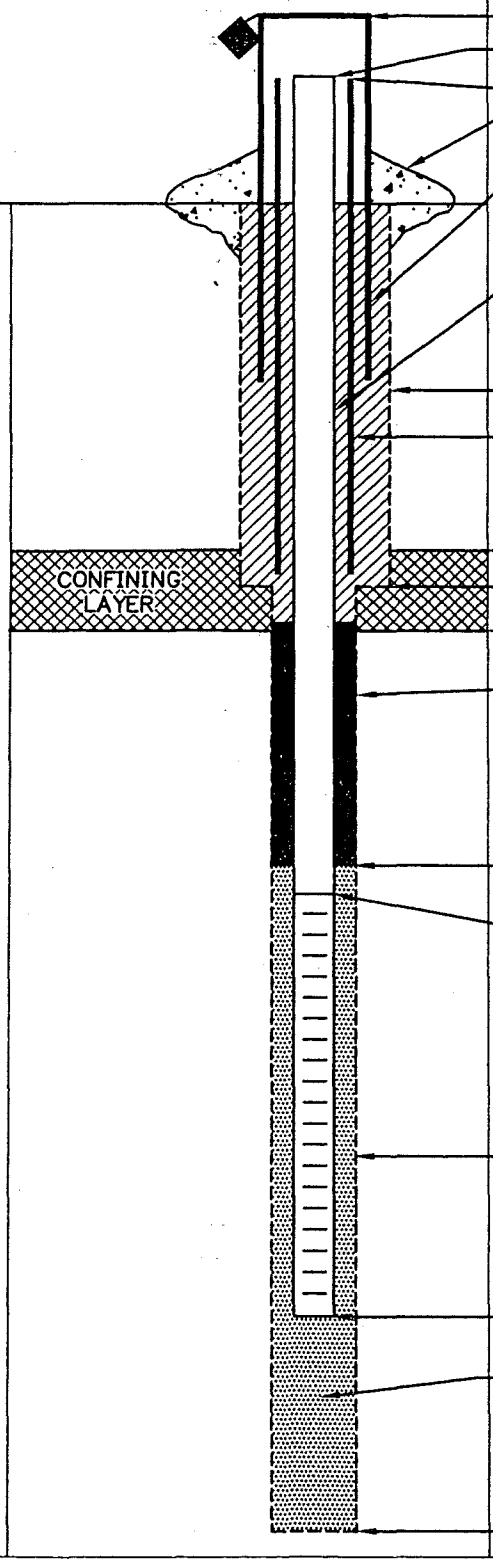
ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 24'

WELL NO.: PAI-FOV-13D

CONFINING LAYER
MONITORING WELL SHEET

Tetra Tech NUS, Inc.

PROJECT Fiber Optic Vault	LOCATION MCRD Parris Island	DRILLER JGW
PROJECT NO. N4211	BORING	DRILLING METHOD HSA / mud rotary
DATE BEGUN 12/14/02	DATE COMPLETED 12/18/02	
FIELD GEOLOGIST BDH		DEVELOPMENT METHOD
GROUND ELEVATION	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 12.9'
ELEVATION/HEIGHT OF TOP OF RISER PIPE: 12.83'
ELEVATION/HEIGHT OF TOP OF PERM. CASING: /
TYPE OF SURFACE SEAL: Concrete

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING: Steel

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 12"
PERM. CASING I.D.: 6"
TYPE OF CASING AND BACKFILL: Steel / Grout

ELEVATION/DEPTH TOP CONFINING LAYER: 129.2'
ELEVATION/DEPTH BOTTOM OF CASING: 130.5'
ELEVATION/DEPTH BOTTOM CONFINING LAYER: 131'

ELEVATION/DEPTH TOP OF SEAL: 124.4'
TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 30.8'

ELEVATION/DEPTH TOP OF SCREEN: 132.8'
TYPE OF SCREEN: PVC

TYPE OF SAND PACK: #2

BOREHOLE DIA. BELOW CASING: 5.5'

ELEVATION/DEPTH BOTTOM OF SCREEN: 135.8'

ELEVATION/DEPTH BOTTOM OF SAND PACK: 136'
BACKFILL MATERIAL BELOW SAND: Sand

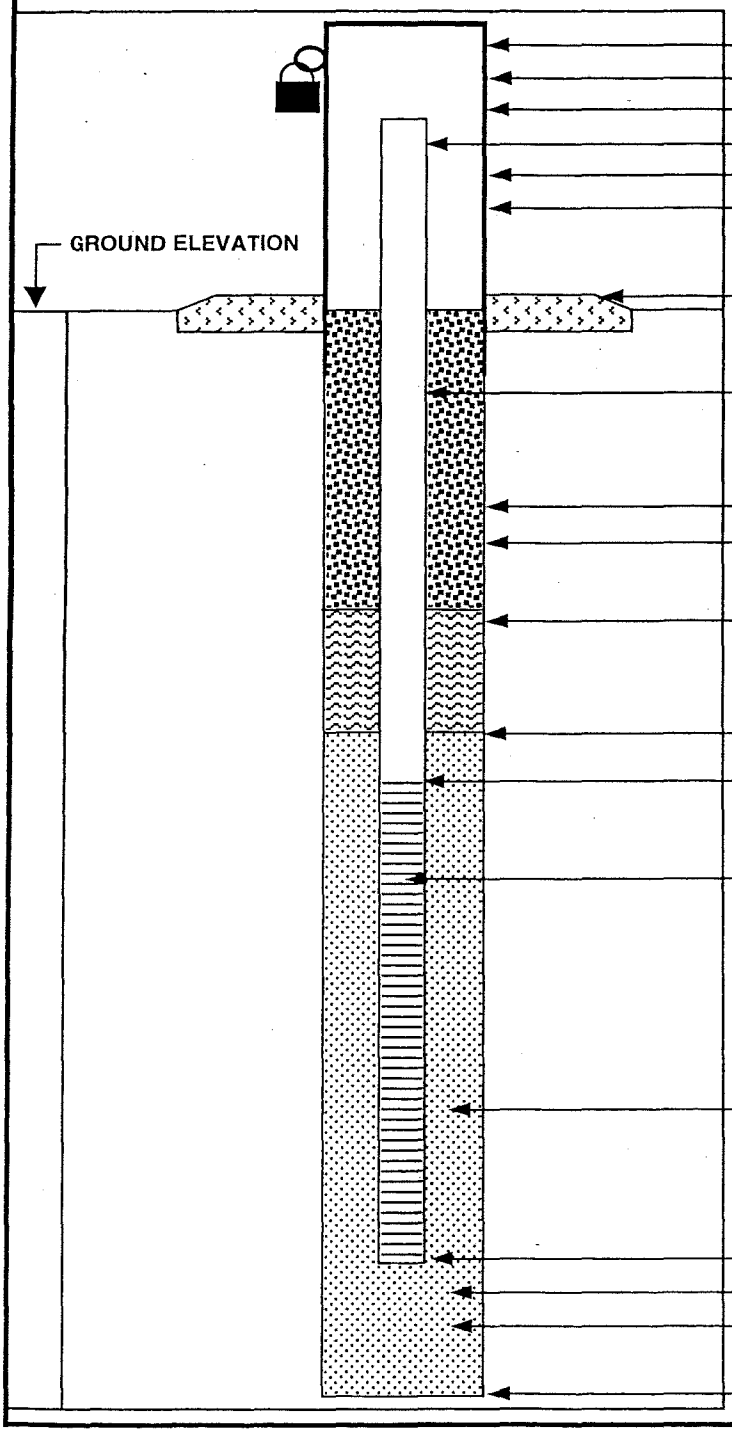
ELEVATION/DEPTH OF HOLE: 136'

ACAD:FORM_CLMW.dwg 07/20/99 INL

WELL NO.: PAI-FOV-14

OVERBURDEN MONITORING WELL SHEET

PROJECT	Fiber Optic Vault	LOCATION	MCRD Parris Island	DRILLER	JGW
PROJECT NO.	N4211	BORING		METHOD:	
ELEVATION		DATE	12/13/02	DRILLING	HSA
FIELD GEOLOGIST	BDH			DEVELOPMENT	



ELEVATION OF TOP OF SURFACE CASING:

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING: 3.02'

STICK-UP OF RISER PIPE: 2.84'

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING: Steel

TYPE OF SURFACE SEAL: Concrete

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 8.25"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: 0.5'

TYPE OF SEAL: Bentonite

DEPTH - TOP OF SAND PACK: 2'

ELEVATION / DEPTH - TOP OF SCREEN: 3.2'

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 X 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #2

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 13.2'

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 14'

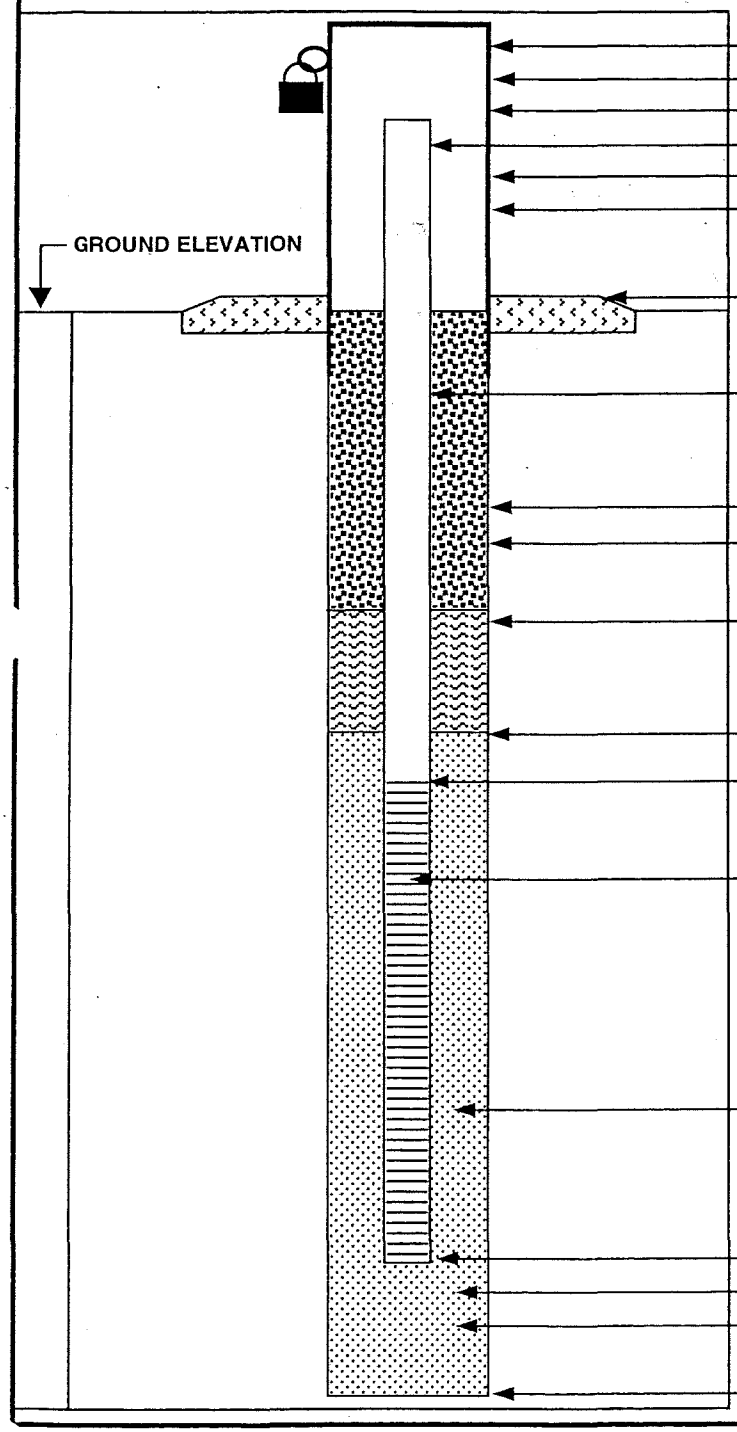
TYPE OF BACKFILL BELOW MONITORING WELL: Sand

ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 14'

WELL NO.: PAI-FOV-15I

OVERBURDEN MONITORING WELL SHEET

PROJECT	Fiber Optic Vault	LOCATION	MCRD Parris Island	DRILLER	JGW
PROJECT NO.	N4211	BORING		METHOD:	
ELEVATION		DATE	12/13/02	DRILLING	HSA
FIELD GEOLOGIST	BDH			DEVELOPMENT	



ELEVATION OF TOP OF SURFACE CASING:

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING: 3.01'

STICK-UP OF RISER PIPE: 2.73'

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING: Steel

TYPE OF SURFACE SEAL: Concrete

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 8.25"

TYPE OF SEAL: Grout

ELEVATION / DEPTH OF SEAL: 17'

TYPE OF SEAL: Bentonite

DEPTH - TOP OF SAND PACK: 19'

ELEVATION / DEPTH - TOP OF SCREEN: 21'

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 X 3'

I.D. OF SCREEN: 2

TYPE OF SAND PACK: #2

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 24'

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 24'

TYPE OF BACKFILL BELOW MONITORING WELL: Sand

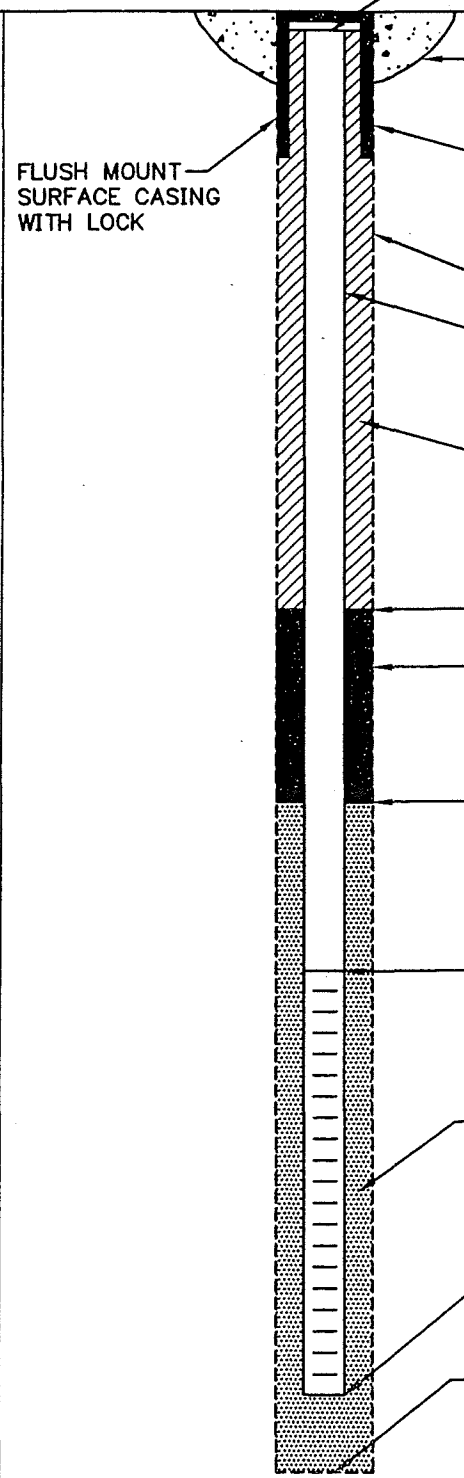
ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 24'

WELL NO.: PAI-FOV-16

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT Fiber Optic Vault	LOCATION MCRD Parris Island	DRILLER JGW
PROJECT NO. N4211	BORING	DRILLING METHOD HSA
DATE BEGUN 12/11/02	DATE COMPLETED 12/11/02	
FIELD GEOLOGIST BDH		DEVELOPMENT METHOD
GROUND ELEVATION	DATUM	



ELEVATION TOP OF RISER:

TYPE OF SURFACE SEAL: Concrete

TYPE OF PROTECTIVE CASING: Steel

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 8.25"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: NA

ELEVATION/DEPTH TOP OF SEAL: / 0.5'

TYPE OF SEAL: Bentonite

ELEVATION/DEPTH TOP OF SAND: / 2'

ELEVATION/DEPTH TOP OF SCREEN: / 3.6'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 10 X 10'

TYPE OF SAND PACK: #2

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 13.6'

ELEVATION / DEPTH BOTTOM OF SAND: / 14'

ELEVATION/DEPTH BOTTOM OF HOLE: / 14'

BACKFILL MATERIAL BELOW SAND: Sand

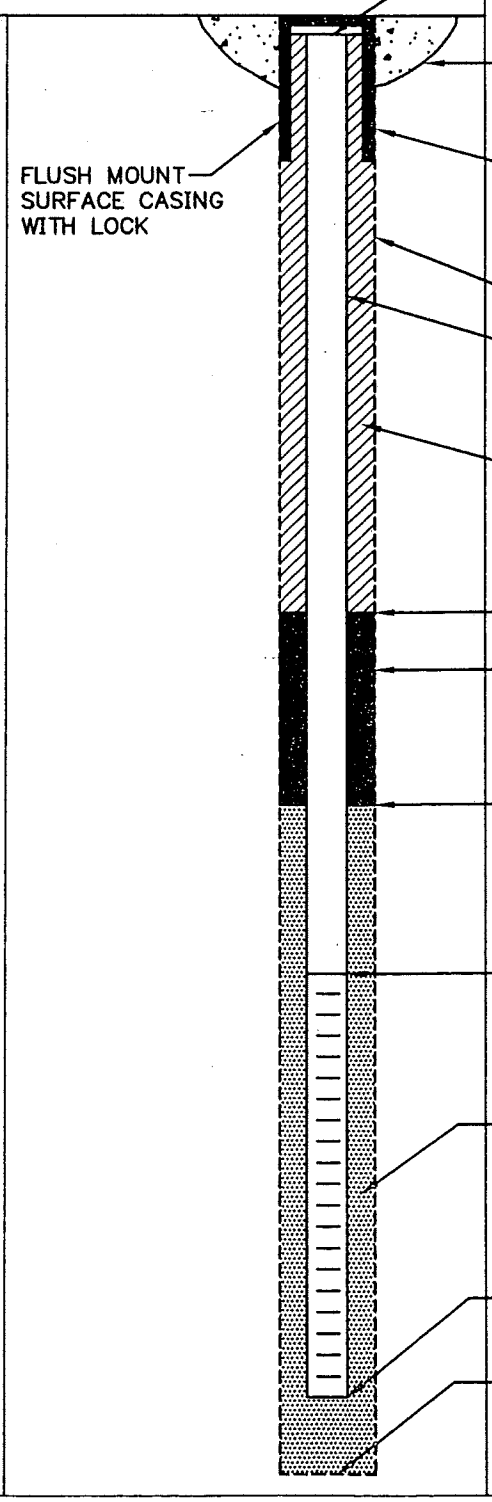
ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: PAI-FOV-17

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT: Fiber Optic Vault	LOCATION: MKRD Paris Island	DRILLER: JGW
PROJECT NO.: N4211	BORING:	DRILLING METHOD: HSA
DATE BEGUN: 12/11/02	DATE COMPLETED: 12/11/02	
FIELD GEOLOGIST: BDH		DEVELOPMENT METHOD:
GROUND ELEVATION:	DATUM:	



ELEVATION TOP OF RISER:

TYPE OF SURFACE SEAL: Concrete

TYPE OF PROTECTIVE CASING: Steel

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 8.25"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: NA

ELEVATION/DEPTH TOP OF SEAL: 10.7'

TYPE OF SEAL: Bentonite

ELEVATION/DEPTH TOP OF SAND: 12'

ELEVATION/DEPTH TOP OF SCREEN: 14'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 10 X 10'

TYPE OF SAND PACK: #2

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: 14'

ELEVATION / DEPTH BOTTOM OF SAND: 14'

ELEVATION/DEPTH BOTTOM OF HOLE: 14'

BACKFILL MATERIAL BELOW SAND: Sand

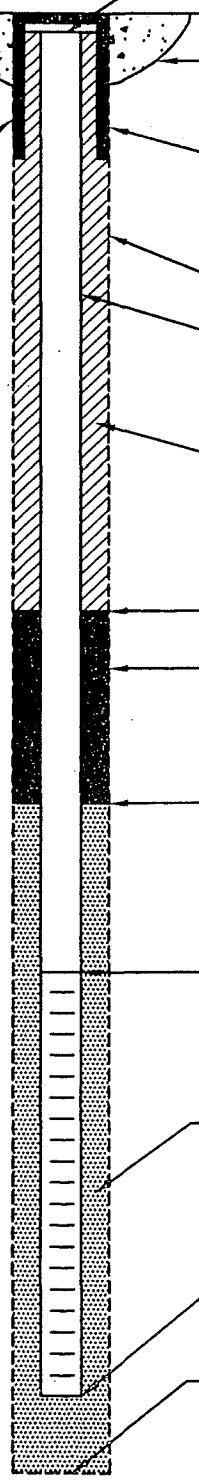
ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: PAI-FOV-182

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT: Fiber Optic Vault	LOCATION: MCRD Parris Island	DRILLER: JGW
PROJECT NO.: N4241	BORING:	DRILLING METHOD: HSA
DATE BEGUN: 12/12/02	DATE COMPLETED: 12/12/02	
FIELD GEOLOGIST: BDH		DEVELOPMENT METHOD:
GROUND ELEVATION:	DATUM:	



ELEVATION TOP OF RISER:

TYPE OF SURFACE SEAL: Concrete

TYPE OF PROTECTIVE CASING: Steel

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 8.25"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: Grout

ELEVATION/DEPTH TOP OF SEAL: 14'

TYPE OF SEAL: Bentonite

ELEVATION/DEPTH TOP OF SAND: 17'

ELEVATION/DEPTH TOP OF SCREEN: 19.5'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 10 X 5'

TYPE OF SAND PACK: #2

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: 24.5

ELEVATION / DEPTH BOTTOM OF SAND: 24.5

ELEVATION/DEPTH BOTTOM OF HOLE: 24.5

BACKFILL MATERIAL BELOW SAND: Sand

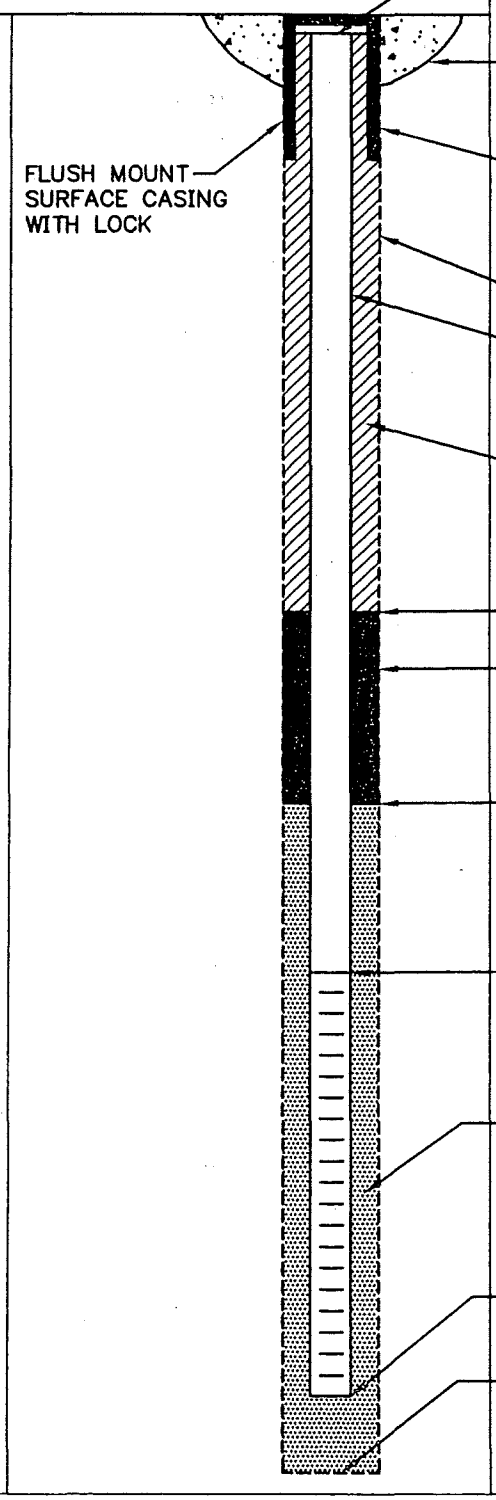
ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: PAI-FOV-19

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT Fiber Optic Vault	LOCATION MCRD Parris Island	DRILLER JGW
PROJECT NO. N4211	BORING	DRILLING METHOD HSA
DATE BEGUN 12/10/02	DATE COMPLETED 12/10/02	
FIELD GEOLOGIST BDH		DEVELOPMENT METHOD
GROUND ELEVATION	DATUM	



ELEVATION TOP OF RISER:

TYPE OF SURFACE SEAL: Concrete

TYPE OF PROTECTIVE CASING: Steel

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 8.25"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: Concrete

ELEVATION/DEPTH TOP OF SEAL: 1017'

TYPE OF SEAL: Bentonite

ELEVATION/DEPTH TOP OF SAND: 11'

ELEVATION/DEPTH TOP OF SCREEN: 12'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 10 X 10'

TYPE OF SAND PACK: #2

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: 12'

ELEVATION / DEPTH BOTTOM OF SAND: 12'

ELEVATION/DEPTH BOTTOM OF HOLE: 12'

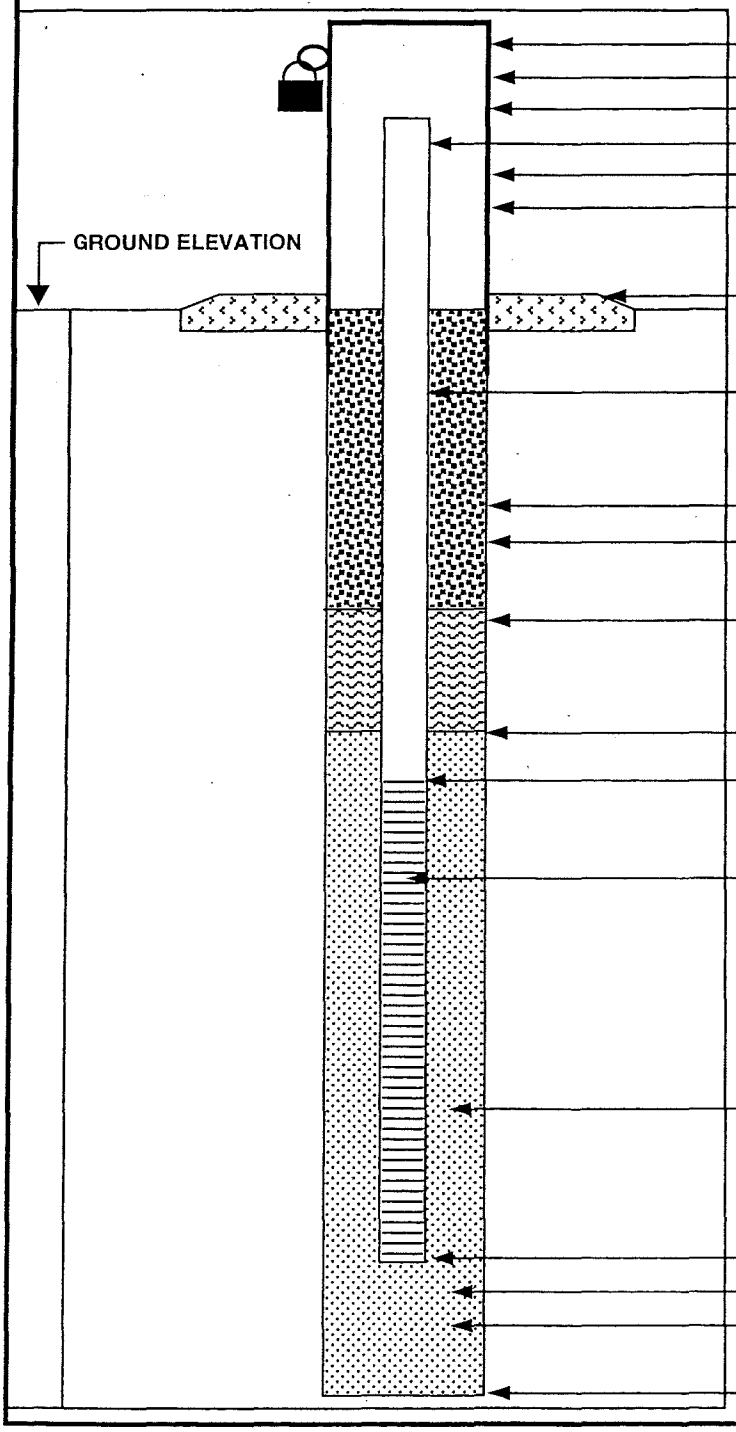
BACKFILL MATERIAL BELOW SAND: Sand

ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: PAI-FOV-20

OVERBURDEN MONITORING WELL SHEET

PROJECT	Fiber Optic Vault	LOCATION	MCRD Parris Island	DRILLER	JGW
PROJECT NO.	4421	BORING		METHOD:	
ELEVATION		DATE	12/11/02	DRILLING	HSA
FIELD GEOLOGIST	BDH			DEVELOPMENT	



ELEVATION OF TOP OF SURFACE CASING:

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING: 3.07'

STICK-UP OF RISER PIPE: 2.7'

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING: Steel

TYPE OF SURFACE SEAL: Concrete

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 8.25"

TYPE OF SEAL: Grout

ELEVATION / DEPTH OF SEAL: 0.5'

TYPE OF SEAL: Bentonite

DEPTH - TOP OF SAND PACK: 2'

ELEVATION / DEPTH - TOP OF SCREEN: 4.1

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 X 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #2

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 14.1

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 14.1

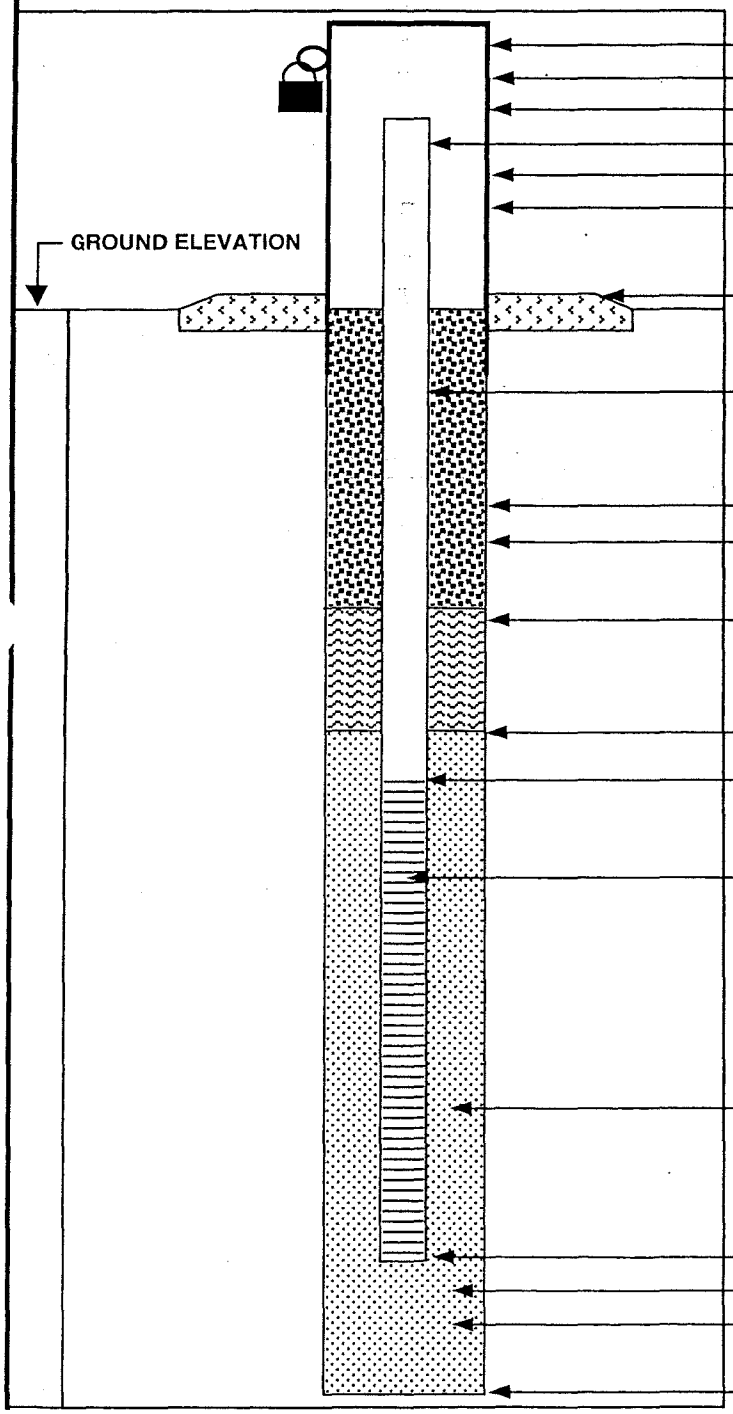
TYPE OF BACKFILL BELOW MONITORING WELL: Sand

ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 14.1

WELL NO.: PAI - FOV - 21

OVERBURDEN MONITORING WELL SHEET

PROJECT	Fiber Optic Route	LOCATION	MCRD Parris Island	DRILLER	JGW
PROJECT NO.	N4211	BORING		METHOD:	
ELEVATION		DATE	12/11/02	DRILLING	HSA
FIELD GEOLOGIST	BDH			DEVELOPMENT	



ELEVATION OF TOP OF SURFACE CASING:

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING: 2.99'

STICK-UP OF RISER PIPE: 2.82'

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING: Steel

TYPE OF SURFACE SEAL: Concrete

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 8.25"

TYPE OF SEAL:

ELEVATION / DEPTH OF SEAL: 0.5'

TYPE OF SEAL: Bentonite

DEPTH - TOP OF SAND PACK: 1'

ELEVATION / DEPTH - TOP OF SCREEN: 2.4'

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 X10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #2

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 12.4'

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 12.4'

TYPE OF BACKFILL BELOW MONITORING WELL: Sand

ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 12.4'

MONITORING WELL DEVELOPMENT RECORD

Well: MW-1
Site: MCRD Parris Island
Date Installed: 12/11/02
Date Developed: 7/9/03
Dev. Method: Pump
Pump Type: Grundfos

Depth to Bottom (ft.): 14.90
Static Water Level Before (ft.): 6.20
Static Water Level After (ft.): 7.88
Screen Length (ft.): 10
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: JB
Drilling Co.: Miller
Project Name: Fiber optic Vault
Project Number: N4211

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.)
0710		0	8.00	25.28	6.93	0.15	999	
0720		3.2	7.90	24.61	6.40	0.15	999	
0730		6.4	7.85	24.60	6.19	0.15	999	
~~0740~~				25.23	6.14	0.15	999	
0750		12.8						
0800		22.3	7.90	24.84	6.09	0.15	999	
0810		30.3		24.74	6.08	0.15	999	
0820			7.98	24.85	6.11	0.15	260	
0830			7.95	24.80	6.14	0.15	738	
0840				24.75	6.12	0.15	505	
0850			7.86	24.91	6.08	0.15	117	
900			7.88	24.87	6.11	0.15	45.5	

MONITORING WELL DEVELOPMENT RECORD

Well: MW-7I
Site: MCRD Parris Island
Date Installed: 12/16/02
Date Developed: 7/9/03
Dev. Method: Pump
Pump Type: Grundfos

Depth to Bottom (ft.): 29.62
Static Water Level Before (ft.): 8.37
Static Water Level After (ft.): 25.15
Screen Length (ft.): 3
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: JB
Drilling Co.: Miller
Project Name: Fiber Optic Vault
Project Number: N4211

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.)
0950		0	15.71	24.91	6.24	0.30	482	
1005		3	20.95	24.79	5.62	0.30	999	Surge
1025		10	24.20	24.93	6.04	0.30	180	.5 gal/min
1045		20	24.90	24.87	5.76	0.30	711	(112) Surge
1110		32	24.80	24.83	5.84	0.29	92.8	
1120		37	25.35	24.60	5.77	0.29	50.5	
1130		42	24.80	24.44	5.88	0.29	80.4	Surge
1140		47	25.15	24.42	5.78	0.29	36.1	

MONITORING WELL DEVELOPMENT RECORD

Well: PAI-FOV-8D
Site: MCRD Parris Island
Date Installed: 12/17/02
Date Developed: 7/9/03
Dev. Method: Pump / surge bailer
Pump Type: Grundfos
Flow rate

Depth to Bottom (ft.): 32.45' before development
Static Water Level Before (ft.): 15.27
Static Water Level After (ft.): 35.3
Screen Length (ft.): 3
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: BDH
Drilling Co.: Geiler
Project Name: Fiber Optic Vault
Project Number: N4219

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.)
								Well bridged w/ dolg sand, use
								bailer to clear + reach TD
1009			26.4					
1025				30.46	6.24	0.740	155	begin pumping ~800 ml/30 sec
								~~tubing separates, put together~~, surge
1039	~1200ml/min	~7g		28.75	6.95	0.746	395	
1044		~8g						well dry after ~8g
1051				28.84	6.90	0.730	83	resume, well dry again
1109	~1200ml/min	9g		30.88	6.91	0.584	37	resume
1117	~800 ml/min	10.5g		28.84	6.86	0.624	46	
1123		12g		28.60	6.84	0.616	50	
1123			~32.5'	28.58	6.81	0.605	22	surge well
1128		13g		28.64	6.85	0.595	120	
1142	200ml	13.5g		29.20	6.85	0.522	38	water clear
1207	~150ml	~15g		29.10	6.89	0.584	91	
1213	~900ml	~17g		29.48	6.91	0.614	573	surged
1220			~35.3'	28.83	6.92	0.600	178	
1223		21g		28.58	6.92	0.587	179	

1410 16.89

MONITORING WELL DEVELOPMENT RECORD

Well: PAI-FOV-10
Site: MCRD Parris Island
Date Installed: 12/12/02
Date Developed: 7/9/03
Dev. Method: Pump
Pump Type: Grundfos

Depth to Bottom (ft.): 13.97' gauge
Static Water Level Before (ft.): 7.16
Static Water Level After (ft.): 11.48
Screen Length (ft.): 10'
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: BDH
Drilling Co.: Miller Drey
Project Name: Fiber Optic Vault
Project Number: N421

Time	~~Estimated Sediment Thickness (Ft.)~~ Flow rate	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1449	1100ml/min			37.42	6.78	0.293	>999	start pump
1454		~1.5g	8.74	35.29	6.64	0.378	>999	
1456								surge well, very turbid
1459	700ml	~2.5g		30.19	6.52	0.352	>999	very turbid
1506	900	~4g	9.14	28.03	6.60	0.373	729	" "
1514	900	~7.5g		27.08	6.72	0.361	>999	" "
1522		~9.0g	9.41	26.28	6.66	0.364	747	turbid
1524								surge well
1526				26.10	6.63	0.360	>999	very turbid
1534		~12.5g	10.61	26.74	6.74	0.352	>999	" "
1549		~16g		26.27	6.76	0.338	109	sl cloudy
1551								surge well, very turbid
1555		~19g		26.18	6.73	0.338	>999	very turbid
1605	1100ml	~21g	11.48	26.76	6.77	0.320	187	sl. cloudy
1613				25.82	6.75	0.326	75	milky
1621		~25g		25.86	6.80	0.323	49	clear
1630		~27g	11.48	25.39	6.79	0.322	58	clear, well developed

MONITORING WELL DEVELOPMENT RECORD

Well: PAI - FOV - 11
Site: MCRD Parris Island
Date Installed: 12/14/02
Date Developed: 7/10/03
Dev. Method: Pump
Pump Type: Grundfos Flow Rate

Depth to Bottom (ft.): 16.7
Static Water Level Before (ft.): 8.80
Static Water Level After (ft.): 10.14
Screen Length (ft.): 10
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: BPH
Drilling Co.: Miller
Project Name: Fiber Optic Navbt
Project Number: N4211

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.)
1043								surge well, start pump
1047		2000ml/min	10.68	30.42	6.32	0.107	>999	very turbid, petroleum odor
1052		8g	10.73	28.93	6.04	0.108	>999	" "
1056			10.78	27.85	6.05	0.108	496	turbid
1058	1800ml/min			~~27.86~~				surge well, very turbid
1106			10.6	27.76	6.07	0.107	372	cldy
1111				27.36	5.99	0.108	215	
1112								surge well, very turbid
1115			10.59	27.15	6.01	0.109	>999	
1120				27.21	6.04	0.108	420	turbid, back for lunch
1302			8.94					surge well, resume pump
1310	2000ml			32.77	5.46	0.095	>999	very turbid
1320	1400ml		10.05	29.22	5.57	0.101	196	
1330				28.62	5.36	0.103	64	clear
1331								surge well
1340				28.09	5.50	0.104	331	cloudy
1351				28.42	5.48	0.105	188	sl cldy
1353		~39g	10.14					well developed

MONITORING WELL DEVELOPMENT RECORD

Well: MW-12I
Site: MCRD Parris Island
Date Installed: 12/13/02
Date Developed: 7/10/03
Dev. Method: Pump
Pump Type: Grundfos

Depth to Bottom (ft.): 24.40
Static Water Level Before (ft.): 9.11
Static Water Level After (ft.):
Screen Length (ft.): 3
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: JB
Drilling Co.: Miller
Project Name: Fiber Optic Vault
Project Number: N4211

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.)
0805		0	19.15	25.08	6.52	0.27	661	
0845		3	22.75	25.05	6.34	0.21	999	
0915		6		24.64	5.58	0.20	999	
0945		10		24.67	5.63	0.18	650	
1020		15		25.91	5.81	0.18	391	
1100		20		26.15	5.80	0.18	230	
1300		25		24.12	5.94	0.17	475	
1315		28		26.52	6.05	0.17	315	

MONITORING WELL DEVELOPMENT RECORD

Well: PAI-FOV-13D
Site: MCRD Parris Island
Date Installed: 12/18/02
Date Developed: 7/10/03
Dev. Method: Pump
Pump Type: Grundfos Flow rate

Depth to Bottom (ft.): 35.28 before develop.
Static Water Level Before (ft.): 15.75
Static Water Level After (ft.): 37.05
Screen Length (ft.): 3
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: BDH
Drilling Co.: Miller
Project Name: Fiber Optic Vault
Project Number: N4211

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.)
0810								dig and bailed well @ 35.28'
								surge thru blockage to TD
0834		~5		28.90	6.13	0.670	>999	very turbid
0836								well dry
0846				30.0				resume pumping
0848	~900 ml/min	~6	36.6	27.73	6.44	0.565	>999	very turbid
0855			37.1	26.94	6.35	0.556	126	milky
0902	~650 ml/min		36.3	26.51	6.38	0.553	26	clear
0909								surge well
0911	1000 ml/min	~9		26.33	6.41	0.569	>999	turbid
0922		~11	37.3	26.36	6.35	0.543	107	milky, stopped pump to recharge
0940			26.5					surge well, resume pumping
0942	1400 ml/min	16	31.5	26.67	6.38	0.520	523	
0947			36.0	25.62	6.34	0.541	103	milky
0957		18	37.04	25.75	6.37	0.545	60	clear
1005		19	37.05	26.09	6.40	0.549	39	clear, well developed

MONITORING WELL DEVELOPMENT RECORD

Well: MW-17
Site: MCRD Parris Island
Date Installed: 12/11/02
Date Developed: 7/11/03
Dev. Method: Pump
Pump Type: Grundfos

Depth to Bottom (ft.): 13.67
Static Water Level Before (ft.): 3.30
Static Water Level After (ft.): 7.65
Screen Length (ft.): 10
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: JB
Drilling Co.: Miller
Project Name: Fiber Optic Vault
Project Number: N4211

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.)
0655		0	4.19	27.69	6.02	0.27	999	Surge
0715		12	7.96	26.70	5.65	0.31	999	
0725		20	8.10	27.10	5.91	0.26	536	Surge
0738		25	7.70	27.15	5.78	0.26	599	
0752		35	7.60	27.41	5.81	0.26	105	
0805		45	~~[illegible]~~ 7.65	27.56	6.20	0.26	32.9	

MONITORING WELL DEVELOPMENT RECORD

Well: PAI-FOV-18I
Site: MCRD Parris Island
Date Installed: 12/12/02
Date Developed: 7/11/03
Dev. Method: Pump
Pump Type: Grundfos
Flow Rate

Depth to Bottom (ft.): 24.58
Static Water Level Before (ft.): 3.8
Static Water Level After (ft.): 20.78
Screen Length (ft.): 5
Specific Capacity:
Casing ID (in.): 2"

Responsible Personnel: BDH
Drilling Co.: Geiler Drlg
Project Name: Filter & pitle Vault
Project Number: N4211

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.)
0719								surge well, spongy bottom
0722								Start pump
0725	1800	~1	12.21	28.09	5.46	0.584	>999	dark gray
0727								Surge well, very turbid
0737	600 ml	~5	17.70	26.85	5.82	0.614	>999	very turbid
0752	600 ml		18.80	26.69	5.86	0.641	>999	turbid
0807	"	~9	18.83	26.71	5.77	0.651	>999	"
0823		~11	18.94	26.82	5.79	0.658	851	
0838		~15	19.02	27.42	5.82	0.658	747	
0839								stop pump to recharge
0849			12.5					surge well
0851	1000 ml			27.65	5.87	0.635	>999	resume pump, very turbid dk gray
								let recharge / surge couple times
1001		~23	20.5	27.98	5.83	0.666	435	very turbid
1012			21.4	28.21	5.82	0.690	351	let recharge
1025		32	16.5	29.27	5.85	0.720	139	
1027		39	20.8	28.75	5.84	0.706	91	well developed

MONITORING WELL DEVELOPMENT RECORD

Well: MW-19
Site: MCRD Parris Island
Date Installed: 12/10/02
Date Developed: 7/11/02
Dev. Method: Pump
Pump Type: Grundfos

Depth to Bottom (ft.): 10.55
Static Water Level Before (ft.): 2.85
Static Water Level After (ft.): 7.92
Screen Length (ft.): 10
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: JB
Drilling Co.: Miller
Project Name: Fiber Optic Vault
Project Number: N4211

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.)
1013		0	5.70	28.61	5.54	0.29	999	surge, pumped dry twice
1040		10	4.40	28.61	4.62	0.23	999	surge
1105		15	4.01	28.01	4.58	0.22	402	pumped dry
1116		20	4.10	28.69	4.60	0.23	999	surge, pumped dry
1223		30	4.62	28.71	4.62	0.23	999	surge
1235		40	6.14	29.24	4.67	0.24	315	
1245		45	7.82	28.87	4.65	0.24	256	
1300		55	7.92	29.18	4.66	0.24	57.4	

MONITORING WELL DEVELOPMENT RECORD

2.6' stickup

Well: PAI - FOV-20
Site: MCRD Parris Island
Date Installed: 12/11/02
Date Developed: 7/10/03
Dev. Method: Pump
Pump Type: Grundfos

Depth to Bottom (ft.): 16.77
Static Water Level Before (ft.): 5.82
Static Water Level After (ft.): 11.47
Screen Length (ft.): 10
Specific Capacity:
Casing ID (in.): 2

Responsible Personnel: BDH
Drilling Co.: Miller
Project Name: Fiber Optic Vault
Project Number: N4291

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.)
1630								surge well
1633	1800 ml/min							begin pump, very turbid
1617				33.60	4.79	0.401	>999	dk brn
1618								surge well, lower pump
1623	850 ml/min	~3	7.63	29.32	4.89	0.888	>999	
1628								surge well
1630	600 ml/18 sec	~4	7.74	28.13	4.68	0.838	>999	very turbid
1640	1700 ml/min			26.06	4.43	0.449	>999	turbid - milky
1655				24.82	4.60	0.467	760	
1704		~20		24.65	4.56	0.487	246	cldy
1710			11.16	24.59	4.53	0.497	76	clear
1711								surge well
1715				24.57	4.61	0.494	838	turbid
1725		~25	11.38	24.21	4.60	0.515	145	sl cldy
1744		~3	11.47	24.04	4.59	0.540	29	clear
1745		~35						well developed

MONITORING WELL DEVELOPMENT RECORD

Well: PAI-FOV-21
Site: MCRD Parris Island
Date Installed: 12/11/02
Date Developed: 7/9/03
Dev. Method: Pump
Pump Type: Grundfos Flowrate

Depth to Bottom (ft.): 15.21
Static Water Level Before (ft.): 8.06
Static Water Level After (ft.): 8.28
Screen Length (ft.): 10
Specific Capacity:
Casing ID (in.): 2"

Responsible Personnel: BDH
Drilling Co.: Driller Drilling
Project Name: Fiber Optic Project
Project Number: N4211

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.)
1750								begin surging
1752	~1400 ml/min	~3 g		32.6	5.08	0.620	>999	begin pumping, very turbid
1800		~5 g	7.96	28.33	4.53	0.585	407	
1805		~6.5 g		26.28	4.47	0.597	163	
1806								surge well
1808				25.92	4.63	0.626	>999	very turbid
1815		~9 g	8.04	25.25	4.44	0.601	548	turbid
1818								surge well
1822	1000 ml	~11 g		25.29	4.54	0.616	>999	very turbid
1828				25.03	4.41	0.606	313	cloudy
1830		~15 g	8.21					surge well, very turbid
1835		~17 g		25.06	4.46	0.608	>999	very turbid
1840	1000 ml	~18 g		24.89	4.42	0.599	280	
1847		~21 g		24.52	4.40	0.602	106	milky
1855		23 g	8.28	24.50	4.39	0.599	73	clear, well developed

Tetra Tech NUS
Groundwater Purging and Sampling Log

Date 7/9/3

Project Site Name:
Project No.: N4211

Sample Location: MW-1

[ ] Domestic Well Data

Flow-Thru Cell Make\Model: Horiba U-22

Sample ID No.: PAI-FOV-GW-01-01

[X] Monitoring Well Data

Serial Nos.: 9292036

Sampled By: JB

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. / Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01 / 0.038	Initial	6.32	0.16	27.60	99.7	7.36	81	6.23	200
1	0.041 / 0.155	1st	6.14	0.16	26.89	37.0	2.62	63	6.41	"
2	0.163 / 0.617	2nd	6.01	0.16	27.07	32.1	3.38	72	6.41	"
4	0.653 / 2.47	3rd	6.11	0.16	27.67	16.7	3.67	59	6.41	"
6	1.469 / 5.56									
8	2.611 / 9.88									
10	4.08 / 15.44									
	[1 gal. = 3.785 L]									

PID Reading (ppm): Ø

Well Casing Diameter: 2"
Total Well Depth: 14.90
Static Water Level: 6.23
Tube Intake Depth: ~13.5'
Volume 1.4 gal
Start Purge (hr): 1350
End Purge (hr): 1515
Total Purge Time (min): 80
Total Vol. Purged: 4.2 gal

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 7/9/3									
Time: 1520	clear	6.11	0.16	27.67	16.7	3.67	59	6.41	200

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
Dissolved Methane	8XXX	HCL	3	40 ml	glass vials	
Total Lead	6000/7000	HNO_3	1	500 ml	HDPE	
SVOC		—	2 x 1 L		Amber	✓
Pest		—	1		Amber	✓
PCB		—	1		Amber	✓

ADDITIONAL INFORMATION

Comments:

Method:
[✓] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[✓] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[✓] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s):

Tetra Tech NUS
Groundwater Purging and Sampling Log

Date 7/9/3

Project Site Name:
Project No.: N4211

Sample Location: MW-II

[ ] Domestic Well Data

Flow-Thru Cell Make\Model: Horiba U-22

Sample ID No.: PAI-FOU-GW-07-01

[X] Monitoring Well Data

Serial Nos.: 9292036

Sampled By: JB

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	Initial	5.65	0.28	25.04	43.7	2.29	53	11.90	350
1	0.041	0.155	1st	5.70	0.29	24.28	17.6	0.25	31	13.20	350
2	0.163	0.617	2nd	5.71	0.29	24.23	5.69	0.22	25	13.49	350
4	0.653	2.47	3rd								
6	1.469	5.56									
8	2.611	9.88									
10	4.08	15.44									
	[1 gal. = 3.785 L]										

PID Reading (ppm): Ø

Well Casing Diameter: 2"

Total Well Depth: 29.62

Static Water Level: 7.45

Tube Intake Depth: ~26'

Volume 3.2 gal

Start Purge (hr): 1550

End Purge (hr): 1710

Total Purge Time (min): 70

Total Vol. Purged: 6.4

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 7/9/3									
Time: 1710	clear	5.71	0.29	24.23	5.69	0.22	25	13.49	350

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
Dissolved Methane	8XXX	HCL	3	40 ml	glass vials	
Total Lead	6000/7000	HNO_3	1	500 ml	HDPE	
SVOC		—	2	L	Amber	✓
Pest		—	1	L	Amber	✓
PCB		—	1	L	Amber	✓

ADDITIONAL INFORMATION

Comments:

Method:
[✓] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[✓] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[✓] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s):

Tetra Tech NUS
Groundwater Purging and Sampling Log

Date 7/9/3

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Project Site Name:
Project No.: N4211

Sample Location: MW-8D

[ ] Domestic Well Data

Flow-Thru Cell Make\Model: Horiba U-22

Sample ID No.: PAI-FOV-GW-08-01

[X] Monitoring Well Data

Serial Nos.: 9292036

Sampled By: JB

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	Initial	6.64	0.54	24.86	6.56	3.28	-42	17.95	300
1	0.041	0.155	1st	6.97	0.57	24.43	3.64	0.26	-90	23.34	300
2	0.163	0.617									
4	0.653	2.47									
6	1.469	5.56									
8	2.611	9.88									
10	4.08	15.44									
	[1 gal. = 3.785 L]										

PID Reading (ppm): Ø

Well Casing Diameter: 2"
Total Well Depth: 38.66
Static Water Level: 15.87
Tube Intake Depth: ~35'
Volume 3.6
Start Purge (hr): 1730
End Purge (hr): 1815
Total Purge Time (min): 45
Total Vol. Purged: 3.6

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 7/9/3									
Time: 1820	Clear	6.97	0.57	24.43	3.64	0.26	-90	23.34	300

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
Dissolved Methane	8XXX	HCL	3	40 ml	glass vials	
Total Lead	6000/7000	HNO_3	1	500 ml	HDPE	
SVOC		—	2	L	Amber	✓
Pest		—	1	L	Amber	✓
PCB		—	1	L	Amber	✓

ADDITIONAL INFORMATION

Comments:

Method:
[✓] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[✓] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[✓] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s):

Tetra Tech NUS
Groundwater Purging and Sampling Log

Date 7/9/3

Project Site Name:
Project No.: N4211

Sample Location: MW-10

[ ] Domestic Well Data

Flow-Thru Cell Make\Model: Horiba U-22

Sample ID No. PAI-FOV-GW-10-01

[X] Monitoring Well Data

Serial Nos.: 9292036

Sampled By: JB

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	Initial	7.27	~~0.00~~	~~32.61~~	236	9.49	57	7.45	228
1	0.041	0.155			0.37	25.14			~~130~~		
2	0.163	0.617	1st	6.84	0.38	24.05	90.7	5.86	130	7.68	"
4	0.653	2.47	2nd	6.77	0.37	23.85	57.6	4.56	147	7.60	"
6	1.469	5.56	3rd	6.76	0.36	23.72	35.2	3.72	157	7.61	"
8	2.611	9.88									
10	4.08	15.44									
	[1 gal. = 3.785 L]										

PID Reading (ppm): Ø

Well Casing Diameter: 2"
Total Well Depth: 14.30
Static Water Level: 7.21
Tube Intake Depth: ~13'
Volume 1.1
Start Purge (hr): 1845
End Purge (hr): 1940
Total Purge Time (min): 55
Total Vol. Purged: 3.3

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 7/9/3									
Time: 1945	clear	6.76	0.36	23.72	35.2	3.72	157	7.61	228

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
Dissolved Methane	8XXX	HCL	3	40 ml	glass vials	
Total Lead	6000/7000	HNO_3	1	500 ml	HDPE	
SVOC		—	2	L	Amber	✓
Pest		—	1	L	Amber	✓
PCB		—	1	L	Amber	✓

ADDITIONAL INFORMATION

Comments:

Method:
[✓] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[✓] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[✓] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s):

Tetra Tech NUS
Groundwater Purging and Sampling Log

Date 7/10/3

Project Site Name:
Project No.: N4211

Sample Location: MW-11

[ ] Domestic Well Data

Flow-Thru Cell Make\Model: Horiba U-22

Sample ID No.: DA1-FOV-GW-11-01

[X] Monitoring Well Data

Serial Nos.: 9292036

Sampled By: JB

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	Initial	6.06	0.10	27.22	5.25	6.90	54	8.92	250
1	0.041	0.155	15'	5.89	0.10	27.03	1.34	3.94	93	9.10	250
2	0.163	0.617									
4	0.653	2.47									
6	1.469	5.56									
8	2.611	9.88									
10	4.08	15.44									
	[1 gal. = 3.785 L]										

PID Reading (ppm): Ø

Well Casing Diameter: 2"

16.80 Total Well Depth: ~~8.92~~

Static Water Level: 8.92

Tube Intake Depth: ~15.5'

Volume 1.6

Start Purge (hr): 1645

End Purge (hr): 1710

Total Purge Time (min): 25

Total Vol. Purged: 1.6 gal

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 7/10/3									
Time: 1710	clear	5.89	0.10	27.03	1.34	3.94	93	9.10	250

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
Dissolved Methane	8XXX	HCL	3	40 ml	glass vials	
Total Lead	6000/7000	HNO_3	1	500 ml	HDPE	
SVOC		—	2	L	Amber	✓
Pest		—	1	L	Amber	✓
PCB		—	1	L	Amber	✓

ADDITIONAL INFORMATION

Comments:

Method:
- [✓] Peristaltic Pump
- [ ] Centrifugal Pump
- [ ] Bladder Pump
- [✓] Tube Evacuation
- [ ] Vacuum Jug Assembly
- [ ] Bailer

Tubing Type:
- [ ] Polyethylene
- [✓] Teflon
- [ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s):

Tetra Tech NUS
Groundwater Purging and Sampling Log

Date 7/10/3

Project Site Name:
Project No.: N 4211

[ ] Domestic Well Data

[X] Monitoring Well Data

[ ] Other Well Type:

Flow-Thru Cell Make\Model: Horiba U-22

Serial Nos.: 9292036

Sample Location: MW-12

Sample ID No.: PAI-FOV-GW-1201

Sampled By: DB

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	Initial	5.75	0.16	23.86	210	3.03	98	8.40	270
1	0.041	0.155	1st	5.73	0.16	24.37	88.1	0.55	78	13.43	270
2	0.163	0.617	2nd	5.84	0.16	24.37	28.7	3.42	68	13.33	270
4	0.653	2.47									
6	1.469	5.56									
8	2.611	9.88									
10	4.08	15.44									
	[1 gal. = 3.785 L]										

PID Reading (ppm): Ø

Well Casing Diameter: 2"
Total Well Depth: 24.25
Static Water Level: 8.40
Tube Intake Depth: ~22.0
Volume 2.5
Start Purge (hr): 1730
End Purge (hr): 1840
Total Purge Time (min): 70
Total Vol. Purged: 5.0

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 7/10/3									
Time: 1845	clear	5.84	0.16	24.37	28.7	3.42	68	13.33	270

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
Dissolved Methane	8XXX	HCL	3	40 ml	glass vials	
Total Lead	6000/7000	HNO_3	1	500 ml	HDPE	
SVOC		—	2	L	Amber	✓
Pest		—	1	L	Amber	✓
PCB		—	1	L	Amber	✓

ADDITIONAL INFORMATION

Comments:

Method:
[✓] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[✓] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[✓] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s):

Tetra Tech NUS
Groundwater Purging and Sampling Log

Date 7/10/3

Project Site Name:
Project No.: N4211

Sample Location: MW-13

[ ] Domestic Well Data

Flow-Thru Cell Make\Model: Horiba U-22

Sample ID No.: PAI-FOV-GW-13-01

[X] Monitoring Well Data

Serial Nos.: 9292036

Sampled By: JB

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	Initial	6.02	0.55	24.96	8.53	5.07	-4	15.71	260
1	0.041	0.155	1st	6.39	0.55	24.83	3.25	1.92	-80	15.84	260
2	0.163	0.617									
4	0.653	2.47									
6	1.469	5.56									
8	2.611	9.88									
10	4.08	15.44									
	[1 gal. = 3.785 L]										

PID Reading (ppm): Ø

Well Casing Diameter: 2"
Total Well Depth: 39.20
Static Water Level: 15.71
Tube Intake Depth: ~37.5'
Volume 3.8
Start Purge (hr): 1520
End Purge (hr): 1615
Total Purge Time (min): 55
Total Vol. Purged: 3.8 gal

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 7/10/3									
Time: 1620	Clear	6.39	0.55	24.83	3.25	1.92	-80	15.84	260

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
Dissolved Methane	8XXX	HCL	3	40 ml	glass vials	
Total Lead	6000/7000	HNO_3	1	500 ml	HDPE	
SVOC		—	2	L	Amber	✓
Pest		—	1	L	Amber	✓
PCB		—	1	L	Amber	✓

ADDITIONAL INFORMATION

Comments:

Method:
[✓] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[✓] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[✓] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s):

Tetra Tech NUS
Groundwater Purging and Sampling Log

Date 7/11/3

Project Site Name:
Project No.: N4211

Sample Location: MW-17

[ ] Domestic Well Data

Flow-Thru Cell Make\Model: Horiba U-22

Sample ID No.: PAI-FOU-GW-17-01

[X] Monitoring Well Data

Serial Nos.: 9292036

Sampled By: JB

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	Initial	5.82	0.27	32.63	21.3	6.11	217	4.05	600
1	0.041	0.155	1st	5.76	0.28	32.19	15.0	5.96	221	4.15	600
2	0.163	0.617									
4	0.653	2.47									
6	1.469	5.56									
8	2.611	9.88									
10	4.08	15.44									
	[1 gal. = 3.785 L]										

PID Reading (ppm): Ø

Well Casing Diameter: 2"
Total Well Depth: 13.67
Static Water Level: 3.69
Tube Intake Depth: ~12.5
Volume 1.6
Start Purge (hr): 1355
End Purge (hr): 1405
Total Purge Time (min): 10
Total Vol. Purged: 1.6

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 7/11/3									
Time: 1410	Clear	5.76	0.28	32.19	15.0	5.96	221	4.15	600

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
Dissolved Methane	8XXX	HCL	3	40 ml	glass vials	
Total Lead	6000/7000	HNO_3	1	500 ml	HDPE	
SVOC		—	2	L	Amber	✓
Pest		—	1	L	Amber	✓
PCB		—	1	L	Amber	✓

ADDITIONAL INFORMATION

Comments:

Method:
[✓] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[✓] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[✓] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s):

Tetra Tech NUS
Groundwater Purging and Sampling Log

Date 7/11/3

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Project Site Name:
Project No.: N4211

Sample Location: MW-18

[ ] Domestic Well Data

Flow-Thru Cell Horiba
Make\Model: U-22

Sample ID No.: PAI-FOV-GW-17-01

[X] Monitoring Well Data

Sampled By: JB

Serial Nos.: 9292036

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	Initial	5.61	0.77	26.76	24.6	5.67	108	4.09	230
1	0.041	0.155	15	5.65	0.79	26.33	1.9	4.52	62	4.15	230
2	0.163	0.617									
4	0.653	2.47									
6	1.469	5.56									
8	2.611	9.88									
10	4.08	15.44									
	[1 gal. = 3.785 L]										

PID Reading (ppm): Ø

Well Casing Diameter: 2"
Total Well Depth: 24.44
Static Water Level: 3.98
Tube Intake Depth: ~23'
Volume 3.3
Start Purge (hr): 1415
End Purge (hr): 1510
Total Purge Time (min): 55
Total Vol. Purged: 3.3

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 7/11/3									
Time: 1515	Clear	5.65	0.79	26.33	1.9	4.52	62	4.15	230

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
Dissolved Methane	8XXX	HCL	3	40 ml	glass vials	
Total Lead	6000/7000	HNO_3	1	500 ml	HDPE	
SVOC		—	2	L	Amber	✓
Pest		—	1	L	Amber	✓
PCB		—	1	L	Amber	✓

ADDITIONAL INFORMATION

Comments:

Method:
[✓] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[✓] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[✓] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s):

Tetra Tech NUS
Groundwater Purging and Sampling Log

Date 7/11/3

Page 1 of ___

Project Site Name:
Project No.: N4211

Sample Location: MW-19

[ ] Domestic Well Data

Flow-Thru Cell Make\Model: Horiba 4-22

Sample ID No.: PAI-FOV-GW-19-01

[X] Monitoring Well Data

Serial Nos.: 9292036

Sampled By: JB

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	Initial	5.05	0.23	29.84	114	9.86	190	2.20	600
1	0.041	0.155	1st	4.72	0.25	30.41	62.3	3.95	202	3.30	600
2	0.163	0.617	2nd	4.64	0.25	30.40	34.3	4.52	219	3.33	600
4	0.653	2.47									
6	1.469	5.56									
8	2.611	9.88									
10	4.08	15.44									
	[1 gal. = 3.785 L]										

PID Reading (ppm): Ø

Well Casing Diameter: 2"

Total Well Depth: 10.55

Static Water Level: 2.20

Tube Intake Depth: 9.0

Volume 1.6

Start Purge (hr): 1600

End Purge (hr): 1620

Total Purge Time (min): 20

Total Vol. Purged: 3.2

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 7/11/3									
Time: 1620	Clear	4.64	0.25	30.40	34.3	4.52	219	3.33	600

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
Dissolved Methane	8XXX	HCL	3	40 ml	glass vials	
Total Lead	6000/7000	HNO_3	1	500 ml	HDPE	
SVOC		—	2	L	Amber	✓
Pest		—	1	L	Amber	✓
PCB		—	1	L	Amber	✓

ADDITIONAL INFORMATION

Comments:

Method:
- [✓] Peristaltic Pump
- [ ] Centrifugal Pump
- [ ] Bladder Pump
- [✓] Tube Evacuation
- [ ] Vacuum Jug Assembly
- [ ] Bailer

Tubing Type:
- [ ] Polyethylene
- [✓] Teflon
- [ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s):

Tetra Tech NUS
Groundwater Purging and Sampling Log

Date 7/11/3

Project Site Name:
Project No.: N4211

Sample Location: MW-20

[ ] Domestic Well Data

Flow-Thru Cell Make\Model: Horiba U-22

Sample ID No.: PAI-FOV-GW-20-01

[X] Monitoring Well Data

Serial Nos.: 9292056

Sampled By: JB

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	Initial	5.04	0.51	23.18	24.7	5.61	~~5.64~~	5.85	200
1	0.041	0.155	1st	4.33	0.47	23.15	6.5	2.23	~~2.23~~	6.85	200
2	0.163	0.617							297		
4	0.653	2.47									
6	1.469	5.56									
8	2.611	9.88									
10	4.08	15.44									
	[1 gal. = 3.785 L]										

PID Reading (ppm): Ø

Well Casing Diameter: 2"
Total Well Depth: 17.63
Static Water Level: 5.85
Tube Intake Depth: ~16.5'
Volume 1.9
Start Purge (hr): 0835
End Purge (hr): 0910
Total Purge Time (min): 35
Total Vol. Purged: 1.9

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 7/11/3									
Time: 0910	Clear	4.33	0.47	23.15	6.5	2.23	297	6.85	200

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
Dissolved Methane	8XXX	HCL	3	40 ml	glass vials	
Total Lead	6000/7000	HNO_3	1	500 ml	HDPE	
SVOC		—	2	L	Amber	✓
Pest		—	1	L	Amber	✓
PCB		—	1	L	Amber	✓

ADDITIONAL INFORMATION

Comments:

Method:
[✓] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[✓] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[✓] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s):

Tetra Tech NUS
Groundwater Purging and Sampling Log

Date 7/10/3

Page 1 of ___

Project Site Name:
Project No.: N4211

Sample Location: MW-21

[ ] Domestic Well Data

Flow-Thru Cell Horiba
Make\Model: U-22

Sample ID No.: PAI-FOV-GW-~~15~~-01 21

[X] Monitoring Well Data

Sampled By: JB

Serial Nos.: 9292036

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	Initial	4.38	0.62	25.36	37.5	3.53	179	6.42	220
1	0.041	0.155	1st	4.15	0.61	24.14	16.0	1.05	165	6.55	"
2	0.163	0.617	2nd	4.23	0.61	23.76	~~41.0~~	1.02	151	6.68	"
4	0.653	2.47					6.65				
6	1.469	5.56									
8	2.611	9.88									
10	4.08	15.44									
	[1 gal. = 3.785 L]										

PID Reading (ppm): Ø

Well Casing Diameter: 2"
Total Well Depth: 15.17
Static Water Level: 6.19
Tube Intake Depth: ~13.5'
Volume 1.4
Start Purge (hr): 1355
End Purge (hr): 1445
Total Purge Time (min): 50
Total Vol. Purged: 2.8

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 7/10/3									
Time: 1450	Clear	4.23	0.61	23.76	6.65	1.02	151	6.68	220

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
Dissolved Methane	8XXX	HCL	3	40 ml	glass vials	
Total Lead	6000/7000	HNO_3	1	500 ml	HDPE	
SVOC		—	2	L	Amber	✓
Pest		—	1	L	Amber	✓
PCB		—	1	L	Amber	✓

ADDITIONAL INFORMATION

Comments:

Method:
[✓] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[ ] Tube Evacuation
[✓] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[✓] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s):

APPENDIX B

ANALYTICAL DATA – PREVIOUS INVESTIGATIONS

B-1 1988 REMEDIAL INVESTIGATION VERIFICATION STEP – SITE 16

B-2 1995 RELATIVE SITE RANKING - SITES 9 AND 27

B-3 1999 SITE INSPECTION/CONFIRMATORY SAMPLING – SITES 9 AND 27

B-4 2002 SOIL AND GROUNDWATER FIELD SCREENING – SITE 55

B-5 2003 GROUNDWATER INVESTIGATION – SITE 55

B-1

1988 REMEDIAL INVESTIGATION VERIFICATION STEP

SITE 16

SUBSURFACE SOIL ANALYTICAL RESULTS - SITE 16 - PESTICIDE RINSATE DISPOSAL AREA
1988 REMEDIAL INVESTIGATION VERIFICATION STEP
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER	PAI16-SB1-3	PAI16-SB2-3	PAI16-SB2-3D	PAI16-SB3-3
SAMPLE LOCATION	PAI16-SB1	PAI16-SB2	PAI16-SB2	PAI16-SB3
SAMPLE DATE	02/24/88	02/24/88	02/24/88	02/24/88
SAMPLE DEPTH (FT)	3	3	3	3
PESTICIDES (UG/KG)				
ALDRIN	330 U	330 U	330 U	330 U
ALPHA-BHC	330 U	330 U	330 U	330 U
BETA-BHC	330 U	330 U	330 U	330 U
DELTA-BHC	330 U	330 U	330 U	330 U
GAMMA-BHC (LINDANE)	330 U	330 U	330 U	330 U
CHLORDANE	330 U	330 U	330 U	330 U
4,4'-DDD	486	330 U	330 U	330 U
4,4'-DDE	421	330 U	330 U	330 U
4,4'-DDT	1380	330 U	330 U	330 U
DIELDRIN	330 U	330 U	330 U	330 U
ENDOSULFAN I	330 U	330 U	330 U	330 U
ENDOSULFAN II	330 U	330 U	330 U	330 U
ENDOSULFAN SULFATE	330 U	330 U	330 U	330 U
ENDRIN	330 U	330 U	330 U	330 U
ENDRIN ALDEHYDE	330 U	330 U	330 U	330 U
HEPTACHLOR	330 U	330 U	330 U	330 U
HEPTACHLOR EPOXIDE	330 U	330 U	330 U	330 U
TOXAPHEHE	330 U	330 U	330 U	330 U
INORGANICS (MG/KG)				
ARSENIC	0.8	0.148	0.235	0.005 U
CADMIUM	0.2 U	0.2 U	0.2 U	0.2 U
CHROMIUM	1.88	2.19	1.86	2.41
LEAD	8.4	1.57	1.84	2.22

B-2

1995 RELATIVE SITE RANKING

SITE 9

SITE 27

TABLE B-2.1

SURFACE SOIL ANALYTICAL RESULTS
SITE 9 - FORMER PAINT WASTE STORAGE AREA
1995 RELATIVE SITE RANKING
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER	PI-009-01(32)	PI-009-02(33)	PI-009-03(34)
SAMPLE LOCATION	PI-009-01	PI-009-02	PI-009-03
SAMPLE DATE	12/12/95	12/12/95	12/12/95
SAMPLE DEPTH (FT)	0.5	0.5	0.5
VOLATILE (UG/KG)			
1,1,1-TRICHLOROETHANE	10 U	11 U	10 U
1,1,2,2-TETRACHLOROETHANE	10 U	11 U	10 U
1,1,2-TRICHLOROETHANE	10 U	11 U	10 U
1,1-DICHLOROETHANE	10 U	11 U	10 U
1,1-DICHLOROETHENE	10 U	11 U	10 U
1,2-DICHLOROETHANE	10 U	11 U	10 U
1,2-DICHLOROETHENE (TOTAL)	10 U	11 U	10 U
1,2-DICHLOROPROPANE	10 U	11 U	10 U
2-BUTANONE	10 U	11 U	10 U
2-HEXANONE	10 U	11 U	10 U
4-METHYL-2-PENTANONE	10 U	11 U	10 U
ACETONE	10 U	11 U	10 U
BENZENE	10 U	11 U	10 U
BROMODICHLOROMETHANE	10 U	11 U	10 U
BROMOFORM	10 U	11 U	10 U
BROMOMETHANE	10 U	11 U	10 U
CARBON DISULFIDE	10 U	11 U	10 U
CARBON TETRACHLORIDE	10 U	6 J	10 U
CHLOROBENZENE	10 U	11 U	10 U
CHLOROETHANE	10 U	11 U	10 U
CHLOROFORM	10 U	11	10 U
CHLOROMETHANE	10 U	11 U	10 U
CIS-1,3-DICHLOROPROPENE	10 U	11 U	10 U
DIBROMOCHLOROMETHANE	10 U	11 U	10 U
ETHYLBENZENE	10 U	11 U	10 U
METHYLENE CHLORIDE	10 U	11 U	10 U
STYRENE	10 U	11 U	10 U
TETRACHLOROETHENE	10 U	2 J	2 J
TOLUENE	10 U	11 U	10 U
TRANS-1,3-DICHLOROPROPENE	10 U	11 U	10 U
TRICHLOROETHENE	10 U	11 U	10 U
VINYL CHLORIDE	10 U	11 U	10 U
XYLENES, TOTAL	10 U	11 U	10 U
SEMIVOLATILE (UG/KG)			
1,2,4-TRICHLOROBENZENE	350 U	360 U	350 U
1,2-DICHLOROBENZENE	350 U	360 U	350 U
1,3-DICHLOROBENZENE	350 U	360 U	350 U
1,4-DICHLOROBENZENE	350 U	360 U	350 U
2,2'-OXYBIS(1-CHLOROPROPANE)	350 U	360 U	350 U
2,4,5-TRICHLOROPHENOL	870 U	910 U	880 U
2,4,6-TRICHLOROPHENOL	350 U	360 U	350 U
2,4-DICHLOROPHENOL	350 U	360 U	350 U
2,4-DIMETHYLPHENOL	350 U	360 U	350 U
2,4-DINITROPHENOL	870 U	910 U	880 U
2,4-DINITROTOLUENE	350 U	360 U	350 U
2,6-DINITROTOLUENE	350 U	360 U	350 U
2-CHLORONAPHTHALENE	350 U	360 U	350 U
2-CHLOROPHENOL	350 U	360 U	350 U
2-METHYLNAPHTHALENE	350 U	360 U	350 U
2-METHYLPHENOL	350 U	360 U	350 U
2-NITROANILINE	870 U	910 U	880 U
2-NITROPHENOL	350 U	360 U	350 U
3,3'-DICHLOROBENZIDINE	350 U	360 U	350 U

TABLE B-2.1

SURFACE SOIL ANALYTICAL RESULTS
SITE 9 - FORMER PAINT WASTE STORAGE AREA
1995 RELATIVE SITE RANKING
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER	PI-009-01(32)	PI-009-02(33)	PI-009-03(34)
SAMPLE LOCATION	PI-009-01	PI-009-02	PI-009-03
SAMPLE DATE	12/12/95	12/12/95	12/12/95
SAMPLE DEPTH (FT)	0.5	0.5	0.5
3-NITROANILINE	870 UR	910 U	880 UR
SEMIVOLATILE (UG/KG)			
4,6-DINITRO-2-METHYLPHENOL	870 U	910 U	880 U
4-BROMOPHENYLPHENYLETHER	350 U	360 U	350 U
4-CHLORO-3-METHYLPHENOL	350 U	360 U	350 U
4-CHLOROANILINE	350 UJ	360 U	350 UJ
4-CHLOROPHENYLPHENYLETHER	350 U	360 U	350 U
4-METHYLPHENOL	350 U	360 U	350 U
4-NITROANILINE	870 U	910 U	880 U
4-NITROPHENOL	870 U	910 U	880 U
ACENAPHTHENE	350 U	360 U	350 U
ACENAPHTHYLENE	350 U	360 U	350 U
ANTHRACENE	350 U	360 U	350 U
BENZO(A)ANTHRACENE	350 U	310 J	44 J
BENZO(A)PYRENE	350 U	580	38 J
BENZO(B)FLUORANTHENE	350 U	610	52 J
BENZO(G,H,I)PERYLENE	350 U	380	350 U
BENZO(K)FLUORANTHENE	350 U	560	40 J
BIS(2-CHLOROETHOXY)METHANE	350 U	360 U	350 U
BIS(2-CHLOROETHYL)ETHER	350 U	360 U	350 U
BIS(2-ETHYLHEXYL)PHTHALATE	350 U	360 U	350 U
BUTYLBENZYLPHTHALATE	350 U	360 U	350 U
CARBAZOLE	350 U	360 U	34 J
CHRYSENE	350 U	420	56 J
DI-N-BUTYLPHTHALATE	350 U	360 U	350 U
DI-N-OCTYLPHTHALATE	350 U	360 U	350 U
DIBENZO(A,H)ANTHRACENE	350 U	360 U	350 U
DIBENZOFURAN	350 U	360 U	350 U
DIETHYLPHTHALATE	350 U	360 U	350 U
DIMETHYLPHTHALATE	350 U	360 U	350 U
FLUORANTHENE	350 U	300 J	100 J
FLUORENE	350 U	360 U	350 U
HEXACHLOROBENZENE	350 U	360 U	350 U
HEXACHLOROBUTADIENE	350 U	360 U	350 U
HEXACHLOROCYCLOPENTADIENE	350 U	360 U	350 U
HEXACHLOROETHANE	350 U	360 U	350 U
INDENO(1,2,3-CD)PYRENE	350 U	470	350 U
ISOPHORONE	350 U	360 U	350 U
N-NITROSO-DI-N-PROPYLAMINE	350 U	360 U	350 U
N-NITROSODIPHENYLAMINE	350 U	360 U	350 U
NAPHTHALENE	350 U	360 U	350 U
NITROBENZENE	350 U	360 U	350 U
PENTACHLOROPHENOL	23 J	910 U	880 U
PHENANTHRENE	350 U	39 J	53 J
PHENOL	350 U	360 U	350 U
PYRENE	350 U	460	64 J
PESTICIDE/PCB (UG/KG)			
4,4'-DDD	35 U	97 U	110 U
4,4'-DDE	56	210	2300
4,4'-DDT	180	680	4200
ALDRIN	18 U	9.3 U	36 U
ALPHA-BHC	18 U	9.3 U	36 U
ALPHA-CHLORDANE	42 U	300	62 U
AROCLOR-1016	350 U	180 U	700 U
AROCLOR-1221	700 U	370 U	1400 U
AROCLOR-1232	350 U	180 U	700 U
AROCLOR-1242	350 U	180 U	700 U
AROCLOR-1248	350 U	180 U	700 U
AROCLOR-1254	350 U	180 U	700 U

TABLE B-2.1

SURFACE SOIL ANALYTICAL RESULTS
SITE 9 - FORMER PAINT WASTE STORAGE AREA
1995 RELATIVE SITE RANKING
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER	PI-009-01(32)	PI-009-02(33)	PI-009-03(34)
SAMPLE LOCATION	PI-009-01	PI-009-02	PI-009-03
SAMPLE DATE	12/12/95	12/12/95	12/12/95
SAMPLE DEPTH (FT)	0.5	0.5	0.5
AROCLOR-1260	350 U	810 J	700 U
PESTICIDE/PCB (UG/KG)			
BETA-BHC	18 U	9.3 U	36 U
DELTA-BHC	18 U	9.3 U	36 U
DIELDRIN	35 U	18 U	70 U
ENDOSULFAN I	18 U	11 R	36 U
ENDOSULFAN II	35 U	35 U	70 U
ENDOSULFAN SULFATE	35 U	35 U	70 U
ENDRIN	35 U	20 U	70 U
ENDRIN ALDEHYDE	35 U	18 U	70 U
ENDRIN KETONE	35 U	25 U	70 U
GAMMA-BHC (LINDANE)	18 U	9.3 U	36 U
GAMMA-CHLORDANE	49	430	74
HEPTACHLOR	18 U	9.3 U	36 U
HEPTACHLOR EPOXIDE	18 U	9.3 U	36 U
METHOXYCHLOR	180 U	93 U	360 U
TOXAPHENE	1800 U	930 U	3600 U
INORGANIC (MG/KG)			
ALUMINUM	4680	5380	1620
ANTIMONY	0.36 U	4.7	0.47 U
ARSENIC	0.92	8.4	7.3
BARIUM	20.4	104	15
BERYLLIUM	0.21 U	3.7	0.19 U
CADMIUM	0.17 U	3.1	0.3 U
CALCIUM	1140	5030	366
CHROMIUM	4	105	4.5
COBALT	0.99	23.5	0.58
COPPER	9.8	615	7.2
CYANIDE	0.51 U	0.54 U	0.5 U
IRON	3240	16700	1460
LEAD	12.7 U	826	51
MAGNESIUM	489	871	105
MANGANESE	73.4	178	19.6
MERCURY	0.05 U	0.4	0.05 U
NICKEL	2.3	253	4
POTASSIUM	662	541	71.3
SELENIUM	0.32 U	0.91	0.41 U
SILVER	0.1 U	0.56	0.13 U
SODIUM	185	715	56.1
THALLIUM	0.33 U	0.41 U	0.43 U
VANADIUM	5.1	12.9	3.2
ZINC	72.3	3490	357

TABLE B-2.2

SURFACE SOIL ANALYTICAL RESULTS
SITE 27 - EQUIPMENT PARADE DECK
1995 RELATIVE SITE RANKING
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER	PI-027-01(46)	PI-027-02(47)	PI-027-02(47)-D
SAMPLE LOCATION	PI-027-01	PI-027-02	PI-027-02
SAMPLE DATE	12/13/1995	12/13/1995	12/13/1995
SAMPLE DEPTH (FT)	0.5	0.5	0.5
VOLATILE (UG/KG)			
1,1,1-TRICHLOROETHANE	11 U	11 U	12 U
1,1,2,2-TETRACHLOROETHANE	11 U	11 U	12 U
1,1,2-TRICHLOROETHANE	11 U	11 U	12 U
1,1-DICHLOROETHANE	11 U	11 U	12 U
1,1-DICHLOROETHENE	11 U	11 U	12 U
1,2-DICHLOROETHANE	11 U	11 U	12 U
1,2-DICHLOROETHENE (TOTAL)	11 U	11 U	12 U
1,2-DICHLOROPROPANE	11 U	11 U	12 U
2-BUTANONE	11 U	11 U	12 U
2-HEXANONE	11 U	11 U	12 U
4-METHYL-2-PENTANONE	11 U	11 U	12 U
ACETONE	11 U	11 U	12 U
BENZENE	11 U	11 U	12 U
BROMODICHLOROMETHANE	11 U	11 U	12 U
BROMOFORM	11 U	11 U	12 U
BROMOMETHANE	11 U	11 U	12 U
CARBON DISULFIDE	11 U	11 U	12 U
CARBON TETRACHLORIDE	11 U	11 U	3 J
CHLOROBENZENE	11 U	11 U	12 U
CHLOROETHANE	11 U	11 U	12 U
CHLOROFORM	11 U	5 J	8 J
CHLOROMETHANE	11 U	11 U	12 U
CIS-1,3-DICHLOROPROPENE	11 U	11 U	12 U
DIBROMOCHLOROMETHANE	11 U	11 U	12 U
ETHYLBENZENE	11 U	11 U	12 U
METHYLENE CHLORIDE	11 U	11 U	12 U
STYRENE	11 U	11 U	12 U
TETRACHLOROETHENE	11 U	11 U	2 J
TOLUENE	11 U	11 U	12 U
TRANS-1,3-DICHLOROPROPENE	11 U	11 U	12 U
TRICHLOROETHENE	11 U	11 U	12 U
VINYL CHLORIDE	11 U	11 U	12 U
XYLENES, TOTAL	11 U	11 U	12 U
SEMIVOLATILE (UG/KG)			
1,2,4-TRICHLOROBENZENE	370 U	380 U	4800 U
1,2-DICHLOROBENZENE	370 U	380 U	4800 U
1,3-DICHLOROBENZENE	370 U	380 U	4800 U
1,4-DICHLOROBENZENE	370 U	380 U	4800 U
2,2'-OXYBIS(1-CHLOROPROPANE)	370 U	380 U	4800 U
2,4,5-TRICHLOROPHENOL	930 U	940 U	12000 U
2,4,6-TRICHLOROPHENOL	370 U	380 U	4800 U
2,4-DICHLOROPHENOL	370 U	380 U	4800 U
2,4-DIMETHYLPHENOL	370 U	380 U	4800 U
2,4-DINITROPHENOL	930 U	940 U	12000 U
2,4-DINITROTOLUENE	370 U	380 U	4800 U
2,6-DINITROTOLUENE	370 U	380 U	4800 U
2-CHLORONAPHTHALENE	370 U	380 U	4800 U
2-CHLOROPHENOL	370 U	380 U	4800 U
2-METHYLNAPHTHALENE	370 U	380 U	4800 U
2-METHYLPHENOL	370 U	380 U	4800 U
2-NITROANILINE	930 U	940 U	12000 U
2-NITROPHENOL	370 U	380 U	4800 U
3,3'-DICHLOROBENZIDINE	370 U	380 U	4800 U
3-NITROANILINE	930 U	940 U	12000 U

TABLE B-2.2

SURFACE SOIL ANALYTICAL RESULTS
SITE 27 - EQUIPMENT PARADE DECK
1995 RELATIVE SITE RANKING
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER	PI-027-01(46)	PI-027-02(47)	PI-027-02(47)-D
SAMPLE LOCATION	PI-027-01	PI-027-02	PI-027-02
SAMPLE DATE	12/13/1995	12/13/1995	12/13/1995
SAMPLE DEPTH (FT)	0.5	0.5	0.5
SEMIVOLATILE (UG/KG)			
4,6-DINITRO-2-METHYLPHENOL	930 U	940 U	12000 U
4-BROMOPHENYLPHENYLETHER	370 U	380 U	4800 U
4-CHLORO-3-METHYLPHENOL	370 U	380 U	4800 U
4-CHLOROANILINE	370 U	380 U	4800 U
4-CHLOROPHENYLPHENYLETHER	370 U	380 U	4800 U
4-METHYLPHENOL	370 U	380 U	4800 U
4-NITROANILINE	930 U	940 U	12000 U
4-NITROPHENOL	930 U	940 U	12000 U
ACENAPHTHENE	370 U	380 U	4800 U
ACENAPHTHYLENE	370 U	380 U	4800 U
ANTHRACENE	370 U	380 U	4800 U
BENZO(A)ANTHRACENE	140 J	110 J	4800 U
BENZO(A)PYRENE	160 J	140 J	4800 U
BENZO(B)FLUORANTHENE	370	250 J	4800 U
BENZO(G,H,I)PERYLENE	36 J	42 J	4800 U
BENZO(K)FLUORANTHENE	370 U	380 U	4800 U
BIS(2-CHLOROETHOXY)METHANE	370 U	380 U	4800 U
BIS(2-CHLOROETHYL)ETHER	370 U	380 U	4800 U
BIS(2-ETHYLHEXYL)PHTHALATE	370 U	380 U	21000
BUTYLBENZYLPHTHALATE	370 U	380 U	4800 U
CARBAZOLE	29 J	380 U	4800 U
CHRYSENE	210 J	150 J	4800 U
DI-N-BUTYLPHTHALATE	370 U	380 U	4800 U
DI-N-OCTYLPHTHALATE	370 U	380 U	4800 U
DIBENZO(A,H)ANTHRACENE	36 J	39 J	4800 U
DIBENZOFURAN	370 U	380 U	4800 U
DIETHYLPHTHALATE	370 U	380 U	4800 U
DIMETHYLPHTHALATE	370 U	380 U	4800 U
FLUORANTHENE	270 J	190 J	4800 U
FLUORENE	370 U	380 U	4800 U
HEXACHLOROBENZENE	370 U	380 U	4800 U
HEXACHLOROBUTADIENE	370 U	380 U	4800 U
HEXACHLOROCYCLOPENTADIENE	370 U	380 U	4800 U
HEXACHLOROETHANE	370 U	380 U	4800 U
INDENO(1,2,3-CD)PYRENE	74 J	96 J	4800 U
ISOPHORONE	370 U	380 U	4800 U
N-NITROSO-DI-N-PROPYLAMINE	370 U	380 U	4800 U
N-NITROSODIPHENYLAMINE	370 U	380 U	4800 U
NAPHTHALENE	370 U	380 U	4800 U
NITROBENZENE	370 U	380 U	4800 U
PENTACHLOROPHENOL	930 U	940 U	12000 U
PHENANTHRENE	200 J	74 J	4800 U
PHENOL	370 U	380 U	4800 U
PYRENE	320 J	170 J	4800 U
PESTICIDE/PCB (UG/KG)			
4,4'-DDD	130	3.8 U	3.9 J
4,4'-DDE	37 U	32	39
4,4'-DDT	37 U	46	60
ALDRIN	19 U	2 U	4 U
ALPHA-BHC	19 U	2 U	4 U
ALPHA-CHLORDANE	19 U	2.7 U	3.6 R
AROCLOR-1016	370 U	38 U	77 U
AROCLOR-1221	750 U	77 U	160 U
AROCLOR-1232	370 U	38 U	77 U
AROCLOR-1242	370 U	38 U	77 U
AROCLOR-1248	370 U	38 U	77 U
AROCLOR-1254	370 U	38 U	77 U
AROCLOR-1260	370 U	38 U	77 U

TABLE B-2.2

SURFACE SOIL ANALYTICAL RESULTS
SITE 27 - EQUIPMENT PARADE DECK
1995 RELATIVE SITE RANKING
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER	PI-027-01(46)	PI-027-02(47)	PI-027-02(47)-D
SAMPLE LOCATION	PI-027-01	PI-027-02	PI-027-02
SAMPLE DATE	12/13/1995	12/13/1995	12/13/1995
SAMPLE DEPTH (FT)	0.5	0.5	0.5
PESTICIDE/PCB (UG/KG)			
DELTA-BHC	19 U	2 U	4 U
DIELDRIN	37 U	3.8 U	7.7 U
ENDOSULFAN I	19 U	3.3 U	2 J
ENDOSULFAN II	37 U	3.8 U	7.7 U
ENDOSULFAN SULFATE	37 U	3.8 U	7.7 U
ENDRIN	37 U	3.8 U	7.7 U
ENDRIN ALDEHYDE	37 U	3.8 U	7.7 U
ENDRIN KETONE	37 U	3.8 U	7.7 U
GAMMA-BHC (LINDANE)	19 U	2 U	4 U
GAMMA-CHLORDANE	19 U	2.7 U	3.6 J
HEPTACHLOR	19 U	2 U	4 U
HEPTACHLOR EPOXIDE	19 U	2 U	4 U
METHOXYCHLOR	190 U	20 U	40 U
TOXAPHENE	1900 U	200 U	400 U
INORGANIC (MG/KG)			
ALUMINUM	2780	3680	3750
ANTIMONY	0.53 U	0.59	0.53 U
ARSENIC	1.4	4	4.2
BARIUM	13.8	32	31
BERYLLIUM	0.11 U	0.2 U	0.25 U
CADMIUM	0.1	0.27	0.31 U
CALCIUM	603	659	693
CHROMIUM	4.7	6.6	5.6
COBALT	0.58	1.2	1.2
COPPER	2.8	13.4	14
CYANIDE	0.44 U	0.58 U	0.49 U
IRON	3810	3580	3510
LEAD	14.9	64.5	57.7
MAGNESIUM	311	540	511
MANGANESE	22.6	60.6	60.2
MERCURY	0.05 U	0.04 U	0.04 U
NICKEL	1.3	2.4	2.7
POTASSIUM	284	483	430
SELENIUM	0.47 U	0.55	0.58
SILVER	0.15 U	0.39	0.38
SODIUM	39.6 U	37 U	39.5 U
THALLIUM	0.49 U	0.46 U	0.49 U
VANADIUM	10.4	11.5	11.4
ZINC	19.5	131	143

B-3

1999 SITE INSPECTION/CONFIRMATORY SAMPLING

SITE 9

SITE 27

TABLE B-3.1

GROUNDWATER ANALYTICAL RESULTS
SITE 9 - FORMER PAINT WASTE STORAGE AREA
1999 SITE INSPECTION/CONFIRMATORY SAMPLING
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER SAMPLE LOCATION SAMPLE DATE	PAI-09-GW-01-01 PAI-09-GW-01 12/14/99	PAI-09-GW-02-01 PAI-09-GW-02 12/14/99
VOLATILE (UG/L)		
1,1,1,2-TETRACHLOROETHANE	0.5 U	
1,1,1-TRICHLOROETHANE	0.5 U	0.5 U
1,1,2,2-TETRACHLOROETHANE	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	0.5 U	0.5 U
1,1-DICHLOROETHANE	0.5 U	0.5 U
1,1-DICHLOROETHENE	0.5 U	0.5 U
1,2,3-TRICHLOROPROPANE	0.5 U	
1,2-DIBROMO-3-CHLOROPROPANE	0.5 U	
1,2-DIBROMOETHANE	0.5 U	0.5 U
1,2-DICHLOROETHANE	0.5 U	0.5 U
1,2-DICHLOROETHENE (TOTAL)	0.5 U	0.5 U
1,2-DICHLOROPROPANE	0.5 U	0.5 U
2-BUTANONE	2 UR	2 UR
2-CHLORO-1,3-BUTADIENE	0.5 UJ	
2-HEXANONE	2 UR	2 U
3-CHLOROPROPENE	2 U	
4-METHYL-2-PENTANONE	2 UR	2 U
ACETONE	2 UR	2 UR
ACETONITRILE	40 UR	
ACROLEIN	160 UR	
ACRYLONITRILE	40 UR	
BENZENE	0.5 U	0.5 U
BROMODICHLOROMETHANE	0.5 U	0.5 U
BROMOFORM	0.5 U	0.5 U
BROMOMETHANE	0.5 U	0.5 U
CARBON DISULFIDE	2 UJ	2 U
CARBON TETRACHLORIDE	0.5 U	0.5 U
CHLOROBENZENE	0.5 U	0.5 U
CHLOROETHANE	0.5 U	0.5 U
CHLOROFORM	0.5 U	0.5 U
CHLOROMETHANE	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	0.5 U	
CIS-1,3-DICHLOROPROPENE	0.5 U	0.5 U
DIBROMOCHLOROMETHANE	0.5 U	0.5 U
DIBROMOMETHANE	0.5 U	
DICHLORODIFLUOROMETHANE	0.5 U	
ETHYL METHACRYLATE	2 U	
ETHYLBENZENE	0.5 U	0.5 U
IODOMETHANE	2 U	
ISOBUTANOL	100 UR	
METHACRYLONITRILE	2 UR	
METHYL METHACRYLATE	2 U	
METHYLENE CHLORIDE	0.5 U	0.5 U

TABLE B-3.1

GROUNDWATER ANALYTICAL RESULTS
SITE 9 - FORMER PAINT WASTE STORAGE AREA
1999 SITE INSPECTION/CONFIRMATORY SAMPLING
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER SAMPLE LOCATION SAMPLE DATE	PAI-09-GW-01-01 PAI-09-GW-01 12/14/99	PAI-09-GW-02-01 PAI-09-GW-02 12/14/99
VOLATILE (UG/L)		
PENTACHLOROETHANE	2 U	
PROPIONITRILE	40 UR	
STYRENE	0.5 U	0.5 U
TETRACHLOROETHENE	0.5 U	0.5 U
TOLUENE	0.5 U	0.5 U
TRANS-1,2-DICHLOROETHENE	0.5 U	
TRANS-1,3-DICHLOROPROPENE	0.5 U	0.5 U
TRANS-1,4-DICHLORO-2-BUTENE	2 UR	
TRICHLOROETHENE	0.5 U	0.5 U
TRICHLOROFLUOROMETHANE	0.5 UJ	
VINYL ACETATE	2 UR	
VINYL CHLORIDE	0.5 U	0.5 U
XYLENES, TOTAL	0.5 U	0.5 U
INORGANIC (UG/L)		
ALUMINUM	369 J	661 U
ANTIMONY	4.5 U	5.9
ARSENIC	3.9 U	3.9 U
BARIUM	23.7	10.9 U
BERYLLIUM	0.7 U	0.7 U
CADMIUM	0.4 U	0.4 U
CALCIUM	42500	32100
CHROMIUM	0.7	1 U
COBALT	0.9 U	0.9 U
COPPER	2 U	2.1 U
CYANIDE	10 U	10 U
IRON	206 U	338 U
LEAD	2.2 U	2.2 U
MAGNESIUM	1560	1330
MANGANESE	2.2 U	7.4 U
MERCURY	0.1 U	0.1 U
NICKEL	1.4 U	1.4 U
POTASSIUM	1610	4040
SELENIUM	3.6 U	3.6 U
SILVER	0.8 U	0.8 U
SODIUM	2370 U	4540
THALLIUM	4.5 U	4.5 U
TIN	3.4 U	
VANADIUM	1 U	4.1 U
ZINC	6 U	6.7 U

TABLE B-3.2

SOIL ANALYTICAL RESULTS
SITE 27 - EQUIPMENT PARADE DECK
1999 SITE INSPECTION/CONFIRMATORY SAMPLING
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER	PAI-27-SS-03-01	PAI-27-SS-04-01	PAI-27-SS-05-01
SAMPLE LOCATION	PAI-27-SS-03	PAI-27-SS-04	PAI-27-SS-05
SAMPLE DATE	12/16/99	12/16/99	12/16/99
SAMPLE DEPTH (FT)	0 - 1	0 - 1	0.67 - 1.67
PCBs (UG/KG)			
AROCLOR-1016	9.6 U	9.6 U	9.7 U
AROCLOR-1221	9.6 U	9.6 U	9.7 U
AROCLOR-1232	9.6 U	9.6 U	9.7 U
AROCLOR-1242	9.6 U	9.6 U	9.7 U
AROCLOR-1248	9.6 U	9.6 U	9.7 U
AROCLOR-1254	9.6 U	9.6 U	9.7 U
AROCLOR-1260	9.6 U	9.6 U	9.7 U

B-4

2002 SOIL AND GROUNDWATER FIELD SCREENING

SITE 55

TABLE B-4.1

SOIL ANALYTICAL RESULTS
SITE 55 - FIBER OPTIC VAULT
2002 FIELD SCREENING
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER	FOVSFB-0106	FOVSFB-0204	FOVSFB-0206	FOVSFB-0305	FOVSFB-0406	FOVSFB-0505	FOVSFB-0605	FOVSFB-0803	FOVSFB-1005	FOVSFB-1105
SAMPLE LOCATION	PAI-55-FDP01	PAI-55-FDP02	PAI-55-FDP02	PAI-55-FDP03	PAI-55-FDP04	PAI-55-FDP05	PAI-55-FDP06	PAI-55-FDP08	PAI-55-FDP10	PAI-55-FDP11
SAMPLE DATE	07/23/02	07/23/02	07/23/02	07/23/02	07/23/02	07/23/02	07/23/02	07/23/02	07/23/02	07/23/02
SAMPLE DEPTH (FT)	3	3	3	3	3	3	3	3	3	3
Volatile Organics (ug/kg)										
BENZENE	5 U	5 U	5 U	5 U	50 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	5 U	5 U	5 U	5 U	30 J	5 U	5 U	5 U	5 U	5 U
ETHYLBENZENE	5 U	5 U	5 U	5 U	50 U	5 U	5 U	5 U	5 U	5 U
M+P-XYLENES	10 U	10 U	10 U	10 U	100 U	10 U	10 U	10 U	10 U	10 U
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	50 U	5 U	5 U	5 U	5 U	5 U
O-XYLENE	5 U	5 U	5 U	5 U	50 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	5 U	5 U	5 U	5 U	50 U	5 U	5 U	5 U	5 U	5 U
NAPHTHALENE	5 U	5 U	18	3 J	180	5 U	5 U	5 U	5 U	5 U

SAMPLE NUMBER	FOVSFB-1204	FOVSFB-1305	FOVSFB-1405	FOVSFB-1505	FOVSFB-1605	FOVSFB-1704	FOVSFB-1804	FOVSFB-1904	FOVSFB-2104
SAMPLE LOCATION	PAI-55-FDP12	PAI-55-FDP13/FDP20	PAI-55-FDP14	PAI-55-FDP15	PAI-55-FDP16	PAI-55-FDP17	PAI-55-FDP18	PAI-55-FDP19	PAI-55-FDP21
SAMPLE DATE	07/23/02	07/23/02	07/23/02	07/23/02	07/23/02	07/23/02	07/23/02	07/23/02	07/23/02
SAMPLE DEPTH (FT)	3	3	3	3	3	3	3	3	3
Volatile Organics (ug/kg)									
BENZENE	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
ETHYLBENZENE	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
METHYL TERT-BUTYL ETHER	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
TOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
NAPHTHALENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

TABLE B-4.2

GROUNDWATER ANALYTICAL RESULTS
SITE 55 - FIBER OPTIC VAULT
2002 FIELD SCREENING
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER	FOVGFB-0110	FOVGFB-0210	FOVGFB-0311	FOVGFB-0412	FOVGFB-0509	FOVGFB-0612	FOVGFB-0710	FOVGFB-0808	FOVGFB-0911	FOVGFB-1010	FOVGFB-1109	FOVGFB-1210
SAMPLE LOCATION	PAI-55-FDP01	PAI-55-FDP02	PAI-55-FDP03	PAI-55-FDP04	PAI-55-FDP05	PAI-55-FDP06	PAI-55-FDP07	PAI-55-FDP08	PAI-55-FDP09	PAI-55-FDP10	PAI-55-FDP11	PAI-55-FDP12
SAMPLE DATE	07/01/02	07/01/02	07/01/02	07/01/02	07/01/02	07/01/02	07/01/02	07/01/02	07/01/02	07/01/02	07/01/02	07/01/02
Volatile Organics (ug/L)												
BENZENE	5 U	79	3 J	280 D	190	5 U	7 U	5 U	5 U	16	5 U	350 J
CHLOROBENZENE	61	2500 D	5 U	3490 D	2830 D	5 U	590 D	5 U	5 U	250 D	24	3400
ETHYLBENZENE	5 U	96	5 U	190 D	80	5 U	3 J	5 U	5 U	14	5 U	560
M+P-XYLENES	10 U	35	10 U	290 D	20 J	10 U	10 U	10 U	10 U	5 J	10 U	1500
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	50 U	5 U	5 U	5 U	5 U	5 U	5 U	500 U
O-XYLENE	5 U	26	5 U	210 D	20 J	5 U	5 U	5 U	5 U	10	5 U	830
TOLUENE	5 U	5 U	5 U	18	50 U	5 U	5 U	5 U	5 U	5 U	5 U	500 U
NAPHTHALENE	2 J	340 D	5 U	450 D	250	5 U	8	5 U	5 U	100 D	6	3200

SAMPLE NUMBER	FOVGFB-1410	FOVGFB-1510	FOVGFB-1610	FOVGFB-1710	FOVGFB-1810	FOVGFB-1910	FOVGFB-2022	FOVGFB-2110	FOVGFB-2210	FOVGFP-0310	FOVGFP-0410
SAMPLE LOCATION	PAI-55-FDP14	PAI-55-FDP15	PAI-55-FDP16	PAI-55-FDP17	PAI-55-FDP18	PAI-55-FDP19	PAI-55-FDP13/FDP20	PAI-55-FDP21	PAI-55-FDP22	PAI-55-P3	PAI-55-P4
SAMPLE DATE	07/01/02	07/01/02	07/01/02	07/01/02	07/01/02	07/01/02	07/01/02	07/01/02	07/01/02	07/01/02	07/01/02
Volatile Organics (ug/L)											
BENZENE	340 D	5 U	5 U	74	5 U	12	24	5 U	39	5 U	5 U
CHLOROBENZENE	960 D	39	5 U	1390 D	5 U	310 D	490 D	14	2310 E	23	56
ETHYLBENZENE	65	5 U	5 U	5 U	5 U	5 U	16	5 U	5 U	5 U	5 U
M+P-XYLENES	8 J	10 U	10 U	10 U	10 U	10 U	37	10 U	10 U	10 U	10 U
METHYL TERT-BUTYL ETHER	2 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
O-XYLENE	20	5 U	5 U	5 U	5 U	5 U	26	5 U	5 U	5 U	5 U
TOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	5	5 U	5 U	5 U	5 U
NAPHTHALENE	280 D	5 U	11	30	5 U	5	110 D	5 J	5 U	5 U	5 U

B-5

2003 GROUNDWATER INVESTIGATION

SITE 55

GROUNDWATER ANALYTICAL RESULTS
SITE 55 - FIBER OPTIC VAULT
2003 GROUNDWATER INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER SAMPLE LOCATION SAMPLE DATE	PAI-FOV-GW-01-01 PAI-27-MW01S 07/09/03	PAI-FOV-GW-07-01 PAI-27-MW07I 07/09/03	PAI-FOV-GW-08-01 PAI-27-MW08D 07/09/03	PAI-FOV-GW-10-01 PAI-27-MW10S 07/09/03	PAI-FOV-GW-11-01 PAI-27-MW11S 07/10/03	PAI-FOV-GW-12-01 PAI-27-MW12I 07/10/03	PAI-FOV-GW-13-01 PAI-27-MW13D 07/10/03
Volatile Organics (ug/L)							
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-TRICHLOROTRIFLUOROETHAN	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
1,2,4-TRICHLOROBENZENE	5 U	5 U	0.42 J	5 U	5 U	2.5 J	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	0.84 J	5 U	0.38 J	10.4	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-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	0.78 J	5 U
1,4-DICHLOROBENZENE	1.7 J	0.58 J	1.9 J	5 U	1.3 J	28.4	5 U
2-BUTANONE	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
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	2.5 J	5 U	5 U	5 U	5 UJ	5 U	5 U
BENZENE	5 U	0.97 J	2.8 J	5 U	5 U	0.58 J	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BROMOFORM	5 U	5 U	5 U	5 U	5 UJ	5 UJ	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	5.8	7.9	8.1	5 U	6.7	276	5 U
CHLORODIBROMOMETHANE	5 U	5 U	5 U	5 U	5 UJ	5 UJ	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
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
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ
ETHYLBENZENE	5 U	0.45 J	3.2 J	5 U	5 U	0.22 J	5 U
ISOPROPYLBENZENE	5 U	5 U	0.36 J	5 U	5 U	0.46 J	5 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 TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U	0.50 J	5 U
METHYLENE CHLORIDE	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
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 XYLENES	5 U	0.55 J	0.32 J	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
TRANS-1,3-DICHLOROPROPENE	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
TRICHLOROFLUOROMETHANE	5 UJ	5 UJ	5 UJ	5 UJ	5 U	5 U	5 U
VINYL CHLORIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U

GROUNDWATER ANALYTICAL RESULTS
SITE 55 - FIBER OPTIC VAULT
2003 GROUNDWATER INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER SAMPLE LOCATION SAMPLE DATE	PAI-FOV-GW-01-01 PAI-27-MW01S 07/09/03	PAI-FOV-GW-07-01 PAI-27-MW07I 07/09/03	PAI-FOV-GW-08-01 PAI-27-MW08D 07/09/03	PAI-FOV-GW-10-01 PAI-27-MW10S 07/09/03	PAI-FOV-GW-11-01 PAI-27-MW11S 07/10/03	PAI-FOV-GW-12-01 PAI-27-MW12I 07/10/03	PAI-FOV-GW-13-01 PAI-27-MW13D 07/10/03
Semivolatile Organics (ug/L)							
1,1-BIPHENYL	9.8 U	0.58 J	1.2 J	10 U	11.2 U	11.1 U	9.6 U
2,2'-OXYBIS(1-CHLOROPROPANE)	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
2,4,5-TRICHLOROPHENOL	24.5 U	27.8 U	27.8 U	25 U	28.1 U	27.8 U	24 U
2,4,6-TRICHLOROPHENOL	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
2,4-DICHLOROPHENOL	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
2,4-DIMETHYLPHENOL	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
2,4-DINITROPHENOL	24.5 U	27.8 U	27.8 U	25 U	28.1 U	27.8 U	24 U
2,4-DINITROTOLUENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
2,6-DINITROTOLUENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
2-CHLORONAPHTHALENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
2-CHLOROPHENOL	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
2-METHYLNAPHTHALENE	9.8 U	7.2 J	3.7 J	10 U	11.2 U	11.1 U	9.6 U
2-METHYLPHENOL	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
2-NITROANILINE	24.5 U	27.8 U	27.8 U	25 U	28.1 U	27.8 U	24 U
2-NITROPHENOL	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
3&4-METHYLPHENOL	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	2.2 J
3,3'-DICHLOROBENZIDINE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
3-NITROANILINE	24.5 U	27.8 U	27.8 U	25 U	28.1 U	27.8 U	24 U
4,6-DINITRO-2-METHYLPHENOL	24.5 U	27.8 U	27.8 U	25 U	28.1 U	27.8 U	24 U
4-BROMOPHENYL PHENYL ETHER	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
4-CHLORO-3-METHYLPHENOL	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
4-CHLOROANILINE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
4-CHLOROPHENYL PHENYL ETHER	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
4-NITROANILINE	24.5 U	27.8 U	27.8 U	25 U	28.1 U	27.8 U	24 U
4-NITROPHENOL	24.5 U	27.8 U	27.8 U	25 U	28.1 U	27.8 U	24 U
ACENAPHTHENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
ACENAPHTHYLENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
ACETOPHENONE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
ANTHRACENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
ATRAZINE	9.8 UR	11.1 UR	11.1 UR	10 UR	11.2 UR	11.1 UR	9.6 UR
BENZALDEHYDE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
BENZO(A)ANTHRACENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
BENZO(A)PYRENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
BENZO(B)FLUORANTHENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
BENZO(G,H,I)PERYLENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
BENZO(K)FLUORANTHENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
BIS(2-CHLOROETHOXY)METHANE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
BIS(2-CHLOROETHYL)ETHER	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
BIS(2-ETHYLHEXYL)PHTHALATE	9.8 U	5 J	4.6 J	10 U	3.4 J	3.5 J	2.9 J
BUTYL BENZYL PHTHALATE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
CAPROLACTAM	9.8 U	11.1 U	11.1 U	14.3	11 J	14	6.1 J
CARBAZOLE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
CHRYSENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
DI-N-BUTYL PHTHALATE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
DI-N-OCTYL PHTHALATE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
DIBENZO(A,H)ANTHRACENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
DIBENZOFURAN	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
DIETHYL PHTHALATE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U

GROUNDWATER ANALYTICAL RESULTS
SITE 55 - FIBER OPTIC VAULT
2003 GROUNDWATER INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER	PAI-FOV-GW-01-01	PAI-FOV-GW-07-01	PAI-FOV-GW-08-01	PAI-FOV-GW-10-01	PAI-FOV-GW-11-01	PAI-FOV-GW-12-01	PAI-FOV-GW-13-01
SAMPLE LOCATION	PAI-27-MW01S	PAI-27-MW07I	PAI-27-MW08D	PAI-27-MW10S	PAI-27-MW11S	PAI-27-MW12I	PAI-27-MW13D
SAMPLE DATE	07/09/03	07/09/03	07/09/03	07/09/03	07/10/03	07/10/03	07/10/03
Semivolatile Organics (ug/L)							
DIMETHYL PHTHALATE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
DIPHENYLAMINE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
FLUORANTHENE	9.8 U	1 J	11.1 U	10 U	11.2 U	11.1 U	9.6 U
FLUORENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
HEXACHLOROBENZENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
HEXACHLOROBUTADIENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
HEXACHLOROCYCLOPENTADIENE	9.8 UJ	11.1 UJ	11.1 UJ	10 UJ	11.2 UJ	11.1 UJ	9.6 UJ
HEXACHLOROETHANE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
INDENO(1,2,3-CD)PYRENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
ISOPHORONE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
N-NITROSO-DI-N-PROPYLAMINE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
NAPHTHALENE	9.8 U	2.3 J	4.9 J	10 U	11.2 U	11.1 U	9.6 U
NITROBENZENE	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
PENTACHLOROPHENOL	24.5 U	27.8 U	27.8 U	25 U	28.1 U	27.8 U	24 U
PHENANTHRENE	9.8 U	1.2 J	11.1 U	10 U	11.2 U	11.1 U	9.6 U
PHENOL	9.8 U	11.1 U	11.1 U	10 U	11.2 U	11.1 U	9.6 U
PYRENE	9.8 U	0.82 J	11.1 U	10 U	11.2 U	11.1 U	9.6 U
Pesticides/PCBs (ug/L)							
4,4'-DDD	0.074 J	7.1	1.6	0.017 J	7.8 U	0.11 U	0.064 J
4,4'-DDE	0.49 U	0.099 R	0.54 U	0.11 U	7.8 U	0.11 U	0.12 U
4,4'-DDT	0.22 J	0.82	0.58	0.059 J	3.3 J	0.11 U	0.08 J
ALDRIN	0.24 U	0.24 U	0.27 U	0.054 U	3.9 U	0.054 U	0.058 U
ALPHA-BHC	0.33	1	3.1	0.26	2.9 J	0.054 U	0.023 J
ALPHA-CHLORDANE	0.24 U	0.24 U	0.27 U	0.054 U	3.9 U	0.054 U	0.058 U
AROCLOR-1016	0.50 U	0.50 U	0.50 U	0.49 U	0.49 U	0.48 U	0.52 UJ
AROCLOR-1221	0.50 U	0.50 U	0.50 U	0.49 U	0.49 U	0.48 U	0.52 UJ
AROCLOR-1232	0.50 U	0.50 U	0.50 U	0.49 U	0.49 U	0.48 U	0.52 UJ
AROCLOR-1242	0.50 U	0.50 U	0.50 U	0.49 U	0.49 U	0.48 U	0.52 UJ
AROCLOR-1248	0.50 U	0.50 U	0.50 U	0.49 U	0.49 U	0.48 U	0.52 UJ
AROCLOR-1254	0.50 U	0.50 U	0.50 U	0.49 U	0.49 U	0.48 U	0.52 UJ
AROCLOR-1260	0.50 U	0.50 U	0.50 U	0.49 U	0.49 U	0.48 U	0.52 UJ
BETA-BHC	1.2	0.23 J	0.55	0.019 J	16 J	0.054 U	0.042 J
DELTA-BHC	2.3 J	2.5	3.2	0.25	47 J	0.054 U	0.14
DIELDRIN	0.49 U	0.49 U	0.54 U	0.11 U	7.8 U	0.11 U	0.12 U
ENDOSULFAN I	0.24 U	0.24 U	0.27 U	0.054 U	3.9 U	0.054 U	0.058 U
ENDOSULFAN II	0.49 U	0.49 U	0.54 U	0.11 U	7.8 U	0.11 U	0.12 U
ENDOSULFAN SULFATE	0.49 U	0.49 U	0.54 U	0.11 U	7.8 U	0.11 U	0.12 U
ENDRIN	0.49 U	0.49 U	0.54 U	0.11 U	7.8 U	0.11 U	0.12 U
ENDRIN ALDEHYDE	0.49 U	0.49 U	0.54 U	0.11 U	7.8 U	0.11 U	0.12 U
ENDRIN KETONE	0.49 U	0.49 U	0.54 U	0.11 U	7.8 U	0.11 U	0.12 U
GAMMA-BHC (LINDANE)	0.24 U	0.13 J	0.44	0.054 U	3.9 U	0.054 U	0.019 J
GAMMA-CHLORDANE	0.24 U	0.24 U	0.27 U	0.054 U	3.9 U	0.054 U	0.058 U
HEPTACHLOR	0.24 U	0.24 U	0.27 U	0.054 U	3.9 U	0.054 U	0.058 U
HEPTACHLOR EPOXIDE	0.24 U	0.24 U	0.27 U	0.054 U	3.9 U	0.054 U	0.058 U
METHOXYCHLOR	2.4 U	2.4 U	2.7 U	0.54 U	39 U	0.54 U	0.58 U
TOXAPHENE	4.9 U	4.9 U	5.4 U	1.1 U	78 U	1.1 U	1.2 U

GROUNDWATER ANALYTICAL RESULTS
SITE 55 - FIBER OPTIC VAULT
2003 GROUNDWATER INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER SAMPLE LOCATION SAMPLE DATE	PAI-FOV-GW-17-01 PAI-27-MW17S 07/11/03	PAI-FOV-GW-18-01 PAI-27-MW18I 07/11/03	PAI-FOV-GW-19-01 PAI-27-MW19S 07/11/03	PAI-FOV-GW-20-01 PAI-27-MW20S 07/11/03	PAI-FOV-GW-21-01 PAI-27-MW21S 07/10/03
Volatile Organics (ug/L)					
1,1,1-TRICHLOROETHANE	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
1,1,2-TRICHLOROETHANE	5 U	5 U	5 U	5 U	5 U
1,1,2-TRICHLOROTRIFLUOROETHAN	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U
1,2,4-TRICHLOROBENZENE	5 U	5 U	2 J	5 U	5 U
1,2-DIBROMO-3-CHLOROPROPANE	5 U	5 U	5 U	5 U	5 U
1,2-DIBROMOETHANE	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	10.9	0.74 J	5 U
1,2-DICHLOROETHANE	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROPROPANE	5 U	5 U	5 U	5 U	5 U
1,3-DICHLOROBENZENE	5 U	5 U	0.44 J	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	28.6	2.2 J	0.41 J
2-BUTANONE	5 U	5 U	5 U	5 U	5 U
2-HEXANONE	5 U	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U
ACETONE	5 U	5 U	5 U	5 U	5 U
BENZENE	5 U	5 U	2.3 J	5 U	5 U
BROMODICHLOROMETHANE	5 U	5 U	5 U	5 U	5 U
BROMOFORM	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
BROMOMETHANE	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U
CARBON TETRACHLORIDE	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	1.8 J	11.4	479	15.7	2.6 J
CHLORODIBROMOMETHANE	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
CHLOROETHANE	5 U	5 U	5 U	5 U	5 U
CHLOROFORM	5 U	5 U	5 U	5 U	5 U
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U
CIS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U
CIS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U
CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U
DICHLORODIFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U
ISOPROPYLBENZENE	5 U	5 U	0.80 J	5 U	5 U
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE	5 U	5 U	5 U	5 U	5 U
METHYL TERT-BUTYL ETHER	5 U	5 U	5 U	5 U	5 U
METHYLENE CHLORIDE	5 U	5 U	5 U	5 U	5 U
STYRENE	5 U	5 U	5 U	5 U	5 U
TETRACHLOROETHENE	5 U	5 U	5 U	5 U	5 U
TOLUENE	5 U	5 U	5 U	5 U	5 U
TOTAL XYLENES	5 U	5 U	5 U	5 U	5 U
TRANS-1,2-DICHLOROETHENE	5 U	5 U	5 U	5 U	5 U
TRANS-1,3-DICHLOROPROPENE	5 U	5 U	5 U	5 U	5 U
TRICHLOROETHENE	5 U	5 U	5 U	5 U	5 U
TRICHLOROFLUOROMETHANE	5 U	5 U	5 U	5 U	5 U
VINYL CHLORIDE	5 U	5 U	5 U	5 U	5 U

GROUNDWATER ANALYTICAL RESULTS
SITE 55 - FIBER OPTIC VAULT
2003 GROUNDWATER INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER SAMPLE LOCATION SAMPLE DATE	PAI-FOV-GW-17-01 PAI-27-MW17S 07/11/03	PAI-FOV-GW-18-01 PAI-27-MW18I 07/11/03	PAI-FOV-GW-19-01 PAI-27-MW19S 07/11/03	PAI-FOV-GW-20-01 PAI-27-MW20S 07/11/03	PAI-FOV-GW-21-01 PAI-27-MW21S 07/10/03
Semivolatile Organics (ug/L)					
1,1-BIPHENYL	9.9 U	10.6 U	1.7 J	11.4 U	10 U
2,2'-OXYBIS(1-CHLOROPROPANE)	9.9 U	10.6 U	11.1 U	11.4 U	10 U
2,4,5-TRICHLOROPHENOL	24.8 U	26.6 U	27.8 U	28.4 U	25 U
2,4,6-TRICHLOROPHENOL	9.9 U	10.6 U	11.1 U	11.4 U	10 U
2,4-DICHLOROPHENOL	9.9 U	10.6 U	11.1 U	11.4 U	10 U
2,4-DIMETHYLPHENOL	9.9 U	10.6 U	11.1 U	11.4 U	10 U
2,4-DINITROPHENOL	24.8 U	26.6 U	27.8 U	28.4 U	25 U
2,4-DINITROTOLUENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
2,6-DINITROTOLUENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
2-CHLORONAPHTHALENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
2-CHLOROPHENOL	9.9 U	10.6 U	11.1 U	11.4 U	10 U
2-METHYLNAPHTHALENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
2-METHYLPHENOL	9.9 U	10.6 U	11.1 U	11.4 U	10 U
2-NITROANILINE	24.8 U	26.6 U	27.8 U	28.4 U	25 U
2-NITROPHENOL	9.9 U	10.6 U	11.1 U	11.4 U	10 U
3&4-METHYLPHENOL	9.9 U	10.6 U	11.1 U	11.4 U	10 U
3,3'-DICHLOROBENZIDINE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
3-NITROANILINE	24.8 U	26.6 U	27.8 U	28.4 U	25 U
4,6-DINITRO-2-METHYLPHENOL	24.8 U	26.6 U	27.8 U	28.4 U	25 U
4-BROMOPHENYL PHENYL ETHER	9.9 U	10.6 U	11.1 U	11.4 U	10 U
4-CHLORO-3-METHYLPHENOL	9.9 U	10.6 U	11.1 U	11.4 U	10 U
4-CHLOROANILINE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
4-CHLOROPHENYL PHENYL ETHER	9.9 U	10.6 U	11.1 U	11.4 U	10 U
4-NITROANILINE	24.8 U	26.6 U	27.8 U	28.4 U	25 U
4-NITROPHENOL	24.8 U	26.6 U	27.8 U	28.4 U	25 U
ACENAPHTHENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
ACENAPHTHYLENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
ACETOPHENONE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
ANTHRACENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
ATRAZINE	9.9 UR	10.6 UR	11.1 UR	11.4 UR	10 UR
BENZALDEHYDE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
BENZO(A)ANTHRACENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
BENZO(A)PYRENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
BENZO(B)FLUORANTHENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
BENZO(G,H,I)PERYLENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
BENZO(K)FLUORANTHENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
BIS(2-CHLOROETHOXY)METHANE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
BIS(2-CHLOROETHYL)ETHER	9.9 U	10.6 U	11.1 U	11.4 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
BUTYL BENZYL PHTHALATE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
CAPROLACTAM	0.99 U	1.1 U	1.1 U	4.2 J	5.4 J
CARBAZOLE	9.9 UJ	10.6 U	11.1 U	11.4 U	10 U
CHRYSENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
DI-N-BUTYL PHTHALATE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
DI-N-OCTYL PHTHALATE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
DIBENZO(A,H)ANTHRACENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
DIBENZOFURAN	9.9 U	10.6 U	0.47 J	11.4 U	10 U
DIETHYL PHTHALATE	9.9 U	10.6 U	11.1 U	11.4 U	10 U

GROUNDWATER ANALYTICAL RESULTS
SITE 55 - FIBER OPTIC VAULT
2003 GROUNDWATER INVESTIGATION
MCRD PARRIS ISLAND, SOUTH CAROLINA

SAMPLE NUMBER SAMPLE LOCATION SAMPLE DATE	PAI-FOV-GW-17-01 PAI-27-MW17S 07/11/03	PAI-FOV-GW-18-01 PAI-27-MW18I 07/11/03	PAI-FOV-GW-19-01 PAI-27-MW19S 07/11/03	PAI-FOV-GW-20-01 PAI-27-MW20S 07/11/03	PAI-FOV-GW-21-01 PAI-27-MW21S 07/10/03
Semivolatile Organics (ug/L)					
DIMETHYL PHTHALATE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
DIPHENYLAMINE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
FLUORANTHENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
FLUORENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
HEXACHLOROBENZENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
HEXACHLOROBUTADIENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
HEXACHLOROCYCLOPENTADIENE	9.9 UJ	10.6 UJ	11.1 UJ	11.4 UJ	10 UJ
HEXACHLOROETHANE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
INDENO(1,2,3-CD)PYRENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
ISOPHORONE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
N-NITROSO-DI-N-PROPYLAMINE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
NAPHTHALENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
NITROBENZENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
PENTACHLOROPHENOL	24.8 U	26.6 U	27.8 U	28.4 U	25 U
PHENANTHRENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
PHENOL	9.9 U	10.6 U	11.1 U	11.4 U	10 U
PYRENE	9.9 U	10.6 U	11.1 U	11.4 U	10 U
Pesticides/PCBs (ug/L)					
4,4'-DDD	0.11 U	0.038 R	4.3 U	0.039 J	0.55 U
4,4'-DDE	0.11 U	0.022 R	4.3 U	0.024 J	0.55 U
4,4'-DDT	0.053 J	0.058 J	4.3 U	0.058 J	0.21 J
ALDRIN	0.054 U	0.048 U	2.2 U	0.056 U	0.28 U
ALPHA-BHC	0.27 J	0.094 J	46 J	0.25	2.9
ALPHA-CHLORDANE	0.054 U	0.048 U	2.2 U	0.056 U	0.28 U
AROCLOR-1016	0.49 U	0.50 U	0.52 U	0.52 U	0.48 U
AROCLOR-1221	0.49 U	0.50 U	0.52 U	0.52 U	0.48 U
AROCLOR-1232	0.49 U	0.50 U	0.52 U	0.52 U	0.48 U
AROCLOR-1242	0.49 U	0.50 U	0.52 U	0.52 U	0.48 U
AROCLOR-1248	0.49 U	0.50 U	0.52 U	0.52 U	0.48 U
AROCLOR-1254	0.49 U	0.50 U	0.52 U	0.52 U	0.48 U
AROCLOR-1260	0.49 U	0.50 U	0.52 U	0.52 U	0.48 U
BETA-BHC	0.043 J	0.048 U	4.1 J	0.056 U	0.28 U
DELTA-BHC	0.41 J	0.039 J	41 J	0.056 U	0.43
DIELDRIN	0.11 U	0.096 U	4.3 U	0.11 U	0.55 U
ENDOSULFAN I	0.054 U	0.048 U	2.2 U	0.056 U	0.28 U
ENDOSULFAN II	0.11 U	0.096 U	4.3 U	0.11 U	0.55 U
ENDOSULFAN SULFATE	0.11 U	0.096 U	4.3 U	0.11 U	0.55 U
ENDRIN	0.11 U	0.096 U	4.3 U	0.11 U	0.55 U
ENDRIN ALDEHYDE	0.11 U	0.096 U	4.3 U	0.11 U	0.55 U
ENDRIN KETONE	0.11 U	0.096 U	4.3 U	0.11 U	0.55 U
GAMMA-BHC (LINDANE)	0.21 J	0.048 U	27 J	0.056 U	0.28 U
GAMMA-CHLORDANE	0.054 U	0.048 U	2.2 U	0.056 U	0.28 U
HEPTACHLOR	0.054 U	0.048 U	2.2 U	0.056 U	0.28 U
HEPTACHLOR EPOXIDE	0.054 U	0.048 U	2.2 U	0.056 U	0.28 U
METHOXYCHLOR	0.54 U	0.48 U	22 U	0.56 U	2.8 U
TOXAPHENE	1.1 U	0.96 U	43 U	1.1 U	5.5 U

APPENDIX C

FIELD PAPERWORK – REMEDIAL INVESTIGATION – SITE 27/55 PHASE I, II and III and SITE 9/16

C-1 PHASE I, PHASE II and PHASE III AND SITE 9/16 RI – CHAIN OF CUSTODY FORMS

C-2 PHASE I RI - SOIL SAMPLE LOG SHEETS

C-3 PHASE II RI - SOIL SAMPLE LOG SHEETS

C-4 PHASE II RI – SOIL BORING LOGS

C-5 PHASE III RI –SOIL BORING LOGS

C-6 PHASE I RI – TEMPORARY MONITORING WELL BORING LOGS

C-7 PHASE I RI – TEMPORARY MONITORING WELL CONSTRUCTION SHEETS

C-8 PHASE II RI – PERMANENT MONITORING WELL BORING LOGS

C-9 PHASE II RI – PERMANENT MONITORING WELL CONSTRUCTION SHEETS

C-10 MONITORING WELL APPROVALS AND PHASE I, II and III 1903s

C-11 PHASE II RI – MONITORING WELL DEVELOPMENT RECORDS

C-12 PHASE I RI – GROUNDWATER SAMPLE LOG SHEETS – TEMPORARY MONITORING WELLS

C-13 PHASE I RI – GROUNDWATER SAMPLE LOG SHEETS, LOW FLOW PURGE DATA SHEETS – PERMANENT MONITORING WELLS

C-14 PHASE II RI – GROUNDWATER SAMPLE LOG SHEETS, LOW FLOW PURGE DATA SHEETS – PERMANENT MONITORING WELLS

C-15 PHASE III RI – GROUNDWATER SAMPLE LOG SHEETS AND LOW FLOW PURGE DATA SHEETS

C-16 SITES 9, 16, 27, AND 55 – GROUNDWATER LEVEL MEASUREMENT SHEETS

C-17 IDW DISPOSAL DOCUMENTATION

C-18 SLUG TESTS

C-19 SITE 9/16 SOIL BORING LOGS AND GROUNDWATER SAMPLE LOG SHEETS

C-20 SITE 9/16 PERMANENT MONITORING WELL CONSTRUCTION SHEETS

C-21 SITE 9/16 MONITORING WELL DEVELOPMENT RECORDS

C-22 SURVEY RECORDS

C-1 PHASE I, PHASE II, PHASE III, and SITE 9/16 RI – CHAIN OF CUSTODY FORMS

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 4582 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
G00455	MCRD SITE 27	M SLADIC	412 921 7090	KATAHDIN / COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Tey Rogal		S CONTI	412 921 7090	600 TECHNOLOGY WAY
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED EX AB# 8545 6732 9014		SCARBOROUGH, ME. 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G P G G
PRESERVATIVE USED: HCL 4°C 4°C 4°C 4°C

DATE YEAR 2007	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	VOLATILES (40ml)	VOLATILES (ENCORE)	SVOA, PEST, PCBS	TAL METALS (8oz) (20z)				COMMENTS
9/19	1000	TB09190701	QC	—	—	QC	G	2	2							TRIP BLANK
9/19	1055	PAI-27-SS13-01	SB 013	0	1	SO	G	6	-	4	1	1				
9/19	1115	PAI-27-SS12-01	SB 012	0	1	SO	G	6	-	4	1	1				
9/19	1125	PAI-27-SS11-01	SB 011	0	1	SO	G	6	-	4	1	1				
9/19	1135	PAI-27-SS10-01	SB 010	0	1	SO	G	6	-	4	1	1				
9/19	1200	PAI-27-SS09-01	SB 009	0	1	SO	G	6	-	4	1	1				
9/19	1220	PAI-27-SS08-01	SB 008	0	1	SO	G	6	-	4	1	1				
9/19	1355	PAI-27-SS06-01	SB 006	0	1	SO	G	6	-	4	1	1				
9/19	1410	PAI-27-SS04-01	SB 004	0	1	SO	G	6	-	4	1	1				
9/19	1420	PAI-27-SS05-01	SB 005	0	1	SO	G	6	-	4	1	1				
9/19	1430	PAI-27-SS03-01	SB 003	0	1	SO	G	6	-	4	1	1				
9/19	1435	PAI-27-SB03-12 (TK)	↓	1	2	SO	G	6	-	4	1	1				SAMPLE ID PAI-27-SB03-12
9/19	1440	PAI-27-SS07-01 (TK)	SB 007	0	1	SO	G	6	-	4	1	1				PAI-27-SS07-01

1. RELINQUISHED BY Tey Rogal	DATE 9/15/07	TIME 1700	1. RECEIVED BY FED EX.	DATE 9/19/07	TIME 1700
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)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 4583 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
G00455	MCRD SITE 27	M. SLADIC	412 921 7090	KATAHDIN / COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Terry Rogalski		S. CONTI	412 921 7090	600 TECHNOLOGY WAY
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX AB# 8545 6732 9014		SCARBOROUGH, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2007	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	VOLATILES (ENCORE)	SVOA, PEST/PCBS (8oz JAR)	TAL METALS (20z JAR)						COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									P	G	G						
PRESERVATIVE USED									4°C	4°C	4°C						
9/19	1455	PAI-27-SS02-01	SB 002	0	1	SO	G	6	4	1	1						
9/19	1510	PAI-27-SS01-01	SB 001	0	1	SO	G	16	12	2	2						RUN MS/MSD
9/19	0000	FD09190701	QC	0	1	SO	G	6	4	1	1						
9/19	0000	FD09190702	QC	0	1	SO	G	6	4	1	1						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Terry Rogalski	9/19/07	1700	1. RECEIVED BY FED. EX.	9/19/07	1700
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)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 4584 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
G00455	MCRD SITE 27	M. SLADIC	412 921 7090	KATAHDIN / COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Terry Rogalski		S. CONTI	412 921 7090	600 TECHNOLOGY WAY
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX AB# 8545 6732 9003		SCARBOROUGH, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G G G P

PRESERVATIVE USED: 4°C/HCl 4°C 4°C 4°C 4°C/HNO3

DATE YEAR 2007	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	VOLATILES (40ml)	TCL SVOA & PAHS (1L AMBER)	TCL PESTICIDES/PCBS (1L AMBER)	TCL PESTICIDES (1L AMBER)	TAL METALS				COMMENTS
9/20	0700	TB092007 01	QC	—	—	QC	G	2	2	—	—	—	—				TRIP BLANK
9/20	0710	RB09200701	QC	—	—	QC	G	8	3	*2	2	—	1				DPT SLEEVE & DIS. TROWEL
9/20	0750	RB09200702	QC	—	—	QC	G	7	3	2	2	—	—				TUBING
9/20	1215	PAI-27-GW-14-01	MW-14	—	—	GW	G	7	3	2	-	2	—				
9/20	1400	PAI-27-GW-15I-01	MW-15I	—	—	GW	G	21	9	6	-	6	—				RUN MS/MSD
9/20	1705	PAI-27-GW-9-01	MW-09	—	—	GW	G	7	3	2	-	2	—				
9/20	1840	PAI-27-GW-16-01	MW-16	—	—	GW	G	7	3	2	-	2	—				
9/21	0925	PAI-27-GW-5I-01	MW-5I	—	—	GW	G	7	3	2	-	2	—				
9/21	1100	PAI-27-GW-4-01	MW-4	—	—	GW	G	7	3	2	-	2	—				
9/21	1300	PAI-27-GW-3-01	MW-3	—	—	GW	G	7	3	2	-	2	—				

1. RELINQUISHED BY Terry Rogalski	DATE 9/21/07	TIME 1700	1. RECEIVED BY FED. EX.	DATE 9/21/07	TIME 1700
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS * SVOCs ONLY FOR ANALYSIS OF RB09200701 (Soil) RINSATE

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4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 4585 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
G00455	MCRD SITE 27	M. SLADIC	(412) 921 7090	KATAHDIN / A. COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Terry Rojahn		S. CONTI	(412) 921 7090	600 TECHNOLOGY WAY
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX AB# 8545 6732 8750		SCARBOROUGH, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G G G

PRESERVATIVE USED: 4°C/HCl 4°C 4°C 4°C

DATE YEAR 2007	TIME	SAMPLE ID (SITE 27)	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES (40ml)	TCL SVOA & PAHS (1L AMBER)	TCL PESTICIDES (1L AMBER)	TCL PEST/PCBS (1L AMBER)					COMMENTS
9/21	1730	TB092107 01	QC	—	—	QC	G	2	2								TRIP BLANK
9/21	1910	PAI-27-GW-2I-01	MW 2I	—	—	GW	G	7	3	2	2						
9/22	0835	PAI-27-TW-30S	TW 30S	—	—	GW	G	7	3	2	2						
9/22	1010	PAI-27-TW-45D	TW 45D	—	—	GW	G	7	3	2	2						
9/22	1140	PAI-27-TW-31I	TW 31I	—	—	GW	G	7	3	2	2						
9/22	1400	PAI-27-TW-41S	TW 41S	—	—	GW	G	7	3	2	-	2					
9/22	1555	PAI-27-TW-43S	TW 43S	—	—	GW	G	7	3	2	2						
9/22	1800	PAI-27-TW-~~44~~ 32I	TW 32I	—	—	GW	G	7	3	2	2						HYDROCARBON ODOR
9/23	0820	PAI-27-TW-44I	TW 44I	—	—	GW	G	7	3	2	2	2 (TC)					
9/23	0950	PAI-27-TW-27I	TW 27I	—	—	GW	G	7	3	2	2						ODOR - SL. HydroCarbon
9/23	1105	PAI-27-TW-26S	TW 26S	—	—	GW	G	7	3	2	2						SL. HydroCarbon
9/23	1345	PAI-27-TW-47I	TW 47I	—	—	GW	G	7	3	2	2						
9/23	1610	PAI-27-TW-22S	TW 22S	—	—	GW	G	7	3	2	2						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY: Terry Rojahn	9/24/07	1700	1. RECEIVED BY: FEDERAL EXPRESS	9/24/07	1700
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 4586 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
600455	MCRD SITE 27	M. SLADIC	(412) 921 7090	KATAHDIN / A. COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Terry Rogak		S CONTI	(412) 921 7090	600 TECHNOLOGY WAY
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX AB# 8545 6732 8750		SCARBOROUGH ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2007	TIME	SAMPLE ID (SITE 27)	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES (40ml)	SVOA & PAHs (1L AMBER)	PESTICIDES (1L AMBER)					COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	G					
PRESERVATIVE USED									4°C/HCl	4°C	4°C					
9/23	1725	PA1-27-TW-23I	TW 23I	—		GW	G	7	3	2	2					
9/23	1920	PA1-27-TW-25I	TW 25I	—		GW	G	7	3	2	2					
9/24	0835	PA1-27-TW-37S	TW 37S	—		GW	G	7	3	2	2					
9/24	0935	PA1-27-TW-38I	TW 38I	—		GW	G	7	3	2	2					
9/24	1020	PA1-27-TW-46S	TW 46S	—		GW	G	6	3	2	1					MWI Vol. = Slow Recharge
9/24	1145	PA1-27-TW-39S	TW 39S	—		GW	G	7	3	2	2					
9/23	0805	PA1-27-TW-42I	TW	—		GW	G	4	3	1	—					Very Slow Recharge More sample to come

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
Terry Rogak	9/24/07	1700	FEDERAL EXPRESS	9/24/07	1700
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)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 4587 T.R. | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
G00455	MCRD SITE 27	M. SLADIC	(412) 921 7090	KATAHDIN / A. COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Terry Ryan		S. CONTI	(412) 921 7090	600 TECHNOLOGY WAY
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED EX AB# 8545 6732 8990		SCARBOROUGH, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G G G

PRESERVATIVE USED: 4°C / HCl 4°C 4°C 4°C

DATE YEAR 2007	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	VOLATILES (40ml)	TCL SVOC & PAH (1L AMBER)	PESTICIDES (1L AMBER)	TCL PEST / PCBS (1L AMBER)					COMMENTS
9/25	0800	TB09250701	QC	–	–	QC	G	2	2								TRIP BLANK
9/25	0910	PA1-27-TW-40I	TW 40I	—	—	GW	G	7	3	2	2						
9/25	1015	PA1-27-TW-28S	TW 28S	—	—	GW	G	7	3	2	2						
9/25	1230	PA1-27-TW-33S	TW 33S	—	—	GW	G	7	3	2	2						
9/25	1335	PA1-27-TW-34I	TW 34I	—	—	GW	G	7	3	2	2						
9/25	1530	PA1-27-TW-35S	TW 35S	—	—	GW	G	7	3	2	2						
9/25	1625	PA1-27-TW-36I	TW 36I	—	—	GW	G	7	3	2	2						
9/25	1708	PA1-27-TW-29I	TW 29I	—	—	GW	G	7	3	2	2						
9/26	1115	PA1-27-TW-24S	TW 25S	—	—	GW	G	7	3	2	2						
9/26	1255	PA1-27-GW-6-01	MW-6	—	—	GW	G	7	3	2	2						Very Strong (Hot) Hydrocarbon odor
9/26	0000	FD09260701	QC	—	—	GW	G	7	3	2	2						
9/23	0805	PA1-27-TW-42I	TW-42I	—	—	GW	G	2.8	–	1	1.8 → AS/CONV. ON 9/27						ADDITIONAL SAMPLE collected (9/25-26)

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
Terry Ryan	9/26/07	1700	FEDERAL EXPRESS	9/26/07	1700
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)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 4057 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00455	MCRD PARRIS ISLAND	MARK SLADIC	(412) 921-8216	KATAHDIN / A. COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER: TERRY ROJAHN	PHONE NUMBER: (412) 921-8857	ADDRESS: 600 TECHNOLOGY WAY
		CARRIER/WAYBILL NUMBER: FED EX AB# 863125264227		CITY, STATE: SCARBOROUGH, ME 04074

Terry Rojahn

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2008	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 40ml VIALS	TCL PESTICIDES 1L AMBER	TOC 40ml VIALS	TOTAL ALK & TDS 250ml HDPE					COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	G	P					
PRESERVATIVE USED									4°C / HCl	4°C	4°C / H_2SO_4	4°C					
8/05	1300	TB080508 01	QC	—	—	AQ	G	2	2								TRIP BLANK
8/05	1625	PAI-27-GW-05I-02	05I	—	—	GW	G	8	3	2	2	1					
8/06	0845	PAI-27-GW-04S-02	04S	—	—	GW	G	8	3	2	2	1					
8/06	1120	PAI-27-GW-01S-02	01S	—	—	GW	G	8	3	2	2	1					
8/06	1410	PAI-27-GW-02I-02	02I	—	—	GW	G	8	3	2	2	1					
8/06	0000	FD080608 01	QC	—	—	GW	G	8	3	2	2	1					

1. RELINQUISHED BY: Terry Rojahn	DATE: 8-06-08	TIME: 1800	1. RECEIVED BY: FEDERAL EXPRESS	DATE: 8-06-08	TIME: 1800
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)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 4058 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00455	MCRD PARRIS ISLAND	MARK SLADIC	(412)921-8216	KATAHDIN / A. COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		T. ROJAHN	(412)921-8857	600 TECHNOLOGY WAY
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED EX AB# 8545 6732 8772		SCARBOROUGH, ME 04074

Terry Rojahn

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2008	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: TCL VOCS 40 ml VIAL	TCL PESTICIDES 1L AMBER	TOC 40 ml VIALS	TOTAL ALK. & TDS 250 ml HDPE					COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	G	A					
PRESERVATIVE USED									4°C/HCl	4°C	4°C/H2SO4	4°C					
8/07	0730	T8080708 01	QC	—	-	QC	G	2	2								TRIP BLANK
8/07	0905	PAI-27-GW-19S-02	MW-19S	—	-	GW	G	8	3	2	2	1					
8/07	1110	PAI-27-GW-21S-02	MW-21S	—	-	GW	G	8	3	2	2	1					
8/07	1315	PAI-27-GW-18I-02	MW-18I	—	—	GW	G	8	3	2	2	1					
8/07	1810	PAI-27-GW-17S-02	MW-17S	—	-	GW	G	8	3	2	2	1					
8/08	1250	PAI-27-GW-14S-02	MW-14	—	-	GW	G	8	3	2	2	1					
8/08	1205	PAI-27-GW-15I-02	MW-15I	—	-	GW	G	8	3	2	2	1					

1. RELINQUISHED BY Terry Rojahn	DATE 8-08-08	TIME 1800	1. RECEIVED BY FEDERAL EXPRESS	DATE 8-08-08	TIME 1800
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)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 4060 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00455	MCRD PARRIS ISLAND	MARK SLADIC	(412) 921-8216	KATAHDIN / ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		TERRY ROJAHN	(412) 921-8857	600 TECHNOLOGY WAY
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX AB # 854567328853		SCARBOROUGH, ME 04074

Terry Rojahn

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

PRESERVATIVE USED: 4°C | HCl 4°C | HNO3 4°C | NaOH 4°C

DATE YEAR 2008	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 40ml VIALS	TCL PESTICIDES 1L AMBER	TOC 40ml VIALS	Total ALK, & TDS 250ml HDPE					COMMENTS
8/09	0730	TB08090801	QC	–	–	QC	G	2	2								TRIP BLANK
8/09	0915	PAI-27-GW-16S-02	MW-16S	–	–	GW	G	8	3	2	2	1					
8/09	1200	PAI-27-GW-20S-02	MW-20S	–	–	GW	G	24	9	6	6	3					RUN MS/MSD
8/10	1140	PAI-27-GW-10S-02	MW-10S	–	–	GW	G	8	3	2	2	1					
8/11	0955	PAI-27-GW-13D-02	MW-13D	–	–	GW	G	8	3	2	2	1					
8/11	1235	PAI-27-GW-12I-02	MW 12I	–	–	GW	G	8	3	2	2	1					
8/11	1535	PAI-27-GW-11S-02	MW 11S	–	–	GW	G	8	3	2	2	1					

1. RELINQUISHED BY Terry Rojahn	DATE 8-11-08	TIME 1800	1. RECEIVED BY Terry Rojahn	DATE 8-11-08	TIME 1800
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)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 4059 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00455	MCRD PARRIS ISLAND	MARK SLADIC	(412) 921-8216	KATAHDIN / ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
SJ Conti		STAN Conti	(412) 921-8422	600 TECHNOLOGY WAY
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED EX AB# 8545 6732 8864		SCARBOROUGH, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): P G G

PRESERVATIVE USED: 4°C 4°C 4°C

DATE YEAR 2008	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 VOLATILES EnCORE SAMPLER	TCL PESTICIDES 4oz JAR	TOC & pH 2oz JAR						COMMENTS
8/12	0730	TB081208 01	QC	–	–	AQ	G	2	*2								*TRIP BLANK w/HCl
8/12	0830	PAI-27-SS-027-01	SB 027	0	1	SO	G	6	4	1	1						
8/12	0840	PAI-27-SB-027-06	SB 027	5	6	SO	G	6	4	1	1						
8/12	0850	PAI-27-SS-022-01	SB 022	0	1	SO	G	6	4	1	1						
8/12	0900	PAI-27-SB-022-05	↓	4	5	SO	G	6	4	1	1						
8/12	0910	PAI-27-SB-023-01 (TB)	SB 023	0	1	SO	G	6	4	1	1						
8/12	0915	PAI-27-SB-023-04	↓	3	4	SO	G	6	4	1	1						
8/12	0925	PAI-27-SS-032-01	SB 032	0	1	SO	G	6	4	1	1						
8/12 (TB)	0937	PAI-27-SB-032-04	↓	3	4	SO	G	6	4	1	1						
8/12	0940	PAI-27-SS-031-01	SB 031	0	1	SO	G	6	4	1	1						
8/12	0947	PAI-27-SB-031-04	↓	3	4	SO	G	6	4	1	1						
8/12	0955	PAI-27-SS-021-01	SB 021	0	1	SO	G	6	4	1	1						
8/12	1000	PAI-27-SB-021-04	↓	3	4	SO	G	6	4	1	1						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY SJ Conti	8-12-08	1800	1. RECEIVED BY FEDERAL EXPRESS	8-12-08	1800
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)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 4061 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112600455	MCRD PARRIS ISLAND	MARK SLADIC	(412)921-8216	KATAHDIN / ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
SJConti		STAN CONTI	(412)921-8422	600 TECHNOLOGY WAY
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX AB # 8545 6732 8864		SCARBOROUGH, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): P G G
PRESERVATIVE USED: 4°C 4°C 4°C

DATE YEAR 2008	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 VOLATILES ENCORE SAMPLER	TCL PESTICIDES 4oz JAR	TOC & pH 2oz JAR						COMMENTS
8/12	1015	PAI-27-SS-025-01	SB 025	0	1	SO	G	6	4	1	1						
8/12	1020	PAI-27-SB-025-07	↓	6	7	SO	G	6	4	1	1						
8/12	1035	PAI-27-SS-024-01	SB 024	0	1	SO	G	6	4	1	1						
8/12	1045	PAI-27-SB-024-07	↓	6	7	SO	G	6	4	1	1						
8/12	1100	PAI-27-SS-020-01	SB 020	0	1	SO	G	16	12	2	2						RUN MS/MSD
8/12	1110	PAI-27-SB-020-07	SB 020	6	7	SO	G	6	4	1	1						
8/12	1120	PAI-27-SS-019-01	SB 019	0	1	SO	G	6	4	1	1						
8/12	1125	PAI-27-SB-019-07	↓	6	7	SO	G	6	4	1	1						
8/12	1140	PAI-27-SS-014-01	SB 014	0	1	SO	G	6	4	1	1						
8/12	1145	PAI-27-SB-014-07	↓	0	7	SO	G	6	4	1	1						
8/12	1155	PAI-27-SS-030-01	SB 030	0	1	SO	G	6	4	1	1						
8/12	1200	PAI-27-SB-030-06	↓	5	6	SO	G	6	4	1	1						
8/12	1215	PAI-27-SS-015-01	SB 015	0	1	SO	G	6	4	1	1						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY SJConti	8-12-08	1800	1. RECEIVED BY FEDERAL EXPRESS	8-12-08	1800
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)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 4062 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112600455	MCRD PARRIS ISLAND	MARK SLADIC	(412) 921-8216	KATAHDIN / ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
SJ Conti		Stan Conti	(412) 921-8422	600 TECHNOLOGY WAY
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED EX AB # 8545 6732 8864		SCARBOROUGH, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): R G G
PRESERVATIVE USED: 4°C 4°C 4°C

DATE YEAR 2008	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 VOLATILES ENCORE SAMPLER	TCL PESTICIDES 4oz JAR	TOC & PH 2oz JAR						COMMENTS
8/12	1225	PAI-27-SB-015-07	SB 015	6	7	SO	G	6	4	1	1						
8/12	1245	PAI-27-SS-016-01	SB 016	0	1	SO	G	6	4	1	1						
8/12	1250	PAI-27-SB-016-07	↓	6	7	SO	G	6	4	1	1						
8/12	1300	PAI-27-SS-017-01 (TA)	SB 017	0	1	SO	G	6	4	1	1						
8/12	1305	PAI-27-SB-017-07	↓	6	7	SO	G	6	4	1	1						
8/12	1310	PAI-27-SS-018-01	SB 018	0	1	SO	G	6	4	1	1						
8/12	1315	PAI-27-SB-018-07	↓	6	7	SO	G	6	4	1	1						
8/12	1340	PAI-27-SS-026-01	SB 026	0	1	SO	G	6	4	1	1						
8/12	1345	PAI-27-SB-026-07	↓	6	7	SO	G	6	4	1	1						
8/12	1355	PAI-27-SS-028-01	SB 028	0	1	SO	G	6	4	1	1						
8/12	1400	PAI-27-SB028-06	↓	5	6	SO	G	6	4	1	1						
8/12	1410	PAI-27-SS-029-01	SB 029	0	1	SO	G	6	4	1	1						
8/12	1420	PAI-27-SB-029-06	↓	5	6	SO	G	16	12	2	2						RUN MS/MSD

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY SJ Conti	8-12-08	1800	1. RECEIVED BY FEDERAL EXPRESS	8-12-08	1800
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)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 4064 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00455	MCRD Parris Island	MARK SLADIC	(412) 921-8216	KATAHDIN / ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
SJ Conti		STAN Conti	(412) 921-8422	600 TECHNOLOGY WAY
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED EX AB # 8545 6732 8864		SCARBOROUGH, ME - 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2008	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 VOLATILES ENCORE SAMPLER	TCL PESTICIDES 4 oz JAR	TOC 2 oz pH JAR	TCL VOLATILES 40ml VIAL	TCL PESTICIDES 1L AMBER	TOC 40ml VIAL w/H2SO4		COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									P	G	G	G	G	G		
PRESERVATIVE USED									4°C	4°C	4°C	4°C/HCl	4°C	4°C		
8/12	0000	PAI-27-DU-081208-01	QC	0	1	SO	G	6	4	1	1					DUP OF 024-01
8/12	0000	PAI-27-DU-081208-02	QC	6	7	SO	G	6	4	1	1					019-07
8/12	0000	PAI-27-DU-081208-03	QC	6	7	SO	G	6	4	1	1					015-07
8/12	0000	PAI-27-DU-081208-04	QC	0	1	SO	G	6	4	1	1					029-01
8/12	1530	PAI-27-SWB-081208-01	QC	—	—	AQ	G	—	—	—	—	3	2	2		SOURCE WATER BLANK
8/12	1540	PAI-27-RB-081208-01	QC	—	—	AQ	G	—	—	—	—	3	2	2		RINSATE OF SLEEVE & SHOE

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY SJ Conti	8-12-08	1800	1. RECEIVED BY FEDERAL EXPRESS	8-12-08	1800
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)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 4065 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00455	MCRD Parris Island	Mark Sladic	(412) 921-8216	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER: Stan Conti	PHONE NUMBER: (412) 921-8422	ADDRESS: 600 Technology Way
		CARRIER/WAYBILL NUMBER: FED. EX AB # 8545 6732 8886		CITY, STATE: Scarborough, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2008	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 Volatiles 40ml Vials	TCL Pesticides 1L Ambers	TOC 40ml Vials	Total Alk & TDS 250ml HDPE					COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	G	P					
PRESERVATIVE USED									4°C/HCl	4°C	4°C/H2SO4	4°C					
8/13	0730	TB08130801	QC	—	—	AQ	G	2	2								TRIP BLANK
8/13	0905	PAI-27-GW-50I-01	27MW 50I	—	—	GW	G	8	3	2	2	1					
8/13	1030	PAI-27-GW-49S-01	27MW 49S	—	—	GW	G	8	3	2	2	1					
8/13	1250	PAI-27-GW-53S-01	27MW 53S	—	—	GW	G	8	3	2	2	1					
8/13	0835	PAI-27-GW-55S-01	27MW 55S	—	—	GW	G	8	3	2	2	1					
8/13	0000	PAI-27-DU-081308-01	—	—	—	GW	G	8	3	2	2	1					DUP OF 55S-01
8/13	1125	PAI-27-GW-56I-01	27MW 56I	—	—	GW	G	24	9	6	6	3					DO MS/MSD
8/13	1345	PAI-27-GW-62S-01	27MW 62S	—	—	GW	G	8	3	2	2	1					
8/13	1415	PAI-27-GW-54I-01	27MW 54I	—	—	GW	G	8	3	2	2	1					

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY: S. Conti	8/13/08	1630	1. RECEIVED BY: FED EX.		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 4067 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00455	MCRD PARRIS ISLAND	MARK SLADIC	(412) 921-8216	KATAHDIN / ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		STAN COATI	(412) 921-8422	600 TECHNOLOGY WAY
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX AB # 8545 6732 8875		SCARBOROUGH, ME 04074

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

PRESERVATIVE USED: 4°C | HCl 4°C 4°C | H2SO4 4°C

DATE YEAR 2008	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 VOLATILES 40ml VIALS	TCL PESTICIDES 1L AMBER	TOC 40ml VIALS	Total Alk & TDS 250ml HDPE					COMMENTS
8/13	1500	TB08130802	QC	—	—	AQ	G	2	2								
8/13	1630	PAI-27-GW-48I-01	27MW 48I	—	—	GW	G	8	3	2	2	1					
8/13	1625	PAI-27-GW-57S-01	27MW 57S	—	—	GW	G	8	3	2	2	1					
8/13	1805	PAI-27-GW-58S-01	27MW 58S	—	—	GW	G	8	3	2	2	1					
8/13	1930	PAI-27-GW-59I-01	27MW 59I	—	—	GW	G	8	3	2	2	1					
8/14	0920	PAI-27-GW-60I-01	27MW 60I	—	—	GW	G	8	3	2	2	1					
8/14	0925	PAI-27-GW-52I-01	27MW 52I	—	—	GW	G	8	3	2	2	1					
8/14	1110	PAI-27-GW-51S-01	27MW 51S	—	—	GW	G	8	3	2	2	1					
8/14	1105	PAI-27-GW-63S-01	27MW 63S	—	—	GW	G	8	3	2	2	1					
8/14	1210	PAI-27-GW-61I-01	27MW 61I	—	—	GW	G	8	3	2	2	1					
8/14	1405	PAI-27-GW-64S-01	27MW 64S	—	—	GW	G	8	3	2	2	1					
8/14	0000	PAI-27-DU-081408-02	—	—	—	GW	G	8	3	2	2	1					DUP OF 64S-01
8/14	1305	PAI-27-GW-08D-02	27MW 08D	—	—	GW	G	8	3	2	2	1					MAYBE SOMEWHAT HOT

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY: S. Coati	8/14/08	1800	1. RECEIVED BY: FED EX	8/14/08	1800
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 4068 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00455	MCRD PARRIS ISLAND	MARK SLADIC	(412) 921-8216	KATAHDIN / ANDREA COLBY
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		STAN CONTI	(412) 921-8422	600 TECHNOLOGY WAY
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX AB # 8545 6732 8875		SCARBOROUGH, ME 04074

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2008	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 VOLATILES 40ml VIALS	TCL PESTICIDES 1L AMBER	TOC 40ml VIALS	TOTAL ALK & TDS 250ml HDPE					COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	G	P					
PRESERVATIVE USED									4°C/HCl	4°C	4°C/H2SO4	4°C					
8/14	1520	PAI-27-GW-07I-02	27MW07I	—	—	GW	G	8	3	2	2	1					
8/14	1545	PAI-27-GW-06S-02	27MW06S	—	—	GW	G	8	3	2	2	1					
8/14	0000	PAI-27-DU-081408-01	QC	—	—	GW	G	8	3	2	2	1					FROM MW08D

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	8/14/08	1800	1. RECEIVED BY FED EX	8/14/08	1800
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 4069 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G00455	MCRD Parris Island	Mark Sladic	(412)921-8216	Katahdin / Andrea Colby
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		Stan Conti	(412)921-8422	600 Technology Way
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED EX AB # 8545 6732 8783		Scarborough, ME 04074

STANDARD TAT ☒ RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G

PRESERVATIVE USED: 1

TYPE OF ANALYSIS: TCL VOCs, SVOCs, & Pest. 40 ml Vial

DATE YEAR 2008	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, SVOCs, & Pest. 40 ml Vial	COMMENTS
8/14	1700	PAI-27-PR-115-01	27 MW 115	–	–	*PR	G	1	1	* PRODUCT SAMPLE

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
	8-15-08	1200	FEDERAL EXPRESS	8-15-08	1200
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: Priority VOCs & SVOCs then Pesticides

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R

FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 1 OF 2

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02406	Parris Island	Mark Sladic 412-921-7090	Cathy Dorer / Compuchem
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: S. Hill 412-921-7090	ADDRESS: 501 Madison Ave
		CARRIER/WAYBILL NUMBER: 8735 5965 9549	CITY, STATE: Cary, NC 27513

STANDARD TAT ☐
RUSH TAT ☒
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☒ 7 day ☐ 14 day
or ASAP

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC	TCL VOC	SVOC, PEST, PCB, PAH	TOC, Metals, pH					COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G	G					
PRESERVATIVE USED						HCl	Meoh	HC	HC					
7/22	0700	PAI-TB-072210-01	Aq	QC	2	2	–	–	–					
	0950	PAI-27-S048-01	SO	G	5	–	3	1	1					
	0955	PAI-27-S048-05			5	–	3	1	1					
	1000	PAI-27-S048-08			5	–	3	1	1					
	1120	PAI-27-S044-01			5	–	3	1	1					
	1125	PAI-27-S044-05			5	–	3	1	1					
	1145	PAI-27-S044-08			5	–	3 2	1	1					
	1400	PAI-55-S004-01			5	–	3	1	1					
	1405	PAI-55-S004-05			5	–	3	1	1					
	1415	PAI-55-S004-10			5	–	3	1	1					
	00:00	PAI-55-SO-072210-02			5	–	3	1	1					Dup of S004-10
	1505	PAI-27-S043-01			5	–	3	1	1					
	1510	PAI-27-S043-05			5	–	3	1	1					

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	7/22/10	1800	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)

3/99
FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 2 OF 2

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G0240a	Harris Island	Mark Sladic 412-921-7090	Cathy Dover / Compuchem
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: S. Hill 412-921-7090	ADDRESS: 501 Madison Ave
		CARRIER/WAYBILL NUMBER: 8735 5965 9549	CITY, STATE: Cary, NC 27513

STANDARD TAT ☐
RUSH TAT ☒
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☒ 7 day ☐ 14 day
or ASAP

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: TCL VOC	SVOC, Pest, PCB, PAH, SM	TOC, Metals, TPH						COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G						
PRESERVATIVE USED						Water Preservation	4°C	4°C						
07/22	1535	PA1-27-S043-08	SO	G	5	3	1	1						

1. RELINQUISHED BY	DATE 7/22/10	TIME 1800	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

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

3/99
FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 1 OF 2

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02406	Parris Island	M. Slade 412-921-7090	Cathy Donr
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER	ADDRESS
		S. Hill	501 Madison Ave
		CARRIER/WAYBILL NUMBER	CITY, STATE
		8735 5965 9550	Cary, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC	TCL VOC	SVOC PAH Pest PCB	TOC Metals pH					COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G	G					
PRESERVATIVE USED						HCl	Tetra Core	HCl	HCl					
7/21	0820	PAI-27-S035-01	SO	G	5	—	3	1	1					
7/21	0700	PAI-TB-072110-01	Aq	QC	2	2	—	—	—					
	0840	PAI-27-S035-08	SO	G	5	—	3	1	1					
	0915	PAI-27-S037-01				—	3	1	1					
	0940	PAI-27-S037-08				—	3	1	1					
	1110	PAI-27-S040-01				—	3	1	1					
	1125	PAI-27-S040-08				—	3	1	1					
	1255	PAI-27-S042-01				—	3	1	1					1
	1405	PAI-27-S042-08				—	3	1	1					
	1510	PAI-27-S041-01				—	3	1	1					
	1540	PAI-27-S041-08				—	3	1	1					
	0000	PAI-27-S072110-01				—	3	1	1					Dup of S042-01
	7/21/10	PAI-27-S033-01				—	3	1	1					

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
	7/23/10	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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3/99
FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 2 OF 2

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02406	Parris Island	M. Sladic 412-921-7090	Cathy Dover Kamplechner
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: S. Hill 412-921-7090	ADDRESS: 501 Madison Ave
		CARRIER/WAYBILL NUMBER: 8735 5965 9550	CITY, STATE: Cary, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: TCL VOC	SVOC/Pest/PCB/PAHs/Ms	TOC/Metals/PH						COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G						
PRESERVATIVE USED						Tera Core	4°C	4°C						
7/21	1640	PAI-~~[illegible]~~-27-~~S033~~-08	SO	G	5	3	1	1						
7/22	0820	PAI-27-S036-01	SO	G	15	9	3	3						MS/MSD
7/22	0850	PAI-27-S036-08	SO	G	5	3	1	1						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	7/22/10	1900	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

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3/99
FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 1 OF 6

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G0240	[illegible] Island	[illegible] 410 [illegible]	[illegible]
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER	ADDRESS
		[illegible]	801 [illegible] Ave
		CARRIER/WAYBILL NUMBER	CITY, STATE
			[illegible], NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G G
PRESERVATIVE USED: [illegible] HCl HCl

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: TCL VOC	Standard Analytical	Technical Data						COMMENTS
7/28	1555	PAI-27-SO45-10	SO	G	5	3	1	1						
7/29	0915	PAI-27-SO34-01			5	3	1	1						
	0920	PAI-27-SO34-05			5	3	1	1						
	0940	PAI-27-SO34-10			5	3	1	1						
	1105	PAI-27-SO31-01			5	3	1	1						MS/MSD
	1110	PAI-27-SO31-05			5	3	1	1						
	1130	PAI-27-SO31-10			5	3	1	1						
	1205	PAI-27-SO36-01			5	3	1	1						
	1210	PAI-27-SO36-05			5	3	1	1						
	1215	PAI-27-SO36-10			5	3	1	1						
	1445	PAI-55-SO46-01			5	3	1	1						
	1450	PAI-55-SO46-05			5	3	1	1						
	1455	PAI-55-SO46-10			5	3	1	1						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [illegible]	7/29/10	1500	1. RECEIVED BY [illegible]	7/30/10	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

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 2 OF 6

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
1&G Cline	Kerr's Farm	M. Sadler 410-901-7090	Calhoun Dunn / Compuchem
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: S. Hall 410-901-1090	ADDRESS: 501 Jackson Ave
		CARRIER/WAYBILL NUMBER	CITY, STATE: Cary, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: TCL VOC	SVOC (+TICs)	Pesticides/PCBs						COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G						
PRESERVATIVE USED						HCl	HCl	HCl						
11/04	1510	PAI-55-SO14-01	SO	G	5	3	1	1						
↓	1550	PAI-55-SO14-10			5	3	1	1						
11/05	0850	PAI-55-SO17-01			5	3	1	1						
	0925	PAI-55-SO17-10			5	3	1	1						
	0955	PAI-55-SO18-01			5	3	1	1						
	1115	PAI-55-SO17-01			5	3	1	1						
	1120	PAI-55-SO17-10			5	3	1	1						
	1410	PAI-55-SO11-01			5	3	1	1						
↓	1430	PAI-55-SO11-10			5	3	1	1						
11/10	0850	PAI-55-SO14-01			5	3	1	1						
	0900	PAI-55-SO14-10			5	3	1	1						
	0955	PAI-55-SO12-01			5	3	1	1						
↓	1005	PAI-55-SO12-10	↓	↓	5	3	1	1						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	11/10	1520	1. RECEIVED BY [illegible]	11/10	1530
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

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 3 OF 6

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
[illegible]	[illegible]	[illegible] 412-921-7090	[illegible]
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: [illegible] 412-921-7090	ADDRESS: [illegible]
		CARRIER/WAYBILL NUMBER	CITY, STATE: [illegible] AL 35[illegible]

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC	SVOC/PCB/PEST/HERB	TCL/TAL-Al/Fe						COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G						
PRESERVATIVE USED						HCL	HCL	HCL						
7/26	1105	PAI-55-SO12-01	SO	G	5	3	1	1						
7/26	1410	PAI-55-SO15-01			5	3	1	1						
7/27	0850	PAI-55-SO16-01			15	9	3	3						[illegible]
	0855	PAI-55-SO16-05			5	3	1	1						
	0900	PAI-55-SO16-10			5	3	1	1						
	~~0905~~	~~PAI-55-SO16-CP~~			~~5~~	~~3~~	~~1~~	~~1~~						
	~~1005~~	~~PAI-55-SO16-TCL~~			~~5~~	~~3~~	~~1~~	~~1~~						
	0955	PAI-55-SO17-01			5	3	1	1						
	1005	PAI-55-SO17-10			5	3	1	1						
	1055	PAI-55-SO18-01			5	3	1	1						
	~~1100~~	~~PAI-55-SO18-05~~			~~5~~	~~3~~	~~1~~	~~1~~						
	~~1105~~	~~PAI-55-SO18-10~~			~~5~~	~~3~~	~~1~~	~~1~~						

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
[illegible]	7/28/10	1530	K Harding	7/28/10	1530
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

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 4 OF 6

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G[illegible]	[illegible]	[illegible] 412-921-7090	Cathy Dover [illegible]
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: [illegible] 412-921-7090	ADDRESS: 501 [illegible] Rd
		CARRIER/WAYBILL NUMBER	CITY, STATE: [illegible] NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G G

PRESERVATIVE USED: [illegible] HCl HCl

TYPE OF ANALYSIS: TCL VOC / SVOC/PCB/PAH [illegible] / TOC/TKN/TNO3/P

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC	SVOC/PCB/PAH [illegible]	TOC/TKN/TNO3/P						COMMENTS
7/23	0010	PAI-27-07[illegible]10-01	SO	G	3	3	1	1						~~27~~-S0~~0~~45-01
7/31	↓	PAI-27-07[illegible]10-05	↓	↓	↓	3	1	1						27-S034-01
7/15		PAI-55-07[illegible]10-06				3	1	1						55-S0~~0~~910
7/15		PAI-55-07[illegible]10-07				3	1	1						55-S0~~0~~7-01
7/20		PAI-55-07[illegible]10-08				3	1	1						55-S014-01
7/26		PAI-55-07[illegible]10-09				3	1	1						55-S013-10
7/27	↓	PAI-55-07[illegible]10-10	↓	↓	↓	3	1	1						55-S017-10
7/23	[illegible]	[illegible]				[illegible]	[illegible]							55-S~~0~~01-01

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [illegible]	7/28/10	15:30	1. RECEIVED BY [illegible]	7/28/10	1530
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

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 5 OF 6

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G 6210	PAI	M. Stone 4/[illegible]	[illegible]
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER	ADDRESS
		[illegible] 907-921-7010	711 [illegible]
		CARRIER/WAYBILL NUMBER	CITY, STATE
			[illegible] AK 99503

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: TCL VOC	SVOC/PAH/PCB/Pesticides	TCL Metals/Hg						COMMENTS
		CONTAINER TYPE PLASTIC (P) or GLASS (G)				G	G	G						
		PRESERVATIVE USED				HCl	HCl	HCl						
7/21	1520	PAI-27-S041-05	SO	G	5	3	1	1						
7/28	0840	PAI-55-S003-01			15	9	3	3						Ex 1 MS/MSD
7/28	0900	PAI-55-S003-10			5	3	1	1						
	1000	PAI-55-S002-01			5	3	1	1						
	1015	PAI-55-S002-05			5	3	1	1						
	1020	PAI-55-S002-10			5	3	1	1						
	1145	PAI-55-S001-01			5	3	1	1						
	1150	PAI-55-S001-05			5	3	1	1						
	1155	PAI-55-S001-08			5	3	1	1						
	1425	PAI-55-S005-01			5	3	1	1						
	1435	PAI-55-S005-10			5	3	1	1						
	1535	PAI-27-S005-01			5	3	1	1						
	1540	PAI-27-S005-05			5	3	1	1						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	7/28/10	1530	1. RECEIVED BY [illegible]	7/28/10	1530
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

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 6 OF 6

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G04GU	[illegible]	[illegible] 412-921-7090	[illegible]
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: [illegible] 412-921-7090	ADDRESS: 501 [illegible] NC
		CARRIER/WAYBILL NUMBER	CITY, STATE: Cary, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G G G G
PRESERVATIVE USED: NA HCL HCL HCL NA

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: TCL VOC	Methane, Ethane, Ethene	Bulk Kg	Dissolved Methane	TOC				COMMENTS
7/21	0700	PAI-TB-072110-02	Aq	Grab	2	—	—	—	—	—				
7/23	0700	PAI-TB-072310-01				2	—	—	—	—				
7/24	0700	PAI-TB-072410-01				2	—	—	—	—				
7/25	0700	PAI-TB-072510-01				2	—	—	—	—				
7/26	0700	PAI-TB-072610-01				2	—	—	—	—				
7/27	0700	PAI-TB-072710-01				2	—	—	—	—				
7/21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3	3	2	1	2				
	1540	[illegible]	[illegible]			3	3	2	1	2				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3	3	2	1	2				

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
[illegible]	7/28/10	1530	K. Manning	7/28/10	1530
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

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 08032010 | PAGE 1 OF 2

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02406	PARRIS ISLAND	M. SLADIC (412)921-7090	CATHY DOVER / COMPUCHEM
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: S. HILL (412)921-7090	ADDRESS: 501 MADISON AVE
		CARRIER/WAYBILL NUMBER: 8735 5965 9538	CITY, STATE: CARY, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G G

PRESERVATIVE USED: MEOH & NaHSO4 4°C 4°C

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC 40ML VIALS	SVOC, PAH SIM, PEST/PCBS 8OZ JAR	TOC/METALS/PH 2OZ JAR						COMMENTS
8/3	0800	PAI-TB-08031D-01	Aq	Grab	2	2	—	—						Trip Blank
	1000	PAI-27-S047-01	SO	G	5	3	1	1						
	1005	PAI-27-S047-05				3	1	1						
	1010	PAI-27-S047-08				3	1	1						
	1015	PAI-27-S047-10				3	1	1						
	1315	PAI-27-S038A-01				3	1	1						
	1320	PAI-27-S038A-05				3	1	1						
	1325	PAI-27-S038A-10				3	1	1						
	00:00	PAI-08031D-11				3	1	1						Dup of S038A-10
	1440	PAI-27-S045A-01				3	1	1						
	1445	PAI-27-S045A-05				3	1	1						
	1450	PAI-27-S045A-10				3	1	1						
	1525	PAI-27-S045B-01				3	1	1						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	8/3/10	1800	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)

3/99
FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 08032010 | PAGE 2 OF 2

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02406	PARRIS ISLAND	M. SLADIC (412) 921-7090	CATHY DOVER / COMPW CHEM
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: S. HILL (412) 921-7090	ADDRESS: 501 MADISON AVE
		CARRIER/WAYBILL NUMBER: 8735 5965 9538	CITY, STATE: CARY, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC 40ML VIALS	SVOC, PAH SIM PEST/PCBS 8OZ JAR	TOC/METALS/PH 2 OZ JAR						COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G						
PRESERVATIVE USED						MeOH & NaHSO4	4°C	4°C						
8/3	1530	PA1-27-S045B-05	SO	G	5	3	1	1						
8/3	1535	PA1-27-S045B-10	SO	G	5	3	1	1						

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
	8/3/10	1800			
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)

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE ____ OF _____

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02406	PARRIS ISLAND	M. SLADIC (412) 921-7090	CATHY DOVER / COMPU CHEM
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: S. HILL (412) 921-7090	ADDRESS: 501 MADISON AVE.
		CARRIER/WAYBILL NUMBER	CITY, STATE: CARY, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G G

PRESERVATIVE USED: MeOH NaHSO4 4°C 4°C

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC 40ml VIALS	SVOC, PAH SIM PEST/PCBS 8oz JAR	TOC/METALS/PH 2oz JAR						COMMENTS
8/4	0840	PA1-55-S0Ø3A01	SO	G	5	3	1	1						
	0845	PA1-55-S0Ø3A-05			5	3	1	1						
	0850	PA1-55-S0Ø2A-10			5	3	1	1						
	0920	PA1-55-S0Ø7A-01			5	3	1	1						
	0925	PA1-55-S0Ø7A-05			5	3	1	1						
	0930	PA1-55-S0Ø7A-10			5	3	1	1						
	1000	PA1-55-S017A-01			5	3	1	1						
	1005	PA1-55-S017A-05			15	9	1	1						MS/MSD
	1010	PA1-55-S017A-10			5	3	1	1						
	1105	PA1-55-S01ØA-01			5	3	1	1						
	1305	PA1-55-S018A-01			5	3	1	1						
	1310	PA1-55-S018A-05			5	3	1	1						
	1315	PA1-55-S018A-10			5	3	1	1						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	8/5/10	1000	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)

3/99
FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE ____ OF _____

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02406	PARRIS ISLAND	M. SLADIC (412) 921-7090	CATHY DOVER / COMPU CHEM
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: S. HILL (412) 921-7090	ADDRESS: 501 MADISON AVE.
		CARRIER/WAYBILL NUMBER	CITY, STATE: CARY, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC 40ml VIAL	SVOC, PAH SIM, PEST, & PCBs 8oz JAR	TOC / METALS / PH 2oz JAR						COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	G			
PRESERVATIVE USED									MeOH & NaHSO4	4°C	4°C			
8/5	00:00	PAI-9/16-S080510-13	SO	G	5	3	1	1						9/16-S0Ø4-05
	00:00	PAI-9/16-S0Ø80510-14			5	3	1	1						9/16-S0Ø5-05
	1450	PAI-9/16-S0Ø5-01			5	3	1	1						
	1455	PAI-9/16-S0Ø5-05			5	3	1	1						
~~8/4~~	~~0800~~	~~PAI-TB-080410-01~~ SEH				3	1	1						
8/5	0800	PAI-TB-080510-01	Aq	Lab Prep	2	2	—	—						Trip Blank
8/4	0800	PAI-TB-080410-01	Aq		2	2	—	—						Trip Blank

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
	8/5/10	1800			
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)

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FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE ____ OF _____

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02406	PARRIS ISLAND	M. SLADIC (412) 921-7090	CATHY DOVER / COMPUCHEM
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: S. HILL (412) 921-7090	ADDRESS: 501 MADISON AVE.
		CARRIER/WAYBILL NUMBER	CITY, STATE: CARY, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G G

PRESERVATIVE USED: MEOH & NaHSO4 4°C 4°C

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC 40ML VIALS	SVOC PAH SIM PEST/PCBS 8OZ JAR	TOC/METALS/PH 2OZ JAR						COMMENTS
7/25	1430	PAI-SS-S011-10	SO	G	5	3	1	1						
7/26	1115	PAI-SS-S012-10				3	1	1						
8/4	1345	PAI-SS-S014A-01				3	1	1						
8/5	0905	PAI-SS-S014B-01				3	1	1						
	1020	PAI-9/16-S001-01				3	1	1						
	1025	PAI-9/16-S001-05				3	1	1						
	1030	PAI-9/16-S001-10				3	1	1						
	1130	PAI-9/16-S010-01				3	1	1						
	~~1135~~	~~PAI-9/16-S010-05~~												
	1325	PAI-9/16-S003-01			5	3	1	1						
	1330	PAI-9/16-S003-05			15	9	3	3						MS/MSD
	1410	PAI-9/16-S004-01			5	3	1	1						
	1415	PAI-9/16-S004-05			5	3	1	1						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	8/5/10	1800	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 | PAGE ____ OF _____

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02406	PARRIS ISLAND	M. SLADIC (412) 921-7090	CATHY DOVER / COMPU CHEM
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: S. HILL (412) 921-7090	ADDRESS: 501 MADISON AVE
		CARRIER/WAYBILL NUMBER: 8735 5965 9560	CITY, STATE: CARY, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	VOCs 40 ml VIAL	SVOC / PAH SIM 1L AMBER	PEST / PCBS 1L AMBER	TOTAL METALS 1L HDPE	ALK / TDS 500 ml HDPE	TOC 40 ml VIAL			COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G	P	P	G			
PRESERVATIVE USED						HCl / 4°C	4°C	4°C	HNO3 / 4°C	4°C	H2SO4 / 4°C			
8/6	0800	PAI-TB-080610-01	Aq	Lab Prep	2	2	—	—	—	—	—			
	1115	PAI-27-GW17S-03		G	11	3	3	2	1	1	2			
	1105	PAI-27-GW18I-03		G	11	3	3	2	1	1	2			
	~~1605~~	~~PAI-27-TW15S~~												
↓	1605	PAI-27-TW18I-01	↓	G	11	3	3	2	1	1	2			

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
	8/6/10	1600			
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 | PAGE 1 OF 5

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G024/C6/W1865	Plum Island	Mark Sladic 412-921-7090	Cathy Doner/Compuchem
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: Shannon Hill 412-921-7090	ADDRESS: 501 Madison Ave
		CARRIER/WAYBILL NUMBER: 8735 5965 9570	CITY, STATE: Cary, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G G

PRESERVATIVE USED: NaHSO4 4°C 4°C

TYPE OF ANALYSIS

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC	40 mL VOCs	SVOCs, PAH, SIM, Pest/PCB	BOD, TSS	TOC/Metals/pH Soil Jar					COMMENTS
8/6	0700	PAI-TB-~~080610-01~~ 090610-01	Aq	lab prep	2	2	—	—							Trip blank
	0930	PAI-9/16-S007-01	SO	G	5	3	1	1							
	0935	PAI-9/16-S007-05				3	1	1							
	1050	PAI-9/16-S002-01				3	1	1							
	1055	PAI-9/16-S002-05				3	1	1							
	1350	PAI-55-S014C-01				3	1	1							
	1355	PAI-55-S014C-05				3	1	1							
	1400	PAI-55-S014C-10				3	1	1							
	1540	PAI-27-S046-01				3	1	1							
	1545	PAI-27-S046-05				3	1	1							
	1550	PAI-27-S046-10				3	1	1							
	1340	PAI-55-S007B-01				3	1	1							
	1355	PAI-55-S010C-01				3	1	1							

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	8/9/10	1100	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

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 2 OF 5

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02406/02688	Parris Island	Mark Sladic 412-921-7090	Cathy Dover / Compuchem
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: Shannon Hill 412-921-7090	ADDRESS: 501 Madison Ave
		CARRIER/WAYBILL NUMBER: 8735 5965 9571	CITY, STATE: Cary, NC 27513

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 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TCL VOC	HD PAH Vials	SVOC, PAH, SIM, PCB, TCL Metals, Pb						COMMENTS
8/6	1405	PAI-9/10-SO04A-01	SO	G	5	3	1	1						
	1413	PAI-9/10-SO05A-01				3	1	1						
	1420	PAI-9/10-SO06A-01				3	1	1						
	1433	~~PAI-9/10 SO~~ PAI-SS-S017A-01				3	1	1						

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
	8/9/10	1500			
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 | PAGE 3 OF 5

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02406	PARRIS ISLAND	M. SLADIC (412) 921-7090	CATHY DOVER / COMPU CHEM
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: S. HILL (412) 921-7090	ADDRESS: 501 MADISON AVE
		CARRIER/WAYBILL NUMBER: 8735 5965 9571	CITY, STATE: CARY, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	VOCs 40ml VIAL	SVOC / PAH SIM 1L AMBER	PEST / PCBS 1L AMBER	TOTAL METALS 1L HDPE	ALK / TDS 500ml HDPE	TOC 40ml VIAL			COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G	P	P	G			
PRESERVATIVE USED						HCl / 4°C	4°C	4°C	HNO3 / 4°C	4°C	H2SO4 / 4°C			
8/7	1005	PAI-9/16-TW03S-01	AQ	G	12	3	3	2	1	1	2			
	1100	PAI-9/16-TW02I-01			12	3	3	2	1	1	2			
	1125	PAI-27-TW16UI-01			12	3	3	2	1	1	2			
	1255	PAI-9/16-TW01S-01			12	3	3	2	1	1	2			
	1300	PAI-27-TW16TS-01			12	3	3	2	1	1	2			
	1320	PAI-27-TW16SS-01			12	3	3	2	1	1	2			
	1450	PAI-9/16-TW04I-01			12	3	3	2	1	1	2			
	1625	PAI-27-GW19S-03			12	3	3	2	1	1	2			
	1710	PAI-27-GW53S-02			12	3	3	2	1	1	2			
	1840	PAI-27-GW48I-02			12	3	3	2	1	1	2			
	1920	PAI-27-GW54I-02			12	3	3	2	1	1	2			
↓	0700	PAI-TB-080710-01			2	2	-	-	-	-	-			
8/8	1150	PAI-27-GW09S-03	↓		12	3	3	2	1	1	2			

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
	8/9/10	1600			
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)

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 4 OF 5

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02406	PARRIS ISLAND	M. SLADIC (412) 921-7090	CATHY DOVER / COMPU CHEM
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: S. HILL (412) 921-7090	ADDRESS: 501 MADISON AVE.
		CARRIER/WAYBILL NUMBER: 8735 5965 9571	CITY, STATE: CARY, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	VOCs 40ml VIAL	SVOC / PAH SIM 1L GLASS AMBER	PEST / PCBS 1L GLASS AMBER	TOTAL METALS 1L HDPE	ALK / TDS 500ml HDPE	TOC 40ml VIAL			COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G	R	R	G			
PRESERVATIVE USED						HCl / 4°C	4°C	4°C	HNO3 / 4°C	4°C	H2SO4 / 4°C			
8/8	1255	PAI-27-GW116S-03	Aq	G	12	3	3	2	1	1	2			
	1325	PAI-27-GW162S-02			12	3	3	2	1	1	2			
	1455	PAI-27-GW152I-02			12	3	3	2	1	1	2			
	1525	PAI-27-GW121S-03			12	3	3	2	1	1	2			
	1625	PAI-27-GW151S-02			12	3	3	2	1	1	2			
	1720	PAI-27-GW105I-03			36	9	9	6	3	3	6			MS/MSD
	1835	PAI-27-GW100I-02			12	3	3	2	1	1	2			
	2000	PAI-27-GW161S-02			12	3	3	2	1	1	2			
	00:00	PAI-27-GW080810-02			12	3	3	2	1	1	2			
	00:00	PAI-27-GW080810-01			12	3	3	2	1	1	2			
8/9	0955	PAI-27-GW103S-03			12	3	3	2	1	1	2			
	1020	PAI-27-TW165I-01			12	3	3	2	1	1	2			
	1035	PAI-27-GW156I-02			12	3	3	2	1	1	2			

PAI-27-GW160I-02
PAI-27-GW151S-0

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
	8/9/10	1600			
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

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 5 OF 5

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02406	PARRIS ISLAND	M. SLADIC (412) 921-7090	CATHY DOVER / COMPU CHEM
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: S. HILL (412) 921-7090	ADDRESS: 501 MADISON AVE
		CARRIER/WAYBILL NUMBER: 8735 5965 9571	CITY, STATE: CARY NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	VOCs 40 ml VIALS	SVOC / PAH S/M 1L GLASS AMBER	PEST / PCBS 1L GLASS AMBER	TOTAL METALS 1L HDPE	ALK / TDS 500ml HDPE	TOC 40ml VIALS			COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G	P	P	G			
PRESERVATIVE USED						HCl / 4°C	4°C	4°C	HNO3 / 4°C	4°C	H2SO4 / 4°C			
8/9	1135	PA1-27-GW1045-03	Aq	G	12	3	3	2	1	1	2			

1. RELINQUISHED BY	DATE 8/9/10	TIME 1600	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

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

3/99
FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 1 OF 1

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02406	Parris Island	Mark Sladic 412-921-7090	Cathy Dover / Compuchem
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: Shannon Hill 412-921-7090	ADDRESS: 501 Madison Ave
		CARRIER/WAYBILL NUMBER	CITY, STATE: Cary, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	VOC 40 mL Vial	SVOC, PAH 1L Amber	RCP, PCBS 1L Amber	Total Metal 1L HDPE	TOC 40 mL Vial	Alk, TDS 500 mL HDPE			COMMENTS
		CONTAINER TYPE PLASTIC (P) or GLASS (G)				G	G	G	P	G	P			
		PRESERVATIVE USED				HCl/4°C	4°C	4°C	HNO3/4°C	H2SO4 4°C	4°C			
8/9	1200	PAI-TB-080910-01	Aq	lab prep	2	2	—	—	—	—	—			
	1715	PAI-27-GW55S-02		G	36	9	9	6	3	6	3			MS/MSD
	1845	PAI-27-GW58S-02			12	3	3	2	1	2	1			
	1935	PAI-27-GW02I-03			12	3	3	2	1	2	1			
8/10	0810	PAI-27-GW59I-02			12	3	3	2	1	2	1			
	0925	PAI-27-GW63S-02			12	3	3	2	1	2	1			
	1030	PAI-27-GW61I-02			12	3	3	2	1	2	1			
	1050	PAI-27-GW01S-03			36	9	9	6	3	6	3			MS/MSD
	1140	PAI-27-GW20S-03			12	3	3	2	1	2	1			
	1230	PAI-27-GW57S-02			12	3	3	2	1	2	1			

1. RELINQUISHED BY	DATE	TIME	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

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 1 OF 4

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02400	Parris Island	Mark Sladic 412-921-7090	Cathy Power / CompuChem
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: Shannon Hill 412-921-7090	ADDRESS: 501 Madison Ave
		CARRIER/WAYBILL NUMBER	CITY, STATE: Cary, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	VOC 40 mL Vial	SVOC/PAH-SIM 1L Amber	Pest/PCB 1L Amber	Total metals 1L HDPE	Alk/TDS 500 mL HDPE	TOC 40 mL HDPE	Ion Chromatography (Chloride) 40 mL Vial		COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G	P	P	G	G		
PRESERVATIVE USED						HCl/4°C	4°C	4°C	HNO3 4°C	4°C	NaSO4 4°C	4°C		
8/11	1600	PAI-27-GW11BD-02	Aq	G	12	3	3	2	1	1	2	—		
↓	1700	PAI-27-GW11S-03			12	3	3	2	1	1	2	—		
8/12	1330	PAI-11S-IDW-081210-01			4	3	—	—	1	—	—	—		
8/12	1100	PAI-27-IDW-CS1210-02			13	3	3	2	1	1	2	1		
↓	1430	PAI-27-RB-081210-01			12	3	3	2	1	1	2	—		Tubing

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
	8/12/10	1700			
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

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 2 OF 4

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02406	Parris Island	Mark Sladic 412-921-7090	Cathy Dover / Compass
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: S. Hill 1112-921-7090	ADDRESS: 501 Madison Ave
		CARRIER/WAYBILL NUMBER	CITY, STATE: Cary, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	VOC	SVOC (PCB/PAH)	Metals (TOC)						COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	G			
PRESERVATIVE USED									None	Na2S2O3	4°C	4°C		
TYPE OF ANALYSIS							40 mL Vials	8oz SIM	2oz					
8/12	0945	PA1-9/16-SO02A-01	SO	G	5	3	1	1						
	0950	PA1-9/16-SO02B-01			5	3	1	1						
	1000	PA1-9/16-SO04B-01			5	3	1	1						~~Dup of~~
	00:00	PA1-9/16-SO-081210-15			5	3	1	1						Dup of 04B
	1010	PA1-9/16-SO04C-D1			5	3	1	1						
	1020	PA1-55-SO17C-01			5	3	1	1						
	1030	PA1-55-SO17D-01			5	3	1	1						

1. RELINQUISHED BY	DATE 8/12/10	TIME 1700	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

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 3 OF 4

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02406	PARRIS ISLAND	M. SLADIC (412) 921-7090	CATHY DOVER / COMPU CHEM
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: S. HILL (412) 921-7090	ADDRESS: 501 MADISON AVE
		CARRIER/WAYBILL NUMBER	CITY, STATE: CARY, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G G R R G

PRESERVATIVE USED: HCl/4°C 4°C 4°C HNO3/4°C 4°C H2SO4/4°C

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	VOCs 40ml Vial	SVOC/PAH SIM 1L Glass Amber	PEST/PCBs 1L Glass Amber	Total Metals 1L HDPE	ALK/TDS 500ml HDPE	TOC 40ml Vial			COMMENTS
8/10	1650	PAI-27-GW10S-03	AQ	G	12	3	3	2	1	1	2			
	1795	PAI-27-GW14S-02			12	3	3	2	1	1	2			
	1840	PAI-27-GW15I-03			12	3	3	2	1	1	2			
	1925	PAI-27-GW15OI-02			12	3	3	2	1	1	2			
	1400	PAI-TB-081010-01		Cyo prep	2	2	—	—	—	—	—			
8/11	0930	PAI-27-GW14S-03		G	12	3	3	2	1	1	2			
	0940	PAI-27-GW07I-03			12	3	3	2	1	1	2			
	00:00	PAI-27-081110-03			12	3	3	2	1	1	2			Dup of GW07I-0
	1220	PAI-27-GW08D-02			12	3	3	2	1	1	2			
	00:00	PAI-27-081110-05			12	3	3	2	1	1	2			Dup of GW08D-02
	1245	PAI-27-GW12I-03			12	3	3	2	1	1	2			
	00:00	PAI-27-081110-04			12	3	3	2	1	1	2			12I-03
	1515	PAI-27-GW06S-03			12	3	3	2	1	1	2			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	8/12/10	1700	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)

3/99
FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER | PAGE 4 OF 11

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G02406	Paris Island	Mark Stone 412-921-7090	Cathy Dover/Compuchem
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: Shannon Hill 412-921-7010	ADDRESS: 501 Madison A-2
		CARRIER/WAYBILL NUMBER	CITY, STATE: Cary, NC 27513

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2010	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: TCLP/ZHE VOC	TCLP SVOC/PCB (Wipes/Blank)	Background Inorganics (Metals)						COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						G	G	G						
PRESERVATIVE USED						HCL	HCL	HCL						
8/11	~~1830~~	~~PA1-IDW1-081110-01~~												
	1830	PA1-27-IDW1-081110-01	SO	C	3	1	1	1						

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
	8/12/10	1900			
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

C-2 PHASE I RI – SOIL SAMPLE LOG SHEETS

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

Sample ID No.: PAI-27-5501-01
Sample Location: 5B001
Sampled By: T. ROHAN
C.O.C. No.: 4583

[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: 9-19-07 Time: 1510 Method: Dis Trowel Monitor Reading (ppm):	0-1'	BRN	Silty Sand Sl. Moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method:				
NA				
Monitor Readings				
(Range in ppm):				
NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles	3 X (4) Encore Sampler	Yes	
SVOA/Pesticides/PCBS	2 X (1) 8oz Jar	Yes	
TAL Metals	2 X (1) 2oz Jar	Yes	

OBSERVATIONS / NOTES:

IN MAINTAINED GRASS

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: PAI-27-5502-01
Sample Location: 58002
Sampled By: T. ROSAHN
C.O.C. No.: 4583

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-19-07 Time: 1455 Method: Dis Trowel Monitor Reading (ppm):	0-1'	BRN	Silty Sand Sl. Moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method:				
NA				
Monitor Readings				
(Range in ppm):				
NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles	(4) Encore Sampler	Yes	
SVOA/Pesticides/PCBS	(1) 8oz Jar	Yes	
TAL Metals	(1) 2oz Jar	Yes	

OBSERVATIONS / NOTES:

IN GRASS

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

Sample ID No.: PAI-27-SS03-01
Sample Location: SB-003
Sampled By: SJC/TR
C.O.C. No.: 4582

[X] Surface Soil
~~[X] Subsurface Soil~~ SJC
[] 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: 9-19-07 Time: 1430 Method: DPT Monitor Reading (ppm): 0	0-1 *	TAN YELLOW	SAND - TR SHELLS - DAMP

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method:				
NA				
Monitor Readings				
(Range in ppm):				
NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles	(4) Encore Sampler	Yes	
SVOA/Pesticides/PCBS	(1) 8oz Jar	Yes	
TAL Metals	(1) 2oz Jar	Yes	

OBSERVATIONS / NOTES:

0-4" ASPHALT
0-1' Below Asphalt

MAP:

Circle if Applicable:

MS/MSD —
Duplicate ID No.: —

Signature(s):

SJ Conti

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

Sample ID No.: PAI-27-SS04-01
Sample Location: SB-004
Sampled By: SJC/TR
C.O.C. No.: 4582 & 4583

[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: 9-19-07 Time: 1410 Method: DPT Monitor Reading (ppm): 0	0-1*	YELLOW BRN TO BRN	SILTY SAND - DAMP → MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles	(4) Encore Sampler	Yes	
SVOA/Pesticides/PCBS	(1) 8oz Jar	Yes	SJC
TAL Metals	(1) 2oz Jar	Yes	

OBSERVATIONS / NOTES:

0-4" ASPHALT
* 0-1' BELOW ASPHALT

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: FD091907-02
~~PAI-27-SS-~~ SJC

Signature(s):

SJ Conti

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

Sample ID No.: PAI-27-SS05-01
Sample Location: SB-005
Sampled By: SJC/TR
C.O.C. No.: 4582

[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: 9-19-07 Time: 1420 Method: DPT Monitor Reading (ppm):	0-1 *	YELLOW BRN	SILTY SAND - MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method:				
NA				
Monitor Readings				
(Range in ppm):				
NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles	(4) Encore Sampler	Yes	
SVOA/Pesticides/PCBS	(1) 8oz Jar	Yes	
TAL Metals	(1) 2oz Jar	Yes	

OBSERVATIONS / NOTES:

0-4" ASPHALT
* 0-1 Below Asphalt

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: ~

Signature(s):

SJ Conte

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[X] Surface Soil
[X] ~~Subsurface Soil~~ SJC
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: PAI-27-SS06-01
Sample Location: SB-006
Sampled By: TR/SJC
C.O.C. No.: 4582

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-19-07 Time: 1355 Method: DPT Monitor Reading (ppm): 0	0-1*	BRN	SILTY SAND - MOIST ~ 4" ASPHALT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method:				
NA				
Monitor Readings				
(Range in ppm):				
NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles	(4) Encore Sampler	Yes	✓
SVOA/Pesticides/PCBS	(1) 8oz Jar	Yes	✓
TAL Metals	(1) 2oz Jar	Yes	✓

OBSERVATIONS / NOTES:

* 0-1' (Below Asphalt)

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): SJ Conte

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: PAI-27-SS07-01
Sample Location: SB-007
Sampled By: SJC/TR
C.O.C. No.: 4582

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-19-07 Time: 1440 Method: DPT Monitor Reading (ppm): 0	0-1*	GRAY BRN	SILTY SAND - DAMP → MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles	(4) Encore Sampler	Yes	
SVOA/Pesticides/PCBS	(1) 8oz Jar	Yes	
TAL Metals	(1) 2oz Jar	Yes	

OBSERVATIONS / NOTES:

* No Asphalt - 3" TOP SOIL

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

SJ Conte

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

Sample ID No.: PAI-27-5508-01
Sample Location: SB008
Sampled By: T. ROJAHN
C.O.C. No.: 4582 & 4583

[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: 9-19-07 Time: 1220 Method: Dig Trowel Monitor Reading (ppm): —	0-1	Brown	Silty Sand, some gravel Trace organic roots

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method:				
NA				
Monitor Readings				
(Range in ppm):				
NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles	(4) Encore Sampler	Yes	
SVOA/Pesticides/PCBS	(1) 8oz Jar	Yes	
TAL Metals	(1) 2oz Jar	Yes	

OBSERVATIONS / NOTES:

Drainage to culvert

MAP:

Circle if Applicable:

MS/MSD: —

Duplicate ID No.: FD09190701

Signature(s):

Ty Rojahn

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

Sample ID No.: PAI-27-5509-01
Sample Location: SB009
Sampled By: T. Rosahn
C.O.C. No.: 4582

[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: 9-19-07 Time: 1200 Method: Dis Trowel Monitor Reading (ppm): —	0-1	Brown	Silty Sand some gravel trace roots sl. moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles	(4) Encore Sampler	Yes	
SVOA/Pesticides/PCBS	(1) 8oz Jar	Yes	
TAL Metals	(1) 2oz Jar	Yes	

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: MCRD Parris Island
Project No.: 112G00455, CTO 039

Sample ID No.: PAI-27-SS10-01
Sample Location: SB010
Sampled By: T. ROJAHN
C.O.C. No.: 4582

[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: 9-19-07 Time: 1135 Method: Dis Trowel Monitor Reading (ppm): —	0-1'	Lt Grey	~~Silty~~ (TT) Silty Sand Moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles	(4) Encore Sampler	Yes	
SVOA/Pesticides/PCBS	(1) 8oz Jar	Yes	
TAL Metals	(1) 2oz Jar	Yes	

OBSERVATIONS / NOTES:

Collected IN drainage swale, WEST OF asphalt lot

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

Sample ID No.: PAI-27-SS11-01
Sample Location: SB011
Sampled By: T. Rosahn
C.O.C. No.: 4582

[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: 9-19-07 Time: 1125 Method: Dis Trowel Monitor Reading (ppm): —	0-1	Lt Grey	Silty Sand Moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method:				
NA				
Monitor Readings				
(Range in ppm):				
NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles	(4) Encore Sampler	Yes	
SVOA/Pesticides/PCBS	(1) 8oz Jar	Yes	
TAL Metals	(1) 2oz Jar	Yes	

OBSERVATIONS / NOTES:

Collected:
In drainage swale west of asphalt lot

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Ty Rosahn

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

Sample ID No.: PA1-27-SS12-01
Sample Location: SB012
Sampled By: T. Ronahan
C.O.C. No.: 4582

[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: 9-19-07 Time: 1115 Method: Dis Trowel Monitor Reading (ppm): —	0-1'	Lt Grey	Silty Sand Moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method:				
NA				
Monitor Readings				
(Range in ppm):				
NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles	(4) Encore Sampler	Yes	
SVOA/Pesticides/PCBS	(1) 8oz Jar	Yes	
TAL Metals	(1) 2oz Jar	Yes	

OBSERVATIONS / NOTES:

Collected in Drainage swale. West of asphalt lot

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page 1 of 1

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

Sample ID No.: PAI-27-SS13-01
Sample Location: (TR) ~~SB13~~ SB013
Sampled By: T. ROJAHN
C.O.C. No.: 4582

[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: 9-19-07 Time: 1055 Method: Dig Trowel Monitor Reading (ppm): –	0-1'	Lt Grey	Silty SAND Moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles	(4) Encore Sampler	Yes	
SVOA/Pesticides/PCBS	(1) 8oz Jar	Yes	
TAL Metals	(1) 2oz Jar	Yes	

OBSERVATIONS / NOTES:

Collected on S. side of FENCE and Asphalt lot.

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: PAI-27-SB03-12
Sample Location: SB-003
Sampled By: SJC/TR
C.O.C. No.: 4582

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-19-07 Time: 1435 Method: DPT Monitor Reading (ppm): 0	1-2	BRN GRAY	SILTY SAND - MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method:				
NA				
Monitor Readings				
(Range in ppm):				
NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles	(4) Encore Sampler	Yes	X
SVOA/Pesticides/PCBS	(1) 8oz Jar	Yes	X SR
TAL Metals	(1) 2oz Jar	Yes	X

OBSERVATIONS / NOTES:

1-2' (Below Asphalt)

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

SJ Conte

C-3 PHASE II RI - SOIL SAMPLE LOG SHEETS

Tetra Tech NUS, Inc.

MULTIPLE SAMPLE LOG SHEET

[] SURFACE SOIL [] SEDIMENT
[] SUBSURFACE SOIL [] LAGOON / POND
[] OTHER _____

SIGNATURE(S): SJ Conti
SAMPLER (S): SJ Conti

PROJECT NAME: MCRD SITE 27
PROTECT NUMBER: 112G00455

LOCATION: SITE 27

SAMPLE No.	SAMPLE METHOD	DEPTH (FL)	DATE 2008	TIME	CONCENTRATION (L)LOW (H)HIGH	(G) GRAB (C) COMPOSITE	TOTAL No. OF CONTAINERS	ANALYSES VOC 5	PEST 4 oz	TOC/PH 2 oz				USCS	PID READING	SOIL DESCRIPTION
PAI-27-SS-027-01	DT	0-1	8/12	0830	L	G	6	4	1	1						
PAI-27-SS-027-06	DT	5-6	"	0840	L	G	6	4	1	1						
PAI-27-SS-022-01	"	0-1	"	0850	"	"	6	4	1	1						
PAI-27-SS-022-05	"	4-5	"	0900	"	"	6	4	1	1						
PAI-27-SS-023-01	"	0-1	"	0910	"	"	6	4	1	1						
PAI-27-SS-023-04	"	3-4	"	0915	"	"	6	4	1	1						
PAI-27-SS-032-01	"	0-1	"	0925	"	"	6	4	1	1						
PAI-27-SS-032-04	"	3-4	"	0939	"	"	6	4	1	1						
PAI-27-SS-031-01	"	01	"	0940	"	"	6	4	1	1						
PAI-27-SS-031-04	"	3-4	"	0947	"	"	6	4	1	1						
PAI-27-SS-021-01	"	0-1	"	0955	"	"	6	4	1	1						
PAI-27-SS-021-04	"	3-4	"	1000	"	"	6	4	1	1						
PAI-27-SS-025-01	"	0-1	"	1015	"	"	6	4	1	1						
PAI-27-SS-025-07	"	6-7	"	1020	"	"	6	4	1	1						

REMARKS:

LABORATORY: KATAHDIN

COC No.:

Tetra Tech NUS, Inc.

MULTIPLE SAMPLE LOG SHEET

[] SURFACE SOIL [] SEDIMENT
[] SUBSURFACE SOIL [] LAGOON / POND
[] OTHER _____

SIGNATURE(S): SJ Conti
SAMPLER (S): SJ CONTI

PROJECT NAME: MCRD SITE 27
PROTECT NUMBER: 112G00455

LOCATION: SITE 27

SAMPLE No.	SAMPLE METHOD	DEPTH (FL)	DATE 2008	TIME	CONCENTRATION (L)LOW (H)HIGH	(G) GRAB (C) COMPOSITE	TOTAL No. OF CONTAINERS	ANALYSES: VOCs	PESTS 4oz	TOC/pH 2oz				USCS	PID READING	SOIL DESCRIPTION
PAI-27-SS-024-01	DT	0-1	8/12	1035	L	G	6	4	1	1						
PAI-27-DU-081208-01	DT	0-1	"	0000	"	"	6	4	1	1						DUP OF 024-01
PAI-27-SS-024-07	"	6-7	"	1045	"	"	6	4	1	1						
PAI-27-SS-020-01	"	0-1	"	1100	"	"	16	12	2	2						
PAI-27-SS-020-07	"	6-7	"	1110	"	"	6	4	1	1						
PAI-27-SS-019-01	"	0-1	"	1120	"	"	6	4	1	1						
PAI-27-SS-019-07	"	6-7	"	1125	"	"	6	4	1	1						
PAI-27-DU-081208-02	"	6-7	"	0000	"	"	6	4	1	1						DUP OF 019-07
PAI-27-SS-014-01	"	0-1	"	1140	"	"	6	4	1	1						
PAI-27-SS-014-07	"	6-7	"	1145	"	"	6	4	1	1						
PAI-27-SS-030-01	"	0-1	"	1155	"	"	6	4	1	1						
PAI-27-SS-030-06	"	5-6	"	1200	"	"	6	4	1	1						

REMARKS: (16) DO MS/MSD

LABORATORY: KATAHDIN

COC No.:

Tetra Tech NUS, Inc.

MULTIPLE SAMPLE LOG SHEET

[] SURFACE SOIL [] SEDIMENT
[] SUBSURFACE SOIL [] LAGOON / POND
[] OTHER _____

SIGNATURE(S): SJ Conti
SAMPLER (S): SJ CONTI

PROJECT NAME: MCRD SITE 27
PROTECT NUMBER: 112G00455

LOCATION:

SAMPLE No.	SAMPLE METHOD	DEPTH (Ft.)	DATE 2008	TIME	CONCENTRATION (L)LOW (H)HIGH	(G) GRAB (C) COMPOSITE	TOTAL No. OF CONTAINERS	ANALYSES VOCs	PESTS	TOC/pH				USCS	PID READING	SOIL DESCRIPTION
PAI-27-SS-015-01	DT	0-1	8/12	1215	L	G	6	4	1	1						
PAI-27-SB-015-07	"	6-7	"	1225	"	"	6	4	1	1						
PAI-27-DU-081208-03	"	6-7	"	0000	"	"	6	4	1	1						DUP OF 015-07
PAI-27-SS-016-01	"	0-1	"	1245	"	"	6	4	1	1						
PAI-27-SB-016-07	"	6-7	"	1250	"	"	6	4	1	1						
PAI-27-SS-017-01	"	01	"	1300	"	"	6	4	1	1						
PAI-27-SB-017-07	"	6-7	"	1305	"	"	6	4	1	1						
PAI-27-SS-018-01	"	0-1	"	1310	"	"	6	4	1	1						
PAI-27-SB-018-07	"	6-7	"	1315	"	"	6	4	1	1						

REMARKS:

LABORATORY: KATAHDIN

COC No.:

Tetra Tech NUS, Inc.

MULTIPLE SAMPLE LOG SHEET

[] SURFACE SOIL [] SEDIMENT
[] SUBSURFACE SOIL [] LAGOON / POND
[] OTHER _____

SIGNATURE(S): SJ Conti
SAMPLER (S): SJ Conti

PROJECT NAME: MCRD SITE 27
PROTECT NUMBER: 112G00455

LOCATION: SITE 27

SAMPLE No.	SAMPLE METHOD	DEPTH (Ft.)	DATE 2007	TIME	CONCENTRATION (L)LOW (H)HIGH	(G) GRAB (C) COMPOSITE	TOTAL No. OF CONTAINERS	ANALYSES: VOCs	Pest	TOC pH				USCS	PID READING	SOIL DESCRIPTION
PAI-27-SS-026-01	DT	0-1	8/12	1340	L	G	6	4	1	1						
PAI-27-SB-026-07	"	6-7	"	1345	"	"	6	4	1	1						
PAI-27-SS-028-01	"	0-1	"	1355	"	"	6	4	1	1						
PAI-27-SB-028-06	"	5-6	"	1400	"	"	6	4	1	1						
PAI-27-SS-029-01	"	0-1	"	1410	"	"	6	4	1	1						
PAI-27-DU-081208-04	"	0-1	"	0000	"	"	6	4	1	1						DUP OF 029-01
PAI-27-SB-029-06	"	5-6	"	1420	"	"	16	12	2	2						

REMARKS:

LABORATORY: KATAHDIN

COC No.:

C-4 PHASE II RI – SOIL BORING LOGS

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: DPT GEOPROBE

BORING No.: SB014
DATE: 8/12/08
GEOLOGIST: C. WARLND
DRILLER: COREY GAMWELL

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-	0.5				LOOSE	LT BROWN	VF-F SAND/ROOTS	SP	DRY	17.5			
0.5-	3.0				LOOSE	BROWN	VF-F SAND	SP	MOIST	16.3			
3.0-	3.5		4/5		LOOSE	DK BROWN	VF-F SAND, F GRAVEL	SW	MOIST	16.7			
							SOME FUEL STAINING			21.7			
3.5-	5.0				LOOSE	TAN	VF-F SAND	SP	MOIST	20.7			
										15.2			
5.0-	8.0						SAA		WET @ 7.5'	21.4			
			3/5							80.7			
8.0-	8.5				STIFF	GRAY	CLAY MED PLASTICITY	CL	MOIST	115			
8.5-	10.0				DENSE	GRAY	VF-F SAND	SP	WET	302			
							PRODUCT FOUND IN SAND @ 8.5'						
					*	PETRO ODOR 7.0-10.0							

* 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): 0.0

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: SB015
DATE: 8/12/08
GEOLOGIST: C. WARING
DRILLER: COLEY CAMPBELL

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 -	0.5				LOOSE	BROWN	VF-F SAND / ROOTS	SW	DRY	15.1			
							FINE GRAVEL			18.4			
0.5 -	5.0		3/5		LOOSE	BROWN	VF-F SAND			12.6			
							FINE GRAVEL	SW	MOIST	10.2			
										10.4			
5.0 -	6.0						SAA			850			
6.0 -	7.0				LOOSE	DK BROWN/GRAY	VF-F SAND	SP	MOIST	3500			
7.0 -	8.0		3/5		LOOSE	GRAY	VF-F SAND	SP	WET	>4000			
8.0 -	9.0				STIFF	GRAY	CLAY MED PLASTICITY	CL	MOIST	>4000			
9.0 -	10.0				DENSE	GRAY	VF-F SAND W/ CLAY	SC	WET	4500			
							W/ PRODUCT						
					*	PETRO	ODOR 6.0 - 10.0						

* 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: MCRD PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: SB016
DATE: 8/12/08
GEOLOGIST: C. WARLIND
DRILLER: COREY CAMWELL

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-	0.5				LOOSE	BROWN	VF-F SAND/ROOTS/ F GRAVEL	SW	DRY	12.5			
										11.6			
0.5-	5.0		3/5		LOOSE	LT BROWN	VF-SAND	SP		11.8			
										11.3			
										11.5			
5.0-	6.5						SAA			11.9			
6.5	-7.5				LOOSE	DK GRAY	VF-F SAND w/ CLAY	SC	MOIST	86.1			
7.50	-9.50		3/5		LOOSE	GRAY	VF-F SAND	SP	WET	153			
9.50	-9.75				STIFF	GRAY	CLAY / MED PLASTICITY	CL	MOIST	125			
9.75	-10.0				DENSE	GRAY	VF-F SAND W/ CLAY	SC	WET	134			

* 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: MCRD PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: SB017
DATE: 8/12/08
GEOLOGIST: C. WARNO
DRILLER: COREY CAMWELL

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-	0.5				LOOSE	LT BROWN	VF-F SAND	SP	DRY	13.1			
0.5-	2.5				LOOSE	BROWN	VF-F SAND, F GRAVEL	SW	MOIST	12.8			
2.5-	2.75		4/5		LOOSE	BLACK	VF-F GRAVEL FILL	GP	MOIST	13.1			
										11.9			
2.75-	5.0				LOOSE	TAN	VF-F SAND	SP	MOIST	12.6			
5.0-	7.5						SAA			12.2			
7.5-	8.0				DENSE	BROWN/GRAY	CLAYE VF-F SAND	SP	WET	12.7			
			3/5							100.5			
										159.1			
8.0-	10.0				DENSE	GRAY	CLAYEY VF-F SAND	SP	WET	63.3			

* 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: MCRD PARRIS ISLAND SITE 27
PROJECT NUMBER: 6004SS
DRILLING COMPANY: VIRONEY
DRILLING RIG: GEOPROBE DPT

BORING No.: SB018
DATE: 8/12/08
GEOLOGIST: L. WARINO
DRILLER: LORRY CAMWELL

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-	0.5				LOOSE	TAN	VF-F SAND	SP	DRY	12.8			
0.5-	3.5				LOOSE	BLK	VF-F GRAVEL FILL	GP	MOIST	12.4			
-			3/5							12.5			
										13.2			
3.5-	5.0				LOOSE	LT BROWN	VF-F SAND	SP	MOIST	13.2			
5.0-	7.5						SAA			16.3			
7.5-	9.25				LOOSE	GRAY	VF-F SAND W/CLAY	SC	WET	58.5			
			3/5							56.7			
9.25	9.75				STIFF	GRAY	CLAY, MOD PLASTICITY		MOIST	39.9			
9.75-	10.00				DENSE	GRAY	VF-F SAND W/ CLAY		WET	118			

* 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): 00

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MLRD PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: SB019
DATE: 8/12/08
GEOLOGIST: C. WARING
DRILLER: CORLEY CAMWELL

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-	0.5				LOOSE	BROWN	VF-F SAND / ROOTS / F GRAVEL		DRY-MOIST	5.9			
0.5-	3.0				LOOSE	BROWN	VF-F SAND	SP	MOIST	5.6			
			3/5							11.0			
										11.0			
3.0-	5.0				LOOSE	LT TAN	VF-F SAND	SP	MOIST	7.1			
5.0-	7.5				LOOSE	TAN	VF-F SAND	SP	MOIST	20.1			
										25.5			
7.5-	8.0		3/5		LOOSE	GRAY	VF-F SAND	SP	WET	59.0			
8.0-	9.0				STIFF	GRAY	CLAY MED PLASTICITY	CL	MOIST	80.1			
9.0-	10.0				DENSE	GRAY	VF-F SAND W/ CLAY	SC	WET	213			
					* PETRO ODOR 6.0-10.0								

* 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: MCRD PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: SB020
DATE: 8/12/08
GEOLOGIST: C. WARNO
DRILLER: COREY GAMWELL

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-	0.5				LOOSE	BROWN	VF-F SAND / ROOTS	SP	DRY	8.7			
0.5-	3.0				LOOSE	BROWN	VF-F SAND	SP	MOIST	7.1			
			3/5							6.4			
3.0-	5.0				LOOSE	LT BROWN	VF-F SAND	SP	MOIST	5.4			
5.0-	7.0				LOOSE	BROWN	VF-F SAND	SP	MOIST	5.0			
										5.1			
7.0-	8.5		3/5		LOOSE	BROWN	VF-F SAND	SP	WET	4.3			
8.5-	9.5				STIFF	GRAY	MOD PLASTICITY CLAY	CL	MOIST	3.1			
9.5-	10.0				DENSE	GRAY	VF-F SAND W/ CLAY	SL	WET / PETRO ODOR	70.2			

* 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): 0.0

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: SB021
DATE: 8/12/08
GEOLOGIST: C. WARNO
DRILLER: CORBY CAMWELL

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-	0.5				LOOSE	DK BROWN	VF-F SAND/ROOTS	SP	DRY	3.4			
0.5-	5.0		3/5		LOOSE	BROWN	VF-F SAND	SP	MOIST	5.4			
										3.3			
										5.8			
										3.2			
6.0-	7.0						SAA			2.1			
										2.9			
8.0-	9.0		3/5		LOOSE	DK BROWN	VF-F SAND	SP	WET	1.7			
9.0-	9.5				STIFF	GRAY	CLAY - MED PLASTICITY	CL	MOIST	2.0			
9.5-	10.0				DENSE	GRAY	VF-F SAND W/ CLAY	SC	WET / PETRO ODOR	80.1			

* 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: PARRIS ISLAND SITE 27
PROJECT NUMBER: 6001155
DRILLING COMPANY: VIRONEX
DRILLING RIG: DPT GEOPROBE

BORING No.: SB022
DATE: 8/6/08
GEOLOGIST: C. WARING
DRILLER: ~~[illegible]~~ COREY GARNWELL

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-	0.5				LOOSE	BROWN	VF-F SAND / ROOTS	SP	MOIST	54.3			
0.5-	2.0				LOOSE	BROWN	VF-F SAND	SP	MOIST	80.6			
2.0-	3.0		4/5		LOOSE	LT BROWN	VF-F SAND	SP	MOIST	79.3			
3.0-	5.0				LOOSE	TAN	VF-F SAND	SP	MOIST	73.7			
5.0-	6.0						SAA			29.6			
6.0	7.5				LOOSE	LT	BROWN VF-F SAND	SP	MOIST	6.3			
7.5-	8.0		3/5		LOOSE	BROWN	VF-F SAND W/CLAY	SC	WET	23.7			
8.0-	9.5				STIFF	GRAY	CLAY	CL	MOIST	25.2			
9.5-	10.0				LOOSE	GRAY	VF-F SAND	SP	WET / PETRO ODOR	80.4			

* 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 [redacted] No X Well I.D. #: [redacted]

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD PARRIS ISLAND SITE 27
PROJECT NUMBER: 000455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT
BORING No.: SB023
DATE: 8/12/08
GEOLOGIST: C. WARNO
DRILLER: COREY GAMWELL

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-	0.5				LOOSE	BROWN	VF-F SAND / ROOTS	SP	DRY	9.9			
0.5-	1.5				LOOSE	BROWN	VF-F SAND	SP	MOIST	17.1			
1.5-	4.0		4/5		LOOSE	DK BROWN	VF-F SAND	SP	MOIST	48.2			
					~~LOOSE~~					34.1			
4.0-	5.0				LOOSE	LT BROWN	VF-F SAND		MOIST	16.1			
5.0-	7.5						SAA			7.8			
7.5-	8.5		4/5		LOOSE	GRAY	SAND (VF-F) / WITH CLAY	SC	WET	6.1			
8.5-	9.5				STIFF	GRAY	MED PLASTICITY CLAY	CL	MOIST	9.2			
9.5-	10.0				LOOSE	GRAY	VF-F SAND	SP	WET / PETRO ODOR	186			

* 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: MCRD PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT
BORING No.: SB024
DATE: 8/12/08
GEOLOGIST: C. WARING
DRILLER: COLEY LAMUEL

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-	0.5				LOOSE	BROWN	VF-F SAND / ROOTS	SP	DRY	5.8			
0.5-	2.0				LOOSE	BROWN	VF-F SAND	SP	MOIST	4.2			
2.0-	2.5		3/5				SAA W/ BLACK STAINING			4.2			
2.5-	4.5				LOOSE	BROWN	VF-F SAND	SP	MOIST	4.9			
4.5-	5.0				LOOSE	LT BROWN	VF-F SAND	SP	MOIST	4.3			
5.0-	7.0						SAA		MOIST	3.9			
7.0-	8.0				LOOSE	BROWN/GRAY	VF-F SAND	SP	WET @ 7.0'	4.2			
			3/5							4.1			
8.0-	9.0				STIFF	GRAY	MED PLASTICITY CLAY	CL	MOIST	3.2			
9.0-	10.0				DENSE	GRAY	VF-F SAND W/CLAY	SC	WET / PETRO ODOR	34.0			

* 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): 0.0

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: SB025
DATE: 8/12/08
GEOLOGIST: C. WARNO
DRILLER: COREY CAMWELL

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-	0.5				LOOSE	BROWN	VF-F SAND / ROOTS	SP	DRY	5.8			
0.5-	2.5				LOOSE	BROWN	VF-F SAND	SP	MOIST	7.9			
2.5-	4.5		3/5		LOOSE	TAN	VF-F SAND	SP	MOIST	12.0			
4.5-	5.0				LOOSE	BROWN	VF-F SAND	SP	MOIST	4.5			
										4.3			
5.0-	7.5				LOOSE	LT BROWN	VF-F SAND	SP	MOIST	2.9			
									WET @ 7'	3.4			
7.5-	9.0		3/5		STIFF	GRAY	MED PLASTICITY CLAY	CL	MOIST	3.7			
										4.1			
9.0-	10.0				DENSE	GRAY	VF-F SAND / W/ CLAY	SL	WET / PETRO ODOR	113			

* 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: MCRD PARRIS ISLAND SITE 27
PROJECT NUMBER: 6001155
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT
BORING No.: SB026
DATE: 8/12/08
GEOLOGIST: C. WARNER
DRILLER: COREY CARNWELL

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 -	0.5				LOOSE	BROWN	VF-F SAND / ROOTS	SP	DRY	0.0			
0.5 -	3.5				LOOSE	BROWN	VF-F SAND	SP	MOIST	8.1			
			3/5				BULK @ 3.5'			9.6			
3.5 -	5.0				LOOSE	TAN	VF-F SAND	SP	MOIST	9.7			
										10.0			
5.0 -	7.0						SAA		WET @ 7.0'	9.7			
7.0 -	8.5				STIFF	GRAY/BROWN	CLAY MED PLASTICITY	CL	MOIST	10.0			
			3/5							11.0			
										24.2			
8.5 -	10.0				LOOSE	GRAY	VF-F SAND		WET	23.6			

* 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: MCRD PARRIS ISLAND
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG:

BORING No.: SB 027
DATE: 8/12/08
GEOLOGIST: CHARLIE WARING
DRILLER: COREY LAMWELL

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	0.5				LOOSE	BROWN	VF-F SAND / ROOTS	SP	DRY	140			
0.5	1.0				LOOSE	TAN	VF-F SAND, F GRAVEL	SP	DRY	187			
1.0	4.0		4/5		LOOSE	BROWN	VF-F SAND, BLACK STAINING	SP	MOIST	212			
4.0	5.0				LOOSE	TAN	VF-F SAND	SP	MOIST	166			
5.0	6.0				LOOSE	BROWN	VF-F SAND/F GRAVEL/BLACK STAINING		MOIST	251			
6.0	7.0		4/5		LOOSE	LT BROWN	VF-F SAND			164			
7.0	9.0				LOOSE	TAN	VF-F SAND		MOIST	238			
9.0	10.0				LOOSE	GRAY/BLUE	VF-F SAND		WET	171			

* 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: MCAS PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: SB028
DATE: 8/12/08
GEOLOGIST: C. WARNO
DRILLER: CORBY CAMWELL

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-	0.5					BLK	ASPHALT						
0.5-	2.5				LOOSE	BROWN	VF-F SAND	SP	MOIST	0.3			
			3/5							0.1			
2.5-	5.0				LOOSE	TAN	VF-F SAND	SP	MOIST	0.6			
										0.9			
5.0-	6.0						SAA			0.8			
6.0-	8.0		3/4		STIFF	BROWN-GRAY	CLAY MOD PLASTICITY		MOIST	0.0			
8.0-	10.0				DENSE	GRAY	VF-F SAND W/ CLAY	SC	WET	78.1			

* 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: MCAS PARRIS ISLAND SITE 27
PROJECT NUMBER: 6064SS
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: SB029
DATE: 8/12/08
GEOLOGIST: C. WARNO
DRILLER: COREY GAMWELL

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**
0.0-0.5							ASPHALT			–			
0.5-3.25					LOOSE	BROWN	VF-F SAND	SP	MOIST	2.3			
			4/5							2.1			
3.25-5.0					STIFF	BROWN-GRAY	CLAY	CL		2.0			
							MED PLASTICITY			1.3			
5.0-6.0							SAA						
			3/5							1.8			
6.0-10.0					DENSE	GRAY	VF-F SAND	SC	WET				
							TRACE CLAY			1.3			

* 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: MCRD PARRIS ISLAND SITE 20
PROJECT NUMBER: 600453
DRILLING COMPANY: VIROMEX
DRILLING RIG: GEOPROBE DPT

BORING No.: SB030
DATE: 8/12/08
GEOLOGIST: C. WARNO
DRILLER: COREY LANWELL

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-	0.5				LOOSE	BROWN	VF-F SAND / ROOTS	SP	DRY	18.0			
0.5-	3.0				LOOSE	BROWN	VF-F SAND / FINE			17.0			
			3/5				GRAVEL & BLACK STAINING	@	2.5' MOIST	16.0			
3.0-	5.0				LOOSE	TAN	VF-F SAND	SP	MOIST	14.3			
										19.1			
5.0-	7.0						SAA		WET @ 6.5'	11.9			
										14.5			
7.0-	7.5		3/5		LOOSE	BROWN/GRAY	VF-F SAND	SP	WET	19.1			
8.0-	8.5				STIFF	GRAY	CLAY MED PLASTICITY	CL	MOIST	97.0			
8.5-	10.0				DENSE	GRAY	VF-F SAND W/ CLAY	SC	WET	37.1			
					*		PETRO ODOR 6.5'-10.0'						

* 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): 0.0

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: SB031
DATE: 8/12/08
GEOLOGIST: C. WARNOD
DRILLER: C. GAMWELL

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-	0.5				LOOSE	BROWN	VF-F SAND	SP	DRY	2.9			
										3.2			
0.5-	5.0		3/5		LOOSE	BROWN	VF-F SAND	SP	MOIST	3.8			
										12.6			
										3.4			
5.0-	7.5				SAME		AS ABOVE	SP	WET @ 7.0'	4.8			
7.5-	8.0				LOOSE	GRAY	VF-F SAND W/ CLAY	SC	WET	3.4			
8.0-	9.0		3/5		STIFF	GRAY	MED PLASTICITY CLAY	CL	MOIST	4.6			
										3.1			
9.0-	10.0				DENSE	GRAY	VF-F SAND W/CLAY	SC	WET/PETRO ODOR	86.1			

* 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: MCRD PARRIS ISLAND SITE 27
PROJECT NUMBER: 000455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: SB 032
DATE: 8/12/08
GEOLOGIST: C. WARNOD
DRILLER: C. GANUEK

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-	0.5				LOOSE	BROWN	VF-F SAND / ROOTS	SP	DRY	5.0			
0.5-	2.5				LOOSE	BROWN	VF-F SAND	SP	MOIST	7.6			
			3/5										
2.5-	5.0				LOOSE	TAN	VF-F SAND	SP	MOIST	3.2			
5.0-	7.5						SAA		WET @ 7.0'				
7.0-	7.5		3/5		LOOSE	GRAY/BROWN	VF-F SAND	SP	WET	4.3			
7.5-	9.0				STIFF	GRAY	MED PLASTICITY CLAY	CL	MOIST	8.9			
9.0-	10.0				LOOSE	GRAY	VF-F SAND	SP	WET / PETRO ODOR	89.1			

* 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. #: ____

C-5 PHASE III RI – SOIL BORING LOGS

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island – Site 27
PROJECT NUMBER: 112 G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-33
DATE: 07/21/10
GEOLOGIST: Chuck Scraen
DRILLER: Billy Ewing

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**
	1		1						Grass/Pine Straw at Surface	0.0			
	2		1	0-2.75	Loose	Dk. Brn	SAND-VF; 10-20% Silt; <10% Clay	SP/SM		0.0			
	3		4/5							0.0			
	4		1	2.75-4.5	Firm	Green Gray	SAND-VF; 20-30% Silt	SM		0.0			
	5		1							0.0			
	6		1	4.5-6.5	Firm	Gray Green	SILT; 20-35% Clay 35-45% VF Sand	SM/SC		0.0			
	7		1	6.5-7.0	Firm	Gray Green	SILT 15-20% Clay	ML		0.0			
	8		5/5							0.0			
	9		1							0.0			
	10		1	7.0-10.0	Firm	Green Gray	CLAY; 8-15% Silt	CL		0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SG-34
DATE: 07/24/10
GEOLOGIST: Chuck Sorder
DRILLER: Bill Ewing

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**
	1			0.5-1.5	Firm	OR Brown	SILT; some (30-40) Clay, and (~~10-25~~ 5%) organics	ML/OL	Asphalt-0-0.5	0.0			
	2			1.5-2.0	Firm	Brown	SAND-VF; (20%) SILT 10-20% Clay	SM		0.0			
	3		4/5	2.0-2.5	Firm	Brown	SILT AND CLAY	ML/CL		0.0			
	4			2.5-3.25	Stiff	Gray Green	CLAY; 10-15% SILT	CL		0.0			
	5			3.25-4.0	Stiff	Gray Green	SILT and CLAY	ML/CL		0.0			
	6									0.0			
	7									0.0			
	8		5/5							0.0			
	9									0.0			
	10			4.0-10.0	Stiff	Gray Green	CLAY; <10% SILT	CL		0.0			
	11									0.0			
	12			10.0-12.0	Firm	Gray	SILT; 10-20% Clay	ML		0.0			
	13		3.5/5	12-13	Stiff	Gray Green	CLAY; 20-30% Silt	CL		0.0			
	14									0.0			
	15			13.0-15.0	Firm	Gray	SILT; 10-20% Clay	ML		0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very Fine
Duplicate from 0-1' Bgs

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island – Site 27
PROJECT NUMBER: 112G 02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-35
DATE: 07/21/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1									0.0			
	2			0.5 – 2.25	Loose	Red Brn.	SAND-VF; 10-20% Silt; trace (<10%) Clay	SP/SM	Asphalt – 0-0.5' Bgs	0.0			
	3		3/5	2.25 – 3.75	Firm	Gray	SAND-VF; 20-30% Silt; 5-15% Clay	SM/SC		0.0			
	4									0.0			
	5			3.75 – 5.0	Loose	Gray	SAND-VF; 10-20% Silt/Clay	SM		0.0			
	6									0.0			
	7									0.0			
	8		4/5	5.0 – 8.75	Firm		CLAY – <10% Silt; trace VF Sand (<10%)	CL		0.0			
	9									0.0			
	10			8.75-10.0	Firm		CLAY; 15-20% Silt	CL		0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF= Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island – Site 27
PROJECT NUMBER: 112G08406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-36
DATE: 07/22/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1	0.5-1	Firm	Red Brn.	SAND-VF; Some (20-30%) Silt/ Trace (<10%) Clay	SM	Asphalt -0.0-0.5'	0.0			
	2		1	0.5-0.75	Stiff	Gray	CLAY AND SILT (35-45%) trace (<10%) VF Sand	CL/ML		0.0			
	3		4/5							0.0			
	4			0.75-4.0	Loose	Gray/ Brn	SAND-VF; Little (10-20%) Silt; trace (<10%) Clay	SP		0.0			
	5		V	4.0-5.0	Stiff	Rust Brn.	CLAY; Trace (<10%) Silt	CL		0.0			
	6		1	5-5.5	Loose	Rust Brn	CLAY; Some (20-30%) Silt (Silty Clay)	CL/ML		0.0			
	7		4/5							0.0			
	8									0.0			
	9		V							0.0			
	10			5.5-10.0	Firm	Gray Green	CLAY; Trace (<10%) Silt	CL	Rust Brown areas throughout	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): 0.0

Remarks: UF = Very Fine

Converted to Well: Yes ____ No X Well I.D. #: ____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island – Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI-27-SO-37
DATE: 07/21/10
GEOLOGIST: Chuck Scraden
DRILLER: Billy Ewing

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**
	1		1						Asphalt 0-0.5' Bgs	0.0			
	2		1							0.0			
	3		3.5/5	0.5-3.0	Loose	Lt. Brn	SAND-VF; 10-20% Silt; <10% Clay	SP/SM	Woody layer ~3.5'	0.0			
	4		1	3.0-3.75	Loose	Gray	SAND-VF; <10% Silt	SP		0.0			
	5		1	3.75-4.5	Loose	Lt. Gray	SAND-VF; ~15% Silt	SM		0.0			
	6		1	4.5-5.0	Loose	Orange Brn	SAND-VF; 10-20% Silt and Clay	SM		0.0			
	7		1	5.0-6.5		Orange Brn.	SAND AND (35-45%) Silt; 20-30% Clay	SM/SC		0.0			
	8		4/5	6.5-8.75	Firm	Gray Green	CLAY; <10% Silt	CL		0.0			
	9		1	8.75-9.5	Firm	Gray Green	CLAY AND (30-45%) SILT	CL/ML		0.0			
	10		1	9.5-10.0	Firm	Gray	SILT; Some Clay (25-35%)	ML/CL		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): 0.0

Remarks: VF = Very Fine

Converted to Well: Yes ____ No X Well I.D. #: ____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-38
DATE: 07/24/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1			0.5-1.5	Firm	Brown	SILT; 10-30% clay	ML	Asphalt 0-0.5'	0.0			
	2									0.0			
	3		35/5							0.0			
	4									0.0			
	5									0.0			
	6			1.5-6.0	Loose	Tan Brown	SAND-U SAND SILT; (10-30% clay	SM		0.0			
	7									0.0			
	8			6-8.25	Firm	Gray Green	Clay 10-15% silt from 8-8.25'	CL		0.0			
	9									0.1			
	10			8.25-9.90	Loose	Gray	SILT; 10-20% Clay	ML		0.0			
				9.90-10	Firm	Rust Brown	SILT AND CLAY	ML/CL					

* 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: VF = Very Fine
Possible FLUTE Liner Detection @ 4'

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 27-SO38A
DATE: 8/3/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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**
D			4/5		loose	Black ~~HBrown~~ HBrown	SAND vf - little	SP	Asphalt @ top	0.0			
						Brown	T-Silt			0.0			
						HBrown				0.0			
					Stiff	gray Brown gray orange	CLAY - mottled	CL		0.0			
5										0.0			
			5/5							0.0			
										0.0			
										0.0			
										0.0			
10					med stiff		SILT w/some sand & little clay	ML SM	Wet	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): 0.0

Remarks: Flute 5 ND
Step-out boring toward Pond (West)

Converted to Well: Yes ____ No X Well I.D. #: ____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-39
DATE: 07/24/10
GEOLOGIST: Chuck Sorden
DRILLER: Bill Ewing

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**
	1			0.5-1.5	Loose	Dk. Brn	SAND-VF AND SILT 10-15% Clay	ML	Asphalt 0-0.5'	0.0			
	2									0.0			
	3		3/5							0.0			
	4			0.5-4.5	Loose	Tan	SAND-VF; 10-20% Silt <10% Clay	SM		0.0			
	5			4.5-5.5	Firm	Brn	SILT AND CLAY	ML/CL		0.0			
	6									0.0			
	7			5.5-7.5			CLAY; 10-25% Silt	CL		0.0			
	8		3.5/5							0.0			
	9									0.1			
	10			7.5-10.0			SILT; 20-30% Clay <10% VF Sand	ML		2.6			

* 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: VF: Very Fine
Potential Detection @ 3' on FLUTE

Converted to Well: Yes ____ No X Well I.D. #: ____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island – Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-40
DATE: 07/21/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1									0.0			
	2			0.5-2.0	Firm	Red Brn	SAND; 10-20% Silt; <10% Clay	SP/SM	Asphalt 0-0.5	0.0			
	3		3.5/5	2.0-2.75	Loose	Brn.	SAND-VF (10-20%) Silt	SM		0.0			
	4			2.75-4.5	Loose	Tan	SAND-VF; 30-40% Silt	SM		0.0			
	5			4.5-5.75	Firm	Red Brn	SILT AND (35-45%) Clay <15% VF Sand	ML/CL		0.0			
	6									0.0			
	7									0.0			
	8		3.25/5	5.75-8.5	Firm	Gray Green	CLAY; <10% Silt	CL		0.0			
	9									0.0			
	10			8.5-10.0	Firm		SAND-VF; 30-40% Silt and Clay (Sandy Loam)	CL/ML		0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes _____ No X Well I.D. #: _____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island-Site 27
PROJECT NUMBER: 112G07406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI-27-SO-41
DATE: 07/21/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1						Grass at Surface	0.0			
	2		1							0.0			
	3		3/5	0-3.0	Loose	Brn.	SAND-UF; 20-30% Silt <10% Clay	SP/SM		0.0			
	4		1							0.0			
	5		1							0.0			
	6		1	3.0-6.0	Firm	Red Brn	CLAY AND (~40%) SILT	ML/CL		0.0			
	7		1							0.0			
	8		5/5							0.0			
	9		1	6.0-9.0	Firm	Gray Green	CLAY; ~20% SILT	CL		0.0			
	10		1	9.0-10.0	Firm	Orange Brn	SILT; 10-20% Clay; <10% UF Sand	ML		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): 0.0

Remarks: UF=Very Fine

Converted to Well: Yes ____ No X Well I.D. #: ____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island – Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-42
DATE: 07/21/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1								Grass at surface	0.0			
	2			0-2.0	Loose	Brn	SAND-VF; 10-20% Silt Some roots	SP		0.0			
	3		2.5/5							0.0			
	4			2.0-4.0	Loose	Tan	SAND-VF; 20-30% Silt	SM		0.0			
	5			4.5-5.5	Stiff	Reg Brn	CLAY AND (30-40%) SILT (Silty Clay)	CL/ML		0.0			
	6			5.5-6.5	Stiff	Gray Green	CLAY; <10% Silt	CL		0.0			
	7									0.0			
	8		3.5/5							0.0			
	9									0.0			
	10			6.5-10.0	Loose	Gray	SAND-VF; 20-35% Silt; <10% Clay	SM		0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island-Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI-27-SO-43
DATE: 07/22/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1	0.5-1	Loose	Brown	SAND-VF; Little	SP	Asphalt-0-0.5'	0.0			
	2		1							0.0			
	3		4/5							0.0			
	4									0.0			
	5									0.0			
	6		1	1-6	Loose	tan/lt. Brn	SAND-VF AND SILT (30-40%)	SP/SM		0.0			
	7		4/5	6-7.5	Firm	Gray Green	CLAY	CL		0.0			
	8									0.0			
	9									0.0			
	10			7.5-10	Firm	Gray Green	SILT; trace (<10%) clay	ML		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): 0.0

Remarks: VF = Very Fine

Converted to Well: Yes _____ No X Well I.D. #: _____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island- Site27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-44
DATE: 07/22/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1	0.5-1.0	Loose	Brn	SAND-VF; 20-30% Silt	SP	Asphalt-0-0.5'	0.0			
	2		1							0.0			
	3		3.5/5							0.0			
	4		1							0.0			
	5		1	1.0-5.0	Loose	tan/ Brn.	SAND AND (30-40%) Silt (Silty Sand)	SM		0.0			
	6		1	5.0-6.0	Loose	Red Brn	SAND-VF; 20-30% Silt; Little (10-20%) clay	SM/SC		0.0			
	7		1							8.2			
	8		4/5	6.0-8.5	Stiff	Gray Green	CLAY; <10% Silt	CL		7.6			
	9		1							101.5			
	10		1	8.5-10	Firm	Gray	SAND-VF AND (35-45%) ~~SILT~~ SILT; 10-20% Clay	SM		9.6			

* 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: VF = Very Fine
@ 7.5' BGS, FLUTE Liner has positive result

Converted to Well: Yes ____ No X Well I.D. #: ____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-45
DATE: 07/23/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1								Asphalt at Surface	0.0			
	2		1	0.5-2.75	Loose	Brn	SAND-VF; some (20-30%) Silt; <10% Clay	SM		0.0			
	3		3/5							0.0			
	4		1	2.75-4.5	Firm	Gray Brn	SAND-VF; some (20-30%) Silt; 10-20% Clay	SM		0.0			
	5		1	~~2.75~~ 5.5-4.5	Firm	Tan	~~SAND-VF~~ SILT AND CLAY (30-45%)	ML/CL		0.0			
	6		1							0.0			
	7									0.0			
	8		4.5/5	5.5-8.0	Stiff	Gray Green	CLAY; <10% Silt (none)	CL		0.0			
	9		1							0.0			
	10		1	8-10	Firm	Gray/ Rust	SILT AND (30-45%) CLAY	ML/CL		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): 0.0

Remarks: VF = Very Fine
Duplicate - 0-1' Bgs

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 27-S045A
DATE: 8/3/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4/5			Black	Asphalt						
					loose	Tan to orange	SAND (VF)	SP	Moist to Dry	0.0			
							↓			0.0			
										0.0			
										0.0			
5					Stiff	orange	CLAY mottled	CL		0.0			
			4/5			Gray H. Brn	↓			0.0			
					loose		SAND w/ little silt	SP	Wet	0.0			
							↓			0.0			
										0.0			
10							↓			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): 0.0

Remarks: Set out boring from 4/5 - West toward the pond

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris ~~#26~~ Island Site 27
PROJECT NUMBER: 112G0240
DRILLING COMPANY: ARM
DRILLING RIG: DPT
BORING No.: 27-S045B-
DATE: 8/3/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4/5				Asphalt						
						Lt Brown/orange	SAND(vf)/Tr clay	SP		0.7			
					loose	Brn	SAND(vf)	SP		0.1			
										0.0			
						Lt Brn			moist	0.1			
5						Brn	SAND w/ little clay	SP		0.0			
			4/5							0.0			
					Stiff	Gray Brown orange	CLAY mottled		Stiff	0.0			
										0.0			
					med stiff		SILT & SAND	ML/SM	wet	0.0			
10										0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: 50' North of 45 - Step out

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: PA1-27-S046
DATE: 8/6/10
GEOLOGIST: SEL
DRILLER: B. Ewing

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			4/5		loose	orange	SAND w/ little clay	SP	Asphalt at top	0.0			
						Brn	VF SAND	SP		0.0			
										0.0			
						Lt Brn				0.0			
5										0.0			
			4/5							0.0			
					Stiff	Blue Gray orange	CLAY mottled	CL		1.1			
										0.0			
					Med Stiff	Gray	SAND (VF) ~~[illegible]~~ SCM w/ little to Trace Silt	SP		33			
10										13			
			3/5							4.7			
						orange to Lt Brn				0.4			
										0.8			
										1.4			
15										0.3			
										0.0			
										0.3			
										0.5			
										0.2			
20						DK Gray				0.0			
			5/5							0.0			
										0.0			
										0.0			
										0.0			
25										0.0			

* 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 X No

Well I.D. #: PA1-27-TW06S
PA1-27-TW06I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT
BORING No.: PAI-27-SD46
DATE: 8/6/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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**
			3/5		Soft	DK Gray	CLAY w/ little sand	CL		0.0			
					~~Hard~~ med	Black	Peat	PT		0.0			
					Stiff	DK	SAND and CLAY	SC		0.0			
						~~Dk~~ Gray				0.0			
30										0.0			

* 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 _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 27-SB47
DATE: 8/3/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4/5	1	loose	Brn	Asphalt orange Brown SAND w/ little clay	SP		0.0			
						lt. Brn	tight Brown SAND	SP		0.0			
								SP		0.0			
									moist @ 4' bgs	0.3			
5										0.4			
			4/5	6'						0.4			
					Stiff		CLAY Blue gray/	CL		40.7			
				8'			Brown/Red-mottled			41.0			
					med stiff	Gray	SILT w/ little	ML/SM	wet	94.7			
10				10	Stiff		Clay, SAND (some)	CL/SC		16.3			
			4/5		med stiff	Gray	SILT & SAND (VF)	ML/SM		13.6			
										17.9			
										0.9			
				13.5									
						Blue gray Brn	SAND (VF), w/ little	SP		4.5			
15					med stiff		Silt			3.5			
			5/5			Brn				0.9			
										1.8			
										2.2			
				19'						0.4			
20						Dk Brown	SAND w/ little Silt	SP		0.4			
			2/5							0.6			
										0.7			
										0.0			
										0.0			
25										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): 0.0

Remarks: Flute hit @ 8' bgs
67S set at 10' bgs sand to 3' bgs, grout to 1' bgs
68I set at 27' bgs

Converted to Well: Yes X No _____ Well I.D. #: PA1-27-TW67S
PA1-27-TW68I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 27-SB47
DATE: 8/3/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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**
			3/5		med stiff	Dk Brown Gray	SAND w/ little silt	SP		0.0			
					soft	Gray	CLAY	CL		0.0			
					med stiff	Gray	peat SAND w/ silt interbedded Clay	SP/SM		0.0			
										0.0			
30										0.0			

* 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 X No ____ Well I.D. #: ____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-48
DATE: 07/22/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1						Asphalt 0-0.5ft.	0.0			
	2		1							0.0			
	3		3/5	0.5-3.0	Loose	Brn.	SAND-VF Little (11-20%) Silt; trace (<10%) clay	SP		0.0			
	4			3.0-4.75	Loose	tan	SAND-VF some (20-30%) Silt	SP		0.0			
	5		1	4.75-5.0	Firm	Red Brn	SILT; Little (~20%) clay trace (<10%) VFSand	ML		0.0			
	6		1							32.2			
	7									2.7			
	8		3.5/5	5.0-8.0	Firm	Gray Green	CLAY; <10% Silt	CL		0.0			
	9									0.0			
	10		1	8.0-10.0	Firm	Gray	SAND-VF AND (30-45%) SILT; 10-20% Clay	SM/SL		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): 0.0

Remarks: VF = Very Fine
Flute = ND

Converted to Well: Yes _____ No X Well I.D. #: _____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site
PROJECT NUMBER: 1126 02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-SS-SO-01
DATE: 07/23/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1			0-0.5	Loose	Brown	SAND AND (30-40%) SILT 30% Organics	SM	Grass at Surface	0.0			
	2		1							0.0			
	3		4/5							0.0			
	4									0.0			
	5						20-30%			0.0			
	6		1	0.5-6.0	Firm	Tan	SAND-VF; ~~30-40%~~ SILT 10-20% Clay	SM		0.0			
	7		1	6.0-6.25	Firm	Tan	SILT AND (30-40%) CLAY	ML/CL		0.0			
	8		4/5	6.25-8.25	Stiff	Gray Green	CLAY; <10% Silt	CL		0.0			
	9									0.0			
	10			8.25-10.0	Firm	Gray Brown	SILT; Little (20-35%) Clay <10% UF Sand	ML		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): 0.0

Remarks: Dup @ D-1 UF = Very Fine
FLUTE Liner = NON-Detect

Converted to Well: Yes _____ No _____ Well I.D. #: _____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-SS-SO-02
DATE: 07/23/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1						Asphalt 0-0.5'	0.0			
	2									1.6			
	3		33/5							0.0			
	4									0.1			
	5		1	0.5-5.0	Loose	Tan Lt. Brn	SAND AND (30-45%) SILT; <10% Clay	SM		0.0			
	6		1	5-5.75	Loose	Tan Lt Brn	SAND AND (30-45%) SILT; <10% Clay	SM		0.0			
	7									96.3			
	8			5.75-8.0	Stiff	Gray w/Brn	CLAY; <10% Silt	CL		38.9			
	9									13.5			
	10		1	8.0-10.0	Loose	Gray Green	SILT; 10-15% VF Sand and Clay	ML		4.1			

* 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: VF = Very Fine
*LIATe - ND

Converted to Well: Yes _____ No X Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 55
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 55 - SO02 A
DATE: 8/4/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			3/5		Hard	Blk	Asphalt			0.0			
					loose	Brn	VF SAND	SP	Dry	0.0			
						Lt Brn				0.0			
						orange/LtBrn			Moist	0.0			
5										0.0			
			4.5/5						Saturated	0.1			
					Stiff	Blue Gray/Lt Brown	CLAY mottled	CL	moist	0.0			
										0.0			
					med stiff		VF SAND w/ little silt	SP	saturated	0.0			
10										0.4			

* 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: Flute = ND
Step-out West toward pond

Converted to Well: Yes ____ No X Well I.D. #: ____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site 55
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-SS-SO-03
DATE: 07/23/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1								Asphalt - 0-0.5'	0.0			
	2			0.5-2.0	Loose	Brown	SAND-VF; 10-20% silt; <10% clay	SP/SM		0.0			
	3		3/5							0.0			
	4									0.0			
	5			3.0-5.75	Firm	Tan	SAND-VF; 30-40% silt 10-15% clay	SM		0.0			
	6									0.4			
	7			5.75-7.5	Stiff	Gray Green	CLAY; <10% silt	CL		6.7			
	8		4/5							37.2			
	9									6.2			
	10			7.5-10.0		Gray	SILT; 10-20% VF Sand and Clay	ML		5.1			

* 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: VF = Very Fine
C-1 = MS/MSD Collected
FLUTE Detection @ 6' and 8'

Converted to Well: Yes ____ No X Well I.D. #: ____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island-Site SS
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI-SS-SO-04
DATE: 07/22/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1	0.5-1.0	Loose	Red Brn	SAND-UF; (10-20%) Silt; Less than 10% Clay	SP	Asphalt-0-0.5'	0.0			
	2		1							0.0			
	3		4/5	1.0-3.0	Loose	Brn.	SAND AND (35-45%) Silt	SM		0.0			
	4		1							0.0			
	5		1							0.0			
	6		1	3.0-6.0	Firm	Lt. Brn	SAND-UF and SILT (30-40%)	SM		0.0			
	7		1	6.0-6.5	Firm	Lt. Brn	SILT AND (30-35%) CLAY	ML/CL		8.0			
	8		5/5	6.5-8.0	Firm	Gray Green	CLAY <10% Silt	CL		11			
	9		1							22.6			
	10		1	8.0-10.0		Gray Green	Silt; 25-40% CLAY; Clay Content varies	ML/CL		7.8			

* 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): 0.0

Remarks: UF = Very Fine
~9-10' Bgs — Flute Liner indicated positive result

Converted to Well: Yes _____ No X Well I.D. #: _____

BORING LOG

Tetra Tech NUS, Inc.

Page ___ of ___

PROJECT NAME: Parris Island - Site
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-SS27-SO-05
DATE: 07/23/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1			Loose	0.5-1.5	Dk Brn	SILT; ~~20-30%~~ Clay 10-20%	ML	Asphalt at surface	0.0			
	2									0.0			
	3		3.5/5							0.0			
	4									0.0			
	5			Firm	1.5-5.0	tan	SAND-VF; 10-20% SILT	SP		0.0			
	6			5.0-6.25	Firm	Gray Green	SILT AND (30-40%) Clay	ML/CL		0.0			
	7									1.3			
	8			6.25-8.0	Stiff	Gray	CLAY	CL		0.6			
	9									62.6			
	10			8.0-10.0	Firm	Gray	SILT AND (30-45%) Clay	ML/CL	Sheen 9-10'	90.9			

* 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: VF = Very Fine
Chlorine = ND

Converted to Well: Yes ____ No X Well I.D. #: ____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site
PROJECT NUMBER:
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-SS-SO-06
DATE: 07/24/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1			0.5-1.0	Firm	Dark Brn	SAND-VF AND SILT 10-25% Clay	SM	Asphalt 0-0.5	0.0			
	2									0.0			
	3		3.5/5							0.0			
	4									0.0			
	5			1-5.25	Firm	Tan	SAND-VF 10-20% SILT <10% Clay in upper; 20-30% Bottom	SM		0.0			
	6									0.0			
	7									0.0			
	8		4/5	5.25-8.0	Stiff	Gray Green	CLAY; 10-20% Silt @ Base of unit	CL		0.0			
	9									0.0			
	10			8.0-10.0	Loose	Tan	SILT; 25-35% Clay	ML		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): 0.0

Remarks: FLUTE = ND

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site - SS
PROJECT NUMBER: 112 G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI - SS-SO-07
DATE: 07/25/10
GEOLOGIST: Chuck Sorden
DRILLER: Bill Ewing

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**
	1		1						Grass and Pine straw at surface	0.0			
	2		1	0-2.0	Loose	Brown/ Dark Brown	SILT; 10-20% Sand-VF; Clay and organics	ML		0.0			
	3		4/5							0.0			
	4									0.0			
	5									0.5			
	6		1	2.0-6.0	Firm	tan/ Brown	SAND-VF; 20-30% SILT	SM		0.0			
	7									8.9			
	8		5/5	6.0-8.0	Stiff	Gray/Green	CLAY	CL		31.5			
	9									88.9			
	10			8.0-10.0	Firm	Gray	SILT AND CLAY	ML/CL		4.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF= Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 55
PROJECT NUMBER: 112G02420
DRILLING COMPANY: ARM
DRILLING RIG: DPT
BORING No.: 55-SO07 A
DATE: 8/4/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			3.5/5		loose	Brn	silty SAND	SP	Grass/Pine Straw + surface	16.1			
						Brn/Gr	VF SAND	SP	Dry	12.0			
						Lt Brown				2.4			
									moist	6.3			
5										0.0			
			3.5/5			Brn				1.7			
										0.6			
						~~white~~ ~~brown~~ ~~orange~~				0.0			
					Stiff	~~Gray~~	CLAY mottled	CL	moist	0.0			
10					med stiff	↓	SAND w/some silt	SM	wet	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): 0.0

Remarks: Flute = ND
Step out southwest

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site -
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI-SS-50-08
DATE: 07/25/10
GEOLOGIST: Chuck Sorden
DRILLER: Bill Ewing

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**
	1		1	0.5-1.0	Firm	Lt Brown	SILT AND UFSAND; 10-15% Clay	ML	Asphalt at surface	1.1			
	2		1	1.0-1.5	Firm	Dark Brown	SILT; <10% UFSand and Clay	ML		0.5			
	3		3/5							0.4			
	4									0.3			
	5		1							0.2			
	6		1							0.4			
	7		1							0.3			
	8		3/5	1.5-8.0	Firm	Lt. Brown	SAND-UF 10-30% silt; silt amts greater in lower unit	SM		0.5			
	9		1	8.0-9.0	Stiff	Gray Green	CLAY	CL		0.5			
	10		1	9.0-10.0	Firm	Gray	SILT AND CLAY	ML	1.6	1.6			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: UF=Very Fine

Drilling Area Background (ppm):

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site - 55
PROJECT NUMBER: 112G02408
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI - SS-50-09
DATE: 07/25/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1								Grass at Surface	0.1			
	2			0-2	Loose	Brown; Dk Brown	SILT; <15% VF Sand; 10-15% Clay and Organics	ML		0.2			
	3		35/5	2.0-3.0	Loose	Light Tan	SAND-VF; 10% Silt	SM		0.3			
	4									0.4			
	5			3.0-5.5	Loose	Brown	SAND-VF; 10-15% SILT	SM		9.4			
	6			5.5-6.0	Firm	Dark Brown	SILT; 10-25% Clay; <10% VF Sand	ML		20.3			
	7									35.1			
	8		25/5.0	6.0-8.5	Stiff	Gray Green	CLAY; Silty Clay @ upper portion of unit	CL		8.4			
	9								Recollected on separate core	162.0	40.8		
	10			8.5-10.0	Stiff	Gray	SILT AND CLAY	ML/CL	172	12.8			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF= Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-SS-SO-10
DATE: 07/24/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1			0-1	Loose/Firm	DK Brn	SILT; 25-35% Clay; 20% organics	ML	Grass at surface	0.0			
	2									0.0			
	3		5/5							0.0			
	4									0.0			
	5									0.0			
	6			1.0-6.0	Firm	Tan	SAND-VF; 10-20% Silt;	SM		0.0			
	7			6.0-7.5	Firm	Gray Green	CLAY	CL		0.0			
	8		4/5							0.3			
	9			7.5-9.0	Firm		SILT AND CLAY	ML/CL		11.3			
	10			9.0-10.0	Loose		SILT 65-90 VF Sand ~5-10 Clay	ML		7.3			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: PLUTe = NP

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 55
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 55-SO 10A
DATE: 8/4/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4.5/5		loose	Brn	SAND (VF) w/ little silt	SP	Grass at surface	0.0			
						orange Brn	SAND (VF)	SP		0.0			
						orange				0.0			
						Hi Brn				0.0			
5										0.0			
			4.5/5						moist	0.0			
					stiff	Orange Gray	CLAY (mottled)	CL		0.0			
					loose	Tan/ Gray	SAND (VF)	SP	Wet	0.0			
										0.0			
10										0.0			
1													

* 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: Flute = ND
Step-out North

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 55
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 55-S01ØB
DATE: 8/5/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4/5		Hard loose	Blk Brn	Asphalt						
						Brn	Gravelly SAND w/ silt	SP		0.0			
						Brn	↓			0.0			
						Brn	VF SAND	SP		0.0			
						Lt. Brn/orange				0.0			
5									moist	0.0			
			2/5							0.0			
						orange				0.0			
					Stiff	Blue Gray	CLAY mottled	CL		0.0			
						orange	↓			0.0			
10					med St. RC	↓	Silty SAND	SM	Wet	0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: 0-1 VOC Fizzed/Bubbled w/Sodium Bisulfate
Step out North

Drilling Area Background (ppm): 0-8

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 55
PROJECT NUMBER: 112G02HOLe
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 55-SB14C-
DATE: 3/16/10
GEOLOGIST: S. Hill
DRILLER: B. Bunz

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			4/5		loose	Brn	Asphalt, shell fragments at top SAND(VF)	SP		0.0			
						orange				0.0			
										0.0			
						lt Brn				0.0			
5										0.0			
			3/5							0.0			
					St. ff	Blue gray	CLAY mottled	CL		0.0			
					med St. ff	orange lt Brn	SAND(VF)	SP	wet	0.0			
										0.0			
10										0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Stepout North of 14B

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site - SS
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI-SS-SO-11
DATE: 07/25/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1	0-1.0	Loose	Dark Brown	SILT; 20-30% Clay and Organics	ML/OL	Grass at surface	0.0			
	2			1-1.25	Loose	White/ gray	Oyster Shell fragments (80%) 20% Silt, Clay and trace UF Sands	GM		0.0			
	3		4/5	1.25-2.0	Loose	Dark Brown	SILT; 20-30% Clay and Organics <10% UF Sand	ML/OL		0.0			
	4									0.0			
	5									0.0			
	6		1	2.0-6.0	Firm	Tan: Lt. Brn	SAND-UF; 10-25% Silt	SM		0.7			
	7									2.8			
	8		3/5	6.0-8.0	Stiff	Gray Green	CLAY (6.0-6.25-Silty Clay)	CL		50.6			
	9			8.0-8.25	Firm	Gray	SILT AND CLAY	ML/CL		344			
	10			8.25-10.0	Firm	Gray	SILT 15-30% Clay	ML		217			

* 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: VF = Very Fine Soil Staining Noted Above Clay layer in Sand/Silty Clay intervals. Positive Flute liner indication @ 9' Bgs

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site - SS
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI - SS-SO-12
DATE: 07/26/10
GEOLOGIST: Chuck Sorden
DRILLER: Dearal Rogers

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**
	1		1	0-0.75	Loose	Dark Brown	SILT; 30-40% Organics 25-30% Clay	ML		0.0			
	2		1	0.75-1.25	Loose	Black	Pebbles (Fill-Spent Coal) "Clinker", Coal 10-30% Silt and SAND sized particles.	GW/GP		0.0			
	3		4/5							0.0			
	4		1							0.0			
	5		1							0.0			
	6		1							0.0			
	7		1							0.0			
	8		4/5	1.25-8.25	Firm	Tan Brown	SAND-UF; 15-35% Silt; greater amts @ top and Bottom	SM		0.0			
	9		1	8.25-8.50	Firm	Brown	SILT AND CLAY	ML/CL		4.6			
	10		1	8.5-9.5	Firm	Gray Green	CLAY	CL		5.0			
				9.5-10.0	Firm	Gray	SILT AND CLAY	ML/CL					

* 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: Parris Island Site - SS
PROJECT NUMBER: 1126 02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI - SS - SO - 13
DATE: 07/26/10
GEOLOGIST: Chuck Sorden
DRILLER: Dearal Rogers

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**
	1		1	0-0.5	Loose	Dark Brown	SILT; 15-30% Clay and Organics	ML/OL	Grass at surface	0.0			
	2		1	0.5-1.0	Loose	Black	Asphalt			0.0			
	3		4/5	1.0-2.0	Firm	Dark Brown	SILT; 10-20% Sand-VF <10% Clay	ML		0.0			
	4		1							0.0			
	5		1							0.0			
	6		1	2.0-6.5	Loose	Brown	SAND-VF 15-25% Silt	SM		0.0			
	7		1	6.5-7.0	Firm	Gray	SILT AND CLAY	ML/CL		0.4			
	8		3.5/5	7.0-8.75	Firm	Gray	SILT; <20-35% Clay	ML		48.2			
	9		1	8.75-9.25	Firm	Gray Green	CLAY	CL		12.2			
	10		1	9.25-10.0	Firm	Gray	SILT AND CLAY	ML/CL		218			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF=Very Fine
9.5-10.0' Flute Liner staining

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site - SS
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI - SS-SO-14
DATE: 07/26/10
GEOLOGIST: Chuck Sorden
DRILLER: Deural Rogers

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**
	1		1	1						0.0			
	2		1	0.0-2.0	Loose	Dark Brown	SILT; 15-30% Clay and organics 60% pebbles	ML	various pebble fill "limmer", shale, "hardpan" @ 2.05' Bgs.	0.0			
	3		3/5							0.0			
	4		1							0.0			
	5		1							0.0			
	6		1							1.5			
	7		1	2.0-7.5	Loose	Tan, Lt. Brn	SAND-VF; 10-15% Silt	SM		0.0			
	8		2.5/5	7.5-8.0	Firm	Gray	SILT AND CLAY	ML/CL		9.4			
	9		1	8.0-8.5	Stiff	Gray Green	CLAY	CL		19.4			
	10		1	8.5-10.0	Firm	Gray	SILT AND CLAY; clay throughout and in thin beds	ML/CL		1.5			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 55
PROJECT NUMBER: 112G0240L
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 55-SD14A
DATE: 8/4/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4/5		loose	Brn	(VF) SAND w/silt	SM	Grass at surface	0.0			
						Lt Brn	(VF) SAND	SP		0.0			
										0.0			
										0.0			
5						Brn			Moist	0.0			
			4/5							0.0			
					Stiff	Blue Gray	CLAY	CL		3.1			
										114			
					med stiff	Blue gray	SAND w/ little silt	SP	wet	15.3			
10										5.4			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Flute Hit @ 8' bgs
Step out North

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 55
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT
BORING No.: 55-SO14B
DATE: 8/9/10
GEOLOGIST: S Hill
DRILLER: B. Ewing

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			3.5/5		loose	Brn	SAND(vf)	SP	Asphalt at top	0.0			
										0.0			
						Lt Brn				0.0			
										0.0			
5										0.0			
			4.5/5			White orange				0.0			
										0.0			
					stiff	Blue gray or orange	CLAY mottled	CL		0.5			
										26.3			
10					much stiff	Blue gray	SAND(uf) little silt	SP		25.2			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: North of 14A stepout

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site -
PROJECT NUMBER:
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI-SS-SO-15
DATE: 07/26/10
GEOLOGIST: Chuck Sorden
DRILLER: Dewal Rogers

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**
	1			0.0-0.5	Loose	Brown	SILT 15-30% Clay w/Organics	ML/OL	Grass at Surface	0.0			
	2			0.5-1.0	Loose	Black	Gravel (Pebbles, red FSIL) "Clinker", Coal	GW/GP		0.0			
	3			1.0-1.5	Loose	Brown	SILT 10-20% Clay	ML		0.0			
	4									0.0			
	5									0.0			
	6									0.0			
	7									0.0			
	8									0.0			
	9			1.5-9.0	Firm	Tan Lt. Brn	SAND-VF; 10-20% Silt 20-30% @ 8.5-9.0	SM		0.0			
	10			9.0-9.1	Stiff	Gray	CLAY-10-15% Silt	CL		0.0			
				9.1-10.0	Firm	Gray	SILT AND CLAY	ML/CL					

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site - SS
PROJECT NUMBER: 112G02408
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI - SS - SO - 16
DATE: 07/27/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1	0-1	Stiff	Black/ Gray	Asphalt AND Subbase			0.0			
	2		1	1.0-1.5	Firm	Brown	SILT AND CLAY; 10-15% Silt	ML		0.0			
	3		5/5							0.0			
	4									0.0			
	5									0.0			
	6		1	1.5-6.0	Firm	Tan/ Brown	SAND-VF; 10-20% Silt; <10% Clay	SM		0.3			
	7		1	6.0-6.25	Firm	Brown	SILT AND CLAY	ML/CL		0.1			
	8		4.5/5	6.25-7.5	Stiff	Gray Green	CLAY	CL		0.3			
	9			7.5-8.5	Firm	Brown	SILT AND CLAY <10% VF Sand	ML/CL		0.1			
	10			8.5-9.0	Stiff	Gray Green	CLAY	CL		0.0			
				9.0-10.0	Firm	Gray	SILT AND Clay	ML/CL					

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF= Very Fine

Drilling Area Background (ppm): 0.1

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site - SS
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI - SS - SO - 17
DATE: 07/27/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1	0-1.0	hard	Black/ Brown	Asphalt and underfill			0.0			
	2		1	1.0-1.5	Loose	Brown	SILT; 10-20% Clay; <10% VF Sand	ML		0.0			
	3		5/5							0.0			
	4									0.0			
	5									0.0			
	6									0.0			
	7			1.5-7.0	Firm	Tan/ Brown	SAND-VF 10-15% Silt	SM		0.9			
	8			7.0-7.5	Stiff	Gray	SILT AND CLAY	ML/CL		0.6			
	9			7.5-8.5	Firm	Gray	SILT; 10-20% CLAY <10% VF Sand	ML		2.5			
	10			8.5-9.5	Stiff	Gray	SILT AND CLAY	ML/CL		15.3			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes _____ No X Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 55
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT
BORING No.: 55-S017A
DATE: 8/4/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4/5		loose	Brn	SAND w/silt	SM	Grass at surface	0.0			
						Brn	SAND w/fill material	SP	coal/glass	0.0			
						Brn	SAND (VF)	SP		0.0			
						lt. Brn				0.0			
5						white lt. Brn			moist	0.0			
			4/5						wet	0.0			
					stiff	Blue Gray	CLAY mottled	CL		0.0			
					loose	" "	SAND (VF)	SP		0.0			
					stiff	" "	CLAY	CL		0.0			
10					med stiff	Blue Gray	SAND (VF) w/ silt	SM		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): 0.0

Remarks: Flute SMP
Step out southeast

Converted to Well: Yes ____ No X Well I.D. #: ____

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island-Site 55
PROJECT NUMBER: 112G02400
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-SS-SO-18
DATE: 07/22/10
GEOLOGIST: Chuck Sorden
DRILLER: Bill Ewing

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**
	1		1	0-1.5	Loose	Brown	SILT; 30% Clay w/ organics	ML/OL		0.0			
	2		1							0.0			
	3		5/5							0.0			
	4									0.0			
	5			1.5-5.5	Firm	Tan Lt. Brn	SAND-VF 10-20% silt (and clay @ Base)	SM	20%-30% @ Base 30% Clay	0.0			
	6		1	5.5-6.0	Firm	Gray Green	SILT AND CLAY	ML/CL		0.0			
	7		1							0.0			
	8		5/5	6.0-8.0	Firm	Tan/ Rust	SILT; 30-40% Clay; increasing toward Base	ML/CL		0.0			
	9			8.0-9.0	Stiff	Gray Green	CLAY; 20% silt @ Base	CL		0.0			
	10			9.0-10.0	Firm	Gray	SILT AND CLAY	ML/CL		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): 0.0

Remarks: VF = Very Fine F = Fine
Little = 1-20% Some = 21-35% AND = 36-49%

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 55
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 55-SO18A
DATE: 8/4/10
GEOLOGIST: 8/4/10
DRILLER: B. Ewing

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			3/5		loose	Brn	Silty SAND (VF)	SM	Grass at top	0.0			
						Brn	VF-SAND	SP		0.0			
						lt Brn				0.0			
									moist	0.8			
5										1.4			
			4.75/5			Brn			wet	0.0			
					stiff	Blue Gray	CLAY w/ little Sand	CL		0.0			
					med stiff	Gray Orange	SAND	SP	wet	0.0			
					stiff	Gray orange Brn	CLAY mottled	CL		0.0			
10					med stiff	Gray	SAND (VF)	SP		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): 0.0

Remarks: Flute = ND
Step-out southeast

Converted to Well: Yes ____ No X Well I.D. #: ____

C-6 PHASE I RI – TEMPORARY MONITORING WELL BORING LOGS

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: **MCRD Parris Is.-Site 27**
PROJECT NUMBER: **G00455**
DRILLING COMPANY: **Vironex, Inc.**
DRILLING RIG: **DPT**

BORING No.: TW-22S
DATE: 9-21-07
GEOLOGIST: **Conti**
DRILLER: GAMWELL

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								SEE 23I				
									FOR DETAILS				
	5												
				8									
	10												
				13									
	15												
							SCREEN 8-13						

* 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 TW No _____ Well I.D. #: TW-22S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW-23I
DATE: 9-21-07
GEOLOGIST: Conti
DRILLER: GAMWELL

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				LOOSE	BRN	TOP 3" TOPSOIL			—			0
S-1 @			3/5			TO	SILTY SAND	SM	DAMP	—			
1445										163			
						TAN			↓	121			
	5		▼						MOIST	145			0
									5→7 WET PERCHED?	—			
S-2 @				6.5	STIFF	GRAY		CL	MOIST	71			
1450			4/5	7.7			SILTY CLAY		(SLIGHT ODOR)	71			
				8.6	M DENSE		CLAYEY SAND	SC		77			
				9.0	STIFF	GRAY	SILTY CLAY	CL					
	10		±	▼	M DENSE	GRAY	CLAYEY SAND	SC/SM	MOIST → WET ~10'	50			0
						ORANG				—			
S-3 @						GRAY BRN	SILTY SAND	SM	WET	54			
1455			4/5							60			
										—			
	15			14.5	M STIFF	GRAY	SANDY CLAY	SC	WET	63			
				16			TO			—			
S-4 @							SILTY SAND	SM	POOR REC	0			
1500			3/5							—			
				19±						0			
	20				M	GRAY	SILTY CLAY-	SC					
					STIFF		TO SAND			0			
S-5 @			3/5							—			
1505									SCREEN	0			
									18-23	—			
	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: THIS BORING ALSO DIFFERENT FROM PREVIOUS BORINGS - MORE CLAY AT DEPTH - DECIDE TO SET SCREEN 18-23.

Converted to Well: Yes TW No _____ Well I.D. #: TW-23I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW-24S
DATE: 9-21-07
GEOLOGIST: Conti
DRILLER: GAMWELL

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				LOOSE	BRN	TOP 4" TOPSOIL			0			
S-1						TO TAN	SILTY SAND-TR	SM	MOIST	500			
@ 1340			5/5			BRN	ROOTS TR WOOD @ 4'		NO ODOR?	>1000			
										500			
	5			▼					4.5' WET	300			
									PERCHED H2O				
S-2 @				7'									
1345			5/5	8'	STIFF	GRAY	SILTY CLAY TO	CL	MOIST				
					M DENSE		CLAYEY SAND	SC					
	10			9.5▼									
					M DENSE	GRAY	SILTY SAND	SM	WET @ 9.5				
S-3						BRN			AGAIN				
@ 1350			5/5	13.0									
				13.5	STIFF	GRAY	SILTY CLAY	CL					
	15			15	M DENSE		SILTY SAND						
				TD									
							SCREEN 9-14'						

* 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 TW No ____ Well I.D. #: TW-24S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW-25I
DATE: 9-21-07
GEOLOGIST: Conti
DRILLER: GAMWELL

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												
					LOOSE	BRN	TOP 4" TOPSOIL SILTY SAND-TR	SM	MOIST	0			0
S-1 @ 1400			5/5				ROOTS, COAL & ROCK TO		NO ODOR ↓	200			
										200			
										165			
	5					GRAY	SILTY SAND	SM	TO	100		50	0
									FUEL ODOR / CHEMICAL ODOR	200			
S-2 @ 1405			4/5	7±						400			
							CLAYEY SAND	SC	MOIST	300			
				9					↓WET	250			
	10			10'±	STIFF	GRAY	SILTY CLAY-TR		≈ 9.5 TO 10'	500		100	
					M		SAND, @ 10			165			0
S-3 @ 1410			4/5		DENSE	GRAY	SILTY SAND-TR CLAY	SM	WET	250			
										160			
										150			
	15					TO				150		10	0
						TAN				100			
S-4 @ 1420			2/5			BRN	SILTY SAND	SM	WET	—			
										50			
										—			
	20									—	0	50	0
										100			
S-5 @ 1425			4/5	23±					SCREEN	—			
				24'±		GRAY	SILTY SAND		19-24	120			
	25				LOOSE	GRAY	CLAYEY SAND/ SANDY CLAY	SC	WET	100	0	25	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:

Converted to Well: Yes TW No _____ Well I.D. #: TW-25I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: **MCRD Parris Is.-Site 27**
PROJECT NUMBER: **G00455**
DRILLING COMPANY: **Vironex, Inc.**
DRILLING RIG: **DPT**

BORING No.: TW-26S
DATE: 9120107
GEOLOGIST: **Conti**
DRILLER: GAMWELL

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												
							FOR LITHOLOGY						0
							SEE TW-27I						
	5												0
				8'									
	10												0
				13'									
	15												0
							SCREEN 8-13'						

* 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 TW No _____ Well I.D. #: TW-26S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW-27I
DATE: 9-20-07
GEOLOGIST: Conti
DRILLER: GAMWELL

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												
					LOOSE	BRN	TOP 3" TOPSOIL SILTY SAND	SM	DAMP	0			
S-1 @ 1020			4/5						↓	0			
										0			
										0			
	5								MOIST	0			0
										0			
S-2 @ 1025			4/5							13			
										0			
										0			
	10		▼	9 / 9.5	STIFF M	GRAY OLIVE	SILTY CLAY	CL	NOT WET, TILL ~9.5 ▼	400			0
					LENSE	GRAY	SILTY SAND	SM	SL ODOR	370			
S-3 @ 1030			4.5/5						TO STRONG FUEL	265			
										45			
										100			
	15					TO				0			0
						YELLOW BRN	SILTY SAND	SM	WET	0			
S-4 @ 1040			2/5							0			
										0			
										0			
	20									0			0
										0			
S-5 @ 1050			5/5							0			
									SCREEN	0			
				23.5	DENSE	OLIVE GRAY	SILTY SAND	SM	19-24±	0			
	25						TR CLAY			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): 0

Remarks:

Converted to Well: Yes TW No _____ Well I.D. #: TW-27I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW-28S
DATE: 9-20-07
GEOLOGIST: Conti
DRILLER: GAMWELL

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												
							FOR LITHOLOGY						0
							SEE TW-29I						
	5												0
				7'									
			▼						8'± H_2O TABLE				
	10												0
				12'									
	15						SCREEN 7-12						0

* 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 TW No _____ Well I.D. #: TW-28S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW-29I
DATE: 9-20-07
GEOLOGIST: Conti
DRILLER: GAMWELL

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												
					LOOSE	BRN	3" ASPHALT		DAMP	0			
S-1						TO TAN	SILTY SAND	SM		0			
@ 1220			3.5/5			BRN				0			
										0			
	5						LAST 2" CLAYEY SAND		MOIST	0			
				6±			TO			0			
S-2			4/5		STIFF	GRAY	SILTY CLAY	CL	MOIST	0			
@ 1225			▼	8±					WET @ 8' JUST	0			
				9'	M DENSE	BRN GRAY	CLAYEY SAND	SC	BELOW CLAY	0			
	10				M	ORANGE				0			
					DENSE	GRAY BRN	SILTY SAND	SM		0			
S-3			5/5			TO YELLOW				0			
@ 1235						BRN GRAY	SILTY SAND	SM	WET → SAT	0			
										0			
	15									0			
										0			
S-4			2/5							0			
@ 1245										0			
										0			
	20				M			SM		0			
					DENSE		SILTY SAND			0			
S-5			4/5			TO				0			
@ 1255						GRAY				0			
				24'±					19-24	0			
	25						SANDY CLAY	SC	WET	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: LOC IN SCRAPYARD (FENCED IN)

Converted to Well: Yes TW No _____ Well I.D. #: TW-29I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: **MCRD Parris Is.-Site 27**
PROJECT NUMBER: **G00455**
DRILLING COMPANY: **Vironex, Inc.**
DRILLING RIG: **DPT**

BORING No.: TW-30S
DATE: 9-19-07
GEOLOGIST: **Conti**
DRILLER: GAMWELL

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												
							SEE LOG FOR						0
							TW-45D FOR						
							LITHOLOGY						
	5												0
				▼									
	10												
	11			11.0									0
							SCREEN						

* 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 TW No _____ Well I.D. #: TW-30S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW 31 I
DATE: 9-19-07
GEOLOGIST: Conti
DRILLER: GAMWELL

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						FOR LITHOLOGY				0		0
							SEE LOG FOR						
							TW-45D						
	5												0
	10												0
	15												0
	20												0
									SCREEN SET				
									19-24				
									@1210 ±				
	24			24'									0
				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 TW No ____ Well I.D. #: TW-31I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW-32I
DATE: 9/20/07
GEOLOGIST: Conti
DRILLER: GAMWELL

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						4" ASPHALT			0			
S-1 @ 1625			4/5		M DENSE	BRN TO	SILTY SAND	SM	MOIST	0			
						TAN BRN				0			
	5									0			
									MOIST → WET	0			
S-2 @ 1630			5/5	6.5						0			
					STIFF	GRAY	SILTY CLAY	CL	MOIST	0			
			▼	9.3					WET ~9'	0			
	10				M DENSE	YELLOW BRN	SILTY SAND	SM	WET	0			
S-3 @ 1635			5/5			GRAY			→ SAT	0			
										0			
	15									0			
									WET	0			
S-4 @ 1640			3/5			TO				0			
						BRN				0			
	20					GRAY				0			
										0			
S-5 @ 1645			4/5						SCREEN 19-24'	0			
				24		TO				0			
	25					OLIVE GRAY	SILTY SAND - TR CLAY	SM	MOIST	0			

* 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 TW No _____ Well I.D. #: TW-32I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW-33S
DATE: 9-21-07
GEOLOGIST: Conti
DRILLER: GAMWELL

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												
							FOR LITHOLOGY						0
							SEE TW-34I						
	5												0
	10												0
				13'									
				CLAY									
	15												0
							SCREEN						
	20												0
				21									

* 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 TW No _____ Well I.D. #: TW-33S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW-34I
DATE: 9-21-07
GEOLOGIST: Conti
DRILLER: SAMWELL

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												
					LOOSE	BRN	4" TOPSOIL		DAMP	0			
S-1			4/5		M	TO	SILTY SAND	SM		0			
@ 1100					DENSE	TAN			↓	0			
						BRN				0			
	5								MOIST	0			
						TO	SILTY SAND	SM		0			
S-2				▽ 7'					WET ~ 7'±	0			
@ 1110			4.5/5			GRAY	TR CLAY		NO LAYER OF CLAY ENCOUNTERED				
							@ 8' → 8.2		HERE UNTIL SEE BELOW	0			
	10					TO				0			
						TAN			WET	0			
S-3										0			
@ 1115			4.5/5	13						0			
					M STIFF	BRN GRAY	SILTY CLAY - TR SAND	CL	MOIST	0			
	15					TO				0			
						D. GRAY	SILTY CLAY	CL		0			
S-4			4.6/5	C						0			
@ 1125				L						0			
				AY						0			
	20						TR SAND →		LAST 1'	0			
				21'					POOR REC - NOT	0			
S-5					M		LESS SOFT @ 21'		SURE WHERE CLAY ENDS	0			
@ 1135			2/5		DENSE	GRAY	SILTY SAND - TR CLAY		SCREEN	0			
									20 - 25	0			
	25									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:

Converted to Well: Yes TW No _____ Well I.D. #: TW-34I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: **MCRD Parris Is.-Site 27**
PROJECT NUMBER: **G00455**
DRILLING COMPANY: **Vironex, Inc.**
DRILLING RIG: **DPT**

BORING No.: TW-35S
DATE: 9-21-07
GEOLOGIST: **Conti**
DRILLER: GAMWELL

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												
							FOR LITHOLOGY						0
							SEE TW-36I						
	5												0
				8									
	10			9									0
				13									
				TD									
	15												0
							SCREEN						
							8 TO 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 TW No _____ Well I.D. #: TW-35S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW-36I
DATE: 9/21/07
GEOLOGIST: Conti
DRILLER: GAMWELL

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												
					M DENSE	BRN	TOPSOIL 4" SILTY SAND		DAMP	0			
						TO				0			
S-1 @			5/5			TAN				0			
0830						BRN	TR CLAY 4→4.3'		↓	0			
	5					TO			MOIST	0			
						ORANG BRN			SOME WETNESS 6→7 - PERCHED	200			
S-2			5/5	7'						300			
@ 0845				8	STIFF	GRAY	SILTY CLAY	CL		50			
				9	M DENSE		CLAYEY SAND	SC	MOIST	500			
	10			▼		TO	SILTY SAND-TR	SM	WET ~9.5	100			
							V. THIN CLAY STRINGERS (1/8")		WET	50			
S-3						BRN			NO ODOR NOTICED	45			
@ 0900			4/5			GRAY				50			
										0			
	15									0			
									POOR REC	0			
S-4										0			
@ 0910			3/5							0			
										0			
	20									0			
						TAN	SILTY SAND-TR		WET	0			
S-5 @						GRAY	TO SOME SHELL FRAGS			-6			
0915			4/5						SCREEN 19-24	0			
				24.0					23.8 or 23.9	0			
	25				M STIFF	GRAY	SILTY CLAY		STARTS CLAY	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:

Converted to Well: Yes TW No _____ Well I.D. #: TW-36I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW-37S
DATE: 9-21-07
GEOLOGIST: Conti
DRILLER: GAMWELL

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												
							FOR LITHOLOGY						0
							SEE TW-						
	5												0
				8									
			▼	~									
	10												0
				TD									
				13'									
	15												0
							SCREEN 8-13						

* 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 TW No _____ Well I.D. #: TW-37S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW-38I
DATE: 9-21-07
GEOLOGIST: Conti
DRILLER: GAMWELL

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												
					M DENSE	BRN	TOP 3" TOPSOIL/ ROCK FRAGS		MOIST	0			
S-1 @ 0955			4.1/5			TO TAN	SILTY SAND	SM		0			
						BRN				0			
										0			
	5									0			
										0			
S-2 @ 1000			5/5	7.5	STIFF	GRAY	SILTY CLAY	CL	MOIST	0			
				8.6						0			
	10				M DENSE	GRAY BRN	SILTY SAND	SM	WET ~9'±	0			
									BELOW THE CLAY	0			
S-3 @ 1005			5/5							0			
										0			
				14						0			
	15				M DENSE	GRAY	SILTY SAND-TR CLAY	SM	WET	0			
										0			
S-4 @ 1015			3/5			TO				0			
						TAN				0			
	20					BRN				0			
										0			
S-5 @ 1020			3/5	23		D.			SCREEN 18-23	0			
				24	M STIFF	GRAY	SILTY CLAY	CL	MOIST	0			
	25				M DENSE	GRAY	SILTY SAND-TR SHELLS			0			

* 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 TW No _____ Well I.D. #: TW-

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW 39S
DATE: 9/20/07
GEOLOGIST: Conti
DRILLER: GAMWELL

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						FOR LITHOLOGY						
							SEE TW-40I						
	5												
				Cl									
	10			▼ ± 9.3									
	15												
							SCREEN 8-13						

* 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 ____ Well I.D. #: TW-39S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW-40I
DATE: 9/20/07
GEOLOGIST: Conti
DRILLER: GAMWELL

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												
					LOOSE	TAN	TOP 3" TOPSOIL			1			
S-1						BRN	SILTY SAND -TR	SM	DAMP	1			
@ 1505			3/5				ROOTS			23			
										22			
	5									0			
				6.0						0			
S-2					STIFF	GRAY	SILTY CLAY	CL	MOIST	0			
@ 1510			5/5							0			
										0			
	10		▼	9.3	M				WET JUST BELOW CLAY	0			
					DENSE	GRAY	SILTY SAND	SM	~9.5'	0			
S-3						TAN TO				0			
@ 1520			5/5			YELLOW BRN			WET → SAT	0			
						GRAY				0			
	15							SM		0			
										0			
S-4			2/5			TO			WET → SAT	0			
@ 1530						TAN				0			
										0			
	20									0			
										0			
S-5			4/5							0			
@									WET	0			
1535					M DENSE	OLIVE GRAY	SILTY SAND	SM	SCREEN	0			
	25						TR CLAY		19-24	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:

Converted to Well: Yes TW No _____ Well I.D. #: TW-40I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: **MCRD Parris Is.-Site 27**
PROJECT NUMBER: **G00455**
DRILLING COMPANY: **Vironex, Inc.**
DRILLING RIG: **DPT**

BORING No.: TW-41S
DATE: 9-20-07
GEOLOGIST: **Conti**
DRILLER: GAMWELL

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												
							SEE LOG				0		0
							TW 42I FOR						
							LITHOLOGY						
	5										0		0
	10										0		0
	11			11'									
				BOTM									
							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 TW No _____ Well I.D. #: TW-41S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW 42 I
DATE: 9/20/07
GEOLOGIST: Conti
DRILLER: GAMWELL

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				M DENSE	BRN	SILTY SAND - TR ROCK FR	SM	DAMP	0			
S-1 e 0925			5/5	2	STIFF	YELLOW BRN	SILTY CLAY	CL	↓	0			
						GRAY			MOIST	0			
	5			5					TR SAND AT BOTM (5')	0			
					M STIFF		SANDY CLAY TO	SC	WET	0			
S-2 e 0930			4/5	▼ 8'			↓ CLAYEY SAND		WET ~ 7'±	0			
						GRAY TO YELLOW BRN	SILTY SAND	SM	WET	0			
	10									0			
					LOOSE				WET → SAT	0			
S-3 e 0935			4/5							0			
										0			
	15									0			
					M DENSE	GRAY	SILTY SAND	SM	WET	0			
S-4 e 0940			3/5						POOR REC NOT SURE WHEN MATL CHANGES COLOR.	0			
							- TR MED			0			
	20						SAND			0			
						TO			1" Φ	0			
S-5 e 0945			4.5/5			BRN GRAY			SCREEN 20-25±	0			
							- TR CLAY			0			
	25			24.8	M STIFF	OLIVE GRAY	SILTY CLAY/SANDY CLAY	SC	WET	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: START ~ 0925 - STILL RAINING

Converted to Well: Yes ✓ No _____ Well I.D. #: TW42 I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW-43S
DATE: 9-19-07
GEOLOGIST: Conti
DRILLER:

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						SEE LOG 44I						0
							FOR LITHOLOGY						
	5												0
	10		▼						▼ ± 9.8/10.0				0
	15			14.5 TD									0
							SCREEN 9.5-14.5						

* 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 TW No _____ Well I.D. #: TW-43S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW 44 I
DATE: 9-19-07
GEOLOGIST: Conti
DRILLER: GAMWELL

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				M DENSE	YELLOW	4" ASPHALT		DAMP	0			
S-1						BRN TO	SILTY SAND - TR		↓	0			
@ 1500			3.5/5			GRAY BRN	ROCK FRAGS		↓	0			
									MOIST	0			
	5			?					MORE WET @ 4.5 - PERCHED	0			
				6' ±					WATER HERE	0			
S-2 @				C	ST IFF	BLUE GRAY	SILTY CLAY	CL	MOIST	0			
1505			5/5	L					(FILL CLAY?)	0			
				AY					NOT SURE	0			
	10		▼	9.8±					TRACE SAND @ 9.8	0			
					M DENSE	YELLOW BRN	SILTY SAND	SM	WET · JUST	0			
S-3 @			3/5						BELOW CLAY.	0			
1515										0			
						TO				0			
	15					GRAY				0			
							SILTY SAND	SM	WET	0			
S-4 @										0			
1520			3/5							0			
										0			
	20					BLUE				0			
						GRAY		SM	WET	0			
S-5 @			3/5							0			
1525									SCREEN	0			
						TO			19.5 → 24.5	0			
	25					BRN GRAY				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:

Converted to Well: Yes IW No _____ Well I.D. #: TW-44I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW 45D
DATE: 9/19/07
GEOLOGIST: Conti
DRILLER: GAMWELL

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												
					M DENSE	BRN	3" ASPHALT			0			
S-1 @ 1000			3.5/5			TO TAN BRN	SILTY SAND	SM	DAMP	0			
				4						0			
	5				STIFF	GRAY	SILTY CLAY	CL	MOIST	0			
				6'±		MOTTLED				0			
S-2 @ 1005			5/5	▼ 7'	M DENSE	ORANG BRN GRAY	SILTY SAND	SM	WET ~ 7'± HIT H2O ~ 7'	0			
										0			
	10					TO				0			
						BRN GRAY	SILTY SAND	SM	WET → SAT	0			
S-3 @ 1015			5/5			TO				0			
										0			
						GRAY				0			
	15					BRN				0			
										0			
S-4 @ 1025			3/5	17±	M DENSE	OLIVE GRAY	SILTY SAND - TR CLAY	SM	MOIST → WET	0			
									DISTINCT CHANG IN COLOR TO	0			
	20					TO			OLIVE GRAY	0			
									POOR REC.	0			
S-5 @ 1035			2.5/5			GRAY	SILTY SAND	SM		0			
										0			
				24.3±						0			
	25			25'±	STIFF	GRAY	SILTY CLAY	CL	GOOD CONTACT @ 24.3'±	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:

Converted to Well: Yes TW No _____ Well I.D. #: TW-45D

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW 45D
DATE: 9/19/07
GEOLOGIST: Conti
DRILLER: GAMWELL

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												
					M DENSE	GRAY BRN	SILTY SAND		CLAY WAS ONLY ± 1'	0			
S-6									THICK 24-25	0			
@ 1050			3/5							0			
										0			
	30					TO				0			
					M DENSE	GRAY	SILTY SAND - TR	SM	MOIST → WET	0			
S-7 @			5/5				V. THIN 1/4" CLAY LENSES			0			
1105							~ 32'			0			
										0			
	35			35						0			
				TD									
							BOTM @ 35'						
							1" SCREEN						

* 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 TW No _____ Well I.D. #: TW 45D

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW-46S
DATE: 9/20/07
GEOLOGIST: Conti
DRILLER: GAMWELL

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												
							FOR LITHOLOGY						0
							SEE TW-47I						
	5												0
				8'									
	10								HIT H_2O ≈ 10' ±				0
				13									
	15						SCREEN 8-13						0

* 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 TW No _____ Well I.D. #: TW-46S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: MCRD Parris Is.-Site 27
PROJECT NUMBER: G00455
DRILLING COMPANY: Vironex, Inc.
DRILLING RIG: DPT

BORING No.: TW-47I
DATE: 9/20/07
GEOLOGIST: Conti
DRILLER: GAMWELL

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												
					LOOSE		TOP 3" TOPSOIL/PINES		DAMP	0			
S-1						YELLOW BRN	SILTY SAND	SM		0			
@ 1125			4/5		M DENSE					0			
										0			
	5									0			
										0			
S-2			5/5							0			
@ 1130										7			
				8.4									
				9.2	STIFF	OLIVE GRAY	SILTY CLAY	CL	MOIST	20			
	10		▼		LOOSE	GRAY	SILTY SAND-TR CLAY		SL ODOR WET ~9.8→10'	35			
					LOOSE	GRAY				0			
S-3			4.5/5			YELLOW BRN	SILTY SAND	SM	WET	0			
@ 1136									SOMEWHAT MOTTLED	0			
										0			
	15									0			
					M			SM	WET	0			
S-4 @			2.5/5		DENSE								
1140													
	20												
S-5 @			4.5/5						SCREEN				
1145								SM	19-24±				
				24'±									
	25				LOOSE	OLIVE GRAY	SILTY SAND-TR CLAY	SM/SC					

* 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:

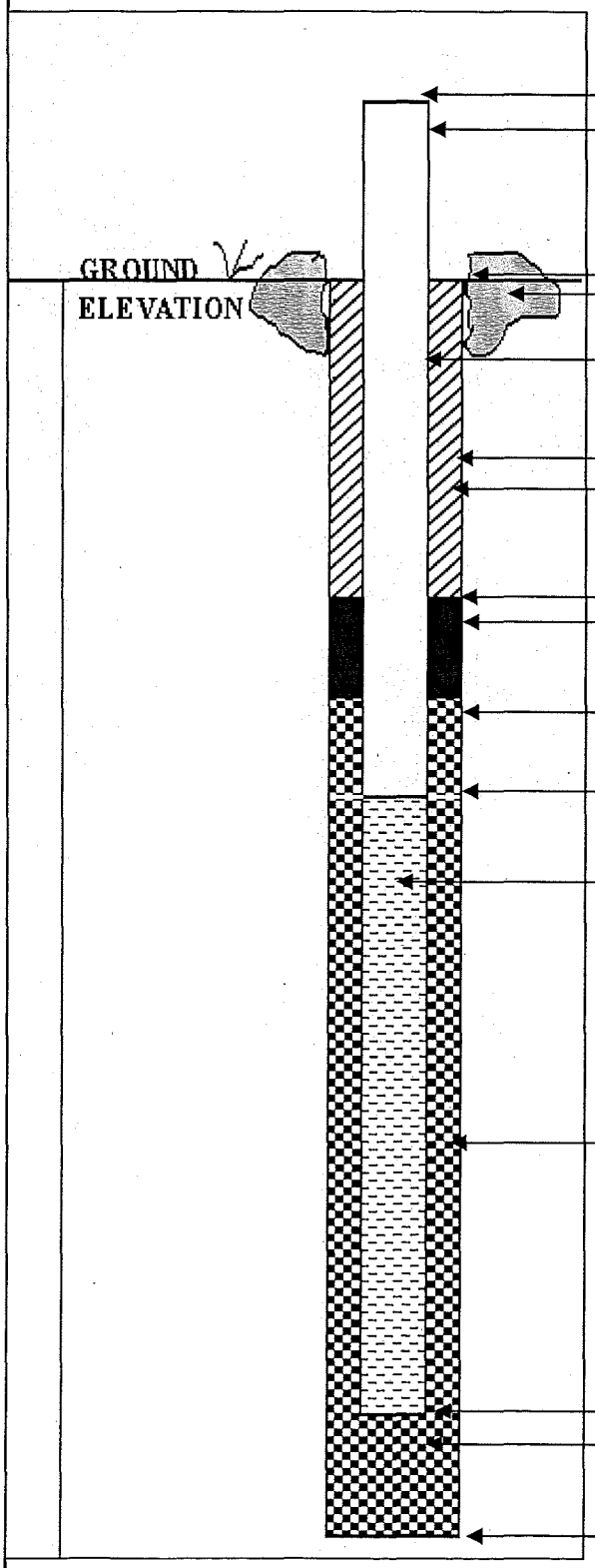
Converted to Well: Yes TW No _____ Well I.D. #: TW-47I

C-7 PHASE I RI – TEMPORARY MONITORING WELL CONSTRUCTION SHEETS

BORING NO.: TW-22S

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-22S
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9-21-07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	188709.67
GEOLOGIST:	Conti	DEV. METHOD:		EASTING:	2094619.66



ELEVATION OF TOP OF RISER PIPE: 12.27

RISER STICK-UP ABOVE GROUND SURFACE: 1.48

GROUND ELEVATION: 10.79

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: / —

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / —

ELEVATION / DEPTH TOP OF SCREEN: / 8

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 SL X 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 13

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / NA

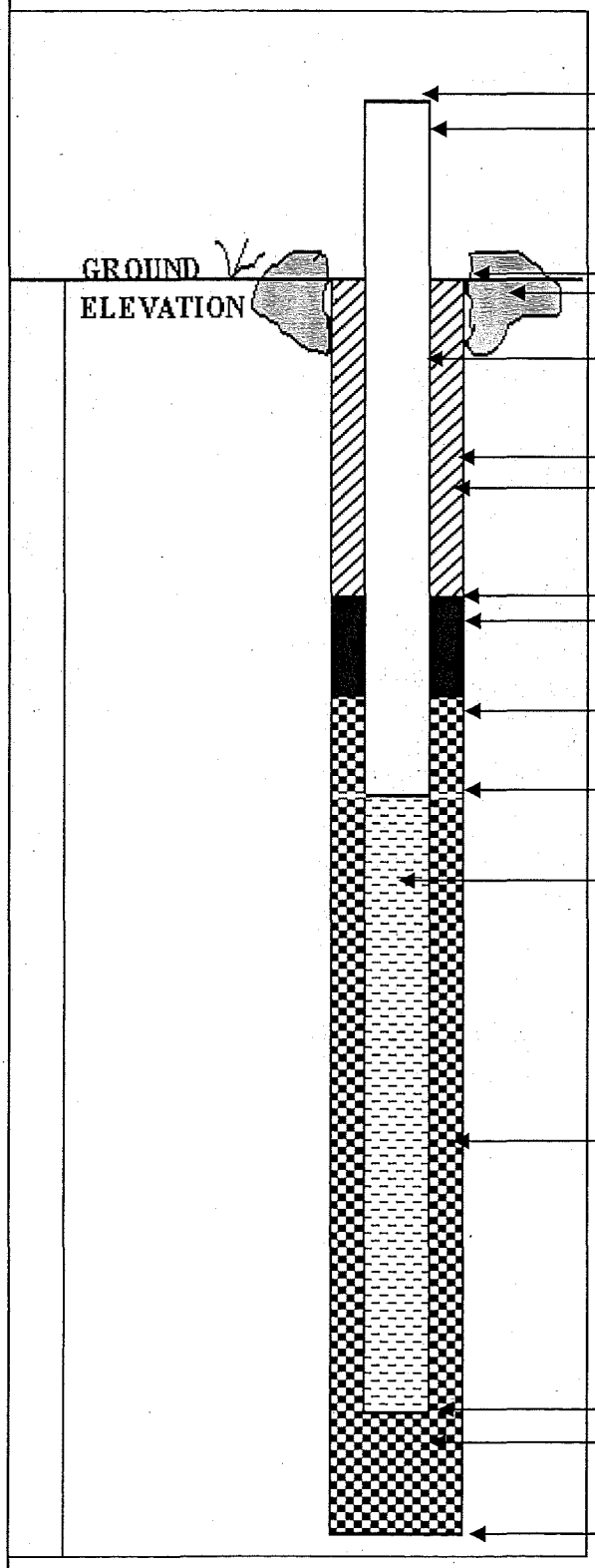
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 13

BORING NO.: TW-23I

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-23I
PROJECT No.:	G00455	DRILLER:		DATE COMPLETED:	9-21-07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	188713.54
GEOLOGIST:	Conti	DEV. METHOD:		EASTING:	2094621.20



ELEVATION OF TOP OF RISER PIPE: 11.88

RISER STICK-UP ABOVE GROUND SURFACE: 1.02

GROUND ELEVATION: 10.86

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: / NA

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / NA

ELEVATION / DEPTH TOP OF SCREEN: / 18

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 SL X 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 23

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / NA

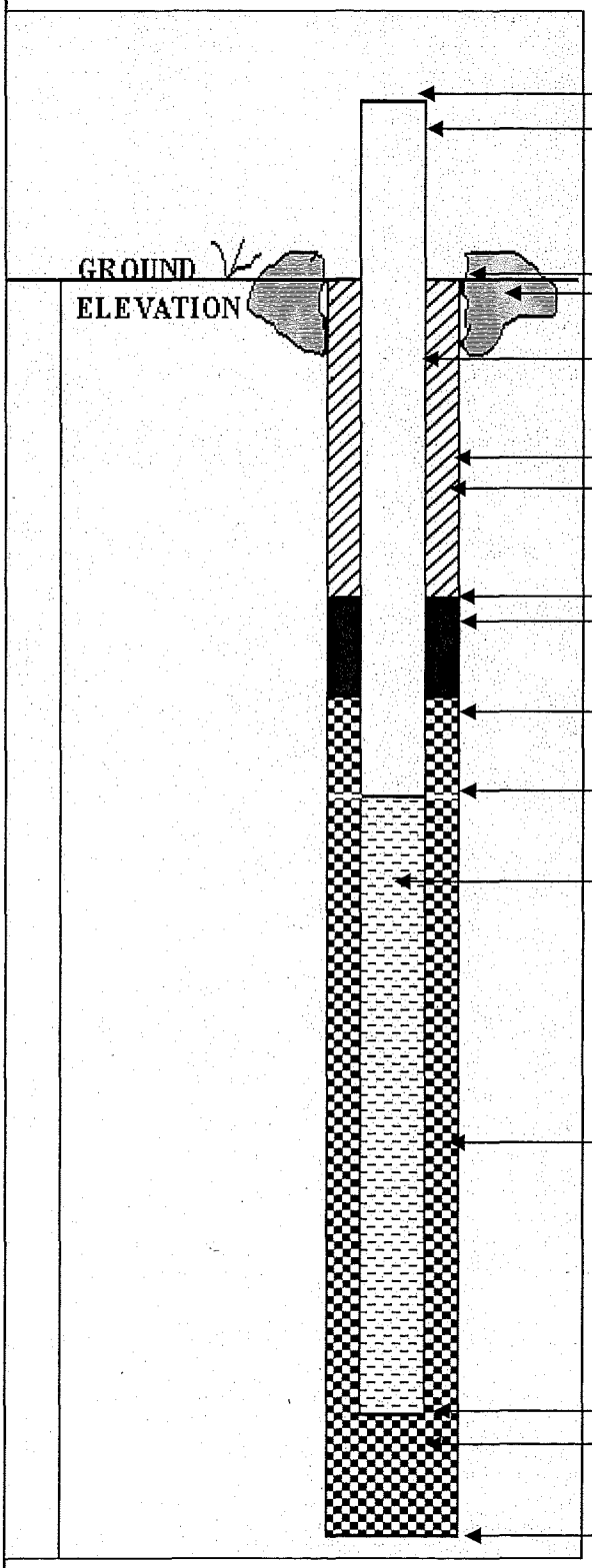
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 25

BORING NO.: TW-24S

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-24S
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9-21-07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	188837.83
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094644.56



ELEVATION OF TOP OF RISER PIPE: 12.88

RISER STICK-UP ABOVE GROUND SURFACE: 1.16

GROUND ELEVATION: 11.72

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: /—

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: /—

ELEVATION / DEPTH TOP OF SCREEN: /9'

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10SL x 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: /14'

ELEVATION / DEPTH BOTTOM OF FILTER PACK: /NA

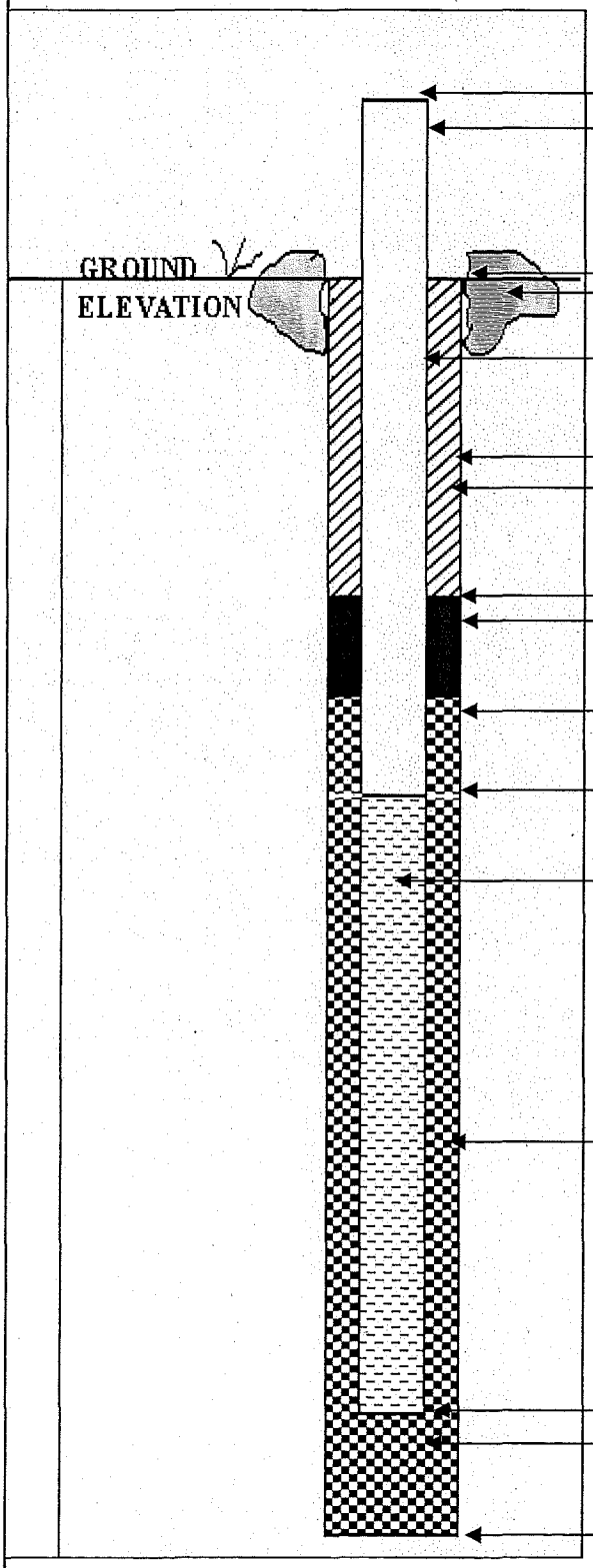
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: /15'

BORING NO.: TW-25 I

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-25 I
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9-21-07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	188852.39
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094524.59



ELEVATION OF TOP OF RISER PIPE: 15.85

RISER STICK-UP ABOVE GROUND SURFACE: 0.55

GROUND ELEVATION: 15.30

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: / —

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / —

ELEVATION / DEPTH TOP OF SCREEN: / 19

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 SL X 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 24

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / NA

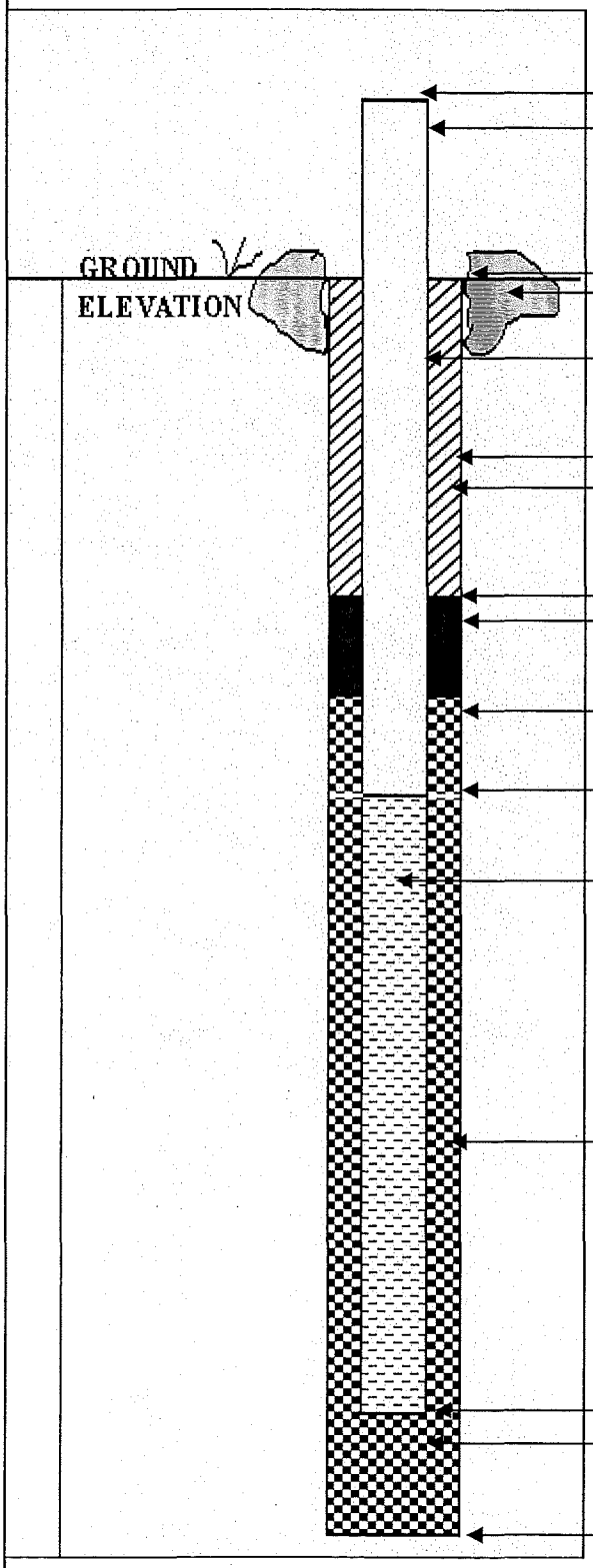
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 25

BORING NO.: TW-26S

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-26S
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9/20/07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	188901.09
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094412.71



ELEVATION OF TOP OF RISER PIPE: 16.43

RISER STICK-UP ABOVE GROUND SURFACE: 1.73

GROUND ELEVATION: 14.70

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: / —

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / —

ELEVATION / DEPTH TOP OF SCREEN: / 8

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 SL x 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 13

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / NA

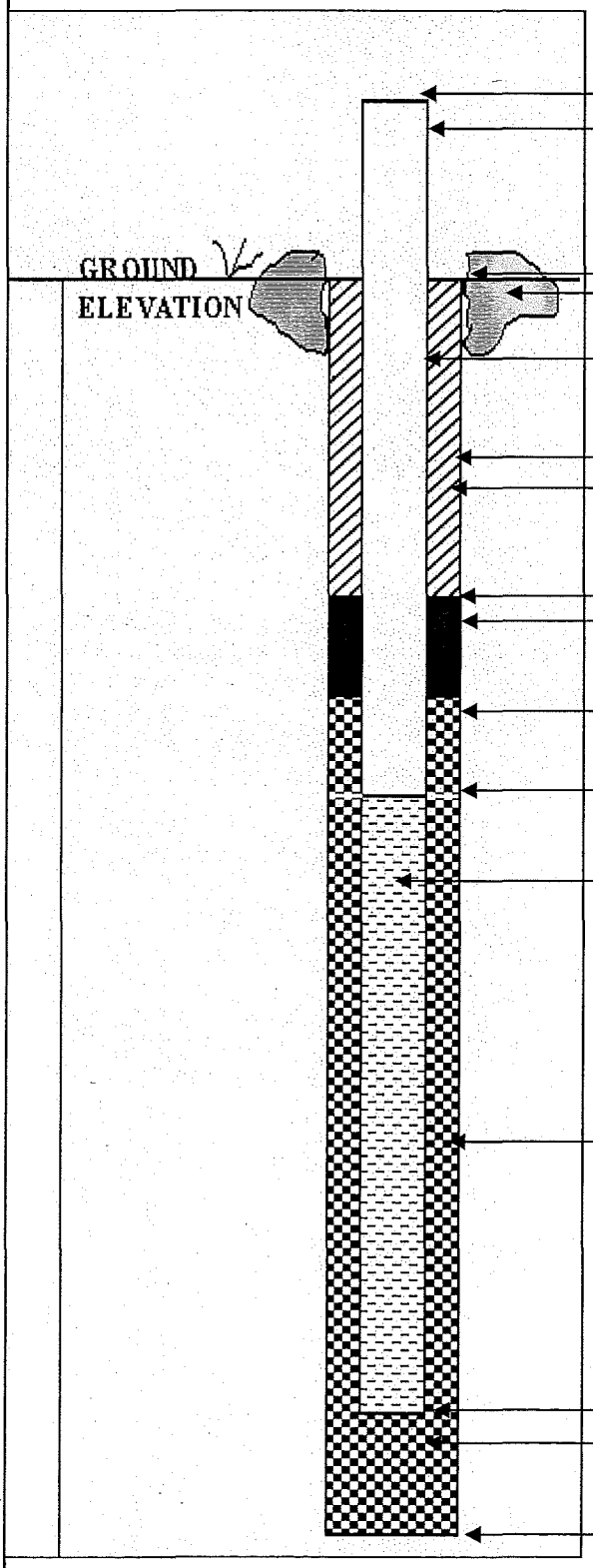
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 13

BORING NO.: TW-27I

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-27 I
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9/20/07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	188907.37
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094417.44



ELEVATION OF TOP OF RISER PIPE: 15.75

RISER STICK-UP ABOVE GROUND SURFACE: 0.95

GROUND ELEVATION: 14.80

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: /NA

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / NA

ELEVATION / DEPTH TOP OF SCREEN: / 19

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 SL X 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 24

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / NA

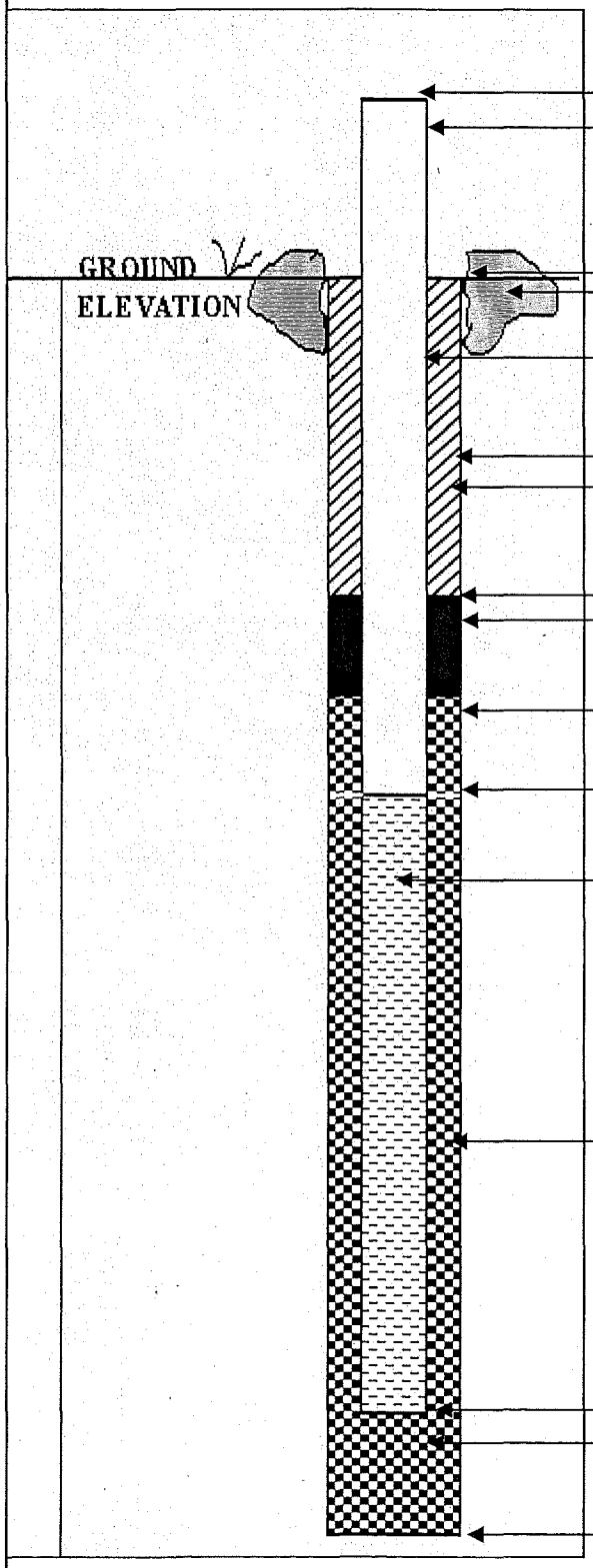
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 25

BORING NO.: TW 28 S

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-28S
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9/20/07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	189003.17
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094268.00



ELEVATION OF TOP OF RISER PIPE: 13.07

RISER STICK-UP ABOVE GROUND SURFACE: 1.09

GROUND ELEVATION: 11.98

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: —

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / —

ELEVATION / DEPTH TOP OF SCREEN: / 7

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10SL X 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 12

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / NA

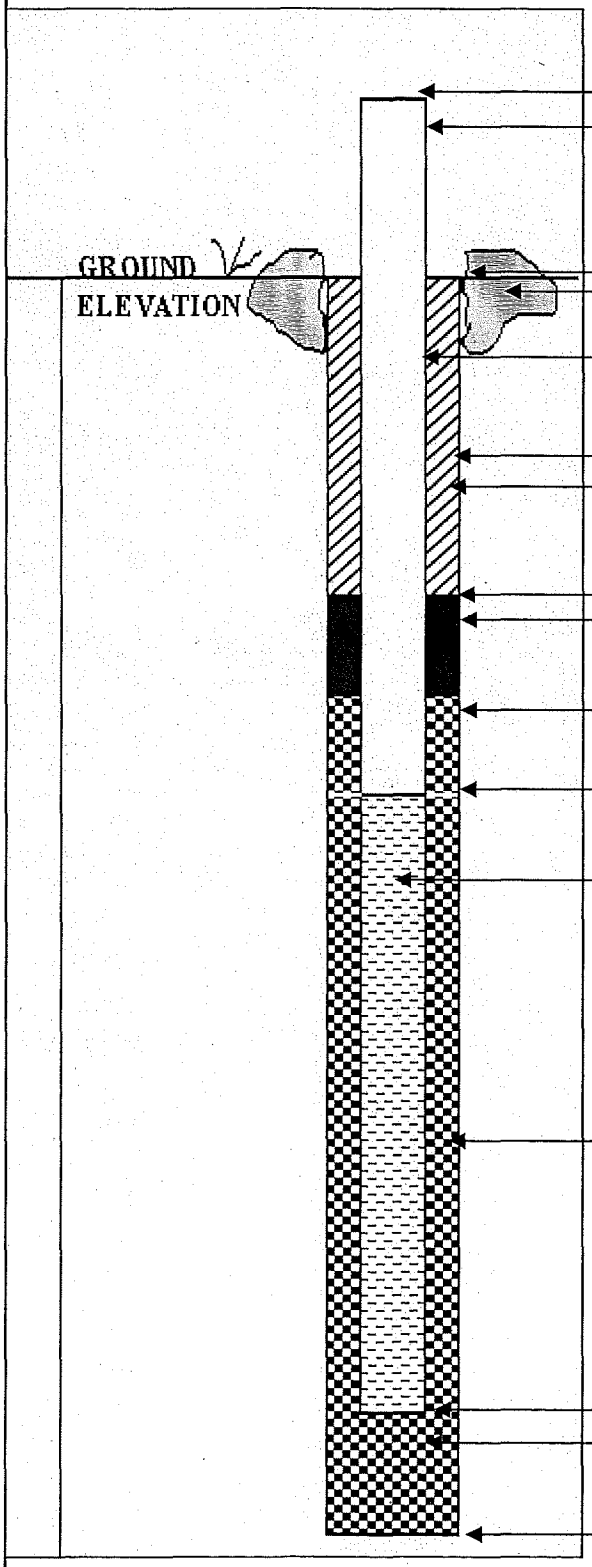
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 12

BORING NO.: TW 29I

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW 29 I
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9/20/07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	189001.33
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094271.02



ELEVATION OF TOP OF RISER PIPE: 13.11

RISER STICK-UP ABOVE GROUND SURFACE: 1.01

GROUND ELEVATION: 12-10

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: /—

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: /—

ELEVATION / DEPTH TOP OF SCREEN: / 19

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 SL x 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 24

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / NA

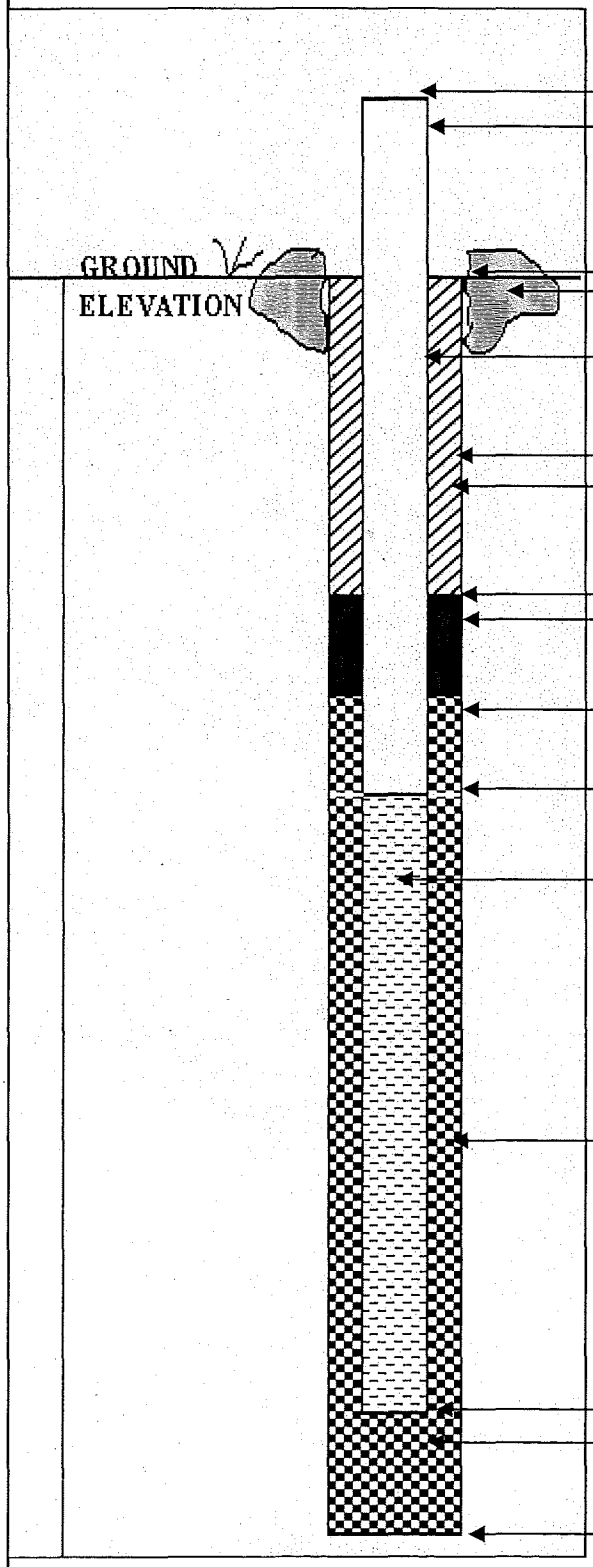
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 24

BORING NO.: TW-30S

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-30S
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9-19-07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	189124.42
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094324.42



ELEVATION OF TOP OF RISER PIPE: 12.43

RISER STICK-UP ABOVE GROUND SURFACE: 0.92

GROUND ELEVATION: 11.51

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: / —

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / —

ELEVATION / DEPTH TOP OF SCREEN: / 6

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 SL X 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 11

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / NA

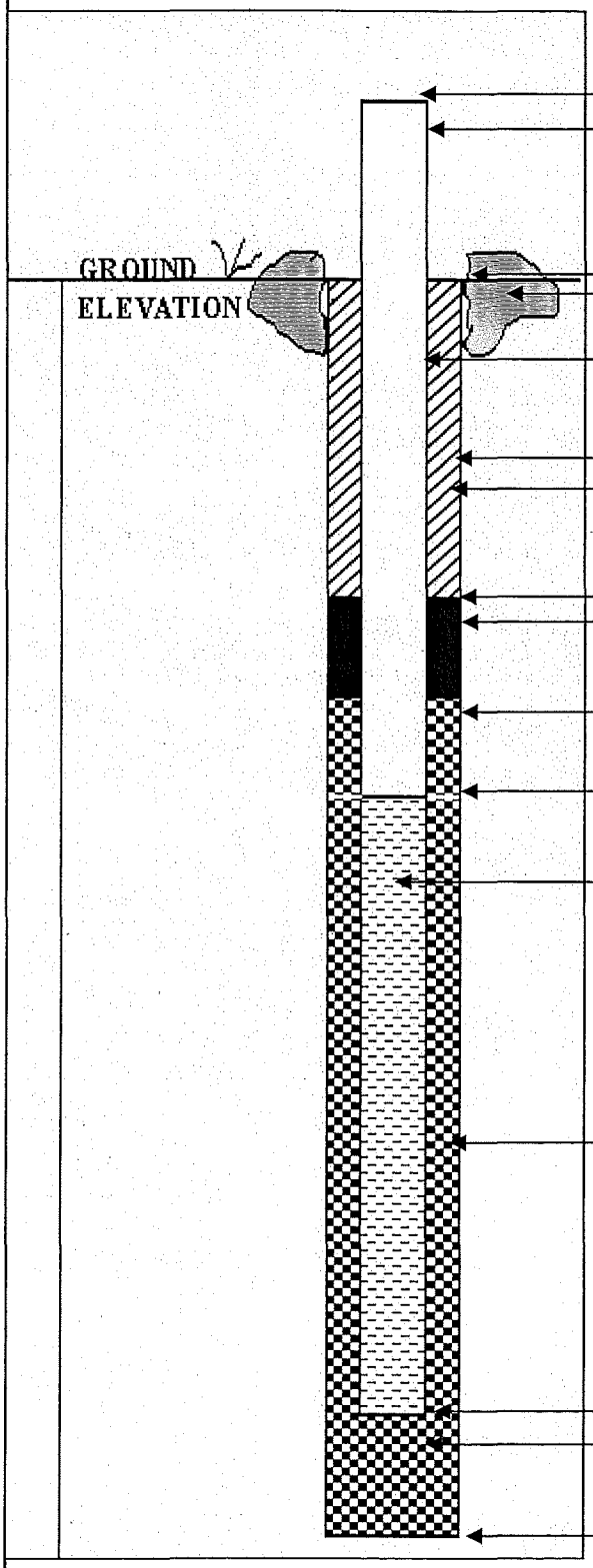
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 11

BORING NO.: TW-31I

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-31 I
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9-19-07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	189121-00
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094320.38



ELEVATION OF TOP OF RISER PIPE: 11.87

RISER STICK-UP ABOVE GROUND SURFACE: 0.40

GROUND ELEVATION: 11.47

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: / NA

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / NA

ELEVATION / DEPTH TOP OF SCREEN: / 19

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 SL X 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 24

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / NA

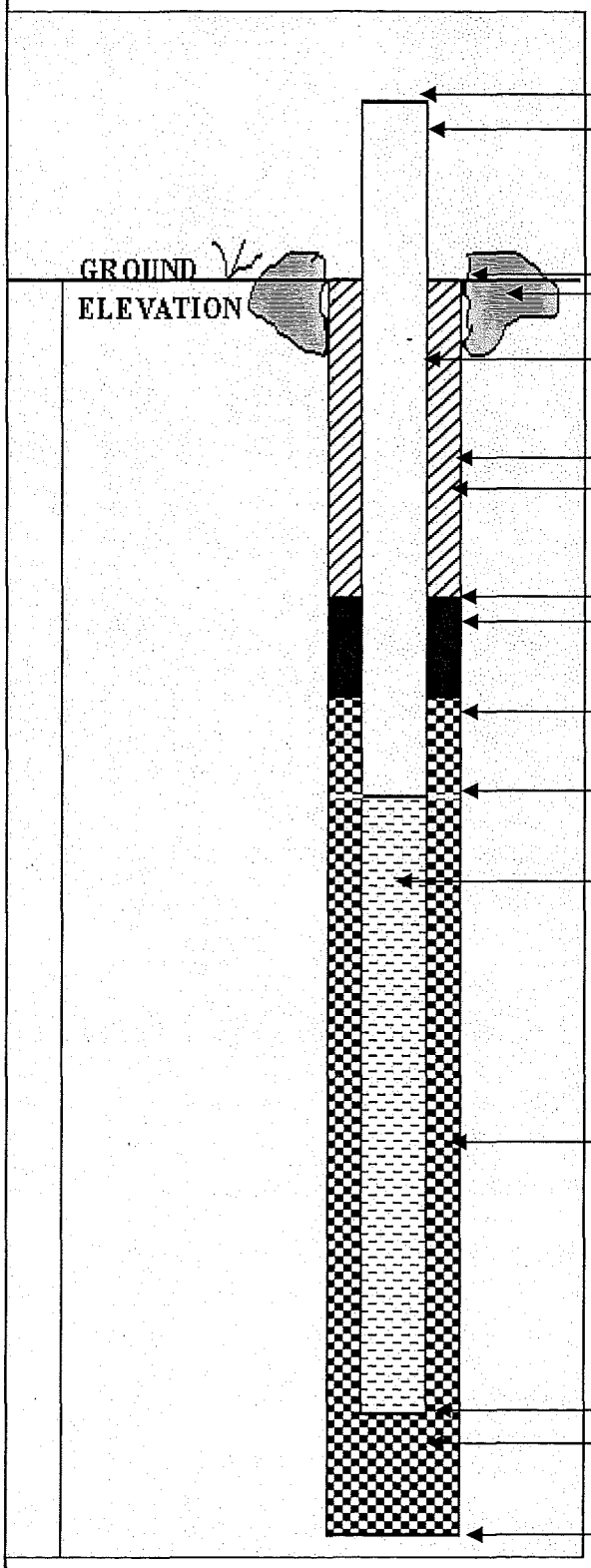
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 24

BORING NO.: TW-32I

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-32I
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9/20/07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	189080.97
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094523.70



ELEVATION OF TOP OF RISER PIPE: 11.77

RISER STICK-UP ABOVE GROUND SURFACE: .47

GROUND ELEVATION: 11.30 ?

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: / —

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / —

ELEVATION / DEPTH TOP OF SCREEN: / 19

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 SL x 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 24

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / —

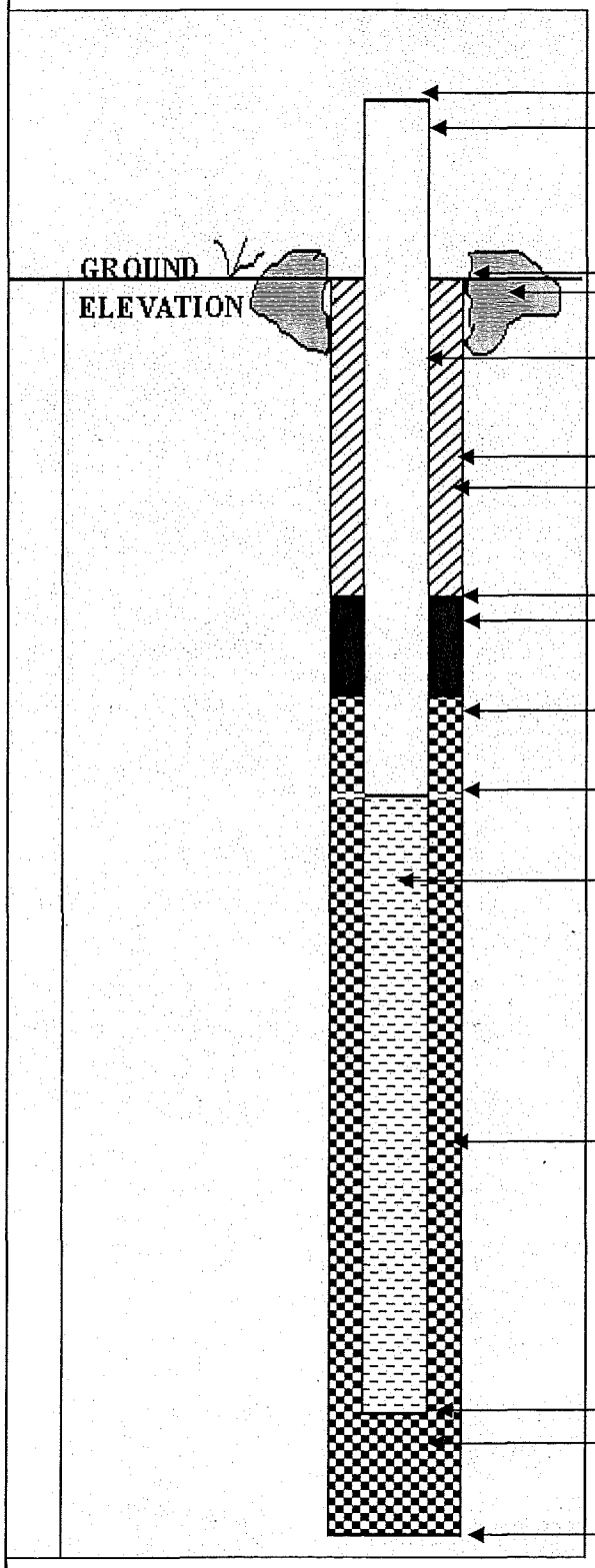
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 25

BORING NO.: TW-33S

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-33S
PROJECT No.:	G00455	DRILLER:	SAMWELL	DATE COMPLETED:	9/21/07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	188991.56
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094693.48



ELEVATION OF TOP OF RISER PIPE: 13.95

RISER STICK-UP ABOVE GROUND SURFACE: .85

GROUND ELEVATION: 13.10

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: /—

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: /—

ELEVATION / DEPTH TOP OF SCREEN: /8

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 SL X 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: /13

ELEVATION / DEPTH BOTTOM OF FILTER PACK: /13

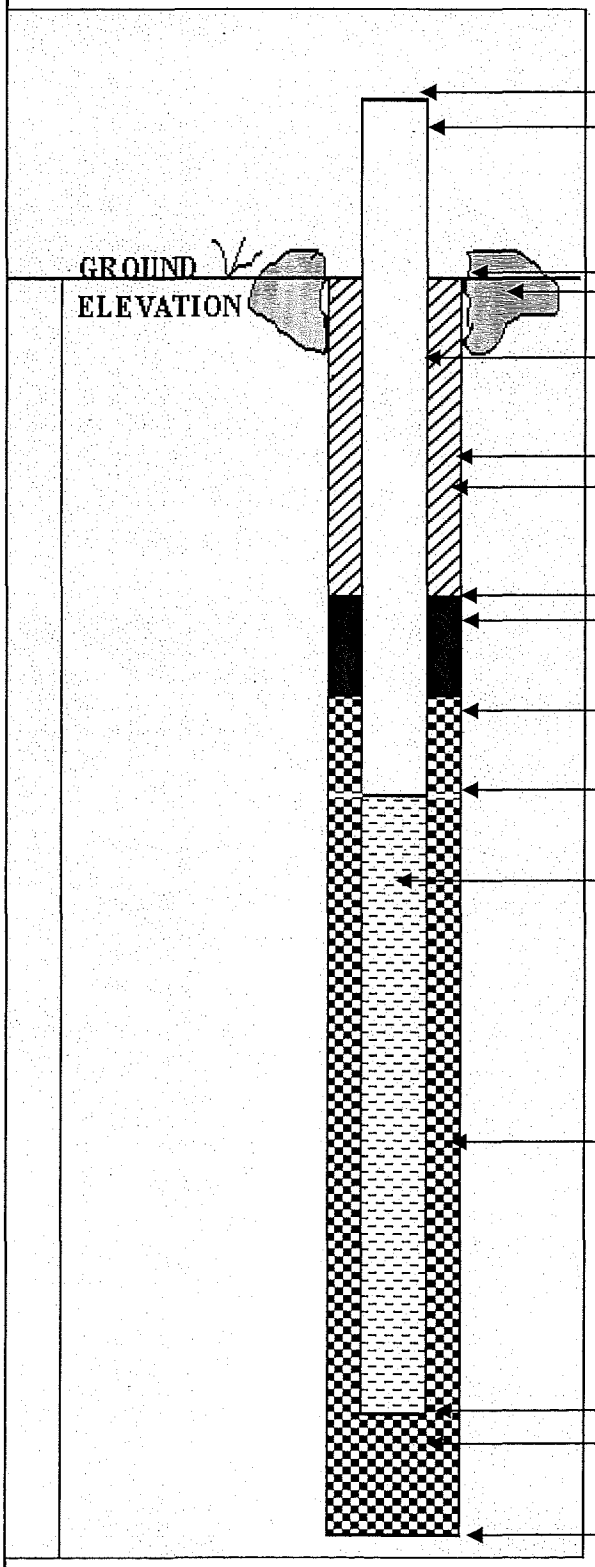
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: /13

BORING NO.: TW-34I

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-34 I
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9-21-07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	188987.57
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094691.64



ELEVATION OF TOP OF RISER PIPE: 13.87

RISER STICK-UP ABOVE GROUND SURFACE: .80

GROUND ELEVATION: 13.07

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: / —

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / —

ELEVATION / DEPTH TOP OF SCREEN: / 20

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 SL X 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 25

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / 25

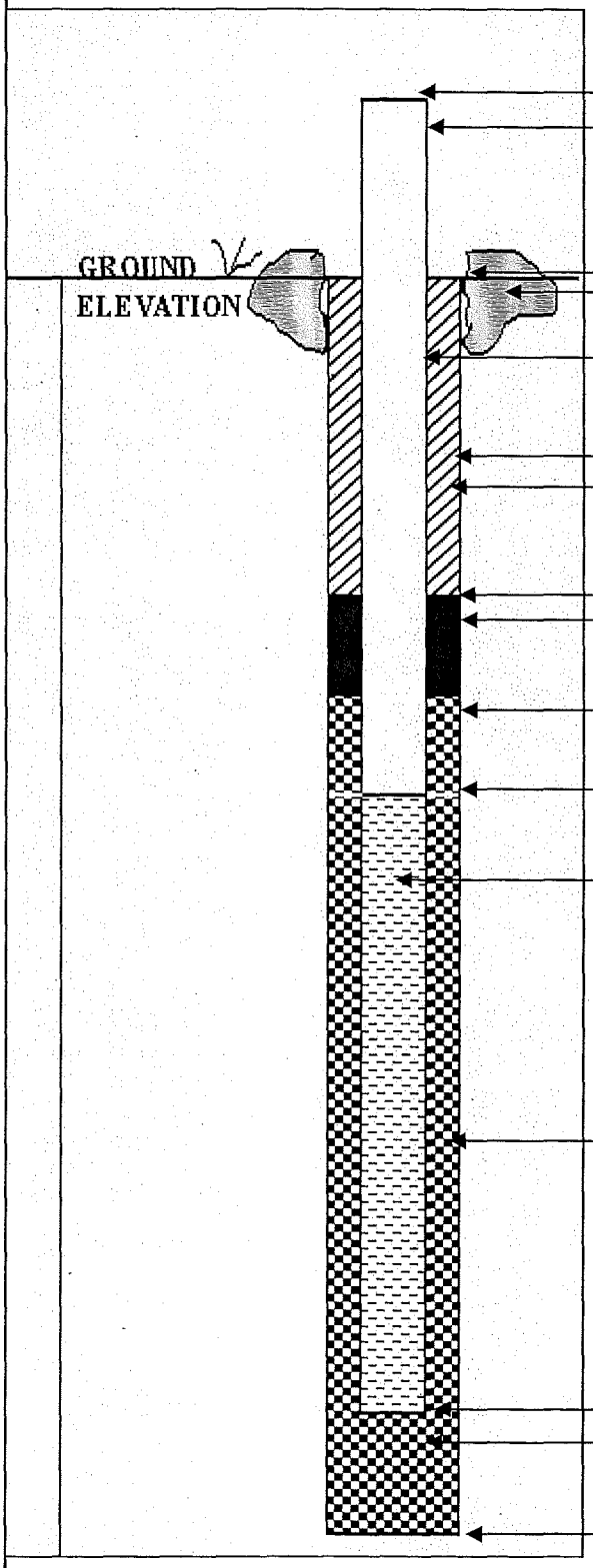
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 25

BORING NO.: TW-35S

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-35S
PROJECT No.:	G00455	DRILLER:	SAMWELL	DATE COMPLETED:	9-21-07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	189152.94
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094924.36



ELEVATION OF TOP OF RISER PIPE: 13.84

RISER STICK-UP ABOVE GROUND SURFACE: 2.01

GROUND ELEVATION: 11.83

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: / —

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / —

ELEVATION / DEPTH TOP OF SCREEN: / 8

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10SL X 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 13

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / 13

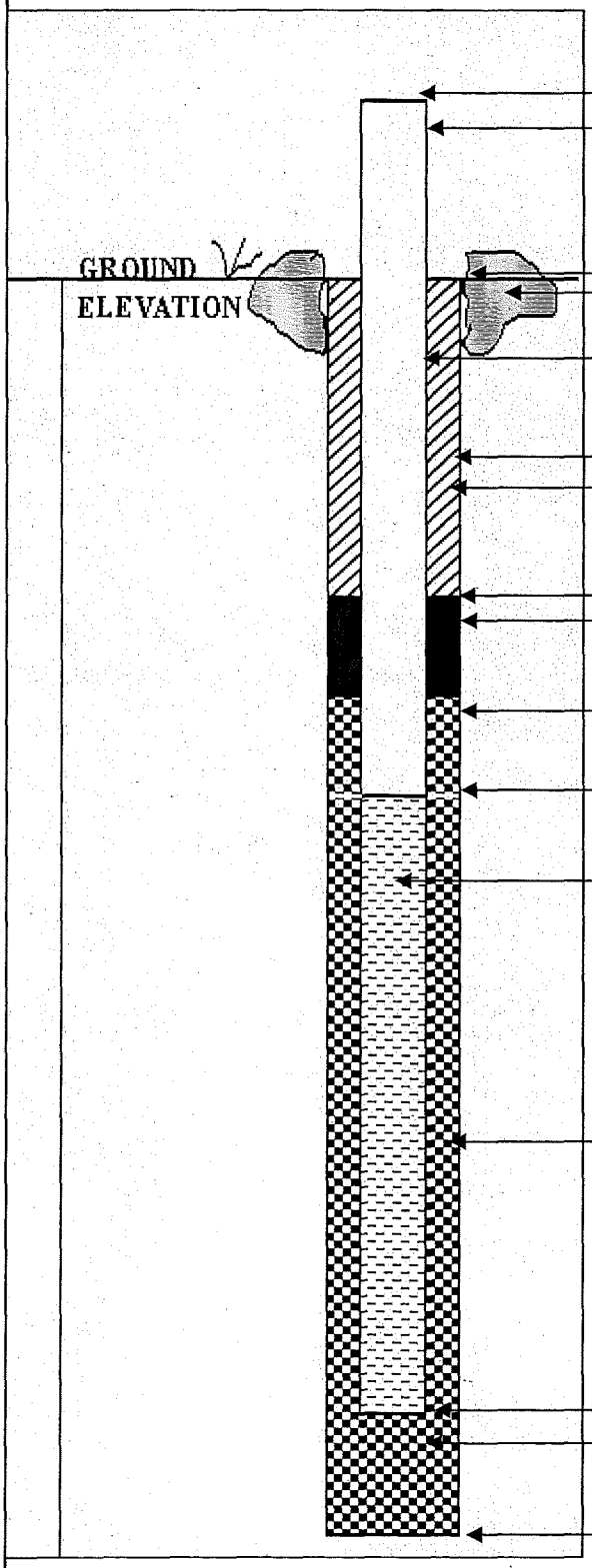
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 13

BORING NO.: TW-36I

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-36I
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9/21/07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	189147.39
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094922.24



ELEVATION OF TOP OF RISER PIPE: 12.39

RISER STICK-UP ABOVE GROUND SURFACE: 0.54

NA

GROUND ELEVATION: 11.85

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: / —

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / —

ELEVATION / DEPTH TOP OF SCREEN: / 19

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10SL X 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 24

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / —

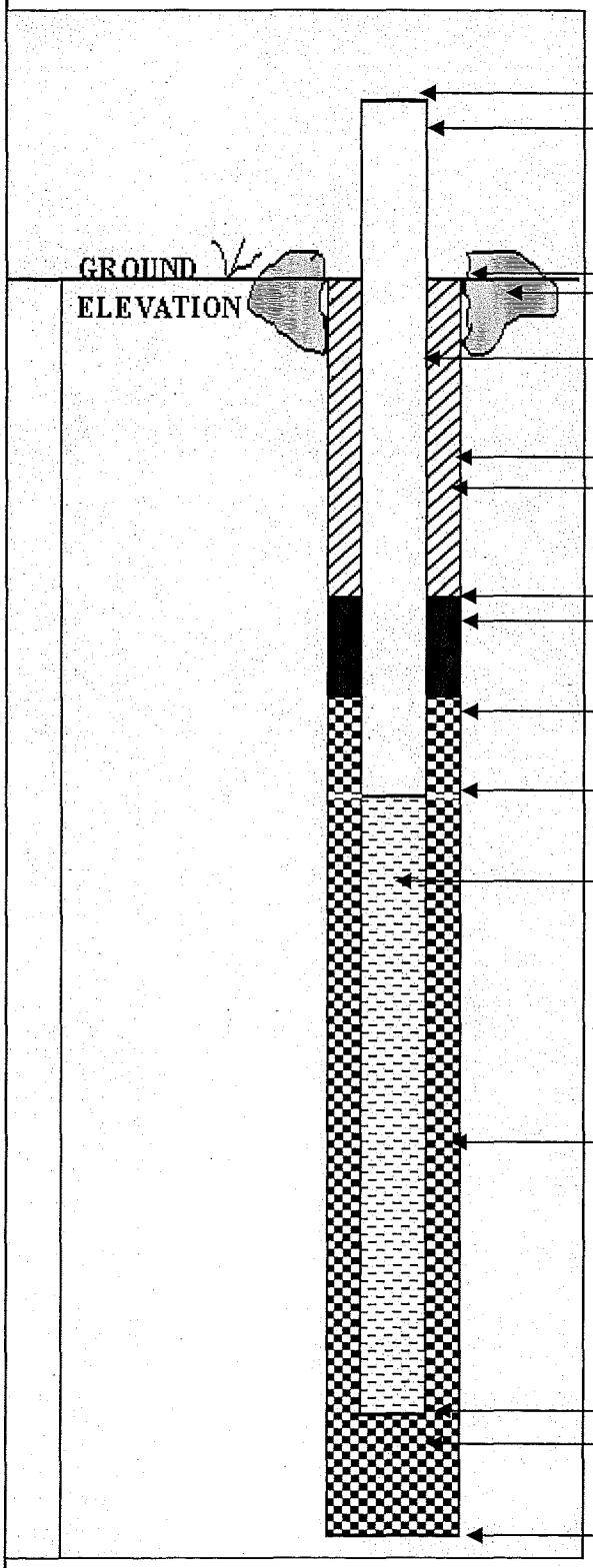
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 25

BORING NO.: TW-37S

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-37S
PROJECT No.:	G00455	DRILLER:	SAMWELL	DATE COMPLETED:	9/21/07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	189094.95
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094800.32



ELEVATION OF TOP OF RISER PIPE: 13.17

RISER STICK-UP ABOVE GROUND SURFACE: .30

GROUND ELEVATION: 12.87

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: /—

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / —

ELEVATION / DEPTH TOP OF SCREEN: / 8

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10SL x 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 13

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / 13

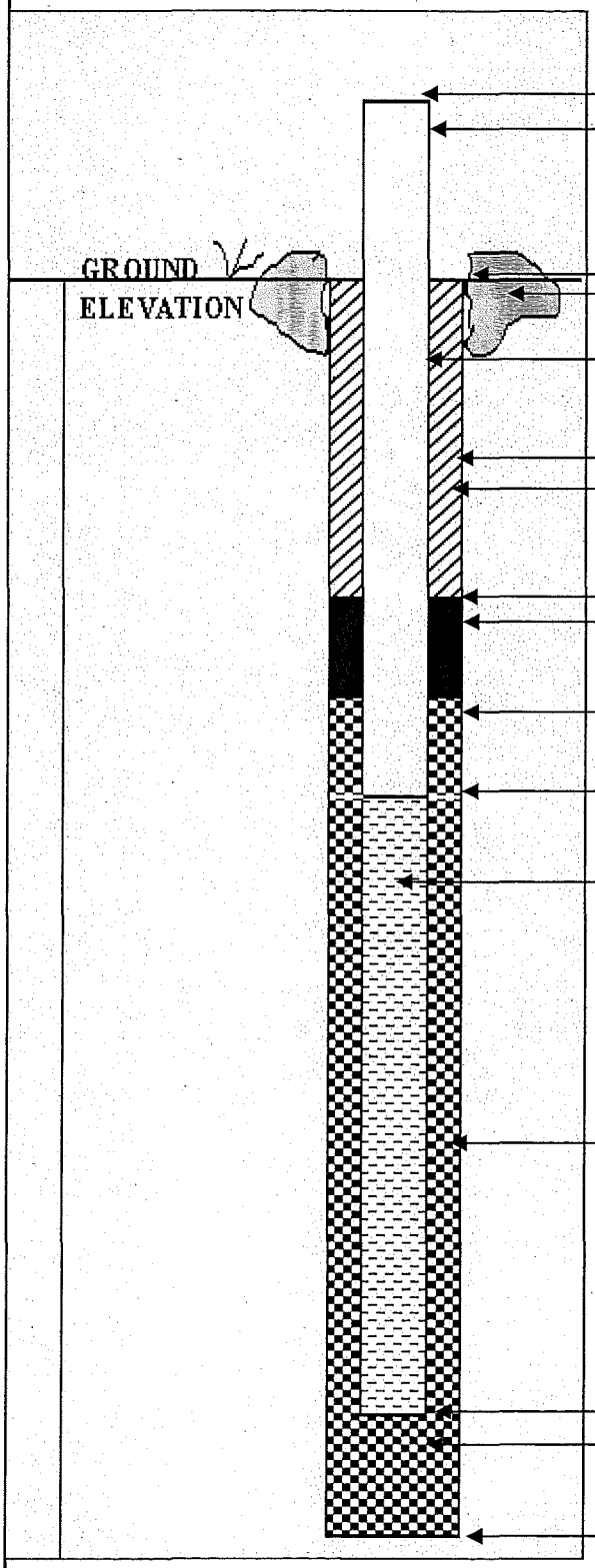
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 13

BORING NO.: TW-38I

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-38I
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9/21/07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	189097.22
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094796.92



ELEVATION OF TOP OF RISER PIPE: 13.22

RISER STICK-UP ABOVE GROUND SURFACE: .25

GROUND ELEVATION: 12.97

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: / —

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / —

ELEVATION / DEPTH TOP OF SCREEN: / 18

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10SL x 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 23

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / —

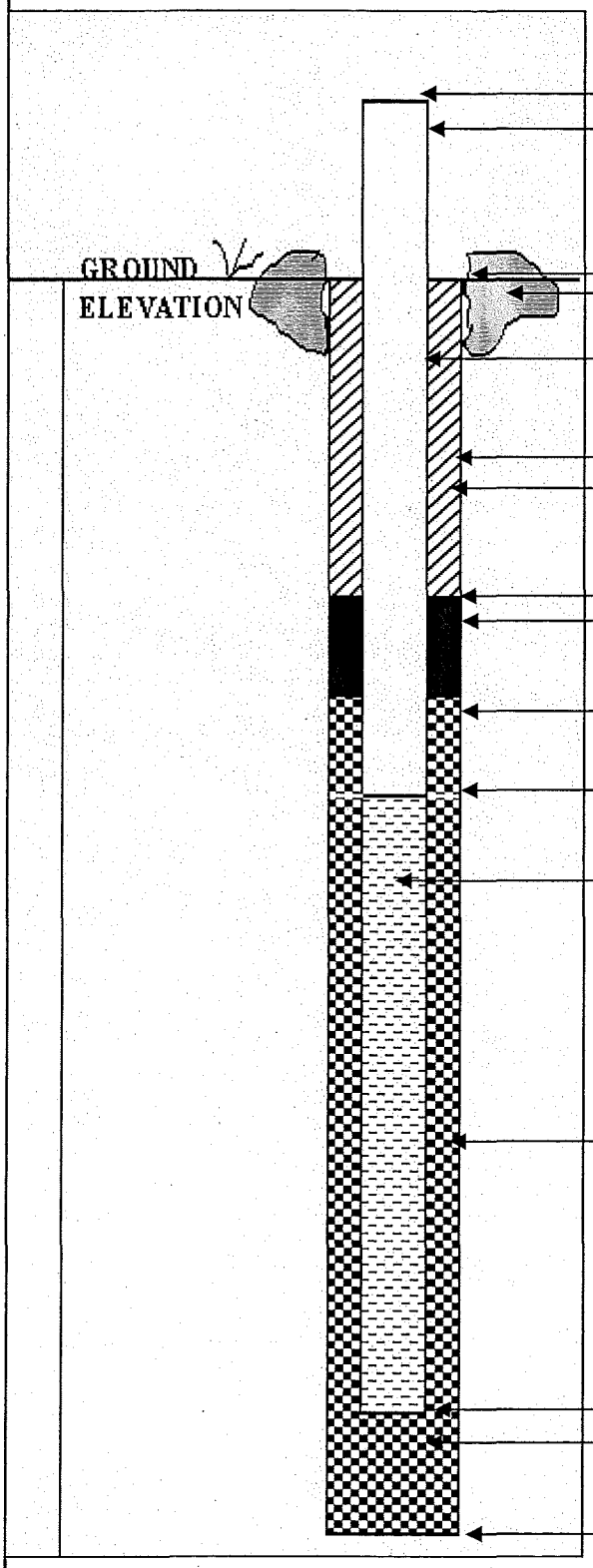
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 25

BORING NO.: TW-39S

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-39S
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9/20/07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	189189.03
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094553.57



ELEVATION OF TOP OF RISER PIPE: —

RISER STICK-UP ABOVE GROUND SURFACE: NA

GROUND ELEVATION: 13.94

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: / —

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / —

ELEVATION / DEPTH TOP OF SCREEN: / 8

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 SL X 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 13

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / —

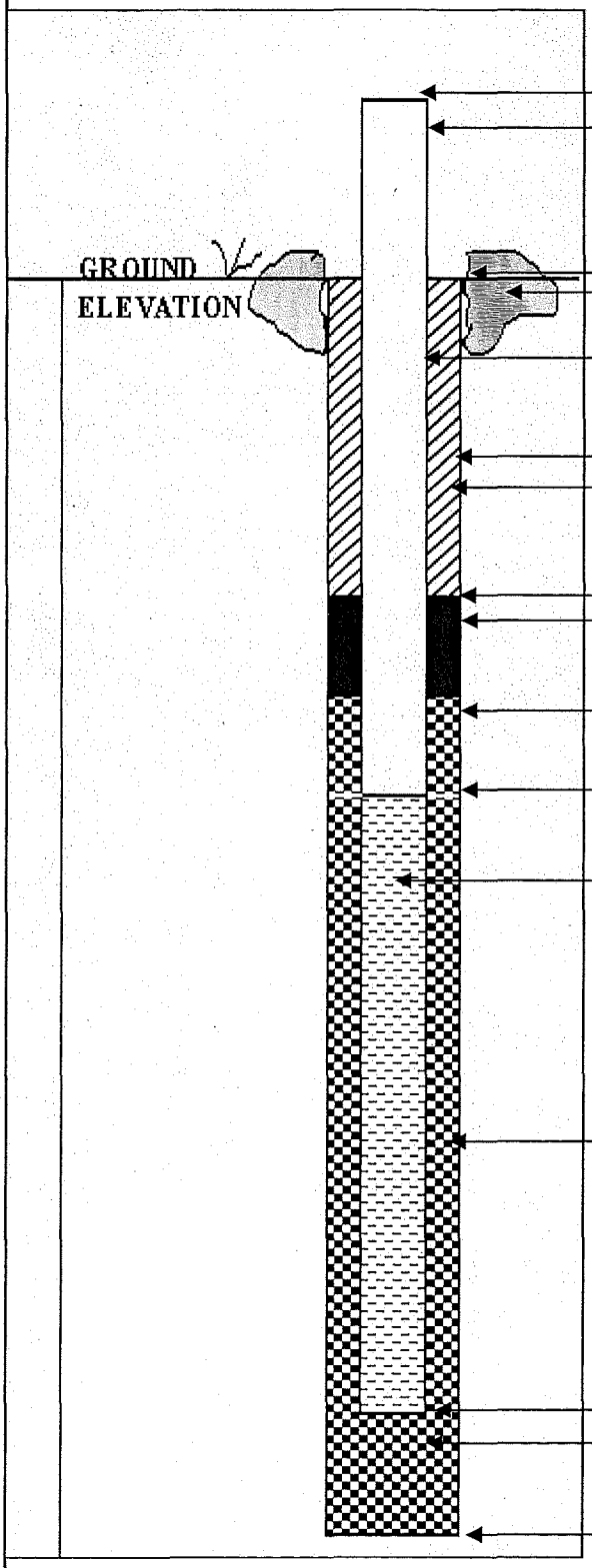
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 13

BORING NO.: TW 40I

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-40I
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9/20/07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	189192.22
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094556.21



ELEVATION OF TOP OF RISER PIPE: 14.53

RISER STICK-UP ABOVE GROUND SURFACE: .58

GROUND ELEVATION: NA 13.95

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: /—

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: /—

ELEVATION / DEPTH TOP OF SCREEN: /19

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10SL x 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: /24

ELEVATION / DEPTH BOTTOM OF FILTER PACK: /—

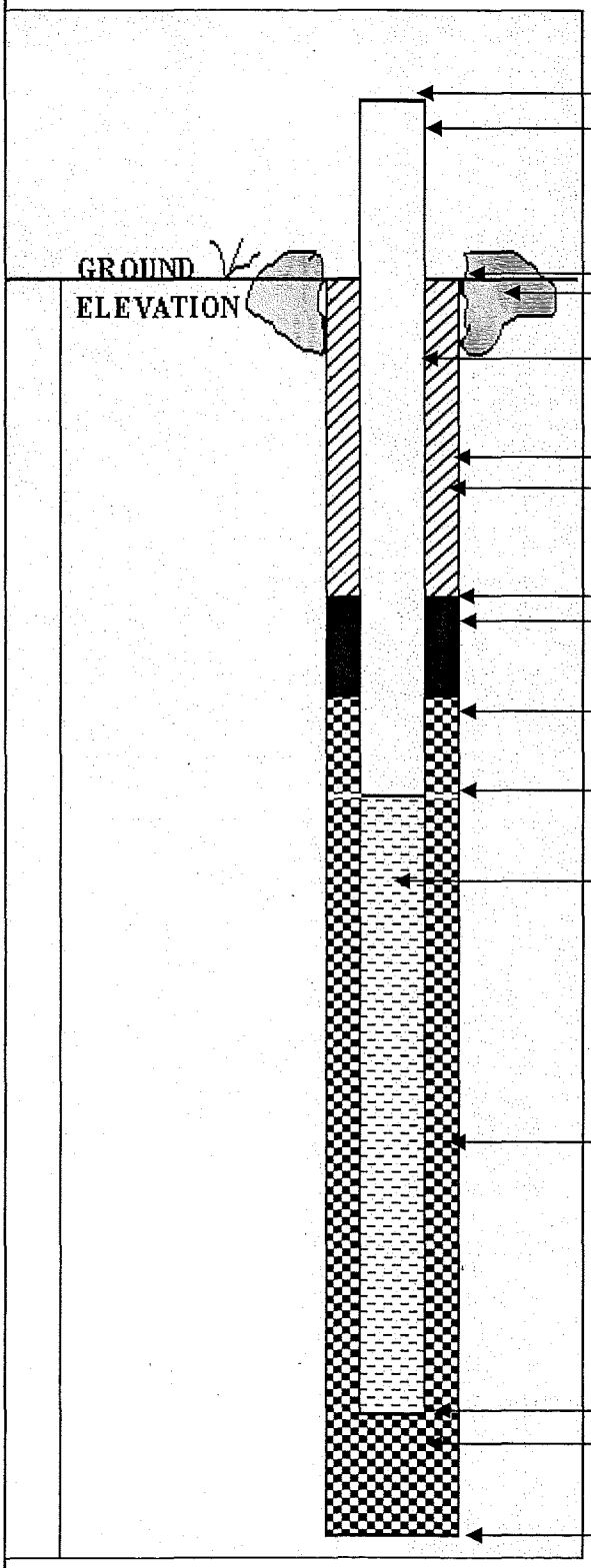
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: /25

BORING NO.: TW-41S

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-41S
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9/20/07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	189279.51
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094214.73



ELEVATION OF TOP OF RISER PIPE: 8.77

RISER STICK-UP ABOVE GROUND SURFACE: 1.22

GROUND ELEVATION: 7.55

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: / –

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / –

ELEVATION / DEPTH TOP OF SCREEN: / 6

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10SL x 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 11

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / NA

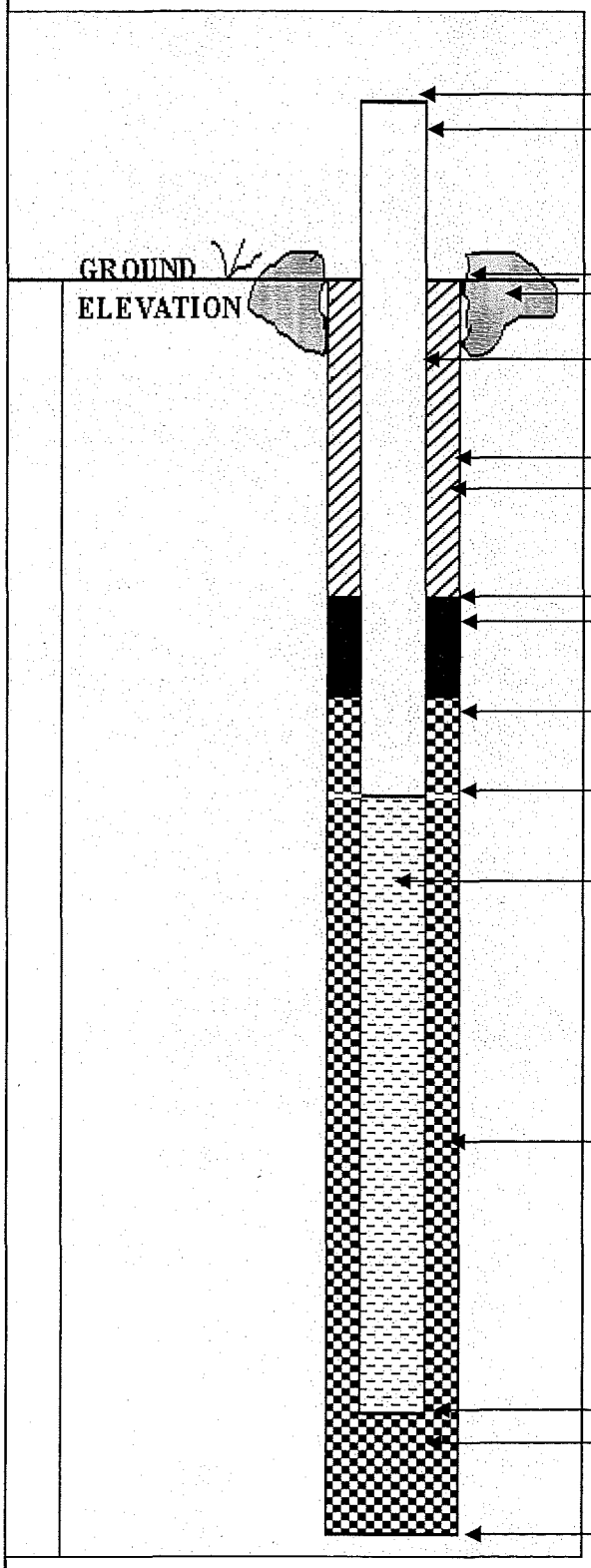
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 11

BORING NO.: TW-42I

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-42I
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9-20-07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	189282.37
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094216.61



ELEVATION OF TOP OF RISER PIPE: 7.97

RISER STICK-UP ABOVE GROUND SURFACE: .42

GROUND ELEVATION: 7.55

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: /—

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: /—

ELEVATION / DEPTH TOP OF SCREEN: /20

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10SL x 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: /25

ELEVATION / DEPTH BOTTOM OF FILTER PACK: /NA

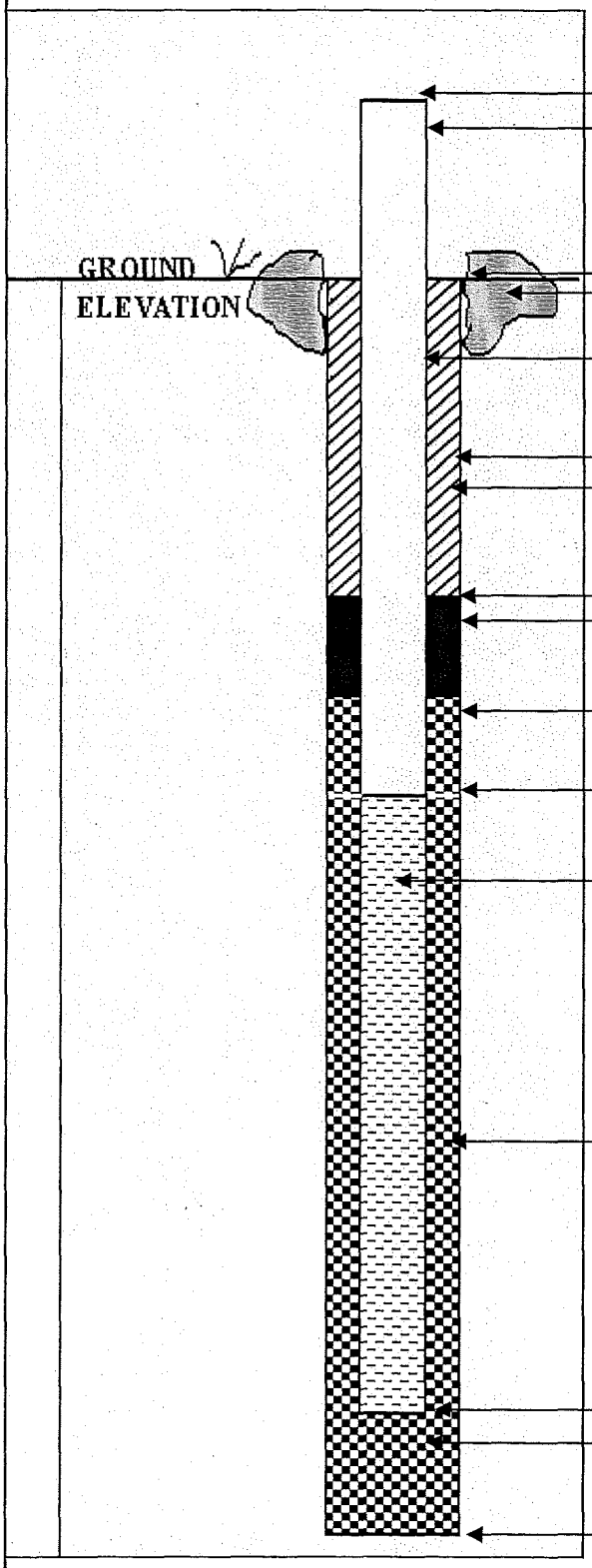
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: /25

BORING NO.: TW43S

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-43S
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9-19-07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	189115.86
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094215.30



ELEVATION OF TOP OF RISER PIPE: 9.88

RISER STICK-UP ABOVE GROUND SURFACE: .52

GROUND ELEVATION: 9.36

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: / —

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / NA

ELEVATION / DEPTH TOP OF SCREEN: /9.5

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10SL x 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: /14.5

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / NA

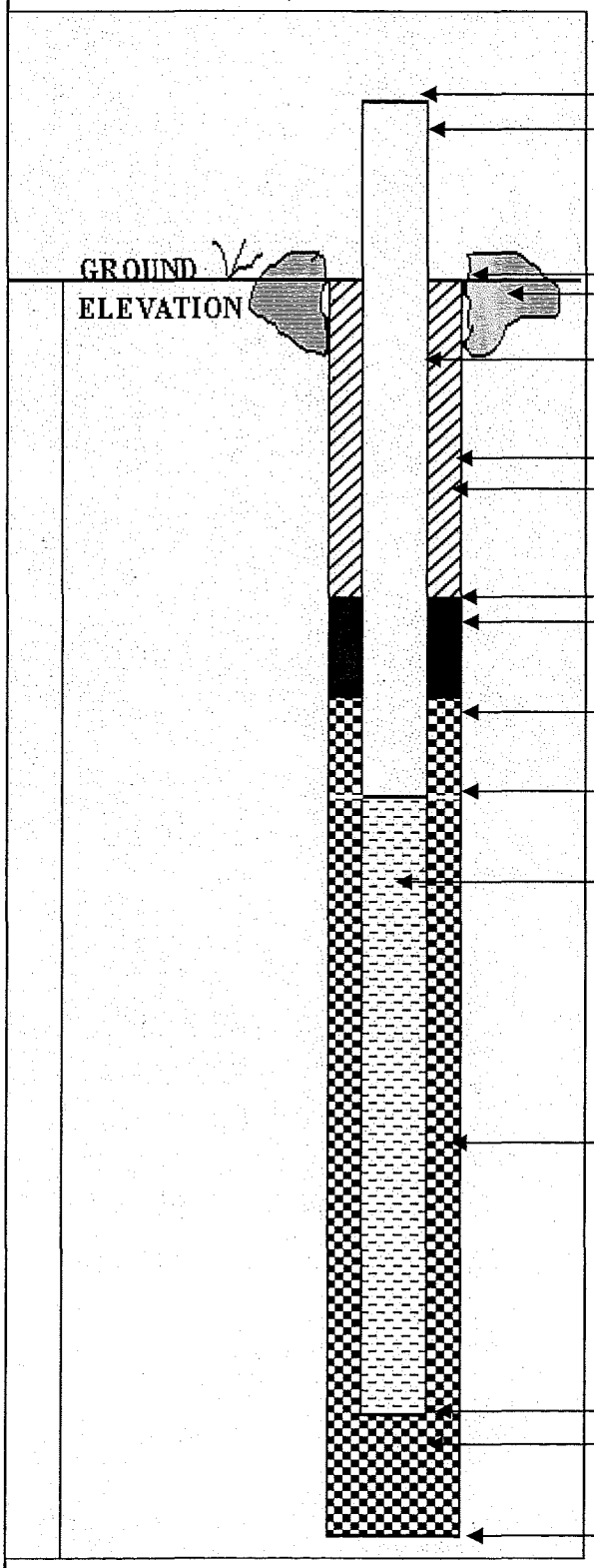
TYPE OF BACKFILL BELOW WELL:

ELEVATION / DEPTH OF BOREHOLE: /14.5

BORING NO.: TW-44I

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW 44I
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9-19-07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	189113.49
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094218.58



ELEVATION OF TOP OF RISER PIPE: 10.02

RISER STICK-UP ABOVE GROUND SURFACE: .58

GROUND ELEVATION: 9.44

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: / —

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / —

ELEVATION / DEPTH TOP OF SCREEN: / 19.5

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 SL x 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 24.5

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / NA

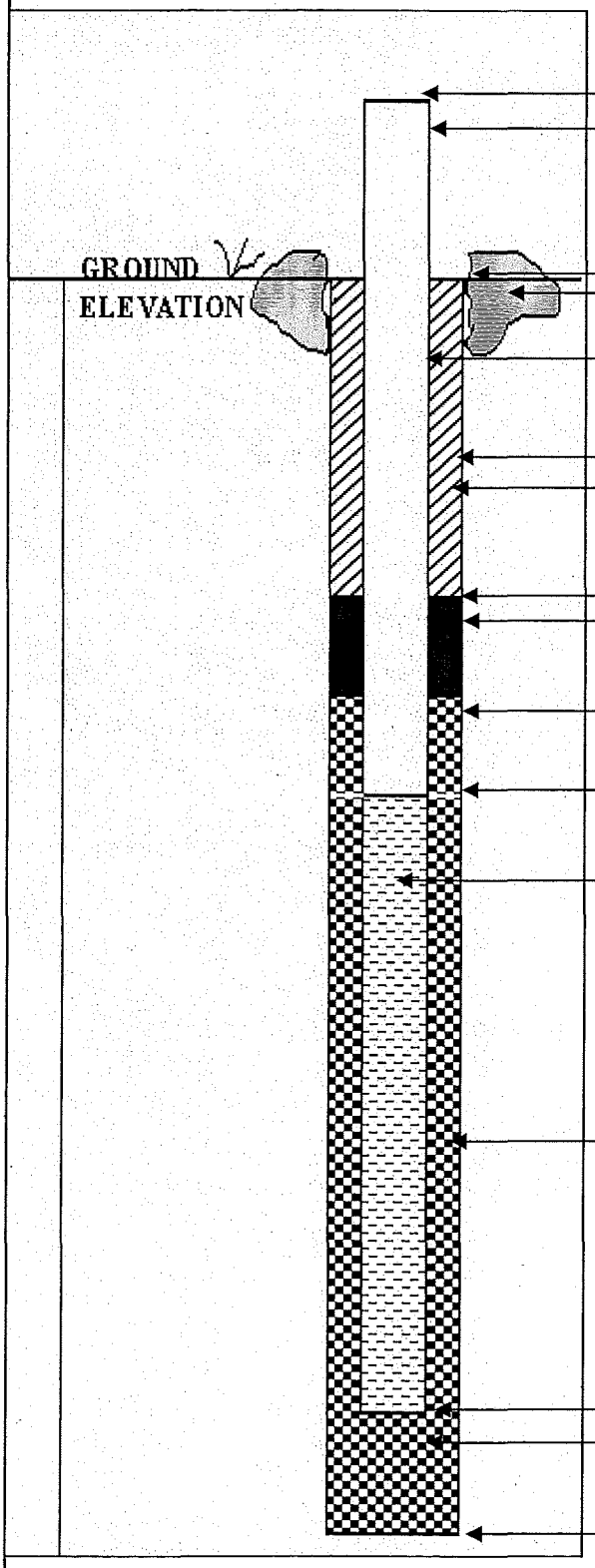
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 25

BORING NO.: TW 45D

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-45D
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9-19-07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	189119.73
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094324.45



ELEVATION OF TOP OF RISER PIPE: 11.99

RISER STICK-UP ABOVE GROUND SURFACE: .39

GROUND ELEVATION: 11.60

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: / NA

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / NA

ELEVATION / DEPTH TOP OF SCREEN: / 29

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 SL x 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 34

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / NA

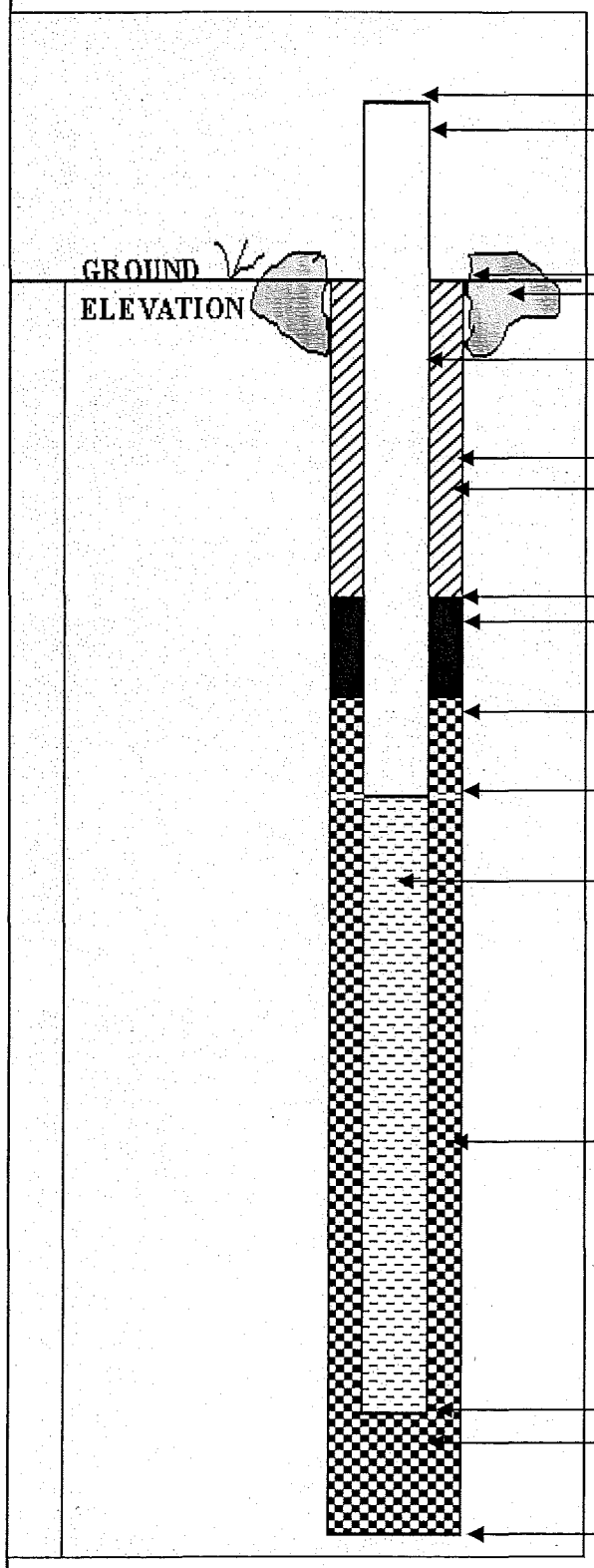
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 35

BORING NO.: TW46S

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW46S
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9/20/07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	188824.74
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094354.72



ELEVATION OF TOP OF RISER PIPE: 15.87

RISER STICK-UP ABOVE GROUND SURFACE: 1.75

GROUND ELEVATION: 14.12

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: / —

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: / —

ELEVATION / DEPTH TOP OF SCREEN: / 8

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10SL X 5'

I.D. OF SCREEN: 1"

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 13

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / NA

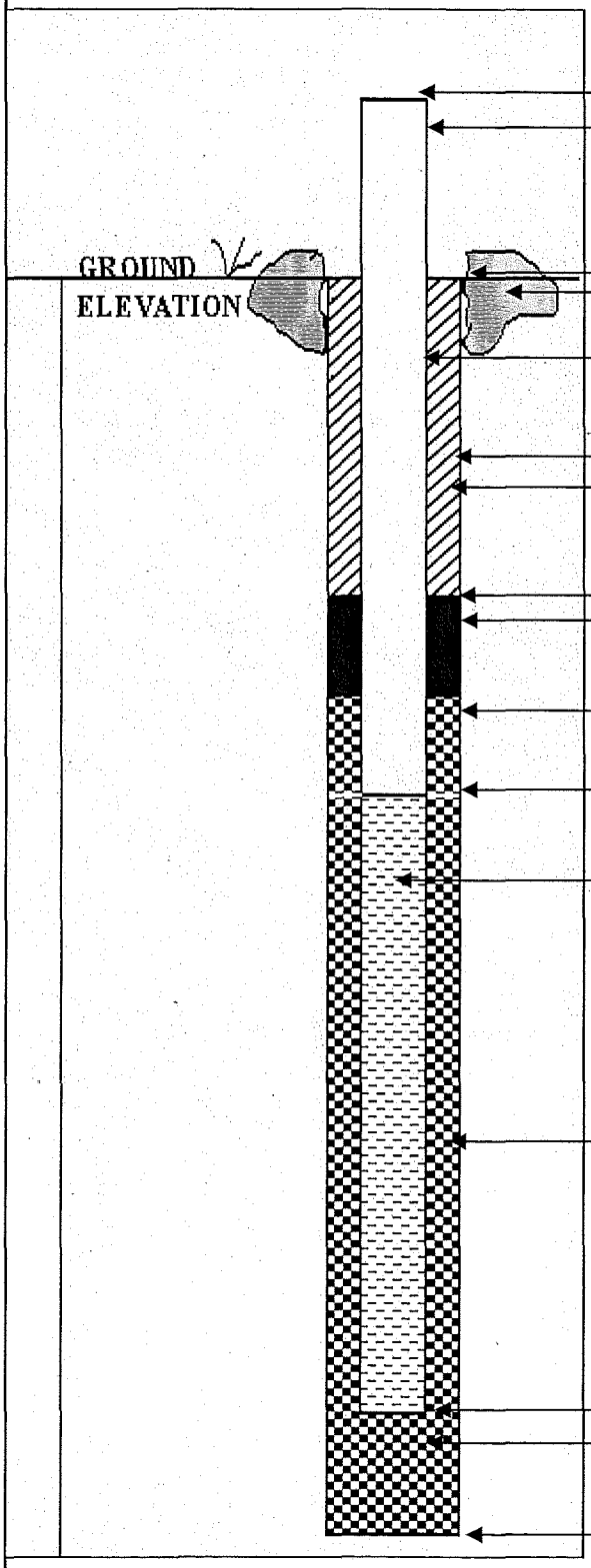
TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 13

BORING NO.: TW-47I

Tetra Tech NUS, Inc. **TEMPORARY MONITORING WELL SHEET**

PROJECT:	MCRD Parris Island	DRILLING Co.:	Vironex	BORING No.:	TW-47I
PROJECT No.:	G00455	DRILLER:	GAMWELL	DATE COMPLETED:	9/20/07
SITE:	Site 27	DRILLING METHOD:	DPT	NORTHING:	188828.50
GEOLOGIST:	Conti	DEV. METHOD:	PERISTALTIC	EASTING:	2094356.56



ELEVATION OF TOP OF RISER PIPE: 15.21

RISER STICK-UP ABOVE GROUND SURFACE: 1.12

GROUND ELEVATION: 14.09

TYPE OF SURFACE SEAL: NA

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF SEAL: NA

ELEVATION / DEPTH OF SEAL: /—

TYPE OF SEAL: NA

ELEVATION / DEPTH TOP OF FILTER PACK: /—

ELEVATION / DEPTH TOP OF SCREEN: / 19

TYPE OF SCREEN: PVC

SLOT SIZE X LENGTH: 10 SL X 5'

I.D. OF SCREEN: 1

TYPE OF FILTER PACK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 24

ELEVATION / DEPTH BOTTOM OF FILTER PACK: / NA

TYPE OF BACKFILL BELOW WELL: NA

ELEVATION / DEPTH OF BOREHOLE: / 25

C-8 PHASE II RI – PERMANENT MONITORING WELL BORING LOGS

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PARRIS ISLAND SITE 27
PROJECT NUMBER: G00455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: PAI-27MW48I
DATE: 8/6-9/08
GEOLOGIST: CHARLIE WARING
DRILLER: ANDREW THORNTON / COREY CAMPBELL

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 -	0.5				LOOSE	BROWN	VF-F SAND WITH F	SP	MOIST	0.0			
							GRAVEL, ROOTS, & ORGANIC MATTER						
			5/5										
0.5 -	5.0				LOOSE	LT BROWN	VF-F SAND	SP	MOIST	0.0			
5.0 -	9.75				LOOSE		SAME AS ABOVE	SP	MOIST	0.0			
									WET @ 7.5'				
			5/5										
9.75 -	10.0				STIFF	BROWN/GRAY	CLAY MED PLASTICITY	CL	MOIST	0.0			
10.0 -	10.75				STIFF		SAME AS ABOVE	CL	MOIST	0.0			
10.75 -	15.0		5/5		LOOSE	GRAY/BLUE	VF-F SAND	SP	WET	0.0			
15.0 -	20.0		4/5		LOOSE		SAME AS ABOVE	SP	WET	0.0			
20.0 -	23.0				LOOSE		SAME AS ABOVE	SP	WET	0.0			
23.0 -	24.5				TIGHT	DK GRAY	CLAYEY VF-F SAND	SC	WET	0.0			
			3/5										
24.5 -	25.0				~~STIFF~~	DK	GRAY CLAY MED PLASTICITY	CL	MOIST	0.0			
							TRACE VF-F SAND						

* 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 X No ____ Well I.D. #: PAI-27MW48I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: PAI-27MW 48I
DATE: 8/6 - 108
GEOLOGIST: CHARLIE WARWD
DRILLER: ANDREW THORNTON / CORY GANNON

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**
~~[illegible]~~	~~[illegible]~~												
25.0-30.0			1/5		LOOSE	GRAY / BLUE	VF - F SAND	SP	WET	0.0			

* 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 X No

Well I.D. #: PAI - 27MW 48I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PATRIS ISLAND SITE 27
PROJECT NUMBER: G00455
DRILLING COMPANY: VIRONEX
DRILLING RIG: DPT / GEOPROBE

BORING No.: PAI-27 MW50 I
DATE: 8/6-/08
GEOLOGIST: CHARLIE WARWO
DRILLER: ANDREW THORNTON / LONEY GAMWELL

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**
0.0-0.5						BLACK	ASPHALT / FILL		DRY				
0.5-2.0					LOOSE	BROWN	VF-F SAND	SP	MOIST	>3000			
2.0-2.25			5/5		~~STIFF~~	GRAY/BROWN	CLAY, MED PLASTICITY	CL	MOIST	449			
2.25-5.0					LOOSE	BROWN	VF-F SAND	SP	MOIST	424			
5.0-7.0					LOOSE		SAME AS ABOVE	SP	MOIST	424			
7.0-8.0					LOOSE	BROWN	VF-F CLAYEY SAND	SC	WET	1467			
			5/5										
8.0-10.0					LOOSE	GRAY	/BLUE VF-F SAND	SP	WET	897			
10.0-15.0			5/5		LOOSE		SAME AS ABOVE	SP	WET	807			
15.0-16.0					LOOSE		SAME AS ABOVE	SP	WET	493			
16.0-18.0					LOOSE	TAN	VF-F SAND	SP	WET				
			4/5										
18.0-20.0					LOOSE	DK BROWN	VF-F SAND	SC	WET	84			
							WITH TRACE CLAY						
20.0-24.5					LOOSE		SAME AS ABOVE	SC	WET	70			
24.5-24.75					STIFF	DK GRAY	CLAY, MED PLASTICITY	CL	WET	60			
			3/5				TRACE VF-F SAND						
24.75-25.0					LOOSE	GRAY	/BLUE VF-F SAND	SP	WET	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): 0.0

Remarks:

Converted to Well: Yes X No ____ Well I.D. #: PAI-27 MW50I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PARRIS ISLAND SITE 27
PROJECT NUMBER: G00455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE PPT

BORING No.: PAI-27MW52I
DATE: 8/6-10/8
GEOLOGIST: CHARLIE WARNO
DRILLER: ANDREW THORNTON, COREY CAMWELL

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 -	0.5				LOOSE	DK BROWN	VF-F SAND, ROOTS,		DRY	0.0			
							ORGANIC MATTER						
0.5 -	3.5				LOOSE	DK BROWN	VF-F SAND, TRACE CLAY	SC	MOIST	0.0			
3.5 -	4.5				LOOSE	DK BROWN	VF-F SAND WITH CLAY	SC	WET	0.0			
4.5 -	5.0				STIFF	GRAY/BROWN	CLAY, MED PLASTICITY	CL	MOIST	0.0			
5.0 -	7.5				TIGHT	GRAY	CLAYEY VF-F SAND	SC	WET	0.0			
7.5 -	8.5				LOOSE	LT GRAY	VF-F SAND	SP	WET	0.0			
8.5 -	10.0				STIFF	GRAY/BROWN	CLAY MED PLASTICITY	CL	MOIST	0.0			
10.0 -	13.0				STIFF		SAME AS ABOVE	CL	MOIST	0.0			
13.0 -	14.0				LOOSE	GRAY	VF-F SAND	SP	WET	0.0			
14.0 -	15.0				LOOSE	GRAY	VF-F SAND	SP	WET	0.0			
15.0 -	18.0				STIFF	GRAY/BROWN	CLAY, MED PLASTICITY	CL	MOIST	0.0			
							VF-F SAND LAMINATIONS						
							AT VARYING INTERVALS						
18.0 -	20.0				STIFF	DK GRAY	SANDY CLAY	CL	MOIST	0.0			
20.0 -	25.0				LOOSE	GRAY/BLUE	VF-F SAND	SP	WET	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): 0.0

Remarks:

Converted to Well: Yes X No ____ Well I.D. #: PAI-27MW52I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: PAI-27 MW54I
DATE: 8/6-9/08
GEOLOGIST: CHARLIE WARINO
DRILLER: ANDREW THORNTON / LOREY GAMWELL

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**
0.0-0.5					TIGHT	BLACK	GRAVEL / ASPHALT / FILL		DRY	–			
			5/5										
0.5-5.0					LOOSE	BROWN	VF-F SAND	SC	MOIST	4.1			
							TRACE SILT & CLAY						
					LOOSE	LIGHT TAN	VF-F SAND	SP	MOIST	10.1			
6.0-8.0							TRACE F GRAVEL						
			5/5										
8.0-10.0					STIFF	GRAY/BROWN	CLAY MED	CL	MOIST	12.2			
							PLASTICITY, TRACE SAND						
10.0-15.0			5/5		TIGHT	GRAY/BROWN	CLAYEY VF-F	SC	WET	16.1			
							SAND						
15.0-20.0			5/5		TIGHT		SAME AS ABOVE	SC	WET	12.4			
20.0-24.0							NO SAMPLE						
			1/5										
24.0-25.0					LOOSE	DK GRAY	CLAYEY VF-F SAND	SC	WET	0.0			
							CLAY LAMINATIONS THROUGHOUT						

* 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 X No ____ Well I.D. #: PAI-27MW54I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PARRIS ISLAND SITE 27
PROJECT NUMBER: G00455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: PAI-27 MW 54I
DATE: 8/6-/08
GEOLOGIST: CHARLIE WARING
DRILLER: ANDREW THORNTON / COREY CAMPBELL

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**
25.0	-30.0		2/5		LOOSE	GRAY/BLWE	VF-F SAND	SP	WET	0.0			

* 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 X No ____ Well I.D. #: PAI-27 MW54I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PARRIS ISLAND SITE 27
PROJECT NUMBER: 6004SS
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: PAI-27MW 56 I
DATE: 8/5-10/8
GEOLOGIST: CHARLIE WARING
DRILLER: ANDREW THORNTON / COREY CAMWELL

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 -	0.5				LOOSE	DK BROWN	VF-F SAND WITH		DRY	0.0			
							ROOTS & ORGANIC MATTER						
0.5 -	2.0		5/5		LOOSE	DK BROWN - BROWN	VF-F SAND	SP	MOIST	11.7			
2.0 -	2.5				LOOSE	LT BROWN	VF-F SAND W/ CLAY	SC	MOIST	7.1			
2.5 -	5.0				STIFF	GRAY	CLAY WITH VF-F SAND. MED PLASTICITY	CL	MOIST	0.0			
5.0 -	6.0				STIFF		SAME AS ABOVE		MOIST	0.0			
6.0 -	7.0				LOOSE	GRAY/BROWN	VF-F SAND W/ CLAY	SC	MOIST	9.7			
			5/5										
7.0 -	10.0				LOOSE	GRAY	VF-F SAND	SP	WET	0.0			
10.0 -	14.5				LOOSE		SAME AS ABOVE		WET	0.0			
			5/5										
14.5 -	15.0				LOOSE	DK GRAY	VF-F SAND	SP	WET	0.0			
15.0 -	20.0		1/5		LOOSE	GRAY	VF-F SAND	SP	WET	0.0			
20.0 -	25.0		0/5			NO	SAMPLE						

* 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 X No ____ Well I.D. #: PAI-27MW56I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: PAI-27MW 56 I
DATE: 8/5-/08
GEOLOGIST: CHARLIE WARNO
DRILLER: ANDREW THORNTON / COREY GAMMELL

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**
2.50-3.0							NO SAMPLE						

* 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 X No ____ Well I.D. #: PAI-27MW56I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: PAI-27MW57S
DATE: 8/5-8/08
GEOLOGIST: CHARLIE WARWO
DRILLER: ANDREW THORTON / CORY GAMBOLL

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**
0.0-0.5						BLK	ASPHALT, GRAVEL FILL		DRY	—			
0.5-2.0					LOOSE	BROWN	VF-C SAND SOME F	SP	DRY	333	2		
							GRAVEL FILL, SHELLS.						
2.0-5.0					LOOSE	GRAY	VF-F SAND, SOME BLACK	SP					
							STAINING @ 4.5-5.0						
5.0-8.0					STIFF	DK GRAY/BROWN	CLAY W TRACE	CL					
							SAND, MED PLASTICITY			931			
							BLACK STAINING						
8.0-9.0					LOOSE	GRY	VF-F SAND & CLAY	SC	MOIST	[redacted]			
9.0-10.0					LOOSE	GRY	VF-F SAND	SP	WET	884			
10.0-15.0							SAME AS ABOVE	SP					

* 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 X No Well I.D. #: PAI-27MW57S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: PA1-27MW59I
DATE: 8/6-10/8
GEOLOGIST: CHARLIE WARNO
DRILLER: ANDREW THORNTON / COREY CAMPBELL

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-	0.5					BLK	ASPHALT, GRAVEL FILL		DRY				
0.5-	2.5				LOOSE	DK BROWN	VF-F SAND, TRACE CLAY	SC	MOIST	2142			
2.5-	4.0		5/5		LOOSE	GRAY	VF-F SAND	SP	MOIST	1244			
4.0-	5.0				STIFF	GRAY/BROWN/GREEN	CLAY	CL	MOIST	494			
							MED PLASTICITY						
5.0-	8.0				STIFF		SAME AS ABOVE		MOIST				
			5/5										
8.0-	10.0				LOOSE	GRAY	VF-F SAND	SP	WET	6.7			
10.0-	15.0		5/5		LOOSE		SAME AS ABOVE	SP	WET	2.1			
15.0-	19.0				LOOSE	DK GRAY	VF-F SAND WITH CLAY	SC	WET	0.0			
			3/5										
19.0-	20.0				STIFF	DK GRAY	CLAY, MED PLASTICITY	CL	MOIST	0.0			
					LOOSE	BLUE/GRAY	VF-F SAND WITH	SC					
20.0-	25.0		2/5				CLAY LAMINATIONS		WET	0.0			
							THROUGHOUT						

* 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 X No ____ Well I.D. #: PA1-27MW59I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PARRIS ISLAND SITE 27
PROJECT NUMBER: 000455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: PA1-27MW60I
DATE: 8/5-10/08
GEOLOGIST: CHARLIE WARLIND
DRILLER: ANDREW THORNTON, COREY CANNELL

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 -	0.5				LOOSE	DK BROWN	VF-F SAND & ORGANIC	SP	DRY	0.0			
							MATERIAL						
			5/5										
0.5 -	5.0				LOOSE	BROWN	VF-F SAND WITH	SP	MOIST	782			
							F GRAVEL @ 4.0-4.25 (FILL)		(BACK @ 6.0')				
5.0 -	6.0				LOOSE		SAME AS ABOVE	SP	MOIST				
6.0 -	7.0				LOOSE	GRAY	VF-F SAND WITH CLAY	SP	WET	603			
7.0 -	9.0		5/5		STIFF	GRAY	MED PLASTICITY CLAY, TRACE	CL		80			
							SAND.						
9.0 -	10.0				LOOSE	TAN	VF-F SAND	SP	WET	478			
10.0 -	13.0				LOOSE	GRAY	VF-F SAND	SP	WET				
13.0 -	14.0				LOOSE	ORANGE/BROWN	VF-F SAND	SP	WET	134			
			5/5										
14.0 -	15.0				LOOSE	TAN	VF-F SAND	SP	WET	112			
15.0 -	18.0				LOOSE		SAME AS ABOVE	SP	WET				
			5/5										
18.0 -	20.0				LOOSE	GRAY/GREEN	VF-F SAND	SP	WET	108			
20.0 -	24.0				LOOSE		SAME AS ABOVE	SP	WET				
			2/5										
24.0 -	25.0				STIFF	DK GRAY	/BLACK CLAY. MED.	CL	MOIST	120			
							PLASTICITY						

* 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 X No ____ Well I.D. #: PA1-27MW60I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: PAI-27MW60I
DATE: 8/5-10/08
GEOLOGIST: CHARLIE WARINO
DRILLER: ANDREW THORNTON, COREY GAMWELL

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**
25.0-	30.0		1/5		LOOSE	GRAY/BLUE	VF-F SAND	SP	WET	121			

* 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 X No ____ Well I.D. #: PAI-27MW60I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: PAI-27 MW 61 I
DATE: 8/6-,0/08
GEOLOGIST: CHARLIE WARNO
DRILLER: ANDREW THORNTON / LORRY GAMWELL

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 -	0.5					BLACK	ASPHALT & GRAVEL FILL		DRY	-			
			5/5										
0.5 -	5.0				LOOSE	DK BROWN	VF-F SAND	SP	MOIST	1240			
							WITH SOME FINE GRAVEL @ 3.0'						
5.0 -	8.5				LOOSE	LT BROWN	VF-F SAND	SP	MOIST	2000			
			5/5										
8.5 -	10.0				STIFF	GRAY	CLAY, MEDIUM	CL	MOIST	1205			
							PLASTICITY. SOME BROWN COLORATIONS.						
10.0 -	15.0		4/5		LOOSE	GRAY	VF-F SAND	SP	WET	93.7			
15.0 -	20.0		2/5		LOOSE	GRAY/BROWN	VF-F SAND	SP	WET	6.8			
20.0 -	22.0				LOOSE	GRAY	VF-F SAND	SP	WET	27.4			
			2/5										
22.0 -	25.0				LOOSE	DK GRAY	CLAYEY VF-F	CL	WET	24.3			
							SAND. CLAY LAMINATIONS						

* 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 X No ____ Well I.D. #: PAI-27 MW 61 I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: PAI-27MW 625
DATE: 8/5-7 10[illegible]
GEOLOGIST: CHARLIE WARING
DRILLER: ANDREW THORNTON / LORDT GAMWELL

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 -	0.5				LOOSE	DK BROWN	VF-F SAND W/ORGANIC MATERIAL	SP	DRY	188			
0.5 -	2.5				LOOSE	BROWN	VF-F SAND, TRACE CLAY	SC	MOIST	16.7			
2.5-	3.5		5/5		STIFF	BROWN/GRAY	SANDY CLAY, MOD PLASTICITY	CL	MOIST	0.0			
3.5-	5.0				LOOSE	GRAY	VF-F SAND WITH		MOIST	0.0			
							TRACE CLAY	SC					
5.0 -	7.5				LOOSE	BROWN/ORANGE	VF-F SAND	SP	WET	0.0			
			5/5										
7.5-	10.0				LOOSE	GRAY	VF-F SAND, SOME	SC	WET	0.0			
							CLAY						
10.0 -	15.0		5/5				SAME AS ABOVE	SC					

* 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 X No ____ Well I.D. #: PAI-27MW 625

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PARRIS ISLAND SITE 27
PROJECT NUMBER: 600455
DRILLING COMPANY: VIROTOX
DRILLING RIG: GEOPROBE DPT

BORING No.: PAI-27MW 63S
DATE: 8/5-10/00
GEOLOGIST: CHARLIE WARING
DRILLER: ANDREW THORNTON / COREY CARNOCK

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-	0.5				LOOSE	DK BROWN	VF-F SAND WITH	SP	DRY	101			
							ROOTS & ORGANIC MATTER						
0.5-	4.0				LOOSE	BROWN	VF-F SAND	SP	MOIST	130			
4.0-	5.0				LOOSE	TAN	VF-F SAND	SP	MOIST	75.6			
5.0-	6.5						SAME AS ABOVE						
6.5-	8.0				STIFF	GRAY	/BROWN CLAY, MED PLASTICITY	CL	MOIST	53.0			
							TRACE VF-F SAND						
8.0-	10.0				LOOSE	TAN	VF-F SAND	SP	WET	269			
10.0-	15.0						SAME AS ABOVE	SP					

* 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 X No ____ Well I.D. #: PAI-27MW 63S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PARRIS ISLAND SITE 27
PROJECT NUMBER: G00455
DRILLING COMPANY: VIRONEX
DRILLING RIG: GEOPROBE DPT

BORING No.: PA1-27 MW64S
DATE: 8/6-10/08
GEOLOGIST: CHARLIE WARING
DRILLER: ANDREW THORTON / CORBY GARNWELL

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-	0.5				LOOSE	DK BROWN	VF-F SAND W/	SP	DRY	0.0			
							ROOTS & ORGANIC MATTER						
0.5-	3.0		5/5		LOOSE	BROWN	VF-F SAND	SP	MOIST	39.1			
3.0-	5.0				LOOSE	LT TAN	VF-F SAND	SP	MOIST	20.1			
5.0-	6.0						SAME AS ABOVE	SP					
6.0-	8.0				TIGHT [redacted]	TAN/BROWN	CLAYEY VF-F SAND	SC	WET	10.1			
8.0-	9.0		5/5		STIFF	GRAY/BROWN	MED PLASTICITY CLAY	CL	MOIST	9.1			
9.0-	10.0				LOOSE	GRAY/BLUE	VF-F SAND	SP	WET	7.3			
10.0-	15		5/5		LOOSE		SAME AS ABOVE	SP	WET	6.4			

* 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 X No ____ Well I.D. #: PA1-27 MW64S

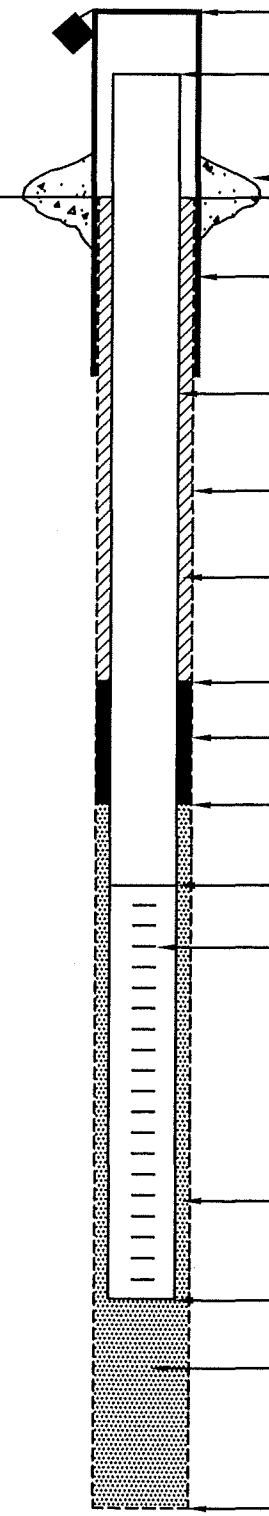
C-9 PHASE II RI – PERMANENT MONITORING WELL CONSTRUCTION SHEETS

WELL NO.: PAI- 27 MW48I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT PARRIS ISLAND SITE 27	LOCATION	DRILLER COREY LAMARELL	
PROJECT NO. 600455	BORING	DRILLING METHOD DPT	
DATE BEGUN 8/6/08	DATE COMPLETED 8/9/08		
FIELD GEOLOGIST CHARLIE WARNOCK		DEVELOPMENT METHOD PERISTALTIC	
GROUND ELEVATION	DATUM		



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: CONCRETE

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 4 1/4"

TYPE OF BACKFILL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 16.5

TYPE OF SEAL: BENTONITE

DEPTH TOP OF SAND PACK: 18.5

ELEVATION/DEPTH TOP OF SCREEN: / 19.5'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 5'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #1 SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: / 24.5'

ELEVATION/DEPTH BOTTOM OF SAND PACK: / 25.0'
BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: / 25.0'

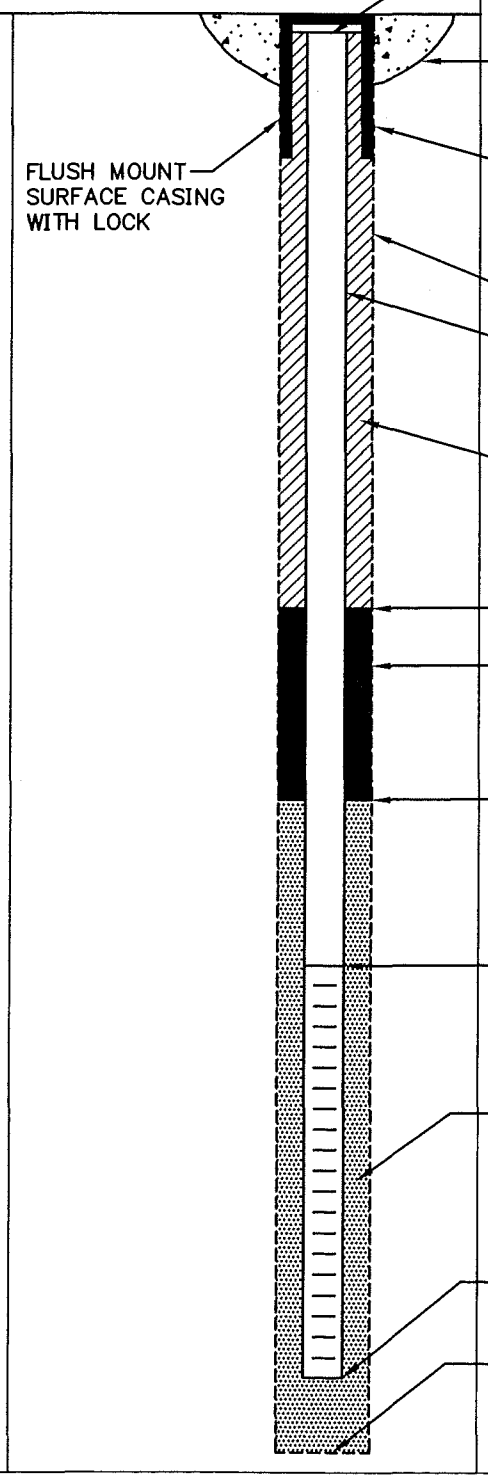
ACAD: FORM_MWSU.dwg 07/20/99 INL

WELL NO.: PA1-27MW49S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT: PARRIS ISLAND SITE 27	LOCATION: MW49S	DRILLER: LOCKY GAMWELL
PROJECT NO.: G00455	BORING:	DRILLING METHOD: DPT
DATE BEGUN: 8/8/08	DATE COMPLETED: 8/8/08	
FIELD GEOLOGIST: CHARLIE WARLIND		DEVELOPMENT METHOD: PERISTALTIC
GROUND ELEVATION:	DATUM:	



ELEVATION TOP OF RISER: _____

TYPE OF SURFACE SEAL: CONCRETE

TYPE OF PROTECTIVE CASING: _____

I.D. OF PROTECTIVE CASING: _____

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 2.0

TYPE OF SEAL: BENTONITE

ELEVATION/DEPTH TOP OF SAND: / 2.5'

ELEVATION/DEPTH TOP OF SCREEN: / 3.0'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 10'

TYPE OF SAND PACK: # 2 SAND

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 13'

ELEVATION / DEPTH BOTTOM OF SAND: / 13.5'

ELEVATION/DEPTH BOTTOM OF HOLE: / 13.5'

BACKFILL MATERIAL BELOW SAND: NA

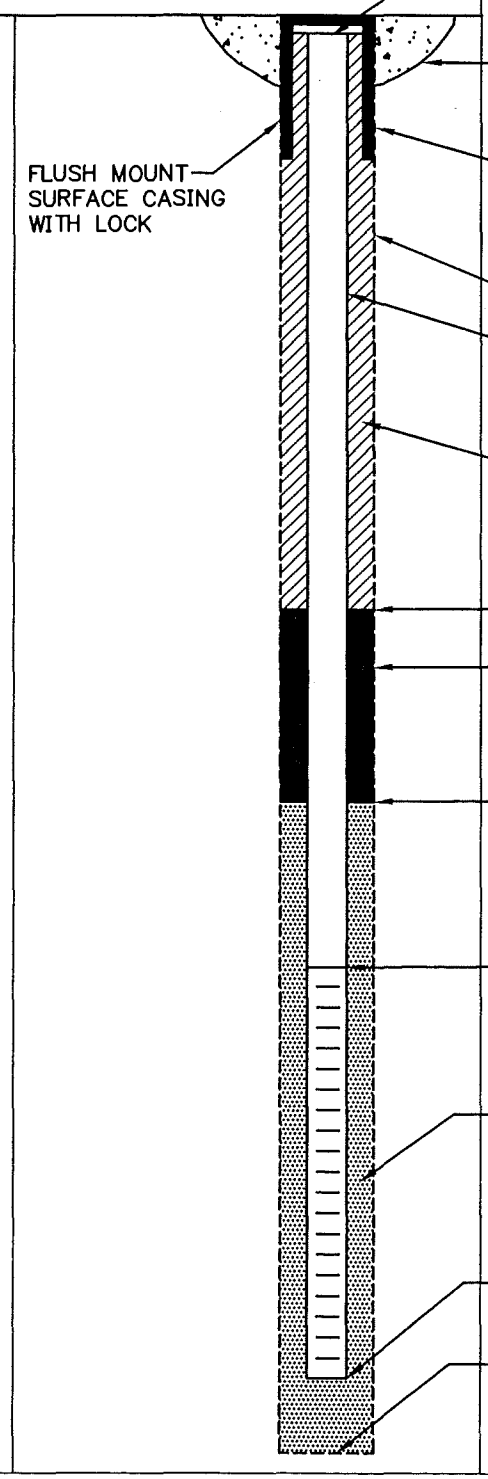
ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: PA1-27MW50I

Tetra Tech NUS, Inc.

OVERBURDEN
MONITORING WELL SHEET
FLUSH - MOUNT

PROJECT: PARRIS ISLAND SITE 27	LOCATION: MW 50I	DRILLER: COREY CAMWOOD
PROJECT NO.: 600455	BORING:	DRILLING METHOD: DPT
DATE BEGUN: 8/6/08	DATE COMPLETED: 8/8/08	
FIELD GEOLOGIST: CHARLIE WARNER		DEVELOPMENT METHOD: PERISTALTIC
GROUND ELEVATION:	DATUM:	



ELEVATION TOP OF RISER: _____

TYPE OF SURFACE SEAL: CONCRETE

TYPE OF PROTECTIVE CASING: _____

I.D. OF PROTECTIVE CASING: _____

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 16'

TYPE OF SEAL: BENTONITE

ELEVATION/DEPTH TOP OF SAND: / 18'

ELEVATION/DEPTH TOP OF SCREEN: / 19'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 5'

TYPE OF SAND PACK: #1 SAND

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 24'

ELEVATION / DEPTH BOTTOM OF SAND: / 24.5'

ELEVATION/DEPTH BOTTOM OF HOLE: / 24.5'

BACKFILL MATERIAL BELOW SAND: NA

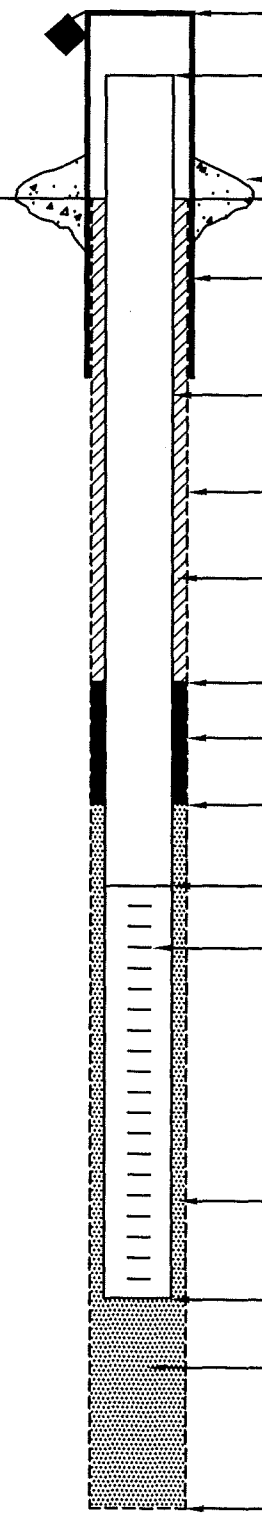
ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: PAI-27MW 59S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT PARRIS ISLAND SITE 27	LOCATION MW 59S	DRILLER CORBY GAMWELL
PROJECT NO. 600455	BORING	DRILLING METHOD DPT
DATE BEGUN 8/8/08	DATE COMPLETED 8/9/08	
FIELD GEOLOGIST CHARLIE WARINO		DEVELOPMENT METHOD PERISTALTIC
GROUND ELEVATION	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: CONCRETE

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 4 1/4"

TYPE OF BACKFILL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 2.0'

TYPE OF SEAL: BENTONITE

DEPTH TOP OF SAND PACK: 2.5'

ELEVATION/DEPTH TOP OF SCREEN: / 3.0'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #1 SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: / 13'

ELEVATION/DEPTH BOTTOM OF SAND PACK: / 13.5'
BACKFILL MATERIAL BELOW SAND: #1 SAND

ELEVATION/DEPTH OF HOLE: / 13.5'

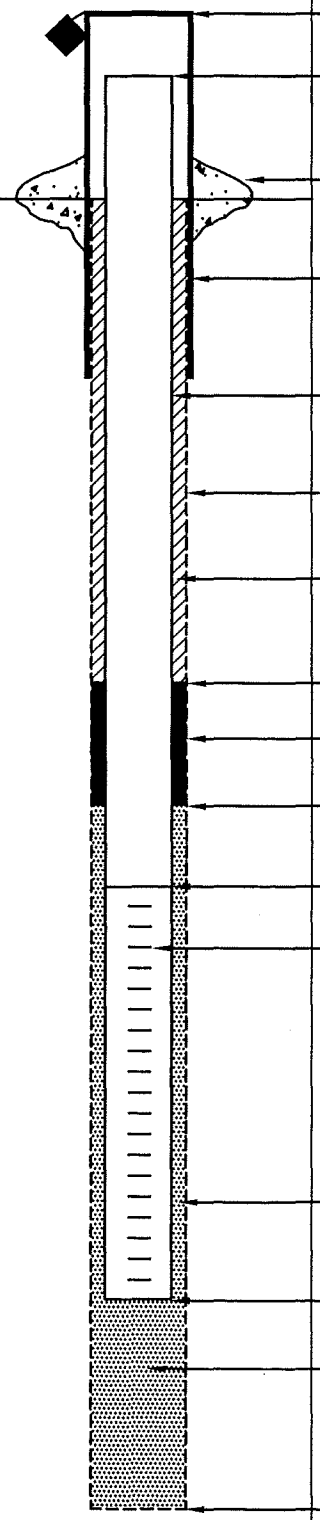
ACAD:FORM_MWSU.dwg 07/20/99 INL

WELL NO.: PA1-27MW52I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT PARRIS ISLAND SITE 27	LOCATION MW 52 I	DRILLER COREY GARNWELL
PROJECT NO. 600455	BORING	DRILLING METHOD APT
DATE BEGUN 8/6/08	DATE COMPLETED 8/9/08	
FIELD GEOLOGIST CHARLIE WARWOOD		DEVELOPMENT METHOD PERISTALTIC
GROUND ELEVATION	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: CONCRETE

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 4 1/4"

TYPE OF BACKFILL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 17'

TYPE OF SEAL: BENTONITE

DEPTH TOP OF SAND PACK: 19'

ELEVATION/DEPTH TOP OF SCREEN: / 20'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 5'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #1 SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: / 25'

ELEVATION/DEPTH BOTTOM OF SAND PACK: / 25.5'
BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: / 25.5'

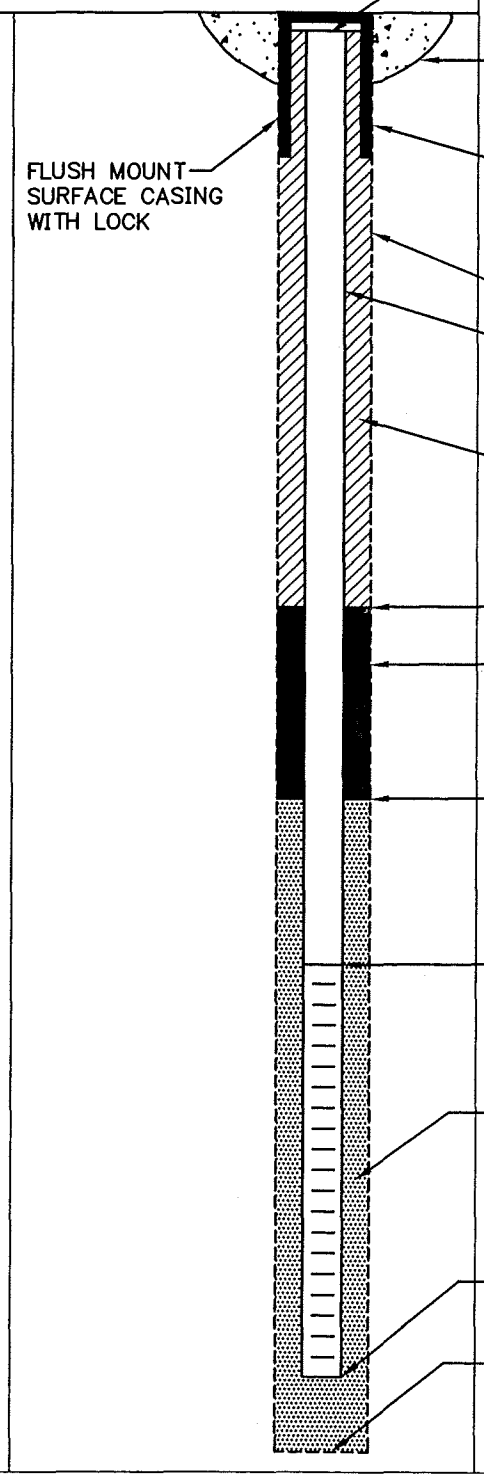
ACAD:FORM_MWSU.dwg 07/20/99 INL

WELL NO.: PA1-27MW53S

Tetra Tech NUS, Inc.

OVERBURDEN
MONITORING WELL SHEET
FLUSH - MOUNT

PROJECT PARRIS ISLAND SITE 27	LOCATION MW 53 S	DRILLER COREY GAMWELL
PROJECT NO. 600455	BORING	DRILLING METHOD DPT
DATE BEGUN 8/9/08	DATE COMPLETED 8/9/08	
FIELD GEOLOGIST CHARLIE HORLING		DEVELOPMENT METHOD PERISTALTIC
GROUND ELEVATION	DATUM	



ELEVATION TOP OF RISER:

TYPE OF SURFACE SEAL: CONCRETE

TYPE OF PROTECTIVE CASING:

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 2'

TYPE OF SEAL: BENTONITE

ELEVATION/DEPTH TOP OF SAND: / 2.5'

ELEVATION/DEPTH TOP OF SCREEN: / 3'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" X 10'

TYPE OF SAND PACK: #1 SAND

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 13'

ELEVATION / DEPTH BOTTOM OF SAND: / 13.5'

ELEVATION/DEPTH BOTTOM OF HOLE: / 13.5'

BACKFILL MATERIAL BELOW SAND: NA

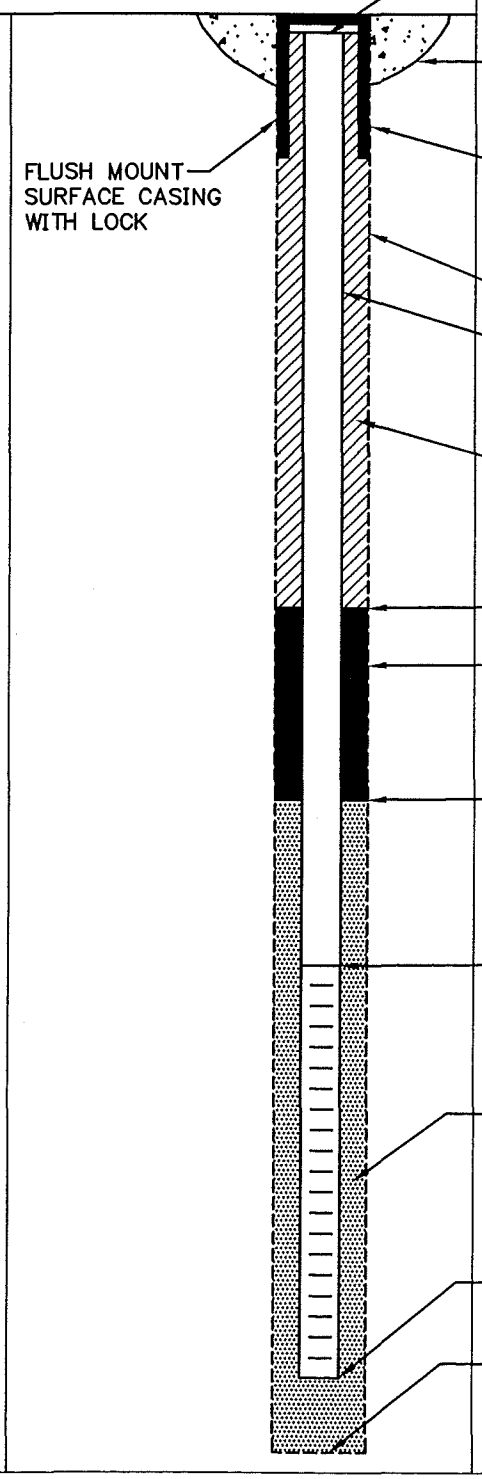
ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: PA1-27MW54I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT: PARRIS ISLAND SITE 27	LOCATION: MW54I	DRILLER: COREY CAMWELL
PROJECT NO.: 000455	BORING:	DRILLING METHOD: DPT
DATE BEGUN: 8/6/08	DATE COMPLETED: 8/9/08	
FIELD GEOLOGIST: CHARLIE WARNO		DEVELOPMENT METHOD: PERISTALTIC
GROUND ELEVATION:	DATUM:	



ELEVATION TOP OF RISER:

TYPE OF SURFACE SEAL:

TYPE OF PROTECTIVE CASING:

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 16'

TYPE OF SEAL: BENTONITE

ELEVATION/DEPTH TOP OF SAND: / 18'

ELEVATION/DEPTH TOP OF SCREEN: / 19'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 5'

TYPE OF SAND PACK: #1 SAND

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 24'

ELEVATION / DEPTH BOTTOM OF SAND: / 24.5'

ELEVATION/DEPTH BOTTOM OF HOLE: / 24.5'

BACKFILL MATERIAL BELOW SAND: NA

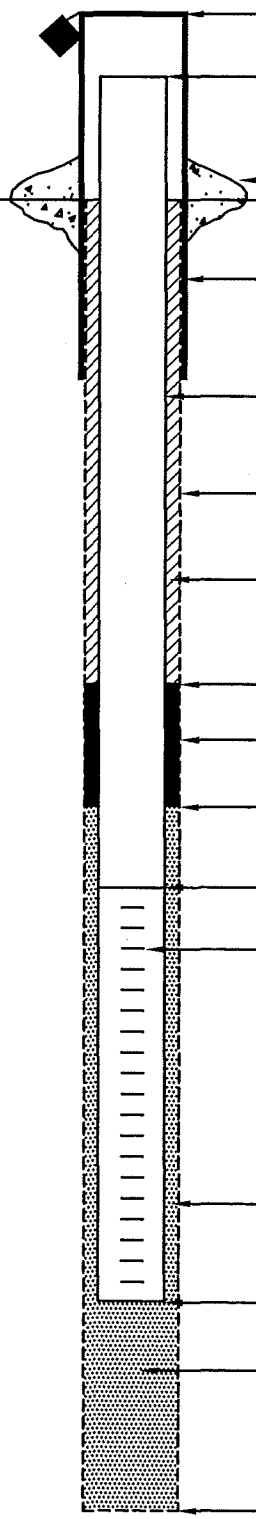
ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: PA1-27 MW 55 S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT: PARRIS ISLAND SITE 27	LOCATION:	DRILLER: COREY GAMWELL
PROJECT NO.: 600455	BORING:	DRILLING METHOD: DPT
DATE BEGUN: 8/7/08	DATE COMPLETED: 8/7/08	
FIELD GEOLOGIST: CHARLIE WHEELING		DEVELOPMENT METHOD: PERISTALTIC
GROUND ELEVATION:	DATUM:	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: CONCRETE

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 4 1/4"

TYPE OF BACKFILL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 2'

TYPE OF SEAL: BENTONITE

DEPTH TOP OF SAND PACK: 2.5'

ELEVATION/DEPTH TOP OF SCREEN: / 3'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #1 SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: / 13'

ELEVATION/DEPTH BOTTOM OF SAND PACK: / 13.5'
BACKFILL MATERIAL BELOW SAND: #1 SAND

ELEVATION/DEPTH OF HOLE: / 13.5

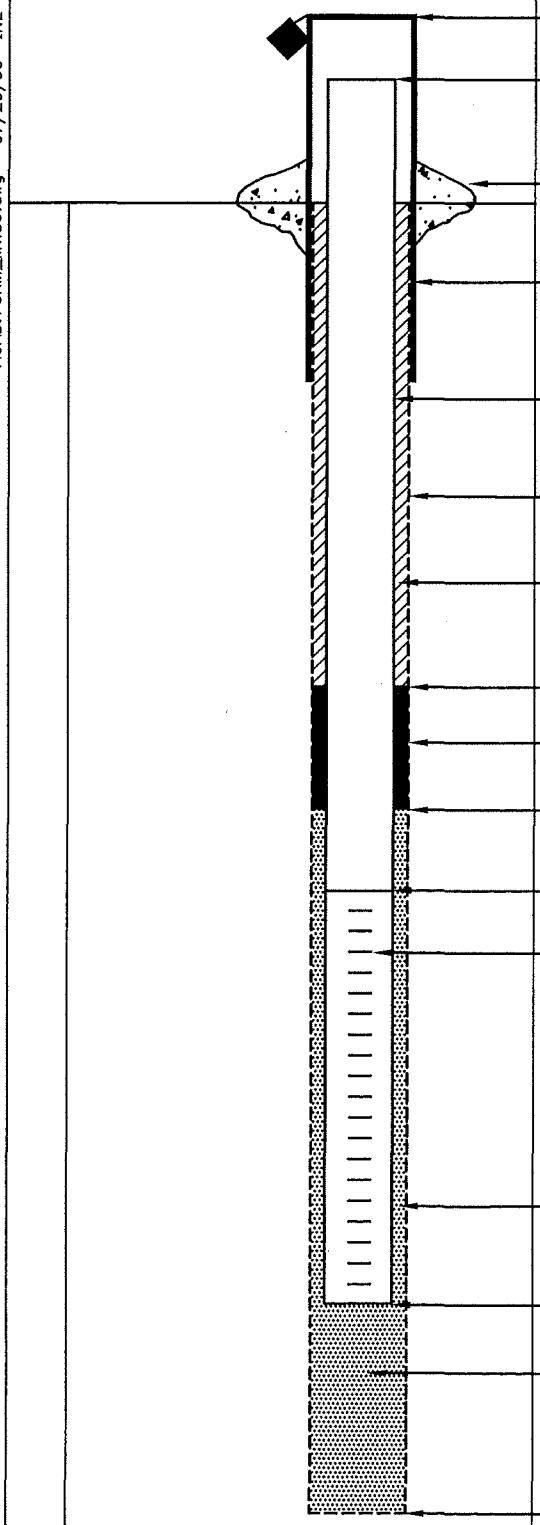
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: PA1 - 27 MW S6I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT PARRIS ISLAND SITE 27	LOCATION MWS6I	DRILLER COREY CAMWELL
PROJECT NO. G00455	BORING	DRILLING METHOD DPT
DATE BEGUN 8/5/08	DATE COMPLETED 8/7/08	
FIELD GEOLOGIST CHARLIE MARLING		DEVELOPMENT METHOD PERISTALTIC
GROUND ELEVATION	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: CONCRETE

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 4 1/4"

TYPE OF BACKFILL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 16'

TYPE OF SEAL: BENTONITE

DEPTH TOP OF SAND PACK: 19'

ELEVATION/DEPTH TOP OF SCREEN: / 20'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 5'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: # 1 SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: / 25'

ELEVATION/DEPTH BOTTOM OF SAND PACK: / 24.5'
BACKFILL MATERIAL BELOW SAND: # 1 SAND

ELEVATION/DEPTH OF HOLE: / 24.5'

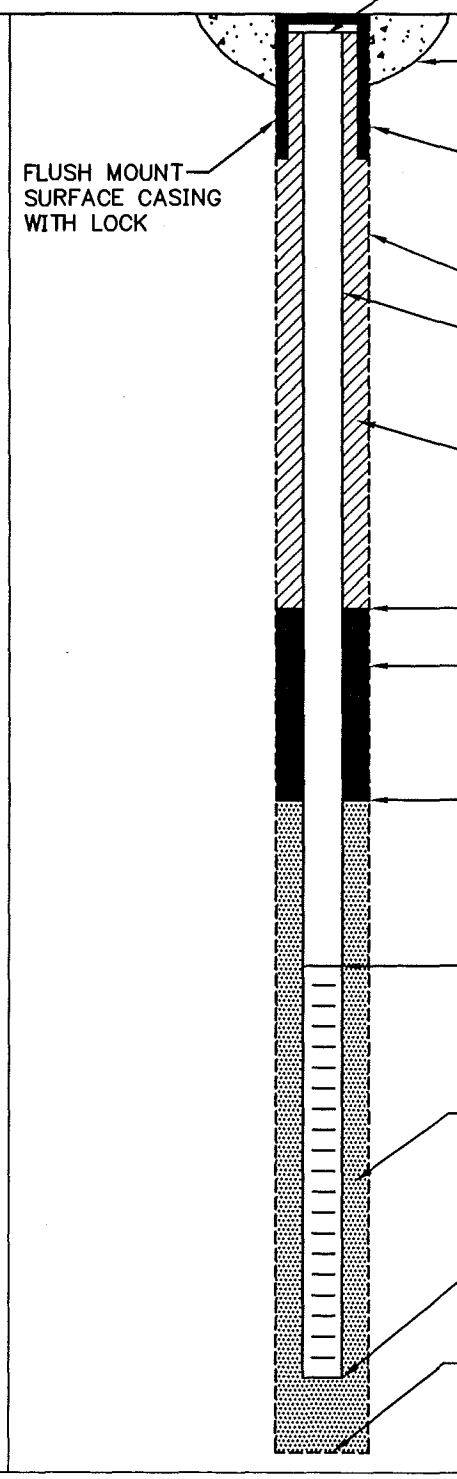
ACAD: FORM_MWSU.dwg 07/20/99 INL

WELL NO.: PA1 - 27MW57S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT: PARRIS ISLAND SITE 27	LOCATION: MW 57 S	DRILLER: LOREY LAMWORK
PROJECT NO.: 600455	BORING:	DRILLING METHOD: DPT
DATE BEGUN: 8/5/08	DATE COMPLETED: 8/8/08	
FIELD GEOLOGIST: CHARLIE WARREND		DEVELOPMENT METHOD: PERISTALTIC
GROUND ELEVATION:	DATUM:	



ELEVATION TOP OF RISER:

TYPE OF SURFACE SEAL: CONCRETE

TYPE OF PROTECTIVE CASING:

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 2.0'

TYPE OF SEAL: BENTONITE

ELEVATION/DEPTH TOP OF SAND: / 2.5'

ELEVATION/DEPTH TOP OF SCREEN: / 3.0'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 10'

TYPE OF SAND PACK: #1 SAND

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 13'

ELEVATION / DEPTH BOTTOM OF SAND: / 13.5'

ELEVATION/DEPTH BOTTOM OF HOLE: / 13.5

BACKFILL MATERIAL BELOW SAND: NA

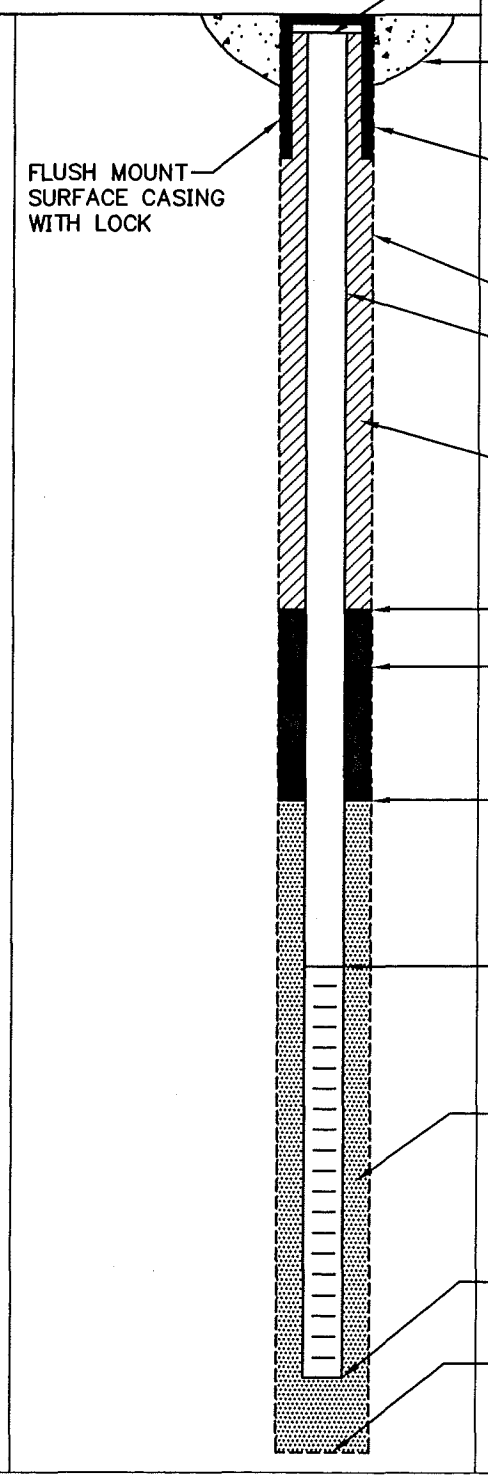
ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: PA1-27MW58S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT PARRIS ISLAND SITE 27	LOCATION	DRILLER CORDY GANNOTTE
PROJECT NO. G00455	BORING	DRILLING METHOD DPT
DATE BEGUN 8/8/08	DATE COMPLETED 8/8/08	
FIELD GEOLOGIST CHARLIE WARNO		DEVELOPMENT METHOD PERISTALTIC
GROUND ELEVATION	DATUM	



ELEVATION TOP OF RISER:

TYPE OF SURFACE SEAL: CONCRETE

TYPE OF PROTECTIVE CASING:

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 2'

TYPE OF SEAL:

ELEVATION/DEPTH TOP OF SAND: / 2.5'

ELEVATION/DEPTH TOP OF SCREEN: / 3'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 9

TYPE OF SAND PACK: #1 SAND

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 12'

ELEVATION / DEPTH BOTTOM OF SAND: / 12.5'

ELEVATION/DEPTH BOTTOM OF HOLE: / 12.5'

BACKFILL MATERIAL BELOW SAND: NO

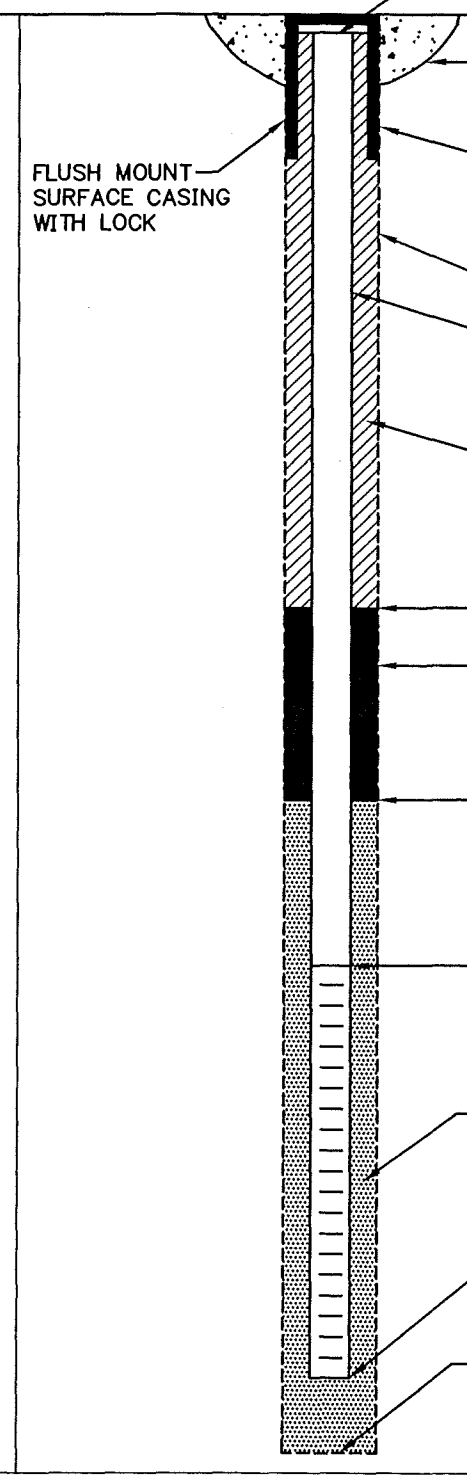
ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: PA1-27MW59I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT PARRIS ISLAND SITE 27	LOCATION	DRILLER COREY GAMEWELL
PROJECT NO. 600455	BORING	DRILLING METHOD DPT
DATE BEGUN 8/6/08	DATE COMPLETED 8/8/08	
FIELD GEOLOGIST CHARLIE DARNO		DEVELOPMENT METHOD PERISTALTIC
GROUND ELEVATION	DATUM	



ELEVATION TOP OF RISER:

TYPE OF SURFACE SEAL:

TYPE OF PROTECTIVE CASING:

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 11'

TYPE OF SEAL: BENTONITE

ELEVATION/DEPTH TOP OF SAND: / 13.5'

ELEVATION/DEPTH TOP OF SCREEN: / 14'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 5

TYPE OF SAND PACK: #1 SAND

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 19'

ELEVATION / DEPTH BOTTOM OF SAND: / 19.5'

ELEVATION/DEPTH BOTTOM OF HOLE: / 19.5'

BACKFILL MATERIAL BELOW SAND: NA

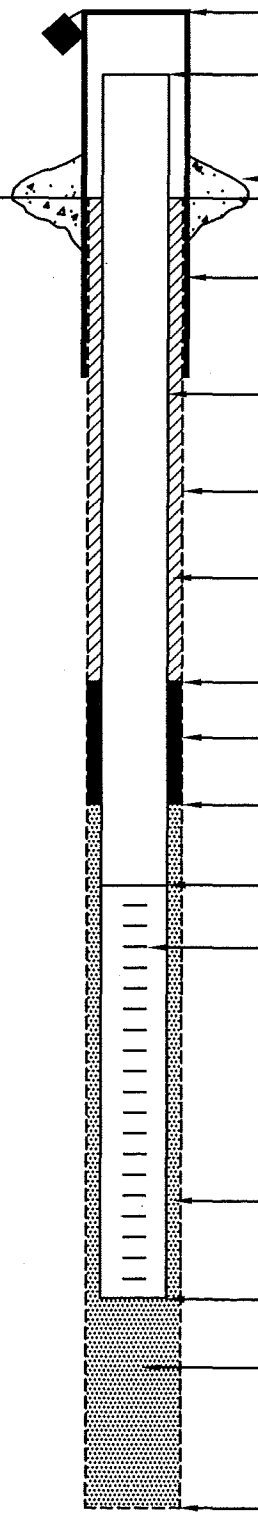
ACAD: FORM_MWFM.dwg 07/20/99 INL

WELL NO.: PAI-27MW60I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT PARRIS ISLAND SITE 27	LOCATION	DRILLER COREY GAMMWELL
PROJECT NO. 600455	BORING	DRILLING METHOD DPT
DATE BEGUN 8/5/08	DATE COMPLETED 8/10/08	
FIELD GEOLOGIST CHARLIE WARNO		DEVELOPMENT METHOD PERISTALTIC
GROUND ELEVATION	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: CONCRETE

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 4 1/4"

TYPE OF BACKFILL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 16'

TYPE OF SEAL: BENTONITE

DEPTH TOP OF SAND PACK: 18'

ELEVATION/DEPTH TOP OF SCREEN: / 19'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 5

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #1 SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: / 24'

ELEVATION/DEPTH BOTTOM OF SAND PACK: / 24.5'
BACKFILL MATERIAL BELOW SAND:

ELEVATION/DEPTH OF HOLE: / 24.5'

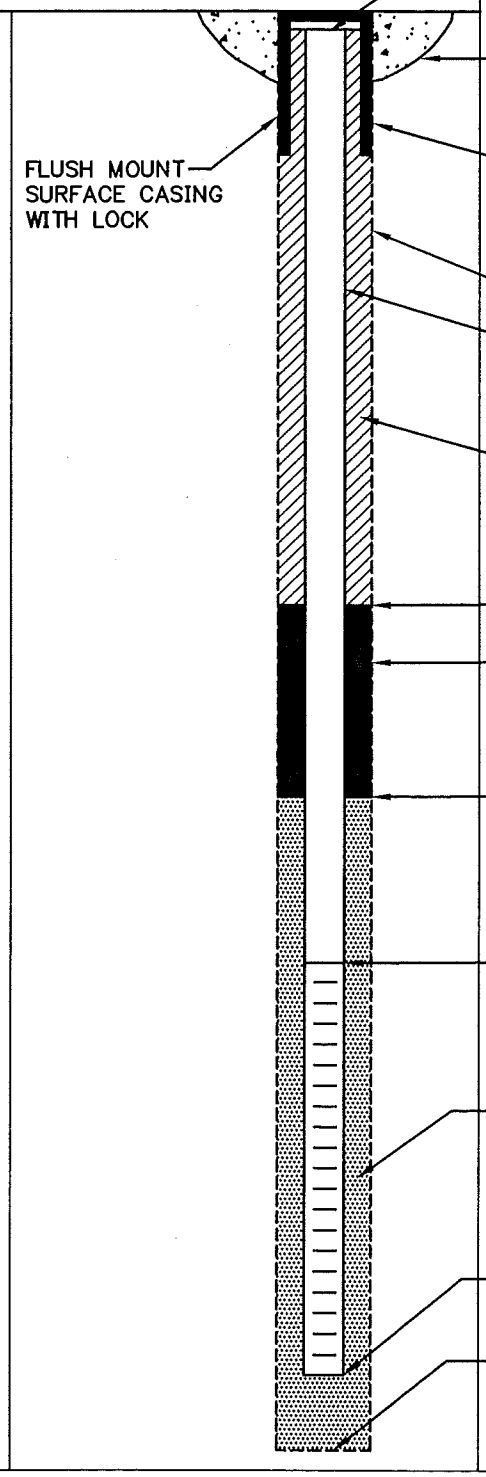
ACAD:FORM_MWSU.dwg 07/20/99 INL

WELL NO.: PAI - 27MW 61I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT: Parris Island Site 27	LOCATION: MW 61I	DRILLER: Corey Gamwell
PROJECT NO.: 600455	BORING:	DRILLING METHOD: DPT
DATE BEGUN: 8/6/08	DATE COMPLETED: 8/10/08	
FIELD GEOLOGIST: Charlie Warwo		DEVELOPMENT METHOD: Peristaltic
GROUND ELEVATION:	DATUM:	



ELEVATION TOP OF RISER:

TYPE OF SURFACE SEAL:

TYPE OF PROTECTIVE CASING:

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: Grout

ELEVATION/DEPTH TOP OF SEAL: / 16'

TYPE OF SEAL: Bentonite

ELEVATION/DEPTH TOP OF SAND: / 18'

ELEVATION/DEPTH TOP OF SCREEN: / 19.5'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 5'

TYPE OF SAND PACK: #1 sand

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: / 24.5'

ELEVATION / DEPTH BOTTOM OF SAND: / 25.0'

ELEVATION/DEPTH BOTTOM OF HOLE: / 25.0'

BACKFILL MATERIAL BELOW SAND: NA

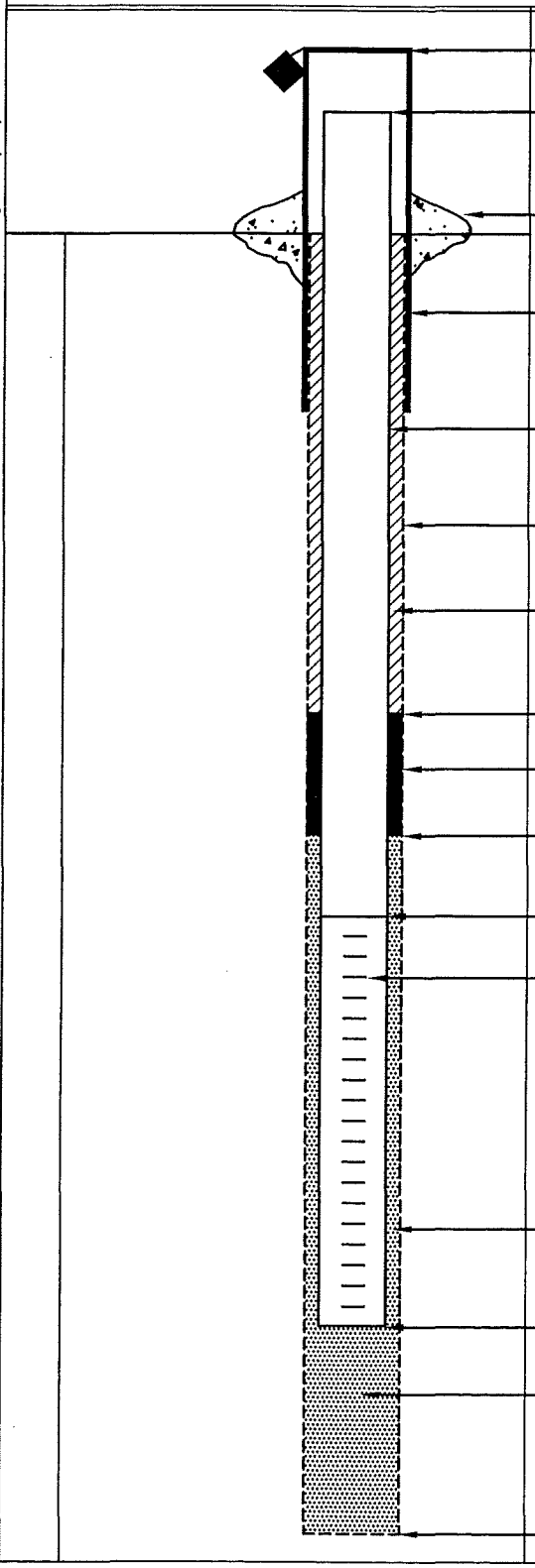
ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: PA1-27MW625

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT (600455) SITE 27 PARRIS ISLAND	LOCATION MW625	DRILLER COREY BAMWELL
PROJECT NO. 600455	BORING	DRILLING METHOD DPT
DATE BEGUN 8/5/08	DATE COMPLETED 8/7/08	
FIELD GEOLOGIST CHARLIE WARINO		DEVELOPMENT METHOD PERISTALTIC
GROUND ELEVATION	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: CEMENT

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 4 1/4"

TYPE OF BACKFILL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 2'

TYPE OF SEAL: BENTONITE

DEPTH TOP OF SAND PACK: 2.5'

ELEVATION/DEPTH TOP OF SCREEN: / 3'

TYPE OF SCREEN: 0.010" SLOT PVC 2"

SLOT SIZE x LENGTH: 0.010" x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #1 SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: / 13'

ELEVATION/DEPTH BOTTOM OF SAND PACK: / 13.5'

BACKFILL MATERIAL BELOW SAND:
#1 SAND

ELEVATION/DEPTH OF HOLE: / 13.5

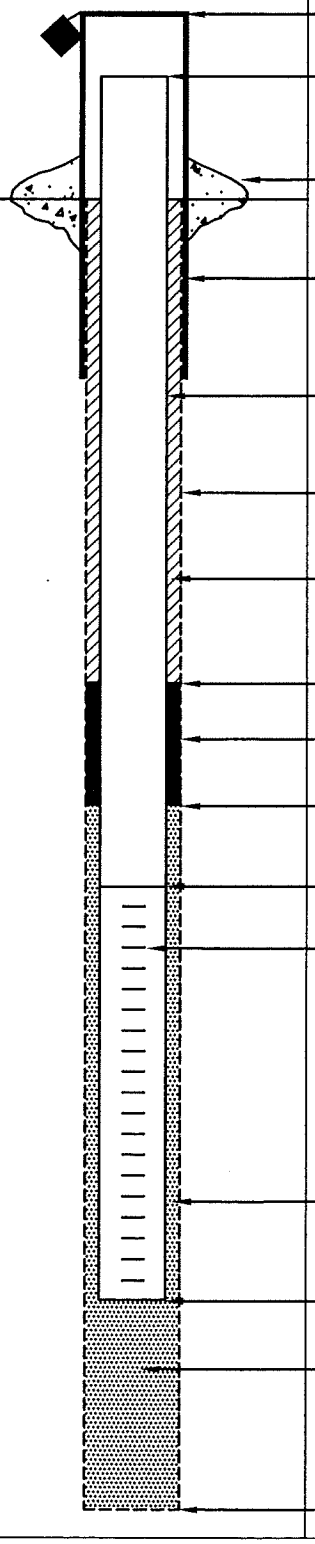
ACAD:FORM_MWSU.dwg 07/20/99 INL

WELL NO.: PA1-27MW63S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT: PARRIS ISLAND	LOCATION: MW63S	DRILLER: CORNEY GAMWELL
PROJECT NO.: 600455	BORING:	DRILLING METHOD: DPT
DATE BEGUN: 8/5/08	DATE COMPLETED: 8/10/08	
FIELD GEOLOGIST: CHARLIE WARNO		DEVELOPMENT METHOD: PERISTALTIC
GROUND ELEVATION:	DATUM:	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: CONCRETE

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 4 1/4"

TYPE OF BACKFILL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 2.0'

TYPE OF SEAL: BENTONITE

DEPTH TOP OF SAND PACK: 2.5'

ELEVATION/DEPTH TOP OF SCREEN: / 3'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #1 SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: / 13'

ELEVATION/DEPTH BOTTOM OF SAND PACK: / 13.5'

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: / 13.5'

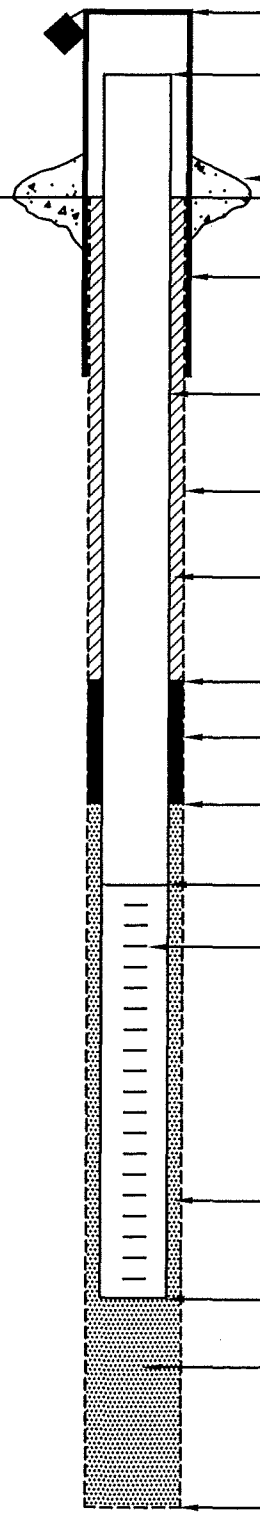
ACAD:FORM_MWSU.dwg 07/20/99 INL

WELL NO.: PA1-27MW645

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT: PARRIS ISLAND SITE 27	LOCATION:	DRILLER: COREY GAMWELL
PROJECT NO.: 600455	BORING:	DRILLING METHOD: DPT
DATE BEGUN: 8/6/08	DATE COMPLETED: 8/10/08	
FIELD GEOLOGIST: CHARLIE WARNO		DEVELOPMENT METHOD: PERISTALTIC
GROUND ELEVATION:	DATUM:	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: /

TYPE OF SURFACE SEAL: CONCRETE

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 4 1/4"

TYPE OF BACKFILL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 2'

TYPE OF SEAL: BENTONITE

DEPTH TOP OF SAND PACK: 2.5'

ELEVATION/DEPTH TOP OF SCREEN: / 3'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #1 SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: / 13'

ELEVATION/DEPTH BOTTOM OF SAND PACK: / 13.5'
BACKFILL MATERIAL BELOW SAND:

ELEVATION/DEPTH OF HOLE: / 13.5'

ACAD:FORM_MWSU.dwg 07/28/99 INL

C-10 MONITORING WELLS APPROVALS AND PHASE I, II III, and 9/16 RI 1903s

D H E C
PROMOTE PROTECT PROSPER
C. Earl Hunter, Commissioner
Promoting and protecting the health of the public and the environment.

July 19, 2010

Commanding Officer
NAVFAC Southeast
ATTN: Mr. Charles Cook, P.E.
PO Box 30
Ajax Street North, Bldg 135
Jacksonville, Florida 32212

RE: Approval of Request for Monitoring Well Approvals for Sites 27 and 55/9/16
Marine Corp Recruit Depot (MCRD)
Parris Island
SC6 170 022 762

Dear Mr. Cook:

The Corrective Action Engineering and the Hydrogeology Sections of the South Carolina Department of Health and Environmental Control (Department) received the Request for Monitoring Well Approvals for Sites 27 and 55/9/16 on July 12, 2010. The Department reviewed the document with respect to applicable sections of the South Carolina Hazardous Waste Management Regulations (SCHWMR). Based on this review, the Department approves this request. Please refer to the attached hydrogeology memoranda.

The Department's concurrence is based on information presented by MCRD to date; any information found to be contradictory may require further action. If you have any questions regarding this issue, please contact me at (803) 896-4218.

Sincerely,

Meredith Amick, P.E., Environmental Engineer
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

cc:

Tim Harrington, MCRD Parris Island
Annie Gerry, Hydrogeology
Priscilla Wendt, SCDNR
Russell Berry, EQC Region 8, Beaufort
Lila Llamas, EPA Region 4
Tom Dillon, NOAA (via email)
Mark Sladic, TtNUS
Heber Pittman, MCRD Parris Island

BOARD:
Paul C. Aughtry, III
Chairman

Edwin H. Cooper, III
Vice Chairman

Steven G. Kisner
Secretary

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment

BOARD:
Henry C. Scott

M. David Mitchell, MD

Glenn A. McCall

Coleman F. Buckhouse, MD

August 17, 2011

Commanding Officer
NAVFAC Southeast
ATTN: Mr. Charles Cook, P.E.
PO Box 30
Ajax Street North, Bldg 135
Jacksonville, Florida 32212

RE: Approval
Drilling and Monitoring Well Install Request
Site 5, 9 and 16, and 27
Marine Corp Recruit Depot (MCRD)
Parris Island
SC6 170 022 762

Dear Mr. Cook:

Department of Health and Environmental Control (the Department) received the above request on August 1, 2011. The Department reviewed the responses with respect to the South Carolina Hazardous Waste Management Regulations. Please see the attached Well Approval. Please note that the Department's concurrence is based on information provided by MCRD to date. Any information found to be contradictory might require further action. If you have any questions, please contact me at (803) 896-4218.

Sincerely,

Meredith Amick, P.E., Environmental Engineer
Corrective Action Engineering Section
Division of Waste Management

cc:

Tim Harrington, MCRD Parris Island
Annie Gerry, Hydrogeology
Priscilla Wendt, SCDNR
Russell Berry, EQC Region 8, Beaufort
Lila Llamas, EPA Region 4
Mark Sladic, P.E., TtNUS
Lisa Donohoe, MCRD Parris Island

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

MEMORANDUM

TO: Meredith Amick, Engineering Associate
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

FROM: Annie M. Gerry, Hydrogeologist
Federal Facilities Groundwater Section
Division of Waste Management
Bureau of Land and Waste Management

DATE: August 11, 2011

RE: Marine Corps Recruit Depot
SC6 170 022 762

Review of Drilling and Monitoring Well Installation Approval Request for Site 5 and Sites 9 and 16 Remedial Investigation and Site 27 Modifications, Marine Corps Recruit Depot (MCRD) Parris Island, South Carolina dated July 2011

The above referenced document has been reviewed with respect to the conditions of the Federal Facility Agreement (FFA) that the Department entered into with the Navy and EPA Region 4 in January 2005, in addition to the SC Well Standards. A letter was received on 7/28/2011 (Churchill to French) requesting the installation of six (6) monitoring wells at Site 5 to delineate potential contamination as part of the sampling and analysis plan. In addition, two (2) wells (a shallow and intermediate) are proposed for installation to delineate potential contamination at Sites 9 and 16. Further, thirteen (13) wells located at Site 27 need to undergo modifications due to construction activities which include conversion from stick up to flush mount wells and raising the grade of flush mount wells located on site.

Installation of eight (8) wells (A1GW01-GW06 and PAI-9/16-MW05S and MW06I) and the conversion of thirteen (13) wells (MW- 11S, -12I, -13D, -14S, -15I, -16S, -19S, -20S, -21S, -49S, -50I, -55S and -56I) at Site 27 are approved for installation. Attached please find a permanent monitoring well approval form with additional conditions for installation.

Should you have any questions regarding this memo, please contact me via email at GerryAM@dhec.sc.gov or by phone at (803) 896-4018.

Attachment: Well Approval: HW-11-036

DD110274.AMG

Monitoring Well Approval

Date of Issuance: **August 11, 2011** **Approval #:** **HW-11-036**

Approval is hereby granted to: Mr. Charles Cook
Facility: Marine Corp Recruit Depot
Beaufort, South Carolina
SC6 170 022 762
Beaufort County

This approval is for the installation of eight permanent groundwater monitoring wells located at Sites 5 (A1GW01-GW06), and 9/16 (PAI-9/16-MW05S and MW06I) and conversion of the thirteen (13) wells at Site 27 (MW-11S, -12I, -13D, -14S, -15I, -16S, -19S, -20S, -21S, -49S, -50I, -55S and -56I). The monitoring wells are to be installed in the locations as illustrated on Figure 17-1, Figure 3-1, and Figure JM18 and per the proposed construction details provided in the July 2011 (Churchill to French) correspondence. The proposed drilling date is 08/29/2011. These monitoring wells are to be installed following all of the applicable requirements of R.61-71 of the South Carolina Well Standards.

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 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 author of this approval 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 monitoring wells shall be labeled as required by R.61-71.H.2.c.

5. If any of the information provided to the Department changes, including the proposed drilling date, Annie Gerry (803-896-4018) shall be notified at least twenty-four (24) 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, dated April 26, 2002.

Annie M. Gerry, Hydrogeologist
Federal Facilities Groundwater Section
Division of Waste Management
Bureau of Waste Management

DD110274.AMG

DEPARTMENT OF THE NAVY
Naval Facilities Engineering Command Southeast
Jacksonville, FL 32212-0030

October 1, 2008

South Carolina Department of Health and Environmental Control (DHEC)
Attn: Mrs. Sommer Streett
Bureau of Land and Waste Management
Division of Hydrogeology
2600 Bull Street
Columbia, SC 29201

Dear Mrs. Streett:

Our contractor, Tetra Tech, via their subcontractor, Vironex, is providing SCDHEC 1903 forms for permanent monitoring wells recently installed at MCRD Parris Island Site 27. Seventeen (17) new monitoring wells were recently installed, pursuant to SCDHEC Monitoring Well Approval HW-08-026, dated 1 August 2008.

The DoN is committed to accomplishing the Team's clean-up goals in both an effective and efficient manner. If you have any questions regarding this submittal, please contact Charles Cook, PE at (904) 542-6409 charles.cook2@navy.mil or myself at (904) 542-6290.

Sincerely,

Sarah Reed

Sarah Reed, P.E.
Restoration Section Head,
South Central IPT

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 10 ft. to surface ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Sand with silt and clay	10+ ft	UNK
*Wet at 8 ft.		
Utilize DPT to collect 19 soil		
samples to 10 ft.		
Location ID#		
PAI 27 SB14 through PAI 27 SB32		
Center location is:		
N 188,923.11		
E 2,094,432.26		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Abandon all locations by presure injecting neat cement bottom-up.

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☑ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/12/08
10 ft. Date Completed: 8/12/08

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ ft. to ____ 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: Corey Gamwell **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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] Date: 9/8/08
Well Driller

If D Level Driller, provide supervising driller's name:

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: N188,708.72 Longitude: E2,094,381.76

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
Sand and silt	8'	8'
Saturated sand and silt	16.5'	25'

*Indicate Water Bearing Zones
(Use a 2nd sheet if needed)

5. REMARKS:
Set well utilizing 4.25" HSA
PAI 27 MW 48 I

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/07/08
24.5 ft. Date Completed: 8/12/08

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
.3 in. to 14.5 ft. depth
______ in. to ______ ft. depth
Height: Above ☐ Below ☑
Surface .5 ft.
Weight ______ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: Sch 40 PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 24.5 ft. and 14.5 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 25 ft. to 13 ft.
Effective size 16-40 sieve size #1 Uniformity Coefficient ______

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☑ Bentonite ☐ Bentonite/Cement ☐ Other ______
Depth: From 13 ft. to .5 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: **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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] Date: 9/8/08
Well Driller

If D Level Driller, provide supervising driller's name:

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: N189,033.38 Longitude: E2,094,392.57

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
Sand and silt	7'	7'
saturated sand and silt	6.5'	13.5

*Indicate Water Bearing Zones
(Use a 2nd sheet if needed)

5. REMARKS:
Set well utilizing 4.25" HSA
PAI 27 MW 49 S

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) 13 ft. Date Started: 8/07/08 Date Completed: 8/12/08

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
.3 in. to 3 ft. depth
______ in. to ______ ft. depth
Height: Above ☐ Below ☑
Surface .5 ft.
Weight ______ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: Sch 40 PVC Diam.: 2"
Slot/Gauge: .010 Length:
Set Between: 13 ft. and 3 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 13.5 ft. to 2 ft.
Effective size 16-40 sieve size #1 Uniformity Coefficient

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☑ Bentonite ☐ Bentonite/Cement ☐ Other
Depth: From 2 ft. to .5 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: **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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] Date: 9/8/08
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)**

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: N188,616.31 Longitude: E2,094,123.13

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
Sand and silt	7'	7'
Saturated sand and silt	17.5'	24.5'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Set well utilizing 4.25" HSA
PAI 27 MW 54 I

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/07/08
24 ft. Date Completed: 8/12/08

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
.3 in. to 14 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☑
Surface .3 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: Sch 40 PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 24 ft. and 14 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 24.5 ft. to 13 ft.
Effective size 16-40 sieve size #1 Uniformity Coefficient _____

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☑ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 13 ft. to .5 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: **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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: 9/8/08
Well Driller

If D Level Driller, provide supervising driller's name:

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: N188,614.08 Longitude: E2,094,126.22

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
Sand and silt	7'	7'
Saturated sand and silt	6.5'	13.5'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Set well utilizing 4.25" HSA
PAI 27 MW 53 S

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/07/08
13 ft. Date Completed: 8/12/08

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
.3 in. to 3 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☑
Surface .3 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: Sch 40 PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 13 ft. and 3 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 13.5 ft. to 2 ft.
Effective size 16-40 sieve size #1 Uniformity Coefficient _____

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☑ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 2 ft. to .5 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: **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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: 9/8/08
Well Driller

If D Level Driller, provide supervising driller's name:

COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: N188,587.31 Longitude: E2,094,557.69

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
Sand and silt	7'	7'
Saturated sand and silt	18.5'	25.5'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Set well utilizing 4.25" HSA
PAI 27 MW 52 I

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/07/08
25 ft. Date Completed: 8/12/08

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
15 in. to .3 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☑
Surface .3 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: Sch 40 PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 25 ft. and 15 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 25.5 ft. to 13.5 ft.
Effective size 16-40 sieve size #1 Uniformity Coefficient _____

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☑ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 13.5 ft. to .5 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: **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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: 9/8/08
Well Driller

If D Level Driller, provide supervising driller's name:

COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: N188,588.75 Longitude: E2,094,554,.91

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
Sand and silt	7'	7'
Saturated sand and silt	6.5	13.5'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Set well utilizing 4.25" HSA
PAI 27 MW 51 S

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/07/08
13 ft. Date Completed: 8/12/08

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
.3 in. to 3 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☑
Surface -.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: Sch 40 PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 3 ft. and 13 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 13.5 ft. to 2 ft.
Effective size 16-40 sieve size #1 Uniformity Coefficient _____

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☑ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 2 ft. to .5 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: **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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: 9/8/08
Well Driller

If D Level Driller, provide supervising driller's name:

COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: N189,036.22 Longitude: E2,094,394.80

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
Sand and silt	7'	7'
Saturated sand and silt	17.5'	24.5'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Set well utilizing 4.25" HSA
PAI 27 MW 50 I

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/07/08
24 ft. Date Completed: 8/12/08

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
.3 in. to 14 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☑
Surface .5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: Sch 40 PVC Diam.: 2"
Slot/Gauge: .010 Length: _____
Set Between: 24 ft. and 14 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 24.5 ft. to 13 ft.
Effective size 16-40 sieve size #1 Uniformity Coefficient _____

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☑ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 13 ft. to .5 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: **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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: 9/8/08
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)**

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: N188,749.14 Longitude: E2,094,485.82

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
Sand and silt	7'	7'
Saturated sand and silt	6.5'	13.5'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Set well utilizing 4.25" HSA
PAI 27 MW 64 S

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/07/08
13 ft. Date Completed: 8/12/08

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
30 in. to 3 ft. depth
_____ in. to _____ ft. depth
Height: Above ☑ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: Sch 40 PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 13 ft. and 3 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 13.5 ft. to 2 ft.
Effective size 16-40 sieve size #1 Uniformity Coefficient _____

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☑ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 2 ft. to 0 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: **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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: 9/8/08
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)**

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: N189,182.28 Longitude: E2,094,542.91

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
Sand and silt	7'	7'
Saturated sand and silt	6.5'	13.5'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Set well utilizing 4.25" HSA
PAI 27 MW 63 S

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/07/08
13 ft. Date Completed: 8/12/08

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
30 in. to 3 ft. depth
_____ in. to _____ ft. depth
Height: Above ☑ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: Sch 40 PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 13 ft. and 3 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 13.5 ft. to 2 ft.
Effective size 16-40 sieve size #1 Uniformity Coefficient _____

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☑ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 2 ft. to 0 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: **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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: 9/8/08
Well Driller

If D Level Driller, provide supervising driller's name:

COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: N189,250.67 Longitude: E2,094,032.71

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
Sand and silt	7'	7'
Saturated sand and silt	6.5'	13.5'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Set well utilizing 4.25" HSA
PAI 27 MW 62 S

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/07/08
13 ft. Date Completed: 8/12/08

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
30 in. to 3 ft. depth
_____ in. to _____ ft. depth
Height: Above ☑ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: Sch 40 PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 13 ft. and 3 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 13.5 ft. to 2 ft.
Effective size 16-40 sieve size #1 Uniformity Coefficient _____

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☑ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 2 ft. to .5 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: **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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] Date: 9/8/08
Well Driller

If D Level Driller, provide supervising driller's name:

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: N189,166.82 Longitude: E2,094,766.19

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
Sand and silt	7'	7'
Saturated sand and silt	18'	25'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Set well utilizing 4.25" HSA
PAI 27 MW 61 I

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/07/08
24.5 ft. Date Completed: 8/12/08

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
3 in. to 14.5 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☑
Surface .5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: Sch 40 PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 24.5 ft. and 14.5 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 25 ft. to 13 ft.
Effective size 16-40 sieve size #1 Uniformity Coefficient _____

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☑ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 13 ft. to .5 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: **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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] Date: 9/8/08
Well Driller

If D Level Driller, provide supervising driller's name:

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: N189,295.31 Longitude: E2,094,618.54

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
Sand and silt	7'	7'
Saturated sand and silt	18'	25'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Set well utilizing 4.25" HSA
PAI 27 MW 60 I

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/07/08
24.5 ft. Date Completed: 8/12/08

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
30 in. to 14.5 ft. depth
_____ in. to _____ ft. depth
Height: Above ☑ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: Sch 40 PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 24.5 ft. and 14.5 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 25 ft. to 13 ft.
Effective size 16-40 sieve size #1 Uniformity Coefficient _____

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☑ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 13 ft. to 0 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: **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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: 9/8/08
Well Driller

If D Level Driller, provide supervising driller's name:

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: N189,400.98 Longitude: E2,094,396.67

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
Sand and silt	7'	7'
Saturated sand and silt	12.5'	19.5'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Set well utilizing 4.25" HSA
PAI 27 MW 59 I

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/07/08
19 ft. Date Completed: 8/12/08

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
.3 in. to 14 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☑
Surface .3 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: Sch 40 PVC Diam.: 2"
Slot/Gauge: .010 Length: 5'
Set Between: 14 ft. and 19 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 19.5 ft. to 12.5 ft.
Effective size 16-40 sieve size #1 Uniformity Coefficient _____

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☑ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 12.5 ft. to .5 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: **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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] Date: 9/9/08
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)**

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: N189,403.13 Longitude: E2,094,396.67

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
Sand and silt	7'	7'
Saturated sand and silt	5.5'	12.5'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Set well utilizing 4.25" HSA
PAI 27 MW 58 S

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/07/08
12 ft. Date Completed: 8/12/08

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
.3 in. to 2 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☑
Surface .5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: Sch 40 PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 12 ft. and 2 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 12.5 ft. to 1.5 ft.
Effective size 16-40 sieve size #1 Uniformity Coefficient _____

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☑ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 1.5 ft. to .5 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: **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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: G W Bd Date: 9/8/08
Well Driller

If D Level Driller, provide supervising driller's name:

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: N189,411.40 Longitude: E2,094,196.89

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
Sand and silt	7'	7'
Saturated sand and silt	6.5'	13.5'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Set well utilizing 4.25" HSA
PAI 27 MW 57 S

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/07/08
13 ft. Date Completed: 8/12/08

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
.3 in. to 3 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☑
Surface .5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: Sch 40 PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 13 ft. and 3 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 13.5 ft. to 2 ft.
Effective size 16-40 sieve size #1 Uniformity Coefficient _____

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☑ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 2 ft. to .5 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: **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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] Date: 9/8/08
Well Driller

If D Level Driller, provide supervising driller's name:

COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: N188,982.16 Longitude: E2,093,912.94

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
Sand and silt	7'	7'
Saturated sand and silt	18.5'	25.5'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Set well utilizing 4.25" HSA
PAI 27 MW 56 I

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/07/08
25 ft. Date Completed: 8/12/08

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
30 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: Sch 40 PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 25 ft. and 15 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 25.5 ft. to 13.5 ft.
Effective size 16-40 sieve size #1 Uniformity Coefficient _____

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☑ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 13.5 ft. to 0 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: **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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: 9/8/08
Well Driller

If D Level Driller, provide supervising driller's name:

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: US Navy NFECS (last) (first)
Address: Naval Facilities Engineering Command SE
City: Jacksonville State: FL Zip: 32212-0030
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: Site 27
Street Address: Talasea St.
City: MCRD Parris Island Zip:
Latitude: N188,978.73 Longitude: E2,093,911.71

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
Sand and silt	7'	7'
Saturated sand and silt	6.5'	13.5'
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Set well utilizing 4.25" HSA
PAI 27 MW 55 S

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☑ Other

7. PERMIT NUMBER: SCDHEC Monitor Well Approval HW-08-026

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/07/08
_____ ft. Date Completed: 8/12/08

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
30 in. to 3 ft. depth
_____ in. to _____ ft. depth
Height: Above ☑ Below ☐
Surface 2.5 ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: Sch 40 PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 13 ft. and 3 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 13.5 ft. to 2 ft.
Effective size 16-40 sieve size #1 Uniformity Coefficient _____

16. WELL GROUTED? ☑ Yes ☐ No
☑ Neat Cement ☑ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 2 ft. to 0 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: **CERT. NO.:** 1576
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
PO Box 539 Stantonsburg, NC 27883
Telephone No.: 919-650-8357 Fax No.: 252-237-1464

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: 9/8/08
Well Driller

If D Level Driller, provide supervising driller's name:

COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

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: Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MARINE CORPS Recruit Depot
Street Address:
City: B Zip:
Latitude: 189,184.01 Longitude: 2,094,979.54

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
Boring log attached		
TEMPORARY Mon. Well		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Boring Log ATTACHED
PAI-9/16-TW041

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-10-035

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☒ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/6/10
20 ft. Date Completed: 8-6-10

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☐ PVC ☐ Galvanized ☐ Steel ☐ Other
1 in. to 15 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 5 ft.
Set Between: 15 ft. and 20 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 20 ft. to 13 ft.
Effective size #2 Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 13 ft. to 0 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: William Ewing CERT. NO.: 1505 (B)
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
1210 1st Street S. Ext.
Columbia, SC 29209
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: William C. Ewing Date: 8-10-10
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: Parris Island 9/11e
PROJECT NUMBER: 112G02088
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 9/11e-SO07
DATE: 8/6/10
GEOLOGIST: S. Hill
DRILLER: B. Fleming

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			4			Brn	Silty SAND (VF)	SM	Grass @ Top	0.0			
						Brn	SAND (VF)	SP		0.0			
							↓			0.0			
						Brn Gray	CLAY w/ little sand	CL	MOIST	0.0			
5						White Brn	SAND (VF)	SP	MOIST	0.0			
5			3			Orange	↓		Wet	0.0			
						Blue Gray	CLAY	CL		0.0			
						Lt Brn	SAND (VF)		Saturated	0.0			
										0.0			
10										0.0			
			5							0.0			
										0.0			
										0.0			
										0.0			
15										0.0			
			5										
						Dk Gray	CLAY-SOFT w/ little silt	CL	silt				
20						L	CLAY-w/silt & 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): 0.0

Remarks: PAI-9/11e-TW035-installed to 10' bgs
PAI-9/11e-TW041-installed to 20' bgs

Converted to Well: Yes X No ____ Well I.D. #: PAI-9/11e-TW-035
PAI-9/11e-TW-041

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: Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MARINE CORPS Recruit Depot
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189,183.17 Longitude: 2,094,978.77

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
Boring log attached		
TEMPORARY MON. WELL		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Boring Log Attached
PAI 9/16 Tw035

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-10-035

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☒ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/6/10
10 ft. Date Completed: 8-6-10

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☐ PVC ☐ Galvanized ☐ Steel ☐ Other
1 in. to 5 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 5 ft
Set Between: 5 ft. and 10 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 10 ft. to 3 ft.
Effective size #2 Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 3 ft. to 0 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: William Ewing CERT. NO.: 1505 (B)
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
1210 1st Street S. Ext.
Columbia, SC 29209
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: William C. Ewing Date: 8-10-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island 9/16
PROJECT NUMBER: 112G03088
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 9/16-S007
DATE: 8/6/10
GEOLOGIST: S. Hill
DRILLER: B. Evings

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			4			Brn	Silty SAND (VF)	SM	Grass @ Top	0.0			
						Brn	SAND (VF)	SP		0.0			
							↓			0.0			
						Brn Gray	CLAY w/little sand	CL	moist	0.0			
5						White Brn	SAND (VF)	SP	moist	0.0			
5			3			Orange	↓		wet	0.0			
						Blue Gray	CLAY	CL		0.0			
						Lt Brn	SAND (VF)		Saturated	0.0			
										0.0			
10										0.0			
			5							0.0			
										0.0			
										0.0			
										0.0			
15										0.0			
			5										
						Dk Gray	CLAY - soft w/ little silt	CL					
20						L	CLAY - w/silt + 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): 0.0

Remarks: PAI- 9/16 - TW035 - installed to 10' bgs
PAI- 9/16 - TW041 - installed to 20' bgs

Converted to Well: Yes X No ____ Well I.D. #: PAI-9/16-TW-035
PAI-9/16-TW-041

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: Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MARINE CORPS Recruit Depot
Street Address:
City: Same as above Zip:
Latitude: 188,926.33 Longitude: 2,094,313.06

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
See attached boring log		
TEMPORARY MON WELL		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Boring Logs Attached
TM
PAI -27 466F

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-10-035

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☒ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) ~~Date Started: 8/6-/10~~
26.5 ft. Date Completed 8-6-10

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
1 in. to 21.5 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☒ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 5ft
Set Between: 21.5 ft. and 26.5 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 26.5 ft. to 19.5 ft.
Effective size #2 Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 19.5 ft. to 0 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: William Ewing CERT. NO.: 1505 (B)
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
1210 1st Street S. Ext.
Columbia, SC 29209
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: William C Ewing Date: 8-10-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island
PROJECT NUMBER: 112G024006
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: PA1-27-S046
DATE: 8/6/10
GEOLOGIST: SEL
DRILLER: B. Ewing

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			4/5		loose	orange	SAND w/ little clay	SP	Asphalt at top	0.0			
						Brn	VF SAND	SP		0.0			
										0.0			
						Lt Brn				1.0			
5										1.1			
			4/5							0.0			
					Stiff	Blue Gray orange	CLAY mottled	CL		1.1			
										1.0			
					Med Stiff	Gray	SAND (VF) ~~with silt~~	SP		33			
10							w/ little to Trace Silt			13			
			3/5							4.7			
						Orange to Lt Brn				0.4			
										0.8			
										1.4			
15										0.3			
										0.0			
										0.3			
										0.5			
										0.2			
20						Dk Orange				1.0			
			5/5							0.0			
										0.0			
										0.0			
										0.0			
25										0.0			

* 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 X No

Well I.D. #: PA1-27-TW0655
PA1-27-TW0661

Tetra Tech NUS; Inc.

BORING LOG

PROJECT NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT
BORING No.: PA-27-SD4/6
DATE: 8/6/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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**
			3/5		soft	DK Gray	CLAY w/ little sand	CL		0.0			
					~~Hard~~ med	~~Black~~	~~Peat~~	~~PT~~		0.0			
					Stiff	DK	SAND and CLAY	SC		0.0			
						~~Black~~ Gray				0.0			
30										0.0			

* 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 ____ Well I.D. #: ____

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: Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MARINE CORPS Recruit Depot
Street Address:
City: Same as above Zip:
Latitude: 188,928.00 Longitude: 2,094,313.77

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
boring log attached		
TEMPORARY MON WELL		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
Bombing Loss Attack
PAI-27-TW65S

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-10-035

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☒ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/6/10
10 ft. Date Completed: 8-6-10

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
1 in. to 5 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☒ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 5 ft
Set Between: 5 ft. and 10 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 10 ft. to 3 ft.
Effective size #2 Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 3 ft. to 0 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: William Ewing CERT. NO.: 1505 (B)
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
1210 1st Street S. Ext.
Columbia, SC 29209
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: William C Ewing Date: 8-10-10
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: Parris Island
PROJECT NUMBER: 112G02400
DRILLING COMPANY: ARCM
DRILLING RIG: DPT

BORING No.: PA1-27-S046
DATE: 8/6/10
GEOLOGIST: SEL
DRILLER: B. Ewing

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			4/5		loose	Orange	SAND w/ little clay	SP	Asphalt at top	0.0			
						Brn	VF SAND	SP		0.0			
										0.0			
						H Brn				0.0			
5										0.1			
			4/5							0.0			
					Stiff	Blue Gray orange	CLAY mottled	CL		1.1			
										0.0			
					med stiff	Gray	SAND (VF) ~~[illegible]~~ w/ little to Trace Silt	SP		33			
10										13			
			3/5							4.7			
						Orange to lt Brn				0.4			
										0.8			
										1.4			
15										0.3			
										0.0			
										0.3			
										0.5			
										0.2			
20						Dk Gray				0.0			
			5/5							0.0			
										0.0			
										0.0			
										0.0			
25										0.0			

* 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 X No

Well I.D. #: PA1-27-TW0655
PA1-27-TW0661

Tetra Tech NUS; Inc.

BORING LOG

PROJECT NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT
BORING No.: PAI-27-SD46
DATE: 8/6/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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**
			3/5		soft	DK Gray	CLAY w/ little	CL		0.0			
					~~Hard~~ med	Black	Peat sand	PT		0.0			
					Stiff	DK	SAND and CLAY	SC		0.0			
						~~Black~~ Gray	↓			0.0			
30										0.0			

* 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 ____ Well I.D. #: ____

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: Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MARINE CORPS Recruit Depot
Street Address:
City: Same as above Zip:
Latitude: 189,022.48 Longitude: 2,094,862.14

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
boring log attached		
TEMPORARY MON WELL		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI-9/16 - Two 15

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-10-035

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☒ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/6/10
10 ft. Date Completed: 8-6-10

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☐ PVC ☐ Galvanized ☐ Steel ☐ Other
1" in. to 5 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 5ft
Set Between: 5 ft. and 10 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 10 ft. to 3 ft.
Effective size #2 Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 3 ft. to 0 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: William Ewing CERT. NO.: 1505 (B)
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
1210 1st Street S. Ext.
Columbia, SC 29209
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: William C. Ewing Date: 8-10-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 9/16 BORING No.: 9/16-SO02
PROJECT NUMBER: 112G02688 DATE: 8/6/10
DRILLING COMPANY: ARM GEOLOGIST: S. Hill
DRILLING RIG: DPT DRILLER: B. Ewing

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			3			Brn	Silty SAND	SM	Grass on Top	0.0			
							VF SAND	SP		0.0			
						Lt Brn				0.0			
										0.0			
5						Brn			wet	0.0			
			4'							0.0			
						Blue Gray	CLAY w/sand	CL/SC		0.0			
						Blue Gray				0.0			
							CLAY	CL		0.0			
10							SAND (VF)	SP		0.0			
							SAND and CLAY	SC					
			5'			Blue Gray	SAND (VF)	SP	Saturated	0.0			
										0.0			
										0.0			
						Dk Gray	SAND & CLAY	SC		0.0			
15						Gray	VF SAND w/ Clay	SP		0.0			
			5'				VF SAND			0.0			
						Dk Gray	CLAY (very soft)	CL		0.0			
										0.0			
										0.0			
20						Dk Gray	Silty CLAY	CL/ML		0.0			

* 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 X No

Well I.D. #: PAI-9/16-TW01S
PAI-9/16-TW02S

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: Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MARINE CORPS Recruit Depot
Street Address:
City: Same as above Zip:
Latitude: 189,024.07 Longitude: 2,094,862.90

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
boring log attached		
TEMPORARY MON WELL		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
PAT-9/16-Two2I

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-10-035

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☒ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/6/10
20 ft. Date Completed: 8-6-10

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
1 in. to 15 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 5ft
Set Between: 15 ft. and 20 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 20 ft. to 17 ft.
Effective size #2 Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 13 ft. to 0 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: William Ewing CERT. NO.: 1505 (B)
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
1210 1st Street S. Ext.
Columbia, SC 29209
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: William C Ewing Date: 8-10-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 9/16 BORING No.: 9/16-SO02
PROJECT NUMBER: 1126 02688 DATE: 8/6/10
DRILLING COMPANY: ARM GEOLOGIST: S. Hill
DRILLING RIG: DPT DRILLER: B. Ewing

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			3			Brn	Silty SAND	SM	Grass on top	0.0			
							VF SAND	SP		0.0			
						Lt Brn				0.0			
										0.0			
5						Brn			wet	0.0			
			4'							0.0			
						Blue Gray	CLAY w/sand	CL/SC		0.0			
						Blue				0.0			
						Gray	CLAY	CL		0.0			
10							SAND (VF)	SP		0.0			
							SAND and CLAY	SC					
			5'			Blue Gray	SAND (VF)	SP	Saturated	0.0			
										0.0			
										0.0			
						Blue Gray	SAND & CLAY	SC		0.0			
15						Gray	SAND w/ + Clay	SP		0.0			
			5'				VF SAND			0.0			
						DK Gray	CLAY (very soft)	CL		0.0			
										0.0			
										0.0			
20						DK Gray	Silty CLAY	CL/ML		0.0			

* 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 X No

Well I.D. #: PA1-9/16-TW01S
PA1-9/16-TW02I

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: Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MARINE CORPS Recruit Depot
Street Address:
City: Same as above Zip:
Latitude: 188,924.30 Longitude: 2,094,364.20

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
boring log attached		
TEMPORARY MON WELL		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
PAI-27-TW675

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-10-035

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☒ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8/3/10
10 ft. Date Completed: 8/3/10

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
1 in. to 5 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 5 ft
Set Between: 5 ft. and 10 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 3 ft. to 10 ft.
Effective size #2 Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☒ Bentonite/Cement ☐ Other _____
Depth: From 3 ft. to 0 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: William Ewing CERT. NO.: 1505 (B)
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
1210 1st Street S. Ext.
Columbia, SC 29209
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: William C Ewing Date: 8-10-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 27
PROJECT NUMBER: 112G024016
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 27-SD47
DATE: 8/3/10
GEOLOGIST: S. Hill
DRILLER: B. Elving

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			4/5	1	loose	Dark Brn	Asphalt						
							orange Brown SAND w/ little clay	SP		0.0			
						lt. Brn	lt. Brown SAND	SP		0.0			
								SP		0.0			
									moist @ 4' bgs	0.3			
5										0.4			
			4/5	6'						0.4			
					Stiff		CLAY Blue gray/	CL		40.7			
				8'			Brown/Red-mottled			41.0			
					med Stiff	Gray	SILT w/ little	ML/SM	Wet	94.7			
10				10	Stiff		Clay & SAND (some)	CL/SC		16.3			
			4/5		med Stiff	Gray	SILT & SAND (vf)	ML/SM		13.6			
										17.9			
										0.9			
				13.5									
						Blue gray Brn	SAND (vf) w/ little	SP		4.5			
15					med Stiff		Silt			3.5			
			5/5			Brn				0.9			
										1.8			
										2.2			
				19'						0.4			
20						Dk Brown	SAND w/ little Silt	SP		0.4			
			2/5							0.0			
										0.7			
										0.0			
										0.0			
25										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): 0.0

Remarks: Fluke hit @ 8' bgs
Grts SPF into 10' bgs Sand to 3' bgs, Grout to 1' bgs
10.8I Slt at 27' bgs

Converted to Well: Yes X No _____ Well I.D. #: PAI-27-TW16S
PAI-27-TW16I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT
BORING No.: 27-8047
DATE: 8/3/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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**
			3/5		med stiff	Gray	Description SAND w/ little silt	SP		0.0			
					soft	Gray	CLAY	CL		0.0			
					Mod stiff	Gray	ppt SAND w/ silt	SP/SM		0.0			
							interbedded Clay			0.0			
30							↓			0.0			

* 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 X No Well I.D. #:

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: Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MARINE CORPS Recruit Depot
Street Address:
City: Same as above Zip:
Latitude: 188,922.91 Longitude: 2,094,362.67

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
boring log attached		
TEMPORARY MON. WELL		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
PAI-27-TW68I

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☒ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-10-035

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☒ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) 27 ft. Date Started: 8/3/2010 Date Completed: 8/3/2010

10. CASING: ☒ Threaded ☐ Welded
Diam.: 1"
Type: ☐ PVC ☐ Galvanized ☐ Steel ☐ Other
1 in. to 22 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☐ No

11. SCREEN:
Type: PVC Diam.: 1"
Slot/Gauge: .010 Length: 5ft
Set Between: 22 ft. and 27 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 27 ft. to 20
Effective size #2 Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ Bentonite/Cement ☐ Other _____
Depth: From 20 ft. to 0 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: William Ewing CERT. NO.: 1505 (B)
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
1210 1st Street S. Ext.
Columbia, SC 29209
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: William C Ewing Date: 8-10-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 27-SB47
DATE: 8/3/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4/5	1	loose	Dark Brn	Asphalt Orange Brown SAND w/ little clay	SP		0.0			
						Lt. Brn	Light Brown SAND	SP		0.0			
								SP		0.0			
									moist @ 4' bgs	0.3			
5										0.4			
			4/5	6'						0.4			
					Stiff		CLAY Blue gray/	CL		40.7			
				8'			Brown/Red-mottled			41.0			
					med stiff	Gray	SILT w/ little	ML/SM	wet	94.7			
10				10	Stiff		Clay & SAND (some)	CL/SC		16.3			
			4/5		med stiff	Gray	SILT & SAND (VF)	ML/SM		13.6			
										17.9			
										0.9			
				13.5									
						Blue gray	SAND (VF) w/ little	SP		4.5			
15					med stiff	Brn	Silt			3.5			
			5/5			Brn				0.9			
										1.8			
										2.2			
				19'						0.4			
20						Dk Brown	SAND w/ little Silt	SP		0.4			
			2/5							0.6			
										0.7			
										0.0			
										0.0			
25										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): 0.0

Remarks: Flute hit @ 8' bgs
6-7S set at 10' bgs Sand to 3' bgs, Grout to 1' bgs
6-8I set at 27' bgs

Converted to Well: Yes X No _____ Well I.D. #: PA1-27-TW16-7S
PA1-27-TW16-8I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT
BORING No.: 27-B047
DATE: 8/3/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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**
			3/5		med stiff	Gray	Brown SAND w/ little silt	SP		0.0			
					soft	Gray	CLAY	CL		0.0			
					Well	Gray	Peat SAND w/ silt	PT SP/SM		0.0			
					Stiff		interbedded Clay			0.0			
3b							↓			0.0			

* 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 X No Well I.D. #:

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: Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: BEAUFORT
Name: PARRIS Island MARINE CORPS DEPOT
Street Address:
City: SAME as above Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: PUBLIC SYSTEM NUMBER:

4. ABANDONMENT: ☒ Yes ☐ No
Grouted Depth: from 27 ft. to 0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
ABANDONMENT		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
PAI-27-TW-68I

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-10-035

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8-9-10
27 ft. Date Completed: 8-9-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: 1"
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 27 ft. to 0 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: William Ewing CERT. NO.: 1505 (B)
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
1210 1st Street S. Ext.
Columbia, SC 29209
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: William C Ewing Date: 8-10-10
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)

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: Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: BEAUFORT
Name: PARRIS Island MARIN CORPS DEPOT
Street Address:
City: Same as above Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: PUBLIC SYSTEM NUMBER:

4. ABANDONMENT: ☒ Yes ☐ No
Grouted Depth: from 10 ft. to 0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
ABANDONMENT		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
PAI -27-TW675

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-10-035

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8-9-10
10 ft. Date Completed: 8-9-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: 1"
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 10 ft. to 0 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: William Ewing CERT. NO.: 1505 (B)
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
1210 1st Street S. Ext.
Columbia, SC 29209
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: William C Ewing Date: 8-10-10
Well Driller

If D Level Driller, provide supervising driller's name:

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: Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: BEAUFORT
Name: PARRIS Island MARIN Corps Depot
Street Address:
City: SAME as Above
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: PUBLIC SYSTEM NUMBER:

4. ABANDONMENT: ☒ Yes ☐ No
Grouted Depth: from 20 ft. to 0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
ABANDONMENT		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
PAI - 9/16 - Thozt

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-10-035

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) 20 ft. Date Started: 8-9-10 Date Completed: 8-9-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: 1"
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 20 ft. to 0 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: William Ewing CERT. NO.: 1505 (B)
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
1210 1st Street S. Ext.
Columbia, SC 29209
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: William C Ewing Date: 8-10-10
Well Driller

If D Level Driller, provide supervising driller's name:

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: Marine Corps (last) (first)
Address: Parris Islans
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: BEAUFORT
Name: PARRIS Island MARIN Corps Depot
Street Address:
City: Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☒ Yes ☐ No
Grouted Depth: from 10 ft. to 0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
ABANDONMENT		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
PAI - 9/16 - Two 15

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-10-035

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8-9-10
10 ft. Date Completed: 8-9-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: 1"
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 10 ft. to 0 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: William Ewing CERT. NO.: 1505 (B)
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
1210 1st Street S. Ext.
Columbia, SC 29209
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: William C. Ewing Date: 8-10-10
Well Driller

If D Level Driller, provide supervising driller's name:

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: Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: BEAUFORT
Name: PARRIS Island MARINE CORPS PLANT
Street Address:
City: Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: PUBLIC SYSTEM NUMBER:

4. ABANDONMENT: ☒ Yes ☐ No
Grouted Depth: from 10 ft. to 0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
ABANDONMENT		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
PAI-27-TW65S

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-10-035

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) 10 ft. Date Started: 8-9-10 Date Completed: 8-9-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: 1"
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 10 ft. to 0 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: William Ewing CERT. NO.: 1505 (B)
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
1210 1st Street S. Ext.
Columbia, SC 29209
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: William C. Ewing Date: 8-10-10
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)

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: Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: BEAUFORT
Name: PARRIS Island MARINE CORPS DEPOT
Street Address:
City: Same as above Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: PUBLIC SYSTEM NUMBER:

4. ABANDONMENT: ☒ Yes ☐ No
Grouted Depth: from 26.5 ft. to 0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
ABANDONMENT		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
TW
PAI-27-166I

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-10-035

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8-9-10
26.5 ft. Date Completed: 8-9-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: 1"
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 27 ft. to 0 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: William Ewing CERT. NO.: 1505 (B)
Address: (Print) Level: A ☐ B ☑ C ☐ D ☐ (circle one)
1210 1st Street S. Ext.
Columbia, SC 29209
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: William C Ewing Date: 8-10-10
Well Driller

If D Level Driller, provide supervising driller's name:

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: Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: BEAUFORT
Name: PARRIS Island MARINE CORPS DEPOT
Street Address:
City: Same as above Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: PUBLIC SYSTEM NUMBER:

4. ABANDONMENT: ☒ Yes ☐ No
Grouted Depth: from 20 ft. to 0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
ABANDONMENT		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
PAE-9/16-Tw041

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-10-035

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8-9-10
20 ft. Date Completed: 8-9-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: 1"
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 20 ft. to 0 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: William Ewing CERT. NO.: 1505 (B)
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
1210 1st Street S. Ext.
Columbia, SC 29209
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: William C Ewing Date: 8-10-10
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)

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: Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: BEAUFORT
Name: PARRIS Island MARIN CORPS DEPOT
Street Address:
City: Same as above Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: PUBLIC SYSTEM NUMBER:

4. ABANDONMENT: ☒ Yes ☐ No
Grouted Depth: from 10 ft. to 0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
ABANDONMENT		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
PAI 9/16 Two 35

6. TYPE: ☐ Mud Rotary ☐ Jetted ☐ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-10-035

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☐ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 8-9-10
10 ft. Date Completed: 8-9-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: 1"
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 10 ft. to 0 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: William Ewing CERT. NO.: 1505 (B)
Address: (Print) Level: A B C D (circle one)
1210 1st Street S. Ext.
Columbia, SC 29209
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: William C Ewing Date: 8-10-10
Well Driller

If D Level Driller, provide supervising driller's name:

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: MARINE CORPS (last) (first)
Address: PARRIS Island
City: BEAUFORT State: S.C. Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: BEAUFORT
Name: MARINE CORPS RECRUIT DEPOT
Street Address: Same as Above
City: Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☒ Yes ☐ No
Grouted Depth: from 14 ft. to 0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
MW		
ABANDONMENT		
*Indicate Water Bearing Zones		
(Use a 2nd sheet if needed)		

5. REMARKS:
PAI -27 -MW175

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: 8-9-10
14 ft. Date Completed: 8-9-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: 2"
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ ft. to ____ 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: William Ewing **CERT. NO.:** 1505
Address: (Print)
ARM Environmental Services, Inc.
P.O. Box 50285
Columbia, SC 29250
Level: A B C D (circle one) ☐ ☑ ☐ ☐
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: 8-10-10
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)

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: MARINE CORPS (last) (first)
Address: Parris Island
City: Beaufort State: Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name:
Street Address: Same As Above
City: Zip:
Latitude: Longitude:

3. PUBLIC SYSTEM NAME: **PUBLIC SYSTEM NUMBER:**

4. ABANDONMENT: ☐ Yes ☒ No
Grouted Depth: from 24.5 ft. to 0 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
MW		
ABANDONMENT		
*Indicate Water Bearing Zones		
(Use a 2nd sheet if needed)		

5. REMARKS:
PAI-27-MW18I

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: 8-9-10
24.5 ft. Date Completed: 8-9-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: 2"
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ ft. to ____ 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: William Ewing CERT. NO.: 1505
Address: (Print)
ARM Environmental Services, Inc.
P.O. Box 50285
Columbia, SC 29250
Level: A ☐ B ☑ C ☐ D ☐ (circle one)
Telephone No.: 803 783-3314 Fax No.: 803 783-2587

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: 8-10-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 55
PROJECT NUMBER: 112G02406
DRILLING COMPANY: AKM
DRILLING RIG: DPT

BORING No.: 55-SO18A
DATE: 8/4/10
GEOLOGIST: 8/4/10
DRILLER: B. Ewing

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			3/5		loose	Brn	Silty SAND (VF)	SM	Grass at Top	0.0			
						Brn	VF-SAND	SP		0.0			
						lt Brn				0.0			
									moist	0.8			
5										1.4			
			4.75/5			Brn			wet	0.0			
					stiff	Blue Gray	CLAY w/ little Sand	CL		0.0			
					med stiff	Gray	SAND	SP	wet	0.0			
					stiff	Blue	CLAY mottled	CL		0.0			
10					med stiff	Gray	SAND (VF)	SP		0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Flute = ND
Step-out southeast

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI 55-5018A
Pumped boot from Bottom To Top

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: 8-4-10
10 ft. Date Completed: 8-4-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island-Site 55
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-55-SO-18
DATE: 07/27/10
GEOLOGIST: Chuck Sorden
DRILLER: Bill Ewing

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**
	1		1	0-1.5	Loose	Brown	SILT; 30% Clay and organics	ML/OL		0.0			
	2									0.0			
	3		5/5							0.0			
	4									0.0			
	5			1.5-5.5	Firm	Tan Lt. Brn	SAND - VF 10-20% silt and clay (@ Base)	SM	20%-30% @ Base 30% Clay	0.0			
	6		1	5.5-6.0	Firm	Gray Green	SILT AND CLAY	ML/CL		0.0			
	7									0.0			
	8		5/5	6.0-8.0	Firm	Tan/ Rust	SILT; 30-40% Clay; increasing toward Base	ML/CL		0.0			
	9			8.0-9.0	Stiff	Gray Green	CLAY; 20% Silt @ Base	CL		0.0			
	10			9.0-10.0	Firm	Gray	SILT AND CLAY	ML/CL		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): 0.0

Remarks: VF = Very Fine F = Fine
Little = 11-20% Some = 21-35% AND = 36-49%

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI 55-5018 Pumped Grout From Bottom To Top

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) 10 ft. Date Started: 7-27-0 Date Completed: 7-27-0

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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] Date: 11-5-0
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 55
PROJECT NUMBER: 112G02402e
DRILLING COMPANY: ARM
DRILLING RIG: DPT
BORING No.: 55-S017A
DATE: 8/4/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4/5		loose	Brn	SAND w/silt	SM	Grass at surface	0.0			
						Brn	SAND w/fill material	SP	coal/glass	0.0			
						Brn	SAND (VF)	SP		0.0			
						lt. Brn				0.0			
5						white lt. Brn			moist	0.0			
			4/5						wet	0.0			
					stiff	Blue Gray	very CLAY mottled	CL		0.0			
					loose	" "	SAND (VF)	SP		0.0			
					stiff	" "	CLAY	CL		0.0			
10					med stiff	Blue Gray	SAND (VF) w/ silt	SM		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): 0.0

Remarks: Flute SMP
Step out southeast

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI 55-5017A pumped Grout From Bottom To Top

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: 8-4-10
10 ft. Date Completed: 8-4-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site - SS
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI - SS - SO - 17
DATE: 07/27/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1	0-1.0	hard	Black/ Brown	Asphalt and underfill			0.0			
	2			1.0-1.5	Loose	Brown	SILT; 10-20% Clay; <10% VF Sand	ML		0.0			
	3		5/5							0.0			
	4									0.0			
	5									0.0			
	6									0.0			
	7			1.5-7.0	Firm	Tan/ Brown	SAND-VF 10-15% Silt	SM		0.9			
	8			7.0-7.5	Stiff	Gray	SILT AND CLAY	ML/CL		0.6			
	9			7.5-8.5	Firm	Gray	SILT; 10-20% CLAY <10% VF Sand	ML		2.5			
	10			8.5-9.5	Stiff	Gray	SILT AND CLAY	ML/CL		15.3			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF=Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes _____ No X Well I.D. #: _____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAC 55-50-17 Pumped Grout From Bottom To Surface

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: 7-27-10
10 ft. Date Completed: 7-27-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site - SS
PROJECT NUMBER: 112G02408
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI - SS - SO - 16
DATE: 07/27/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1	0-1	Stiff	Black/ Gray	Asphalt AND Subbase			0.0			
	2		1	1.0-1.5	Firm	Brown	SILT AND CLAY; 10-15% Silt	ML		0.0			
	3		5/5							0.0			
	4									0.0			
	5									0.0			
	6		1	1.5-6.0	Firm	Tan/ Brown	SAND-VF; 10-20% Silt; <10% Clay	SM		0.3			
	7		1	6.0-6.25	Firm	Brown	SILT AND CLAY	ML/CL		0.1			
	8		4.5/5	6.25-7.5	Stiff	Gray Green	CLAY	CL		0.0			
	9			7.5-8.5	Firm	Brown	SILT AND CLAY <10% VF Sand	ML/CL		0.1			
	10			8.5-9.0	Stiff	Gray Green	CLAY	CL		0.0			
				9.0-10.0	Firm	Gray	SILT AND Clay	ML/CL					

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF= Very Fine

Drilling Area Background (ppm): 0.1

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI 55-50-16 Pumped Grout From Bottom To Surface

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: 7-27-10
10 ft. Date Completed: 7-27-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site -
PROJECT NUMBER:
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI-SS-SO-15
DATE: 07/26/10
GEOLOGIST: Chuck Sorden
DRILLER: Dewal Rogers

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**
	1			0.0-0.5	Loose	Brown	SILT 15-30% Clay w/Organics	ML/OL	Grass at Surface	0.0			
	2			0.5-1.0	Loose	Black	Gravel (Pebble sized F-M) w/ Inner Coal	GW/GP		0.0			
	3			1.0-1.5	Loose	Brown	SILT 10-20% Clay	ML		0.0			
	4									0.0			
	5									0.0			
	6									0.0			
	7									0.0			
	8									0.0			
	9			1.5-9.0	Firm	Tan Lt. Brn	SAND-VF; 10-20% Silt 20-30% @ 8.5-9.0	SM		0.0			
	10			9.0-9.1	Stiff	Gray	CLAY-10-15% Silt	CL		0.0			
				9.1-10.0	Firm	Gray	SILT AND CLAY	ML/CL					

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: UF = Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAL 55-50-15 Pumped Grout From Bottom To Surface

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: 7-26-10
10 ft. Date Completed: 7-26-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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. **CERT. NO.:** #1461
Address: (Print) DEARAL RODGERS
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Level: A (B) C D (circle one)
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
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: Parris Island Site 55
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 55-SO14B
DATE: 8/5/10
GEOLOGIST: S Hill
DRILLER: B. Ewing

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			3.5/5		loose	Brn	SAND(vf)	SP	Asphalt at top	0.0			
										0.0			
						Lt Brn				0.0			
										0.0			
5										0.0			
			4.5/5			white orange				0.0			
										0.0			
					stiff	Blue gray w/ orange	CLAY mottled	CL		0.5			
										26	3		
10					much silt	Blue gray	SAND(uf) little silt	SP		25	2		

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: North of 14A stepout

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: B5-50 14B Pumped Grout From Bottom To Top

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: 8-5-10
10 ft. Date Completed: 8-5-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: _____
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: _____ Diam.: _____
Slot/Gauge: _____ Length: _____
Set Between: _____ ft. and _____ 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 _____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 55
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 55-SO14A
DATE: 8/4/10
GEOLOGIST: S. Hill
DRILLER: B. Fluny

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			4/5		loose	Brn	(VF) SAND w/silt	SM	Grass at surface	0.0			
						Lt. Brn	(VF) SAND	SP		0.0			
										0.0			
										0.0			
5						Brn			Moist	0.0			
			4/5							0.0			
					Stiff	Blue Gray	CLAY	CL		3.1			
										1.4			
					med stiff	Blue gray	SAND w/ little silt	SP	wet	15.3			
10										5.4			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Flute Hit @ 8' bgs
Step out North

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: 55-50-14A
Pumped Grout From Bottom To Top

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: 8-4-10
10 ft. Date Completed: 8-4-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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] Date: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site - SS
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI - SS-SO-14
DATE: 07/26/10
GEOLOGIST: Chuck Sorden
DRILLER: Deural Rogers

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**
	1									0.0			
	2			0.0-2.0	Loose	Dark Brown	SILT; 15-30% Clay and organics 60% pebbles	ML	various pebble fill "limmer", shale, "hardpan" @ 20.5' Bgs.	0.0			
	3		3/5							0.0			
	4									0.0			
	5									0.0			
	6									1.5			
	7			2.0-7.5	Loose	Tan, Lt. Brn	SAND-VF; 10-15% Silt	SM		0.0			
	8		2.5/5	7.5-8.0	Firm	Gray	SILT AND CLAY	ML/CL		9.4			
	9			8.0-8.5	Stiff	Gray Green	CLAY	CL		19.4			
	10			8.5-10.0	Firm	Gray	SILT AND CLAY; Clay throughout and in thin Beds	ML/CL		1.5			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI 55-50-14 Pumped Grout From Bottom To Surface

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: 7-26-10
10 ft. Date Completed: 7-26-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: CERT. NO.: 1461
Address: (Print) DEARAL RODGERS
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Level: A (B) C D (circle one)
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site - SS
PROJECT NUMBER: 1126 02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI - SS - SO - 13
DATE: 07/26/10
GEOLOGIST: Chuck Sorden
DRILLER: Dearal Rogers

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**
	1		1	0-0.5	Loose	Dark Brown	SILT; 15-30% Clay and Organics	ML/OL	Grass at surface	0.0			
	2		1	0.5-1.0	Loose	Black	Asphalt			0.0			
	3		4/5	1.0-2.0	Firm	Dark Brown	SILT; 10-20% Sand-VF <10% Clay	ML		0.0			
	4		1							0.0			
	5		1							0.0			
	6		1	2.0-6.5	Loose	Brown	SAND-VF 15-25% SILT	SM		0.0			
	7		1	6.5-7.0	Firm	Gray	SILT AND CLAY	ML/CL		0.4			
	8		3.5/5	7.0-8.75	Firm	Gray	SILT (20-35% Clay)	ML		4.8			
	9		1	8.75-9.25	Firm	Gray Green	CLAY	CL		12.2			
	10		1	9.25-10.0	Firm	Gray	SILT AND CLAY	ML/CL		21.8			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF=Very Fine
9.5-10.0' Flute Liner staining

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		
5. REMARKS: PAT 55-50-D Pumped Grout From Bottom To Top		

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) 10 ft. Date Started: 7-26-10 Date Completed: 7-26-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: CERT. NO.: 1461
Address: (Print) DEARAL RODGERS
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Level: A (B) C D (circle one)
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site - SS
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI - SS-SO-12
DATE: 07/26/10
GEOLOGIST: Chuck Sorden
DRILLER: Dearal Rogers

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**
	1		1	0-0.75	Loose	Dark Brown	SILT; 30-40% Organics 25-30% Clay	ML		0.0			
	2		1	0.75-1.25	Loose	Black	Pellets (Fill-spent coal) "Clinker", Con 10-30% Silt and SAND sized particles.	GW/GP		0.0			
	3		4/5							0.0			
	4		1							0.0			
	5		1							0.0			
	6		1							0.0			
	7		1							0.0			
	8		4/5	1.25-8.25	Firm	Tan Brown	SAND-UF; 15-35% Silt; greater amounts @ 4 ft bgs at Bottom	SM		0.0			
	9		1	8.25-8.50	Firm	Brown	SILT AND CLAY	ML/CL		4.6			
	10		1	8.5-9.5	Firm	Gray Green	CLAY	CL		5.0			
				9.5-10.0	Firm	Gray	SILT AND CLAY	ML/CL					

* 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. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI 55-50-12 Pumped Grout From Bottom To Top

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: 7-26-10
10 ft. Date Completed: 7-26-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: CERT. NO.: 1461
Address: (Print) DEARAL RODGERS
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Level: A (B) C D (circle one)
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
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: Parris Island Site - SS
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI-SS-SO-11
DATE: 07/25/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1	0-1.0	Loose	Dark Brown	SILT; 20-30% Clay and Organics	ML/OL	Grass at surface	0.0			
	2		1	1-1.25	Loose	White/ Gray	Oyster Shell fragments (60%) 20% Silt, Clay and trace UF Sands	GM		0.0			
	3		4/5	1.25-2.0	Loose	Dark Brown	SILT; 20-30% Clay and Organics <10% UF Sand	ML/OL		0.0			
	4									0.0			
	5									0.0			
	6		1	2.0-6.0	Firm	Tan: Lt. Brn	SAND-UF; 10-25% Silt	SM		4.7			
	7									2.8			
	8		3/5	6.0-8.0	Stiff	Gray Green	CLAY (6.0-6.25 - Silty Clay)	CL		50.6			
	9			8.0-8.25	Firm	Gray	SILT AND CLAY	ML/CL		344			
	10			8.25-10.0	Firm	Gray	SILT 15-30% Clay	ML		217			

* 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: VF = Very Fine Soil Staining Noted Above Clay layer in Sand/Silty Clay layers. Positive Flute liner indication @ 9' Bgs

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: 55-50-11
Pumped Grout From Bottom To Top

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: 7-25-10
10 ft. Date Completed: 7-25-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 55
PROJECT NUMBER: 112G02HOLe
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 55-SO-14C-
DATE: 3/6/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4/5		loose	Brn	Asphalt, shell fragments at top SAND(VF)	SP		0.0			
						orange				0.0			
										0.0			
						Lt Brn				0.0			
5										0.0			
			3/5							0.0			
					St.ff.	Blue-gray Gray	CLAY mottled	CL		0.0			
					med st.ff	orange lt. Br	SAND(VF)	SP	wet	0.0			
										0.0			
10										0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Step out North of 14B

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: SS-50-14C
Pumped Grout From Bottom To Top

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: 8-6-10
10 ft. Date Completed: 8-6-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 55
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 55-SO1ØB
DATE: 8/5/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4/5		Hard loose	Blk Brn	Asphalt Gravelly SAND w/ silt	SP		0.0			
						Brn	↓			0.0			
						Brn	VF SAND	SP		0.0			
						Lt. Brn/orange				0.0			
5									moist	0.0			
			2/5							0.0			
						orange				0.0			
						Blue	CLAY mottled	CL		0.0			
					Stiff	Gray orange	↓			0.0			
10					med Stiff	↓	Silty SAND	SM	Wet	0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: 0-1 VOC Fizzed/Bubbled w/Sodium Bisulfate
Step out North

Drilling Area Background (ppm): 0-0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: 55-50 10 13 Pumped Grout From Bottom TO TOP

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: 8-5-10
10 ft. Date Completed: 8-5-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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] Date: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 55
PROJECT NUMBER: 112G0240Le
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 55-SO 10A
DATE: 8/4/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4.5/5		loose	Brn	SAND (VF) w/ little silt	SP	Grass at surface	0.0			
						Orange Brn	SAND (VF)	SP		0.0			
						orange				0.0			
						Hbrn				0.0			
5										0.0			
			4.5/5						moist	0.0			
					stiff	Orange Gray	CLAY (mottled)	CL		0.0			
					loose	Tan Gray	SAND (VF)	SP	Wet	0.0			
										0.0			
10										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): 0.0

Remarks: Flute = ND
Step-out North

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: SS - SO - 10A
Pumped Grout From Bottom To Top

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: 8-4-10
10 ft. Date Completed: 8-4-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-SS-SO-10
DATE: 07/24/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1			0-1	Loose/Firm	DK Brn	SILT; 25-35% Clay; 2-5% organics	ML	Grass at surface	0.0			
	2		1							0.0			
	3		5/5							0.0			
	4									0.0			
	5									0.0			
	6		1	1.0-6.0	Firm	Tan	SAND-VF; 10-20% Silt;	SM		0.0			
	7		1	6.0-7.5	Firm	Gray Green	CLAY	CL		0.0			
	8		4/5							0.3			
	9			7.5-9.0	Firm		SILT AND CLAY	ML/CL		11.3			
	10			9.0-10.0	Loose		SILT 15-20% VF Sand ~5-10 Clay	ML		73			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: PLUTe = NP

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI 55-30-10 Pumped Grout from bottom to top

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: 7-24-10
10 ft. Date Completed: 7-24-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site - 55
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI - SS-SO - 09
DATE: 07/25/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1								Grass at Surface	0.1			
	2			0-2	Loose	Brown; DK Brown	SILT; <15% VF Sand; 10-15% Clay and Organics	ML		0.2			
	3		3.5/5	2.0-3.0	Loose	Light Tan	SAND-VF; 10% Silt	SM		0.3			
	4									0.4			
	5			3.0-5.5	Loose	Brown	SAND-VF; 10-15% SILT	SM		9.4			
	6			5.5-6.0	Firm	Dark Brown	SILT; 10-25% Clay; <10% VF Sand	ML		20.3			
	7									35.1			
	8		2.5/5.0	6.0-8.5	Stiff	Gray Green	CLAY; Silty Clay @ upper portion of unit	CL		8.4			
	9								Recollected on separate core	162.0	40.8		
	10			8.5-10.0	Stiff	Gray	SILT AND CLAY	ML/CL	172	17.8			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: 55-30-09
Placed out from Butler Rd
TOP

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: 7-25-10
10 ft. Date Completed: 7-25-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: _____
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: _____ Diam.: _____
Slot/Gauge: _____ Length: _____
Set Between: _____ ft. and _____ 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 _____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site -
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI-SS-SO-08
DATE: 07/25/10
GEOLOGIST: Chuck Sorden
DRILLER: Bill Gwinn

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**
	1		1	0.5-1.0	Firm	Lt Brown	SILT AND UFSAND; 10-15% Clay	ML	Asphalt at surface	1.1			
	2		1	1.0-1.5	Firm	Dark Brown	SILT; <10% UFsand and Clay	ML		0.5			
	3		3/5							0.4			
	4									0.3			
	5									0.2			
	6									0.4			
	7									0.3			
	8		3/5	1.5-8.0	Firm	Lt. Brown	SAND-UF 10-30% SILT; Silt amts greater in lower unit	SM		0.5			
	9			8.0-9.0	Stiff	Gray Green	CLAY	CL		0.5			
	10			9.0-10.0	Firm	Gray	SILT AND CLAY	ML	1.6	1.6			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: UF=Very Fine

Drilling Area Background (ppm):

Converted to Well: Yes _____ No _____ Well I.D. #: _____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: SS-30-08
Pumped Grout from Bottom to Top

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: 7-25-10
10 ft. Date Completed: 7-25-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 55
PROJECT NUMBER: 112G02400
DRILLING COMPANY: ACM
DRILLING RIG: DPT
BORING No.: 55-SO07A
DATE: 8/4/10
GEOLOGIST: S. Hill
DRILLER: B Ewing

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			3.5/5		loose	Brn	Silty SAND	SP/SM	Grass/Pine Straw + surface	16.1			
						Brn/Org	VF SAND	SP	Dry	12.0			
						lt Brown				2.4			
									moist	0.3			
5										0.0			
			3.5/5			Brn				1.7			
										0.6			
						~~white~~ ~~brown~~ orange				0.0			
					stiff	~~Org~~	CLAY mottled	CL	moist	0.0			
10					med stiff	↓	SAND w/some silt	SM	wet	0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Flute = ND
Step out southwest

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: SS-50 074 Pumped Grout from Bottom To Top

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: 8-4-10
10 ft. Date Completed: 8-4-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: ____ Well Driller Date: 11-5-10

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site - SS
PROJECT NUMBER: 112 G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI - SS-SO-07
DATE: 07/25/10
GEOLOGIST: Chuck Sorden
DRILLER: Bill Ewing

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**
	1		1						Grass and Pine Straw at surface	1.8			
	2		1	0-2.0	Loose	Brown/ Dark Brown	SILT; 10-20% Sand-VF) Clay and organics	ML	0.0	1.8			
	3		4/5							0.0			
	4		1							0.0			
	5		1							0.5			
	6		1	2.0-6.0	Firm	tan/ Brown	SAND-VF; 20-30% Silt	SM		0.0			
	7		1							8.9			
	8		5/5	6.0-8.0	Stiff	Gray/Green	CLAY	CL		31.5			
	9		1							88.9			
	10		1	8.0-10.0	Firm	Gray	SILT AND CLAY	ML/CL		4.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF= Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI 55-50-07 Pumped Gravel From Bottom To Top

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: 7-25-10
10 ft. Date Completed: 7-25-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: ____ Well Driller Date: 11-5-10

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site
PROJECT NUMBER:
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-SS-SO-06
DATE: 07/24/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1	0.5-1.0	Firm	Dark Brn	SAND-VF ANDSILT 10-25% Clay	SM	Asphalt 0-0.5	0.0			
	2		1							0.0			
	3		3.5/5							0.0			
	4		1							0.0			
	5		1	1-5.25	Firm	Tan	SAND-VF 10-20% SILT <10% Clay, in upper; 20-30% Bottom	SM		0.0			
	6		1							0.0			
	7		1							0.0			
	8		4/5	5.25-8.0	Stiff	Gray Green	CLAY; 10-20% Silt @ Base of unit	CL		0.0			
	9		1							0.0			
	10		1	8.0-10.0	Loose	Tan	SILT; 25-35% Clay	ML		0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: FLUTC = ND

Drilling Area Background (ppm): 0.0

Converted to Well: Yes _____ No _____ Well I.D. #: _____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI 55-50-05 Pumped Grout From Bottom To Top

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: 7-24-10
10 ft. Date Completed: 7-24-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
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)**

BORING LOG

Tetra Tech NUS, Inc.

Page ___ of ___

PROJECT NAME: Parris Island - Site
PROJECT NUMBER: 112G0240[illegible]6
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-SS27-SO-05
DATE: 07/23/10
GEOLOGIST: Chuck Sorder
DRILLER: Billy Ewing

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**
	1			Loose	0.5-1.5	Dk Brn	SILT; ~~[illegible]~~ 10-20% Clay	ML	Asphalt at Surface	0.0			
	2		1							0.0			
	3		3.5/5							0.0			
	4									0.0			
	5			Firm	1.5-5.0	Tan	SAND-VF; 10-20% SILT	SP		0.0			
	6		1	5.0-6.25	Firm	Gray Green	SILT AND (30-40%) Clay	ML/CL		0.0			
	7									1.3			
	8			6.25-8.0	Stiff	Gray	CLAY	CL		0.6			
	9									62.6			
	10			8.0-10.0	Firm	Gray	SILT AND (30-45%) Clay	ML/CL	Sheen 9-10'	90.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very Fine
SILTE = AND

Drilling Area Background (ppm): 0.0

Converted to Well: Yes _____ No X Well I.D. #: _____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI 55 50-05 Pumped Grout From Bottom To Top

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: 7-27-10
10 ft. Date Completed: 7-27-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island – Site SS
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI-SS-SO-04
DATE: 07/22/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1	0.5-1.0	Loose	Red Brn	SAND-UF; (10-20%) Silt; Less than 10% Clay	SP	Asphalt-0-0.5'	0.0			
	2		1							0.0			
	3		4/5	1.0-3.0	Loose	Brn.	SAND AND (35-45%) Silt	SM		0.0			
	4		1							0.0			
	5		1							0.0			
	6		1	3.0-6.0	Firm	Lt. Brn	SAND-UF and SILT (30-40%)	SM		0.0			
	7		1	6.0-6.5	Firm	Lt. Brn	SILT AND (30-35%) CLAY	ML/CL		8.0			
	8		5/5	6.5-8.0	Firm	Gray Green	CLAY <10% Silt	CL		11			
	9		1							22.6			
	10		1	8.0-10.0		Gray Green	Silt; 25-40% CLAY; Clay Content varies	ML/CL		7.8			

* 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): 0.0

Remarks: UF = Very Fine
~9-10' Bgs — Flute Liner indicated positive result

Converted to Well: Yes _____ No X Well I.D. #: _____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		
5. REMARKS: PAI 55-50-04 Pumped Grout From Bottom To Top		

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: 7-22-10
10 ft. Date Completed: 7-22-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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] Date: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site 55
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-SS-SO-03
DATE: 07/23/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1								Asphalt - 0-0.5'	0.0			
	2			0.5-2.0	Loose	Brown	SAND-VF; 10-20% silt; <10% clay	SP/SM		0.0			
	3		3/5							0.0			
	4									0.0			
	5			3.0-5.75	Firm	Tan	SAND-VF; 30-40% silt 10-15% clay	SM		0.0			
	6									0.4			
	7			5.75-7.5	Stiff	Gray Green	CLAY; <10% silt	CL		6.7			
	8		4/5							37.2			
	9									6.2			
	10			7.5-10.0		Gray	SILT; 10-20% VF Sand and Clay	ML		5.1			

* 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: VF = Very Fine
C-1 = MS/MSD Collected
FLUTE Detection @ 6' and 8'

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAE 55-30-07 pumped Grout From Bottom To Top

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: 7-23-10
10 ft. Date Completed: 7-23-0

10. CASING: ☐ Threaded ☐ Welded
Diam.: _____
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: _____ Diam.: _____
Slot/Gauge: _____ Length: _____
Set Between: _____ ft. and _____ 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 _____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 55
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 55 - SO02 A
DATE: 8/4/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			3/5		Hard	Blk	Asphalt			0.0			
					loose	Brn	VF SAND	SP	Dry	0.0			
						Lt Brn				0.0			
						orange/Lt Brn			Moist	0.0			
5										0.0			
			4.5/5						Saturated	0.1			
					Stiff	Blue Gray/Lt Brown	CLAY mottled	CL	moist	0.0			
										0.0			
					med Stiff		VF SAND w/ little Silt	SP	saturated	0.0			
10										0.4			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Flute = ND
Step-out West toward pond

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: 55-5002A Pump al Grout From Bottom to Top

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: 8-4-10
10 ft. Date Completed: 8-4-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-SS-SO-02
DATE: 07/23/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1								Asphalt 0-0.3'	0.0			
	2		1							1.6			
	3		33/5							0.0			
	4									0.1			
	5			0.5-5.0	Loose	Tan Lt. Brn	SAND AND (30-45%) SILT; <10% Clay	SM		0.0			
	6		1	5-5.75	Loose	Tan Lt Brn	SAND AND (30-45%) SILT; <10% Clay	SM		0.0			
	7									96.3			
	8			5.75-8.0	Stiff	Gray w/Brn	CLAY; <10% Silt	CL		38.9			
	9									13.5			
	10			8.0-10.0	Loose	Gray Green	SILT; 10-15% VF Sand and Clay	ML		4.1			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very Fine
*Lute - ND

Drilling Area Background (ppm): 0.0

Converted to Well: Yes _____ No X Well I.D. #: _____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI SS-50-02 pumped Grout From Bottom To Top

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: 7-23-10
10 ft. Date Completed: 7-23-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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] Date: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-SS-SO-01
DATE: 07/23/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1			0-0.5	Loose	Brown	SAND AND (30-40%) SILT 30% Organics	SM	Grass at Surface	0.0			
	2		1							0.0			
	3		4/5							0.0			
	4									0.0			
	5						20-30%			0.0			
	6		1	0.5-6.0	Firm	tan	SAND-UF; ~~30-40%~~ SILT 10-20% Clay	SM		0.0			
	7			6.0-6.25	Firm	Tan	SILT AND (30-40%) CLAY	ML/CL		0.0			
	8		4/5	6.25-8.25	Stiff	Gray Green	CLAY; <10% silt	CL		0.0			
	9									0.0			
	10			8.25-10.0	Firm	Gray Brown	SILT; Little (20-35%) Clay <10% UF Sand	ML		0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Dup @ D-1 UF = Very Fine
FLUTE Liner = NON-Detect

Drilling Area Background (ppm): 0.0

Converted to Well: Yes _____ No _____ Well I.D. #: _____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI SS-50-01 Pumped Grout From Bottom To Surface

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: 7-23-00
10 ft. Date Completed: 7-23-00

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-00
Well Driller

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-48
DATE: 07/22/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1						Asphalt 0-0.5ft.	0.0			
	2		1							0.0			
	3		3/5	0.5-3.0	Loose	Brn.	SAND-VF Little (11-20%) Silt; trace (<10%) clay	SP		0.0			
	4		1	3.0-4.75	Loose	tan	SAND-VF Some (20-30%) Silt	SP		0.0			
	5		1	4.75-5.0	Firm	Red Brn	SILT; Little (~20%) Clay trace (<10%) VF Sand	ML		0.0			
	6		1							32.2			
	7		1							3.7			
	8		3.5/5	5.0-8.0	Firm	Gray Green	CLAY; <10% Silt	CL		0.0			
	9									0.0			
	10		1	8.0-10.0	Firm	Gray	SAND-VF AND (30-45%) SILT; 10-20% Clay	SM/SC		0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very Fine
Flute = ND

Drilling Area Background (ppm): 0.0

Converted to Well: Yes _____ No X Well I.D. #: _____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI -27- 50 48
Pumped out from bottom to surface

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: 7-22-60
10 ft. Date Completed: 7-22-60

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-60
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: ~~#26~~ Parris Island Site 27
PROJECT NUMBER: 112G0240
DRILLING COMPANY: ARW
DRILLING RIG: DPT
BORING No.: 27-S045B-
DATE: 8/3/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4/5			Lt Brown/orange	Asphalt SAND(VF)/T-Clay	SP		0.7			
					loose	Brn	SAND(VF)	SP		0.1			
										0.0			
						Lt Brn			moist	0.1			
5						Brn	SAND w/ little clay	SP		0.0			
			4/5							0.0			
					Stiff	Gray Brown orange	CLAY mottled		Stiff	0.0			
										0.0			
					med stiff		SILT & SAND	ML/SM	wet	0.0			
10										0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: 50' North of 45 - Step out

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: 27-SO 45B
Pumped Grout From Bottom TO Top

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: 8-3-10
10 ft. Date Completed: 8-3-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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] Date: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 27-S045A
DATE: 8/3/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4/5		loose	black Asphalt Tan to orange	SAND (VF)	SP	Moist to Dry	0.0			
							↓			0.0			
										0.0			
										0.0			
5					stiff	orange Gray R. Brn	CLAY mottled	CL		0.0			
			4/5				↓			0.0			
					loose		SAND w/ little SILT	SP	Wet	0.0			
							↓			0.0			
										0.0			
10							↓			0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Set out boring from c/5 - West toward the pond

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: 27-30 45A pumped out from bottom to surface

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: 8-3-10
10 ft. Date Completed: 8-3-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-45
DATE: 07/23/10
GEOLOGIST: Chuck Sorden
DRILLER: Bill Ewing

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**
	1								Asphalt at Surface	0.0			
	2		1	0.5-2.75	Loose	Brn	SAND-VF; Some (20-30%) Silt; <10% Clay	SM		0.0			
	3		3/5							0.0			
	4			2.75-4.5	Firm	Gray Brn	SAND-VF; Some (20-30%) Silt; 10-20% Clay	SM		0.0			
	5			~~2.75~~-4.5-5.5	Firm	Tan	~~SAND-VF~~ SILT AND CLAY (30-45%)	ML/CL		0.0			
	6		1							0.0			
	7									0.0			
	8		4.5/5	5.5-8.0	Stiff	Gray Green	CLAY; <10% Silt (none)	CL		0.0			
	9									0.0			
	10			8-10	Firm	Gray Rust	SILT AND (30-45%) CLAY	ML/CL		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): 0.0

Remarks: VF = Very Fine
Duplicate - 0-1' Bgs

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI 27-50-45 Pumped Grout From Bottom To Surface

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: 7-23-10
10 ft. Date Completed: 7-23-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: ____ Well Driller Date: 11-5-10

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site 27
PROJECT NUMBER: 112G-02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-44
DATE: 07/22/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1	0.5-1.0	Loose	Brn	SAND-VF; 20-30% Silt	SP	Asphalt-0-0.5'	0.0			
	2		1							0.0			
	3		3.5/5							0.0			
	4		1							0.0			
	5		1	1.0-5.0	Loose	tan/Lt. Brn.	SAND AND (30-40%) Silt (Silty Sand)	SM		0.0			
	6		1	5.0-6.0	Loose	Red Brn	SAND-VF; 20-30% Silt; Little (10-20%) clay	SM/SC		0.0			
	7		1							8.2			
	8		4/5	6.0-8.5	Stiff	Gray Green	CLAY; <10% Silt	CL		7.6			
	9		1							10.5			
	10		1	8.5-10	Firm	Gray	SAND-VF AND (35-45%) ~~SILT~~ SILT; 10-20% Clay	SM		9.6			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very Fine
@ 7.5' BGS, FLUTE Liner has positive result

Drilling Area Background (ppm): 0.0

Converted to Well: Yes _____ No X Well I.D. #: _____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI 27-50-44 Pumped Grout From Bottom To Surface

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) 10 ft. Date Started: 7-22-10 Date Completed: 7-22-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: ____ Well Driller Date: 11-5-10

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island-Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI-27-SO-43
DATE: 07/22/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1	0.5-1	Loose	Brown	SAND-VF; Little	SP	Asphalt-0-0.5'	0.0			
	2									0.0			
	3		4/5							0.0			
	4									0.0			
	5									0.0			
	6		1	1-6	Loose	tan/ lt. Brn	SAND-VF AND SILT (30-40%)	SP/SM		0.0			
	7		4/5	6-7.5	Firm	Gray Green	CLAY	CL		0.0			
	8									0.0			
	9									0.0			
	10			7.5-10	Firm	Gray Green	SILT; trace (<10%) clay	ML		0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes _____ No X Well I.D. #: _____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI 27-50-43 Pumped Grout From Bottom To Surface

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: 7-22-10
10 ft. Date Completed: 7-22-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island – Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-42
DATE: 07/21/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1								Grass at surface	0.0			
	2			0-2.0	Loose	Brn	SAND-VF; 10-20% Silt Some roots	SP		0.0			
	3		2.5/5							0.0			
	4			2.0-4.0	Loose	Tan	SAND-VF; 20-30% Silt	SM		0.0			
	5			4.5-5.5	Stiff	Med Brn	CLAY AND (30-40%) SILT (Silty Clay)	CL/ML		0.0			
	6			5.5-6.5	Stiff	Gray Green	CLAY; <10% Silt	CL		0.0			
	7									0.0			
	8		3.5/5							0.0			
	9									0.0			
	10			6.5-10.0	Loose	Gray	SAND-VF; 20-35% Silt; <10% Clay	SM		0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes _____ No X Well I.D. #: _____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI-27-50-42
Pumped Grout From Bottom to Surface

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: 7-21-10
10 ft. Date Completed: 7-21-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island-Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 8720 DT

BORING No.: PAI-27-SO-41
DATE: 07/21/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1								Grass at Surface	0.0			
	2		1							0.0			
	3		3/5	0-3.0	Loose	Brn.	SAND-VF; 20-30% Silt <10% Clay	SP/SM		0.0			
	4									0.0			
	5		1							0.0			
	6			3.0-6.0	Firm	Red Brn	CLAY AND (~40%) SILT	ML/CL		0.0			
	7		1							0.0			
	8		5/5							0.0			
	9			6.0-9.0	Firm	Gray Green	CLAY; ~20% Silt	CL		0.0			
	10		1	9.0-10.0	Firm	Orange Brn	SILT; 10-20% Clay; <10% VF Sand	ML		0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 8 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF=Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI 27-50-41
Pumped water from Bottom to Surface

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: 7-21-10
10 ft. Date Completed: 7-21-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: ____ Well Driller Date: 11-5-10

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island – Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-40
DATE: 07/21/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1							0.0			
	2		1	0.5-2.0	Firm	Red Brn	SAND; 10-20% Silt; <10% Clay	SP/SM	Asphalt 0-0.5	0.0			
	3		3.5/5	2.0-2.75	Loose	Brn.	SAND-VF (10-20%) Silt	SM		0.0			
	4		1	2.75-4.5	Loose	Tan	SAND-VF; 30-40% Silt	SM		0.0			
	5		1	4.5-5.75	Firm	Red Brn	SILT AND (35-45%) Clay <15% VF Sand	ML/CL		0.0			
	6		1							0.0			
	7		1							0.0			
	8		3.25/5	5.75-8.5	Firm	Gray Green	CLAY; <10% Silt	CL		0.0			
	9		1							0.0			
	10		1	8.5-10.0	Firm		SAND-VF; 30-40% Silt and Clay (Sandy Loam)	CL/ML		0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes _____ No X Well I.D. #: _____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI 27-50-40 Pumped Grout From Bottom TO Surface

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: 7-21-10
10 ft. Date Completed: 7-21-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-39
DATE: 07/24/10
GEOLOGIST: Chuck Sorden
DRILLER: Bill Ewing

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**
	1			0.5-1.5	Loose	Dk. Brn	SAND-VF AND SILT 10-15% Clay	ML	Asphalt 0-0.5'	0.0			
	2		1							0.0			
	3		3/5							0.0			
	4			0.5-4.5	Loose	Tan	SAND-VF; 10-20% Silt <10% Clay	SM		0.0			
	5			4.5-5.5	Firm	Brn	SILT AND CLAY	ML/CL		0.0			
	6									0.0			
	7		1	5.5-7.5			CLAY; 10-25% Silt	CL		0.0			
	8		3.5/5							0.0			
	9									0.1			
	10			7.5-10.0			SILT; 20-30% Clay <10% VF Sand	ML		2.6			

* 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: VF: Very Fine
Potential Detection @ 3' on FLUTE

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI 27-5039 Pumped Grout From Bottom To Surface

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: 7-24-10
10 ft. Date Completed: 7-24-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 27-SO38A
DATE: 8/3/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4/5		loose	~~Black HBrown~~ HBrown	SAND vf - little	SP	Asphalt top	0.0			
						Brown	T-S, it			0.0			
						HBrown gray				0.0			
					Stiff	Brown gray brown	CLAY - mottled	CL		0.0			
5										0.0			
			5/5							0.0			
										0.0			
										0.0			
										0.0			
10					med Stiff		SILT w/some sand & little clay	ML	wet DM	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): 0.0

Remarks: Flute SND
Step-out boring toward Pond (West)

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: 27-50384
Pumped Grout From Bottom to Surface

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: 8-3-10
10 ft. Date Completed: 8-3-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-30-38
DATE: 07/24/18
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewings

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**
	1			0.5-1.5	Firm	Brown	SILT; 10-30% Clay	ML	Asphalt 0-0.5'	0.0			
	2		↑							0.0			
	3		35/5							0.0			
	4									0.0			
	5		↓							0.0			
	6		↑	1.5-6.0	Loose	Tan Brown	SAND-UF AND SILT; (10-30% clay	SM		0.0			
	7									0.0			
	8			6-8.25	Firm	Gray Green	CLAY 10-15% SILT Green 8-8.25'	CL		0.0			
	9		↓							0.1			
	10			8.25-9.90	Loose	Gray	SILT; 10-20% Clay	ML		0.0			
				9.90-10	Firm	Rust Brown	SILT AND CLAY	ML/CL					

* 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: VF = Very Fine
Possible FLUTE Liner Detection @ 4'

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI 27-50-38 Pumped Grout From Bottom To Surface

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: 7-24-10
10 ft. Date Completed: 7-24-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island – Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720 DT

BORING No.: PAI-27-SO-37
DATE: 07/21/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1						Asphalt 0-0.5' Bgs	0.0			
	2		1							0.0			
	3		3.5/5	0.5-3.0	Loose	Lt. Brn	SAND-VF; 10-20% Silt; <10% Clay	SP/SM	Woody later ~3.5'	0.0			
	4		1	3.0-3.75	Loose	Gray	SAND-VF; <10% Silt	SP		0.0			
	5		1	3.75-4.5	Loose	Lt. Gray	SAND-VF; ~15% Silt	SM		0.0			
	6		1	4.5-5.0	Loose	Orange Brn	SAND-VF; 10-20% Silt and Clay	SM		0.0			
	7		1	5.0-6.5		Orange Brn.	SAND AND (35-45%) Silt; 20-30% Clay	SM/SC		0.0			
	8		4/5	6.5-8.75	Firm	Gray Green	CLAY; <10% Silt	CL		0.0			
	9		1	8.75-9.5	Firm	Gray Green	CLAY AND (30-45%) SILT	CL/ML		0.0			
	10		1	9.5-10.0	Firm	Gray	SILT; Some Clay (25-35%	ML/CL		0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAE-27-50-37 Pumped Grout From Bottom To Surface

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: 7-21-10
10 ft. Date Completed: 7-21-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site 27
PROJECT NUMBER: 112G08406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-36
DATE: 07/22/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1		1	0.5-1	Firm	Red Brn.	SAND-VF; Some (20-30%) Silt / Trace (<10%) Clay	SM	Asphalt - 0.0-0.5'	0.0			
	2		1	0.5-0.75	Stiff	Gray	CLAY AND SILT (35-45%) trace (<10%) VF Sand	CL/ML		0.0			
	3		4/5							0.0			
	4		1	0.75-4.0	Loose	Gray/ Brn	SAND-VF; Little (10-20%) Silt; trace (<10%) Clay	SP		0.0			
	5		1	4.0-5.0	Stiff	Rust Brn.	CLAY; Trace (<10%) Silt	CL		0.0			
	6		1	5-5.5	Loose	Rust Brn	CLAY; Some (20-30%) Silt (Silty Clay)	CL/ML		0.0			
	7		4/5							0.0			
	8									0.0			
	9									0.0			
	10			5.5-10.0	Firm	Gray Green	CLAY; Trace (<10%) Silt	CL	Rust Brown areas throughout	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): 0.0

Remarks: UF = Very Fine

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI-27-SO-36
Pumped Grout From Bottom
To Surface

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: 7-22-10
10 ft. Date Completed: 7-22-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island – Site 27
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-35
DATE: 07/21/10
GEOLOGIST: Chuck Sorden
DRILLER: Billy Ewing

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**
	1			1						0.0			
	2		1	0.5 – 2.25	Loose	Red Brn.	SAND-VF; 10-20% Silt; trace (<10%) clay	SP/SM	Asphalt – 0-0.5' Bgs	0.0			
	3		3/5	2.25 – 3.75	Firm	Gray	SAND-VF; 20-30% Silt; 5-15% Clay	SM/SC		0.0			
	4									0.0			
	5			3.75 – 5.0	Loose	Gray	SAND-VF; 10-20% Silt/Clay	SM		0.0			
	6									0.0			
	7									0.0			
	8		4/5	5.0 – 8.75	Firm		CLAY – <10% Silt; trace VF Sand (<10%)	CL		0.0			
	9									0.0			
	10			8.75-10.0	Firm		CLAY; 15-20% Silt	CL		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): 0.0

Remarks: VF= Very Fine

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAT-27-50-35 Pumped Grout From Bottom To Surface

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: 7-21-10
10 ft. Date Completed: 7-21-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island - Site
PROJECT NUMBER: 112G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SG-34
DATE: 07/24/10
GEOLOGIST: Chuck Sorder
DRILLER: Bill Ewing

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**
	1			0.5-1.5	Firm	OK Brown	SILT; some (30-40) Clay, and (~~[illegible]~~ 5%) organics	ML/OL	Asphalt-0-0.5	0.0			
	2		1	1.5-2.0	Firm	Brown	SAND-VF, (20%) SILT 10-20% Clay	SM		0.0			
	3		4/5	2.0-2.25	Firm	Brown	SILT AND CLAY	ML/CL		0.0			
	4			2.5-3.25	Stiff	Gray Green	CLAY; 10-15% SILT	CL		0.0			
	5			3.25-4.0	Stiff	Gray Green	SILT and CLAY	ML/CL		0.0			
	6		1							0.0			
	7									0.0			
	8		5/5							0.0			
	9									0.0			
	10			4.0-10.0	Stiff	Gray Green	CLAY; <10% SILT	CL		0.0			
	11		1							0.0			
	12			10.0-12.0	Firm	Gray	SILT; 10-20% Clay	ML		0.0			
	13		3.5/5	12-13	Stiff	Gray Green	CLAY; 20-30% Silt	CL		0.0			
	14									0.0			
	15			13.0-15.0	Firm	Gray	SILT; 10-20% Clay	ML		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): 0.0

Remarks: VF = Very Fine
Duplicate From 0-1' Bgs

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 15 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI-27-SO 34 Pumped Grout From Bottom to Surface

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: 7-24-10
15 ft. Date Completed: 7-24-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

BORING LOG

Tetra Tech NUS, Inc.

PROJECT NAME: Parris Island – Site 27
PROJECT NUMBER: 112 G02406
DRILLING COMPANY: ARM Environmental
DRILLING RIG: Geoprobe 7720DT

BORING No.: PAI-27-SO-33
DATE: 07/21/10
GEOLOGIST: Chuck Serden
DRILLER: Billy Ewing

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**
	1								Grass/Pine Straw at surface	0.0			
	2			0-2.75	Loose	Dk. Brn	SAND-VF; 10-20% Silt; <10% Clay	SP/SM		0.0			
	3		4/5							0.0			
	4			2.75-4.5	Firm	Green Gray	SAND-VF; 20-30% Silt	SM		0.0			
	5									0.0			
	6			4.5-6.5	Firm	Gray Green	SILT; 20-35% Clay, 35-45% VFSand	SM/SC		0.0			
	7			6.5-7.0	Firm	Gray Green	SILT 15-20% Clay	ML		0.0			
	8		5/5							0.0			
	9									0.0			
	10			7.0-10.0	Firm	Green Gray	CLAY; 8-15% Silt	CL		0.0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: VF = Very Fine

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: PAI-27-5033 Pumped Grout From Bottom To Top

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: 7-21-10
10 ft. Date Completed: 7-21-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 9/12
PROJECT NUMBER: 112G02688
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 9/12-SO06
DATE: 8/5/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4'			Brn	Silty SAND	SM	Grass on Top	0.0			
						Lt Brn	VF SAND	SP		0.0			
										0.0			
										0.0			
5									Moist	0.0			

* 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. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 5 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: 9/16 5006 Pumped Grout From Bottom To Surface

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: 8-5-10
5 ft. Date Completed: 8-5-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 9/16
PROJECT NUMBER: 112G02688
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 9/16/-SO05
DATE: 8/5/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4'			Brn	Silty SAND	SM	Grass on top	0.0	0		
						lt Brn	VF SAND	SP		0.0	0		
						orange Brn				0.0	0		
						lt Brn				0.0	0		
5						↓	↓			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:

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 5 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: 9/16-5005 Pumped Grout From Bottom To Surface

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: 8-5-10
5 ft. Date Completed: 8-5-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 9/16
PROJECT NUMBER: 112G02188
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 9/16 - SO04
DATE: 8/5/10
GEOLOGIST: S. Hill
DRILLER: B. Ebony

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			4			Dk Brn	Silty SAND FILL @ 0.5 (Asphalt)	Sm	Grass on top Dry	0.0			
						Lt Brn	SAND	SP	moist	0.0			
							↓			0.0			
						Brn / Lt Brn	↓			0.0			
5							CLAY w/ little sand	CL		0.0			

* 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. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 5 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: 9/16 50 04
Pumped Grout From Bottom To surface

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: 8-5-10
5 ft. Date Completed: 8-5-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 9/16
PROJECT NUMBER: 112G02688
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 9/16-SO03
DATE: 8/5/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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						H. Brn	Gravelly SAND	SP	Grass at surface	0.0			
						BRN	VF SAND			0.0			
										0.0			
										0.0			
5									wet	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): 0-0

Remarks: D-1 Sizzled / bubble w/sodium Bisulfite

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 5 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		
5. REMARKS: 9/16 50 03		

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: 8-5-10
5 ft. Date Completed: 8-5-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: ____
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: ____ Diam.: ____
Slot/Gauge: ____ Length: ____
Set Between: ____ ft. and ____ 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 ____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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] Date: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 9/16
PROJECT NUMBER: 112G02685
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 9/16-SO01
DATE: 8/5/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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						Brn	Silty SAND (VF)	SM	Grass at TOP	0.0			
							VF SAND	SP		0.0			
						Med Brn				0.0			
									moist	0.0			
5						Brn				0.0			
									Saturated	0.0			
										0.0			
										0.0			
						Orange				0.0			
10						Blue Gray	CLAY	CL		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): 0.0

Remarks:

Converted to Well: Yes ____ No X Well I.D. #: ____

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: U.S. Marine Corps (last) (first)
Address: Parris Island
City: Beaufort State: SC Zip:
Telephone: Work: Home:

2. LOCATION OF WELL: **COUNTY:** Beaufort
Name: MCRD
Street Address: Parris Island
City: Beaufort Zip:
Latitude: 189.184.01 Longitude: 2.094.979.54

3. PUBLIC SYSTEM NAME: N/A **PUBLIC SYSTEM NUMBER:** N/A

4. ABANDONMENT: ☑ Yes ☐ No
Grouted Depth: from 0 ft. to 10 ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see boring log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS: 9/16 - 50 #1 Pumped grout from bottom to surface

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: 8-5-10
10 ft. Date Completed: 8-5-10

10. CASING: ☐ Threaded ☐ Welded
Diam.: _____
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: _____ Diam.: _____
Slot/Gauge: _____ Length: _____
Set Between: _____ ft. and _____ 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 _____ 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: Billy Ewing **CERT. NO.:** 1505(B)
Address: (Print) Level: A B C D (circle one)
ARM Environmental Svcs, P.O. Box 50285
Columbia, SC 29250
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: 11-5-10
Well Driller

If D Level Driller, provide supervising driller's name:

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: NAVFAC, SE Naval Air Station, JAX (last) (first)
Address: Installation Restoration SC IPT-PO Box 30
City: North Ajax St Bldg 135 State: FL Zip: 32212
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD Parris Island-NREAO
Street Address: PO Box 5028
City: Parris Island Zip: 29905
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
SEE Boring Log		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
9/16 - MW06I

6. TYPE: ☐ Mud Rotary ☐ Jetted ☒ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-11-036

8. USE: ☐ Residential ☐ Public Supply ☐ Process ☐ Irrigation ☐ Air Conditioning ☐ Emergency ☐ Test Well ☒ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 9-7-11
22 ft. Date Completed: 9-7-11

10. CASING: ☒ Threaded ☐ Welded
Diam.: 2"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
0 in. to 12 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☒ No

11. SCREEN:
Type: PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 12 ft. and 22 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 22 ft. to 10 ft.
Effective size #2 Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☐ Bentonite ☒ Bentonite/Cement ☐ Other _____
Depth: From 8 ft. to 0 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: William Ewing **CERT. NO.:** 1505
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
ARM Environmental Services, Inc.
1210 1st Street South Ext. Columbia, SC 29209
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: William C Ewing Date: 09/19/2011
Well Driller

If D Level Driller, provide supervising driller's name:

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: NAVFAC, SE Naval Air Station, JAX
(last) (first)
Address: Installation Restoration SC IPT-PO Box 30
City: North Ajax St Bldg 135 State: FL Zip: 32212
Telephone: Work: (904) 542-6409 Home:

2. LOCATION OF WELL: COUNTY: Beaufort
Name: MCRD Parris Island-NREAO
Street Address: PO Box 5028
City: Parris Island Zip: 29905
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
SEE Boring Log		
*Indicate Water Bearing Zones		
(Use a 2nd sheet if needed)		

5. REMARKS:
9/16 - MW055

6. TYPE: ☐ Mud Rotary ☐ Jetted ☒ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER: HW-11-036

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☒ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 9-7-11
17 ft. Date Completed: 9-7-11

10. CASING: ☒ Threaded ☐ Welded
Diam.: 2"
Type: ☒ PVC ☐ Galvanized ☐ Steel ☐ Other
0 in. to 7 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface _____ ft.
Weight _____ lb./ft.
Drive Shoe? ☐ Yes ☒ No

11. SCREEN:
Type: PVC Diam.: 2"
Slot/Gauge: .010 Length: 10'
Set Between: 7 ft. and 17 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 5 ft. to 17 ft.
Effective size #2 Uniformity Coefficient _____

16. WELL GROUTED? ☒ Yes ☐ No
☐ Neat Cement ☐ Bentonite ☒ Bentonite/Cement ☐ Other _____
Depth: From 5 ft. to 0 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: William Ewing CERT. NO.: 1505
Address: (Print) Level: A B C D (circle one) ☐ ☑ ☐ ☐
ARM Environmental Services, Inc.
1210 1st Street South Ext. Columbia, SC 29209
Telephone No.: 803-783-3314 Fax No.: 803-783-2587

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: William C Ewing Date: 09/19/2011
Well Driller

If D Level Driller, provide supervising driller's name:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 9/16
PROJECT NUMBER: 112G0
DRILLING COMPANY: ARM
DRILLING RIG: DPT w/Augers

BORING No.: PA1-9/16-MW05S/06I
DATE: 9/7/11
GEOLOGIST: S. Hill
DRILLER: W. Ewing

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**
							Asphalt @ surface						
			3/5		DK Brn		SAND vf-f	SP		0			
					Brn					0			
										0			
										0			
					Lt Brn					0			
5			3/5							0			
									moist	0			
										0			
										0			
						Orange Lt. Brn	Clay w/ little sand	CL		0			
10			5/5				SAND vf-f	SP	Saturated @10	0			
										0			
							Clayey SAND	SC		0			
										0			
										0			
15			5/5							0			
						Lt Gray	SAND vf-f	SP		0			
										0			
										0			
										0			
20			5/5							0			
						Dk Gray	CLAY w/little SAND	CL		0			
										0			
										0			
						Dk gray	SAND w/little amount clay Shell frags	SP		0			

28 When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reporse read.

Drilling Area Background (ppm): 0.0

Remarks: collect sample 0-1 & 7-9
PA1-9/16-MW05- 1020 1030

Converted to Well: Yes X No _____ Well I.D. #: PA1-9/16-MW05S (7-17')
PA1-9/16-MW06I (12-22')

C-11 PHASE II RI – MONITORING WELL DEVELOPMENT RECORDS

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: PAI-27MW48 I
Site: SITE 27
Date Installed: 8/9/08
Date Developed: 8/11/08
Dev. Method: PERISTALTIC
Pump Type: PERISTALTIC

Depth to Bottom (ft.): 25.24
Static Water Level Before (ft.): 8.79
Static Water Level After (ft.): 11.70
Screen Length (ft.): 5'
Specific Capacity: NA
Casing ID (in.): 2"

Responsible Personnel: C. WARINO
Drilling Co.: Vironex
Project Name: MCRD PARRIS ISLAND
Project Number: 112G00455

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.)
1130	< 0.25	0	8.79	24.8	6.53	0.19	>1000	BROWN / SILTY
1140	0	1.5	12.12	24.0	5.56	0.17	213	CLOUDY
1150	0	2.5	12.16	24.0	5.52	0.16	115	
1200	0	3.5	12.29	24.0	5.65	0.13	35.1	CLEAR / CLOUDY
1210	0	5.0	12.16	24.0	5.92	0.16	19.7	CLEAR
1220	0	6.5	11.96	24.1	5.95	0.14	11.3	
1230	0	8.0	11.82	24.2	5.96	0.14	7.12	
1240	0	9.5	11.73	24.3	5.95	0.15	8.95	
1250	0	10.5	11.70	24.3	5.95	0.15	8.19	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

(WELL NOT FINISHED)

Well:	PAI-27MW495	Depth to Bottom (ft.):	14.3	Responsible Personnel:	T. ROJAHN
Site:	SITE 27	Static Water Level Before (ft.):	8.58	Drilling Co.:	Vironex
Date Installed:	8-08-08	Static Water Level After (ft.):	8.76	Project Name:	MCRD PARRIS ISLAND
Date Developed:	8-10-08	Screen Length (ft.):	10	Project Number:	112G00455
Dev. Method:	SURGE & PURGE	Specific Capacity:	NA		
Pump Type:	PERISTALTIC	Casing ID (in.):	2" Ø		

PUMP INTAKE ON BOTTOM OF WELL

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.)
0935	0.20	–	8.58	–	–	–	–	TAN - BRN NO ODOR
0955	–	10 L	8.86	30.1	5.91	16 (TR)	~~30~~ 110	V. Sl. Cloudy " "
1005	–	15 L	8.87	29.7	5.97	17	400	Cloudy " "
1015	–	20 L	8.88	30.5	6.29	20	210	Sl Cloudy " "
1025	–	25 L	8.88	30.7	6.32	21	475 (TR)	~~Sl~~ Cloudy " " → REDUCE FLOW RATE 300 ml/min
1035	–	28 L	8.88	30.9	6.40	22	300	Sl Cloudy " "
1045	–	31 L	8.88	31.1	6.48	23	290	Sl Cloudy " " → REDUCE FLOW 200 ml/min
1055	–	34 L	8.83	31.4	6.51	23	260	Sl Cloudy " "
1105	–	36 L	8.76	31.5	6.56	24	15	CLEAR " "

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

(WELL NOT FINISHED)

Well:	PAI-27MW50I	Depth to Bottom (ft.):	25.3	Responsible Personnel:	T. ROSAHN
Site:	SITE 27	Static Water Level Before (ft.):	8.15	Drilling Co.:	Vironex
Date Installed:	8-08-08	Static Water Level After (ft.):	11.49	Project Name:	MCRD PARRIS ISLAND
Date Developed:	8-10-08	Screen Length (ft.):	5	Project Number:	112G00455
Dev. Method:	SURGE & PURGE	Specific Capacity:	NA		
Pump Type:	PERISTALTIC	Casing ID (in.):	2" ø		

PUMP INTAKE ON BOTTOM OF WELL

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.)
0801	0.10	0	8.15	—	—	—	—	DARK GREY NO ODOR
0831	—	15L	11.39	26.4	5.74	36	340	SI Cloudy " "
0841	—	20L	11.45	26.4	5.76	35	60	V.SI. Cloudy " "
0851	—	25L	11.47	26.4	5.78	35	40	CLEAR " "
0901	—	30L	11.49	26.4	5.79	35	28	CLEAR " "
0911	—	35L	11.49	26.4	5.80	35	20	CLEAR " "
0921	—	40L	11.49	26.4	5.80	35	17	CLEAR " "

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: PAI-27MW515
Site: SITE 27
Date Installed: 8/8/08
Date Developed: 8/11/08
Dev. Method: PERISTALTIC PUMP
Pump Type: PERISTALTIC

Depth to Bottom (ft.): 15.00
Static Water Level Before (ft.): 4.41
Static Water Level After (ft.): 4.53
Screen Length (ft.): 10'
Specific Capacity: NA
Casing ID (in.): 2"

Responsible Personnel: C. WARINO
Drilling Co.: Vironex
Project Name: MCRD PARRIS ISLAND
Project Number: 112G00455

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.)
0745	~1 FT	0	4.41	26.6	5.63	0.08	>1000	BROWN - SILTY/SANDY
0755	~1.5 FT	2	4.94	26.4	5.24	0.04	>1000	↓
0805	1.1	3	4.92	26.8	5.51	0.04	>1000	LT BROWN / CLOUDY
0815	0	4	4.93	26.8	5.64	0.04	>1000	↓
0825	0	5	4.93	26.9	5.45	0.08	400	LT TAN / CLOUDY
0835	0	7	4.93	27.0	5.77	0.09	87.6	
0845	0	8	4.93	27.1	5.65	0.10	109.3	
0855	0	10	4.93	27.2	5.75	0.10	81.1	
0905	0	12	4.93	27.1	5.77	0.10	62.7	
0915	0	13	4.93	27.1	5.75	0.10	56.7	
0925	0	14	4.93	27.1	5.72	0.10	57.2	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: PAI-27MW52I
Site: SITE 27
Date Installed: 8/9/08
Date Developed: 8/11/08
Dev. Method: PERISTALTIC
Pump Type: PERISTALTIC

Depth to Bottom (ft.): 25.10
Static Water Level Before (ft.): 8.04
Static Water Level After (ft.): 8.03
Screen Length (ft.): 5'
Specific Capacity: NA
Casing ID (in.): 2"

Responsible Personnel: [redacted] C. WARLAND
Drilling Co.: Vironex
Project Name: MCRD PARRIS ISLAND
Project Number: 112G00455

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.)
0940	< 0.25	0	8.04	23.6	6.49	0.47	>1000	DK GRAY/SANDY/SILTY
0950	<0.10	1.5	9.48	23.6	6.40	0.46	750	GRAY / CLOUDY
1000	0	2.5	9.94	22.9	6.34	0.46	28.7	CLEAR TO SLIGHTLY CLOUDY
1010	0	4.0	9.94	22.9	6.49	0.46	6.56	CLEAR
1020	0	5.5	9.94	23.0	6.67	0.47	4.88	
1030	0	7.0	9.94	22.9	6.67	0.46	3.79	
1040	0	9.0	9.94	23.0	6.69	0.47	2.70	
1050	0	10	9.94	23.1	6.61	0.46	2.20	CLEAR

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well:	PAI-27 MW 53 S	Depth to Bottom (ft.):	15.00	Responsible Personnel:	C. WARNO
Site:	SITE 27	Static Water Level Before (ft.):	11.50	Drilling Co.:	Vironex
Date Installed:	8/9/08	Static Water Level After (ft.):	11.22	Project Name:	MCRD PARRIS ISLAND
Date Developed:	8/11/08	Screen Length (ft.):	10'	Project Number:	112G00455
Dev. Method:	PERISTALTIC	Specific Capacity:	NA		
Pump Type:	PERISTALTIC	Casing ID (in.):	2"		

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.)
1330	< 0.25	0	11.50	24.2	5.46	0.08	>1000	LT BROWN / SANDY / SILTY
1340	< 0.10	1.5	11.99	23.2	4.93	0.07	>1000	LT BROWN - CLOUDY
1350	0	3.0	12.29	23.0	4.35	0.05	107.4	
1400	0	4.5	12.29	23.0	4.36	0.05	42.7	
1410	0	6.0	12.29	23.1	4.40	0.05	56.1	
1420	0	7.5	12.30	23.1	4.41	0.05	47.8	
1430	0	9.0	12.30	23.2	4.57	0.05	13.3	CLEAR
1440	0	10.0	12.29	23.2	4.67	0.05	10.7	
1450	0	11.5	12.27	23.2	4.68	0.05	11.3	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well:	PA1-27MW 54 I	Depth to Bottom (ft.):	25.00	Responsible Personnel:	C. WARLND
Site:	SITE 27	Static Water Level Before (ft.):	10.27	Drilling Co.:	Vironex
Date Installed:	8/9/08	Static Water Level After (ft.):	15.29	Project Name:	MCRD PARRIS ISLAND
Date Developed:	8/11/08	Screen Length (ft.):	5'	Project Number:	112G00455
Dev. Method:	PERISTALTIC	Specific Capacity:	N/A		
Pump Type:	PERISTALTIC	Casing ID (in.):	2"		

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.)
1515	<2.0'	0	10.27	—	—	—	—	REMOVING SEDIMENT
1525	<1.0	0.5	10.90	—	—	—	—	
1535	<.50	1.0	11.51	—	—	—	—	
1545	<.025	1.5	12.62	—	—	—	—	
1555	<0.1	2	13.40	—	—	—	—	REMOVING SEDIMENT
1605	0	3	13.98	23.3	6.07	0.10	>1000	TAN / CLOUDY
1615	0	4	14.60	22.2	5.34	0.09	720	
1625	0	5	14.99	22.1	5.29	0.09	513	
1635	0	6.5	15.10	22.2	5.28	0.09	187	
1645	0	8	15.23	22.3	5.31	0.09	152	
1655	0	9	15.28	22.2	5.35	0.09	125	
1705	0	10.5	15.29	22.2	5.40	0.09	88.1	CLEAR
1715	0	11.5	15.29	22.1	5.52	0.09	82.5	
1725	0	13	15.29	22.2	5.64	0.09	75.3	
1735	0	13.5	15.29	22.2	5.67	0.09	75.6	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

(WELL NOT FINISHED)

Well:	PAI-27MW555	Depth to Bottom (ft.):	14.5	Responsible Personnel:	T. ROJAHN
Site:	SITE 27	Static Water Level Before (ft.):	6.30	Drilling Co.:	Vironex
Date Installed:	08-07-08	Static Water Level After (ft.):	7.21	Project Name:	MCRD PARRIS ISLAND
Date Developed:	08-09-08	Screen Length (ft.):	10	Project Number:	112G00455
Dev. Method:	SURGE & PUMP	Specific Capacity:	NA		
Pump Type:	PERISTALTIC	Casing ID (in.):	2"Ø		

PUMP INTAKE ON WELL BOTTOM

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.)
1633	NA	0	6.30	—	—	—	—	START PURGE; BRN
1643	—	5L	6.94	22.7	5.02	74	65	V.SL cloudy NO ODOR
1648	—	7.5L	7.02	22.7	4.96	72	28	CLEAR " "
1653	—	10L	7.05	22.6	4.91	72	14	CLEAR " "
1703	—	15L	7.10	22.6	4.88	72	15	CLEAR " "
1713	—	20L	7.17	22.6	4.85	72	12	CLEAR " "
1723	—	25L	7.21	22.6	4.83	72	10	CLEAR " "

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: PAI-27MW56 I
Site: SITE 27
Date Installed: 08-07-08
Date Developed: 08-09-08
Dev. Method: Surge & Pump
Pump Type: Peristaltic

Depth to Bottom (ft.): 25.10 (WELL NOT FINISHED)
Static Water Level Before (ft.): 4.45
Static Water Level After (ft.): 4.55
Screen Length (ft.): 5
Specific Capacity: NA
Casing ID (in.): 2" ϕ

Responsible Personnel: T. ROJALIN
Drilling Co.: Vironex
Project Name: MCRD PARRIS ISLAND
Project Number: 112G00455

Pump intake on well bottom

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume ~~(Gal.)~~ L	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1510	0.05	—	4.45	—	—	—	+1000	GRAY - DARK, NO ODOR
1520	—	5 L	4.60	—	—	—	+1000	DARK ~~DRY~~ GRAY ↓
1530	—	11 L	4.55	21.3	6.00	0.12	800	DARK GRAY, Turbid, No odor
1540	—	17 L	4.56	20.9	5.75	0.11	300	CLOUDY NO ODOR
1550	—	23 L	4.55	20.9	5.75	0.11	180	SI CLOUDY " "
1600	—	29 L	4.55	20.9	5.77	0.11	130	SI CLOUDY " "
1610	—	35 L	4.55	20.8	5.79	0.11	100	VSI CLOUDY " "
1620	—	41 L	4.55	20.8	5.80	0.11	65	VSI CLOUDY " "
1630	—	47 L	4.55	20.8	5.81	0.11	45	CLEAR " "

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: PAI-27MW57S
Site: SITE 27
Date Installed: 8/8/08
Date Developed: 8/10/08
Dev. Method: PERISTALTIC
Pump Type: PERISTALTIC

Depth to Bottom (ft.): 14.80
Static Water Level Before (ft.): 5.23
Static Water Level After (ft.): 6.02
Screen Length (ft.): 10'
Specific Capacity: NA
Casing ID (in.): 2"

Responsible Personnel: C. WARNO
Drilling Co.: Vironex
Project Name: MCRD PARRIS ISLAND
Project Number: 112G00455

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.)
1700	<0.5	0	5.23	29.1	6.06	0.72	>1000	GRAY
1710	<0.25	2	7.02	29.1	5.90	0.70	>1000	
1720	<0.10	3	7.72	29.2	5.79	0.69	>1000	
1730	0	5	8.12	29.3	5.58	0.67	>1000	
1740	0	7	8.31	29.1	5.51	0.67	>1000	
1750	0	8	8.40	29.0	5.54	0.67	870	
1800	0	9	8.22	28.9	5.49	0.65	840	LT GRAY
1810	0	10	8.18	28.9	5.46	0.64	560	
1820	0	11	8.23	28.9	5.43	0.64	300	
1830	0	13	8.32	28.9	5.44	0.62	260	LT GRAY HAZE/CLEAR
1840	0	14	8.32	28.8	5.44	0.61	265	
1850	0	15	8.33	28.8	5.44	0.62	270	
1900	0	~16	8.32	28.7	5.43	0.61	265	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

(WELL NOT FINISHED)

Well:	PAI-27MW58S	Depth to Bottom (ft.):	13.42	Responsible Personnel:	T. ROJAHN
Site:	SITE 27	Static Water Level Before (ft.):	4.64	Drilling Co.:	Vironex
Date Installed:	8-08-08	Static Water Level After (ft.):	5.08	Project Name:	MCRD PARRIS ISLAND
Date Developed:	8-10-08	Screen Length (ft.):	10'	Project Number:	112G00455
Dev. Method:	PURGE & SURGE	Specific Capacity:	NA		
Pump Type:	PERISTALTIC	Casing ID (in.):	2" Φ		

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.)
1445	0.20	0	4.64	—	—	—	—	TANNISH NO ODOR
1455	—	5L	5.23	29.5	5.43	21	1000+	TURBID
1505	—	10L	5.16	29.6	5.40	20	1000+	"
1515	—	15L	5.15	29.3	5.45	20	1000+	"
1525	—	20L	5.09	29.5	5.35	21	650	CLOUDY
1535	—	23L	5.06	29.9	5.45	21	320	Sl. Cloudy
1545	—	26L	5.06	30.3	5.49	21	160	Sl. Cloudy
1555	—	29L	5.06	29.6	5.29	21	170	Sl. Cloudy
1605	—	32L	5.06	29.6	5.29	21	70	V.Sl. Cloudy
1615	—	35L	5.06	29.6	5.21	20	80	V.Sl. Cloudy
1625	—	38L	5.08	30.0	5.18	20	39	CLEAR

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

(WELL NOT FINISHED)

Well:	PAI-27MW59I	Depth to Bottom (ft.):	20.12	Responsible Personnel:	T. ROJAHN
Site:	SITE 27	Static Water Level Before (ft.):	5.10	Drilling Co.:	Vironex
Date Installed:	8-08-08	Static Water Level After (ft.):	7.09	Project Name:	MCRD PARRIS ISLAND
Date Developed:	8-10-08	Screen Length (ft.):	5	Project Number:	112G00455
Dev. Method:	PURGE & SURGE	Specific Capacity:	NA		
Pump Type:	PERISTALTIC	Casing ID (in.):	2"Ø		

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.)
1320	–	0	5.10	–	–	–	–	DARK GREY; NO ODOR
1340	–	10L	6.92	27.3	5.68	30	400	CLOUDY
1350	–	15L	6.98	26.9	5.63	29	280	CLOUDY
1400	–	20L	7.02	26.5	5.59	28	200	SI CLOUDY
1410	–	25L	7.07	27.1	5.63	28	140	SI CLOUDY
1420	–	30L	7.08	27.3	5.71	28	90	V SI CLOUDY
1430	–	35L	7.08	27.1	5.71	28	60	V SI CLOUDY
1440	–	40L	7.09	27.1	5.71	28	39	CLEAR

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

(WELL NOT FINISHED)

Well:	PAI-27MW60I	Depth to Bottom (ft.):	25.30	Responsible Personnel:	T. ROJAHN
Site:	SITE 27	Static Water Level Before (ft.):	8.66	Drilling Co.:	Vironex
Date Installed:	8-10-08	Static Water Level After (ft.):	11.18	Project Name:	MCRD PARRIS ISLAND
Date Developed:	8-12-08	Screen Length (ft.):	5'	Project Number:	112G00455
Dev. Method:	SURGE & PURGE	Specific Capacity:	NA		
Pump Type:	Peristaltic	Casing ID (in.):	2"Φ		

PUMP INTAKE BOTTOM OF WELL

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume ~~(Gal.)~~	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/m)	Turbidity (NTU)	Remarks (odor, color, etc.)
0840	0.20	–	8.60	–	–	–	–	DARK GREY; NO ODOR
0910	–	15 L	14.32	24.2	5.89	19	+1000	Lt Grey
0920	–	20L	14.40	24.0	6.01	18	+1000	Lt Grey
0930	–	25L	14.45	24.1	6.04	18	+1000	Lt Grey
0940	–	29L	14.00	24.0	6.05	17	1000	Lt Grey
0950	–	33L	13.81	24.1	6.02	17	750	CLOUDY
1000	–	36L	13.10	24.1	6.07	16	450	CLOUDY
1010	–	39L	12.60	24.3	6.04	17	350	CLOUDY
1020	–	42L	11.82	24.4	6.04	17	240	SL CLOUDY
1030	–	45L	11.69	24.4	6.05	17	210	SL CLOUDY
1040	–	48L	11.58	24.5	6.08	19	170	SL CLOUDY
1050	–	51L	11.40	24.5	6.10	19	150	SL CLOUDY
1100	–	54L	11.22	24.6	6.12	19	140	SL CLOUDY
1110	–	57L	11.18	24.6	6.14	19	130	SL CLOUDY

REMOVED 5 WELL VOLUMES

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

(WELL Not FINISHED)

Well:	PAI-27MW16I	Depth to Bottom (ft.):	25.3	Responsible Personnel:	T. ROJAHN
Site:	SITE 27	Static Water Level Before (ft.):	9.09	Drilling Co.:	Vironex
Date Installed:	8-10-08	Static Water Level After (ft.):	13.90	Project Name:	MCRD PARRIS ISLAND
Date Developed:	8-12-08	Screen Length (ft.):	5	Project Number:	112G00455
Dev. Method:	Surge & PURGE	Specific Capacity:	NA		
Pump Type:	Peristaltic	Casing ID (in.):	2" ϕ		

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume ~~(Gal.)~~ L	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ~~mS/m~~)	Turbidity (NTU)	Remarks (odor, color, etc.)
1230	0.10	0	9.90	—	—	—	—	START DEV.
1240	—	5	15.25	26.7	6.06	43	140	SI Cloudy NO ODOR
1250	—	10	15.81	26.4	5.95	45	65	V.SI. Cloudy
1300	—	15	16.21	26.1	5.95	45	23	CLEAR
1310	—	18	14.25	26.3	5.94	42	8	"
1320	—	21	13.90	26.4	5.91	42	5.0	"

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

(WELL NOT FINISHED)

Well:	PSI-27MW62S	Depth to Bottom (ft.):	14.84	Responsible Personnel:	T. ROJAHN
Site:	SITE 27	Static Water Level Before (ft.):	6.03	Drilling Co.:	Vironex
Date Installed:	8-08-08	Static Water Level After (ft.):	6.94	Project Name:	MCRD PARRIS ISLAND
Date Developed:	8-10-08	Screen Length (ft.):	10'	Project Number:	112G00455
Dev. Method:	SURGE & PURGE	Specific Capacity:	NA		
Pump Type:	PERISTALTIC	Casing ID (in.):	2" Ø		

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.)
1657	–	0	6.03	–	–	–	–	START DEV. Lt. Grey
1707	–	5L	6.65	23.1	5.59	51	1000+	Lt Grey No Odor
1717	–	10L	6.82	22.4	5.06	51	240	SL Cloudy
1727	–	15L	6.88	22.3	4.94	52	25	CLEAR
1737	–	20L	6.92	22.3	4.93	52	14	CLEAR
1747	–	25L	6.94	22.4	4.95	52	6.9	CLEAR

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

(WELL NOT FINISHED)

Well:	PAI-27MW635	Depth to Bottom (ft.):	14.85	Responsible Personnel:	T. RUSAUN
Site:	SITE 27	Static Water Level Before (ft.):	10.02	Drilling Co.:	Vironex
Date Installed:	8-10-08	Static Water Level After (ft.):	10.35	Project Name:	MCRD PARRIS ISLAND
Date Developed:	8-12-08	Screen Length (ft.):	10	Project Number:	112G00455
Dev. Method:	Surge & Purge	Specific Capacity:	NA		
Pump Type:	Peristaltic	Casing ID (in.):	2"		

PUMP INTAKE BOTTOM OF WELL

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/m)	Turbidity (NTU)	Remarks (odor, color, etc.)
1415	0.4	0	10.02	—	—	—	—	BRN NO ODOR
1425	—	5L	10.32	25.4	6.27	19	+1000	TANNISH NO ODOR
1435	—	10L	10.30	25.5	6.23	19	280	SL Cloudy " "
1445	—	15L	10.35	25.3	6.23	18	8.5	CLEAR

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well:	MW64S	Depth to Bottom (ft.):		Responsible Personnel:	C. WARNO
Site:	SITE 27	Static Water Level Before (ft.):	8.33	Drilling Co.:	Vironex
Date Installed:	8/10/08	Static Water Level After (ft.):	9.00	Project Name:	MCRD PARRIS ISLAND
Date Developed:	8/12/08	Screen Length (ft.):	10'	Project Number:	112G00455
Dev. Method:	PERISTALTIC	Specific Capacity:	NA		
Pump Type:	PERISTALTIC	Casing ID (in.):	2"		

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.)
1530	<1.0	0	8.33	24.9	6.15	0.12	>1000	PETRO ODOR / SANDY
1540	<0.1	1.0	8.75	25.1	5.73	0.11	>1000	
1550	0	3.0	8.96	25.4	5.73	0.11	>1000	CLOUDY
1600	0	5.0	9.00	25.4	5.73	0.11	638	
1610	0	6.5	9.00	25.3	6.20	0.10	301	
1620	0	8.0	9.00	25.2	6.34	0.10	91.1	
1630	0	9.0	9.00	25.2	6.35	0.10	59.0	CLEAR
1640	0	10.0	9.00	25.1	6.27	0.10	49.0	
1650	0	11.0	9.00	25.2	6.19	0.10	46.7	
1700	0	12.5	9.00	25.1	6.37	0.10	90.5	
1710	0	13.5	9.00	25.2	6.28	0.10	69.9	
1720	0	15.0	9.00	25.1	6.09	0.10	45.9	
1730	0	16.0	9.00	25.2	6.37	0.10	26.1	
1740	0	17.5	9.00	25.1	6.37	0.10	33.7	
1750	0	18.5	9.00	25.1	6.25	0.10	20.8	

C-12 PHASE I RI – GROUNDWATER SAMPLE LOG SHEETS
TEMPORARY MONITORING WELLS

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PA1-27-TW-22S
Sample Location: TW-22S
Sampled By: T. ROJAHN
C.O.C. No.: 4585
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~ SAL ~~NA~~ %
Date: 9-23-07	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Time: 1610								
Method: SAME	V.Sl. cloudy	5.84	0.089	25.4	100	0.00	58	0.0

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	~~Other~~ TIME	WL
Date: 9-23-07									
Method: PERISTALTIC	0	—	—	—	—	—	—	1515	4.55
Monitor Reading (ppm): —	2500	6.06	0.100	25.6	71100	2.12	0.0	1525	6.82
Well Casing Diameter & Material	4000	5.96	0.094	25.7	71100	0.39	0.0	1535	5.45
Type: 1" Ø PVC			~~See Low Flow Purge Data Sheets~~ TC						
Total Well Depth (TD): 14.55	5500	5.84	0.091	25.5	1100	0.00	0.0	1545	5.42
Static Water Level (WL): 4.55	7000	5.95	0.098	25.4	310	0.00	0.0	1555	5.42
One Casing Volume(gal/L): 1.6	8500	5.87	0.089	25.4	100	0.00	0.0	1605	5.42
Start Purge (hrs): 1515									
End Purge (hrs): 1605									
Total Purge Time (min): 50									
Total Vol. Purged (gal/L): 8.5									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

MEAS TD = 14.55'
SCREEN = 8'-13'
STICK UP = 1.48'

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PA1-27-TW-23I
Sample Location: TW-23I
Sampled By: T. ROJAHN
C.O.C. No.: 4586
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	~~Other~~ ~~NA~~ SAL %
Date: 9-23-07								
Time: 1725								
Method: SAME	V.S. Cloudy	6.22	0.128	24.1	140	0.00	17	0.0

PURGE DATA:

	mL Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TIME ~~Other~~	WL
Date: 9-23-07									
Method: PERISTALTIC	0	—	—	—	—	—	—	1640	4.44
Monitor Reading (ppm): —	4000	6.23	0.120	24.3	>1100	2.30	0.0	1650	8.62
Well Casing Diameter & Material	6200	6.19	0.126	24.3	500	0.00	0.0	1700	8.26
Type: 1" Ø PVC	~~8~~		(TD) ~~See Low Flow Purge Data Sheets~~						
Total Well Depth (TD): 23.0'	8400	6.22	0.131	24.2	300	0.00	0.0	1710	8.30
Static Water Level (WL): 4.44	10600	6.22	0.128	24.1	140	0.00	0.0	1720	8.32
One Casing Volume(gal/L): 2.9									
Start Purge (hrs): 1640									
End Purge (hrs): 1720									
Total Purge Time (min): 40									
Total Vol. Purged (gal/L): 10.6									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

MEAS. TD = 23.0'
Stick up = 1.02'
SCREEN = 18-23'

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PA1-27-TW-24S
Sample Location: TW-24S
Sampled By: T. ROJAHN
C.O.C. No.: 4587
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	~~Other~~ SAL ~~NA~~ %
Date: 9-26-07								
Time: 1115								
Method: SAME	Clear	7.06	0.132	26.1	48.5	0.00	-114	0.0

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	~~Other~~	TIME
Date: 9-26-07	ML							WL	
Method: Peristaltic	0	–	–	–	–	–	–	5.31	1005
Monitor Reading (ppm):	3000	7.01	0.158	26.3	>1100	5.00	0.0	7.03	1015
Well Casing Diameter & Material	5000	7.16	0.147	26.2	>1100	0.34	0.0	6.90	1025
Type: 1"Φ PVC			See Low Flow Purge Data Sheets						
Total Well Depth (TD):	7000	7.11	0.140	26.2	>1100	0.00	0.0	6.90	1035
Static Water Level (WL): 5.31	9000	7.09	0.137	26.0	803	0.00	0.0	6.95	1045
One Casing Volume(gal/L): 1.6	11000	7.07	0.133	25.8	135	0.00	0.0	6.93	1055
Start Purge (hrs): 1005	13000	7.06	0.133	26.0	75.8	0.00	0.0	6.94	1105
End Purge (hrs): 1110	14000	7.06	0.132	26.1	48.5	0.00	0.0	6.94	1110
Total Purge Time (min): 65									
Total Vol. Purged (gal/L): 14									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	–

OBSERVATIONS / NOTES:

SCREEN = 9-14'
Stick up = 1.16'

Circle if Applicable:

MS/MSD –

Duplicate ID No.: FD092607 01

Signature(s): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-25I
Sample Location: TW-25 I
Sampled By: T. ROJAHN
C.O.C. No.: 4586
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	~~Other~~ SAL ~~Na~~ %
Date: 9-23-07								
Time: 1920								
Method: SAME	Cloudy	6.83	0.271	24.9	850	0.00	-89	0.0

PURGE DATA: mL TIME

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other	WL
Date: 9-23-07									
Method: PERISTALTIC	0	—	—	—	—	—	—	1840	8.52
Monitor Reading (ppm): —	3000	6.92	0.291	25.1	160	0.36	0.0	1850	8.91
Well Casing Diameter & Material	5000	6.85	0.277	25.0	500	0.00	0.0	1900	8.91
Type: 1" Ø PVC			~~See Low Flow Purge Data Sheets~~ TR						
Total Well Depth (TD): 25.0	7000	6.84	0.273	25.0	240	0.00	0.0	1910	8.92
Static Water Level (WL): 8.52	8000	6.83	0.271	24.9	850	0.00	0.0	1915	8.92
One Casing Volume(gal/L): 2.6									
Start Purge (hrs): 1840									
End Purge (hrs): 1915									
Total Purge Time (min): 35									
Total Vol. Purged (gal/L) 8									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

MEAS. TD = 25.0

Stick up = 0.55'
SCREEN = 19-24'

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-26S
Sample Location: TW-26S
Sampled By: T. ROSAHN
C.O.C. No.: 4585
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other SAL
Date: 9-23-07	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA %
Time: 1105								
Method: SAME	Clear	6.81	0.320	28.3	14	5.47	-85	0-0

PURGE DATA:

	ML							TIME	WL
Date: 9-23-07	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	~~Other~~	
Method: PERISTALTIC	0	–	–	–	–	–	–	1030	9.13
Monitor Reading (ppm): –	2000	6.79	0.324	26.9	>1100	2.39	0.0	1040	14.45
Well Casing Diameter & Material	3500	6.82	0.321	27.8	38	4.49	0.0	1050	14.65
Type: 1" Ø PVC	~~4500~~	~~See Low Flow Purge Data Sheets~~ TC							
Total Well Depth (TD): 15.0	4500	6.81	0.320	28.3	14	5.47	0.0	1100	14.03
Static Water Level (WL): 9.13									
One Casing Volume(gal/L): 0.9									
Start Purge (hrs): 1030									
End Purge (hrs): 1100									
Total Purge Time (min): 30									
Total Vol. Purged (gal/L): 4.5									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	–

OBSERVATIONS / NOTES:

MEAS TD = 15.0'
Stick UP = 1.73'
SCREEN = 8-13'

Circle if Applicable:

MS/MSD –

Duplicate ID No.: –

Signature(s): Troy Rosahn

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-27I
Sample Location: TW-27I
Sampled By: T. ROJAHN
C.O.C. No.: 4585
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	~~Other~~ SAL ~~NA~~ %
Date: 9-23-07								
Time: 0950								
Method: SAME	CLEAR	6.09	0.230	24.5	36	0.00	-10	0.0

PURGE DATA:

	Volume (ML)	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	~~Other~~ TIME	WL
Date: 9-23-07									
Method: Peristaltic	0	—	—	—	—	—	—	0855	8.15
Monitor Reading (ppm): —	3000	6.63	0.298	24.6	71100	1.30	0.0	0905	12.43
Well Casing Diameter & Material	5000	6.12	0.233	24.3	400	0.23	0.0	0915	18.66
Type: 1" Ø PVC	TQ 6500		~~See Low Flow Purge Data Sheets~~ TQ						
Total Well Depth (TD): 25.0	~~6500~~	6.08	0.232	24.5	110	0.17	0.0	0925	15.85
Static Water Level (WL): 8.15	8000	6.08	0.230	24.6	45	0.00	0.0	0935	15.16
One Casing Volume(gal/L): 1.3	9500	6.09	0.230	24.5	36	0.00	0.0	0945	14.79
Start Purge (hrs): 0855									
End Purge (hrs): 0945									
Total Purge Time (min): 50									
Total Vol. Purged (gal/L): 9.5									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

MEAS. TD = 25.0'
STICK UP = 0.95'
SCREEN = 19-24

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-28S
Sample Location: TW-28S
Sampled By: T. ROJAHN
C.O.C. No.: 4587
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~ SAL ~~NA~~ %
Date: 9-25-07	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Time: 1015								
Method: SAME	CLEAR	5.64	0.151	29.6	5.5	0.80	126	0.0

PURGE DATA: ml TIME

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other	WL
Date: 9-25-07									
Method: Peristaltic	0	—	—	—	—	—	—	0945	6.25
Monitor Reading (ppm): —	3000	5.67	0.153	29.4	30	1.21	0.0	0955	10.87
Well Casing Diameter & Material Type: 2" 1" Φ PVC	5000	5.66	0.152	29.6	10	0.90	0.0	1005	10.38
			~~See Low Flow Purge Data Sheets~~ TR						
Total Well Depth (TD): 13.10	6000	5.64	0.151	29.6	5.5	0.80	0.0	1010	10.36
Static Water Level (WL): 6.25									
One Casing Volume(gal/L): 1.05									
Start Purge (hrs): 0940									
End Purge (hrs): 1010									
Total Purge Time (min): 30									
Total Vol. Purged (gal/L): 6									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

Stick up = 1.09'
SCREEN = 7-12'

Circle if Applicable:

MS/MSD —
Duplicate ID No.: —

Signature(s): Terry [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-29I
Sample Location: TW-29I
Sampled By: T. Roshan
C.O.C. No.: 4587
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	Other SAL % NA
Date: 9-25-07								
Time: 1708								
Method: SAME	Milky BW → 40 clear	6.32	0.608	28.5	>1100	2.60	-22	40

PURGE DATA: ML TIME

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other	WL
Date: 9-25-07									
Method: PERISTALTIC	0	—	—	—	—	—	—	1045	5.75
Monitor Reading (ppm): —	4000	6.32	0.608	28.5	>1100	2.60	0.0	1055	23.82
Well Casing Diameter & Material	4800	Dry	—	—	—	—	—	1105	25.00
Type: 1" Ø PVC			See Low Flow Purge Data Sheets						
Total Well Depth (TD): 25.00									
Static Water Level (WL): 5.75									
One Casing Volume(gal/L): 3.1									
Start Purge (hrs): 1045									
End Purge (hrs): 1105									
Total Purge Time (min): 20									
Total Vol. Purged (gal/L): 4.8									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

DRIED OUT

SCREEN = 19-24
Stick up = 1.01

SAMPLE sl. cloudy - CLEAR
446 NTU - 34.2

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Terry Nagel

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-305
Sample Location: TW-305
Sampled By: T. ROJAHN
C.O.C. No.: 4585
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	~~Other~~ SAL ~~NA~~ %
Date: 9-22-07								
Time: 0835								
Method: SAME	CLEAR	5.25	0.285	30.1	5.3	3.33	158	0.0

PURGE DATA: ml

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	~~Other~~ TIME	W.L.
Date: 9-22-07									
Method: Peristaltic	0	—	—	—	—	—	—	0758	5.47
Monitor Reading (ppm): —	3000	5.36	0.293	30.0	30.0	3.56	0.0	0808	12.45
Well Casing Diameter & Material	5000	5.28	0.283	30.0	28.0	3.03	0.0	0818	12.45
Type: 1" PVC			~~See Low Flow Purge Data Sheets~~ TR						
Total Well Depth (TD): 12.50	7000	5.25	0.286	30.1	6.1	3.32	0.0	0828	12.45
Static Water Level (WL): 5.47	8000	5.25	0.285	30.1	5.3	3.33	0.0	0833	12.45
One Casing Volume(gal/L) 1									
Start Purge (hrs): 0758									
End Purge (hrs): 0833									
Total Purge Time (min): 35									
Total Vol. Purged (gal/L) 8									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

MEAS. TD = 12.50
Stick up = 0.92'
SCREEN = 6-11'

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Tey Rojahn

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PA1-27-TW-31I
Sample Location: TW-31 I
Sampled By: T. ROJAHN
C.O.C. No.: 4585
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	~~Other~~ SAL ~~NA~~ o/o
Date: 9-22-07								
Time: 1140								
Method: SAME	CLEAR	6.06	0.506	27.9	46	0.00	-10	0.0

PURGE DATA: ML

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	~~Other~~ TIME	WL
Date: 9-22-07									5.19
Method: Peristaltic	0	—	—	—	—	—	—	1055	
Monitor Reading (ppm):	5000	6.06	0.500	27.3	>1100	0.71	0.0	1105	15.82
Well Casing Diameter & Material (PA)	~~13000~~	6.06	0.498	27.2	400	0.32	0.0	1115	17.25
Type: 1" PVC	~~15500~~ (TA)	~~See Low Flow Purge Data Sheets~~							
Total Well Depth (TD): 24.10	15500	6.05	0.515	27.8	12	0.00	0.0	1125	10.38
Static Water Level (WL): 5.19	18000	6.06	0.506	27.9	46	0.00	0.0	1135	9.96
One Casing Volume(gal/L): 3									
Start Purge (hrs): 1055									
End Purge (hrs): 1135									
Total Purge Time (min): 40									
Total Vol. Purged (gal/L): 18									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

MEAS. TD = 24.10'
STICK UP = 0.4'
SCREEN = 19-24'

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PA1-27-~~GA~~ TW-32I
Sample Location: TW-32I
Sampled By: T. ROJAHN
C.O.C. No.: 4585
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	~~Other~~ SAL ~~NA~~ %
Date: 9-22-07								
Time: 1800								
Method: SAME	Sl. Cloudy	6.02	0.211	25.9	160	0.00	3	0.0

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other	TIME	WL
Date: 9-22-07										
Method: Peristaltic	0	—	—	—	—	—	—		1655	7.69
Monitor Reading (ppm): —	2500	6.22	0.235	26.0	71100	6.00	0.0		1705	10.05
Well Casing Diameter & Material	5000	6.02	0.217	26.0	71100	0.00	0.0		1715	10.02
Type: 1" Φ PVC			~~See Low Flow Purge Data Sheets~~ TRJ							
Total Well Depth (TD): 24.5	7500	6.00	0.212	25.9	750	0.00	0.0		1725	10.00
Static Water Level (WL): 7.69	10000	6.00	0.211	25.9	340	0.00	0.0		1735	9.97
One Casing Volume(gal/L): 2.6	12500	6.01	0.211	25.9	230	0.00	0.0		1745	9.97
Start Purge (hrs): 1655	15000	6.02	0.211	25.9	160	0.00	0.0		1755	9.97
End Purge (hrs): 1755										
Total Purge Time (min): 60										
Total Vol. Purged (gal/L): 15										

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

MEAS. TD = 24.5
SCREEN = 19-24'
Stick up = 0.47'

Hydrocarbon odor

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Troy Rojahn

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-33S
Sample Location: TW-33S
Sampled By: T. ROJAHN
C.O.C. No.: 4587
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	~~Other~~ SAL NA %
Date: 9-25-07								
Time: 1230								
Method: SAME	CLEAR	7.34	0.186	26.6	21.0	1.86	-30	0.0

PURGE DATA:

	ML Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TIME ~~Other~~	WL
Date: 9-25-07									
Method: PERISTALTIC	0	—	—	—	—	—	—	1155	6.05
Monitor Reading (ppm): —	3000	7.35	0.187	26.6	900	2.16	0.0	1205	6.15
Well Casing Diameter & Material	5500	7.37	0.185	26.6	35.1	1.88	0.0	1215	6.16
Type: 1" Ø PVC			See Low Flow Purge Data Sheets						
Total Well Depth (TD): 13.6	8000	7.34	0.186	26.6	21.0	1.86	0.0	1225	6.16
Static Water Level (WL): 6.05									
One Casing Volume(gal/L): 1.05									
Start Purge (hrs): 1155									
End Purge (hrs): 1225									
Total Purge Time (min): 30									
Total Vol. Purged (gal/L): 8									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

SCREEN = 8-13'
Stick up = 0.85'

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-34I
Sample Location: TW-34I
Sampled By: T. ROJAHN
C.O.C. No.: 4587
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	~~Other~~ SAL ~~NA~~ %
Date: 9-25-07								
Time: 1335								
Method: SAME	CLEAR	6.65	0.172	24.1	10.1	0.00	-67	0.0

PURGE DATA:

	Volume (ML)	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	~~Other~~ TIME	WL
Date: 9-25-07									
Method: PERISTALTIC	0	—	—	—	—	—	—	1255	6.90
Monitor Reading (ppm): —	4000	6.82	0.196	24.2	53.7	0.00	0.0	1305	14.28
Well Casing Diameter & Material	5500	6.67	0.175	24.2	45.1	0.00	0.0	1315	13.65
Type: 1" Ø PVC			~~See Low Flow Purge Data Sheets~~ (FA)						
Total Well Depth (TD): 25.0	7000	6.65	0.171	23.9	23.8	0.00	0.0	1325	13.83
Static Water Level (WL): 6.90	7750	6.65	0.172	24.1	10.1	0.00	0.0	1330	13.86
One Casing Volume(gal/L): 2.9									
Start Purge (hrs): 1255									
End Purge (hrs): 1330									
Total Purge Time (min): 35									
Total Vol. Purged (gal/L): 7.8									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

SCREEN = 20-25'
stick up = 0.80'

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):
—	—	[signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PA1-27-TW-35S
Sample Location: TW-35S
Sampled By: T. ROJAHN
C.O.C. No.: 4587
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	~~Other~~ SAL ~~NA~~ %
Date: 9-25-07								
Time: 1530								
Method: SAME	CLEAR	6.62	0.284	27.5	10.1	0.20	71	0.0

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other TIME	WL
Date: 9-25-07									
Method: PERISTALTIC	0	—	—	—	—	—	—	1455	7.38
Monitor Reading (ppm): —	3000	6.69	0.280	27.7	63.9	0.83	0.0	1505	8.70
Well Casing Diameter & Material	5000	6.65	0.283	27.6	37.5	0.32	0.0	1515	8.78
Type: 1" Ø PVC			See Low Flow Purge Data Sheets						
Total Well Depth (TD): 15.0	6000	6.63	0.285	27.5	15.4	0.25	0.0	1520	8.77
Static Water Level (WL): 7.38	7000	6.62	0.284	27.5	10.1	0.20	0.0	1525	8.77
One Casing Volume(gal/L): 1.2									
Start Purge (hrs): 1455									
End Purge (hrs): 1525									
Total Purge Time (min): 30									
Total Vol. Purged (gal/L): 7									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

Stick up = 2.01'
Screen = 8-13'

Circle if Applicable:

MS/MSD —
Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW36I
Sample Location: TW-36 I
Sampled By: T. ROJAHN
C.O.C. No.: 4587
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~ SAL ~~NA~~ %
Date: 9-25-07	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Time: 1625								
Method: SAME	Clear	6.35	0.637	26.1	9.02	0.00	17	0.0

PURGE DATA: ML TIME

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	~~Other~~	WL
Date: 9-25-07									
Method: PERISTALTIC	0	—	—	—	—	—	—	1550	6.15
Monitor Reading (ppm): —	4000	6.39	0.635	26.1	26.8	0.15	0.0	1600	7.53
Well Casing Diameter & Material	6500	6.34	0.641	26.2	26.3	0.00	0.0	1610	7.52
Type: 1" Ø PVC			~~See Low Flow Purge Data Sheets~~ (LR)						
Total Well Depth (TD): 24.05	9000	6.35	0.637	26.1	9.02	0.00	0.0	1620	7.52
Static Water Level (WL): 6.15									
One Casing Volume(gal/L): 2.8									
Start Purge (hrs): 1550									
End Purge (hrs): 1620									
Total Purge Time (min): 30									
Total Vol. Purged (gal/L): 9									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

SCREEN = 19-24'
Stick up = 0.54'

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PA1-27-TW-375
Sample Location: TW-375
Sampled By: T. ROJAHN
C.O.C. No.: 4586
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	Other ~~NA~~ %
Date: 9-24-07								
Time: 0835								
Method: SAME	MILKY	7.02	0.206	28.7	>1100	1.24	12	0.0

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	~~Other~~	WL
Date: 9-24-07									
Method: PERISTALTIC	0	—	—	—	—	—	—	0750	5.95
Monitor Reading (ppm): —	2500	6.80	0.206	28.6	>1100	2.49	0.0	0800	6.92
Well Casing Diameter & Material	4000	6.99	0.206	28.7	>1100	1.31	0.0	0810	6.54
Type: 1" Ø PVC			~~See Low Flow Purge Data Sheets~~ TC						
Total Well Depth (TD): 13.3	6000	6.98	0.197	28.7	>1100	1.29	0.0	0820	6.51
Static Water Level (WL): 5.95	8000	7.02	0.206	28.7	>1100	1.24	0.0	0830	6.48
One Casing Volume(gal/L): 1.2									
Start Purge (hrs): 0750									
End Purge (hrs): 0830									
Total Purge Time (min): 4									
Total Vol. Purged (gal/L): 8									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

stick up = 0.30'
SCREEN = 8'-13'

Circle if Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s): Ty Rojahn

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-38I
Sample Location: TW-38I
Sampled By: T. ROJAHN
C.O.C. No.: 4586
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	Other SAL NA %
Date: 9-24-07								
Time: 0935								
Method: SAME	Clear	6.99	0.381	27.0	45	0.00	-116	0.0

PURGE DATA: ML TIME

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other	WL
Date: 9-24-07									
Method: PERISTALTIC	0	—	—	—	—	—	—	0905	6.47
Monitor Reading (ppm): —	4000	7.00	0.372	27.1	260	0.54	0.0	0915	7.04
Well Casing Diameter & Material	8000	6.99	0.380	27.1	19	0.00	0.0	0925	7.04
Type: 1" Ø PVC			See Low Flow Purge Data Sheets TK						
Total Well Depth (TD): 22.5	10000	6.99	0.381	27.0	4.5	0.00	0.0	0930	
Static Water Level (WL): 6.47									
One Casing Volume(gal/L) 2.4									
Start Purge (hrs): 0905									
End Purge (hrs): 0930									
Total Purge Time (min): 25									
Total Vol. Purged (gal/L) 10									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

SCREEN = 18-23'
Stick up = 0.25'

Circle if Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-395
Sample Location: TW-395
Sampled By: T. ROSAHN
C.O.C. No.: 4586
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	~~Other~~ SAL ~~NA~~ %
Date: 9-24-07								
Time: 1145								
Method: SAME	CLEAR	7.06	0.162	27.5	25	6.57	34	0.0

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other	
Date: 9-24-07									
Method: PERISTALTIC	0	–	–	–	–	–	–	1115	9.01
Monitor Reading (ppm): –	1500	7.16	0.162	28.0	120	6.95	0.0	1125	13.61
Well Casing Diameter & Material	2500	7.08	0.163	27.7	26	6.63	0.0	1130	13.61
Type: 1" Ø PVC			~~See Low Flow Purge Data Sheets~~ TR						
Total Well Depth (TD): 13.80	3000	7.07	0.163	27.5	28	6.57	0.0	1135	13.62
Static Water Level (WL): 9.01	3500	7.06	0.162	27.5	25	6.57	0.0	1140	13.62
One Casing Volume(gal/L) 0.75									
Start Purge (hrs): 1115									
End Purge (hrs) TR ~~1140~~	1140								
Total Purge Time (min): 25									
Total Vol. Purged (gal/L): 3.5									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	–

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD –

Duplicate ID No.: –

Signature(s): Ty Rosahn

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-40I
Sample Location: TW 40I
Sampled By: T. ROWAHN
C.O.C. No.: 4587
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~ SAL ~~NA~~ %
Date: 9/25/07	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Time: 0910								
Method: SAME	CLEAR	6.17	0.198	23.4	44	0.00	13	0.0

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other	WL
Date: 9-25-07									
Method: PERISTALTIC	0	—	—	—	—	—	—	0825	8.53
Monitor Reading (ppm): —	3000	6.19	0.210	23.4	311	1.69	0.0	0835	12.65
Well Casing Diameter & Material	6000	6.18	0.202	23.4	124	0.00	0.0	0845	12.76
Type: 1" Ø PVC			~~See Low Flow Purge Data Sheets~~ (TR)						
Total Well Depth (TD): 24.15	9000	6.18	0.199	23.4	62	0.00	0.0	0855	12.85
Static Water Level (WL): 8.53	12000	6.17	0.198	23.4	44	0.00	0.0	0905	12.88
One Casing Volume(gal/L): .25									
Start Purge (hrs): 0825									
End Purge (hrs): 0905									
Total Purge Time (min): 40									
Total Vol. Purged (gal/L): 12									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

SCREEN = 19-24'
Stick up = 0.58

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Terry Hazel

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-41S
Sample Location: TW 41S
Sampled By: T. ROJAHN
C.O.C. No.: 4585
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	~~Other~~ SAL ~~NA~~ %
Date: 9-22-07								
Time: 1400								
Method: SAME	CLEAR	4.85	0.199	30.1	30	3.52	280	0.0

PURGE DATA: ML

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other	TIME	WL
Date: 9-22-07										
Method: PERISTALTIC	0	–	–	–	–	–	–		1315	3.55
Monitor Reading (ppm): –	3000	5.21	0.202	29.97	>1100	7.50	0.0		1325	11.80
Well Casing Diameter & Material	4700	4.89	0.204	30.1	50	2.91	0.0		1335	11.80
Type: 1" Ø PVC	~~6400~~		~~See Low Flow Purge Data Sheets~~ (TR)							
Total Well Depth (TD): 12.45	6400	4.89	0.199	30.4	35	3.45	0.0		1345	11.80
Static Water Level (WL): 3.55	8100	4.85	0.199	30.1	30	3.52	0.0		1355	11.80
One Casing Volume(gal/L): 1.4										
Start Purge (hrs): 1315										
End Purge (hrs): 1355										
Total Purge Time (min): 40										
Total Vol. Purged (gal/L): 8.1										

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	–
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	YES

OBSERVATIONS / NOTES:

MEAS. TD = 12.45
Stick up = 1.22'
SCREEN = 6'-11'

Circle if Applicable:

MS/MSD –
Duplicate ID No.: –

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-42I
Sample Location: TW-42I
Sampled By: T. ROJAHN
C.O.C. No.: 4586
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 9-23-07	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Time: 0805								
Method: SAME							68	

PURGE DATA:

	mL							TIME	
Date: 9-22-07	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	~~Other~~	WL
Method: Peristaltic	0	—	—	—	—	—	—	1430	11.68
Monitor Reading (ppm): —	3800	609	0.603	27.2	>110	4.51	0.0	1440	24.80
Well Casing Diameter & Material	DRY						→	1442	DRY
Type: 2" Ø PVC			~~See Low Flow Purge Data Sheets~~ TR						
Total Well Depth (TD): 25									
Static Water Level (WL): 11.68									
One Casing Volume(gal/L): 3.8 ~~4.0~~ TR									
Start Purge (hrs): 1430									
End Purge (hrs): 1442									
Total Purge Time (min): 12									
Total Vol. Purged (gal/L): ~3.8 ~~4.0~~ TR									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	—
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	YES

OBSERVATIONS / NOTES:

MEAS. TD: 25'
Stick up = 0.42'
SCREEN = 20-25'

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-43S
Sample Location: TW-43S
Sampled By: T. ROJAHN
C.O.C. No.: 4585
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	SAL ~~Other~~ ~~NA~~ %
Date: 9-22-07								
Time: 1555								
Method: SAME	Cloudy	5.43	0.176	29.9	360	0.05	189	0.0

PURGE DATA:

	Volume (ml)	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TIME ~~Other~~	WL
Date: 9-22-07									
Method: Peristaltic	0	—	—	—	—	—	—	1510	3.15
Monitor Reading (ppm): —	4,000	5.55	0.178	29.9	>1100	1.90	0.0	1520	4.21
Well Casing Diameter & Material	6000	5.44	0.179	30.0	240	0.39	0.0	1530	4.13
Type: 1"Ø PVC			~~See Low Flow Purge Data Sheets~~ (T-9)						
Total Well Depth (TD): 14.85	8000	5.42	0.178	29.8	230	0.21	0.0	1540	4.12
Static Water Level (WL): 3.15	9500	5.43	0.176	29.9	360	0.05	0.0	1550	4.04
One Casing Volume(gal/L): 1.8									
Start Purge (hrs): 1510									
End Purge (hrs): 1550									
Total Purge Time (min): 40									
Total Vol. Purged (gal/L): 9.5									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

MEAS. TD = 14.85'
Stick up = 0.52'
SCREEN = 9.5'-14.5'

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-44I
Sample Location: TW-44I
Sampled By: T. ROJAHN
C.O.C. No.: 4585
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 9-23-07	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Time: 0820								
Method: SAME								

PURGE DATA:

	mL							TIME	WL
Date: 9-22-07	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	~~Other~~	
Method: Peristaltic	0	—	—	—	—	—	—	16:25	6.75
Monitor Reading (ppm): —	4000	5.95	0.808	27.6	71100	8.13	0.0	1635	DRY
Well Casing Diameter & Material									
Type: 1" Ø PVC			~~See Low Flow Purge Data Sheets~~ TR						
Total Well Depth (TD): 25.0'									
Static Water Level (WL): 6.75									
One Casing Volume(gal/L): 3									
Start Purge (hrs): 1625									
End Purge (hrs): 1635									
Total Purge Time (min): 10									
Total Vol. Purged (gal/L): 3									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

MEAS. TD = 25.0'
SCREEN = 19.5 - 24.5'
Stick up = 0.58

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Tony Rojahn

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-45D
Sample Location: TW-45D
Sampled By: T. ROJAHN
C.O.C. No.: 4585
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	~~Other~~ SAL ~~NA~~ %
Date: 9-22-07								
Time: 1010								
Method: SAME	Cloudy	6.26	1.24	27.4	800	0.00	-40	0.1

PURGE DATA:

	Volume (mL)	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	~~Other~~ Time	WL
Date: 9-22-07									
Method: Peristaltic	0	—	—	—	—	—	—	0908	9.10
Monitor Reading (ppm): —	4,000	6.23	1.23	26.5	>1100	0.60	0.1	0918	11.90
Well Casing Diameter & Material	6,500	6.28	1.24	26.6	>1100	0.06	0.1	0928	10.60
Type: 1" Φ PVC			~~See Low Flow Purge Data Sheets~~ TR						
Total Well Depth (TD): 34'	9,000	6.31	1.24	26.6	>1100	0.00	0.1	0938	10.61
Static Water Level (WL): 9.10	10,500	6.33	1.24	27.1	>1100	0.00	0.1	0948	10.28
One Casing Volume(gal/L): 3.8	12,000	6.29	1.24	27.1	750	0.00	0.1	0958	10.24
Start Purge (hrs): 0908	13,500	6.26	1.24	27.4	800	0.00	0.1	1008	10.28
End Purge (hrs): 1008									
Total Purge Time (min): 60									
Total Vol. Purged (gal/L) 13.5									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

MEAS. TD = 34'
Stick up = 0.39'
Screen = 29-34'

Circle if Applicable:

MS/MSD —
Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-46S
Sample Location: TW-46S
Sampled By: T. ROWAHN
C.O.C. No.: 4586
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	Other SAL NA %
Date: 9/24/07								
Time: 1020								
Method: SAME	TURBID	6.99	0.363	26.5	>1100	2.32	-81	0.0

PURGE DATA:

	ML Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	TIME ~~Other~~	WL
Date: 9/23/07									
Method: PERISTALTIC	0	—	—	—	—	—	—	1415	8.76
Monitor Reading (ppm): —	3000	6.99	0.363	26.5	>1100	2.32	0.0	1425	14.15
Well Casing Diameter & Material	4000	—	—	—	—	—	—	1435	DRY
Type: 1" Ø PVC			~~See Low Flow Purge Data Sheets~~ TK						
Total Well Depth (TD): 15.0									
Static Water Level (WL): 8.76									
One Casing Volume(gal/L): 1									
Start Purge (hrs): 1415									
End Purge (hrs): 1435									
Total Purge Time (min): 20									
Total Vol. Purged (gal/L): 4									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	1 ~~(2)~~ L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

Stick up = 1.75'
SCREEN = 8'-13'

SLOW RECHARGE WELL

Circle if Applicable:

MS/MSD —
Duplicate ID No.: —

Signature(s): Terry Rowahn

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: PAI-27-TW-47I
Sample Location: TW-47I
Sampled By: T. ROJAHN
C.O.C. No.: 4585
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~ SAL ~~NA~~ %
Date: 9/23/07	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Time: 1345								
Method: SAME	Cloudy	6.40	290	23.9	320	0.00	-35	0.0

PURGE DATA:

	mL							TIME	
Date: 9/23/07	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	~~Other~~	WL
Method: PERISTALTIC	0	—	—	—	—	—	—	1300	7.85
Monitor Reading (ppm): —	4000	6.49	0.298	23.8	71100	0.96	0.0	1310	17.88
Well Casing Diameter & Material	6000	6.37	0.272	23.8	160	0.00	0.0	1320	15.42
Type: 1" Ø PVC			See Low Flow Purge Data Sheets (TC)						
Total Well Depth (TD): ~25.0	8000	6.41	0.292	23.6	550	0.00	0.0	1330	15.12
Static Water Level (WL): 7.85	10000	6.40	0.290	23.9	320	0.00	0.0	1340	14.88
One Casing Volume(gal/L): 2.8									
Start Purge (hrs): 1300									
End Purge (hrs): 1340									
Total Purge Time (min): 40									
Total Vol. Purged (gal/L): 10									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

MEAS. TD = 25.0'
Stickup = 1.12'
SCREEN = 19-24'

Circle if Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s): [signature]

C-13 PHASE I RI – GROUNDWATER SAMPLE LOG SHEETS

LOW FLOW PURGE DATA SHEETS

PERMANENT MONITORING WELLS

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-2I-01
Sample Location: MW 2I
Sampled By: T. ROJAHN
C.O.C. No.: 4585
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~ SAL ~~NA~~ %
Date: 9-21-07	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Time: 1910								
Method: SAME	CLEAR	6.41	0.254	24.0	8.5	0.00	-44	0.0

PURGE DATA:

Date: 9-21-07	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" Ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 27.27								
Static Water Level (WL): 7.48								
One Casing Volume(gal/L): 12.3								
Start Purge (hrs): 1725								
End Purge (hrs): 1905								
Total Purge Time (min): 100								
Total Vol. Purged (gal/L): 13.8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	NO

OBSERVATIONS / NOTES:

Stick up
Screen - 21.8 - 24.8'

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD Parris Island-Site 27
PROJECT NUMBER: G00455

WELL ID.: MW-2I
DATE: 9-21-07

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (% or ppt)	ORP (mV)	Comments (Volume & Color)
1725	7.48	0	—	—	—	—	—	—	—	Start Purge
1735	11.39	200	6.15	0.325	25.7	0.77	24.7	0.0	103	2000 Clear w/Precip - orange
1745	13.86	200	6.24	0.327	25.4	1.04	24.8	0.0	68	4000 " "
1755	15.85	200	6.31	0.324	32.8	0.97	24.8	0.0	31	6000 " "
1805	16.93	140	6.38	0.310	43.8	0.55	24.6	0.0	-8	7400 " "
1815	17.60	140	6.41	0.301	43.3	0.45	24.4	0.0	-21	8800 " "
1825	17.30	100	6.42	0.280	36.2	0.00	24.8	0.0	-42	9800 " "
1835	17.21	100	6.42	0.268	24.7	0.00	24.7	0.0	-46	10800 " "
1845	17.12	100	6.42	0.263	15.3	0.00	24.6	0.0	-47	11800 Clear —
1855	17.05	100	6.42	0.259	11.5	0.00	24.2	0.0	-46	12800 "
1905	16.99	100	6.41	0.254	8.5	0.00	24.0	0.0	-44	13800 "
1910	—	—	—	—	—	—	—	—	—	Start Sampling

SIGNATURE(S): [signature]

TOTAL DEPTH (BTOR): 27.27'
PUMP INTAKE SET AT (BTOR): 25'

Stick up

Screen = 21.8 - 24.8' BGS

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-3-01
Sample Location: MW 3
Sampled By: T. ROJAHN
C.O.C. No.: 4584
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	SAL ~~Other~~ ~~NA~~ %
Date: 9-21-07								
Time: 1300								
Method: SAME	CLEAR	6.93	0.155	27.2	1.14	4.35	127	0.0

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Date: 9-21-07								
Method: PERISTALTIC								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2" Ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 14.15								
Static Water Level (WL): 5.46								
One Casing Volume(gal/L) 5.6								
Start Purge (hrs): 1150								
End Purge (hrs): 1255								
Total Purge Time (min): 65								
Total Vol. Purged (gal/L) 13								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	NO

OBSERVATIONS / NOTES:

Flush Mount
SCREEN 4.15 - 14.15'

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD Parris Island-Site 27
PROJECT NUMBER: G00455

WELL ID.: MW-3
DATE: 9-21-07

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (% or ppt)	ORP (mV)	Comments (Volume & Color)
1150	5.46	0	—	—	—	—	—	—	—	Start Purge
1200	5.71	200	6.96	0.158	2.94	3.22	27.0	0.0	91	2000 CLEAR
1210	5.73	200	6.95	0.158	2.85	3.37	27.0	0.0	97	4000 "
1220	5.75	200	6.95	0.157	2.80	3.45	27.0	0.0	104	6000 "
1230	5.76	200	6.95	0.156	2.33	3.98	27.0	0.0	113	8000 "
1240	5.77	200	6.95	0.156	2.05	4.07	27.1	0.0	120	10000 "
1250	5.77	200	6.94	0.156	1.55	4.29	27.1	0.0	125	12000 "
1255	5.77	200	6.93	0.155	1.14	4.35	27.2	0.0	127	13000 "
1300	—	—	—	—	—	—	—	—	—	Start Sampling

SIGNATURE(S): [signature]

Flush Mount

SCREEN = 4.15 - 14.15'

TOTAL DEPTH (BTOR): 14.15
PUMP INTAKE SET AT (BTOR): 10'

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-4-01
Sample Location: MW-04
Sampled By: T. ROJAHN
C.O.C. No.: 4584
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~ SAL ~~NA~~ %
Date: 9-21-07	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Time: 1100								
Method: SAME	CLEAR	7.13	0.212	28.0	1.43	0.59	-26	0.0

PURGE DATA:

Date: 9-21-07	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: PERISTALTIC								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2"Ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 13.3								
Static Water Level (WL): 6.28								
One Casing Volume(gal/L) 4.3								
Start Purge (hrs): 10:05								
End Purge (hrs): 10:55								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): 9								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	NO

OBSERVATIONS / NOTES:

Flush Mount
SCREEN 3.3'-13.3'

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD Parris Island-Site 27
PROJECT NUMBER: G00455

WELL ID.: MW-04
DATE: 9/21/07

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (% or ppt)	ORP (mV)	Comments (Volume & Color)
1005	6.28	0	—	—	—	—	—	—	—	START PURGE
1015	6.70	200	7.20	0.217	11.5	2.13	27.9	0.0	-22	2000 CLEAR
1025	6.75	200	7.18	0.218	4.06	1.24	28.2	0.0	-26	4000 "
1035	6.80	200	7.16	0.216	3.11	0.78	28.2	0.0	-28	6000 "
1045	6.69	150	7.15	0.213	2.05	0.70	28.0	0.0	-28	7500 "
1055	6.69	150	7.13	0.212	1.43	0.59	28.0	0.0	-26	9000 "
1100	—	—	—	—	—	—	—	—	—	START SAMPLING

SIGNATURE(S): [illegible]

FLUSH MOUNT
SCREEN 3.3-13.3'

TOTAL DEPTH (BTOR): ~ 13.3
PUMP INTAKE SET AT (BTOR): 10'

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PA1-27-GW-SI-01
Sample Location: MW-05I
Sampled By: T. ROJAHN
C.O.C. No.: 4584
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	Other SAL ~~NA~~ %
Date: 9-21-07								
Time: 0925								
Method: SAME	Sl. Cloudy	6.98	0.237	24.9	192	0.00	-123	0.0

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Date: 9-21-07								
Method: PERISTALTIC								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" Ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 23.55								
Static Water Level (WL): 6.65								
One Casing Volume(gal/L) 10.5								
Start Purge (hrs): 0743								
End Purge (hrs): 0923								
Total Purge Time (min): 100								
Total Vol. Purged (gal/L): 18								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	NO

OBSERVATIONS / NOTES:

FLUSH MOUNT
SCREEN 20.55 - 23.55'

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD Parris Island-Site 27
PROJECT NUMBER: G00455

WELL ID.: MW-5I
DATE: 9-21-07

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (% or ppt)	ORP (mV)	Comments (Volume & Color)
0743	6.65	0	—	—	—	—	—	—	—	Start PURGE
0753	8.64	200	6.84	0.270	>1100	0.00	25.3	0.0	-130	2000 TURBID
0803	8.75	200	6.81	0.210	>1100	0.00	25.1	0.0	-99	4000 "
0813	9.07	200	6.84	0.216	580	0.00	25.2	0.0	-83	6000 Cloudy
0823	9.35	200	6.86	0.221	161	0.00	24.9	0.0	-82	8000 Sl Cloudy
0833	9.43	200	6.90	0.225	200	0.00	24.9	0.0	-101	10000 " "
0843	9.49	200	6.93	0.228	269	0.00	24.8	0.0	-116	12000 " "
0853	9.03	150	7.00	0.237	198	0.00	24.9	0.0	-126	13500 " "
0903	8.95	150	7.00	0.237	132	0.00	25.0	0.0	-126	15000 " "
0913	8.91	150	6.98	0.235	108	0.00	24.9	0.0	-123	16500 V. Sl. Cloudy
0923	8.89	150	6.98	0.237	142	0.00	24.9	0.0	-123	18000 Sl. Cloudy
0925	—	—	—	—	—	—	—	—	—	Start Sampling

SIGNATURE(S): [signature]

FLUSH MOUNT
SCREEN 20.55 - 23.55

TOTAL DEPTH (BTOR): ~ 23.55
PUMP INTAKE SET AT (BTOR): 21.55

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-6-01
Sample Location: MW-6
Sampled By: T. ROJAHN
C.O.C. No.: 4587
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	~~Other~~ SAL ~~NA~~ %
Date: 9-26-07								
Time: 1255								
Method: SAME	V. S. cloudy w/percip.	6.74	0.484	26.8	67.5	0.26	-118	0.0

PURGE DATA:

Date: 9-26-07	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: PERISTALTIC								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" Ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 16.20								
Static Water Level (WL): 9.76								
One Casing Volume(gal/L)								
Start Purge (hrs): 0825								
End Purge (hrs): 0940								
Total Purge Time (min): 75								
Total Vol. Purged (gal/L): 9.2								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

Strong Hydrocarbon odor w/ sheen
Dried out well

Circle if Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD Parris Island-Site 27
PROJECT NUMBER: G00455

WELL ID.: MW-6
DATE: 9-26-07

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (% or ppt)	ORP (mV)	Comments (Volume & Color)
0825	9.76	0	—	—	—	—	—	—	—	START PURGE
0835	11.13	300	6.54	0.466	96.8	0.51	27.1	0.0	-122	3000 V.Sl Cloudy
0845	12.61	150	6.52	0.477	29.6	0.26	26.8	0.0	-134	4500 CLEAR
0855	13.63	150	6.67	0.476	67.2	1.23	26.3	0.0	-169	6000 V.Sl Cloudy → LOWERED Tubing
0905	14.05	80	6.62	0.484	65.6	0.43	26.5	0.0	-164	6800 " " "
0915	14.25	80	6.68	0.484	64.5	0.35	26.6	0.0	-120	7600 " " "
0925	15.95	80	6.71	0.484	63.7	0.28	26.7	0.0	-120	8400 " " "
0935	15.95	80	6.74	0.484	67.5	0.26	26.8	0.0	-118	9200 " " "
0940	—	—	—	—	—	—	—	—	—	DRY
1255	—	—	—	—	—	—	—	—	—	Start Sampling

SIGNATURE(S): [signature]

Strong Hydrocarbon Odor

TOTAL DEPTH (BTOR): 16.20'
PUMP INTAKE SET AT (BTOR): 15.70'

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-9-01
Sample Location: MW-9
Sampled By: T. ROJAHN
C.O.C. No.: 4584
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~
Date: 9-20-07	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL ~~NA~~ %
Time: 1705								
Method: SAME	CLEAR	7.26	0.365	27.4	3.38	0.10	-134	0.0

PURGE DATA:

Date: 9-20-07	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" Ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 14.0*								
Static Water Level (WL): 7.61								
One Casing Volume(gal/L): ~4								
Start Purge (hrs): 1600								
End Purge (hrs): 1700								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	NO

OBSERVATIONS / NOTES:

* 14.0' = bottom of SCREEN (Flush mount); however, obstruction @ 8.9'

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Ty Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD Parris Island-Site 27
PROJECT NUMBER: G00455

WELL ID.: MW-9
DATE: 9-20-07

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (% or ppt)	ORP (mV)	Comments (Volume & Color)
1600	7.61	—	—	—	—	—	—	—	—	Start Purge
1610	7.78	150	7.21	0.395	107	0.41	27.6	0.0	-139	1500 Sl. Cloudy
1620	7.79	150	7.25	0.379	21.2	0.22	27.5	0.0	-145	3000 CLEAR
1630	7.79	150	7.26	0.375	7.24	0.15	27.5	0.0	-142	4500 "
1640	7.79	150	7.26	0.369	5.32	0.13	27.5	0.0	-138	6000 "
1650	7.79	150	7.26	0.368	3.61	0.11	27.4	0.0	-136	7500 "
1700	7.79	150	7.26	0.365	3.38	0.10	27.4	0.0	-134	8000 "
1705	—	—	—	—	—	—	—	—	—	Start SAMPLING

obstruction @ 8.9' could be roots - CAME UP IN pump tubing

SIGNATURE(S): Ty Nyk

TOTAL DEPTH (BTOR): 8.9 MEAS. Historic Bottom of SCREEN = 14'
PUMP INTAKE SET AT (BTOR): 8.9'
Flush Mount SCREEN 4-14'

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-14-01
Sample Location: MW14
Sampled By: T. ROJAHN
C.O.C. No.: 4584
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~ SAL ~~NA~~ %
Date: 9-20-07	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Time: 1215								
Method: SAME	CLEAR	6.79	0.125	26.4	19	0.10	26.4	0.0

PURGE DATA:

Date: 9-20-07	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: PERISTALTIC								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" Φ PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 15.7'								
Static Water Level (WL): 9.21'								
One Casing Volume(gal/L): 4								
Start Purge (hrs): 1110								
End Purge (hrs): 1210								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 11								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	—

OBSERVATIONS / NOTES:

Stick up
SCREEN = 3.2' - 13.2'

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD Parris Island-Site 27
PROJECT NUMBER: G00455

WELL ID.: MW 14
DATE: 9-20-07

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (% or ppt)	ORP (mV)	Comments (Volume & Color)
1110	9.21	0	—	—	—	—	—	—	-	START PURGE
1120	10.06	200	6.91	0.141	130	1.48	26.4	0.0	68	2,000 Sl. Cloudy
1130	10.19	200	6.82	0.135	28	1.23	26.6	0.0	1	4,000 CLEAR
1140	10.31	200	6.73	0.124	23	0.12	26.7	0.0	-49	6,000 "
1150	10.38	200	6.75	0.130	22	0.10	26.6	0.0	-72	8,000 "
1200	10.29	100	6.78	0.126	23	0.10	26.5	0.0	-85	9,000 "
1205	10.25	100	6.79	0.126	20	0.10	26.4	0.0	-92	10,000 "
1210	10.23	100	6.79	0.125	19	0.10	26.4	0.0	-95	11,000 "
1215	—	—	—	—	—	—	—	—	-	START SAMPLING

SIGNATURE(S): Terry Rojas

TOTAL DEPTH (BTOR): 15.7
PUMP INTAKE SET AT (BTOR): 12.7

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-15I-01
Sample Location: MW15I
Sampled By: T. ROJAHN
C.O.C. No.: 4584
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~ SAL ~~NA~~ %
Date: 9-20-07								
Time: 1400	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: SAME	CLEAR	6.23	0.299	24.7	9.33	0.10	-82	0.0

PURGE DATA:

Date: 9-20-07	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2" ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 24.25								
Static Water Level (WL): 9.54								
One Casing Volume(gal/L) 9.3								
Start Purge (hrs): 1245								
End Purge (hrs): 1355								
Total Purge Time (min): 70								
Total Vol. Purged (gal/L) 14.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	3 X (3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	3X (2) L Glass Amber	YES
TCL Pesticides	4°C	3X (2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	NO

OBSERVATIONS / NOTES:

Stick up
SCREEN 21'-24' one sat. SCREEN vol. = 1.9 L

Circle if Applicable:

MS/MSD YES

Duplicate ID No.: ——

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD Parris Island-Site 27
PROJECT NUMBER: G00455

WELL ID.: MW 15 I
DATE: 9-20-07

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (% or ppt)	ORP (mV)	Comments (Volume & Color)
1245	9.54	–	–	–	–	–	–	–	–	Start PURGE
1255	10.56	250	6.30	0.340	150	0.10	25.0	0.0	-78	2500 Sl. Cloudy
1305	10.69	250	6.22	0.306	100	0.10	24.6	0.0	-79	5000 Sl. Cloudy
1315	10.72	250	6.21	0.302	60	0.10	24.5	0.0	-79	7500 V.Sl. Cloudy
1325	10.75	250	6.21	0.300	58.5	0.10	24.6	0.0	-80	10000 " " "
1335	10.54	150	6.22	0.299	34.6	0.10	24.8	0.0	-79	11500 CLEAR
1345	10.54	150	6.22	0.298	16.0	0.10	24.8	0.0	-80	13000 "
1355	10.56	150	6.23	0.299	9.33	0.10	24.7	0.0	-82	14500 "
1400	–	–	–	–	–	–	–	–	–	Start SAMPLING

SIGNATURE(S): Terry Rogal

TOTAL DEPTH (BTOR): 24.25
PUMP INTAKE SET AT (BTOR): 22.00

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD Parris Island
Project No.: 112G00455, CTO 039

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PA1-27-GW-16-01
Sample Location: MW-16
Sampled By: T. ROJAHN
C.O.C. No.: 4584
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 9-20-07	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~ SAL ~~NA~~ %
Time: 1840	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: SAME	CLEAR	6.09	0.061	27.7	5.25	0.00	158	0.0

PURGE DATA:

Date: 9-20-07	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: PERISTALTIC								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" Ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 13.6								
Static Water Level (WL): 7.25								
One Casing Volume(gal/L): 4								
Start Purge (hrs): 1745								
End Purge (hrs): 1835								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): 9								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	4°C/HCl	(3) 40ml Vails	YES
TCL SVOCS & PAHs	4°C	(2) L Glass Amber	YES
TCL Pesticides	4°C	(2) L Glass Amber	YES
TCL Pesticides & PCBs	4°C	(2) L Glass Amber	NO

OBSERVATIONS / NOTES:

FLUSH MOUNT
3.6-13.6'

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD Parris Island-Site 27
PROJECT NUMBER: G00455

WELL ID.: MW-16
DATE: 9-20-07

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (% or ppt)	ORP (mV)	Comments (Volume & Color)
1745	7.25	0	–	–	–	–	–	–	–	Start PURGE
1755	7.35	180	6.17	0.062	17.4	0.05	27.7	0.0	137	CLEAR 1800
1805	7.35	180	6.14	0.059	13.3	0.00	27.7	0.0	142	" 3600
1815	7.35	180	6.12	0.060	10.2	0.00	27.7	0.0	150	" 5400
1825	7.35	180	6.10	0.060	8.80	0.00	27.7	0.0	154	" 7200
1835	7.35	180	6.09	0.061		0.00	27.7	0.0	158	" 9000
1840	–	–	–	–	–	–	–	–	–	Start SAMPLING

SIGNATURE(S): [illegible]

TOTAL DEPTH (BTOR): ~13.6'
PUMP INTAKE SET AT (BTOR): 10'

C-14 PHASE II RI – GROUNDWATER SAMPLE LOG SHEETS

LOW FLOW PURGE DATA SHEETS

PERMANENT MONITORING WELLS

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-018-02
Sample Location: PI055MW01
Sampled By: T. ROJAHN
C.O.C. No.: 4057
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8-06-08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1120	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL % NA
Method: SAME	CLEAR	6.36	9	29.1	19	0.56	4	0.0

PURGE DATA:

Date: 8-06-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 14.75								
Static Water Level (WL): 7.46								
One Casing Volume(gal/L): 4.5								
Start Purge (hrs): 1005								
End Purge (hrs): 1115								
Total Purge Time (min): 70								
Total Vol. Purged (gal/L): 11								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	(2) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PI055MW01 PAI-27-GW-015-02
DATE: 8-06-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1005	7.46	—	—	—	—	—	—	—	—	Start PURGE
1015	8.40	200	6.33	8	39	3.82	27.8	0.0	25	2000 CLEAR
1025	8.50	150	6.28	10	21	1.46	27.7	0.0	16	3500 "
1035	8.58	150	6.28	8	15	0.80	27.9	0.0	8	5000 "
1045	8.44	150	6.31	9	20	0.71	27.7	0.0	7	6500 "
1055	8.44	150	6.35	9	22	0.69	27.8	0.0	3	8000 "
1105	8.40	150	6.36	9	16	0.32	27.9	0.0	3	9500 "
1115	8.41	150	6.36	9	19	0.56	29.1	0.0	4	1100 "
1120	—	—	—	—	—	—	—	—	—	Start SAMPLING

SIGNATURE(S): Terry Rojas

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-02I-02
Sample Location: PAI-27-MW-2I
Sampled By: T. ROJAHN
C.O.C. No.: 4057
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 8-06-08	Visual	Standard	mS/cm	^{0}C	NTU	mg/l	mV	SAL % NA
Time: 1410								
Method: SAME	CLEAR	6.04	22	26.9	7.8	0.00	-70	0.0

PURGE DATA:

Date: 8-06-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: PERISTALTIC								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2"Φ PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 27.27								
Static Water Level (WL): 7.61								
One Casing Volume(gal/L): 12.3								
Start Purge (hrs): 1205								
End Purge (hrs): 1405								
Total Purge Time (min): 120								
Total Vol. Purged (gal/L): 21								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	(2) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27-MW-2I
DATE: 8-06-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1205	7.61	—	—	—	—	—	—	—	—	Start PURGE
1215	10.80	200	5.66	24	95	0.00	26.2	0.0	6	2000 V.SI Cloudy
1225	12.73	200	5.70	24	9.5	0.32	26.5	0.0	0	4000
1235	13.80	200	5.73	24	95	0.48	26.7	0.0	-8	6000
1245	14.62	200	5.86	24	61	0.00	26.5	0.0	-37	8000
1255	15.16	200	5.90	24	33	0.00	26.4	0.0	-44	10000 CLEAR
1305	15.67	200	5.94	24	17	0.00	26.3	0.0	-52	12000
1315	15.89	150	5.97	24	16	0.00	26.5	0.0	-56	13500
1325	16.05	150	5.99	23	16	0.00	26.6	0.0	-59	15000
1335	16.46	150	6.00	22	7.6	0.00	27.0	0.0	-67	16500
1345	16.48	150	6.05	22	7.8	0.00	27.4	0.0	-75	18000
1355	16.53	150	6.04	22	7.6	0.00	27.1	0.0	-70	19500
1405	16.58	150	6.04	22	7.8	0.00	26.9	0.0	-70	21000
1410	—	—	—	—	—	—	—	—	—	Start SAMPLING

SIGNATURE(S): Terry Rigel

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-045-02
Sample Location: PAI-27-MW-4
Sampled By: T. ROJAHN
C.O.C. No.: 4057
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8-06-08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 0845	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL NA %
Method: SAME	CLEAR	6.21	24	26.7	1.3	0.00	-197	0.0

PURGE DATA:

Date: 8-06-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2"Φ, PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 13.3								
Static Water Level (WL): 7.21								
One Casing Volume(gal/L): 4								
Start Purge (hrs): 0740								
End Purge (hrs): 0840								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 10.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	(1) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

Sulfur ODOR

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	FD080608 01

Signature(s): Tony Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27-MW-4
DATE: 8-06-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
0740	7.21	—	—	—	—	—	—	—	—	Start PURGE
0750	7.68	200	6.08	23	4.8	0.00	26.8	0.0	-139	2000ml CLEAR
0800	8.12	200	6.16	24	1.4	4.13	26.8	0.0	-159	4000 ml CLEAR
0810	8.35	200	6.18	25	1.2	3.66	26.8	0.0	-172	6000 ml CLEAR
0820	8.34	150	6.20	24	1.2	0.00	26.7	0.0	-188	7500ml CLEAR
0830	8.36	150	6.20	24	1.4	0.00	26.7	0.0	-194	9000ml CLEAR
0840	8.38	150	6.21	24	1.3	0.00	26.7	0.0	-197	10500ml CLEAR
0845	—	—	—	—	—	—	—	—	—	Start SAMPLING

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-05I-02
Sample Location: PAI-27-MW-5I
Sampled By: T. ROSAHN
C.O.C. No.: 4057
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~ SAL
Date: 08-05-08	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA %
Time: 1625								
Method: SAME	CLEAR	665	20	27.5	50	0.00	-133	0.0

PURGE DATA:

Date: 08-05-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: PERISTALTIC								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2"Φ PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 23.55								
Static Water Level (WL): 7.22								
One Casing Volume(gal/L): 10								
Start Purge (hrs): 1422								
End Purge (hrs): 1622								
Total Purge Time (min): 130								
Total Vol. Purged (gal/L) 18.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	(2) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

FLUSH MOUNT
SCREEN 20.55'-23.55'

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Troy [illegible]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27-MW-5I
DATE: 8-05-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1422	7.22	—	—	—	—	—	—	—	—	
1432	9.31	200	6.04	16	48	0.00	25.4	0.0	-66	2000 CLEAR
1442	9.40	150	6.12	17	270	0.00	27.5	0.0	-89	3500 CLOUDY
1452	9.33	150	6.29	18	190	0.00	27.3	0.0	-107	5000 SL. CLOUDY
1502	9.33	150	6.39	19	160	0.00	27.1	0.0	-120	6500 SL. CLOUDY
1512	9.28	150	6.44	19	100	0.00	27.7	0.0	-120	8000 V.SL. CLOUDY
1522	9.40	150	6.47	19	90	0.00	26.6	0.0	-124	9500 V.SL. CLOUDY
1532	9.42	150	6.48	19	90	0.00	26.1	0.0	-123	11000 V.SL. CLOUDY
1542	9.35	150	6.56	19	75	0.00	27.6	0.0	-134	12500 V.SL. CLOUDY
1552	9.28	150	6.65	19	95	0.00	27.5	0.0	-137	14000 V.SL. CLOUDY
1602	9.25	150	6.67	20	75	0.00	27.5	0.0	-137	15500 V.SL. CLOUDY
1612	9.30	150	6.66	20	55	0.00	26.7	0.0	-135	17000 CLEAR
1622	9.25	150	6.65	20	50	0.00	27.5	0.0	-133	18500 CLEAR
1625	—	—	—	—	—	—	—	—	—	START SAMPLING

SIGNATURE(S): Tony Rojas

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-065-02 (HOT)
Sample Location: PAI-27MW06
Sampled By: T. ROJAHN
C.O.C. No.: 4068
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 8-14-08	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Time: 1545								
Method: SAME	SHEEN	—	—	—	—	—	—	—

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Date: 8-13-08								
Method: Peristaltic								
Monitor Reading (ppm): -								
Well Casing Diameter & Material								
Type: 2" ø PVC	See Low Flow Purge Data Sheets							
Total Well Depth (TD): 16.20								
Static Water Level (WL): 10.60								
One Casing Volume(gal/L): 3.7								
Start Purge (hrs): 1740								
End Purge (hrs): 1757								
Total Purge Time (min): 17								
Total Vol. Purged (gal/L): 3.4								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

PRODUCT @ 10.56
W.L. @ 10.60
SCREEN -
DRIED out WELL - SAME NEXT day

DIDN'T RUN WATER quality - Strong Hydrocarbon odor & PRESENCE OF PRODUCT could damage METER PROBES!

Circle if Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27MW106
DATE: 8-13-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1740	10.60	0	–	–	–	–	–	–	–	START PURGE
1750	14.15	200	–	–	–	–	–	–	–	2000 SHEEN
1757	DRY	200	–	–	–	–	–	–	–	3400 "

SIGNATURE(S): Terry Rojek

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-07I-02 Possibl Hot
Sample Location: P1055MW07I
Sampled By: T. ROJAHN
C.O.C. No.: 4068
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 8-14-08	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL ~~NA~~ %
Time: 1520								
Method: SAME	CLEAR	5.77	22	26.3	0.90	0.00	-37	0.0

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Date: 8-14-08								
Method: Peristaltic								
Monitor Reading (ppm): –								
Well Casing Diameter & Material Type: 2"Φ PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 29.6								
Static Water Level (WL): 11.24								
One Casing Volume(gal/L): 11.5								
Start Purge (hrs): 1430								
End Purge (hrs): 1515								
Total Purge Time (min): 45								
Total Vol. Purged (gal/L): 6.3								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

SCREEN 24.5 - 27.5'
11.23 - PRODUCT
11.24 - W.L.
1 SAT. SCREEN Vol = 1.9L

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PI055MW07I
DATE: 8/14/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1430	11.24	—	—	—	—	—	—	—	—	Start PURGE
1440	12.29	140	5.79	23	2.3	0.00	25.9	0.0	-22	1400 CLEAR
1450	12.39	140	5.78	22	2.0	0.00	26.1	0.0	-27	2800 CLEAR
1500	12.44	140	5.78	22	1.7	0.00	26.0	0.0	-33	4200 CLEAR
1510	12.47	140	5.78	22	1.2	0.00	26.1	0.0	-36	5600 CLEAR
1515	12.48	140	5.77	22	0.90	0.00	26.3	0.0	-37	6300 CLEAR
1520	—	—	—	—	—	—	—	—	—	Start Sampling

SIGNATURE(S): Troy [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-08D-02 Possible Hot
Sample Location: PI055MW08D
Sampled By: T. ROJAHN
C.O.C. No.: 4067 & 4068
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8-14-08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1305	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL ~~NA~~ %
Method: SAME	CLEAR	7.28	47	2.49	1.6	0.00	-169	0.0

PURGE DATA:

Date: 8-14-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): -								
Well Casing Diameter & Material								
Type: 2" Ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 38.7								
Static Water Level (WL): 15.92								
One Casing Volume(gal/L) 42								
Start Purge (hrs): 1155								
End Purge (hrs): 1300								
Total Purge Time (min): 65								
Total Vol. Purged (gal/L) 9.8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

SCREEN 33-36'
1 SAT. SCREEN VOL = 1.9L

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):
—	PAI ~~DL~~-27-DU-081408-01 (TC)	[signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PI055MW08D
DATE: 8/14/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1155	15.92	0	—	—	—	—	—	—	—	Start PURGE
1205	18.30	150	7.34	53	2.8	0.00	24.6	0.0	-175	1500 CLEAR
1215	19.31	150	7.33	53	1.9	0.00	25.0	0.0	-172	3000 "
1225	19.75	150	7.32	51	2.5	0.00	24.8	0.0	-171	4500 "
1235	20.24	150	7.32	50	2.0	0.00	24.9	0.0	-173	6000 "
1245	20.54	150	7.29	49	1.5	0.00	25.2	0.0	-170	7500 "
1255	20.65	150	7.28	47	1.2	0.00	24.9	0.0	-169	9000 "
1300	20.68	150	7.28	47	1.6	0.00	24.9	0.0	-169	9750 "
1305	—	—	—	—	—	—	—	—	—	Start PURGE

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: NA
Sample Location: PAI-27-MW-9
Sampled By: NA
C.O.C. No.: NA
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8-07-08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: —	Visual	Standard	mS/cm	^{0}C	NTU	mg/l	mV	NA
Method: —	—							

PURGE DATA:

Date: —	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: —								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type:			See Low Flow Purge Data Sheets					
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 Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	(1) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

OBSTRUCTION NOW @ 8.35' - DRY WELL
MUCK & VEG ON WATER LEVEL PROBE

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-105-02
Sample Location: PZ055MW10
Sampled By: T. ROJAHN
C.O.C. No.: 4060
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8-10-08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1140	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Method: SAMPLE	Clear - Sl cloudy	6.47	42	23.0	150	0.00	160	0.0

PURGE DATA:

Date: 8-09-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): -								
Well Casing Diameter & Material								
Type: 2" ϕ PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 14.25								
Static Water Level (WL): 10.35								
One Casing Volume(gal/L): 2.5								
Start Purge (hrs): 1339								
End Purge (hrs): 1408								
Total Purge Time (min): 29								
Total Vol. Purged (gal/L): 3.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PI055MW10
DATE: 08-09-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1339	10.35	—	—	—	—	—	—	—	—	START PURGE
1349	12.00	200	6.54	43	140	2.89	25.0	0.0	152	2000 sl. Cloudy
1359	13.25	150	6.47	42	150	0.00	23.0	0.0	160	3500 sl. Cloudy
1408	DRY								→	DRY WELL
1418	13.31	—	—	—	—	—	—	—	—	RECHARGE
1428	12.68	—	—	—	—	—	—	—	—	↓
1438	12.10	—	—	—	—	—	—	—	—	

SIGNATURE(S): Terry Rogers

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-115-02
Sample Location: PI055MW11
Sampled By: T. ROJAHN
C.O.C. No.: 4060
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	Other SAL % NA
Date: 8-11-08								
Time: 1535								
Method: SAME	CLEAR	5.98	17	26.2	4.9	0.00	-96	0.0

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Date: 8-11-08								
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2"Ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 16.65								
Static Water Level (WL): 12.15								
One Casing Volume(gal/L): 2.8								
Start Purge (hrs): 1420								
End Purge (hrs): 1530								
Total Purge Time (min): 70								
Total Vol. Purged (gal/L): 7.9								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

PRODUCT 11.38
W.L. 12.15
SCREEN 4-14

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PI055MW11
DATE: 08-11-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1420	12.15	—	—	—	—	—	—	—	—	Start PURGE
1430	13.33	130	5.65	14	7.9	0.00	26.1	0.0	-52	1300 CLEAR
1440	(TR) ~~13.66~~ 13.66	110	5.72	14	7.7	0.00	26.2	0.0	-63	2400 CLEAR
1450	13.85	110	5.76	14	6.3	0.00	26.3	0.0	-71	3500 CLEAR
1500	14.02	110	5.82	15	4.3	0.00	26.2	0.0	-80	4600 CLEAR
1510	14.08	110	5.91	16	4.8	0.00	26.3	0.0	-86	5700 CLEAR
1520	14.12	110	5.95	16	5.0	0.00	26.2	0.0	-92	6800 CLEAR
1530	14.15	110	5.98	17	4.9	0.00	26.2	0.0	-96	7900 CLEAR
1535	—	—	—	—	—	—	—	—	—	Start SAMPLING

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27GW-12I-02
Sample Location: P1055 MW 12I
Sampled By: T. ROJAHN
C.O.C. No.: 4060
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 08-11-08	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL % NA
Time: 1235								
Method: SAME	CLEAR	5.89	17	25.5	2.6	0.00	31	0.0

PURGE DATA:

Date: 08-11-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2"Φ PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 24.3								
Static Water Level (WL): 11.54								
One Casing Volume(gal/L): 8.2								
Start Purge (hrs): 1139								
End Purge (hrs): 1229								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): 7.4								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

SCREEN - 21' - 24'
PRODUCT 11.53
W.L. 11.54
SCREEN VOL = 2.5L

Circle if Applicable:

MS/MSD —
Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: P1055MW12I
DATE: 08-11-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1139	11.54	–	–	–	–	–	–	–	–	Start PURGE
1149	14.26	200	5.74	18	6.6	0.00	25.1	0.0	47	2000 CLEAR
1159	14.54	150	5.83	18	5.6	0.00	25.5	0.0	38	3500 "
1209	14.40	130	5.85	18	4.5	0.00	25.5	0.0	34	4800 "
1219	14.43	130	5.87	17	2.8	0.00	25.6	0.0	32	6100 "
1229	14.45	130	5.89	17	2.6	0.00	25.5	0.0	31	7400 "
1235	–	–	–	–	–	–	–	–	–	START SAMPLING

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-13D-02
Sample Location: PI055MW13D
Sampled By: T. ROJAHN
C.O.C. No.: 4060
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other SAL %
Date: 8-11-08	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Time: 0955								
Method: SAME	CLEAR	6.73	53	24.3	0.25	0.00	-153	0.0

PURGE DATA:

Date: 8-11-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2"Φ PVC	See Low Flow Purge Data Sheets							
Total Well Depth (TD): 39.15								
Static Water Level (WL): 15.82								
One Casing Volume(gal/L): 8.7								
Start Purge (hrs): 0852								
End Purge (hrs): 0952								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 7								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

SCREEN 36'-39'
PRODUCT = 15.80
WL = 15.82
SCREEN VOL = 1.9 L

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PI055MW13D
DATE: 08-11-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
0852	15.82	—	—	—	—	—	—	—	—	START PURGE
0902	18.88	200	6.61	47	6.3	0.00	24.0	0.0	-73	2000 NO ODOR
0912	19.59	100	6.68	49	2.8	0.00	24.2	0.0	-117	3000 " "
0922	19.85	100	6.70	51	2.3	0.00	24.2	0.0	-141	4000 " "
0932	19.98	100	6.73	52	0.75	0.00	24.4	0.0	-151	5000 " "
0942	20.02	100	6.74	53	0.15	0.00	24.3	0.0	-154	6000 " "
0952	20.03	100	6.73	53	0.25	0.00	24.3	0.0	-153	7000 " "
0955	—	—	—	—	—	—	—	—	—	START SAMPLING

SIGNATURE(S): Terry Rojas

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-145-02
Sample Location: PAI-27-MW-14
Sampled By: T. ROSAHN
C.O.C. No.: 4058
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	Other SAL NA %
Date: 8-08-08								
Time: 1250								
Method: SAME	V.Sl.Cloudy	6.23	18	26.0	75	0.00	-55	0.0

PURGE DATA:

Date: 8-08-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2"Ø PVC		See Low Flow Purge Data Sheets						
Total Well Depth (TD): ~~15.7'~~ → 16.8		(REMOVE SEDI)						
Static Water Level (WL): 10.3		DUE to high Turbidity						
One Casing Volume(gal/L): ~~3.4~~ → 4								
Start Purge (hrs): 0835								
End Purge (hrs): 0955								
Total Purge Time (min): 1015								
Total Vol. Purged (gal/L): 21.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	(2) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

SCREEN - 3.2' - 13.2'

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Terry Rosahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27-MW-14
DATE: 8-08-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
0835	10.30	—	—	—	—	—	—	—	—	START PURGE
0845	10.83	250	6.15	10	20	0.00	26.0	0.0	-96	2500 CLEAR
0855	11.37	200	6.17	10	5.3	0.00	26.0	0.0	-112	4500 CLEAR
0905	11.90	150	6.24	10	46	0.00	26.0	0.0	-115	6000 CLEAR
0915	12.36	150	6.28	10	170	0.00	25.9	0.0	-95	7500 SL. CLOUDY
0925	12.59	150	6.30	10	270	0.00	26.0	0.0	-85	9000 SL. CLOUDY
0935	12.85	150	6.28	10	385	0.000	26.0	0.0	-77	10500 CLOUDY
0945	13.13	150	6.25	10	500	0.00	25.9	0.0	-70	12000 CLOUDY
0955	13.30	150	6.25	10	1000+	0.00	26.0	0.0	-65	13500 TURBID
0955	13.30	400	REMOVE LOW FLOW CELL - PUMP HARD TO REMOVE							HEAVY SEDI / CLEAN UP WELL
1015	16.8	—	—	—	—	—	—	—	—	DRY OUT WELL 21500 ml
1245	11.84	0	6.23	13	75	0.00	26.0	0.0	-55	
1250	—	—	—	—	—	—	—	—	—	SAMPLE TIME

SIGNATURE(S): Terry Rojas

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-15I-02
Sample Location: PAI-27-MW-15I
Sampled By: T. ROJAHN
C.O.C. No.: 4058
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 8-08-08	Visual	Standard	mS/cm	^{0}C	NTU	mg/l	mV	SAL % NA
Time: 1205								
Method: SAMS	CLEAR	5.91	29	25.0	6.9	0.00	-169	0.0

PURGE DATA:

Date: 8-08-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" & PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 24.25								
Static Water Level (WL): 10.52								
One Casing Volume(gal/L): 8.7								
Start Purge (hrs): 1030								
End Purge (hrs): 1200								
Total Purge Time (min): 90								
Total Vol. Purged (gal/L): 17								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	(2) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	
—	—	

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27-MW-15I
DATE: 8-08-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1030	10.52	—	—	—	—	—	—	—	—	Start PURGE
1040	11.58	200	5.96	30	65	0.00	24.5	0.0	-139	2000 V.Sl. Cloudy
1050	11.65	200	5.92	29	55	0.00	24.4	0.0	-146	4000 CLEAR
1100	11.63	200	5.91	29	26	0.00	24.6	0.0	-153	6000 CLEAR
1110	11.60	200	5.91	29	30	0.00	24.6	0.0	-157	8000 CLEAR
1120	11.60	200	5.92	29	34	0.00	24.8	0.0	-159	10000 CLEAR
1130	11.60	200	5.90	29	40	0.00	25.1	0.0	-163	12000 CLEAR
1140	11.60	200	5.91	29	20	0.00	24.9	0.0	-166	14000 CLEAR
1150	11.58	150	5.91	29	13	0.00	24.9	0.0	-168	15500 CLEAR
1200	11.58	150	5.91	29	6.9	0.00	25.0	0.0	-169	17000 CLEAR
1205	—	—	—	—	—	—	—	—	—	Start SAMPLING

SIGNATURE(S): Terry Rogers

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-165-02
Sample Location: PAI-27-MW-16
Sampled By: T. ROSAHN
C.O.C. No.: 4060
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 8-09-08	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL % NA
Time: 0915								
Method: SAMS	CLEAR	5.36	4	26.5	9.9	0.00	187	0.0

PURGE DATA:

Date: 8-09-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: PERISTALTIC								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2"Ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 13.60								
Static Water Level (WL): 8.05								
One Casing Volume(gal/L): 3.5								
Start Purge (hrs): 0800								
End Purge (hrs): 0910								
Total Purge Time (min): 70								
Total Vol. Purged (gal/L): 11								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	(1) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

SCREEN 4-16'
Flush mount

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Ty Rogal

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27-MW-16
DATE: 08-09-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
0800	8.05	—	—	—	—	—	—	—	—	Start PURGE
0810	8.18	200	5.24	4	30	0.00	26.5	0.0	199	2000 CLEAR
0820	8.19	150	5.30	4	17	0.00	26.5	0.0	193	3500 CLEAR
0830	8.19	150	5.27	4	16	0.00	26.4	0.0	192	5000 CLEAR
0840	8.19	150	5.31	4	14	0.00	26.5	0.0	190	6500 CLEAR
0850	8.19	150	5.34	4	13	0.00	26.5	0.0	188	8000 CLEAR
0900	8.19	150	5.33	4	11	0.00	26.5	0.0	189	9500 CLEAR
0910	8.19	150	5.36	4	9.9	0.00	26.5	0.0	187	11000 CLEAR
0915	—	—	—	—	—	—	—	—	—	Start SAMPLING

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-175-02
Sample Location: P1055MW17
Sampled By: T. ROJAHN
C.O.C. No.: 4058
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 8-07-08	Visual	Standard	mS/cm	^{0}C	NTU	mg/l	mV	SAL %
Time: 1810								
Method: SAME	CLEAR	5.99	14	30.8	190	2.26	143	0.0

PURGE DATA:

Date: 8-07-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): -								
Well Casing Diameter & Material								
Type: 2"Φ PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 13.4								
Static Water Level (WL): 5.34								
One Casing Volume(gal/L): 5								
Start Purge (hrs): 1400								
End Purge (hrs): 1805								
Total Purge Time (min): 190								
Total Vol. Purged (gal/L): 30								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	(2) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

SCREEN - 4-14'

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: P1055MW17
DATE: 8-07-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1400	5.34	—	—	—	—	—	—	—	—	Start PURGE
1410	6.18	200	5.69	15	29	4.63	33.8	0.0	75	2000 CLEAR
1420	6.60	200	5.75	15	48	4.17	33.9	0.0	80	4000 CLEAR
1430	7.15	200	5.79	15	85	3.77	33.7	0.0	88	6000 V.Sl. Cloudy
1440	7.48	150	5.78	15	345	3.94	33.5	0.0	97	7500 CLOUDY
1450	7.70	150	5.80	15	550	3.84	33.7	0.0	98	9000 CLOUDY
1500	7.93	150	5.88	15	700	3.44	33.9	0.0	97	10500 CLOUDY
1510	8.21	150	5.91	15	600	3.36	33.9	0.0	103	12000 CLOUDY
1520	8.48	150	5.91	14	400	3.36	33.7	0.0	107	13500 CLOUDY
1530	8.70	150	5.90	14	270	3.53	33.1	0.0	109	15000 CLOUDY
1540	8.91	150	5.90	14	160	3.35	33.1	0.0	112	16500 Sl Cloudy
1550	9.15	150	5.90	14	150	3.36	32.4	0.0	117	18000 Sl Cloudy
1600	9.34	150	5.90	14	200	3.18	31.7	0.0	123	19500 Sl Cloudy
1610	9.45	150	5.88	14	200	3.21	31.3	0.0	125	21000 Sl. Cloudy
1612	—	—	—	—	—	—	—	—	—	Stop FOR THUNDER storm
1705	7.45	0	5.92	15	60	3.76	30.1	0.0	133	RESTART PURGE
1715	7.90	150	5.94	15	55	2.60	30.8	0.0	133	22500 CLEAR
1725	8.18	150	6.03	14	150	2.81	31.1	0.0	132	24000 Sl Cloudy
1735	8.42	150	6.01	14	180	2.62	31.0	0.0	136	25500 Sl Cloudy
1745	8.66	150	6.01	14	180	2.28	30.9	0.0	139	27000 Sl Cloudy
1755	8.82	150	6.00	14	190	2.26	30.9	0.0	141	28500 Sl Cloudy
1805	8.95	150	5.99	14	190	2.26	30.8	0.0	143	30000 Sl Cloudy
1810	—	—	—	—	—	—	—	—	—	Start SAMPLING

SIGNATURE(S): Terry Rojik

REMOVED 6 WELL VOLUMES

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-18I-02
Sample Location: P1055MW18I
Sampled By: T. ROJAHN
C.O.C. No.: 4058
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8-07-08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other SAL %
Time: 1315	Visual	Standard	mS/cm	^{0}C	NTU	mg/l	mV	NA
Method: SAME	CLEAR	5.60	46	29.4	2.8	0.00	-153	0.0

PURGE DATA:

Date: 8-07-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2"ϕ PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 24.40								
Static Water Level (WL): 5.22								
One Casing Volume(gal/L): 12								
Start Purge (hrs): 1208								
End Purge (hrs): 1313								
Total Purge Time (min): 65								
Total Vol. Purged (gal/L): 10.3								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	(2) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

SCREEN 19-24'

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: P1055MW18I
DATE: 8-07-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1208	5.22	—	—	—	—	—	—	—	—	START PURGE
1218	7.94	200	5.41	43	5.1	0.00	29.4	0.0	-114	2000 CLEAR
1228	8.76	150	5.46	44	2.7	0.00	29.6	0.0	-128	3500 CLEAR
1238	9.26	150	5.49	44	2.5	0.00	29.4	0.0	-137	5000 CLEAR
1248	9.50	150	5.51	45	2.8	0.00	29.3	0.0	-143	6500 CLEAR
1258	9.58	150	5.54	45	2.8	0.00	29.7	0.0	-145	8000 CLEAR
1308	9.62	150	5.59	46	3.0	0.00	29.4	0.0	-153	9500 CLEAR
1313	9.63	150	5.60	46	2.8	0.00	29.4	0.0	-153	10250 CLEAR
1315	—	—	—	—	—	—	—	—	—	START SAMPLING

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-195-02
Sample Location: PI027MW19
Sampled By: T. ROJAHN
C.O.C. No.: 4058
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 8-07-08	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL % NA
Time: 0905								
Method: SAME	CLEAR	4.85	23	30.8	4.9	0.00	226	0.0

PURGE DATA:

Date: 8-07-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" Ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 11.50								
Static Water Level (WL): 5.22								
One Casing Volume(gal/L): 4								
Start Purge (hrs): 0820								
End Purge (hrs): 0900								
Total Purge Time (min): 40								
Total Vol. Purged (gal/L): 6.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	(2) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Tony Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PI027MW19
DATE: 8-07-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
0820	5.22	—	—	—	—	—	—	—	—	START PURGE
0830	5.47	200	4.84	25	29	0.00	30.6	0.0	219	2000 CLEAR
0840	5.50	150	4.85	23	13	0.00	30.8	0.0	225	3500
0850	5.51	150	4.86	23	9.7	0.00	30.8	0.0	230	5000
0900	5.51	150	4.85	23	4.9	0.00	30.8	0.0	226	6500
0905	—	—	—	—	—	—	—	—	—	START SAMPLING

SIGNATURE(S): Terry Rogers

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-205-02
Sample Location: PI027 MW20
Sampled By: T. ROSAHN
C.O.C. No.: 4060
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8-09-08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1200	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL NA %
Method: SAME	CLEAR	4.99	48	25.0	0.70	0.00	23	0.0

PURGE DATA:

Date: 8-09-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2" Φ PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 16.7								
Static Water Level (WL): ~~16.7~~ = 7.20								
One Casing Volume(gal/L): 7.1								
Start Purge (hrs): 1035								
End Purge (hrs): 1155								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L): 12.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	3 x (3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	3 x (2) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	3x (2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	3x (1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

SCREEN 4-14'
STICK UP
PURGED 2 SAT SCREEN VOL.

Circle if Applicable:
MS/MSD YES
Duplicate ID No.:

Signature(s): Tony Rosahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PI027MW20
DATE: 8-09-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1035	7.20	—	—	—	—	—	—	—	—	START PURGE
1045	7.61	200	4.92	49	26	0.00	24.1	0.0	123	2000 CLEAR
1055	7.64	150	5.00	49	27	0.00	24.2	0.0	103	3500 CLEAR
1105	7.68	150	4.99	49	12	0.00	24.2	0.0	72	5000 CLEAR
1115	7.71	150	4.98	48	2.7	0.00	24.3	0.0	51	6500 CLEAR
1125	7.68	150	4.98	48	2.5	0.00	24.6	0.0	42	8000 CLEAR
1135	7.68	150	4.98	48	1.2	0.00	24.8	0.0	33	9500 CLEAR
1145	7.68	150	5.00	48	0.90	0.00	25.0	0.0	23	11000 CLEAR
1155	7.68	150	4.99	48	0.70	0.00	25.0	0.0	23	12500 CLEAR
1200	—	—	—	—	—	—	—	—	—	START SAMPLING

SIGNATURE(S): Terry Rogers

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-21S-02
Sample Location: PAI-27 MW21S
Sampled By: CW
C.O.C. No.: 4058
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 8/7/08								
Time: 1110	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Method: PERISTALTIC	CLEAR	5.30	0.46	28.3	3.88	0.23	-157	—

PURGE DATA:

Date: 8/7/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: PERISTALTIC								
Monitor Reading (ppm): 1337								
Well Casing Diameter & Material Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 15.20								
Static Water Level (WL): 7.90								
One Casing Volume(gal/L): ~1.25								
Start Purge (hrs): 1000								
End Purge (hrs): 1110								
Total Purge Time (min): 70								
Total Vol. Purged (gal/L): 7.00								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	(2) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI - 27MW21S
DATE: 8/7/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1000	7.90	100	5.74	0.73	23	1.99	25.4	0.0	-131	CLEAR
1005	8.14	100	5.25	0.65	10	0.23	25.6	0.0	-178	
1010	8.18	100	5.36	0.49	6.76	0.15	26.0	0.0	-167	
1015	8.19	100	5.35	0.48	6.02	0.13	25.9	0.0	-168	
1020	8.20	100	5.35	0.48	5.13	0.11	25.9	0.0	-169	
1025	8.20	100	5.33	0.48	4.10	0.20	27.1	0.0	-170	
1030	8.20	100	5.31	0.47	3.20	0.28	28.0	0.0	-171	
1035	8.20	100	5.22	0.46	4.75	0.08	25.5	0.0	-156	
1040	8.20	100	5.14	0.46	5.23	0.03	25.6	0.0	-153	
1045	8.20	100	5.29	0.45	2.04	0.08	26.4	0.0	-159	
1050	8.20	100	5.25	0.46	2.69	0.12	26.6	0.0	-162	
1055	8.20	100	5.25	0.47	3.30	0.16	26.7	0.0	-166	
1100	8.20	100	5.25	0.48	3.77	0.20	26.9	0.0	-174	
1105	8.20	100	5.31	0.47	2.74	0.18	27.1	0.0	-163	
1110	8.20	100	5.30	0.46	3.88	0.23	28.3	0.0	-157	SAMPLED @ 1110

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-48I-01
Sample Location: PAI-27MW48I
Sampled By: T. ROJAHN
C.O.C. No.: 4067
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other SAL %
Date: 8-13-08	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Time: 1630								
Method: SAME	CLEAR	5.97	18	24.2	5.8	0.00	-61	0.0

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Date: 8-13-08								
Method: PERISTALTIC								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2"ϕ PVC	See Low Flow Purge Data Sheets							
Total Well Depth (TD): 25.1								
Static Water Level (WL): 8.56								
One Casing Volume(gal/L): 10.5								
Start Purge (hrs): 1532								
End Purge (hrs): 1627								
Total Purge Time (min): 55								
Total Vol. Purged (gal/L): 8.8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

5' SCREEN
1 SAT SCREEN VOL. = 3.1 L

Circle if Applicable:

MS/MSD | Duplicate ID No.: —

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27MW48I
DATE: 8-13-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1532	8.56	—	—	—	—	—	—	—	—	Start Purge
1542	9.90	200	6.01	17	4.0	0.00	23.9	0.0	20	2000 CLEAR
1552	9.71	150	5.99	18	11	0.00	24.0	0.0	-10	3500 "
1602	9.58	150	5.99	18	13	0.00	24.1	0.0	-40	5000 "
1612	9.60	150	5.97	18	7.9	0.00	24.2	0.0	-52	6500 "
1622	9.60	150	5.97	18	5.6	0.00	24.2	0.0	-59	8000 "
1627	9.60	150	5.97	18	5.8	0.00	24.2	0.0	-61	8750 "
1630	—	—	—	—	—	—	—	—	—	Start Sampling

SIGNATURE(S): Terry Rogers

FINISHED TD = 25.1'

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-495-01
Sample Location: PAI-27MW495
Sampled By: T. ROJAHN
C.O.C. No.: 4065
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 8-13-08	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL % NA
Time: 1030								
Method: SAME	CLEAR	6.68	29	30.4	3.1	0.00	-72	0.0

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Date: 8-13-08								
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2"Φ PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 14.3 → WELL Not Finished								
Static Water Level (WL): 8.65								
One Casing Volume(gal/L): 3.7								
Start Purge (hrs): 0930								
End Purge (hrs): 1025								
Total Purge Time (min): 55								
Total Vol. Purged (gal/L): 11								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	Sx 2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

10' SCREEN

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Troy Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27MW495
DATE: 8-13-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
0930	8.65	0	–	–	–	–	–	–	–	Start PURGE
0940	8.83	200	6.53	28	5.0	0.00	30.2	0.0	-45	2000 CLEAR
0950	8.84	200	6.60	29	4.1	0.00	30.3	0.0	-53	4000 "
1000	8.84	200	6.64	29	3.3	0.00	30.3	0.0	-58	6000 "
1010	8.83	200	6.67	29	2.9	0.00	30.6	0.0	-65	8000 "
1020	8.83	200	6.67	29	3.0	0.00	30.4	0.0	-71	10000 "
1025	8.83	200	6.68	29	3.1	0.00	30.4	0.0	-72	11000 "
1030	—	—	—	—	—	—	—	—	—	SAMPLE TIME

SIGNATURE(S): Troy Nagle

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-50I-01
Sample Location: PAI-27MW50I
Sampled By: T. ROJAHN
C.O.C. No.: 4065
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	Other SAL NA %
Date: 8-13-08								
Time: 0905								
Method: SAME	CLEAR	5.85	32	26.8	8.8	0.00	-83	0.0

PURGE DATA:

Date: 8-13-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2"Ø PVC	See Low Flow Purge Data Sheets							
Total Well Depth (TD): 25.3 → Not WELL Finished								
Static Water Level (WL): 8.44								
One Casing Volume(gal/L): 10.5								
Start Purge (hrs): 0815								
End Purge (hrs): 0900								
Total Purge Time (min): 45								
Total Vol. Purged (gal/L): 7.8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	Sjc 2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

Slight Sulfur odor
5' SCREEN - 1 sat SCREEN VOL = 3.1 L

Circle if Applicable:

MS/MSD –
Duplicate ID No.: –

Signature(s): Troy Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27MW50I
DATE: 8-13-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
0815	8.44	–	–	–	–	–	–	–	–	Start PURGE
0825	9.51	200	5.92	35	9.8	0.00	27.1	0.0	-65	2000 CLEAR
0835	9.54	200	5.91	34	8.0	0.00	27.2	0.0	-74	4000 "
0845	9.46	150	5.88	33	12	0.00	26.8	0.0	-80	5500 "
0855	9.47	150	5.86	32	8.9	0.00	26.8	0.0	-83	7000 "
0900	9.47	150	5.85	32	8.8	0.00	26.8	0.0	-83	7750 "
0905	–	–	–	–	–	–	–	–	–	Start SAMPLING

SIGNATURE(S): Terry Rojas

1 SAT SCREEN Vol. = 3.1

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-515-01
Sample Location: PAI-27MW515
Sampled By: T. ROJAHN
C.O.C. No.: 4067
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 8-14-08	Visual	Standard	mS/cm	^{0}C	NTU	mg/l	mV	SAL NA %
Time: 1110								
Method: SAME	CLEAR	6.16	18	28.7	6.2	0.00	45	0.0

PURGE DATA:

Date: 8-14-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" Φ PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 13.45 → FINISHED TD								
Static Water Level (WL): 2.35								
One Casing Volume(gal/L): 7								
Start Purge (hrs): 0947								
End Purge (hrs): 1107								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L) 12.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

10' SCREEN
1 SAT SCREEN VOL = 6.2 L
FLUSH MOUNT

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Tey Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27MW515
DATE: 8-14-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
0947	2.35	—	—	—	—	—	—	—	—	START PURGE
0957	2.52	200	6.42	20	45	0.00	28.4	0.0	22	2000ml CLEAR
1007	2.47	150	6.35	19	32	0.00	28.6	0.0	39	3500 "
1017	2.47	150	6.30	19	17	0.00	28.6	0.0	45	5000 "
1027	2.48	150	6.26	19	12	0.00	28.6	0.0	49	6500 "
1037	2.48	150	6.22	19	7.8	0.00	28.6	0.0	51	8000 "
1047	2.48	150	6.20	19	7.3	0.00	28.7	0.0	49	9500 "
1057	2.48	150	6.17	19	6.9	0.00	28.5	0.0	47	11000 "
1107	2.48	150	6.16	18	6.2	0.00	28.7	0.0	45	12500 "
1110	—	—	—	—	—	—	—	—	—	SAMPLE TIME

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-52I-01
Sample Location: PAI-27MW52I
Sampled By: T. ROJAHN
C.O.C. No.: 4067
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	Other SAL % NA
Date: 8-14-08								
Time: 0925								
Method: SAME	CLEAR	6.58	95	23.6	1.0	0.00	-144	0.0

PURGE DATA:

Date: 8-14-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2"Ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 24.8								
Static Water Level (WL): 6.95								
One Casing Volume(gal/L): 1.2								
Start Purge (hrs): 0825								
End Purge (hrs): 0920								
Total Purge Time (min): 55								
Total Vol. Purged (gal/L): 9.8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

5' SCREEN
1 SAT. SCREEN VOL = 3.1 L
FLUSH MOUNT

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27MW52I
DATE: 8-14-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
0825	6.95	0	—	—	—	—	—	—	—	Start PURGE
0835	7.98	200	6.23	47	16	0.00	23.8	0.0	-71	2000 CLEAR
0845	8.22	200	6.36	46	6.8	0.00	23.6	0.0	-103	4000 "
0855	8.22	200	6.45	45	3.7	0.00	23.6	0.0	-124	6000 "
0905	8.02	150	6.53	45	1.7	0.00	23.7	0.0	-138	7500 "
0915	8.02	150	6.57	45	1.4	0.00	23.6	0.0	-143	9000 "
0920	8.02	150	6.58	45	1.0	0.00	23.6	0.0	-144	9750 "
0925	—	—	—	—	—	—	—	—	—	Start SAMPLING

SIGNATURE(S): Terry Rojek

24.8 FINISHED TD
FLUSH MOUNT

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-535-01
Sample Location: PAI-27MW1535
Sampled By: T. ROJAHN
C.O.C. No.: 4065
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8-13-08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other SAL %
Time: 1250	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Method: SAME	CLEAR	4.97	6	23.0	5.4	0.00	130	0.0

PURGE DATA:

Date: 8-13-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2" ø PVC	See Low Flow Purge Data Sheets							
Total Well Depth (TD): 13.42								
Static Water Level (WL): 8.97								
One Casing Volume(gal/L): 3.1								
Start Purge (hrs): 1145								
End Purge (hrs): 1245								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 10.8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	(2) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

10' - SCREEN

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27MW53S
DATE: 08-13-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1145	8.97	—	—	—	—	—	—	—	—	START PURGE
1155	9.30	180	5.13	6	10.2	0.00	23.1	0.0	86	1800 CLEAR
1205	9.35	180	4.97	6	4.3	0.00	23.0	0.0	108	3600 "
1215	9.40	180	4.92	6	2.4	0.00	23.0	0.0	121	5400 "
1225	9.41	180	4.93	6	2.1	0.00	23.0	0.0	124	7200 "
1235	9.41	180	4.95	6	4.5	0.00	23.0	0.0	128	9000 "
1245	9.41	180	4.97	6	5.4	0.00	23.0	0.0	130	10800 "
1250	—	—	—	—	—	—	—	—	—	START SAMPLING

SIGNATURE(S): [signature]

FINISHED TD = 13.42

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-54I-01
Sample Location: PAI-27MW54I
Sampled By: T. ROJAHN
C.O.C. No.: 4065
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8-13-08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1415	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	SAL % NA
Method: SAME	CLEAR	5.79	11	22.4	3.9	0.00	43	0.0

PURGE DATA:

Date: 8-13-08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 23.94								
Static Water Level (WL): 8.96								
One Casing Volume(gal/L): 93								
Start Purge (hrs): 1323								
End Purge (hrs): 1413								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): 9								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	(2) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

5' SCREEN
ONE SAT. SCREEN VOLUME = 3.1 L

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27MW54I
DATE: (TR) ~~8-6~~ 8-13-08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1323	8.96	—	—	—	—	—	—	—	—	Start PURGE
1333	9.50	200	5.81	11	24	0.00	22.1	0.0	53	2000 CLEAR
1343	10.28	200	5.79	10	15	0.00	22.2	0.0	50	4000 "
1353	10.80	200	5.77	10	11	0.00	22.3	0.0	48	6000 "
1403	10.15	150	5.77	11	6.6	0.00	22.4	0.0	46	7500 "
1413	10.08	150	5.79	11	3.9	0.00	22.4	0.0	43	9000 "
1415	—	—	—	—	—	—	—	—	—	Start SAMPLING

SIGNATURE(S): Terry Rojas

FINISHED TO = 23.94

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI - 27-GW - 555-01
Sample Location: PAI - 27 MW555
Sampled By: CW
C.O.C. No.: 4065
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8/13/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 0835	Visual	Standard	mS/cm	^{0}C	NTU	mg/l	mV	NA
Method: PERISTALTIC	CLEAR	4.69	0.62	22.6	0.00	0.76	229	-

PURGE DATA:

Date: 8/13/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: PERISTALTIC								
Monitor Reading (ppm): -								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 14.40								
Static Water Level (WL): 6.42								
One Casing Volume(gal/L): ~1.36 gal								
Start Purge (hrs): 0735								
End Purge (hrs): 0835								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 12 L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	(2) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
-	PAI-27-DU-081308-01

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27 MWSSS
DATE: 8/13/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
0735	6.42	200	4.67	0.82	6.70	3.30	22.4	0.0	184	
0740	6.61	200	4.70	0.78	7.06	2.59	22.4	0.0	182	
0745	6.67	200	4.75	0.73	2.17	1.78	22.6	0.0	200	
0750	6.69	200	4.73	0.68	1.4	1.23	22.7	0.0	208	
0755	6.73	200	4.74	0.66	0.51	0.61	22.7	0.0	217	
0800	6.73	200	4.72	0.66	0.68	0.62	22.9	0.0	216	
0805	6.73	200	4.68	0.64	0.80	0.77	22.7	0.0	228	
0810	6.73	200	4.69	0.64	0.89	0.71	22.6	0.0	231	
0815	6.73	200	4.69	0.64	0.63	0.88	22.6	0.0	231	
0820	6.73	200	4.69	0.63	0.29	0.78	22.6	0.0	230	
0825	6.73	200	4.68	0.63	0.20	0.73	22.6	0.0	230	
0830	6.73	200	4.68	0.63	0	0.75	22.6	0.0	229	
0835	6.73	200	4.69	0.62	0	0.76	22.6	0.0	229	SAMPLED @ 0835

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-SCI-01
Sample Location: PAI-27MWSCI
Sampled By: CW
C.O.C. No.: 4065
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8/13/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1125	Visual	Standard	mS/cm	^{0}C	NTU	mg/l	mV	NA
Method: PERISTALTIC	CLEAR	5.81	1.0	21.8	0.0	1.81	-26	

PURGE DATA:

Date: 8/13/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: PERISTALTIC								
Monitor Reading (ppm): -								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 25.00								
Static Water Level (WL): 4.40								
One Casing Volume(gal/L): 3.5 gal								
Start Purge (hrs): 0925								
End Purge (hrs): 1125								
Total Purge Time (min): 120								
Total Vol. Purged (gal/L): 39 L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails X3	YES
TCL Organochlorine Pesticides	4°C	(2) 1L Glass Amber X3	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails X3	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE X3 ?	YES

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD YES

Duplicate ID No.: ——

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27 MW 56 I
DATE: 8/13/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
0925	4.40	325	5.49	0.80	16.6	7.77	22.1	0.0	77	CLEAR
0930	4.43	325	5.73	0.90	16.6	6.79	21.7	0.0	37	
0935	4.50	325	5.83	1.0	9.10	4.95	21.5	0.0	18	
0940	4.51	325	5.81	1.0	8.96	4.86	21.4	0.0	16	
0945	4.51	325	5.79	1.0	5.96	3.54	21.6	0.0	8	
0950	4.51	325	5.76	1.0	5.19	3.36	21.6	0.0	-3	
0955	4.51	325	5.81	1.0	3.79	3.14	21.8	0.0	-6	
1000	4.51	325	5.88	1.0	3.70	2.84	21.9	0.0	-8	
1005	4.51	325	5.89	1.0	2.92	2.70	21.8	0.0	-12	
1010	4.51	325	5.86	1.0	2.78	2.45	21.8	0.0	-15	
1015	4.51	325	5.85	1.0	2.24	2.31	21.9	0.0	-19	
1020	4.51	325	5.83	1.0	2.16	2.16	21.9	0.0	-19	
1025	4.51	325	5.83	1.0	1.36	1.99	21.9	0.0	-21	
1030	4.51	325	5.83	1.1	1.24	1.99	21.8	0.0	-23	
1035	4.51	325	5.83	1.1	1.06	1.89	21.8	0.0	-24	
1040	4.51	325	5.83	1.1	0.89	1.86	21.8	0.0	-24	
1045	4.51	325	5.82	1.1	0.61	1.85	21.8	0.0	-25	
1050	4.51	325	5.82	1.1	0.23	1.84	21.8	0.0	-25	
1055	4.51	325	5.82	1.0	0.17	1.84	21.8	0.0	-25	
1100	4.51	325	5.82	1.0	0.08	1.83	21.8	0.0	-26	
1105	4.51	325	5.81	1.0	0.0	1.82	21.8	0.0	-26	
1110	4.51	325	5.81	1.0	0.0	1.82	21.8	0.0	-26	
1115	4.51	325	5.81	1.0	0.0	1.82	21.8	0.0	-27	
1120	4.51	325	5.81	1.0	0.0	1.81	21.8	0.0	-27	
1125	4.51	325	5.81	1.0	0.0	1.81	21.8	0.0	-26	SAMPLED @ 1125

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PA1-27-GW-575-01
Sample Location: PA1-27MW575
Sampled By: CW
C.O.C. No.: 4067
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 8/13/08	Visual	Standard	mS/cm	^{0}C	NTU	mg/l	mV	NA
Time: 1625								
Method: PERISTALTIC	CLEAR	5.46	0.66	28.1	9.6	5.90	15	

PURGE DATA:

Date: 8/13/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: PERISTALTIC								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 15.15								
Static Water Level (WL): 3.58								
One Casing Volume(gal/L):								
Start Purge (hrs): 1425								
End Purge (hrs): 1625								
Total Purge Time (min): 120								
Total Vol. Purged (gal/L): 15 L								

24
1.5
9.5

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
–	–

Signature(s): [signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27MW57S
DATE: 8/13/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1425	3.58	200	5.55	0.65	72.1	6.63	26.8	0.0	51	CLEAR
1430	4.16	200	5.57	0.66	51.3	2.45	27.6	0.0	30	
1435	4.36	200	5.58	0.67	63.1	4.61	28.0	0.0	27	
1440	4.55	200	5.56	0.68	89.6	5.01	28.1	0.0	32	CLOUDY
1445	4.55	200	5.52	0.69	151	5.31	27.9	0.0	37	
1450	4.56	150	5.52	0.69	150	5.61	27.9	0.0	36	
1455	4.54	150	5.51	0.69	149	5.93	28.0	0.0	35	
1500	4.53	100	5.51	0.69	151	6.02	28.0	0.0	34	
1505	4.53	100	5.49	0.69	142	6.28	28.0	0.0	34	
1510	4.53	100	5.47	0.68	140	6.31	28.1	0.0	33	
1515	4.53	100	5.45	0.68	127	6.60	28.1	0.0	33	
1520	4.53	100	5.42	0.68	98.0	6.71	27.9	0.0	31	
1525	4.53	100	5.42	0.68	87.9	6.78	27.9	0.0	29	
1530	4.53	100	5.43	0.68	83.6	6.81	27.9	0.0	27	CLEAR
1535	4.52	100	5.44	0.67	79.0	6.82	27.8	0.0	25	
1540	4.52	100	5.45	0.67	65.1	6.83	27.6	0.0	22	
1545	4.52	100	5.47	0.67	53.4	6.74	27.7	0.0	20	
1550	4.50	100	5.48	0.67	47.9	6.78	27.7	0.0	19	
1555	4.50	100	5.50	0.67	44.9	6.66	27.9	0.0	16	
1600	4.50	100	5.50	0.67	43.8	6.64	27.9	0.0	16	
1605	4.50	100	5.47	0.67	44.8	6.57	27.9	0.0	17	
1610	4.49	100	5.47	0.67	37.7	6.45	28.1	0.0	16	
1615	4.49	100	5.46	0.66	35.5	6.21	28.1	0.0	15	
1620	4.49	100	5.46	0.66	31.5	5.92	28.1	0.0	15	
1625	4.49	100	5.46	0.66	9.6	5.90	28.1	0.0	15	SAMPLED @ 1625

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-585-01
Sample Location: PAI-27MW585
Sampled By: CW
C.O.C. No.: 4067
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8/13/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1805	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Method: PERISTALTIC	CLEAR	5.13	0.21	29.0	9.3	1.30	73	

PURGE DATA:

Date: 8/13/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: PERISTALTIC								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 11.85								
Static Water Level (WL): 2.83								
One Casing Volume(~~gal~~/L): 1.25								
Start Purge (hrs): 1715								
End Purge (hrs): 1805								
Total Purge Time (min): 50								
Total Vol. Purged (~~gal~~): 10								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
–	–

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27MW58S
DATE: 8/13/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1715	2.83	200	5.29	0.21	402	1.76	28.9	0.0	132	CLOUDY
1720	3.18	200	4.90	0.21	370	1.72	29.0	0.0	135	
1725	3.22	200	5.04	0.21	307	1.73	29.3	0.0	112	
1730	3.24	200	5.14	0.21	117	1.69	29.7	0.0	103	
1735	3.26	200	5.14	0.21	75.0	1.66	29.5	0.0	97	CLEAR
1740	3.27	200	5.14	0.21	62.1	1.60	29.4	0.0	95	
1745	3.28	200	5.14	0.21	30.4	1.50	29.4	0.0	84	
1750	3.28	200	5.19	0.21	47.0	1.43	29.5	0.0	79	
1755	3.28	200	5.13	0.21	14.1	1.34	29.2	0.0	74	
1800	3.28	200	5.13	0.21	12.0	1.30	29.1	0.0	73	
1805	3.28	200	5.13	0.21	9.3	1.30	29.0	0.0	73	SAMPLED @ 1805

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW59I-01
Sample Location: PAI-27MW59I
Sampled By: CW
C.O.C. No.: 4067
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 8/13/08	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Time: 1930								
Method: PERISTALTIC	CLEAR	5.65	0.29	26.8	9.73	0.46	-54	

PURGE DATA:

Date: 8/13/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: PERISTALTIC								
Monitor Reading (ppm): -								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 18.86								
Static Water Level (WL): 2.87								
One Casing Volume (gal/L): ~1.25								
Start Purge (hrs): 1835								
End Purge (hrs): 1930								
Total Purge Time (min): 55								
Total Vol. Purged (gal/L): 11 L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27MW59I
DATE: 8/13/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1838	2.87	200	5.74	0.30	71.7	2.93	26.8	0.0	61	cloudy
1840	3.48	200	5.40	0.30	70.8	1.78	27.0	0.0	70	
1845	3.66	200	5.34	0.30	58.1	1.44	27.6	0.0	51	
1850	3.65	200	5.42	0.30	46.5	1.34	27.6	0.0	15	
1855	3.64	200	5.50	0.29	31.8	1.20	27.6	0.0	3	
1900	3.63	200	5.56	0.29	27.2	1.01	27.6	0.0	-7	
1905	3.63	200	5.56	0.29	20.8	0.91	27.4	0.0	-10	
1910	3.63	200	5.55	0.29	16.4	0.80	27.3	0.0	-17	
1915	3.63	200	5.55	0.29	13.1	0.75	27.1	0.0	-30	
1920	3.63	200	5.55	0.29	11.29	0.60	27.0	0.0	-41	
1925	3.63	200	5.65	0.29	10.39	0.51	26.8	0.0	-51	
1930	3.63	200	5.65	0.29	9.73	0.46	26.8	0.0	-54	SAMPLED @ 1930

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-0601-01
Sample Location: PAI-27MW601 I
Sampled By: CW
C.O.C. No.: 4067
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8/14/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 0920	Visual	Standard	mS/cm	^{0}C	NTU	mg/l	mV	NA
Method: PERISTALTIC	CLEAR	6.15	0.22	23.8	6.9	0.12	-8	

PURGE DATA:

Date: 8/14/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: PERISTALTIC								
Monitor Reading (ppm): -								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 26.90								
Static Water Level (WL): 10.07								
One Casing Volume (gal/L): 2.25								
Start Purge (hrs): 0800								
End Purge (hrs): 0920								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L) 9.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	2 (1) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
-	-

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PA1-27M60I
DATE: 8/14/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
0800	10.07	200	5.49	0.34	204	3.57	24.0	0.0	72	CLOUDY
0805	11.32	200	5.75	0.30	224	0.43	24.1	0.0	39	
0810	11.64	200	6.12	0.29	201	0.56	24.1	0.0	14	
0815	11.77	200	6.24	0.28	206	0.50	23.9	0.0	5	
0820	11.85	200	6.25	0.28	223	0.43	23.8	0.0	4	
0825	11.81	100	6.23	0.28	251	0.38	23.7	0.0	2	
0830	11.81	100	6.26	0.27	248	0.35	23.7	0.0	1	
0835	11.81	100	6.23	0.26	213	0.32	23.7	0.0	2	
0840	11.80	100	6.23	0.25	188	0.29	23.6	0.0	2	
0845	11.80	100	6.12	0.24	160	0.28	23.7	0.0	5	
0850	11.80	100	6.14	0.24	133	0.17	23.7	0.0	2	
0855	11.80	100	6.19	0.23	111	0.15	23.6	0.0	-3	
0900	11.80	100	6.23	0.23	99.0	0.14	23.6	0.0	-7	
0905	11.80	100	6.20	0.23	56.3	0.13	23.7	0.0	-7	CLEAR
0910	11.80	100	6.19	0.22	19.3	0.12	23.7	0.0	-8	
0915	11.80	100	6.18	0.27	10.1	0.12	23.8	0.0	-8	
0920	11.80	100	6.15	0.22	6.9	0.12	23.8	0.0	-8	SAMPLES @ 0920

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-61 I-01
Sample Location: PAI-27MW61I
Sampled By: CW
C.O.C. No.: 4067
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 8/14/08	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Time: 1210								
Method: PERISTALTIC	CLEAR	6.09	0.49	27.2	8.23	0.00	-2	

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Date: 8/14/08								
Method: PERISTALTIC								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 23.89								
Static Water Level (WL): 8.44								
One Casing Volume(~~gal~~/L): 2 lgal								
Start Purge (hrs): 1125								
End Purge (hrs): 1210								
Total Purge Time (min): 45								
Total Vol. Purged (gal/~~L~~): 9.0								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
–	–

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PA1-27MW 61I
DATE: 8/14/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1125	8.44	200	6.21	0.44	80.9	6.84	28.0	0.0	11	CLEAR
1130	9.33	200	6.00	0.46	29.4	1.40	27.4	0.0	21	
1135	10.10	200	5.79	0.46	17.8	0.31	27.5	0.0	26	
1140	10.61	200	5.79	0.46	16.2	0.11	27.6	0.0	22	
1145	10.78	200	5.90	0.47	14.1	0.09	27.3	0.0	12	
1150	10.87	200	6.08	0.48	13.7	0.05	27.4	0.0	2	
1155	10.89	200	6.10	0.48	7.91	0.04	27.3	0.0	0	
1200	11.91	200	6.09	0.48	9.90	0.00	27.2	0.0	-1	
1205	11.92	200	6.09	0.48	8.19	0.00	27.2	0.0	-1	
1210	11.92	200	6.09	0.49	8.23	0.00	27.2	0.0	-2	SAMPLED @ 1210

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-625-01
Sample Location: PAI-27MW625
Sampled By: CW
C.O.C. No.: 4065
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 8/13/08	Visual	Standard	mS/cm	^{0}C	NTU	mg/l	mV	NA
Time: 1345								
Method: PERISTALTIC	CLEAR	4.98	0.54	21.8	3.50	0.81	150	

PURGE DATA:

Date: 8/13/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: PERISTALTIC								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2" PVC	See Low Flow Purge Data Sheets							
Total Well Depth (TD): 14.80								
Static Water Level (WL): 5.90								
One Casing Volume(gal/L): ~1.06								
Start Purge (hrs): 1250								
End Purge (hrs): 1345								
Total Purge Time (min): 55								
Total Vol. Purged (gal/L): 10								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	(2) 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD

Duplicate ID No.: –

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-27MW62S
DATE: 8/13/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1250	5.90	200	6.14	0.83	192	1.62	20.6	0.0	-3	
1255	8.15	200	6.11	0.84	145	0.12	20.7	0.0	1	
1300	6.20	200	6.08	0.86	81.3	0.00	21.0	0.0	7	
1305	6.31	200	5.15	0.61	35.3	0.20	21.3	0.0	123	
1310	6.32	200	5.06	0.60	32.1	0.24	21.2	0.0	126	
1315	6.35	200	5.00	0.54	12.4	0.40	21.7	0.0	141	
1320	6.35	200	4.99	0.54	6.21	0.50	21.8	0.0	146	
1325	6.35	200	4.98	0.54	4.01	0.65	21.8	0.0	150	
1330	6.36	200	4.98	0.54	3.59	0.75	21.8	0.0	151	
1335	6.36	200	4.98	0.54	3.54	0.79	21.8	0.0	150	
1345	6.36	200	4.98	0.54	3.50	0.81	21.8	0.0	150	SAMPLED @ 1345

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW-635-01
Sample Location: PAI-27MW635
Sampled By: CW
C.O.C. No.: 4067
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8/14/08	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1105	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	NA
Method: PERISTALTIC	CLEAR	6.39	0.20	25.7	0.97	0.89	120	

PURGE DATA:

Date: 8/14/08	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: PERISTALTIC								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 16.45								
Static Water Level (WL): 11.40								
One Casing Volume (gal/L): 4.6								
Start Purge (hrs): 1005								
End Purge (hrs): 1105								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L) 12								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
–	–

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PA1-27MW635
DATE: 8/14/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1005	11.40	200	6.31	0.21	110	5.10	24.9	0.0	77	clear
1010	11.51	200	6.29	0.20	50.5	3.00	24.8	0.0	84	
1015	11.53	200	5.96	0.19	64.0	1.07	25.1	0.0	120	
1020	11.53	200	6.02	0.20	27.1	1.03	25.5	0.0	120	
1025	11.53	200	6.30	0.20	12.7	0.68	25.7	0.0	108	
1030	11.53	200	6.39	0.20	4.99	0.70	25.8	0.0	108	
1035	11.53	200	6.37	0.20	3.55	0.69	25.4	0.0	114	
1040	11.53	200	6.36	0.20	4.62	0.50	25.7	0.0	117	
1045	11.53	200	6.39	0.20	1.73	0.90	25.8	0.0	118	
1050	11.53	200	6.39	0.20	1.01	0.91	25.7	0.0	120	
1055	11.53	200	6.39	0.20	1.01	0.90	25.7	0.0	120	
1100	11.53	200	6.39	0.20	1.00	0.90	25.7	0.0	119	
1105	11.53	200	6.39	0.20	0.97	0.89	25.7	0.0	120	SAMPLED @ 1105

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: MCRD PARRIS ISLAND
Project No.: 112G00455

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI - 27- GW-645-01
Sample Location: PAI-27MW645
Sampled By: CW
C.O.C. No.: 4067
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Date: 8/14/08	Visual	Standard	mS/cm	^{0}C	NTU	mg/l	mV	NA
Time: 1405								
Method: PERISTALTIC	CLEAR	6.15	0.11	26.8	9.73	3.74	75	

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Date: 8/14/08								
Method: PERISTALTIC								
Monitor Reading (ppm): NA								
Well Casing Diameter & Material								
Type: 2" ø PVC	See Low Flow Purge Data Sheets							
Total Well Depth (TD): 16.50								
Static Water Level (WL): 9.91								
One Casing Volume(gal/L): ≈1								
Start Purge (hrs): 1310								
End Purge (hrs): 1405								
Total Purge Time (min): 55								
Total Vol. Purged (gal/L): 11 L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL Volatiles	4°C/HCl	(3) 40ml Vails	YES
TCL Organochlorine Pesticides	4°C	2 ~~(1)~~ 1L Glass Amber	YES
TOC	4°C/H_2SO_4	(2) 40ml Vails	YES
Total Dissolved Solids & Total Alkalinity	4°C	(1) 250ml HDPE	YES

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
–	PAI-27-DU-081408-02

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: MCRD PARRIS ISLAND
PROJECT NUMBER: 112G00455

WELL ID.: PAI-22 MW 645
DATE: 8/14/08

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)	ORP (mV)	Comments (Volume & Color)
1310	9.91	200	6.29	0.13	21.2	8.27	27.2	0.0	87	CLEAR
1315	10.00	200	5.94	0.12	19.2	7.75	27.3	0.0	94	
1320	10.06	200	5.76	0.11	13.9	5.98	27.2	0.0	89	
1325	10.02	200	5.74	0.11	13.6	2.94	26.9	0.0	90	
1330	10.02	200	5.73	0.11	11.5	2.93	27.1	0.0	93	
1335	10.02	200	5.73	0.11	11.2	2.60	26.7	0.0	92	
1340	10.03	200	5.73	0.11	9.50	3.50	26.6	0.0	97	
1345	10.03	200	5.73	0.11	9.19	3.51	26.5	0.0	96	
1350	10.03	200	5.74	0.11	8.86	3.54	26.5	0.0	97	
1355	10.03	200	5.76	0.11	8.68	3.58	27.0	0.0	98	
1340	10.03	200	6.02	0.11	8.71	3.63	26.9	0.0	79	
1345	10.03	200	6.15	0.11	9.82	3.75	26.8	0.0	74	
1350	10.03	200	6.16	0.11	9.80	3.76	26.8	0.0	74	
1355	10.03	200	6.15	0.11	9.81	3.73	26.8	0.0	73	
1400	10.03	200	6.15	0.11	9.80	3.75	26.8	0.0	74	
1405	10.03	200	6.15	0.11	9.73	3.74	26.8	0.0	75	SAMPLED @ 1405

SIGNATURE(S): [signature]

C-15 PHASE III RI – GROUNDWATER SAMPLE LOG SHEETS AND LOW FLOW PURGE DATA SHEETS

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PA1-27-GW01S-03
Sample Location: PA1-27-MW01S
Sampled By: SSH
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8/10/10								
Time: 1050								
Method: LF	Clear	4.94	0.303	28.64	19	2.00	0.1	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8/10/10								
Method: LF	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 14.8								
Static Water Level (WL): 7.58								
One Casing Volume (gal/L): 1.18								
Start Purge (hrs): 0905								
End Purge (hrs): 1050								
Total Purge Time (min): 105								
Total Vol. Purged (gal/L): 5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	9
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	9
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	6
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	3
Alkalinity/TDS	4°C	1 - 500mL HDPE	3
TOC	H2SO4/ 4°C	2 - 40ml Vials	6

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
YES	—

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island
PROJECT NUMBER: 112G024006

WELL ID.: PAI-27-MW02S
DATE: 8/10/10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
0905	7.58	250 begin purge								
0915	8.52	160	4.94	0.280	75	4.92	27.64	85	0.1	irony - reddish
0925	8.07	160	5.03	0.281	45	4.35	27.66	86	0.1	
0935	8.77	160	5.01	0.287	35	3.80	27.70	87	0.1	
0945	8.77	150	4.96	0.290	33	3.50	27.88	88	0.1	
0955	8.77	150	4.95	0.287	32	3.42	28.21	92	0.1	
1005	8.77	150	4.94	0.293	26	2.91	28.39	93	0.1	
1015	8.77	150	4.93	0.299	20	2.53	28.48	95	0.1	
1025	8.77	150	4.91	0.299	28	2.41	28.63	94	0.1	
1035	8.77	150	4.89	0.800	21	2.23	28.71	97	0.1	
1045	8.77	150	4.94	0.303	19	2.00	28.64	98	0.1	Turbidity not coming down. irony water
1050	collect sample									

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW/02I-03
Sample Location: PAI-27-MW/02I
Sampled By: SEH
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8/9/10								
Time: 1935								
Method: LF	Clear	6.07	0.187	25.70	12	0.70	0.0	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8/9/10								
Method: LF	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm):								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 27.18								
Static Water Level (WL): 8.34								
One Casing Volume (gal/L): 0.77								
Start Purge (hrs): 1720								
End Purge (hrs): 1935								
Total Purge Time (min): 135								
Total Vol. Purged (gal/L): 5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	yes
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	yes
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	yes
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	yes
Alkalinity/TDS	4°C	1 - 500mL HDPE	yes
TOC	H2SO4/ 4°C	2 - 40ml Vials	yes

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island Site 27
PROJECT NUMBER: 112@02406

WELL ID.: PAI-27-MW02I
DATE: 8/9/16

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1720	8.34	Start purge								
1730	10.99	200	5.84	0.187	245	1.41	26.14	176	0.0	very iron/(reddish)
1740	13.80	150	5.84	0.188	75	1.03	26.28	97	0.0	
1750	14.8	150	6.07	0.192	130	1.09	25.86	110	0.0	
1800	15.3	130	6.11	0.194	110	1.01	26.77	18	0.0	
1810	15.82	130	6.19	0.192	146	1.14	26.41	12	0.0	
1820	16.14	125	6.13	0.193	45	1.02	26.07	4	0.0	
1830	16.35	125	6.03	0.195	32	0.97	25.54	6	0.0	
1840	16.55	125	5.92	0.191	25	0.89	25.73	12	0.0	
1850	16.52	125	5.78	0.191	21	0.79	25.67	16	0.0	
1900	16.45	125	5.70	0.190	17	0.74	25.72	17	0.0	
1910	16.80	130	5.95	0.189	16	0.88	25.24	9	0.0	
1920	16.85	125	6.04	0.188	15	0.70	25.48	0	0.0	
1925	16.85	125	6.06	0.187	12	0.70	25.46	0	0.0	
1930	16.86	128	6.07	0.187	12	0.70	25.70	-1	0.0	
1935	sample									

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW03S-03
Sample Location: PAI-27-MW-03S
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other ORP
Date: 8-9-10								
Time: 0955								
Method: Peristaltic	Clear	6.58	0.129	27.61	4.4	2.42	0.01	190

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-9-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm):								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): —								
Static Water Level (WL): 6.44								
One Casing Volume(gal/L): —								
Start Purge (hrs): 0915								
End Purge (hrs): 0955								
Total Purge Time (min): 40								
Total Vol. Purged (gal/L): 8L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1
Alkalinity/TDS	4°C	1 - 500mL HDPE	1
TOC	H2SO4/ 4°C	2 - 40ml Vials	2

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Jason Trentini

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island / Site 27
PROJECT NUMBER: 112G02406

WELL ID.: PAI-27-MW-03S
DATE: 8-9-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
0915	6.44	Int	6.45	0.142	9.1	4.05	26.52	169	0.01	
0925	6.62	200	6.56	0.131	9.2	3.16	27.11	176	0.01	
0935	6.65	200	6.58	0.129	5.9	2.65	27.42	189	0.01	
0945	6.67	200	6.59	0.129	4.8	2.43	27.53	190	0.01	
0955	6.67	200	6.58	0.129	4.4	2.42	27.61	190	0.01	

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW04S-03
Sample Location: PAI-27-MW-04S
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8-9-10								
Time: 1135								ORP
Method: Peristaltic	Clear	6.35	0.313	29.62	7.4	0.00	0.01	-40

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-9-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): —								
Static Water Level (WL): 7.27								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1055								
End Purge (hrs): 1135								
Total Purge Time (min): 40								
Total Vol. Purged (gal/L): 8L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1
Alkalinity/TDS	4°C	1 - 500mL HDPE	1
TOC	H2SO4/ 4°C	2 - 40ml Vials	2

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Jason Trentini

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island
PROJECT NUMBER: 112G02406

WELL ID.: PAI-27-MW-04S
DATE: 8-9-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1055	7.27	~~Tot.~~	6.42	0.213	11	0.90	32.72	3	0.01	
1105	7.51	200	6.40	0.277	9.8	0.10	30.63	-32	0.01	
1115	7.58	200	6.42	0.306	7.8	0.08	29.81	-33	0.01	
1125	7.65	200	6.37	0.313	7.7	0.00	29.70	-35	0.01	
1135	7.72	200	6.36	0.313	7.4	0.00	29.62	-40	0.01	

SIGNATURE(S): Jason Trenton

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island/Site 27
Project No.: 112G02604

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW051-03
Sample Location: PAI-27-MW-051
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other ORP
Date: 8-8-10								
Time: 1720								
Method: Peristaltic	Cloudy	6.50	0.203	27.66	42.7	0.00	0.01	-42

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-8-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): —								
Static Water Level (WL): 7.34								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1420								
End Purge (hrs): 1720								
Total Purge Time (min): 180								
Total Vol. Purged (gal/L): 31.5L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3+6 (9)
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3+6 (9)
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2+4 (6)
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1+2 (3)
Alkalinity/TDS	4°C	1 - 500mL HDPE	1+2 (3)
TOC	H2SO4/ 4°C	2 - 40ml Vials	2+4 (6)

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

* Sampled well following 3 hour purge and turbidity stabilization.

Circle if Applicable:

MS/MSD

Duplicate ID No.: 005

Signature(s): Jason Trentini

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island
PROJECT NUMBER: 112G02604

WELL ID.: PAI-27-MW-05I
DATE: 8-8-10

	Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
	1420	7.34	Fnt	5.83	0.073	126	1.90	36.86	164	0.00	
	1430	8.49	150	6.39	0.149	12.6	0.14	32.45	21	0.01	
	1440	8.72	150	6.37	0.152	36.5	0.00	31.07	14	0.01	
	1450	8.78	150	6.40	0.159	307	0.00	30.65	6	0.01	
	1500	8.80	150	6.40	0.159	69.2	0.00	30.70	8	0.01	
	1510	8.81	150	6.45	0.168	321	0.00	30.60	-8	0.01	
	1520	8.81	150	6.47	0.172	236	0.00	30.43	-17	0.01	
	1530	8.82	150	6.48	0.174	137	0.00	29.94	-20	0.01	
	1540	8.84	150	6.49	0.178	104	0.00	29.58	-24	0.01	
13.5L	1550	8.85	150	6.50	0.180	84.4	0.00	29.41	-29	0.01	
	1600	9.12	200	6.52	0.186	66.2	0.00	29.18	-32	0.01	adjusted flow
	1610	9.18	200	6.53	0.189	48.3	0.00	28.96	-33	0.01	rate in an
	1620	9.20	200	6.54	0.194	45.5	0.00	28.99	-36	0.01	attempt to
	1630	9.25	200	6.55	0.196	43.5	0.00	28.32	-39	0.01	reduce turbidity
	1640	9.29	200	6.56	0.199	39.6	0.00	27.98	-40	0.01	
	1650	9.24	200	6.53	0.197	40.2	0.00	27.89	-42	0.01	
	1700	9.19	200	6.49	0.193	41.8	0.00	27.78	-41	0.01	
	1710	9.14	200	6.46	0.200	44.4	0.00	27.72	-42	0.01	
18L	1720	9.10	200	6.50	0.203	42.7	0.00	27.66	-42	0.01	* Sampled well
											following turbidity
											stabilization.
31.5L											

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island/Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW06S-03
Sample Location: PAI-27-MW-06S
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8-11-10								
Time: 1515								ORP
Method: Peristaltic	Clear	6.14	0.491	28.00	18	0.06	0.02	-55

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-11-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): —								
Static Water Level (WL): 10.86								
One Casing Volume(gal/L): —								
Start Purge (hrs): 0800								
End Purge (hrs): 0830								
Total Purge Time (min): 30								
Total Vol. Purged (gal/L): ~4.5L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1
Alkalinity/TDS	4°C	1 - 500mL HDPE	1
TOC	H2SO4/ 4°C	2 - 40ml Vials	2

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

* Well DRY after purging ~ 30min at 150mL/min (peristaltic pump's lowest setting). Will allow to recover then collect sample volume.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	~~PAI-27-GW10S~~

Signature(s): Jason Trentini

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island / Site 27
PROJECT NUMBER: 112G02406
WELL ID.: PAI-27-MW-06S
DATE: 8-11-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
0800	10.86	Int	6.19	0.497	8.2	1.64	26.90	-38	0.02	
0810	11.19	~~150~~	6.17	0.495	19	0.83	27.22	-61	0.02	
0820	11.41	150	6.14	0.490	18	0.06	28.00	-55	0.02	
0830	DRY	~~150~~	~~6.14~~	~~0.492~~						* Well DRY after
~~0840~~		~~150~~								purging ~30 min
										at 150 mL/min
										- will allow to
1515	Sample									recover then
										collect sample
										volume.

SIGNATURE(S): Joan Trenton

PAGE 2 OF 2

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island / Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW07I-03
Sample Location: PAI-27-MW-07I
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other ORP
Date: 8-11-10								
Time: 0940								
Method: Peristaltic	Clear	5.83	0.219	25.70	2.1	0.00	0.01	11

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-11-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): —								
Static Water Level (WL): 11.31								
One Casing Volume(gal/L): —								
Start Purge (hrs): 0850								
End Purge (hrs): 0940								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): 7.5L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3+3 (6)
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3+3 (6)
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2+2 (4)
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1+1 (2)
Alkalinity/TDS	4°C	1 - 500mL HDPE	1+1 (2)
TOC	H2SO4/ 4°C	2 - 40ml Vials	2+2 (4)

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

* Duplicate sample volume collected.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	PAI-27-081110-03

Signature(s): Jason Trentini

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island / Site 27
PROJECT NUMBER: 112G02406

WELL ID.: PAI-27-MW-07I
DATE: 8-11-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
0850	10.31	Int	5.72	0.301	26	0.57	28.87	10	0.01	
0900	12.39	150	5.98	0.230	3.5	0.00	27.32	8	0.01	
0910	12.77	150	5.89	0.220	2.5	0.00	26.27	9	0.01	
0920	12.95	150	5.87	0.219	2.0	0.00	25.84	10	0.01	
0930	13.03	150	5.85	0.219	1.9	0.00	25.76	10	0.01	
0940	13.07	150	5.83	0.219	2.1	0.00	25.70	11	0.01	

SIGNATURE(S): Jason Trentman

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island / Site 27
Project No.: 112G024016

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW08D-02
Sample Location: PAI-27-MW-08D
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8-11-10								
Time: 1220								ORP
Method: Peristaltic	Clear	7.33	0.468	29.91	6.6	0.00	0.02	-101

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-11-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): —								
Static Water Level (WL): 15.71								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1140								
End Purge (hrs): 1220								
Total Purge Time (min): 40								
Total Vol. Purged (gal/L): 6L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3+3 (6)
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3+3 (6)
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2+2 (4)
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1+1 (2)
Alkalinity/TDS	4°C	1 - 500mL HDPE	1+1 (2)
TOC	H2SO4/ 4°C	2 - 40ml Vials	2+2 (4)

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

* Duplicate sample volume collected.
* Fuel Oil odor on interface probe.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	PAI-27-081110-05

Signature(s): Jason Trentini

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island / Site 27
PROJECT NUMBER: 112G02406
WELL ID.: PAI-27-MW-08D
DATE: 8-11-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1140	15.71	Int	7.14	0.434	12	1.12	31.24	-54	0.02	
1150	17.66	150	7.35	0.456	6.6	0.31	29.90	-95	0.02	
1200	18.47	150	7.38	0.472	6.0	0.00	29.71	-101	0.02	
1210	18.91	150	7.36	0.472	6.4	0.00	29.86	-102	0.02	
1220	19.32	150	7.33	0.468	6.6	0.00	29.91	-101	0.02	

SIGNATURE(S): Jason Trenton

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW095-03
Sample Location: ~~PAI-27-MW095~~
Sampled By: SEH
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8/8/10								
Time: 1150	(Visual)	(S.U.)	(mS/cm)	(°C)	(NTU)	(mg/l)	ppt ~~(%)~~	
Method: LF	Clear	6.84	0.441	28.25	9.8	1.27	0.1	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8/8/10								
Method: LF	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 13.20								
Static Water Level (WL): 8.10								
One Casing Volume (gal/L): 0.83								
Start Purge (hrs): 1105								
End Purge (hrs): 1150								
Total Purge Time (min): 45								
Total Vol. Purged (gal/L): 3								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	yes
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	yes
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	yes
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	yes
Alkalinity/TDS	4°C	1 - 500mL HDPE	yes
TOC	H2SO4/ 4°C	2 - 40ml Vials	yes

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD —

Duplicate ID No.:

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island Site 27
PROJECT NUMBER: 112G02490

WELL ID.: PAI-27-MW09S
DATE: 8/8/10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity ~~% or~~ ppt	Comments
1105	8.10	Start purge								
1115	8.35	200	6.63	0.462	16.0	1.47	26.77	139	0.1	organic material in well
1125	8.35	200	6.79	0.449	8.6	1.19	27.36	127	0.1	
1135	8.35	200	6.82	0.446	5.5	1.22	27.71	131	0.1	
1145	8.35	200	6.84	0.441	1.8	1.27	28.25	139	0.1	
1150	collect	sample								

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island/Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW10S-03
Sample Location: PAI-27-MW-10S
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8-10-10								
Time: 1650								ORP
Method: Peristaltic	Clear	6.70	0.414	26.79	2.1	3.70	0.02	152

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-10-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): —								
Static Water Level (WL): 10.18								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1600								
End Purge (hrs): 1650								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): TOSL								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1
Alkalinity/TDS	4°C	1 - 500mL HDPE	1
TOC	H2SO4/ 4°C	2 - 40ml Vials	2

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Jason Trentini

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island/Site 27
PROJECT NUMBER: 112G02406

WELL ID.: PAI-27-MW-10S
DATE: 8-10-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1600	10.18	Int.	5.24	0.324	679	2.90	33.34	93	0.02	
1610	10.45	150	6.74	0.416	329	1.95	32.00	105	0.02	
1620	10.81	150	6.72	0.447	154	3.18	25.35	130	0.02	
1630	11.12	150	6.63	0.412	23	3.34	26.65	145	0.02	
1640	11.19	150	6.68	0.413	6.5	3.59	26.74	149	0.02	
1650	11.23	150	6.70	0.414	2.1	3.70	26.79	152	0.02	

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island / Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAT-27-GW11S-03
Sample Location: PAT-27-MW-11S
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8-11-10								
Time: 1700								
Method: Peristaltic	Clear	6.20	0.138	32.35	2.4	0.00	0.01	ORP -28

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-11-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): —								
Static Water Level (WL): 11.70								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1600								
End Purge (hrs): 1700								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 9L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1
Alkalinity/TDS	4°C	1 - 500mL HDPE	1
TOC	H2SO4/ 4°C	2 - 40ml Vials	2

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

DTW = 11.70' btoc DTP = 11.30' btoc

* Product detected in tubing during purge.

Circle if Applicable:

MS/MSD — Duplicate ID No.:

Signature(s): Joan Trentini

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island / Site 27
PROJECT NUMBER: 112G02406
WELL ID.: PAI-27-MW-11S
DATE: 8-11-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity (%) or ppt	Comments
1600	11.70	[illegible]	6.89	0.392	9.5	6.03	33.95	-22	0.02	DTW = 11.70' btoc
1610	12.61	150	6.11	0.155	4.9	3.43	30.69	0	0.01	DTP = 11.30' btoc
1620	12.76	150	6.08	0.145	4.7	2.00	30.35	-8	0.01	
1630	12.81	150	6.02	0.143	1.3	0.00	31.57	-9	0.01	* small drops of
1640	12.92	150	6.16	0.142	4.2	0.00	32.20	-24	0.01	product visible in tubing
1650	13.02	150	6.21	0.139	2.0	0.00	32.25	-28	0.01	at the beginning
1700	13.14	150	6.20	0.138	2.4	0.00	32.35	-28	0.01	of purge.

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PA1-27-GW112T-03
Sample Location: PA1-27-MW12T
Sampled By: SEH
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity ppt ~~(%)~~	Other
Date: 8/11/10								
Time: 1245								
Method: LF	Clear	9.48	0.413	26.33	3.9	2.03	0.1	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8/11/10								
Method: LF	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm):								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 24.4								
Static Water Level (WL): 11.4								
One Casing Volume(gal/L): 2.12								
Start Purge (hrs): 1150								
End Purge (hrs): 1245								
Total Purge Time (min): 55								
Total Vol. Purged (gal/L): 4								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	YES
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	YES
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	YES
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	YES
Alkalinity/TDS	4°C	1 - 500mL HDPE	YES
TOC	H2SO4/ 4°C	2 - 40ml Vials	YES

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Slight petroleum odor

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	PA1-27-081110-04

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island
PROJECT NUMBER: 112G02406

WELL ID.: PA1-27 - MW12I
DATE: 8/11/10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1150	11.40	200 Start purge								
1200	15.15	150	4.45	0.420	13	3.14	25.27	60	0.1	
1210	15.18	150	4.40	0.417	8.0	2.83	25.89	30	0.1	
1220	15.22	150	4.44	0.414	5.3	2.45	25.86	26	0.1	
1230	15.31	150	4.47	0.413	3.3	2.28	25.94	25	0.1	
1240	15.20	150	4.48	0.413	3.9	2.03	26.33	26	0.1	
1245	collect sample									

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island Site 27
Project No.: 112G02408

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW13D-02
Sample Location: PAI-27-MW13D
Sampled By: SEW
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (PPT%)	Other
Date: 8/11/10 Time: 1600 Method: LF	Clear	4.95	1.34	27.73	1.3	0.51	0.4	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8/11/10 Method: LF	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm):								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 39.2								
Static Water Level (WL): 15.53								
One Casing Volume (gal/L): 3.86								
Start Purge (hrs): 1420								
End Purge (hrs): 1600								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L): 4								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	YES
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	Yes
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	Yes
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	Yes
Alkalinity/TDS	4°C	1 - 500mL HDPE	Yes
TOC	H2SO4/ 4°C	2 - 40ml Vials	Yes
			Yes

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island Site 27 **WELL ID.:** PAI-27-MW13D
PROJECT NUMBER: 112G02906 **DATE:** 8/11/10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1420	15.53	250 Start purge								
1430	19.40	160	4.56	1.22	23	1.05	26.92	23	0.4	
1440	20.40	150	4.37	1.27	24	0.83	26.92	-23	0.4	
1450	20.95	140	4.74	1.30	1.0	0.77	27.33	-66	0.4	
1500	21.30	130	4.60	1.33	5.0	0.72	27.39	-76	0.4	
1510	21.40	130	4.64	1.33	3.9	0.66	27.28	-76	0.4	
1520	21.55	130	4.67	1.34	1.7	0.61	27.60	-78	0.4	
1530	21.60	130	4.86	1.34	0.7	0.57	27.77	-88	0.4	
1540	21.63	130	4.93	1.34	2.5	0.53	27.80	-91	0.4	
1550	21.70	130	4.95	1.33	1.4	0.48	27.74	-92	0.4	
1555	21.75	130	4.95	1.34	1.3	0.51	27.73	-91	0.4	
1600	collect sample									

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island
Project No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW14S-03
Sample Location: PAI-27-MW14S
Sampled By: SEH
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8/11/10								
Time: 0930								
Method: LF	Cloudy	4.84	0.347	26.90	2.7	0.78	0.1	

↳ increased!

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8/11/10								
Method: LF	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 16.79								
Static Water Level (WL): 10.22								
One Casing Volume (gal/L): 1.07								
Start Purge (hrs): 0755								
End Purge (hrs): 0930								
Total Purge Time (min): 95								
Total Vol. Purged (gal/L): 5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	YES
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	YES
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	YES
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	YES
Alkalinity/TDS	4°C	1 - 500mL HDPE	YES
TOC	H2SO4/ 4°C	2 - 40ml Vials	YES
			YES
			YES
			YES

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Turbidity increased with sampling

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406

WELL ID.: PI-27-MW14S
DATE: 8/11/10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
0755	10.22	150	Start	purge						
0805	10.65	150	4.74	0.335	31	1.04	25.52	70	0.1	
0815	11.01	130	4.71	0.306	9.8	0.91	25.76	101	0.1	
0825	11.35	130	4.72	0.312	6.3	0.89	26.10	112	0.1	
0835	11.70	120	4.74	0.320	3.5	0.87	26.30	114	0.1	
0845	11.92	120	4.74	0.321	4.7	0.88	26.51	116	0.1	
0850	12.13	110	4.78	0.335	4.1	0.88	26.62	107	0.1	
0900	12.36	110	4.79	0.338	3.6	0.85	26.66	103	0.1	
0905	12.5	110	4.80	0.340	3.5	0.83	26.71	98	0.1	
0910	12.65	110	4.82	0.342	2.7	0.81	26.78	93	0.1	
0915	12.73	110	4.82	0.343	2.9	0.80	26.84	90	0.1	
0920	12.9	110	4.83	0.347	3.3	0.78	26.87	91	0.1	
0925	13.0	110	4.84	0.347	2.7	0.78	26.90	95	0.1	
0930	Collect sample									

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PA1-27-GW15I-03
Sample Location: PA1-27-MW15I
Sampled By: SEH
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8/10/10								
Time: 1840								
Method: LF	Cloudy then Gray	4.25	0.781	31.60	340	0.47	0.2	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8/10/10								
Method: LF	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm):								
Well Casing Diameter & Material Type: 2" PVC - Stickup								
Total Well Depth (TD): 23.86								
Static Water Level (WL): 10.42								
One Casing Volume (gal/L): 2.19								
Start Purge (hrs): 1655								
End Purge (hrs): 1840								
Total Purge Time (min): 105								
Total Vol. Purged (gal/L): 5								✓

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	yes
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	yes
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	yes
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	yes
Alkalinity/TDS	4°C	1 - 500mL HDPE	yes
TOC	H2SO4/ 4°C	2 - 40ml Vials	yes

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Slight petroleum odor

Turbidity started increasing significantly after stabilization. Sample collected in attempts to avoid making turbidity worse.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	

Signature(s):

Unfortunately Turbidity increased significantly (sludge coming out at one point)
Potentially Grout?

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406
WELL ID.: PAI-27-MW15I
DATE: 8/10/10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1655	10.42	Start	pump							
1705	11.53	150	4.65	0.981	110	1.21	30.60	-19	0.3	
1715	11.64	150	4.48	0.868	90	0.74	29.52	-8	0.2	
1725	11.63	150	4.23	0.843	55	0.68	29.08	0	0.2	
1735	11.64	150	4.13	0.844	27	0.65	28.78	3	0.2	
1745	11.64	150	3.98	0.842	20	0.64	28.59	10	0.2	
1755	11.70	150	4.22	0.795	24	0.54	31.58	-4	0.2	
1805	11.72	150	4.40	0.785	50	0.51	31.65	-15	0.2	
1815	11.60	130	4.40	0.820	80	0.58	29.31	-20	0.2	
1825	11.60	130	4.44	0.786	95	0.51	31.38	-27	0.2	
1830	11.55	130	4.45	0.785	140	0.50	31.59	-33	0.2	
1835	11.55	130	4.45	0.781	340	0.47	31.60	-39	0.2	
1840		collect	sample							

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island / Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW16S-03
Sample Location: PAI-27-MW-16S
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8-8-10								
Time: 1255								ORP
Method: Peristaltic	Clear	5.60	0.035	30.60	6.3	0.00	0.00	251

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-8-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): —								
Static Water Level (WL): 8.11								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1205								
End Purge (hrs): 1255								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): 7.5L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1
Alkalinity/TDS	4°C	1 - 500mL HDPE	1
TOC	H2SO4/ 4°C	2 - 40ml Vials	2

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Joseph Trentini

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island / Site 27
PROJECT NUMBER: 112G02406

WELL ID.: PAI-27-MW-16S
DATE: 8-8-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1205	8.11	Int	5.84	0.063	565	1.58	31.21	220	0.00	
1215	8.18	150	5.68	0.046	30	0.44	30.83	248	0.00	
1225	8.18	150	5.62	0.037	19	0.01	30.53	254	0.00	
1235	8.19	150	5.61	0.035	7.7	0.00	30.56	253	0.00	
1245	8.19	150	5.60	0.034	4.3	0.00	30.61	253	0.00	
1255	8.20	150	5.60	0.035	6.3	0.00	30.60	251	0.00	

SIGNATURE(S): Jason Trenton

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island
Project No.: Site 27 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW17S-03
Sample Location: PAI-27-MW17S
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8-6-10								ORP
Time: 1015								
Method: Peristaltic	Clear	6.18	0.175	31.60	3.8	2.76	0.01	243

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-6-10								
Method: Low Flow/Peristaltic	See Low Flow Purge Sheet for Details							ORP
Monitor Reading (ppm): —	~~Int~~	~~6.13~~	~~0.181~~	~~31.20~~	~~3.2~~	~~4.47~~		~~232~~
Well Casing Diameter & Material Type: 2"								
Total Well Depth (TD): —								
Static Water Level (WL): 6.02								
One Casing Volume(gal/L): —								
Start Purge (hrs): 0935								
End Purge (hrs): 1015								
Total Purge Time (min): 40								
Total Vol. Purged (gal/L): 8.5L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1
Alkalinity/TDS	4°C	1 - 500mL HDPE	1
TOC	H2SO4/ 4°C	2 - 40ml Vials	2

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Jason Trentini

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island - Site 27
PROJECT NUMBER:

WELL ID.: PAI-27-MW17S
DATE: 8-6-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
0935	6.02	Int	6.13	0.181	3.2	4.47	31.20	232	0.01	
0945	6.70	250	6.18	0.181	3.8	2.90	31.52	253	0.01	turned down flow
0955	6.81	200	6.18	0.182	3.8	2.82	31.62	253	0.01	due to drawdown
1005	6.92	200	6.18	0.173	3.7	2.77	31.59	249	0.01	
1015	7.01	200	6.18	0.175	3.8	2.76	31.60	243	0.01	- peristaltic pump
										set at lowest
										possible speed
										without turning
										off.

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island - Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW18I-03
Sample Location: PAI-27-MW18I
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8-6-10								
Time: 1105								ORP
Method: Low Flow/Peristaltic	Clear	5.90	0.345	31.33	6.7	0.97	0.02	8

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-6-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): —								
Static Water Level (WL) 6.70								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1105								
End Purge (hrs): 1205								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 12L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1
Alkalinity/TDS	4°C	1 - 500mL HDPE	1
TOC	H2SO4/ 4°C	2 - 40ml Vials	2

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

*No free product (LNAPL) detected but noticed fuel oil smell on interface probe.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Jason Trentini

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island / Site 27
PROJECT NUMBER:

WELL ID.: PAI-27-MW18I
DATE: 8-6-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1105	6.70	Int	5.92	0.369	20.6	2.51	31.83	23	0.02	- peristaltic
1115	7.40	200	5.90	0.357	19.9	2.14	32.10	18	0.02	set at lowest
1125	8.04	200	5.88	0.342	23.5	1.56	31.39	12	0.02	possible speed
1135	8.75	200	5.89	0.339	11	1.33	31.37	10	0.02	without turning
1145	9.37	200	5.89	0.339	9.9	1.18	31.38	10	0.02	off
1155	10.04	200	5.90	0.344	9.5	1.01	31.31	9	0.02	
1205	10.56	200	5.90	0.345	6.7	0.97	31.33	8	0.02	

SIGNATURE(S): Joan Trenton

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island Site 27
Project No.: 112G024016

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PA1-27-GW19S-03
Sample Location: PA1-27-MW19S
Sampled By: SEH
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8/7/10								
Time: 1625								
Method: LF	Clear	5.02	0.220	33.11	9.2	0.92	0.0	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8/7/10								
Method: LF	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 12'								
Static Water Level (WL): 5.00	~~5.00~~							
One Casing Volume (gal/L): 1.14								
Start Purge (hrs): 1500								
End Purge (hrs): 1625								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L): 148.75								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	yes
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	yes
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	yes
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	yes
Alkalinity/TDS	4°C	1 - 500mL HDPE	yes
TOC	H2SO4/ 4°C	2 - 40ml Vials	yes

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

See photo - well grout filled to lid. Needs new plug

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406

WELL ID.: PAI-27 - MW19S
DATE: 8/7/10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1500	5.00	Start LF Purge								
1510	5.79	175	5.39	0.249	95	1.37	31.11	271	0.0	
1520	5.82	175	5.13	0.240	60	1.07	31.25	204	0.0	
1530	5.85	175	5.15	0.240	36	1.12	31.54	316	0.0	
1540	5.86	175	5.15	0.237	26	1.11	31.71	327	0.0	
1550	5.90	175	5.09	0.228	25	0.92	32.61	338	0.0	
1600	5.90	175	5.09	0.225	19	0.89	33.03	343	0.0	
1610	5.87	175	5.05	0.221	13	0.90	33.21	349	0.0	
1620	5.87	175	5.02	0.220	9.2	0.92	33.11	353	0.0	
1625	collect sample									

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: PARRIS ISLAND
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW205-03
Sample Location: PAI-27-MW205
Sampled By: T. ROJAHN
C.O.C. No.:
Type of Sample:
[✓] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity ~~(%)~~ ppt	~~Other~~ ORP(mV)
Date: 8-10-10								
Time: 1140								
Method: PERISTALTIC	CLEAR	5.07	0.364	30.08	1.20	0.00	0.1	+ 79

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-10-10								
Method: SAME	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2"Ø PVC								
Total Well Depth (TD): 16.68								
Static Water Level (WL): 7.85								
One Casing Volume(gal/L) 5.6								
Start Purge (hrs): 10:35								
End Purge (hrs): 11:35								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 12								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	✓
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	✓
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	✓
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	✓
Alkalinity/TDS	4°C	1 - 500mL HDPE	✓
TOC	H2SO4/ 4°C	2 - 40ml Vials	✓

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Troy Rojahn

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island
PROJECT NUMBER: 112602406
WELL ID.: PAI-27-MW20S
DATE: 8/10/10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments Vol.	Color
10:35	7.85	0	–	–	–	–	–	–	–	Start Purge	
10:45	8.26	200	5.32	0.350	1.59	0.00	31.86	165	0.1	2000	Clear
10:55	8.44	200	5.10	0.351	12.0	0.00	30.88	176	0.1	4000	"
11:05	8.49	200	5.02	0.362	5.05	0.00	30.29	118	0.1	6000	"
11:15	8.50	200	5.05	0.371	3.35	0.00	29.78	88	0.1	8000	"
1125	8.50	200	5.06	0.369	2.00	0.00	29.98	81	0.1	10000	"
1135	8.50	200	5.07	0.364	1.20	0.00	30.08	79	0.1	12000	"
1140	—	—	—	—	—	—	—	—	—	Start Sampling	

SIGNATURE(S): Terry Rojik

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: PARRIS ISLAND
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW215-03
Sample Location: PAI-27-MW215
Sampled By: T. ROJAHN
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity ~~(%)~~ ppt	Other ORP(mV)
Date: ~~452~~ 8-08-10								
Time: 1525								
Method: PERISTALTIC	CLEAR	4.87	0.421	27.04	1.75	0.00	0.1	-37

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-08-10								
Method: SAME	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2" Ø PVC								
Total Well Depth (TD): 15.13								
Static Water Level (WL): 8.34								
One Casing Volume(gal/L): 4.3								
Start Purge (hrs): 1423								
End Purge (hrs): 1523								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 12								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	✓
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	✓
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	✓
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	✓
Alkalinity/TDS	4°C	1 - 500mL HDPE	✓
TOC	H2SO4/ 4°C	2 - 40ml Vials	✓

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

NO ODOR

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Terry Rojahn

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: PARRIS ISLAND
PROJECT NUMBER: 112G02406
WELL ID.: PAI-27. MW215
DATE: 8-08-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1423	8.34	0	—	—	—	—	—	—	—	START PURGE
1433	8.70	200	5.10	0.433	2.62	3.02	26.12	-87	0.1	2000 CLEAR
1443	8.71	200	4.96	0.415	2.36	0.00	26.70	-66	0.1	4000 "
1453	8.71	200	4.92	0.420	2.11	0.00	26.53	-52	0.1	6000 "
1503	8.71	200	4.89	0.424	1.85	0.00	26.49	-41	0.1	8000 "
1513	8.71	200	4.87	0.422	1.81	0.00	26.77	-38	0.1	10000 "
1523	8.71	200	4.87	0.421	1.75	0.00	27.04	-37	0.1	12000 "
1525	—	—	—	—	—	—	—	—	—	START SAMPLING

SIGNATURE(S): Terry Rojas

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: ~~[illegible]~~ PA1-27-GW481-02
Sample Location: PA1-27-GW481
Sampled By: S.EH
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8/8/10								
Time: 1840								
Method: LF	Clear	5.16	0.192	24.76	0.45	0.65	0.0	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8/8/10								
Method: LF	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 25.10								
Static Water Level (WL): 8.08								
One Casing Volume(gal/L): 2.77								
Start Purge (hrs): 1745								
End Purge (hrs): 1840								
Total Purge Time (min): 55								
Total Vol. Purged (gal/L): 3								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	yes
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	yes
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	yes
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	yes
Alkalinity/TDS	4°C	1 - 500mL HDPE	yes
TOC	H2SO4/ 4°C	2 - 40ml Vials	yes

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406

WELL ID.: PAI-27-MW481
DATE: 8/7/10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1815	8.08									
1855	10.05	175	5.99	0.246	12	0.70	25.97	-20	0.0	
1805	9.81	175	5.86	0.227	4.3	0.68	25.73	-7	0.0	
1815	9.78	175	5.69	0.207	1.0	0.66	25.31	8	0.0	
1825	9.80	175	5.61	0.195	0.70	0.65	25.03	14	0.0	
1835	9.85	175	5.65	0.192	0.45	0.65	24.76	14	0.0	
1840	collect sample									

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: PARRIS ISLAND
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW495-02
Sample Location: PAI-27-MW495
Sampled By: T. ROJAHN
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity ppt ~~(%)~~	Other ORP (mV)
Date: 8-10-10								
Time: 1725								
Method: SAME	CLEAR	6.65	0.384	32.43	9.95	0.00	0.1	-121

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-10-10								
Method: PERISTALTIC	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2"Φ PVC								
Total Well Depth (TD): 12.63								
Static Water Level (WL): 7.10								
One Casing Volume(gal/L) 3.4								
Start Purge (hrs): 16:35								
End Purge (hrs): 17:20								
Total Purge Time (min): 45								
Total Vol. Purged (gal/L) 9								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	✓
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	✓
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	✓
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	✓
Alkalinity/TDS	4°C	1 - 500mL HDPE	✓
TOC	H2SO4/ 4°C	2 - 40ml Vials	✓

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Ty Rojahn

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: PARRIS ISLAND
PROJECT NUMBER: 112G02406
WELL ID.: PAI-27-MW495
DATE: 8-10-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments Vol	Color
1635	7.10	0	—	—	—	—	—	—	—	Start	PURGE
1645	7.29	200	6.55	0.368	3.3	0.71	32.60	-31	0.1	2000	CLEAR
1655	7.31	200	6.54	0.390	1.00	0.08	32.19	-96	0.1	4000	"
1705	7.32	200	6.59	0.385	0.90	0.00	32.51	-117	0.1	6000	"
1715	7.32	200	6.63	0.387	0.75	0.00	32.34	-121	0.1	8000	"
1720	7.32	200	6.65	0.384	0.95	0.00	32.43	-121	0.1	9000	"
1725	—	—	—	—	—	—	—	—	—	Start	SAMPLING

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW50I-02
Sample Location: PAI-27-MW50I
Sampled By: T. Rojahn
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8-10-10	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: 1925	(Visual)	(S.U.)	(mS/cm)	(°C)	(NTU)	(mg/l)	ppt(‰)	ORP(mV)
Method: Peristaltic	CLEAR	5.65	0.283	27.74	6.1	0.00	0.1	-88

PURGE DATA:

Date: 8-10-10	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method: SAME	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2"Ø PVC								
Total Well Depth (TD): 24.05								
Static Water Level (WL): 7.10								
One Casing Volume(gal/L): 10.5								
Start Purge (hrs): 1805								
End Purge (hrs): 1920								
Total Purge Time (min): 75								
Total Vol. Purged (gal/L): 15								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	✓
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	✓
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	✓
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	✓
Alkalinity/TDS	4°C	1 - 500mL HDPE	✓
TOC	H2SO4/ 4°C	2 - 40ml Vials	✓

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Terry Rojahn

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: PARRIS ISLAND
PROJECT NUMBER: 112G02406

WELL ID.: PAI-27-MW50I
DATE: 8-10-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments VOL.	Comments COLOR
1805	7.10	0	—	—	—	—	—	—	—	Start PURGE	
1815	8.57	200	5.61	0.260	18	0.00	29.55	-59	0.1	2000	CLEAR
1825	8.89	200	5.58	0.267	34	0.00	28.42	-64	0.1	4000	"
1835	8.78	200	5.58	0.270	30	0.41	28.64	-66	0.1	6000	"
1845	8.78	200	5.59	0.274	18	0.00	28.64	-71	0.1	8000	"
1855	8.79	200	5.61	0.273	13	4.07	28.13	-77	0.1	10000	"
1905	8.79	200	5.62	0.277	8.9	0.00	28.05	-83	0.1	12000	"
1915	8.79	200	5.65	0.281	7.2	0.00	27.72	-88	0.1	14000	"
1920	8.79	200	5.65	0.283	6.1	0.00	27.74	-88	0.1	15000	"
1925	8.79	200	—	—	—	—	—	—	—	START SAMPLING	

SIGNATURE(S): Tony Rogers

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island - Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW515-02
Sample Location: PAI-27-MW1515
Sampled By: SEH
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8/8/10								
Time: 1645								
Method: LF	Clear	6.77	0.251	32.07	9.2	0.56	0.1	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8/8/10								
Method: LF	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 13.45								
Static Water Level (WL): 2.61								
One Casing Volume(gal/L): 1.760								
Start Purge (hrs): 1535								
End Purge (hrs): 1645								
Total Purge Time (min): 70								
Total Vol. Purged (gal/L): 4								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	yes
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	yes
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	yes
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	yes
Alkalinity/TDS	4°C	1 - 500mL HDPE	yes
TOC	H2SO4/ 4°C	2 - 40ml Vials	yes

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	PAI-27-GW-080810-01

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island Site 27
PROJECT NUMBER: 126 024006
WELL ID.: PAI-27-MW515
DATE: 8/8/00

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1535	2.64	Start purge								
1545	3.15	200	6.78	0.263	24	0.72	29.65	53	0.1	
1555	3.08	200	6.71	0.262	27	0.67	30.00	61	0.1	
1605	3.08	200	6.65	0.260	30	0.68	29.86	81	0.1	
1615	3.20	200	6.52	0.256	22	0.65	30.36	108	0.1	
1625	3.05	150	6.73	0.257	18	0.65	30.72	105	0.1	
1635	3.05	150	6.74	0.258	11	0.60	30.65	105	0.1	
1640	3.05	150	6.77	0.251	9.2	0.56	30.07	109	0.1	
1645	collect sample									

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW52I
Sample Location: PAI-27-MW52I
Sampled By: SEH
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8/8/10								
Time: 1155								
Method: LF	Clear	6.30	0.245	27.31	4.2	0.55	0.0	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8/8/10								
Method: LF	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 24.75								
Static Water Level (WL): 6.85								
One Casing Volume(gal/L): 2.92								
Start Purge (hrs): 1325								
End Purge (hrs): 1455								
Total Purge Time (min): 90								
Total Vol. Purged (gal/L): 4								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	yes
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	yes
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	yes
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	yes
Alkalinity/TDS	4°C	1 - 500mL HDPE	yes
TOC	H2SO4/ 4°C	2 - 40ml Vials	yes

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406

WELL ID.: PAI-27-MW52I
DATE: 8/8/10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1325	6.85	begin	purge							
1335	8.35	150	~~150~~ 6.15	0.170	50	0.67	27.94	46	0.0	
1345	8.38	150	6.15	0.191	21	0.63	27.91	-27	0.0	
1355	8.46	150	6.17	0.202	12	0.60	27.71	-33	0.0	
1405	8.33	150	6.20	0.215	6.8	0.60	27.69	-40	0.0	
1415	8.45	200	6.26	0.216	13	0.57	27.44	-43	0.0	
1425	8.92	200	6.20	0.219	9.2	0.55	26.73	-42	0.0	
1435	9.09	200	6.25	0.233	5.8	0.53	26.63	-50	0.0	
1445	8.50	150	6.30	0.244	4.5	0.55	27.31	-57	0.0	
1450	8.50	150	6.30	0.245	4.2	0.55	27.31	-57	0.0	
1455	collect sample									

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: PARRIS ISLAND
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW53S-02
Sample Location: PAI-27-MW53S
Sampled By: T. ROJAHN
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity PPT ~~(%)~~	Other ORP (mV)
Date: 8-07-10								
Time: 1710								
Method: PERISTALTIC	CLEAR	5.80	0.337	27.10	2.16	0.00	0.1	+44

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-07-10								
Method: PERISTALTIC	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" Ø PVC								
Total Well Depth (TD): 13.40								
Static Water Level (WL): 7.92								
One Casing Volume(gal/L): 3.5								
Start Purge (hrs): 1616								
End Purge (hrs): 1706								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): 7.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	✓
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	✓
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	✓
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	✓
Alkalinity/TDS	4°C	1 - 500mL HDPE	✓
TOC	H2SO4/ 4°C	2 - 40ml Vials	✓

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

NO ODOR

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Terry Rojahn

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: PARRIS ISLAND
PROJECT NUMBER: 112G02406
WELL ID.: PAI-27-MW53S
DATE: 8-07-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1616	7.92	0	—	—	—	—	—	—	—	Start Purge
1626	8.35	150	5.94	0.395	115	0.00	29.34	24	0.1	1500 Orange/Rust Flock
1636	8.42	150	5.88	0.348	14.4	0.00	28.22	26	0.1	3000 CLEAR
1646	8.45	150	5.84	0.333	5.78	0.00	27.74	36	0.1	4500 CLEAR
1656	8.45	150	5.81	0.331	3.38	0.00	27.53	40	0.1	6000 CLEAR
1706	8.45	150	5.80	0.337	2.16	0.00	27.10	44	0.1	7500 CLEAR
1710	—	—	—	—	—	—	—	—	—	SAMPLE TIME

SIGNATURE(S): Terry Rojek

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: PARRIS ISLAND
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW54I-02
Sample Location: PAI-27-MW54I
Sampled By: T. ROJAHN
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-07-10								
Time: 1920	(Visual)	(S.U.)	(mS/cm)	(^{0}C)	(NTU)	(mg/l)	ppt ~~(%)~~	ORP (mV)
Method: Peristaltic	CLEAR	6.22	0.097	25.14	4.01	0.00	0.0	+108

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-07-10								
Method: SAME	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2"Ø PVC								
Total Well Depth (TD): 23.85								
Static Water Level (WL): 8.08								
One Casing Volume(gal/L): 9.9								
Start Purge (hrs): 17:55								
End Purge (hrs): 19:15								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L): 12.8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	✓
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	✓
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	✓
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	✓
Alkalinity/TDS	4°C	1 - 500mL HDPE	✓
TOC	H2SO4/ 4°C	2 - 40ml Vials	✓

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

No ODOR

Circle if Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s): Terry Rojahn

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: PARRIS ISLAND
PROJECT NUMBER: 112G02406

WELL ID.: PAI-27-MW54I
DATE: 8-07-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments VOL.	COLOR
(TR) 1855	8.08	0	—	—	—	—	—	—	—	START PURGE	
1805	9.11	160	6.24	0.094	16.0	2.07	26.46	153	0.0	1600ml	CLEAR
1815	9.13	160	6.22	0.095	12.2	0.00	26.35	135	0.0	3200ml	"
1825	9.11	160	6.19	0.095	8.76	0.00	26.12	119	0.0	4800ml	"
1835	9.11	160	6.19	0.096	7.82	0.00	25.75	113	0.0	6400ml	"
1840	9.11	160	6.19	0.096	6.37	0.00	25.43	112	0.0	7200ml	"
1845	9.11	160	6.17	0.096	5.54	0.00	25.58	112	0.0	8000ml	"
1855	9.11	160	6.20	0.096	4.85	0.00	25.31	107	0.0	9600ml	"
1905	9.11	160	6.21	0.096	4.30	0.00	25.32	109	0.0	11200ml	"
1915	9.11	160	6.22	0.097	4.01	0.00	25.14	108	0.0	12800ml	"
1920	—	—	—	—	—	—	—	—	—	START SAMPLING	

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW555-02
Sample Location: PAI-27-MW555
Sampled By: T. Rojahn
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA: → 15.4 @ time of metals sampling.

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity ppt ~~(%)~~	Other ORP(mV)
Date: 8-09-10								
Time: 1745								
Method: Peristaltic	CLEAR	4.94	0.498	24.51	* 47.1	0.00	0.1	208

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-09-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: PVC 2"Ø								
Total Well Depth (TD): 16.49								
Static Water Level (WL): 8.92								
One Casing Volume(gal/L): 4.6								
Start Purge (hrs): 1125								
End Purge (hrs): 1745 w/ BREAK								
Total Purge Time (min): 130								
Total Vol. Purged (gal/L): 23								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	✓
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	✓
Pesticides/PCB	4°C	2 - 1 L Amber Bottles ×3	✓
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	✓
Alkalinity/TDS	4°C	1 - 500mL HDPE	✓
TOC	H2SO4/ 4°C	2 - 40ml Vials	✓

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Removed over 5 well volumes during purge
* Start sampling with turb. under 50 NTUs
Start collecting metals @ 1950 hrs turb = 15.4 NTUs
Last hr turbity was between 14.4 & 15.6
Removed over 8 well volumes prior to sampling metals

Circle if Applicable:
MS/MSD YES
Duplicate ID No.:

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: PARRIS ISLAND
PROJECT NUMBER: 112G02406
WELL ID.: PAI-27-GW55S
DATE: 8-09-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1125	8.98	0	—	—	—	—	—	—	—	Start Purge
1135	9.24	200	5.48	1.96	541	0.00	24.87	197	0.1	2000 turbid
1145	9.28	200	5.46	0.319	428	0.00	24.87	213	0.1	4000 Cloudy
1155	9.30	200	5.39	0.344	273	0.00	24.77	220	0.1	6000 "
1205	9.31	200	5.33	0.404	194	0.00	25.07	224	0.1	8000 SI "
1215	9.33	200	5.24	0.443	120	0.00	25.38	235	0.1	10000 SI "
1225	9.33	200	5.24	0.440	104	0.00	25.42	234	0.1	12000 V.SI "
		BREAK FOR LUNCH & PREP SAMPLES FOR SHIPPING								↓
1635	RESTART PURGE	→	—	—	—	—	—	—	—	12000 V.SI CLOUDY
1645	9.28	200	5.17	0.470	80.5	0.00	24.54	231	0.1	14000 V.SI "
1655	9.34	200	5.08	0.473	70.3	0.00	24.37	225	0.1	16000 " "
1705	9.37	200	4.99	0.479	65.1	0.00	24.20	218	0.1	18000 " "
1715	9.36	200	4.92	0.487	62.8	0.00	24.19	215	0.1	20000 " "
1725	9.31	120	4.87	0.489	60.6	0.00	24.49	213	0.1	21200 " "
1735	9.33	120	4.85	0.495	78.7	0.00	25.50	211	0.1	22400 " "
1740	9.33	120	4.94	0.498	47.1	0.00	24.51	208	0.1	23000 CLEAR
1745	—	—	—	—	—	—	—	—	—	Start Sampling

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: PARRIS ISLAND
Project No.: 112G0240G

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW56I-02
Sample Location: PAI-27 MW56I
Sampled By: T. ROSAHN
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity ppt (%)	Other ORP(mV)
Date: 8-09-10								
Time: 1035								
Method: PERISTALTIC	CLEAR	6.12	1.20	23.27	9.02	0.00	0.3	-42

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-09-10								
Method: SAME	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 28.15								
Static Water Level (WL): 6.98								
One Casing Volume(gal/L): 12.9								
Start Purge (hrs): 0925								
End Purge (hrs): 1030								
Total Purge Time (min): 65								
Total Vol. Purged (gal/L): 13.0								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	✓
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	✓
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	✓
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	✓
Alkalinity/TDS	4°C	1 - 500mL HDPE	✓
TOC	H2SO4/ 4°C	2 - 40ml Vials	✓

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Terry Rosahn

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: PARRIS ISLAND
PROJECT NUMBER: 112G02406
WELL ID.: PAI-27-MW 56 I
DATE: 8-09-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
0925	6.98	0	—	—	—	—	—	—	—	START PURGE
0935	7.05	200	6.18	1.22	32.4	0.00	22.40	-18	0.3	2000 Rust Flock
0945	7.07	200	6.15	1.21	19.5	0.00	22.50	-27	0.3	4000 CLEAR w/ "
0955	7.07	200	6.17	1.21	16.3	0.00	22.36	-37	0.3	6000 " Sl. Flock
1005	7.07	200	6.17	1.21	15.5	0.00	22.39	-37	0.3	8000 " " "
1015	7.07	200	6.16	1.20	15.2	0.00	22.44	-39	0.3	10000 " " "
1025	7.04	200	6.12	1.20	8.26	0.00	23.13	-41	0.3	12000 CLEAR
1030	7.04	200	6.12	1.20	9.02	0.00	23.27	-42	0.3	13000 "
1035	—	—	—	—	—	—	—	—	—	START SAMPLING

SIGNATURE(S): Terry Rogal

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island / Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW57S-02
Sample Location: PAI-27-MW-57S
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other ORP
Date: 8-10-10								
Time: 1230								
Method: Peristaltic	Clear	5.48	0.585	32.08	11	0.00	0.03	84

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-10-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): —								
Static Water Level (WL): 4.02								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1140								
End Purge (hrs): 1230								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): 106								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1
Alkalinity/TDS	4°C	1 - 500mL HDPE	1
TOC	H2SO4/ 4°C	2 - 40ml Vials	2

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Joan Trentini

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island / Site 27
PROJECT NUMBER: 112G02406
WELL ID.: PAI-27-MW-57S
DATE: 8-10-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1140	4.02	Int.	6.15	0.460	2.3	0.63	32.48	36	0.02	
1150	4.82	200	5.82	0.747	39	0.03	31.71	38	0.04	
1200	4.90	200	5.72	0.694	24	0.00	31.92	49	0.03	
1210	4.95	200	5.55	0.624	15	0.00	31.92	73	0.03	
1220	5.00	200	5.49	0.602	11	0.00	32.02	82	0.03	
1230	5.02	200	5.48	0.595	11	0.00	32.08	84	0.03	

SIGNATURE(S): Jason Trenton

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island / Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW58S-02
Sample Location: PAI-27-MW-58S
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8-9-10								
Time: 1845								ORP
Method: Peristaltic	Clear	5.00	0.184	30.35	7.9	0.52	0.01	175

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-9-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): —								
Static Water Level (WL): 3.20								
One Casing Volume(gal/L): —								
Start Purge (hrs): 1705								
End Purge (hrs): 1845								
Total Purge Time (min): 100								
Total Vol. Purged (gal/L): 20L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1
Alkalinity/TDS	4°C	1 - 500mL HDPE	1
TOC	H2SO4/ 4°C	2 - 40ml Vials	2

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Jason Trentini

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island/Site 27
PROJECT NUMBER: 112G02406
WELL ID.: PAI-27-MW-58S
DATE: 8-9-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1705	3.20	Int	5.50	0.200	12	6.65	32.08	139	0.01	
1715	3.31	200	5.22	0.193	7.0	5.78	31.91	162	0.01	
1725	3.58	200	5.07	0.192	19	4.62	31.65	187	0.01	
1735	3.76	200	5.07	0.189	36	3.47	31.62	188	0.01	
1745	3.81	200	5.05	0.187	27	1.91	31.44	188	0.01	
1755	3.87	200	5.04	0.185	23	1.51	31.29	187	0.01	
1805	3.90	200	5.02	0.186	18	1.20	30.84	185	0.01	
1815	3.92	200	5.01	0.185	19	1.08	30.76	184	0.01	
1825	3.93	200	5.01	0.185	15	0.60	30.36	177	0.01	
1835	3.93	200	5.03	0.185	11	0.55	30.29	174	0.01	
1845	3.94	200	5.00	0.184	7.9	0.52	30.35	175	0.01	

SIGNATURE(S): Jason Trenton

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island / Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW59I-02
Sample Location: PAI-27-MW-59I
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8-10-10								
Time: 0840								ORP
Method: Peristaltic	Clear	5.93	0.259	28.19	8.0	0.00	0.01	80

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-10-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): —								
Static Water Level (WL): 3.15								
One Casing Volume(gal/L): —								
Start Purge (hrs): 0800								
End Purge (hrs): 0840								
Total Purge Time (min): 40								
Total Vol. Purged (gal/L): 8L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1
Alkalinity/TDS	4°C	1 - 500mL HDPE	1
TOC	H2SO4/ 4°C	2 - 40ml Vials	2

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Jason Trentini

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island / Site 27
PROJECT NUMBER: 112G02406

WELL ID.: PAI-27-MW-59I
DATE: 8-10-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity (%) or ppt	Comments
0800	3.15	Int.	5.70	0.258	14.0	1.06	27.94	123	0.01	
0810	4.10	200	5.86	0.243	24	0.21	28.00	97	0.01	
0820	4.16	200	5.93	0.254	17	0.00	28.06	84	0.01	
0830	4.21	200	5.93	0.257	14	0.00	28.11	82	0.01	
0840	4.25	200	5.93	0.259	8.0	0.00	28.19	80	0.01	

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: PARRIS ISLAND
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW60I-02
Sample Location: PAI-27-MW60I
Sampled By: T. ROJAHN
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity ppt ~~(%)~~	Other ORP(mV)
Date: 8-08-10								
Time: 1835								
Method: Peristaltic	CLEAR	6.02	0.169	27.05	5.54	0.00	0.0	-84

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-08-10								
Method: SAME	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2" Ø PVC								
Total Well Depth (TD): 26.88								
Static Water Level (WL): 10.06								
One Casing Volume(gal/L): 10.5								
Start Purge (hrs): 1705								
End Purge (hrs): 1830								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L): 12.8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	✓
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	✓
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	✓
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	✓
Alkalinity/TDS	4°C	1 - 500mL HDPE	✓
TOC	H2SO4/ 4°C	2 - 40ml Vials	✓

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

No odor

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	PAI-27-GW080810-02

Signature(s): [signature]

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: PARRIS ISLAND
PROJECT NUMBER: 112G02406
WELL ID.: PAI-27-MW60I
DATE: 8-08-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments Vol	Color
1705	10.06	0	–	–	–	–	–	–	–	Start Purge	
1715	11.50	150	6.18	0.171	8.37	0.00	28.88	-76	0.0	1500ml	CLEAR w/Floc
1725	11.72	150	6.13	0.173	7.92	0.00	27.88	-79	0.0	3000	"
1735	11.79	150	6.11	0.168	5.78	0.00	28.73	-83	0.0	4500	"
1745	11.83	150	6.11	0.169	7.90	0.00	28.04	-86	0.0	6000	"
1755	11.85	150	6.07	0.167	7.67	0.00	28.14	-88	0.0	7500	"
1805	11.83	150	6.03	0.167	7.00	0.00	28.08	-89	0.0	9000	"
1815	11.83	150	6.03	0.166	7.32	0.00	28.28	-87	0.0	10500	"
1825	11.83	150	6.02	0.167	6.05	0.00	27.47	-85	0.0	12000	"
1830	11.83	150	6.02	0.169	5.54	0.00	27.05	-84	0.0	12750	"
1835	–	–	–	–	–	–	–	–	–	SAMPLE TIME	

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island / Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW61I-02
Sample Location: PAI-27-MW-61I
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8-10-10								
Time: 1030								ORP
Method: Peristaltic	Clear	6.59	0.329	31.07	4.7	0.00	0.02	-47

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-10-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): —								
Static Water Level (WL): 8.68								
One Casing Volume(gal/L): —								
Start Purge (hrs): 0940								
End Purge (hrs): 1030								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): 10 L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1
Alkalinity/TDS	4°C	1 - 500mL HDPE	1
TOC	H2SO4/ 4°C	2 - 40ml Vials	2

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Jean Trentini

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island / Site 27
PROJECT NUMBER: 112G02406

WELL ID.: PAI-27-MW-61
DATE: 8-10-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
0940	8.68	Int	6.39	0.266	64.4	2.42	31.23	6	0.01	
0950	9.27	200	6.59	0.268	13.1	1.04	30.59	-39	0.01	
1000	9.91	200	6.60	0.301	15.8	0.42	30.40	-45	0.01	
1010	10.17	200	6.56	0.326	9.0	0.19	30.99	-46	0.01	
1020	10.24	200	6.58	0.329	2.0	0.06	31.03	-47	0.02	
1030	10.30	200	6.59	0.329	4.7	0.00	31.07	-47	0.02	

SIGNATURE(S): Jason Trenton

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: PARRIS ISLAND
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW625-02
Sample Location: PAI-27-MW625
Sampled By: T. ROJAHN
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity ~~(%)~~ PPT	Other ORP (mV)
Date: 8-08-10								
Time: 1325								
Method: PERISTALTIC	CLEAR	5.42	0.782	29.29	7.55	0.00	0.2	-84

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-08-10								
Method: SAME	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2" Ø PVC								
Total Well Depth (TD): 16.7								
Static Water Level (WL): 8.33								
One Casing Volume(gal/L): 5.2								
Start Purge (hrs): 12:10								
End Purge (hrs): 13:20								
Total Purge Time (min): 70								
Total Vol. Purged (gal/L): 10.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	✓
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	✓
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	✓
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	✓
Alkalinity/TDS	4°C	1 - 500mL HDPE	✓
TOC	H2SO4/ 4°C	2 - 40ml Vials	✓

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

NO ODOR

Circle if Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s): Terry Rojahn

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: PARRIS ISLAND
PROJECT NUMBER: 112G02406
WELL ID.: PAI-27-MW 62S
DATE: 8-08-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or (ppt)	Comments Vol	Color
1210	8.33	0	—	—	—	—	—	—	—	Start Purge	
1220	8.81	150	6.35	0.905	14.0	1.85	32.05	-58	0.2	1500	CLEAR
1230	8.87	150	6.01	1.16	13.5	0.62	31.20	-59	0.3	3000	"
1240	8.89	150	5.73	0.925	18.3	0.47	30.22	-68	0.2	4500	"
1250	8.90	150	5.45	0.917	19.7	0.38	30.19	-79	0.2	6000	"
1300	8.90	150	5.42	0.860	14.0	0.14	29.78	-82	0.2	7500	"
1310	8.90	150	5.41	0.786	9.31	0.00	29.34	-84	0.2	9000	"
1315	8.93	150	5.40	0.789	8.57	0.00	29.25	-82	0.2	9750	"
1320	8.92	150	5.42	0.782	7.55	0.00	29.29	-84	0.2	10500	"
1325	—	—	—	—	—	—	—	—	—	Start Sampling	

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: PARRIS ISLAND
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GW63S-02
Sample Location: PAI-27-MW 63S
Sampled By: T. ROJAHN
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-10-10								
Time: 0925	(Visual)	(S.U.)	(mS/cm)	(°C)	(NTU)	(mg/l)	ppt (%)	ORP (mV)
Method: PERISTALTIC	CLEAR	6.79	0.221	26.07	1.82	5.49	0.0	+136

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-10-10								
Method: SAME	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2"Φ PVC								
Total Well Depth (TD): 16.45								
Static Water Level (WL): 11.55								
One Casing Volume(gal/L): 3.1								
Start Purge (hrs): 8:35								
End Purge (hrs): 0925								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): Ce								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	✓
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	✓
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	✓
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	✓
Alkalinity/TDS	4°C	1 - 500mL HDPE	✓
TOC	H2SO4/ 4°C	2 - 40ml Vials	✓

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Tony Rojahn

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: PARRIS ISLAND
PROJECT NUMBER: 112G02406
WELL ID.: PAI-27-MW635-
DATE: 8-10-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
0835	11.55	0	—	—	—	—	—	—	—	START PURGE
0845	11.66	150	6.65	0.224	11.6	1.36	26.27	139	0.0	1500 CLEAR
0855	11.67	150	6.77	0.219	4.75	6.12	25.88	138	0.0	3000 "
0905	11.67	150	6.79	0.223	3.16	5.80	25.50	141	0.0	4500 "
0915	11.67	150	6.76	0.221	2.35	5.75	25.92	143	0.0	6000 "
0920	11.67	150	6.79	0.221	1.82	5.49	26.07	136	0.0	
0925	—	—	—	—	—	—	—	—	—	START SAMPLING

SIGNATURE(S): [illegible]

PAGE ___ **OF** ___

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-GAW06-S-02
Sample Location: PAI-27-MW06S
Sampled By: SEH
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8/8/10								
Time: 2000								
Method: LF	Clear	6.34	0.126	26.06	1.2	1.77	0.0	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8/8/10								
Method: LF	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm):								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 16.5								
Static Water Level (WL): 9.68								
One Casing Volume(gal/L): ~~1.5~~	1.11							
Start Purge (hrs): 1845								
End Purge (hrs): 2000								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L): 4								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	yes
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	yes
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	yes
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	yes
Alkalinity/TDS	4°C	1 - 500mL HDPE	yes
TOC	H2SO4/ 4°C	2 - 40ml Vials	yes

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Stick-up well

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island Site 27
PROJECT NUMBER: 112G0240a
WELL ID.: PAI-27-MW64S
DATE: 8/8/10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity ~~% or~~ ppt	Comments
1845	9.68	Start pump								
1855	9.92	200	6.70	0.116	6.0	2.50	26.69	84	0.0	
1905	9.90	200	6.08	0.122	19	1.82	26.35	80	0.0	
1915	9.90	200	5.96	0.123	4.5	1.84	26.31	82	0.0	
1925	9.90	200	5.98	0.125	2.4	1.80	26.17	83	0.0	
1935	9.90	200	6.54	0.125	1.7	1.77	26.21	50	0.0	
1940	9.90	200	6.62	0.125	1.2	1.77	26.17	49	0.0	
1945	9.90	200	6.27	0.125	1.4	1.81	26.10	70	0.0	
1950	9.90	200	6.37	0.125	1.5	1.79	26.09	62	0.0	
1955	9.90	200	6.34	0.126	1.2	1.77	26.02	66	0.0	
2000	collect sample									

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island / Site 27
Project No.: 112G02406

[] Domestic Well Data
[X] Monitoring Well Data - TW
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-TW65S-01
Sample Location: PAI-27-TW-65S
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other ORP
Date: 8-7-10								
Time: 1320								
Method: Peristaltic	Cloudy	6.21	0.383	34.41	66.5	1.54	0.02	35

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-7-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 1" - temporary								
Total Well Depth (TD): 10.18								
Static Water Level (WL): 7.71								
One Casing Volume(gal/L): 0.10								
Start Purge (hrs): 1210								
End Purge (hrs): 1215								
Total Purge Time (min): 5								
Total Vol. Purged (gal/L): 625mL								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1
Alkalinity/TDS	4°C	1 - 500mL HDPE	1
TOC	H2SO4/ 4°C	2 - 40ml Vials	2

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

*Attempted to develop well prior to purge/sample.
Surged & purged well ~1/minute with peristaltic pump at full speed until DRY
Allowed to recover prior to purge/sample.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Jason Trentini

*Well DRY after purging @ 125 mL for ~5 mins. Will allow to recover prior to collecting sample volume.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island / Site 27
PROJECT NUMBER: 112G02406

WELL ID.: PAI-27-TW-65S
DATE: 8-7-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1210	7.69	Int	6.21	0.383	66.5	1.54	34.41	35	0.02	* Well DRY after purging at the peristaltic pump's lowest setting (125mL) for ~5 mins. -will allow to recover prior to collecting sample volume
1215	DRY	125								
1320	Sample									

SIGNATURE(S): Jason Trenton

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island / Site 27
Project No.: 112G2406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-TWG6I-01
Sample Location: PAI-27-TW-G6I
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other ORP
Date: 8-7-10								
Time: 1125								
Method: Peristaltic	Clear	5.96	0.541	29.47	4.4	0.00	0.03	22

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-7-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 1"-temporary								
Total Well Depth (TD): 26.82								
Static Water Level (WL): 8.00								
One Casing Volume (gal/L): 0.67								
Start Purge (hrs): 1045								
End Purge (hrs): 1125								
Total Purge Time (min): 40								
Total Vol. Purged (gal/L): 5L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1
Alkalinity/TDS	4°C	1 - 500mL HDPE	1
TOC	H2SO4/ 4°C	2 - 40ml Vials	2

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

DTW = 8.00'
TD = 26.82' btoc

* Developed well (surge/purge) prior to purge/sample. Surged & purged for 30 min. with peristaltic pump at full speed.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Jason Trentini

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island / Site 27
PROJECT NUMBER: 112G02406

WELL ID.: PAI-27-TW-GGI
DATE: 8-7-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1045	9.50	Int	6.27	0.362	111	3.62	32.55	46	0.02	
1055	10.31	125	5.97	0.537	12	0.10	29.85	29	0.03	
1105	10.59	125	5.97	0.542	5.6	0.00	29.41	25	0.03	
1115	10.63	125	5.97	0.544	4.8	0.00	29.42	23	0.03	
1125	10.67	125	5.96	0.541	4.4	0.00	29.47	22	0.03	

SIGNATURE(S): Jason Trenton

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island / Site 27
Project No.: 112602406

[] Domestic Well Data
[X] Monitoring Well Data - TW
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-TW67S-01
Sample Location: PAI-27-TW-67S
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other ORP
Date: 8-[illegible]-10								
Time: 1300								
Method: Peristaltic	Cloudy	6.26	0.261	29.11	279	3.64	0.01	18

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-[illegible]-10								
Method: Peristaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 1" temporary								
Total Well Depth (TD): 10.19								
Static Water Level (WL): 7.98								
One Casing Volume (gal/L): 0.09								
Start Purge (hrs): 0910								
End Purge (hrs): 0915								
Total Purge Time (min): 5								
Total Vol. Purged (gal/L): 625mL								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1
Alkalinity/TDS	4°C	1 - 500mL HDPE	1
TOC	H2SO4/ 4°C	2 - 40ml Vials	2

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

*Attempted to develop well prior to purge/sample. DTW = 8.37' btoc
TD = 10.19' btoc
Purged & surged with peristaltic pump at top speed for ~1/min. until DRY
~~until~~ Allowed to recover, purged DRY for a second time then allowed to recover and purged a third time for sample collection.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Jason Trentini

*Well DRY after purging ~ 625mL.
Will allow well to recover then begin to collect sample volume.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island / Site 27
PROJECT NUMBER: 112G02406
WELL ID.: PAI-27-TW-67S
DATE: 8-8-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
0910	7.98	Int	6.26	0.261	279	3.64	29.11	18	0.01	* Well DRY after
0915	DRY	125								purging ~ 625mL
1300	Sample									- will allow to
										recover then
										proceed to
										collect sample
										volume
										* Fuel oil odor
										on interface
										probe and
										some sheen on
										purge water.

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island / Site 27
Project No.: 112G2406

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-TW68I-01
Sample Location: PAI-27-TW-68I
Sampled By: J. Trentini
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8-6-10								
Time: 1605								ORP
Method: Peristaltic	Clear	6.00	0.493	29.98	7.7	0.00	0.02	5

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-6-10								
Method: Perstaltic	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 1" temporary								
Total Well Depth (TD): 27.56								
Static Water Level (WL): 8.4								
One Casing Volume (gal/L): 0.79								
Start Purge (hrs): 1515								
End Purge (hrs): 1605								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): 7.5L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	3
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	3
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	2
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	1
Alkalinity/TDS	4°C	1 - 500mL HDPE	1
TOC	H2SO4/ 4°C	2 - 40ml Vials	2

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Developed (surged + purged) well for 30 mins. prior to purge/sample.

DTW = 8.49
TD = 27.56

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Jason Trentini

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island / Site 27
PROJECT NUMBER: 112G02406
WELL ID.: PAI-27-TW-681
DATE: 8-6-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
1515	8.67	Int	6.13	0.489	34.4	2.25	35.18	22	0.02	*peristaltic pump
1525	10.33	150	6.03	0.493	16	0.27	31.39	8	0.02	set at lowest
1535	11.14	150	6.01	0.495	13	0.16	30.59	9	0.02	possible speed
1545	11.30	150	6.01	0.494	9.0	0.00	30.09	8	0.02	without shutting
1555	11.32	150	6.00	0.494	7.9	0.00	30.03	6	0.02	off
1605	11.34	150	6.00	0.493	7.7	0.00	29.98	5	0.02	

SIGNATURE(S): Jason Trenton

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island
Project No.:

[] Domestic Well Data
[X] Monitoring Well Data – TW
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-27-TW(68)I-01
Sample Location: PAI-27-TW(68)I
Sampled By: SEH
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8/9/10								
Time: 1020	(Visual)	(S.U.)	(mS/cm)	(°C)	(NTU)	(mg/l)	(%)	
Method: LF	Clear	6.14	0.499	26.84	0.0	0.04	0.1	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8/9/10								
Method: LF	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): –								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 27.56								
Static Water Level (WL): 7.95								
One Casing Volume (gal/L): 0.8								
Start Purge (hrs): 0920								
End Purge (hrs): 1020								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): 4								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	yes
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	yes
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	yes
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	yes
Alkalinity/TDS	4°C	1 - 500mL HDPE	yes
TOC	H2SO4/ 4°C	2 - 40ml Vials	yes

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Resample b/c field lost cooler

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island Site 27
PROJECT NUMBER: 112G02406

WELL ID.: 27-TW6805-01
DATE: 8/9/10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
0920	7.95	Start	purge							
0925	11.8	200	6.18	0.488	4.0	0.79	26.05	-18	0.1	
0935	11.5	150	6.15	0.499	2.6	0.70	26.19	-21	0.1	
0945	11.58	150	6.15	0.497	2.2	0.67	26.14	-23	0.1	
0955	11.65	130	6.11	0.495	1.8	0.65	26.11	-23	0.1	
1005	11.35	130	6.13	0.502	1.2	0.66	26.85	-26	0.1	
1010	10.15	130	6.13	0.501	0.0	0.66	27.04	-26	0.1	
1015	10.20	130	6.14	0.499	0.0	0.64	26.84	-26	0.1	
1020	collect sample									

SIGNATURE(S): [signature]

PAGE___OF___

C-16 SITES 9, 16, 27, AND 55 – GROUNDWATER LEVEL MEASUREMENT SHEETS

WATER LEVELS 9-26-07

STICKUP	WELL ID	TIME	WL	TPK
	MW-2I	1027	7.77	
	MW-3	1744	5.78	
	MW-4	1745	6.55	
	MW-5I	1748	7.99	
	MW-6	0825	9.76	
	MW-9	1739	7.73	
	MW-14	1711	9.55	
	MW-15I	1712	9.71	
	MW-16	1702	7.46	
1.48	TW-22S	1539	4.9 (3.43)	
1.02	TW-23I	1540	4.68 (3.66)	
1.16	TW-24S	10:02	5.31 (4.15)	
0.55	TW-25I	10:42	8.58 (8.03)	
1.73	TW-26S	15:15	9.28 (7.55)	
0.95	TW-27I	1516	8.67 (7.72)	
1.09	TW-28S	1508	6.32 (5.23)	
1.01	TW-29I	1509	6.37 (5.36)	
0.92	TW-30S	1520	5.78 (4.86)	
0.40	TW-31I	1521	5.32 (4.92)	
0.85	TW-33S	1528	(5.18) 6.03	
0.80	TW-34I	1529	7.13 (6.33)	
2.01	TW-35S	1534	7.47 (5.46)	
0.54	TW-36I	1535	6.15 (5.61)	
0.30	TW-37S	1530	6.13 (5.83)	
0.25	TW-38I	1531	6.51 (6.26)	
—	TW-39S	1546	9.08 —	
0.58	TW-40I	1547	8.60 (8.02)	
1.22	TW-41S	1541	3.82 (2.60)	
0.42	TW-42I	1541	NOT RECOVERED	
0.52	TW-43S	1523	3.39 (2.87)	
0.58	TW-44I	1524	7.17 * (6.59) *	
0.39	TW-45D	1522	9.18 (8.79)	
1.75	TW-46S	1511	9.06 (7.31)	
1.12	TW-47I	1512	8.27 (7.15)	

SU

Product → MW-11

FM → MW-19

SU

FM Gate Locked

ID	WL	TIME
TW-32I	7.97 @ ~~1704~~ 1709 HRS (TR)	
	0.47	
	7.50 WL	

WELL	WL	TD	TIME
MW-1	7.05	TD 14.75	1030
MW-7I	10.70	29.60	1039
MW-8D	15.11	38.76	1041
MW-11	11.33	16.65	1719
MW-12I	10.73	24.30	1723
MW-13D	14.90	39.15	1726
MW-19	4.43	11.50	1755
MW-20	6.12	16.70	1805
MW-21	6.42	15.16	1807
MW-10	9.42	14.25	1815

(2.87) Reduced to G.S.

* MAY NOT HAVE RECOVERED

SCIENTIFIC BRAND PRODUCTS . CHICAGO USA

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: MCRD PARRIS IS-SITE 27 **Project No.:** 112G00455
Location: PARRIS IS. SOUTH CAROLINA **Personnel:** CONTI
Weather Conditions: SUNNY WARM 31.30 in/Hg **Measuring Device:** Heron H-OIL
Tidally Influenced: Yes ____ No ____ **Remarks:** 01-3651 (SN)
HIGH TIDE ~ 1015 HRS

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
PAI-27-MW-6	8/18/08	0955			10.67			
PI055MW07I	"	0956			11.09			
PI055MW08D	"	0958			15.74			
PI055MW11		1046			11.48*	.43' PRODUCT →		TOP 11.05 PRODUCT 11.48 TOP H_2O
PI055MW12I		1047			11.15			
PI055MW13D		1048			15.59			
PI027MW19		1018			4.93			
PI055MW17		1057			4.87			
PI055MW18I		1058			7.03*		WATER FLOWING IN NOT ACCURATE	
PAI-27-MW-14		1009			9.99			
PAI-27-MW-15I		1010			10.14			
PAI-27-MW-16		1011			7.82			
PI055MW01	•	0950			7.16			
PAI-27-MW-2I	•	1004			11.99		WAS UNDER PRESS ?	COULD BE STILL RISING
PI027MW21		1024			7.02			
PAI-27-MW-9	—	—	—	—	—	—	—	—
PAI-27-MW-48I	•	0938			8.26			
PAI-27-MW-4		1007			6.95			
PAI-27-MW-5I		1009			7.56			
PI055MW10		1105			9.80			
PI027MW20		1023			6.64			
PAI-27-MW-49S		1015			6.79			
PAI-27-MW-50I		1016			6.85			
• PAI-27-MW-51S		0934			2.37			
• PAI-27-MW-52I		0935			6.79			

* All measurements to the nearest 0.01 foot

MW3 1005 6.06

Page ____ of ____

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: MCRD PARRIS IS-SITE 27 **Project No.:** 112G00455
Location: PARRIS IS. SOUTH CAROLINA **Personnel:**
Weather Conditions: **Measuring Device:**
Tidally Influenced: Yes ____ No ____ **Remarks:**

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
PAI-27-MW-53S	8/18/08	0930			8.63			
PAI-27-MW-54I	"	0931			8.61			
PAI-27-MW-55S		1021			7.67			
PAI-27-MW-56I		1020			7.09			
PAI-27-MW-57S		1029			3.01			
PAI-27-MW-58S		1032			2.64			
PAI-27-MW-59I		1033			2.61			
PAI-27-MW-60I		1036			9.93			
PAI-27-MW-61I		1044			8.35			
PAI-27-MW-62S		1026			7.12			
PAI-27-MW-63S		1038			11.31			
PAI-27-MW-64S		0941			9.76			

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: MCRD PARRIS IS-SITE 27
Project No.: 112G00455
Location: PARRIS IS. SOUTH CAROLINA
Personnel: CONTI
Weather Conditions: PARTLY CLDY HOT 31.30 IN/Hg
Measuring Device: Heron H-OIL
Tidally Influenced: Yes ___ No ___ LOW TIDE 1627 HRS
Remarks: 01-3651 (SN)

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
PAI-27-MW-6		1554			10.66			
PI055MW07I		1555			11.10			
PI055MW08D		1556			15.70			
PI055MW11		1703			11.52*	→	TOP PRODUCT → TOP H2O	11.06 11.52 = .46
PI055MW12I		1704			11.17			
PI055MW13D		1705			15.52			
PI027MW19		1631			4.91			
PI055MW17		1711			4.89			
PI055MW18I		1712			6.87			
PAI-27-MW-14		77.23			9.98			
PAI-27-MW-15I		1722			10.17			
PAI-27-MW-16		1623			7.83			
PI055MW01		1557			7.16			
PAI-27-MW-2I		1558			8.15			
PI027MW21		1641			7.13			
PAI-27-MW-9		—	—		—			
PAI-27-MW-48I		1547			8.32			
PAI-27-MW-4		1620			6.95			
PAI-27-MW-5I		1616			7.47			
PI055MW10					10.12			
PI027MW20		1639			6.72			
PAI-27-MW-49S		1625			6.79			
PAI-27-MW-50I		1626			6.85			
PAI-27-MW-51S		1542			2.40			
PAI-27-MW-52I		1541			6.76			
MW 3		1613			6.03			

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: MCRD PARRIS IS-SITE 27
Project No.: 112G00455
Location: PARRIS IS. SOUTH CAROLINA
Personnel: CONTI
Weather Conditions:
Measuring Device:
Tidally Influenced: Yes ____ No ____
Remarks:

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
PAI-27-MW-53S	8/18/08	1535			8.83			
PAI-27-MW-54I		1536			8.80			
PAI-27-MW-55S		1634			7.71			
PAI-27-MW-56I		1636			7.09			
PAI-27-MW-57S		1646			3.07			
PAI-27-MW-58S		1650			2.63			
PAI-27-MW-59I		1651			2.60			
PAI-27-MW-60I		1655			9.92			
PAI-27-MW-61I		1700			8.34			
PAI-27-MW-62S		1643			7.25			
PAI-27-MW-63S		1657			11.30			
PAI-27-MW-64S		1550			9.77			

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: Parris Island - Sites 27, 55, 9/16
Project No.: 112G02406
Location: Parris Island MCRD
Personnel: JT / TR
Weather Conditions: Sunny - Hot
Measuring Device: Interface probe
Tidally Influenced: Yes ____ No ____
Remarks: Shallow wells

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 PID	Tubbing
PAI-27-MW01S	8-8-10	9:42			7.45			0.0	YES
PAI-27-MW03S		09:54			6.37			0.0	YES
PAI-27-MW04S		0930			7.18			0.0	YES
PAI-27-MW06S		09:44			10.92			0.4	YES
PAI-27-MW09S		10:15			6.88			0.0	YES
PAI-27-MW10S		9:11			9.70			0.0	YES
PAI-27-MW11S		10:01			11.53	11.20 (0.33')		9.0	YES
PAI-27-MW14S		9:36			10.01			0.6	YES
PAI-27-MW16S		9:19			8.10			0.0	YES
PAI-27-MW17S		9:05			5.64			0.0	YES
PAI-27-MW19S		8:40			5.34			0.0	YES
PAI-27-MW20S		1047			7.91			0.0	YES
PAI-27-MW21S		1049			8.23			0.0	YES
PAI-27-MW49S		8:48			7.05			0.0	NO
PAI-27-MW51S		10:24			2.58			0.0	YES
PAI-27-MW53S		10:27			7.80			0.0	YES
PAI-27-MW55S		10.39			9.00			0.0	YES TD 16.49
PAI-27-MW57S		8:33			4.06			0.0	YES
PAI-27-MW58S		8:26			3.22			0.0	YES
PAI-27-MW62S		10:50			8.30			0.0	YES
PAI-27-MW63S		8:21			11.55			0.0	YES
PAI-27-MW64S		9:51			9.70			0.0	YES
PAI-27-TW-65S		8:59			7.48			3.1	YES
PAI-27-TW-67S		8:52			7.80				

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: Parris Island - Sites 27, 55, 9/16 **Project No.:** 112G02406
Location: Parris Island MCRD **Personnel:** JT / TR
Weather Conditions: Sunny - Hot **Measuring Device:** Interface Probe
Tidally Influenced: Yes ____ No ____ **Remarks:** Intermediate/deep wells

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 Turbidity
PAI-27-MW02I	8/8/10	9:41			8.34			0.0 YES
PAI-27-MW05I		9:24			7.11			2.5 YES
PAI-27-MW07I		9:45			11.25			0.0 YES
PAI-27-MW12I		9:59			11.30			0.0 YES - SHEEN
PAI-27-MW15I		9:36			10.30			2.1 YES
PAI-27-MW18I		9:05			6.27			0.4 YES
PAI-27-MW48I		10:14			7.96			0.0 YES
PAI-27-MW50I		8:45			7.16			0.0 NO
PAI-27-MW52I		10:24			6.84			0.0 YES
PAI-27-MW54I		10:28			7.85			0.0 YES
PAI-27-MW56I		10:41			7.13			0.0 YES TD 28.13
PAI-27-MW59I		8:28			3.14			0.2 YES
PAI-27-MW60I		8:18			10.08			0.0 YES
PAI-27-MW61I	8/9	0940			8.68			0.0 YES
PAI-27-TW66I		8:58			7.60			~~0.0~~ 0.2 YES
PAI-27-TW68I		8:18			8.03			0.0 YES
PAI-27-MW08D		9:46			16.04			0.0 YES SHEEN
PAI-27-MW13D		9:57			15.89			0.0 YES SHEEN
9/16 TW01S		8:05			5.01			0.7
TW02I		8:06			6.01			0.4
TW03S		8:07			6.87			0.2
TW04I		8:08			7.11			0.3

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: Site 9/16 **Project No.:** 112G01509

Location: Parris Island, SC **Personnel:** GB and KS

Weather Conditions: Sunny, 71 **Measuring Device:** Solinst WL indicator

Tidally Influenced: Yes ____ No ___x_ **Remarks:**

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
PAI-27-MW54I	2011/09/30				8.2	NA		
PAI-27-MW53S	2011/09/30				8.22			
PAI-27-MW51S	2011/09/30				2.35			
PAI-27-MW52I	2011/09/30				6.57			
PAI-27-MW48I	2011/09/30				7.81			
PAI-27-MW09I	2011/09/30				7.87			
PAI-27-MW64S	2011/09/30				9.23			
PAI-27-MW10S	2011/09/30				8.62			
PAI-27-MW14S	2011/09/30				9.1			
PAI-27-MW15I	2011/09/30				9.47			
PAI-27-MW13D	2011/09/30				15.3			
PAI-27-MW12I	2011/09/30				10.56			
PAI-27-MW11S	2011/09/30				11.2			
PAI-27-MW02I	2011/09/30				7.75			
PAI-27-MW01I	2011/09/30				6.87			
PAI-27-MW06S	2011/09/30				9.88			
PAI-27-MW07I	2011/09/30				10.62			
PAI-27-MW08D	2011/09/30				15.47			
PAI-27-MW03S	2011/09/30				5.4			lock on well
PAI-27-MW04S	2011/09/30				6.07			lock on well
PAI-27-MW-05I	2011/09/30				6.63			lock on well
PAI-27-MW61I	2011/09/30				8.21			
PAI-09-MW05S	2011/09/30				8.08			
PAI-09-MW06I	2011/09/30				8.33			
PAI-27-MW63S	2011/09/30				10.8			
PAI-27-MW-60I	2011/09/30				9.65			
PAI-27-MW-16S	2011/09/30				could not locate			

* All measurements to the nearest 0.01 foot

C-17 IDW DISPOSAL DOCUMENTATION

FENN-VAC

141 FENNELL ROAD
P.O. BOX 62679
CHARLESTON, SC 29419-2679
(843) 552-8306
FAX (843) 760-5220

40375

DATE 9-30-08

CONTRACTING FOR TETRA TECH

CUSTOMER

LOCATION

CONDITION OF TARP & BOWS

NUMBER OF BOWS ( )

JOB #

CUSTOMER ORDER NO.

MANIFEST NO.

	LOADING	UNLOADING
START TIME	915	
STOP TIME	1008	
TOTAL TIME		

REASON FOR DEMURRAGE Transport ~~50~~ 33 drums to ABM

DROP BOX NO.

PICKUP BOX NO.

CUSTOMER REPRESENTATIVE:
CONTAINER IS "FREE OF LIQUIDS / TARPED / POLY-LINED"

X

FENN-VAC REPRESENTATIVE

X Frank Scott

LANDFILL REPRESENTATIVE

X DC Oh

ORIGINAL - WHITE OFFICE - CANARY CUSTOMER - PINK LANDFILL - GOLDENROD

Please print or type
(Form designed for use on elite (12-pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.

Manifest Doc. No.

2. Page 1 of 1

GENERATOR

3. Generator's Name and Mailing Address

4. Generator's Phone ( )

5. Transporter 1 Company Name: LINN-VAC

6. US EPA ID Number: [illegible]

A. Transporter's Phone: [illegible]

7. Transporter 2 Company Name

8. US EPA ID Number

B. Transporter's Phone

9. Designated Facility Name and Site Address

10. US EPA ID Number

C. Facility's Phone: 813 893-2580

11. Waste Shipping Name and Description	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. [illegible]	01.1	DM	04.400	G
b.				
c.				
d.				

D. Additional Descriptions for Materials Listed Above: [illegible] D3196

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: DAVID DAMOIE | Signature | Month 09 | Day 30 | Year 08

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: FRANK SCOTT | Signature: Frank Scott | Month 09 | Day 30 | Year 08

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 | Signature | Month | Day | Year

Printed by J. J. KELLER & ASSOCIATES, INC.
Neenah, WI 54957-0368

GENERATOR'S COPY

12-BLS-C5 Rev. 12/98

Please print or type
For Restricted Use Only Follow Instructions

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.

Manifest Doc. No.

2. Page 1 of 1

3. Generator's Name and Mailing Address

4. Generator's Phone ( )

5. Transporter 1 Company Name

6. US EPA ID Number

A. Transporter's Phone

7. Transporter 2 Company Name

8. US EPA ID Number

B. Transporter's Phone

9. Designated Facility Name and Site Address

10. US EPA ID Number

C. Facility's Phone

11. Waste Shipping Name and Description	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a.	022	DM	1,200	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	Signature	Month	Day	Year
DAVID DAMORE		09	30	08

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
FRANK SCOTT	FRANK SCOTT	09	30	08

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	Signature	Month	Day	Year

GENERATOR

TRANSPORTER

FACILITY

Printed by J.J. KELLER & ASSOCIATES, INC.
Neenah, WI 54957-0368

GENERATOR'S COPY

12-BLS-05 Rev. 12/98

US Water Recovery

Non-Hazardous Wastewater Manifest

Number:

1. Generator's EPA ID# (if applicable):

Waste ID Number:

2. Generator's Name and Mailing Address:

Phone (843)

P O #:

3. Agent of Generator and Mailing Address:

Phone ( )

P O #:

4. Transporter Company Name:

Phone (843)

Truck & Trailer License Number:

5. Transporter U.S. EPA ID#:

6. Facility Name and Site Address:
U S Water Recovery
~~435 Old Mt. Holly Rd.~~ 210 Cedar Street
~~Mt. Holly, SC 29445~~ Summerville SC 29483
Phone: (843) 797-8674
Fax: (843) 797-2126

Mailing Address:
U S Water Recovery
511 Old Mt. Holly Rd.
Goose Creek, SC 29445
Phone: (843) 797-3111
Fax: (843) 797-0710

7. Facility U.S. EPA ID#:

Start Level: End Level: Total Gallons: Tank Number

8. U.S. DOT Desciption	Container No.	Container Type	Unit	Quantity
a. Non-Hazardous, non-regulated waste water	1	TT	GAL	550

9. 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: Signature: Date:

10. Transporter Acknowledgement of Receipt of Materials

Printed/Typed Name: Signature: Date:

11. Discrepancy indication space:

12. Facility Owner or Operator: Certification of Receipt of Materials

Printed/Typed Name: Signature: Date:

White - Facility Yellow - Transporter Pink - Generator

3988

OAKRIDGE LANDFILL
a WASTE MANAGEMENT COMPANY

SPECIAL WASTE MANIFEST
PROFILE # VA2172
Expiration: 2/10/2012

Generator: FENN VAC / USMC Parris Island Marine Recruit Depot

Account Number: 490-845

Location/Address: 4152 AZALEA DR N CHAS SC (10)

Tele Number: 843-529-1399 Contact: CORIN CLARK

Generator Signature: x John B Hoy

********* TO BE COMPLETED BY TRANSPORTER **********

Transporter of Waste: Fenn-Vac, LLC. Truck: 43

Date: 12-13-10 Driver's Signature: Richard Hoyt

********** TO BE COMPLETED BY OAKRIDGE LANDFILL **********

Disposal Site: Oakridge Landfill DWP 130

Description of Waste: PETROLEUM CONTAMINATED SOLIDS

Ticket Number: 379999 Tonnage: 4 DRUMS .79

Received By: Ashly Date: Dec 10 2010

2183 HWY 78, (POB 145), DORCHESTER, SC. 29437
TEL: 843-563-2607, FAX: 843-563-4158

WASTE MANAGEMENT

Oakridge Landfill
2103 Highway 78
Dorchester, SC, 29437
Ph: (843) 563-2607

Original
Ticket# 579990

Customer Name FENNVACLLC_845 FENN-VAC LLC
Ticket Date 12/13/2010
Payment Type Credit Account
Parent Ticket#
Hauling Ticket#
Load
State Waste Code
Manifest VA2172
Destination
PO
Profile VA2172 (PETROLEUM CONTAMINATED SOLIDS)
Generator 126-FENNVACINC FENN VAC INC

Carrier FENNVACINCBLANK FENN-VAC, INC./BLANK
Vehicle# 43
Volume
Container
Driver
Check#
Billing # 0000845
Gen EPA ID

	Time	Scale	Operator		
In	12/13/2010 14:21:36	Scale1	ALLOYD	Gross	9500 lb
Out	12/13/2010 14:29:31	Scale2	ALLOYD	Tare	8000 lb
				Net	1500 lb
				Tons	0.75

Comments

	Product	LD%	Qty	UOM	Rate	Tax	Amount	Origin
1	Cont Soil Pet-Tons	100	0.79	Tons				10-CHARLES
2	Heavy Lnd Fee - Cu	100		%				10-CHARLES
3	FULL-Fuel Surcharg	100		%				10-CHARLES

Total Tax
Total Ticket

Richard Smith

3-179-01

BILL OF LADING/MANIFEST

1. Shipper's US EPA ID No. (If Applicable): SC6170022762
Document No.: 11102
2. Page 1 of 1
16193

3. Shipper's Name and Mailing Address: COMMANDING GENERAL-PARRIS
PO BOX 19001
AC/S INL NREAO (MALCON DR)
PARRIS ISLAND SC 29905

4. Shipper's Phone (843)525-2648

5. Transporter 1 Company Name: SAFETY-KLEEN SYSTEMS, INC
6. US EPA ID Number: SCR000075150
A. Transporter's Phone: 800 669-5840

7. Transporter 2 Company Name:
8. US EPA ID Number:
B. Transporter's Phone:

9. Designated Facility Name and Site Address: 317901
SAFETY-KLEEN SYSTEMS, INC.
5217 AUGUSTA ROAD
GARDEN CITY, GA 31408
10. US EPA ID Number: GAD000776781
C. Facility's Phone: 912 964-7040

	11. Shipping Name and Description	HM	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol
a.	USED OIL AND WATER MIXTURE (NOT USDOT HAZARDOUS MATERIAL)		001	TT	01555	G
b.						
c.						
d.						

SHIPPER

15. Special Handling Instruction and Additional Information

P000411102 MFST R/T#100452912 0002-5617-57
EMERGENCY RESP 800-468-1760(24 HR). IF UNDELIVERABLE RETURN TO GENERATOR.

SKDOT# A: 927 B: C: D:

USE 16A OR 16B

16a. US DOT HAZARDOUS MATERIALS SHIPPER'S CERTIFICATION: "This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Printed/Typed Name: | Signature required here if US DOT regulated | Month Day Year

16b. NON-REGULATED SHIPPER'S CERTIFICATION: I certify the materials described above on this form are not subject to federal regulations for Transportation or Disposal.

Printed/Typed Name: CHARLES C. PINCKNEY | Sign here if material is not DOT regulated | Month Day Year 03 26 01

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: ROBERT E. LEE | Signature: Robert E. Lee | Month Day Year 03 26 01

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 materials covered by this form except as noted in Item 19.

Printed/Typed Name: Dianna Insalaco | Signature: Dianna Insalaco | Month Day Year 3 26 01

IN EVENT OF EMERGENCY CALL
1-800-468-1760 (24 hours)

ORIGINAL RETURN TO GENERATOR

FORM NO. 00001 (11/00)

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Certificate of Analysis

Company : Marine Corps Recruit Depot
Address : Commanding General
MCRD/ERR
Parris Island, South Carolina 29905
Contact: Jim Clark
Project: AC/S, I&L (NREAO)-Clark/Pinckney

Report Date: June 18, 2001

Client Sample ID:	0115901	Project:	MARI00199
Sample ID:	43618001	Client ID:	MARI001
Matrix:	Misc Liquid		
Collect Date:	07-JUN-01		
Receive Date:	08-JUN-01		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Volatile Organics											
5035/8260B BTEX in Liquid											
Benzene	U	ND	0.140	2.00	ug/L	1	JEB	06/13/01	1116	82699	1
Ethylbenzene	U	ND	0.150	2.00	ug/L	1					
Toluene	U	ND	0.220	2.00	ug/L	1					
Xylenes (total)	U	ND	0.440	6.00	ug/L	1					

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8260B	8260B Volatiles In Liquid	JEB	06/13/01	1116	82699

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 8260B	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Amy Jamison.

Amy C Jamison
Reviewed by

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(843) 556-8171 • Fax (843) 766-1178

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GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Certificate of Analysis

Company : Marine Corps Recruit Depot
Address : Commanding General
MCRD/ERR
Parris Island, South Carolina 29905
Contact: Jim Clark
Project: AC/S, I&L (NREAO)-Clark/Pinckney

Report Date: June 18, 2001

Client Sample ID:	0115902	Project:	MARI00199
Sample ID:	43618002	Client ID:	MARI001
Matrix:	Misc Liquid		
Collect Date:	06-JUN-01		
Receive Date:	08-JUN-01		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP											
TCLP ICP Metals for Liq											
Lead		70.2	0.172	0.500	mg/L	10	HSC	06/12/01	0230	82353	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3010A	ICP-TRACE TCLP by SW846 3010A	FDG	06/11/01	1000	82351
SW846 1311	SW846 1311 TCLP Leaching	COB1	06/09/01	0922	82244

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3010/6010B	

Notes:
The Qualifiers in this report are defined as follows :

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GENERAL ENGINEERING LABORATORIES

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Certificate of Analysis

Company : Marine Corps Recruit Depot
Address : Commanding General
MCRD/ERR
Parris Island, South Carolina 29905
Contact: Jim Clark
Project: AC/S, I&L (NREAO)-Clark/Pinckney

Report Date: June 18, 2001

Client Sample ID:	0115903	Project:	MARI00199
Sample ID:	43618003	Client ID:	MARI001
Matrix:	Misc Liquid		
Collect Date:	06-JUN-01		
Receive Date:	08-JUN-01		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP											
TCLP ICP Metals for Liq											
Silver		94.2	0.0448	0.500	mg/L	10	HSC	06/12/01	0244	82353	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3010A	ICP-TRACE TCLP by SW846 3010A	FDG	06/11/01	1000	82351
SW846 1311	SW846 1311 TCLP Leaching	COB1	06/09/01	0922	82244

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3010/6010B	

Notes:
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Amy C Jamison
Reviewed by

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GENERAL ENGINEERING LABORATORIES

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Certificate of Analysis

Company : Marine Corps Recruit Depot
Address : Commanding General
MCRD/ERR
Parris Island, South Carolina 29905
Contact: Jim Clark
Project: AC/S, I&L (NREAO)-Clark/Pinckney

Report Date: June 18, 2001

Client Sample ID:	0115904	Project:	MARI00199
Sample ID:	43618004	Client ID:	MARI001
Matrix:	Misc Liquid		
Collect Date:	06-JUN-01		
Receive Date:	08-JUN-01		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Metals Analysis-ICP										
TCLP ICP Metals for Liq										
Silver	U	ND	0.0448	0.500	mg/L	10	HSC 06/12/01	0250	82353	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3010A	ICP-TRACE TCLP by SW846 3010A	FDG	06/11/01	1000	82351
SW846 1311	SW846 1311 TCLP Leaching	COB1	06/09/01	0922	82244

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3010/6010B	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
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U Indicates the compound was analyzed for but not detected above the detection limit

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Amy C Jamison
Reviewed by

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Project Mgr - Tony Jamison
Change to C. Pinckney" Gov. Visa Card.

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Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

CHAIN OF CUSTODY RECORD

Page 1 of 1

436189

Client Name/Facility Name: NREAO, Parris Is.

Collected by/Company: NREAO (228-2611) Robert

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

NEW CLIENT SET UP 20010617176

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	RTEX		Remarks	
01-	0115901	6-7-01	900				x	1																X		sample has a strong Fuel odor	.1
02-	0115902	6-6-01	1300				x	1							X											TCLP LEAD only	2
03-	0115903	6-6-01	10:00				x	1							X											TCLP Silver only	.3
04	0115904	6-6-01	1000				x	1							X											TCLP Silver only	.3

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	6-8-01	0950					

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
			Mike Kirkler	6/8/01	0950	

White = sample collector Yellow = file Pink = with report

Charge to C. Pinckney Gov. Visa Card.

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Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

CHAIN OF CUSTODY RECORD

Client Name/Facility Name: NREAO, Parris Is.

Collected by/Company: NREAO (228-2611) Robert

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	BTEX		Remarks
0115901	6-7-01	9:00				X	1																X		Sample has a strong Fuel odor.
0115902	6-6-01	1300				X	1							X											TCLP LEAD only
0115903	6-6-01	10:00				X	1							X											TCLP Silver only
0115904	6-6-01	1000				X	1							X											TCLP Silver only

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	6-8-01	0950					

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
			Mike Barker	6/8/01	0950	

White = sample collector Yellow = file Pink = with report

Brodeur GS-11 Robert

From: Amy Jamison [acj@mail.gel.com]
Sent: Monday, June 18, 2001 9:13 AM
To: brodeurr@mcrdpi.usmc.mil
Subject: Note

Robert,
I did not see the note until I received your message this morning, I apologize. The cost you have for TCLP metals is incorrect. Fourteen dollars is the charge for total metals per element. The cost for TCLP single metal would be $99 per sample. The price for the BTEX is $80. I'm not sure if we still have Mr. Pickney's credit card number on file, so I could please let me know what it is I would appreciate it. The analyses have been completed. I can fax them or e-mail (as a PDF file, unsigned). Let me know what you prefer.
Thanks,
Amy

80x1
99x3

$ 377

4 Samples - ON 6-8-01

GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Certificate of Analysis

Company : Marine Corps Recruit Depot
Address : Commanding General
MCRD/ERR
Parris Island, South Carolina 29905
Contact: Jim Clark
Project: AC/S, I&L (NREAO)-Clark/Pinckney

Report Date: October 5, 2001

Client Sample ID:	0127001	Project:	MARI00199
Sample ID:	49584001	Client ID:	MARI001
Matrix:	Oil		
Collect Date:	19-SEP-01		
Receive Date:	27-SEP-01		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP											
3050S/6010 Lead											
Lead	U	ND	331	485	ug/kg	2	HSC	10/02/01	0233	112239	1
Semi-Volatiles-PCB											
8082/3550B PCB in Soil											
Aroclor-1016	U	ND	39500	167000	ug/kg	500	IC1	10/01/01	1443	112269	2
Aroclor-1221	U	ND	141000	167000	ug/kg	500					
Aroclor-1232	U	ND	36300	167000	ug/kg	500					
Aroclor-1242	U	ND	83500	167000	ug/kg	500					
Aroclor-1248	U	ND	45300	167000	ug/kg	500					
Aroclor-1254	U	ND	68500	167000	ug/kg	500					
Aroclor-1260	U	ND	71700	167000	ug/kg	500					
Volatile Organics											
5035/8260B BTEX in Solid											
Benzene	J	19700	9750	50000	ug/kg	2500	JEB	10/03/01	1314	112771	4
Ethylbenzene		613000	8750	50000	ug/kg	2500					
Toluene		51000	12500	50000	ug/kg	2500					
Xylenes (total)		2790000	26300	75000	ug/kg	2500					

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PCB Prep Soil	GMS	09/29/01	1106	112268
SW846 5035	5035/8260B Prep Encore	CDS1	10/03/01	1100	112770
SW846 8260B	8260B Volatiles In Soil	JEB	10/03/01	1314	112771
SW846 3050B	846 3050BS PREP	AJM	09/28/01	1400	112238

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3050B/6010B	
2	SW846 8082	
3	SW846 8082	
4	SW846 8260B	

Surrogate recovery	Test	Recovery%	Acceptable Limits
4cmx	8082/3550B PCB in Soil	0% *	(41%-132%)

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Certificate of Analysis

Company : Marine Corps Recruit Depot
Address : Commanding General
MCRD/ERR
Parris Island, South Carolina 29905
Contact: Jim Clark
Project: AC/S, I&L (NREAO)-Clark/Pinckney

Report Date: October 5, 2001

Client Sample ID: 0127001
Sample ID: 49584001

Project: MARI00199
Client ID: MARI001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Decachlorobiphenyl		8082/3550B PCB in Soil		0%*	(44%-127%)					
Bromofluorobenzene		5035/8260B BTEX in Solid		0%*	(61%-146%)					
Dibromofluoromethane		5035/8260B BTEX in Solid		0%*	(54%-144%)					
Toluene-d8		5035/8260B BTEX in Solid		0%*	(61%-131%)					

Notes:
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< Actual result is less than amount reported
> Actual result is greater than amount reported
E Concentration exceeds instrument calibration range
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on an "as received" basis.

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Amy C Jamison
Reviewed by

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GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Certificate of Analysis

Company : Marine Corps Recruit Depot
Address : Commanding General
MCRD/ERR
Parris Island, South Carolina 29905
Contact: Jim Clark
Project: AC/S, I&L (NREAO)-Clark/Pinckney

Report Date: October 5, 2001

Client Sample ID:	0127001 TCLP	Project:	MARI00199
Sample ID:	49584002	Client ID:	MARI001
Matrix:	Oil		
Collect Date:	19-SEP-01		
Receive Date:	27-SEP-01		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP											
TCLP Pb only											
Lead	U	ND	0.0172	0.050	mg/L	10	HSC	10/02/01	0639	112344	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3010A	ICP-TRACE TCLP by SW846 3010A	AJM	09/28/01	1600	112341
SW846 1311	SW846 1311 TCLP Leaching	COB1	09/27/01	2030	112076

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SW846 3010/6010B	

Notes:
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E Concentration exceeds instrument calibration range
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Reviewed by Amy C Jamison

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Project Manager: Tony Stanison

★ Follow Speical Billing Procedures.

49584%

CHAIN OF CUSTODY RECORD

Page 1 of 1

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Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

Client Name/Facility Name: DSMC / MCRD / PARRIS IS

Collected by/Company: NREAO / R. BRODEUR

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

2001092613

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify 1/2	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	BTEX	Remarks
0127001	9-19-01	1100				X	2							X						X			X	TCLP metal - Lead only (1,2)
																								Trace metal - Lead only
																					Note:			Sample has a strong odor

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	9/27/01	0900					

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
			[signature]	9/27/01	0900	

White = sample collector Yellow = file Pink = with report

Project Manager Tony Jamison

★ Follow Speical Billing Procedures.

CHAIN OF CUSTODY RECORD

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

Page 1 of 1

Client Name/Facility Name

Collected by/Company

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify 1 2	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	BTEX		Remarks
0127001	9-19-01	1100				X	2							X						X			X		① TCLP metal - Lead only
																									② Trace metal - Lead only
																					Note:				Sample has a strong odor

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	9/27/01	0900					

Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:
			Paulette Alexander	9/27/01	0900	

White = sample collector Yellow = file Pink = with report

BILL OF LADING/MANIFEST	1. Shipper's US EPA ID No. (If Applicable) SC4170022762	Document No. 92879	2. Page 1 of 1	19230

3. Shipper's Name and Mailing Address: PARRIS ISLAND, P.O. BOX 19001, PARRIS ISLAND S.C. 29905

4. Shipper's Phone ( ) 843-525 3102

5. Transporter 1 Company Name	6. US EPA ID Number	A. Transporter's Phone
~~SAFETY-KLEEN SYSTEMS, INC~~	~~SCR000075150~~	~~800-669-5840~~
7. Transporter 2 Company Name	**8. US EPA ID Number**	**B. Transporter's Phone**
SAFETY-KLEEN (TG), INC.	SCR000074591	
9. Designated Facility Name and Site Address	**10. US EPA ID Number**	**C. Facility's Phone**
SAFETY-KLEEN SYSTEMS, INC. 317901 5217 AUGUSTA ROAD GARDEN CITY, GA 31408	GAD000776781	912 964-7040

	11. Shipping Name and Description	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a.	USED OIL AND WATER MIXTURE (NOT USDOT HAZARDOUS MATERIAL)		1	TT	50	G
b.						
c.						
d.						

15. Special Handling Instruction and Additional Information

MFST R/T# ~~000000000~~ 101460634 ~~0-000-00~~ 2-6761-35

EMERGENCY RESP 800-468-1760(24 HR). IF UNDELIVERABLE RETURN TO GENERATOR.

SKDOT# A: 927 B: C: D:

16a. US DOT HAZARDOUS MATERIALS SHIPPER'S CERTIFICATION: "This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Printed/Typed Name | Signature required here if US DOT regulated | Month Day Year

16b. NON-REGULATED SHIPPER'S CERTIFICATION: I certify the materials described above on this form are not subject to federal regulations for Transportation or Disposal.

Printed/Typed Name: James W Clark | Sign here if material is not DOT regulated | Month 11 Day 06 Year 01

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Carey Hart | Signature | Month 11 Day 06 Year 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 materials covered by this form except as noted in Item 19.

Printed/Typed Name: Dianna Insalaco | Signature | Month 11 Day 06 Year 01

IN EVENT OF EMERGENCY CALL 1-800-468-1760 (24 hours)

ORIGINAL-RETURN TO GENERATOR

FORM NO. 90201 (11/00)

COLUMBIA, SOUTH CAROLINA 29201

PLACEMENT FORM

FOR SERVICE CALL	BRANCH MANAGER	REFERENCE NUMBER
843 757 1516	MICHAEL BLESSATT	P00092879

DUNS NO. 05-397-6551 FED. ID NO. 396090019

NAME	TITLE	SIGN
1.		
2.		

CUSTOMER

GENERATOR LOCATION

NAME: PARIS ISLAND
DELIVERY ADDRESS: P.O. BOX 19001
INFORMATION/ATTENTION LINE: JIM CLARK
CITY & STATE: PARRIS ISLAND
ZIP:
TAX CODE:

BILL TO (IF DIFFERENT FROM LOCATION)

NAME: PPSI-202 EHB
DELIVERY ADDRESS:
INFORMATION/ATTENTION LINE: PPSI-202 EHB
CITY & STATE:
ZIP:
TAX CODE:

LOCATION	SIC CODE

BUSINESS TYPE	CHAIN	ASSOCIATION	SVC. P/C	PROD. P/C

SALES TAX EXEMPTION NUMBER

DATE PLACED	SALES REP NO.	CUSTOMER'S P.O. NUMBER	☐ BLANKET	☐ TEMPORARY	CUSTOMER PHONE NO.	HANDLING CODE	CREDIT CODE	SERVICE TAX	C.O.M.S. TAX	PRODUCT TAX
11/06/01	1705				843 525 3102					

DEPT	SERVICE/ PRODUCT	SERIAL NUMBER	REMARKS/UNIT PRICE	QUAN.	CHARGE	SALES TAX	TOTAL CHARGE	SOLVENT/DRUMS CLEAN	SPENT	% CONT	SK DOT	CC	SERVICE TERM	SCHEDULE DATE (YY WW)	FACILITY CODE SEE BELOW	FREE TRIAL	INV. CODE	PROMO NO.	RELEASE NO.	MSDS GIVEN
		10915																		☐
		66667	LIQUIDS 50		42.00	/	42.00													☐
		10909		1	567.00	/	567													☐
		10916		2	126.00	/	126													☐
		10917		3	315.00	/	315													☐
																				☐
																				☐

TOTAL-SERVICE/PRODUCTS 1050

REFUSED SERVICE EXPLAIN

PLACEMENT CODES:
(1) NEW APPLICATION
(2) REPLACE DEFECTIVE MACHINE
(3) REPLACE COMPETITIVE MACHINE
(4) REPLACE HOME MADE VAT.
(5) ADDITIONAL MACHINE

USEPA TRANSPORTER 1 ID NO.	USEPA TRANSPORTER 2 ID NO.	GENERATOR USEPA ID NO.	GENERATOR STATE ID NO.

11. US DOT DESCRIPTION (INCLUDING PROPER SHIPPING NAME, HAZARD CLASS, AND ID.)	12. CONTAINERS NO.	TYPE	13. TOTAL QUANTITY	14. UNIT WT/VOL	SK DOT NUMBER
USED OIL & WATER MIXTURE (NOT U.S.DOT HAZARDOUS MATERIAL)		TT		G	927

I CERTIFY THAT MY TOTAL WASTE STREAMS ARE WITHIN ONE OF THE FOLLOWING CATEGORIES.
0 TO 220 LBS./MONTH — INITIALS
220 LBS. TO 2,200 LBS./MONTH — INITIALS
GREATER THAN 2,200 LBS./MONTH — INITIALS

DESIGNATED FACILITY NAME AND ADDRESS: SAFETY KLEEN SYSTEMS, INC.

USA EPA ID NO.
STATE ID NO.

PAYMENT RECEIVED SECTION

CASH ☐
CHECK NUMBER
TOTAL RECEIVED
APPLY PAYMENT TO: ☐ TODAY'S SERVICE/SALE ☐ PREVIOUS BALANCE AS FOLLOWS

INVOICE #	AMOUNT $	INVOICE #	AMOUNT $

PREVIOUS CREDIT CARD NO.
CREDIT CARD NO.
AMEX VISA MC
EXP. DATE
CUSTOMER REFERENCE INFORMATION

MANIFEST NO. 92879
LDR MESSAGE
MANIFEST CODE
SEQ #

IN THE EVENT OF AN EMERGENCY CALL 1-800-468-1760 (24 hours)

I AGREE TO PAY THE ABOVE CHARGES AND TO BE BOUND BY THE TERMS AND CONDITIONS SET FORTH ABOVE AND ON THE REVERSE SIDE OF THIS DOCUMENT. PLEASE CHARGE MY ACCOUNT FOR THIS TRANSACTION UNLESS OTHERWISE INDICATED IN THE PAYMENT RECEIVED SECTION. THE INDIVIDUAL SIGNING THIS DOCUMENT IS DULY AUTHORIZED TO SIGN AND BIND CUSTOMER TO ITS TERMS.
"This is to certify that the above-named materials are properly classified, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation."

Print Customer Name
By: Customer's Authorized Representative

TOTAL CHARGE (FROM ABOVE)
TOTAL DUE 1050

DO NOT WRITE IN AREA BELOW

P00092879

THIS AGREEMENT CONTINUES ON THE REVERSE SIDE

PART NO. 1360 (Rev 01/01)

Continued From Page

PROJECT SAMPLE ID #	Collector	DATE	TYPE	ANALYSIS	Description
21 024002	RB	1-24-01		TCLP Silver + Mercury	Water From P-Trap. Dental
				HG 0.0866 mg/L Silver < 50.0 ug/L	
21 024003	RB	1-24-01		TCLP Silver + Mercury	Solid From P Trap - Dental.
				HG 0.0625 mg/L Total Silver < 50 ug/L	
21 024004	R	1-24-01		TCLP Total Mercury	Waste Water Ales
					Hg 496 mg/L
21 037001	RB	2-5-01		Santee Cooper Spec's	HI Used Oil Tank #1
21 037002	RB	2-5-01		" "	HI USED OIL TANK #2
21 15901	Clark	5-21-01	Grab	Contractor hole Pest Control - MWR	BTEX
21 159002	Charles	6-6-01	Grab	Motor-T Antifreeze	TCLP Lead 70.2
21 159003	RB	6-6-01	Grab	Cobbler Fixer	TCLP Silver 94.2
21 159004	RB	6-6-01	Grab	Cobbler Dev.	TCLP Silver ND
21 21101	RB	6-27-01		HI Asphalt Left side	TCLP, 8 metals PCB, Pesticide 5 Day Rush
21 21102	RB	6-27-01		Dirt	
21 21103	RB	6-27-01		HI Asphalt Right side	
21 21104	RB	6-27-01		Dirt	
21 27001	RB	9-19-01		Manhole near Pest Control	BTEX, PCB, TLCP, Trace METAL For Lead only

Continued on Page

Read and Understood By

Signed _____ Date _____ Signed _____ Date _____

C-18 SLUG TESTS

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	**PI055MW08D**
Test No.:	**1**
Date:	**8/15/2008**
Geologist:	CONTI
Checked by / Date:	FRED RAMSFER 6/28/11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.333
Screened / Monitored Interval Below Water Table, L (ft):	3
Static Water Level (Depth/ Elevation) (ft.):	15.82
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	1.74	0.00	-1.74	1.00	0.0000	0.00
	0.16	1.71	0.16	-1.71	0.98	-0.0174	0.00
	0.91	1.64	0.91	-1.64	0.94	-0.0592	-0.02
	2.15	1.57	2.15	-1.57	0.90	-0.1028	-0.05
	4.92	1.44	4.92	-1.44	0.83	-0.1892	-0.11
	9.91	1.26	9.91	-1.26	0.72	-0.3228	-0.23
	14.91	1.12	14.91	-1.12	0.64	-0.4406	-0.34
	21.01	0.97	21.01	-0.97	0.56	-0.5843	-0.48
	25.01	0.89	25.01	-0.89	0.51	-0.6704	-0.58
	31.51	0.77	31.51	-0.77	0.44	-0.8152	-0.73
	42.11	0.62	42.11	-0.62	0.36	-1.0319	-0.97
	56.11	0.48	56.11	-0.48	0.28	-1.2879	-1.29
x	70.71	0.37	0.00			0.0000	
x	99.01	0.25	0.00			0.0000	
x	124.01	0.19	0.00			0.0000	
x	169.01	0.15	0.00			0.0000	
x	219.01	0.13	0.00			0.0000	
x	309.01	0.10	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	12
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-0.023
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.059
Actual Y-intercept is set to 0.	0.000
T_0 (min):	43.351
K (ft/min):	5.86E-05
K (ft/day):	**0.084**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

T_0: Time at which ln(H/H0)=-1

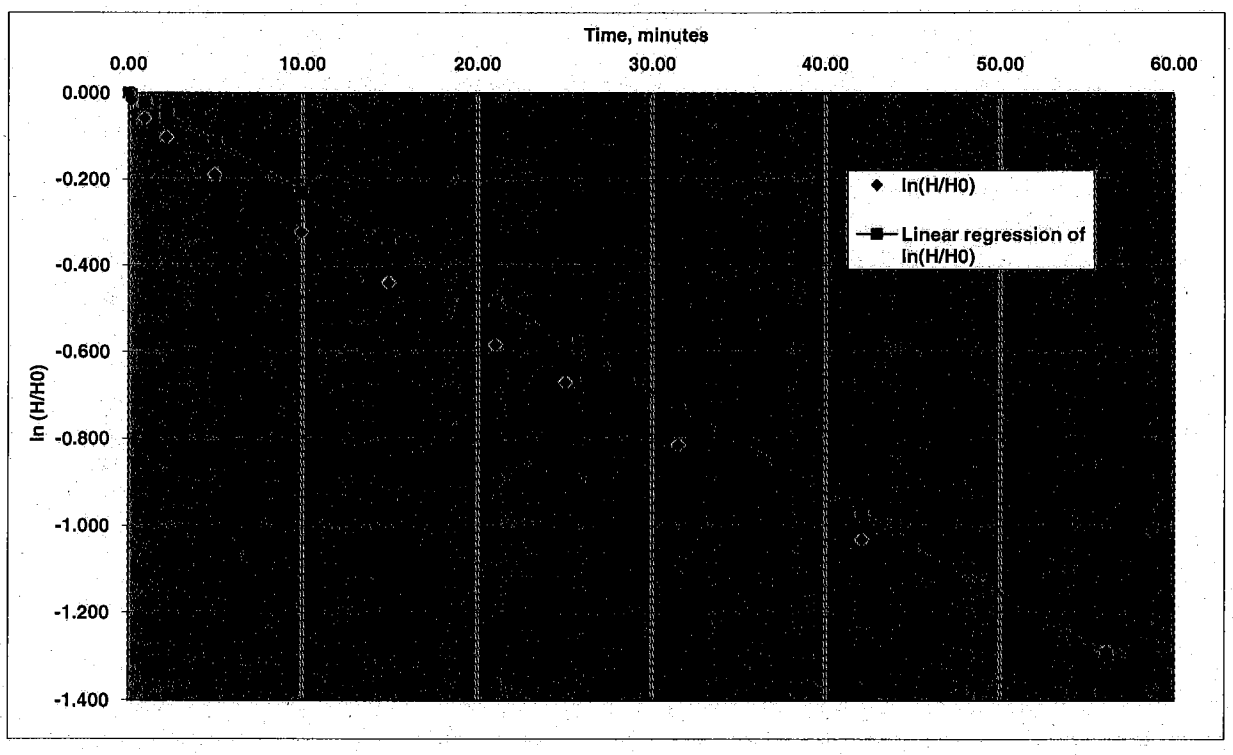
$K = r^2 * \ln(L/R)/(2LT_0)$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: MCRD PARRIS IS- SITE 27 WELL/BORING NO.: MW8D

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 3 / 38.80 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 15.82 DATE: 8/15/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

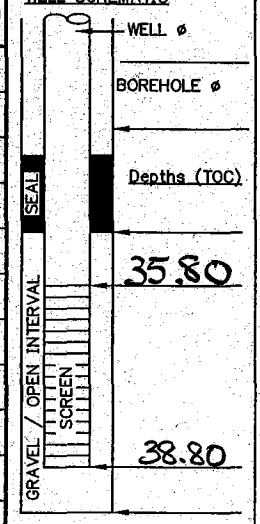
METHOD OF INDUCING WATER LEVEL CHANGE: 2 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

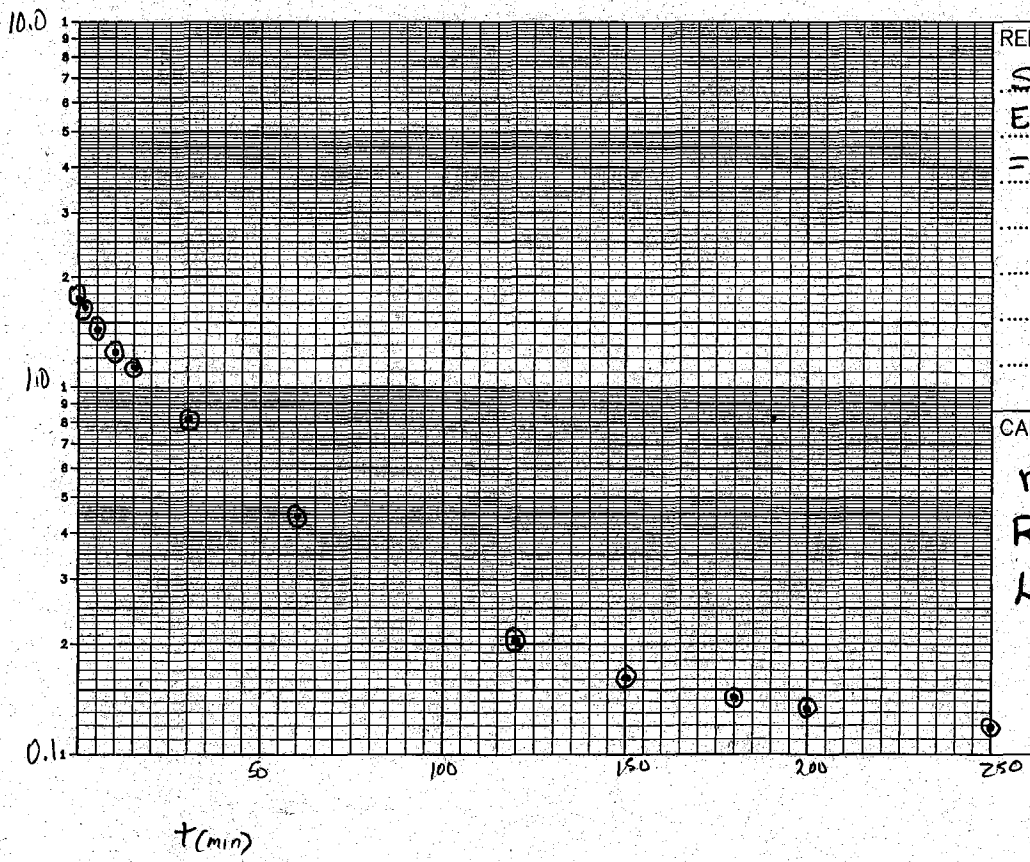
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

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)
.096		1.754			
1		1.642			
5		1.435			
10		1.260			
15		1.119			
30		.802			
60		.449			
120		.202			
150		.161			
180		.143			
200		.134			
250		.119			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS,SKETCH MAPS, ETC.:

r = .083'
R = .333
L = 3'

Report Date:	8/16/2008 8:15
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-8D 2008-08-15 17-25-56.wsl
Create Date	8/16/2008 8:15

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-8D
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/15/2008 16:12
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	3.46533 (PSI)
Head Pressure	3.46579 (PSI)
Temperature	24.3831 (C)
Depth of Probe	8.00239 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/15/2008 17:24	Manual Start Command
8/15/2008 17:25	User Note: "Downloading log - Used Batt: 4% Memory: 14% User: Stanley.Conti"
8/16/2008 8:13	User Note: "Downloading log - Used Batt: 4% Memory: 14% User: Stanley.Conti"

8/16/2008 8:15 Manual Stop Command

Log Data:
Record Count 303

Date and Time	Elapsed Time Minutes	Sensor: Pres 35ft SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/15/2008 17:24	0	3.596	23.431	-0.301
8/15/2008 17:24	0.004	3.595	23.45	-0.3
8/15/2008 17:24	0.008	3.596	23.464	-0.302
8/15/2008 17:24	0.013	3.598	23.534	-0.305
8/15/2008 17:24	0.02	3.596	23.521	-0.301
8/15/2008 17:24	0.024	3.596	23.519	-0.303
8/15/2008 17:24	0.028	3.595	23.521	-0.3
8/15/2008 17:24	0.031	3.595	23.503	-0.3
8/15/2008 17:24	0.038	3.596	23.511	-0.303
8/15/2008 17:24	0.042	3.596	23.516	-0.301
8/15/2008 17:24	0.046	3.597	23.52	-0.304
8/15/2008 17:24	0.05	3.595	23.52	-0.299
8/15/2008 17:24	0.054	3.595	23.518	-0.299
8/15/2008 17:24	0.058	3.596	23.522	-0.302
8/15/2008 17:24	0.062	3.6	23.528	-0.31
8/15/2008 17:24	0.065	2.461	23.53	2.318
8/15/2008 17:24	0.069	3.375	23.533	0.208
8/15/2008 17:24	0.073	3.599	23.535	-0.31
8/15/2008 17:24	0.076	2.993	23.535	1.092
8/15/2008 17:24	0.08	3.018	23.537	1.033
8/15/2008 17:24	0.084	2.844	23.536	1.435
8/15/2008 17:24	0.088 0	2.714	23.536	1.735
8/15/2008 17:24	0.092	2.703	23.535	1.76
8/15/2008 17:24	0.096	2.705	23.534	1.754
8/15/2008 17:24	0.1	2.711	23.535	1.741
8/15/2008 17:24	0.106	2.709	23.523	1.746
8/15/2008 17:24	0.112	2.714	23.521	1.736
8/15/2008 17:24	0.119	2.714	23.513	1.734
8/15/2008 17:24	0.126	2.715	23.508	1.732
8/15/2008 17:24	0.133	2.715	23.505	1.733
8/15/2008 17:24	0.141	2.715	23.502	1.732
8/15/2008 17:24	0.15	2.714	23.497	1.734
8/15/2008 17:24	0.158	2.718	23.498	1.726
8/15/2008 17:24	0.168	2.717	23.49	1.728
8/15/2008 17:24	0.178	2.719	23.488	1.723
8/15/2008 17:24	0.188	2.72	23.487	1.721
8/15/2008 17:24	0.199	2.723	23.485	1.715
8/15/2008 17:24	0.211	2.724	23.481	1.712
8/15/2008 17:24	0.224	2.724	23.477	1.712
8/15/2008 17:24	0.237	2.726	23.478	1.706
8/15/2008 17:24	0.251 .163	2.726	23.476	1.706

8/15/2008 17:24	0.266		2.728	23.476	1.704
8/15/2008 17:24	0.282		2.728	23.472	1.702
8/15/2008 17:24	0.298		2.729	23.472	1.7
8/15/2008 17:24	0.316		2.729	23.469	1.7
8/15/2008 17:24	0.335		2.731	23.468	1.695
8/15/2008 17:24	0.355		2.732	23.465	1.693
8/15/2008 17:24	0.376		2.733	23.468	1.69
8/15/2008 17:24	0.398		2.734	23.465	1.69
8/15/2008 17:24	0.422		2.734	23.465	1.688
8/15/2008 17:24	0.447		2.736	23.46	1.685
8/15/2008 17:24	0.473		2.737	23.462	1.682
8/15/2008 17:24	0.501		2.738	23.459	1.679
8/15/2008 17:24	0.531		2.739	23.457	1.676
8/15/2008 17:24	0.562		2.741	23.46	1.673
8/15/2008 17:24	0.596		2.742	23.456	1.67
8/15/2008 17:24	0.631		2.744	23.456	1.666
8/15/2008 17:24	0.668		2.744	23.454	1.665
8/15/2008 17:24	0.708		2.745	23.454	1.663
8/15/2008 17:24	0.75		2.747	23.452	1.658
8/15/2008 17:24	0.794		2.748	23.447	1.657
8/15/2008 17:24	0.841		2.75	23.45	1.653
8/15/2008 17:24	0.891		2.751	23.449	1.648
8/15/2008 17:25	0.944		2.754	23.448	1.643
8/15/2008 17:25	1	.912	2.754	23.447	1.642
8/15/2008 17:25	1.06		2.757	23.445	1.636
8/15/2008 17:25	1.12		2.759	23.44	1.631
8/15/2008 17:25	1.19		2.76	23.439	1.627
8/15/2008 17:25	1.26		2.763	23.441	1.621
8/15/2008 17:25	1.33		2.765	23.441	1.618
8/15/2008 17:25	1.41		2.767	23.435	1.613
8/15/2008 17:25	1.5		2.769	23.436	1.608
8/15/2008 17:25	1.58		2.772	23.436	1.602
8/15/2008 17:25	1.68		2.774	23.433	1.596
8/15/2008 17:25	1.78		2.777	23.43	1.59
8/15/2008 17:25	1.88		2.78	23.425	1.583
8/15/2008 17:26	1.99		2.782	23.428	1.578
8/15/2008 17:26	2.11		2.785	23.426	1.57
8/15/2008 17:26	2.24	2.152	2.788	23.425	1.565
8/15/2008 17:26	2.37		2.792	23.423	1.556
8/15/2008 17:26	2.51		2.797	23.42	1.542
8/15/2008 17:26	2.66		2.798	23.418	1.541
8/15/2008 17:26	2.82		2.801	23.415	1.534
8/15/2008 17:27	2.98		2.803	23.414	1.53
8/15/2008 17:27	3.16		2.808	23.41	1.517
8/15/2008 17:27	3.35		2.812	23.411	1.509
8/15/2008 17:27	3.55		2.818	23.407	1.494
8/15/2008 17:27	3.76		2.82	23.402	1.489
8/15/2008 17:28	3.98		2.825	23.399	1.48
8/15/2008 17:28	4.22		2.83	23.399	1.467
8/15/2008 17:28	4.47		2.834	23.394	1.457
8/15/2008 17:28	4.73		2.839	23.392	1.446
8/15/2008 17:29	5.01	4.922	2.844	23.387	1.435

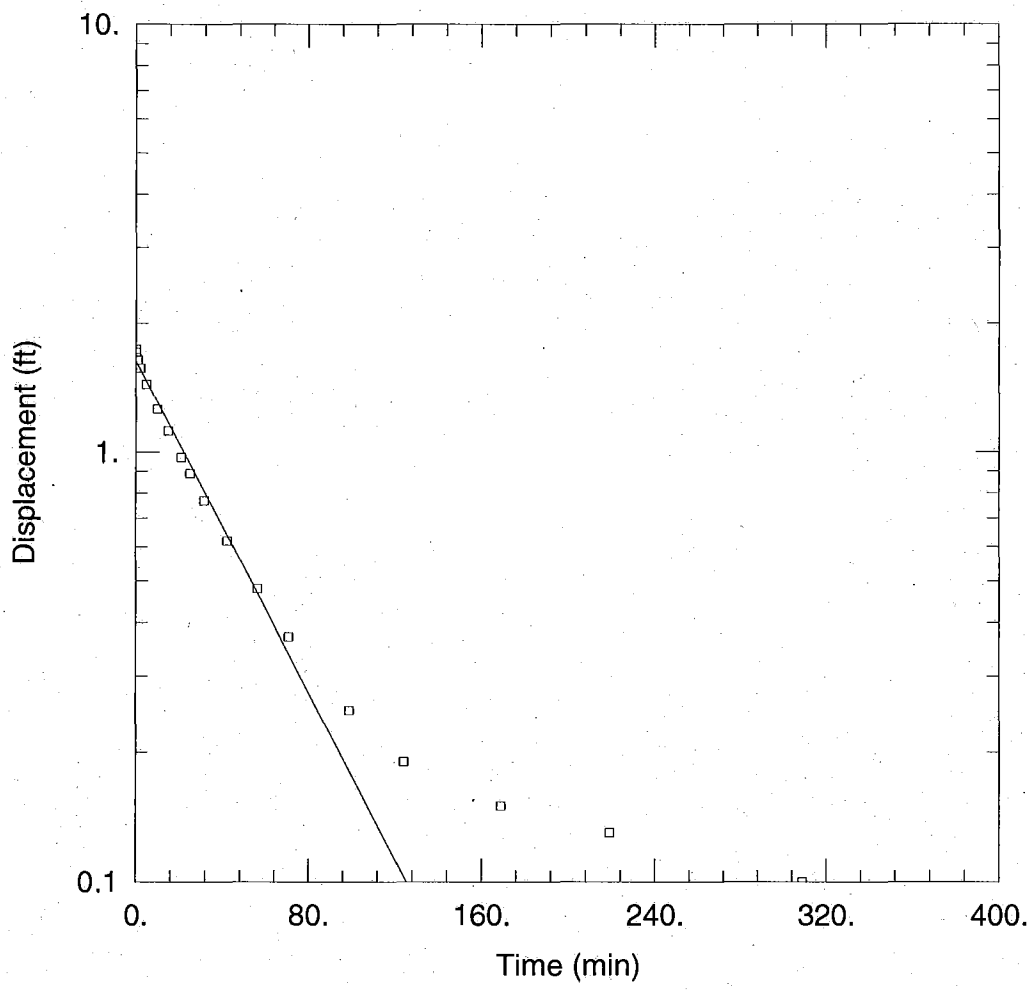
8/15/2008 17:29	5.31		2.85	23.385	1.422
8/15/2008 17:29	5.62		2.855	23.382	1.41
8/15/2008 17:30	5.96		2.86	23.379	1.397
8/15/2008 17:30	6.31		2.866	23.379	1.383
8/15/2008 17:30	6.68		2.871	23.376	1.373
8/15/2008 17:31	7.08		2.878	23.372	1.357
8/15/2008 17:31	7.5		2.885	23.367	1.341
8/15/2008 17:32	7.94		2.891	23.367	1.326
8/15/2008 17:32	8.41		2.898	23.363	1.31
8/15/2008 17:33	8.91		2.904	23.358	1.296
8/15/2008 17:33	9.44		2.912	23.358	1.277
8/15/2008 17:34	10	9.912	2.92	23.355	1.26
8/15/2008 17:34	10.6		2.927	23.351	1.243
8/15/2008 17:35	11.2		2.935	23.347	1.223
8/15/2008 17:35	11.9		2.944	23.347	1.204
8/15/2008 17:36	12.6		2.953	23.344	1.183
8/15/2008 17:37	13.3		2.961	23.342	1.165
8/15/2008 17:38	14.1		2.97	23.337	1.144
8/15/2008 17:39	15	14.912	2.981	23.335	1.119
8/15/2008 17:39	15.8		2.99	23.331	1.098
8/15/2008 17:40	16.8		3.001	23.331	1.072
8/15/2008 17:41	17.8		3.012	23.327	1.047
8/15/2008 17:42	18.8		3.021	23.324	1.025
8/15/2008 17:43	19.9		3.033	23.322	0.999
8/15/2008 17:45	21.1	21.012	3.045	23.319	0.971
8/15/2008 17:46	22.4		3.057	23.317	0.943
8/15/2008 17:47	23.7		3.069	23.315	0.916
8/15/2008 17:49	25.1	25.012	3.081	23.31	0.887
8/15/2008 17:50	26.6		3.093	23.311	0.86
8/15/2008 17:52	28.2		3.106	23.312	0.83
8/15/2008 17:53	29.8		3.118	23.306	0.802
8/15/2008 17:55	31.6	31.512	3.131	23.307	0.772
8/15/2008 17:57	33.5		3.144	23.302	0.742
8/15/2008 17:59	35.5		3.156	23.299	0.714
8/15/2008 18:01	37.6		3.17	23.301	0.682
8/15/2008 18:03	39.8		3.183	23.301	0.651
8/15/2008 18:06	42.2	42.112	3.197	23.297	0.62
8/15/2008 18:08	44.7		3.209	23.296	0.591
8/15/2008 18:11	47.3		3.221	23.296	0.564
8/15/2008 18:14	50.1		3.234	23.295	0.534
8/15/2008 18:17	53.1		3.246	23.294	0.506
8/15/2008 18:20	56.2	56.112	3.257	23.293	0.481
8/15/2008 18:23	59.6		3.271	23.292	0.449
8/15/2008 18:27	63.1		3.281	23.294	0.425
8/15/2008 18:30	66.8		3.293	23.289	0.399
8/15/2008 18:34	70.8	70.712	3.304	23.296	0.372
8/15/2008 18:39	75		3.313	23.293	0.351
8/15/2008 18:43	79.4		3.324	23.294	0.326
8/15/2008 18:48	84.1		3.334	23.296	0.304
8/15/2008 18:53	89.1		3.342	23.296	0.285
8/15/2008 18:58	94.1		3.35	23.295	0.267
8/15/2008 19:03	99.1	99.012	3.357	23.298	0.25

8/15/2008 19:08	104.1		3.363	23.3	0.236
8/15/2008 19:13	109.1		3.369	23.298	0.224
8/15/2008 19:18	114.1		3.373	23.301	0.213
8/15/2008 19:23	119.1		3.378	23.298	0.202
8/15/2008 19:28	124.1	124.012	3.382	23.302	0.193
8/15/2008 19:33	129.1		3.385	23.306	0.185
8/15/2008 19:38	134.1		3.388	23.304	0.178
8/15/2008 19:43	139.1		3.39	23.306	0.173
8/15/2008 19:48	144.1		3.394	23.308	0.165
8/15/2008 19:53	149.1		3.396	23.305	0.161
8/15/2008 19:58	154.1		3.397	23.307	0.158
8/15/2008 20:03	159.1		3.398	23.309	0.155
8/15/2008 20:08	164.1		3.4	23.31	0.152
8/15/2008 20:13	169.1	169.012	3.4	23.309	0.151
8/15/2008 20:18	174.1		3.402	23.311	0.147
8/15/2008 20:23	179.1		3.403	23.314	0.143
8/15/2008 20:28	184.1		3.404	23.312	0.142
8/15/2008 20:33	189.1		3.406	23.315	0.137
8/15/2008 20:38	194.1		3.406	23.314	0.137
8/15/2008 20:43	199.1		3.407	23.315	0.134
8/15/2008 20:48	204.1		3.408	23.317	0.132
8/15/2008 20:53	209.1		3.409	23.316	0.131
8/15/2008 20:58	214.1		3.409	23.316	0.13
8/15/2008 21:03	219.1	219.012	3.409	23.316	0.13
8/15/2008 21:08	224.1		3.411	23.317	0.126
8/15/2008 21:13	229.1		3.411	23.317	0.125
8/15/2008 21:18	234.1		3.411	23.317	0.125
8/15/2008 21:23	239.1		3.412	23.318	0.123
8/15/2008 21:28	244.1		3.412	23.315	0.123
8/15/2008 21:33	249.1		3.414	23.317	0.119
8/15/2008 21:38	254.1		3.413	23.317	0.12
8/15/2008 21:43	259.1		3.415	23.318	0.116
8/15/2008 21:48	264.1		3.415	23.317	0.115
8/15/2008 21:53	269.1		3.416	23.318	0.114
8/15/2008 21:58	274.1		3.417	23.321	0.112
8/15/2008 22:03	279.1		3.417	23.32	0.112
8/15/2008 22:08	284.1		3.417	23.318	0.111
8/15/2008 22:13	289.1		3.418	23.32	0.109
8/15/2008 22:18	294.1		3.42	23.319	0.105
8/15/2008 22:23	299.1		3.42	23.321	0.104
8/15/2008 22:28	304.1		3.421	23.319	0.103
8/15/2008 22:33	309.1	309.012	3.422	23.318	0.1
8/15/2008 22:38	314.1		3.423	23.32	0.098
8/15/2008 22:43	319.1		3.424	23.318	0.095
8/15/2008 22:48	324.1		3.426	23.321	0.091
8/15/2008 22:53	329.1		3.427	23.318	0.09
8/15/2008 22:58	334.1		3.427	23.319	0.089
8/15/2008 23:03	339.1		3.428	23.318	0.087
8/15/2008 23:08	344.1		3.429	23.321	0.083
8/15/2008 23:13	349.1		3.43	23.318	0.081
8/15/2008 23:18	354.1		3.43	23.318	0.082
8/15/2008 23:23	359.1		3.432	23.32	0.077

8/15/2008 23:28	364.1	3.433	23.317	0.076
8/15/2008 23:33	369.1	3.435	23.318	0.071
8/15/2008 23:38	374.1	3.435	23.32	0.071
8/15/2008 23:43	379.1	3.436	23.321	0.067
8/15/2008 23:48	384.1	3.437	23.321	0.065
8/15/2008 23:53	389.1	3.438	23.319	0.062
8/15/2008 23:58	394.1	3.439	23.321	0.06
8/16/2008 0:03	399.1	3.44	23.318	0.058
8/16/2008 0:08	404.1	3.441	23.319	0.057
8/16/2008 0:13	409.1	3.442	23.32	0.053
8/16/2008 0:18	414.1	3.443	23.322	0.051
8/16/2008 0:23	419.1	3.443	23.322	0.052
8/16/2008 0:28	424.1	3.445	23.319	0.048
8/16/2008 0:33	429.1	3.446	23.322	0.045
8/16/2008 0:38	434.1	3.445	23.32	0.046
8/16/2008 0:43	439.1	3.448	23.317	0.04
8/16/2008 0:48	444.1	3.448	23.32	0.04
8/16/2008 0:53	449.1	3.449	23.32	0.039
8/16/2008 0:58	454.1	3.45	23.319	0.035
8/16/2008 1:03	459.1	3.451	23.322	0.033
8/16/2008 1:08	464.1	3.452	23.32	0.032
8/16/2008 1:13	469.1	3.451	23.321	0.033
8/16/2008 1:18	474.1	3.453	23.321	0.029
8/16/2008 1:23	479.1	3.453	23.32	0.028
8/16/2008 1:28	484.1	3.454	23.319	0.026
8/16/2008 1:33	489.1	3.454	23.32	0.025
8/16/2008 1:38	494.1	3.455	23.319	0.024
8/16/2008 1:43	499.1	3.456	23.318	0.022
8/16/2008 1:48	504.1	3.456	23.319	0.022
8/16/2008 1:53	509.1	3.457	23.321	0.019
8/16/2008 1:58	514.1	3.457	23.32	0.019
8/16/2008 2:03	519.1	3.458	23.319	0.017
8/16/2008 2:08	524.1	3.458	23.32	0.017
8/16/2008 2:13	529.1	3.459	23.321	0.016
8/16/2008 2:18	534.1	3.459	23.321	0.016
8/16/2008 2:23	539.1	3.46	23.321	0.013
8/16/2008 2:28	544.1	3.46	23.321	0.013
8/16/2008 2:33	549.1	3.459	23.322	0.015
8/16/2008 2:38	554.1	3.46	23.32	0.012
8/16/2008 2:43	559.1	3.46	23.32	0.012
8/16/2008 2:48	564.1	3.459	23.323	0.014
8/16/2008 2:53	569.1	3.46	23.322	0.011
8/16/2008 2:58	574.1	3.461	23.323	0.01
8/16/2008 3:03	579.1	3.461	23.319	0.009
8/16/2008 3:08	584.1	3.461	23.325	0.011
8/16/2008 3:13	589.1	3.461	23.324	0.009
8/16/2008 3:18	594.1	3.462	23.321	0.008
8/16/2008 3:23	599.1	3.461	23.324	0.009
8/16/2008 3:28	604.1	3.46	23.321	0.011
8/16/2008 3:33	609.1	3.461	23.323	0.009
8/16/2008 3:38	614.1	3.462	23.322	0.008
8/16/2008 3:43	619.1	3.462	23.324	0.008

8/16/2008 3:48	624.1	3.461	23.323	0.01
8/16/2008 3:53	629.1	3.462	23.321	0.008
8/16/2008 3:58	634.1	3.462	23.321	0.009
8/16/2008 4:03	639.1	3.461	23.321	0.01
8/16/2008 4:08	644.1	3.461	23.323	0.01
8/16/2008 4:13	649.1	3.461	23.323	0.01
8/16/2008 4:18	654.1	3.46	23.325	0.011
8/16/2008 4:23	659.1	3.461	23.325	0.009
8/16/2008 4:28	664.1	3.461	23.321	0.01
8/16/2008 4:33	669.1	3.461	23.323	0.01
8/16/2008 4:38	674.1	3.461	23.323	0.01
8/16/2008 4:43	679.1	3.46	23.323	0.012
8/16/2008 4:48	684.1	3.461	23.323	0.011
8/16/2008 4:53	689.1	3.46	23.328	0.012
8/16/2008 4:58	694.1	3.461	23.327	0.011
8/16/2008 5:03	699.1	3.461	23.323	0.011
8/16/2008 5:08	704.1	3.46	23.323	0.012
8/16/2008 5:13	709.1	3.459	23.324	0.014
8/16/2008 5:18	714.1	3.46	23.325	0.012
8/16/2008 5:23	719.1	3.46	23.325	0.013
8/16/2008 5:28	724.1	3.46	23.326	0.013
8/16/2008 5:33	729.1	3.46	23.329	0.013
8/16/2008 5:38	734.1	3.459	23.327	0.016
8/16/2008 5:43	739.1	3.459	23.328	0.014
8/16/2008 5:48	744.1	3.459	23.327	0.014
8/16/2008 5:53	749.1	3.459	23.327	0.016
8/16/2008 5:58	754.1	3.458	23.325	0.017
8/16/2008 6:03	759.1	3.458	23.327	0.017
8/16/2008 6:08	764.1	3.457	23.325	0.02
8/16/2008 6:13	769.1	3.458	23.328	0.018
8/16/2008 6:18	774.1	3.455	23.33	0.023
8/16/2008 6:23	779.1	3.456	23.327	0.021
8/16/2008 6:28	784.1	3.455	23.329	0.024
8/16/2008 6:33	789.1	3.455	23.33	0.024
8/16/2008 6:38	794.1	3.456	23.329	0.022
8/16/2008 6:43	799.1	3.453	23.329	0.027
8/16/2008 6:48	804.1	3.455	23.326	0.024
8/16/2008 6:53	809.1	3.454	23.328	0.026
8/16/2008 6:58	814.1	3.453	23.328	0.029
8/16/2008 7:03	819.1	3.454	23.33	0.027
8/16/2008 7:08	824.1	3.453	23.327	0.029
8/16/2008 7:13	829.1	3.452	23.328	0.031
8/16/2008 7:18	834.1	3.451	23.328	0.033
8/16/2008 7:23	839.1	3.451	23.329	0.032
8/16/2008 7:28	844.1	3.451	23.33	0.034
8/16/2008 7:33	849.1	3.45	23.329	0.036
8/16/2008 7:38	854.1	3.45	23.328	0.036
8/16/2008 7:43	859.1	3.45	23.328	0.035
8/16/2008 7:48	864.1	3.449	23.327	0.037
8/16/2008 7:53	869.1	3.448	23.331	0.04
8/16/2008 7:58	874.1	3.448	23.329	0.04
8/16/2008 8:03	879.1	3.448	23.327	0.041

8/16/2008 8:08	884.1	3.448	23.329	0.039
8/16/2008 8:13	889.1	3.449	23.334	0.039



WELL TEST ANALYSIS

Data Set:
Date: 06/28/11 Time: 11:18:25

PROJECT INFORMATION

Company: Tetra Tech NUS
Client: Navy
Project: 112G00455
Location: Parris Island
Test Well: PI055MW08D
Test Date: 8/15/08

AQUIFER DATA

Saturated Thickness: 23. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (Pio55MW08D)

Initial Displacement: 1.74 ft
Total Well Penetration Depth: 22.98 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 15. ft
Screen Length: 3. ft
Wellbore Radius: 0.333 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 5.69E-5 ft/min
y0 = 1.63 ft

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	PI055MW07I
Test No.:	1
Date:	8/15/2008
Geologist:	CONTI
Checked by / Date:	SCRomer 6-28-11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.333
Screened / Monitored Interval Below Water Table, L (ft):	3
Static Water Level (Depth/ Elevation) (ft.):	11.33
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of $\ln(H/H0)$ (b=0)
	0.00	1.86	0.00	1.86	1.00	0.0000	0.00
	0.03	1.80	0.03	1.80	0.97	-0.0328	0.00
	0.14	1.73	0.14	1.73	0.93	-0.0725	-0.02
	0.43	1.62	0.43	1.62	0.87	-0.1392	-0.04
	0.93	1.48	0.93	1.48	0.80	-0.2295	-0.12
	1.43	1.36	1.43	1.36	0.73	-0.3131	-0.18
	2.04	1.25	2.04	1.25	0.67	-0.4074	-0.27
	3.09	1.09	3.09	1.09	0.59	-0.5436	-0.41
	4.94	0.85	4.94	0.85	0.46	-0.783	-0.65
	7.43	0.64	7.43	0.64	0.34	-1.0839	-0.89
	9.93	0.49	9.93	0.49	0.26	-1.3539	-1.01
x	14.93	0.32	0.00			0.0000	
x	19.93	0.23	0.00			0.0000	
x	25.03	0.17	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	11
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-0.132
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.081
Actual Y-intercept is set to 0.	0.000
T_0 (min):	7.558
K (ft/min):	3.36E-04
K (ft/day):	**0.484**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

T_0: Time at which ln(H/H0)=-1

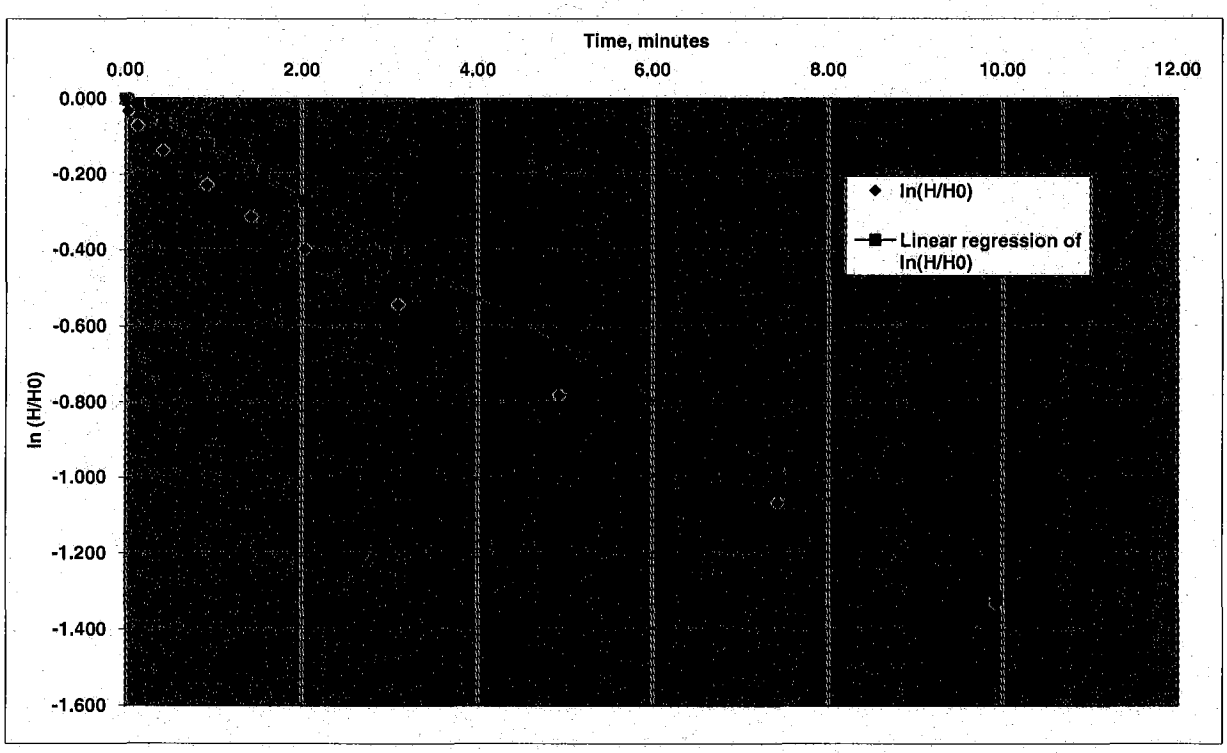
$K = r^2 * \ln(L/R)/(2LT_0)$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: MCRD PARRIS IS - SITE 27 WELL/BORING NO.: MW 7-I

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 3 / 29.65 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 11.33 DATE: 8/15/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

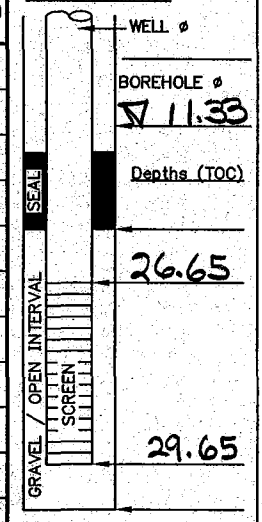
METHOD OF INDUCING WATER LEVEL CHANGE: 2 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

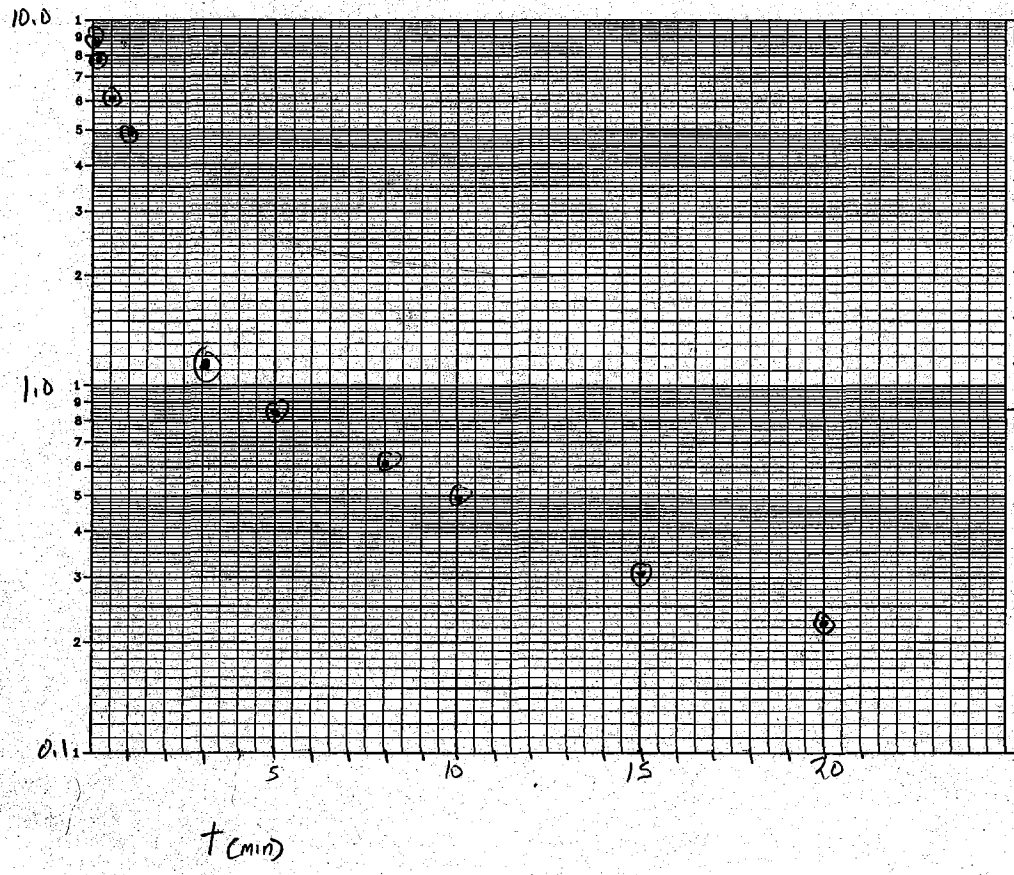
ACAD: FORM_HYDCONTST.dwg 07/06/99 INL

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)
.073		1.863			
.1		1.798			
.5		1.616			
1.0		1.483			
3.0		1.109			
5.0		.851			
8.0		.605			
10.0		.492			
15.0		.316			
20.0		.227			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS, SKETCH MAPS, ETC.:

r = .083'
R = .333
L = 3'

Report Date:	8/15/2008 16:06
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-7I 2008-08-15 15-51-08.wsl
Create Date	8/15/2008 16:06

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-7I
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/15/2008 15:17
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	3.1909 (PSI)
Head Pressure	3.18883 (PSI)
Temperature	25.6149 (C)
Depth of Probe	7.3629 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/15/2008 15:40	Manual Start Command
8/15/2008 15:51	User Note: "Downloading log - Used Batt: 4% Memory: 12% User: Stanley.Conti"
8/15/2008 15:58	User Note: "Downloading log - Used Batt: 4% Memory: 12% User: Stanley.Conti"

8/15/2008 16:00 User Note: "Downloading log - Used Batt: 4% Memory: 12% User: Stanley.Conti"
8/15/2008 16:04 User Note: "Downloading log - Used Batt: 4% Memory: 12% User: Stanley.Conti"
8/15/2008 16:06 Manual Stop Command

Log Data:
Record Count 121

Date and Time	Elapsed Time Minutes		Sensor: Pres 35ft SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/15/2008 15:40	0		3.246	24.818	-0.127
8/15/2008 15:40	0.004		3.246	24.839	-0.128
8/15/2008 15:40	0.008		3.246	24.851	-0.128
8/15/2008 15:40	0.013		3.247	24.86	-0.13
8/15/2008 15:40	0.017		3.247	24.868	-0.129
8/15/2008 15:40	0.021		3.248	24.873	-0.132
8/15/2008 15:40	0.029		3.247	24.867	-0.13
8/15/2008 15:40	0.033		3.247	24.877	-0.13
8/15/2008 15:40	0.036		3.246	24.887	-0.126
8/15/2008 15:40	0.04		3.252	24.892	-0.142
8/15/2008 15:40	0.046		2.8	24.883	0.902
8/15/2008 15:40	0.05		2.831	24.892	0.831
8/15/2008 15:40	0.054		3.183	24.902	0.018
8/15/2008 15:40	0.058		2.958	24.9	0.537
8/15/2008 15:40	0.062		2.62	24.906	1.319
8/15/2008 15:40	0.065		2.588	24.908	1.392
8/15/2008 15:40	0.069		2.388	24.91	1.855
8/15/2008 15:40	0.073	0	2.384	24.908	1.863
8/15/2008 15:40	0.077		2.403	24.914	1.82
8/15/2008 15:40	0.081		2.402	24.918	1.822
8/15/2008 15:40	0.084		2.405	24.917	1.816
8/15/2008 15:40	0.088		2.407	24.919	1.809
8/15/2008 15:40	0.092		2.409	24.92	1.806
8/15/2008 15:40	0.096		2.412	24.92	1.798
8/15/2008 15:40	0.1	.027	2.412	24.92	1.798
8/15/2008 15:40	0.106		2.416	24.908	1.789
8/15/2008 15:40	0.112		2.419	24.907	1.781
8/15/2008 15:40	0.119		2.418	24.897	1.784
8/15/2008 15:40	0.126		2.422	24.894	1.775
8/15/2008 15:40	0.133		2.424	24.893	1.77
8/15/2008 15:40	0.141		2.426	24.886	1.765
8/15/2008 15:40	0.15		2.429	24.884	1.76
8/15/2008 15:40	0.158		2.43	24.883	1.756
8/15/2008 15:40	0.168		2.432	24.876	1.752
8/15/2008 15:40	0.178		2.436	24.877	1.742
8/15/2008 15:40	0.188		2.439	24.874	1.737
8/15/2008 15:40	0.199		2.441	24.871	1.732
8/15/2008 15:40	0.211	.138	2.444	24.864	1.725
8/15/2008 15:40	0.224		2.446	24.866	1.72

8/15/2008 15:40	0.237		2.449	24.867	1.714
8/15/2008 15:40	0.251		2.452	24.862	1.706
8/15/2008 15:40	0.266		2.454	24.859	1.701
8/15/2008 15:40	0.282		2.457	24.859	1.695
8/15/2008 15:40	0.298		2.46	24.857	1.687
8/15/2008 15:40	0.316		2.463	24.853	1.68
8/15/2008 15:40	0.335		2.466	24.855	1.674
8/15/2008 15:40	0.355		2.469	24.852	1.668
8/15/2008 15:40	0.376		2.472	24.852	1.661
8/15/2008 15:40	0.398		2.476	24.851	1.652
8/15/2008 15:40	0.422		2.48	24.85	1.642
8/15/2008 15:40	0.447		2.484	24.849	1.633
8/15/2008 15:40	0.473		2.487	24.846	1.626
8/15/2008 15:40	0.501	.428	2.491	24.842	1.616
8/15/2008 15:40	0.531		2.494	24.841	1.608
8/15/2008 15:40	0.562		2.499	24.84	1.598
8/15/2008 15:40	0.596		2.503	24.838	1.589
8/15/2008 15:41	0.631		2.507	24.835	1.579
8/15/2008 15:41	0.668		2.512	24.832	1.566
8/15/2008 15:41	0.708		2.516	24.83	1.558
8/15/2008 15:41	0.75		2.522	24.83	1.543
8/15/2008 15:41	0.794		2.528	24.826	1.532
8/15/2008 15:41	0.841		2.533	24.818	1.519
8/15/2008 15:41	0.891		2.539	24.816	1.506
8/15/2008 15:41	0.944		2.543	24.816	1.495
8/15/2008 15:41	1	.927	2.549	24.814	1.483
8/15/2008 15:41	1.06		2.557	24.809	1.464
8/15/2008 15:41	1.12		2.563	24.803	1.45
8/15/2008 15:41	1.19		2.57	24.797	1.435
8/15/2008 15:41	1.26		2.577	24.795	1.418
8/15/2008 15:41	1.33		2.584	24.787	1.402
8/15/2008 15:41	1.41		2.592	24.782	1.383
8/15/2008 15:41	1.5	1.427	2.6	24.776	1.364
8/15/2008 15:41	1.58		2.608	24.771	1.347
8/15/2008 15:42	1.68		2.615	24.76	1.329
8/15/2008 15:42	1.78		2.624	24.755	1.309
8/15/2008 15:42	1.88		2.632	24.746	1.291
8/15/2008 15:42	1.99		2.642	24.738	1.268
8/15/2008 15:42	2.11	2.037	2.65	24.729	1.249
8/15/2008 15:42	2.24		2.662	24.718	1.222
8/15/2008 15:42	2.37		2.671	24.71	1.201
8/15/2008 15:42	2.51		2.679	24.698	1.182
8/15/2008 15:43	2.66		2.69	24.693	1.156
8/15/2008 15:43	2.82		2.702	24.677	1.13
8/15/2008 15:43	2.98		2.711	24.668	1.109
8/15/2008 15:43	3.16	3.087	2.723	24.658	1.081
8/15/2008 15:43	3.35		2.735	24.644	1.052
8/15/2008 15:43	3.55		2.748	24.63	1.022
8/15/2008 15:44	3.76		2.759	24.616	0.997
8/15/2008 15:44	3.98		2.772	24.603	0.968
8/15/2008 15:44	4.22		2.784	24.591	0.939
8/15/2008 15:44	4.47		2.797	24.573	0.909

8/15/2008 15:45	4.73		2.81	24.56	0.879
8/15/2008 15:45	5.01	4.937	2.822	24.546	0.851
8/15/2008 15:45	5.31		2.835	24.53	0.822
8/15/2008 15:46	5.62		2.848	24.52	0.791
8/15/2008 15:46	5.96		2.861	24.502	0.761
8/15/2008 15:46	6.31		2.875	24.485	0.73
8/15/2008 15:47	6.68		2.887	24.471	0.701
8/15/2008 15:47	7.08		2.901	24.456	0.668
8/15/2008 15:47	7.5	7.427	2.914	24.445	0.639
8/15/2008 15:48	7.94		2.929	24.433	0.605
8/15/2008 15:48	8.41		2.94	24.417	0.58
8/15/2008 15:49	8.91		2.953	24.405	0.549
8/15/2008 15:49	9.44		2.965	24.389	0.521
8/15/2008 15:50	10	9.927	2.978	24.378	0.492
8/15/2008 15:50	10.6		2.99	24.367	0.464
8/15/2008 15:51	11.2		3.001	24.359	0.439
8/15/2008 15:52	11.9		3.014	24.345	0.408
8/15/2008 15:52	12.6		3.024	24.337	0.385
8/15/2008 15:53	13.3		3.034	24.328	0.363
8/15/2008 15:54	14.1		3.043	24.32	0.342
8/15/2008 15:55	15	14.927	3.054	24.311	0.316
8/15/2008 15:56	15.8		3.063	24.304	0.295
8/15/2008 15:57	16.8		3.07	24.298	0.278
8/15/2008 15:58	17.8		3.079	24.29	0.258
8/15/2008 15:59	18.8		3.086	24.286	0.243
8/15/2008 16:00	19.9	19.827	3.093	24.282	0.227
8/15/2008 16:01	21.1		3.1	24.28	0.209
8/15/2008 16:02	22.4		3.104	24.276	0.201
8/15/2008 16:04	23.7		3.11	24.275	0.187
8/15/2008 16:05	25.1	25.027	3.117	24.277	0.171

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	PAI-27-MW6
Test No.:	1
Date:	8/15/2008
Geologist:	CONTI
Checked by / Date:	SWRamsey 6-28-11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.333
Screened / Monitored Interval Below Water Table, L (ft):	5.79
Static Water Level (Depth/ Elevation) (ft.):	10.91
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	0.84	0.00	-0.84	1.00	0.0000	0.00
	0.04	0.80	0.04	-0.80	0.95	-0.0488	-0.02
	0.09	0.78	0.09	-0.78	0.93	-0.0741	-0.05
	0.15	0.75	0.15	-0.75	0.89	-0.1133	-0.08
	0.25	0.70	0.25	-0.70	0.83	-0.1823	-0.16
	0.44	0.64	0.44	-0.64	0.76	-0.2719	-0.25
	0.65	0.57	0.65	-0.57	0.68	-0.3878	-0.36
	0.94	0.49	0.94	-0.49	0.58	-0.5390	-0.53
	1.44	0.37	1.44	-0.37	0.44	-0.8109	-0.81
	2.05	0.26	2.05	-0.26	0.31	-1.1727	-1.15
x	3.10	0.13	0.00			0.0000	
x	4.41	0.10	0.00			0.0000	
x	4.95	0.09	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	10
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-0.560
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.021
Actual Y-intercept is set to 0.	0.000
T_0 (min):	1.787
K (ft/min):	9.58E-04
K (ft/day):	**1.379**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

T_0: Time at which ln(H/H0)=-1

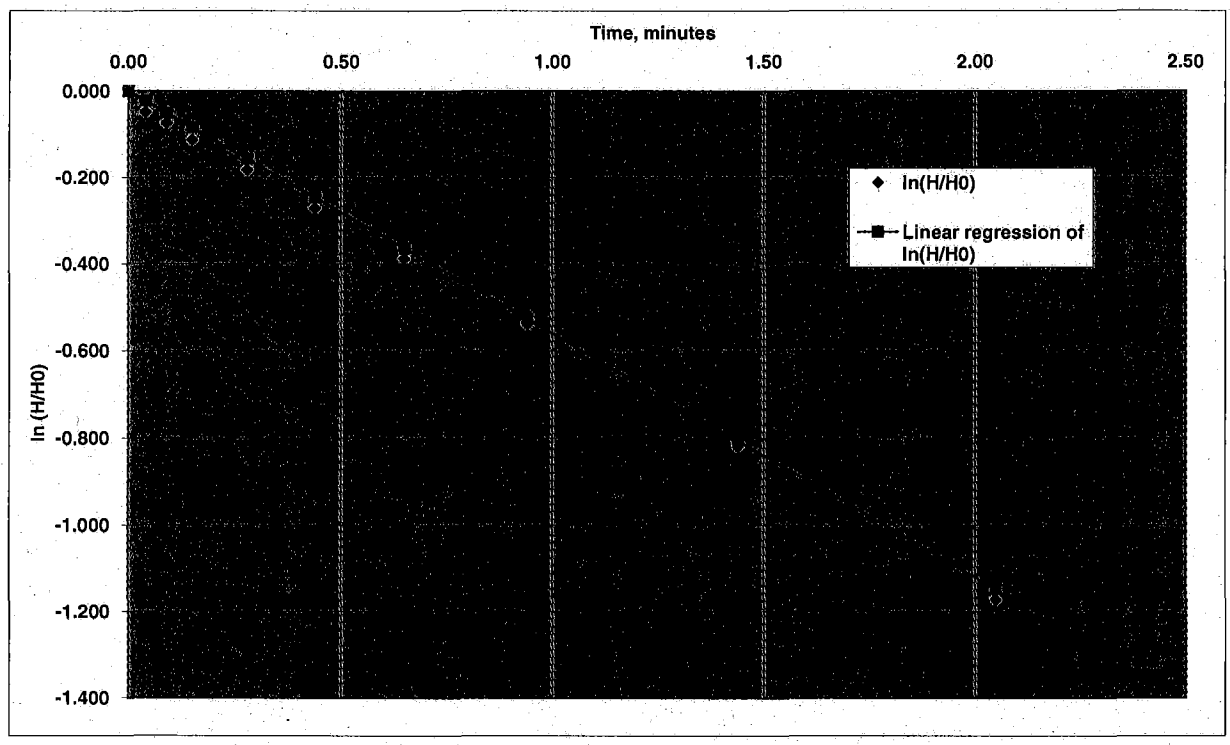
$K = r^2 * \ln(L/R)/(2LT_0)$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: MCRD PARRIS IS - SITE 27 WELL/BORING NO.: MW6

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10 / 16.70 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 10.91 DATE: 8/15/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

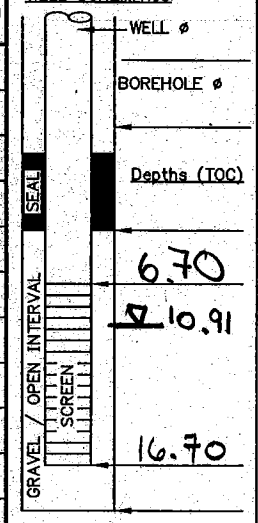
METHOD OF INDUCING WATER LEVEL CHANGE: 1 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

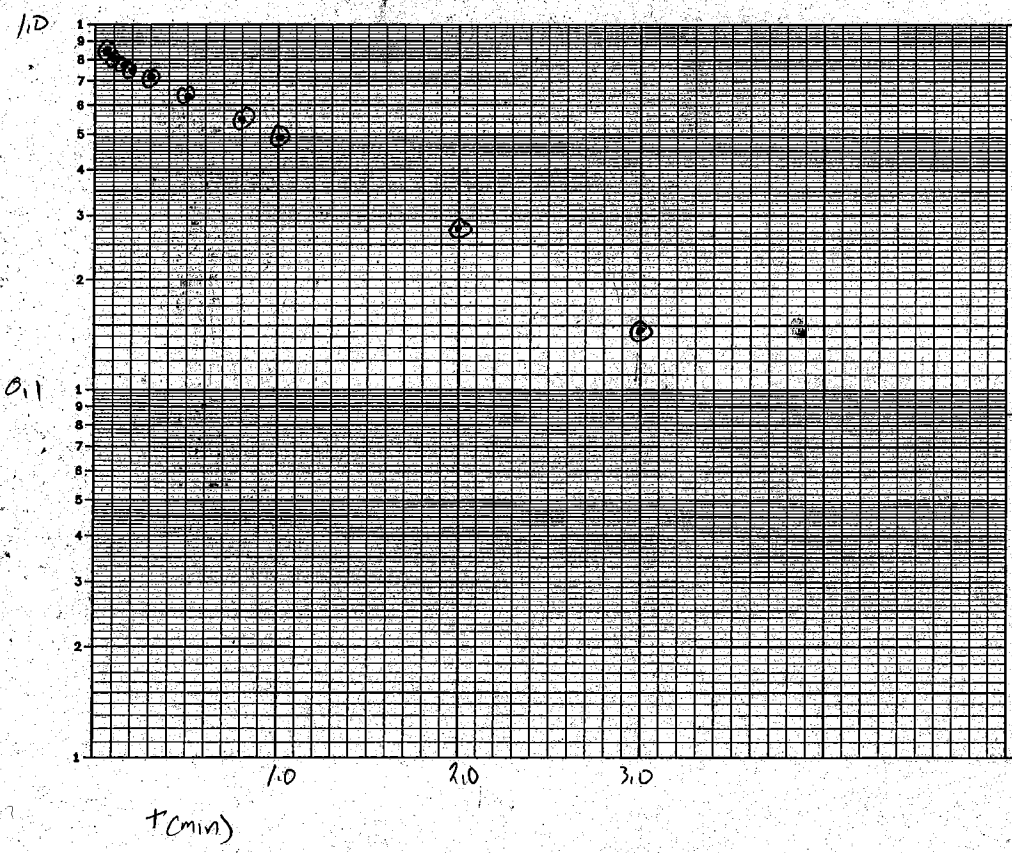
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

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)
.06		.844			
.10		.804			
.15		.777			
.20		.755			
.30		.712			
.50		.638			
.80		.543			
1.0		.488			
2.0		.279			
3.0		.147			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG.

FUEL ODOR

CALCS, SKETCH MAPS, ETC.:

r = .083'
R = .333
L = 5.79

Report Date:	8/15/2008 15:11
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-6 2008-08-15 15-04-33.wsl
Create Date	8/15/2008 15:10

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-6
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/15/2008 14:53
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	1.26082 (PSI)
Head Pressure	1.2607 (PSI)
Temperature	34.3844 (C)
Depth of Probe	2.91091 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/15/2008 15:02	Manual Start Command
8/15/2008 15:04	User Note: "Downloading log - Used Batt: 4% Memory: 10% User: Stanley.Conti"
8/15/2008 15:05	User Note: "Downloading log - Used Batt: 4% Memory: 10% User: Stanley.Conti"

8/15/2008 15:07 User Note: "Downloading log - Used Batt: 4% Memory: 10% User: Stanley.Conti"
8/15/2008 15:10 User Note: "Downloading log - Used Batt: 4% Memory: 10% User: Stanley.Conti"
8/15/2008 15:10 Manual Stop Command

Log Data:
Record Count 101

Date and Time	Elapsed Time Minutes		Sensor: Pres 35ft SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/15/2008 15:02	0		1.346	27.409	-0.196
8/15/2008 15:02	0.004		1.346	27.43	-0.196
8/15/2008 15:02	0.008		1.345	27.443	-0.194
8/15/2008 15:02	0.013		1.344	27.45	-0.193
8/15/2008 15:02	0.017		1.346	27.459	-0.197
8/15/2008 15:02	0.021		1.346	27.464	-0.197
8/15/2008 15:02	0.029		1.345	27.453	-0.194
8/15/2008 15:02	0.032		1.346	27.465	-0.196
8/15/2008 15:02	0.036		1.345	27.473	-0.194
8/15/2008 15:02	0.04		1.346	27.481	-0.196
8/15/2008 15:02	0.045		0.88	27.472	0.88
8/15/2008 15:02	0.049		1.271	27.481	-0.024
8/15/2008 15:02	0.053		1.113	27.482	0.342
8/15/2008 15:02	0.057		0.932	27.488	0.759
8/15/2008 15:02	0.06	0	0.895	27.493	0.844
8/15/2008 15:02	0.064		0.902	27.496	0.829
8/15/2008 15:02	0.068		0.906	27.495	0.82
8/15/2008 15:02	0.072		0.902	27.5	0.829
8/15/2008 15:02	0.076		0.905	27.502	0.822
8/15/2008 15:02	0.08		0.903	27.504	0.825
8/15/2008 15:02	0.083		0.906	27.501	0.82
8/15/2008 15:02	0.087		0.908	27.503	0.814
8/15/2008 15:02	0.092		0.909	27.5	0.812
8/15/2008 15:02	0.096		0.911	27.502	0.809
8/15/2008 15:02	0.1	.04	0.913	27.502	0.804
8/15/2008 15:02	0.106		0.914	27.489	0.801
8/15/2008 15:02	0.112		0.914	27.484	0.8
8/15/2008 15:02	0.119		0.917	27.481	0.795
8/15/2008 15:02	0.126		0.918	27.474	0.791
8/15/2008 15:02	0.133		0.919	27.47	0.789
8/15/2008 15:02	0.141		0.921	27.467	0.785
8/15/2008 15:02	0.15	.09	0.924	27.462	0.777
8/15/2008 15:02	0.158		0.926	27.463	0.774
8/15/2008 15:02	0.168		0.927	27.454	0.77
8/15/2008 15:02	0.178		0.929	27.454	0.766
8/15/2008 15:02	0.188		0.931	27.449	0.76
8/15/2008 15:02	0.199		0.934	27.447	0.755
8/15/2008 15:02	0.211	.151	0.936	27.444	0.751
8/15/2008 15:02	0.224		0.938	27.442	0.745

8/15/2008 15:02	0.237		0.941	27.441	0.739
8/15/2008 15:02	0.251		0.944	27.439	0.732
8/15/2008 15:02	0.266		0.946	27.435	0.727
8/15/2008 15:02	0.282		0.949	27.436	0.719
8/15/2008 15:02	0.298		0.952	27.432	0.712
8/15/2008 15:02	0.316		0.956	27.429	0.705
8/15/2008 15:02	0.335	.275	0.958	27.426	0.699
8/15/2008 15:02	0.355		0.963	27.423	0.687
8/15/2008 15:03	0.376		0.966	27.423	0.682
8/15/2008 15:03	0.398		0.968	27.421	0.675
8/15/2008 15:03	0.422		0.973	27.416	0.666
8/15/2008 15:03	0.447		0.977	27.414	0.654
8/15/2008 15:03	0.473		0.981	27.413	0.647
8/15/2008 15:03	0.501	.441	0.985	27.412	0.638
8/15/2008 15:03	0.531		0.99	27.41	0.625
8/15/2008 15:03	0.562		0.993	27.405	0.617
8/15/2008 15:03	0.596		0.999	27.403	0.604
8/15/2008 15:03	0.631		1.004	27.399	0.594
8/15/2008 15:03	0.668		1.008	27.394	0.583
8/15/2008 15:03	0.708	.648	1.015	27.394	0.568
8/15/2008 15:03	0.75		1.02	27.389	0.557
8/15/2008 15:03	0.794		1.026	27.387	0.543
8/15/2008 15:03	0.841		1.031	27.384	0.53
8/15/2008 15:03	0.891		1.038	27.378	0.515
8/15/2008 15:03	0.944		1.044	27.377	0.501
8/15/2008 15:03	1	.94	1.049	27.373	0.488
8/15/2008 15:03	1.06		1.057	27.371	0.471
8/15/2008 15:03	1.12		1.063	27.365	0.458
8/15/2008 15:03	1.19		1.071	27.363	0.439
8/15/2008 15:03	1.26		1.077	27.358	0.424
8/15/2008 15:03	1.33		1.085	27.355	0.406
8/15/2008 15:04	1.41		1.092	27.35	0.389
8/15/2008 15:04	1.5	1.44	1.101	27.345	0.369
8/15/2008 15:04	1.58		1.107	27.343	0.354
8/15/2008 15:04	1.68		1.115	27.337	0.336
8/15/2008 15:04	1.78		1.123	27.334	0.318
8/15/2008 15:04	1.88		1.131	27.326	0.299
8/15/2008 15:04	1.99		1.14	27.323	0.279
8/15/2008 15:04	2.11	2.05	1.149	27.32	0.258
8/15/2008 15:04	2.24		1.159	27.313	0.235
8/15/2008 15:05	2.37		1.168	27.312	0.215
8/15/2008 15:05	2.51		1.175	27.306	0.198
8/15/2008 15:05	2.66		1.183	27.3	0.179
8/15/2008 15:05	2.82		1.192	27.296	0.159
8/15/2008 15:05	2.98		1.197	27.29	0.147
8/15/2008 15:05	3.16	3.10	1.204	27.28	0.131
8/15/2008 15:05	3.35		1.209	27.274	0.119
8/15/2008 15:06	3.55		1.212	27.265	0.112
8/15/2008 15:06	3.76		1.215	27.26	0.105
8/15/2008 15:06	3.98		1.215	27.252	0.105
8/15/2008 15:06	4.22		1.217	27.244	0.1
8/15/2008 15:07	4.47	4.41	1.219	27.236	0.097

8/15/2008 15:07	4.73		1.219	27.225	0.097
8/15/2008 15:07	5.01	4.95	1.221	27.212	0.093
8/15/2008 15:07	5.31		1.22	27.203	0.094
8/15/2008 15:08	5.62		1.221	27.192	0.091
8/15/2008 15:08	5.96		1.222	27.182	0.091
8/15/2008 15:08	6.31		1.221	27.168	0.092
8/15/2008 15:09	6.68		1.222	27.156	0.09
8/15/2008 15:09	7.08		1.223	27.141	0.088
8/15/2008 15:10	7.5		1.224	27.127	0.086
8/15/2008 15:10	7.94		1.223	27.115	0.087

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	**PI027MW14**
Test No.:	**1**
Date:	**8/17/2008**
Geologist:	CONTI
Checked by / Date:	[illegible] 6/22/11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.333
Screened / Monitored Interval Below Water Table, L (ft):	6.41
Static Water Level (Depth/ Elevation) (ft.):	10.09
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	0.90	0.00	-0.90	1.00	0.0000	0.00
	0.01	0.86	0.01	-0.86	0.95	-0.0499	-0.13
	0.02	0.65	0.02	-0.65	0.72	-0.3299	-0.27
	0.04	0.47	0.04	-0.47	0.52	-0.6541	-0.53
	0.05	0.37	0.05	-0.37	0.41	-0.8933	-0.66
	0.07	0.29	0.07	-0.29	0.32	-1.1369	-0.93
	0.10	0.19	0.10	-0.19	0.21	-1.5598	-1.33
	0.15	0.14	0.15	-0.14	0.15	-1.8652	-1.99
x	0.21	0.12	0.00			0.0000	
x	0.30	0.11	0.00			0.0000	
x	0.45	0.10	0.00			0.0000	
x	0.70	0.09	0.00			0.0000	
x	0.95	0.09	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	8
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-13.279
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.081
Actual Y-intercept is set to 0.	0.000
T_0 (min):	0.075
K (ft/min):	2.13E-02
K (ft/day):	**30.610**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

T_0: Time at which ln(H/H0)=-1

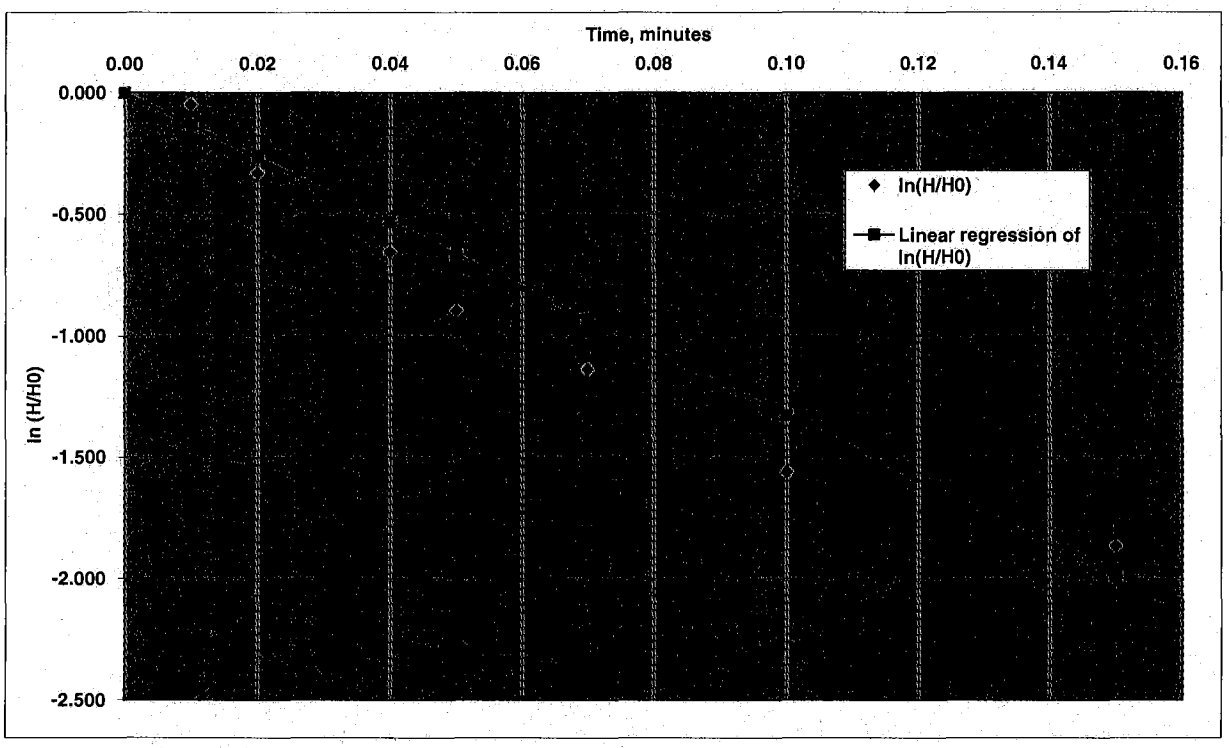
$K = r^2 * \ln(L/R)/(2LT_0)$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: MCRD PARRIS IS - SITE 27 WELL/BORING NO.: MW 14

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10 / 16.50 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 10.09 DATE: 8/17/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

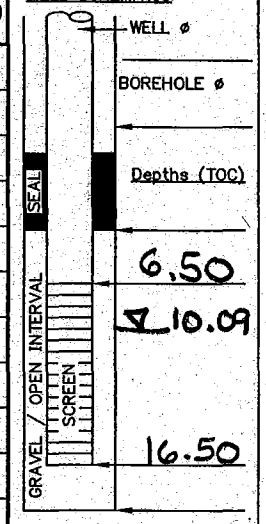
METHOD OF INDUCING WATER LEVEL CHANGE: 1 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

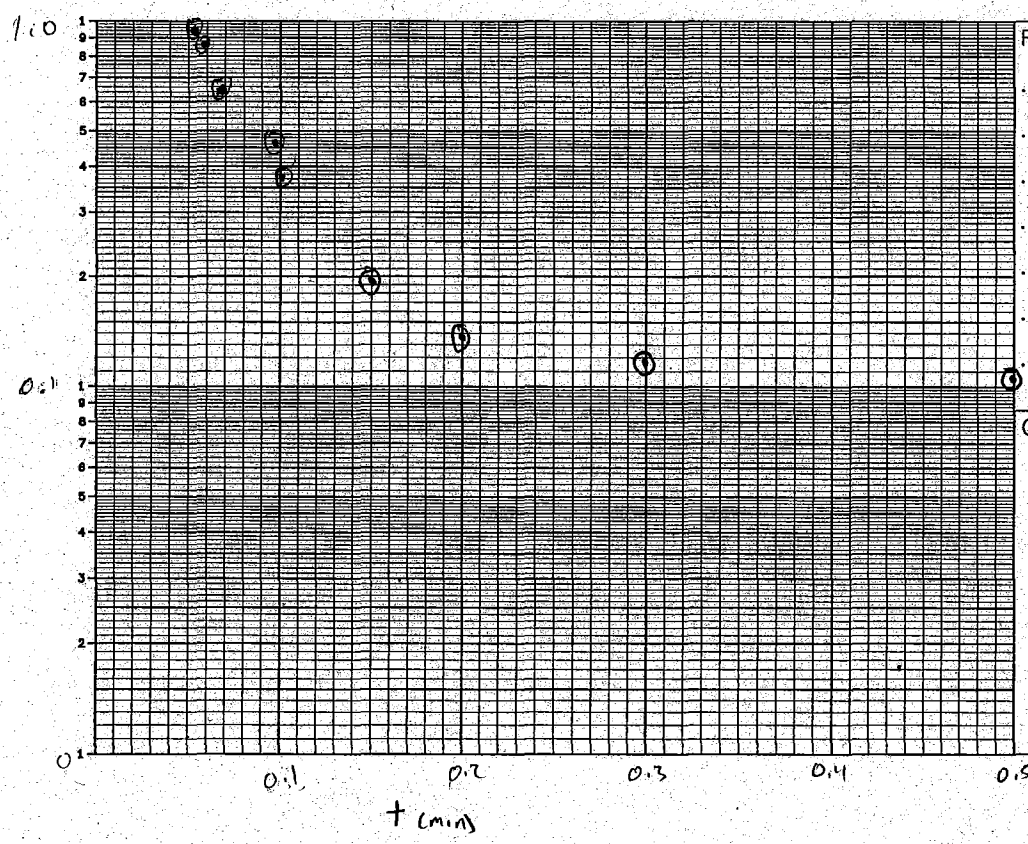
ACAD: FORM_HYDCONTST.dwg 07/06/99 INL

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)
.052		.904			
.059		.856			
.067		.648			
.09		.466			
.10		.371			
.15		.194			
.20		.138			
.30		.118			
.50		.104			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS, SKETCH MAPS, ETC.:

r = .083'
R = .333
L = 6.41

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Report Date:	8/17/2008 8:58
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-14 2008-08-17 08-57-22.wsl
Create Date	8/17/2008 8:58

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-14
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/17/2008 8:47
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	2.50904 (PSI)
Head Pressure	2.50789 (PSI)
Temperature	24.099 (C)
Depth of Probe	5.79065 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/17/2008 8:52	Manual Start Command
8/17/2008 8:57	User Note: "Downloading log - Used Batt: 4% Memory: 35% User: Stanley.Conti"
8/17/2008 8:58	Manual Stop Command

Log Data:
Record Count 94

Date and Time	Elapsed Time Minutes		Sensor: Pres 35 SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/17/2008 8:52	0		2.581	24.507	-0.166
8/17/2008 8:52	0.004		2.581	24.529	-0.167
8/17/2008 8:52	0.008		2.581	24.542	-0.167
8/17/2008 8:52	0.013		2.582	24.55	-0.169
8/17/2008 8:52	0.017		2.581	24.56	-0.167
8/17/2008 8:52	0.021		2.582	24.565	-0.168
8/17/2008 8:52	0.029		2.581	24.555	-0.165
8/17/2008 8:52	0.033		2.582	24.568	-0.168
8/17/2008 8:52	0.036		2.581	24.576	-0.166
8/17/2008 8:52	0.04		2.581	24.58	-0.167
8/17/2008 8:52	0.048		2.415	24.567	0.216
8/17/2008 8:52	0.052	0	2.117	24.58	0.904
8/17/2008 8:52	0.055		2.728	24.585	-0.507
8/17/2008 8:52	0.059	.007	2.138	24.59	0.856
8/17/2008 8:52	0.067	.015	2.228	24.627	0.648
8/17/2008 8:52	0.071		2.239	24.621	0.624
8/17/2008 8:52	0.074	.022	2.252	24.621	0.593
8/17/2008 8:52	0.078		2.285	24.672	0.518
8/17/2008 8:52	0.086		2.296	24.652	0.491
8/17/2008 8:52	0.09	.038	2.307	24.642	0.466
8/17/2008 8:52	0.094		2.319	24.639	0.439
8/17/2008 8:52	0.097		2.34	24.619	0.391
8/17/2008 8:52	0.104	.052	2.348	24.622	0.371
8/17/2008 8:52	0.108		2.36	24.611	0.344
8/17/2008 8:52	0.112		2.368	24.618	0.325
8/17/2008 8:52	0.116		2.377	24.621	0.305
8/17/2008 8:52	0.12	.068	2.383	24.624	0.29
8/17/2008 8:52	0.124		2.395	24.62	0.263
8/17/2008 8:52	0.129		2.399	24.62	0.254
8/17/2008 8:52	0.133		2.407	24.617	0.235
8/17/2008 8:52	0.141		2.416	24.603	0.214
8/17/2008 8:52	0.15	.098	2.425	24.59	0.194
8/17/2008 8:52	0.158		2.431	24.589	0.18
8/17/2008 8:52	0.168		2.439	24.582	0.162
8/17/2008 8:52	0.178		2.443	24.577	0.153
8/17/2008 8:52	0.188		2.446	24.576	0.146
8/17/2008 8:52	0.199	.147	2.449	24.574	0.138
8/17/2008 8:52	0.211		2.451	24.571	0.134
8/17/2008 8:52	0.224		2.453	24.567	0.128
8/17/2008 8:52	0.237		2.455	24.566	0.124
8/17/2008 8:52	0.251		2.457	24.564	0.121
8/17/2008 8:52	0.266	.214	2.457	24.564	0.12

8/17/2008 8:52	0.282		2.457	24.562	0.12
8/17/2008 8:52	0.298		2.458	24.56	0.118
8/17/2008 8:52	0.316		2.459	24.563	0.116
8/17/2008 8:52	0.335		2.459	24.559	0.116
8/17/2008 8:52	0.355	.303	2.461	24.557	0.112
8/17/2008 8:52	0.376		2.461	24.56	0.11
8/17/2008 8:52	0.398		2.461	24.56	0.11
8/17/2008 8:52	0.422		2.462	24.56	0.108
8/17/2008 8:52	0.447		2.461	24.558	0.11
8/17/2008 8:52	0.473		2.463	24.561	0.105
8/17/2008 8:52	0.501	.449	2.464	24.558	0.104
8/17/2008 8:52	0.531		2.464	24.556	0.103
8/17/2008 8:52	0.562		2.465	24.56	0.101
8/17/2008 8:53	0.596		2.467	24.557	0.098
8/17/2008 8:53	0.631		2.467	24.561	0.097
8/17/2008 8:53	0.668		2.467	24.561	0.097
8/17/2008 8:53	0.708		2.467	24.56	0.096
8/17/2008 8:53	0.75	.698	2.468	24.558	0.094
8/17/2008 8:53	0.794		2.469	24.56	0.093
8/17/2008 8:53	0.841		2.469	24.561	0.092
8/17/2008 8:53	0.891		2.47	24.56	0.09
8/17/2008 8:53	0.944		2.47	24.56	0.091
8/17/2008 8:53	1	.948	2.47	24.566	0.09
8/17/2008 8:53	1.06		2.472	24.563	0.086
8/17/2008 8:53	1.12		2.471	24.563	0.087
8/17/2008 8:53	1.19		2.473	24.563	0.083
8/17/2008 8:53	1.26		2.473	24.567	0.084
8/17/2008 8:53	1.33		2.473	24.566	0.082
8/17/2008 8:53	1.41		2.473	24.569	0.083
8/17/2008 8:53	1.5		2.473	24.569	0.083
8/17/2008 8:53	1.58		2.474	24.566	0.082
8/17/2008 8:54	1.68		2.474	24.569	0.081
8/17/2008 8:54	1.78		2.474	24.569	0.081
8/17/2008 8:54	1.88		2.475	24.568	0.078
8/17/2008 8:54	1.99		2.474	24.569	0.08
8/17/2008 8:54	2.11		2.475	24.568	0.078
8/17/2008 8:54	2.24		2.476	24.57	0.077
8/17/2008 8:54	2.37		2.476	24.569	0.077
8/17/2008 8:54	2.51		2.477	24.57	0.075
8/17/2008 8:55	2.66		2.476	24.57	0.076
8/17/2008 8:55	2.82		2.478	24.57	0.073
8/17/2008 8:55	2.98		2.477	24.571	0.073
8/17/2008 8:55	3.16		2.478	24.574	0.071
8/17/2008 8:55	3.35		2.478	24.574	0.073
8/17/2008 8:55	3.55		2.478	24.575	0.073
8/17/2008 8:56	3.76		2.478	24.579	0.071
8/17/2008 8:56	3.98		2.479	24.58	0.069
8/17/2008 8:56	4.22		2.479	24.58	0.07
8/17/2008 8:56	4.47		2.48	24.583	0.068
8/17/2008 8:57	4.73		2.479	24.591	0.07
8/17/2008 8:57	5.01		2.48	24.59	0.068
8/17/2008 8:57	5.31		2.48	24.592	0.067

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	PI027MW15I
Test No.:	1
Date:	8/17/2008
Geologist:	CONTI
Checked by / Date:	FWRamer 6-28-11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.33
Screened / Monitored Interval Below Water Table, L (ft):	3
Static Water Level (Depth/ Elevation) (ft.):	10.23
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of $\ln(H/H0)$ (b=0)
	0.00	1.08	0.00	1.08	1.00	0.0000	0.00
	0.03	1.04	0.03	1.04	0.96	-0.0389	-0.01
	0.06	1.03	0.06	1.03	0.96	-0.0455	-0.01
	0.09	1.02	0.09	1.02	0.94	-0.0602	-0.02
	0.16	0.98	0.16	0.98	0.91	-0.0953	-0.04
	0.24	0.96	0.24	0.96	0.89	-0.1119	-0.05
	0.44	0.91	0.44	0.91	0.84	-0.1604	-0.09
	0.94	0.80	0.94	0.80	0.74	-0.3020	-0.18
	2.94	0.51	2.94	0.51	0.47	-0.7485	-0.50
	4.95	0.35	4.95	0.35	0.32	-1.1249	-1.02
	7.44	0.24	7.44	0.24	0.22	-1.5148	-1.53
x	9.94	0.16	0.00			0.0000	
x	14.94	0.16	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	11
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-0.205
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.060
Actual Y-intercept is set to 0.	0.000
T_0 (min):	4.868
K (ft/min):	5.24E-04
K (ft/day):	**0.755**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum\left(x^2\right)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

T_0: Time at which ln(H/H0)=-1

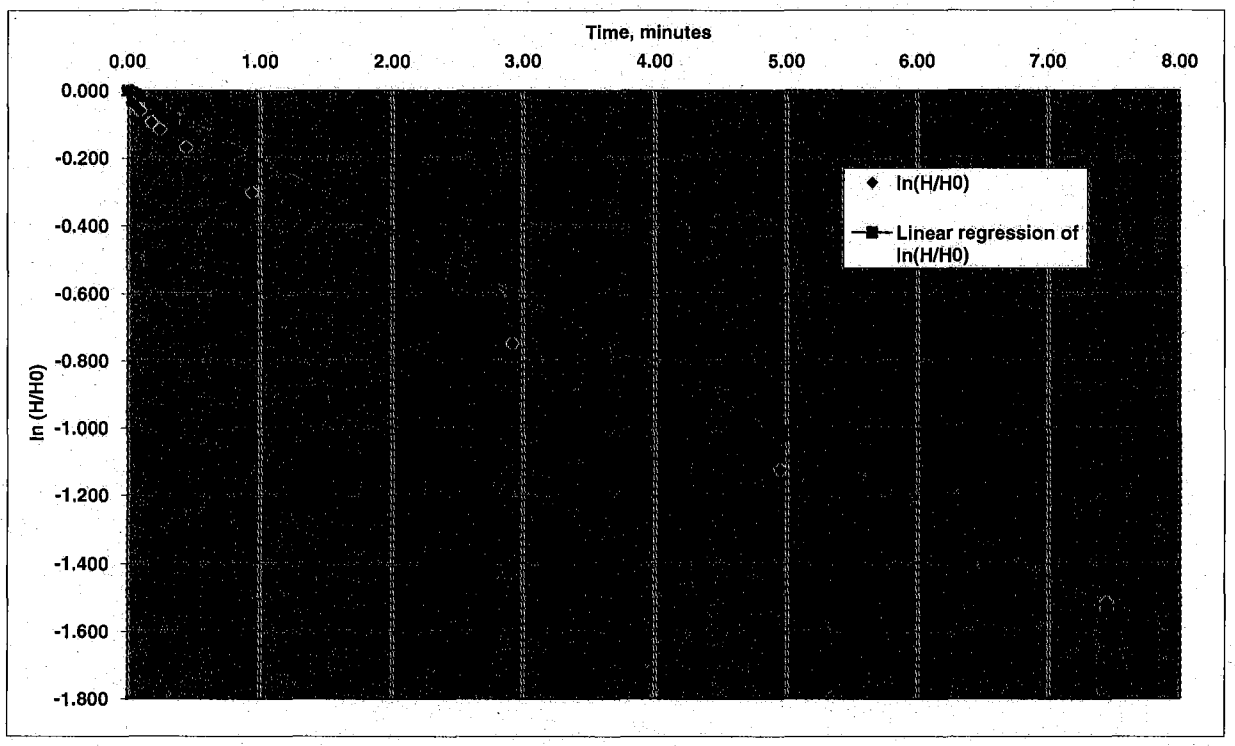
$K = r^2 * \ln(L/R)/(2LT_0)$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: MCRD PARRIS IS- SITE 27 WELL/BORING NO.: MW15I

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2"Φ SCREEN LENGTH/DEPTH: 3 / 23.70 ± TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 10.23 DATE: 8/17/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

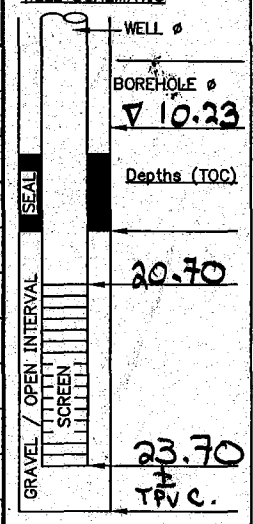
METHOD OF INDUCING WATER LEVEL CHANGE: 1 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

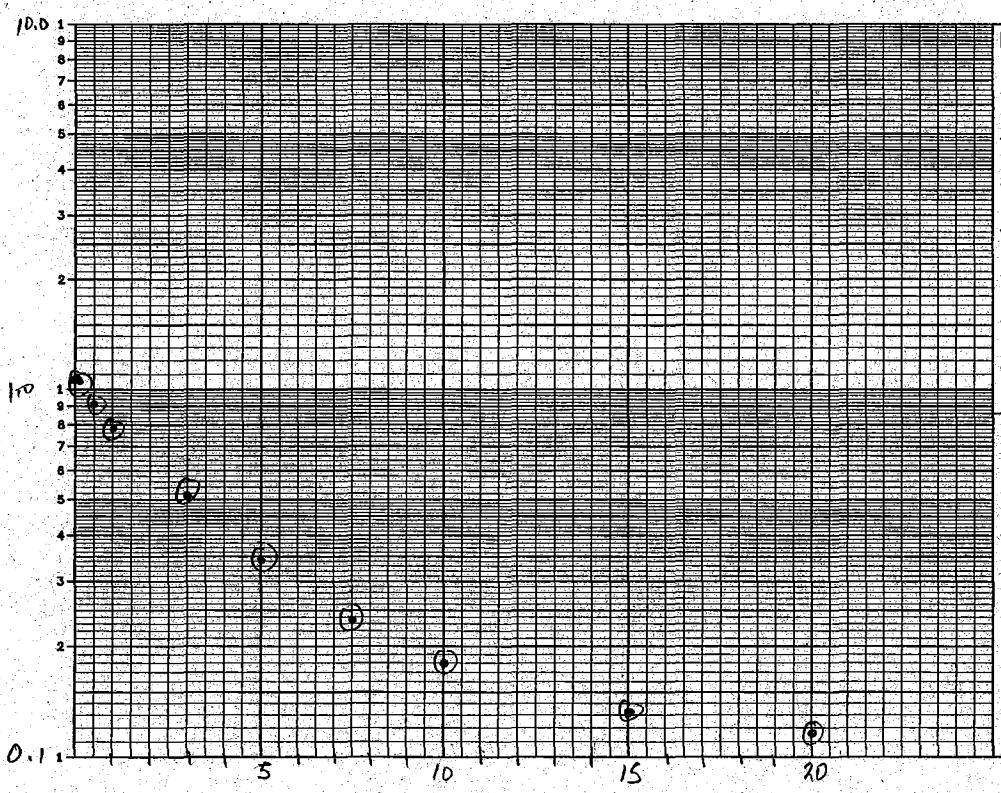
ACAD: FORM_HYDCONTST.dwg 07/06/99 INL

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)
.059		1.078			
.501		.907			
1.0		.797			
3.0		.508			
5.0		.346			
7.5		.237			
10.0		.180			
15.0		.132			
20.0		.116			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS, SKETCH MAPS, ETC.:

r = .083' (2" well)
R = .33'
L = 3'

24

Report Date:	8/17/2008 9:42
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-15I 2008-08-17 09-21-58.wsl
Create Date	8/17/2008 9:42

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-15I
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/17/2008 9:05
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	3.77236 (PSI)
Head Pressure	3.77227 (PSI)
Temperature	24.3371 (C)
Depth of Probe	8.71005 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/17/2008 9:18	Manual Start Command
8/17/2008 9:21	User Note: "Downloading log - Used Batt: 4% Memory: 37% User: Stanley.Conti"
8/17/2008 9:29	User Note: "Downloading log - Used Batt: 4% Memory: 37% User: Stanley.Conti"

8/17/2008 9:38 User Note: "Downloading log - Used Batt: 4% Memory: 37% User: Stanley.Conti"
8/17/2008 9:41 Manual Stop Command

Log Data:
Record Count 119

Date and Time	Elapsed Time Minutes		Sensor: Pres 35 SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/17/2008 9:18		0	3.762	24.011	0.023
8/17/2008 9:18		0.004	3.763	24.031	0.022
8/17/2008 9:19		0.008	3.763	24.047	0.021
8/17/2008 9:19		0.013	3.762	24.055	0.024
8/17/2008 9:19		0.017	3.762	24.061	0.025
8/17/2008 9:19		0.021	3.763	24.07	0.021
8/17/2008 9:19		0.029	3.762	24.057	0.024
8/17/2008 9:19		0.033	3.763	24.071	0.021
8/17/2008 9:19		0.036	3.763	24.078	0.022
8/17/2008 9:19		0.04	3.762	24.086	0.024
8/17/2008 9:19		0.048	3.075	24.073	1.609
8/17/2008 9:19		0.052	3.678	24.082	0.217
8/17/2008 9:19		0.055	3.505	24.09	0.617
8/17/2008 9:19	0	0.059	3.305	24.095	1.078
8/17/2008 9:19		0.067	3.312	24.131	1.063
8/17/2008 9:19		0.071	3.314	24.126	1.059
8/17/2008 9:19		0.074	3.314	24.122	1.059
8/17/2008 9:19		0.078	3.321	24.18	1.042
8/17/2008 9:19		0.086	3.32	24.154	1.044
8/17/2008 9:19	.03	0.09	3.321	24.147	1.042
8/17/2008 9:19		0.094	3.33	24.142	1.021
8/17/2008 9:19		0.097	3.325	24.116	1.034
8/17/2008 9:19		0.105	3.326	24.123	1.03
8/17/2008 9:19		0.109	3.329	24.123	1.024
8/17/2008 9:19		0.113	3.329	24.122	1.025
8/17/2008 9:19	.058	0.117	3.326	24.125	1.031
8/17/2008 9:19		0.12	3.327	24.127	1.029
8/17/2008 9:19		0.124	3.331	24.124	1.02
8/17/2008 9:19		0.129	3.329	24.123	1.024
8/17/2008 9:19		0.133	3.333	24.115	1.015
8/17/2008 9:19		0.141	3.332	24.104	1.017
8/17/2008 9:19	.091	0.15	3.333	24.089	1.015
8/17/2008 9:19		0.158	3.333	24.088	1.013
8/17/2008 9:19		0.168	3.335	24.079	1.009
8/17/2008 9:19		0.178	3.337	24.076	1.005
8/17/2008 9:19		0.188	3.339	24.074	1
8/17/2008 9:19		0.199	3.342	24.07	0.994
8/17/2008 9:19		0.211	3.343	24.067	0.992
8/17/2008 9:19		0.224	3.345	24.063	0.987
8/17/2008 9:19	.178	0.237	3.347	24.062	0.981

8/17/2008 9:19		0.251	3.349	24.059	0.979
8/17/2008 9:19		0.266	3.351	24.059	0.972
8/17/2008 9:19		0.282	3.354	24.055	0.967
8/17/2008 9:19	.239	0.298	3.356	24.056	0.962
8/17/2008 9:19		0.316	3.358	24.056	0.957
8/17/2008 9:19		0.335	3.36	24.055	0.953
8/17/2008 9:19		0.355	3.362	24.051	0.948
8/17/2008 9:19		0.376	3.365	24.049	0.942
8/17/2008 9:19		0.398	3.367	24.052	0.935
8/17/2008 9:19		0.422	3.37	24.049	0.929
8/17/2008 9:19		0.447	3.374	24.045	0.92
8/17/2008 9:19		0.473	3.376	24.046	0.915
8/17/2008 9:19	.442	0.501	3.38	24.043	0.907
8/17/2008 9:19		0.531	3.383	24.045	0.898
8/17/2008 9:19		0.562	3.387	24.041	0.89
8/17/2008 9:19		0.596	3.39	24.039	0.882
8/17/2008 9:19		0.631	3.394	24.04	0.873
8/17/2008 9:19		0.668	3.398	24.038	0.865
8/17/2008 9:19		0.708	3.401	24.034	0.858
8/17/2008 9:19		0.75	3.405	24.035	0.848
8/17/2008 9:19		0.794	3.409	24.035	0.839
8/17/2008 9:19		0.841	3.414	24.031	0.827
8/17/2008 9:19		0.891	3.417	24.028	0.819
8/17/2008 9:19		0.944	3.423	24.029	0.806
8/17/2008 9:19	.941	1	3.427	24.027	0.797
8/17/2008 9:20		1.06	3.433	24.025	0.783
8/17/2008 9:20		1.12	3.438	24.023	0.772
8/17/2008 9:20		1.19	3.444	24.023	0.759
8/17/2008 9:20		1.26	3.449	24.021	0.746
8/17/2008 9:20		1.33	3.455	24.017	0.734
8/17/2008 9:20		1.41	3.461	24.015	0.72
8/17/2008 9:20		1.5	3.467	24.013	0.704
8/17/2008 9:20		1.58	3.473	24.009	0.691
8/17/2008 9:20		1.68	3.48	24.009	0.674
8/17/2008 9:20		1.78	3.486	24.007	0.66
8/17/2008 9:20		1.88	3.493	24	0.644
8/17/2008 9:20		1.99	3.5	23.998	0.629
8/17/2008 9:21		2.11	3.508	23.996	0.611
8/17/2008 9:21		2.24	3.515	23.994	0.595
8/17/2008 9:21		2.37	3.522	23.99	0.577
8/17/2008 9:21		2.51	3.53	23.987	0.561
8/17/2008 9:21		2.66	3.537	23.981	0.543
8/17/2008 9:21		2.82	3.545	23.975	0.525
8/17/2008 9:21	2.921	2.98	3.552	23.974	0.508
8/17/2008 9:22		3.16	3.561	23.969	0.488
8/17/2008 9:22		3.35	3.568	23.967	0.472
8/17/2008 9:22		3.55	3.575	23.962	0.455
8/17/2008 9:22		3.76	3.584	23.955	0.434
8/17/2008 9:22		3.98	3.592	23.951	0.416
8/17/2008 9:23		4.22	3.599	23.946	0.4
8/17/2008 9:23		4.47	3.607	23.943	0.382
8/17/2008 9:23		4.73	3.615	23.936	0.364

8/17/2008 9:24	4.951	5.01	3.622	23.931	0.346
8/17/2008 9:24		5.31	3.63	23.923	0.329
8/17/2008 9:24		5.62	3.637	23.917	0.312
8/17/2008 9:24		5.96	3.644	23.911	0.296
8/17/2008 9:25		6.31	3.65	23.905	0.282
8/17/2008 9:25		6.68	3.658	23.9	0.265
8/17/2008 9:26		7.08	3.663	23.893	0.252
8/17/2008 9:26	7.441	7.5	3.67	23.886	0.237
8/17/2008 9:26		7.94	3.675	23.882	0.226
8/17/2008 9:27		8.41	3.681	23.874	0.211
8/17/2008 9:27		8.91	3.685	23.87	0.202
8/17/2008 9:28		9.44	3.69	23.867	0.191
8/17/2008 9:28	9.941	10	3.694	23.865	0.18
8/17/2008 9:29		10.6	3.698	23.859	0.172
8/17/2008 9:30		11.2	3.701	23.886	0.164
8/17/2008 9:30		11.9	3.704	23.865	0.157
8/17/2008 9:31		12.6	3.707	23.864	0.151
8/17/2008 9:32		13.3	3.71	23.867	0.143
8/17/2008 9:33		14.1	3.713	23.86	0.138
8/17/2008 9:33	14.941	15	3.715	23.859	0.132
8/17/2008 9:34		15.8	3.717	23.862	0.129
8/17/2008 9:35		16.8	3.717	23.861	0.127
8/17/2008 9:36		17.8	3.72	23.862	0.121
8/17/2008 9:37		18.8	3.721	23.859	0.118
8/17/2008 9:38		19.9	3.722	23.843	0.116
8/17/2008 9:40		21.1	3.724	23.836	0.113
8/17/2008 9:41		22.4	3.723	23.832	0.113

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	**PI027MW16**
Test No.:	**1**
Date:	**8/16/2008**
Geologist:	CONTI
Checked by / Date:	BLRomner 6/28/11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.333
Screened / Monitored Interval Below Water Table, L (ft):	5.32
Static Water Level (Depth/ Elevation) (ft.):	7.93
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	0.85	0.00	-0.85	1.00	0.0000	0.00
	0.01	0.74	0.01	-0.74	0.88	-0.1327	-0.13
	0.02	0.61	0.02	-0.61	0.72	-0.3259	-0.26
	0.03	0.51	0.03	-0.51	0.60	-0.5049	-0.38
	0.05	0.37	0.05	-0.37	0.44	-0.8258	-0.64
	0.08	0.27	0.08	-0.27	0.32	-1.1409	-1.02
	0.09	0.22	0.09	-0.22	0.26	-1.3457	-1.15
	0.11	0.20	0.11	-0.20	0.23	-1.4663	-1.41
	0.13	0.17	0.13	-0.17	0.20	-1.6035	-1.66
x	0.16	0.16	0.00			0.0000	
x	0.20	0.14	0.00			0.0000	
x	0.27	0.12	0.00			0.0000	
x	0.38	0.10	0.00			0.0000	
x	0.47	0.09	0.00			0.0000	
x	0.64	0.08	0.00			0.0000	
x	0.93	0.06	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	9
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-12.791
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.077
Actual Y-intercept is set to 0.	0.000
T_0 (min):	0.078
K (ft/min):	2.31E-02
K (ft/day):	**33.287**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

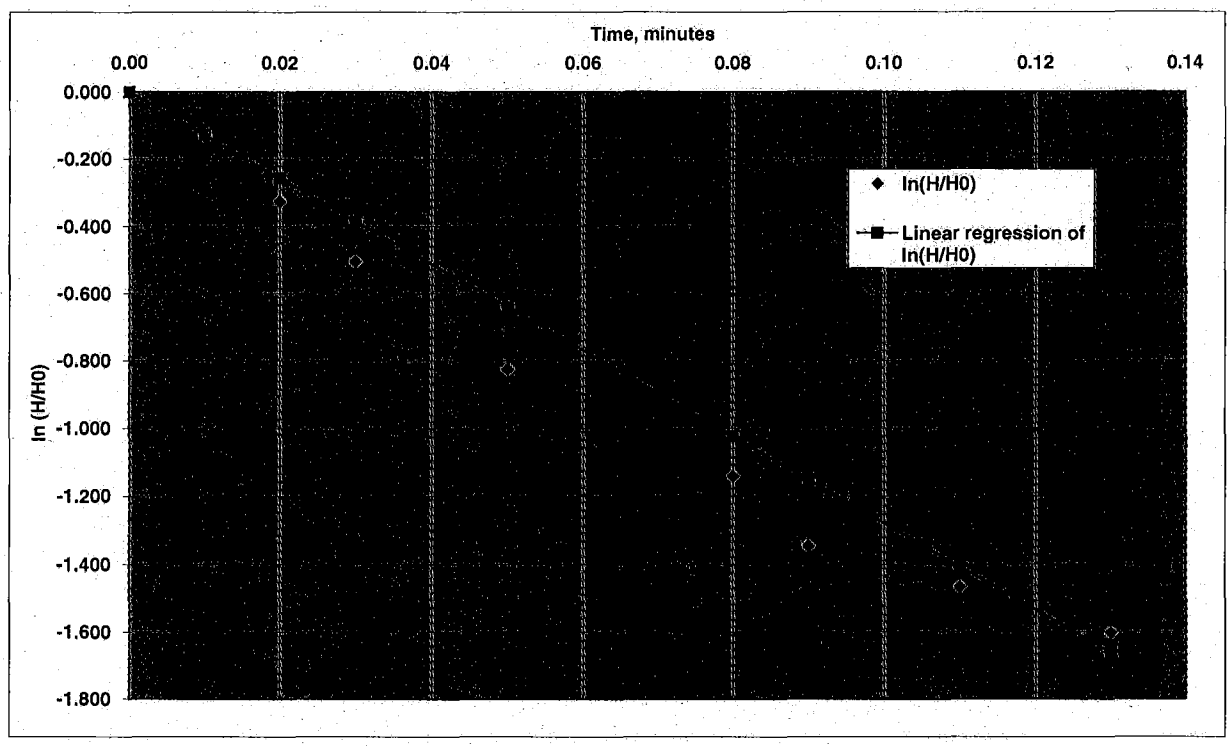
T_0: Time at which ln(H/H0)=-1

$K = r^2 * \ln(L/R)/(2LT_0)$

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: MCRD PARRIS IS - SITE 27 WELL/BORING NO.: MW-16

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10 / 13.25 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 7.93' DATE: 8/16/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

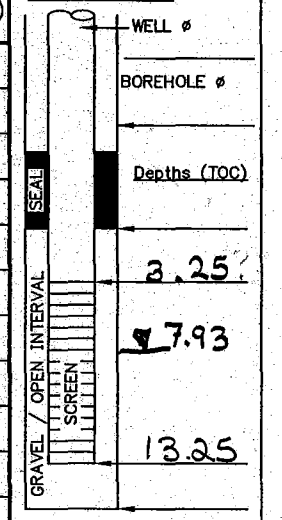
METHOD OF INDUCING WATER LEVEL CHANGE: 1 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

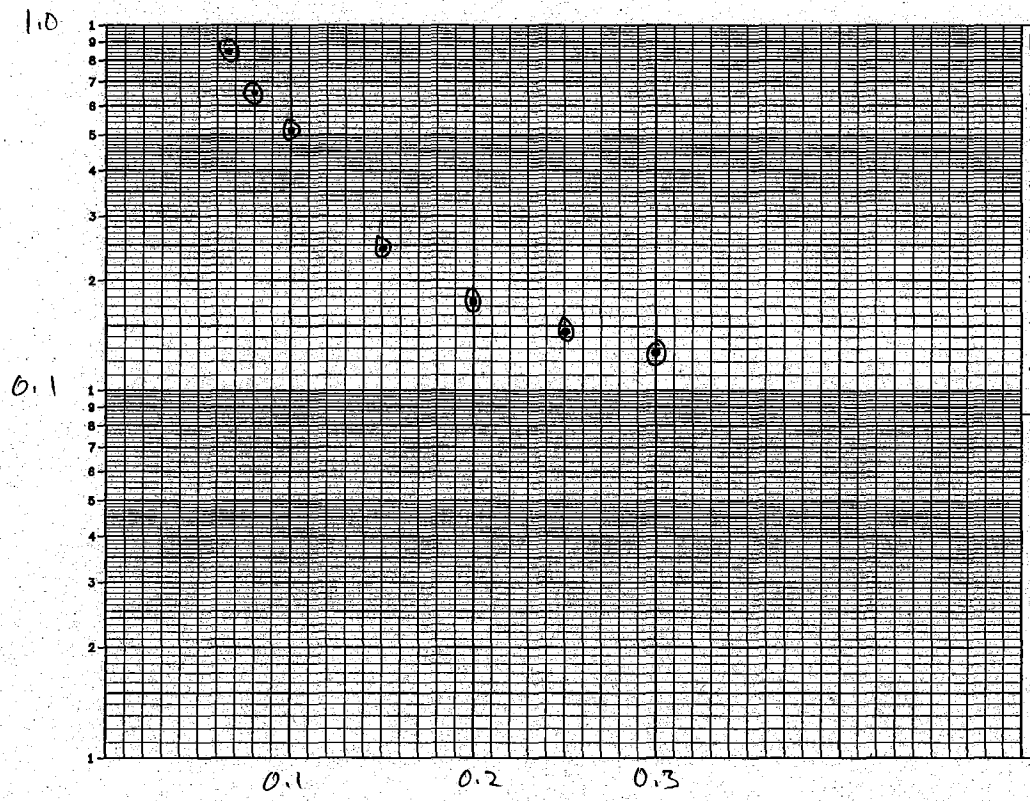
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

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)
.066		.845			
.082		.647			
.1		.507			
.15		.242			
.20		.174			
.25		.144			
.30		.128			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS, SKETCH MAPS, ETC.:

r = .083'
R = .333'
L = 5.32'

Report Date:	8/16/2008 8:46
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-16 2008-08-16 08-43-41.wsl
Create Date	8/16/2008 8:45

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-16
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/16/2008 8:36
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	2.12407 (PSI)
Head Pressure	2.1246 (PSI)
Temperature	25.1656 (C)
Depth of Probe	4.90564 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/16/2008 8:42	Manual Start Command
8/16/2008 8:43	User Note: "Downloading log - Used Batt: 4% Memory: 15% User: Stanley.Conti"
8/16/2008 8:45	Manual Stop Command

Log Data:
Record Count 85

Date and Time	Elapsed Time Minutes		Sensor: Pres 35 SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/16/2008 8:42	0		2.145	25.826	-0.049
8/16/2008 8:42	0.004		2.144	25.847	-0.046
8/16/2008 8:42	0.008		2.144	25.859	-0.046
8/16/2008 8:42	0.013		2.146	25.928	-0.051
8/16/2008 8:42	0.02		2.146	25.916	-0.05
8/16/2008 8:42	0.024		2.145	25.916	-0.047
8/16/2008 8:42	0.028		2.144	25.913	-0.046
8/16/2008 8:42	0.031		2.144	25.894	-0.045
8/16/2008 8:42	0.039		2.144	25.902	-0.047
8/16/2008 8:42	0.043		2.144	25.909	-0.046
8/16/2008 8:42	0.047		2.114	25.909	0.023
8/16/2008 8:42	0.051		2.137	25.917	-0.031
8/16/2008 8:42	0.055		1.593	25.92	1.227
8/16/2008 8:42	0.058		2.23	25.92	-0.245
8/16/2008 8:42	0.062		1.903	25.921	0.509
8/16/2008 8:42	0.066	0	1.758	25.923	0.845
8/16/2008 8:42	0.071		1.768	25.925	0.821
8/16/2008 8:42	0.074		1.793	25.927	0.765
8/16/2008 8:42	0.078	.012	1.805	25.932	0.736
8/16/2008 8:42	0.082		1.844	25.937	0.647
8/16/2008 8:42	0.085		1.846	25.933	0.642
8/16/2008 8:42	0.089	.023	1.861	25.933	0.607
8/16/2008 8:42	0.093		1.876	25.937	0.573
8/16/2008 8:42	0.096		1.89	25.939	0.54
8/16/2008 8:42	0.1	.034	1.904	25.939	0.507
8/16/2008 8:42	0.106		1.928	25.93	0.452
8/16/2008 8:42	0.112		1.944	25.921	0.416
8/16/2008 8:42	0.119	.053	1.963	25.913	0.372
8/16/2008 8:42	0.126		1.981	25.907	0.331
8/16/2008 8:42	0.133		1.995	25.907	0.299
8/16/2008 8:42	0.141	.075	2.007	25.904	0.27
8/16/2008 8:42	0.15		2.019	25.897	0.242
8/16/2008 8:42	0.158	.092	2.027	25.897	0.224
8/16/2008 8:42	0.168		2.034	25.892	0.209
8/16/2008 8:42	0.178	.112	2.04	25.89	0.195
8/16/2008 8:42	0.188		2.044	25.889	0.184
8/16/2008 8:42	0.199	.133	2.049	25.887	0.174
8/16/2008 8:42	0.211		2.053	25.885	0.164
8/16/2008 8:42	0.224	.158	2.057	25.883	0.155
8/16/2008 8:42	0.237		2.059	25.884	0.149
8/16/2008 8:42	0.251		2.062	25.881	0.144
8/16/2008 8:42	0.266	.200	2.065	25.88	0.137

8/16/2008 8:42	0.282		2.067	25.88	0.132
8/16/2008 8:42	0.298		2.069	25.878	0.128
8/16/2008 8:42	0.316		2.07	25.878	0.124
8/16/2008 8:42	0.335	.269	2.072	25.876	0.119
8/16/2008 8:42	0.355		2.074	25.878	0.115
8/16/2008 8:42	0.376		2.076	25.874	0.111
8/16/2008 8:42	0.398		2.078	25.873	0.107
8/16/2008 8:42	0.422		2.079	25.875	0.104
8/16/2008 8:42	0.447	.381	2.08	25.876	0.102
8/16/2008 8:42	0.473		2.082	25.875	0.097
8/16/2008 8:42	0.501		2.083	25.876	0.095
8/16/2008 8:42	0.531	.465	2.085	25.875	0.09
8/16/2008 8:42	0.562		2.085	25.874	0.089
8/16/2008 8:42	0.596		2.088	25.876	0.084
8/16/2008 8:42	0.631		2.089	25.876	0.082
8/16/2008 8:42	0.668		2.09	25.877	0.079
8/16/2008 8:42	0.708	.642	2.092	25.874	0.075
8/16/2008 8:42	0.75		2.092	25.879	0.074
8/16/2008 8:42	0.794		2.095	25.878	0.068
8/16/2008 8:42	0.841		2.095	25.877	0.067
8/16/2008 8:42	0.891		2.097	25.878	0.064
8/16/2008 8:42	0.944		2.098	25.879	0.06
8/16/2008 8:43	1	.934	2.099	25.881	0.059
8/16/2008 8:43	1.06		2.101	25.882	0.054
8/16/2008 8:43	1.12		2.102	25.881	0.052
8/16/2008 8:43	1.19		2.103	25.882	0.049
8/16/2008 8:43	1.26		2.104	25.882	0.047
8/16/2008 8:43	1.33		2.105	25.885	0.044
8/16/2008 8:43	1.41		2.106	25.885	0.042
8/16/2008 8:43	1.5		2.107	25.889	0.039
8/16/2008 8:43	1.58		2.108	25.89	0.037
8/16/2008 8:43	1.68		2.109	25.889	0.034
8/16/2008 8:43	1.78		2.11	25.894	0.032
8/16/2008 8:43	1.88		2.112	25.896	0.028
8/16/2008 8:44	1.99		2.112	25.9	0.027
8/16/2008 8:44	2.11		2.113	25.901	0.025
8/16/2008 8:44	2.24		2.115	25.901	0.022
8/16/2008 8:44	2.37		2.115	25.903	0.021
8/16/2008 8:44	2.51		2.117	25.906	0.017
8/16/2008 8:44	2.66		2.116	25.91	0.018
8/16/2008 8:44	2.82		2.119	25.911	0.012
8/16/2008 8:45	2.98		2.119	25.916	0.012
8/16/2008 8:45	3.16		2.123	25.92	0.002

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	**PI027MW19**
Test No.:	**1**
Date:	**8/16/2008**
Geologist:	CONTI
Checked by / Date:	SLRamer 6/28/11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.333
Screened / Monitored Interval Below Water Table, L (ft):	6.44
Static Water Level (Depth/ Elevation) (ft.):	5.06
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	1.08	0.00	-1.08	1.00	0.0000	0.00
	0.02	0.90	0.02	-0.90	0.83	-0.1823	-0.17
	0.03	0.82	0.03	-0.82	0.76	-0.2754	-0.25
	0.05	0.71	0.05	-0.71	0.66	-0.4195	-0.41
	0.07	0.61	0.07	-0.61	0.56	-0.5713	-0.58
	0.09	0.51	0.09	-0.51	0.47	-0.7503	-0.74
	0.12	0.38	0.12	-0.38	0.35	-1.0445	-0.99
	0.16	0.29	0.16	-0.29	0.27	-1.3148	-1.32
x	0.21	0.24	0.00			0.0000	
x	0.27	0.21	0.00			0.0000	
x	0.40	0.16	0.00			0.0000	
x	0.53	0.15	0.00			0.0000	
x	0.65	0.13	0.00			0.0000	
x	0.90	0.12	0.00			0.0000	
x	1.40	0.10	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	8
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-8.277
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.011
Actual Y-intercept is set to 0.	0.000
T_0 (min):	0.121
K (ft/min):	1.32E-02
K (ft/day):	**19.021**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum\left(x^2\right)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

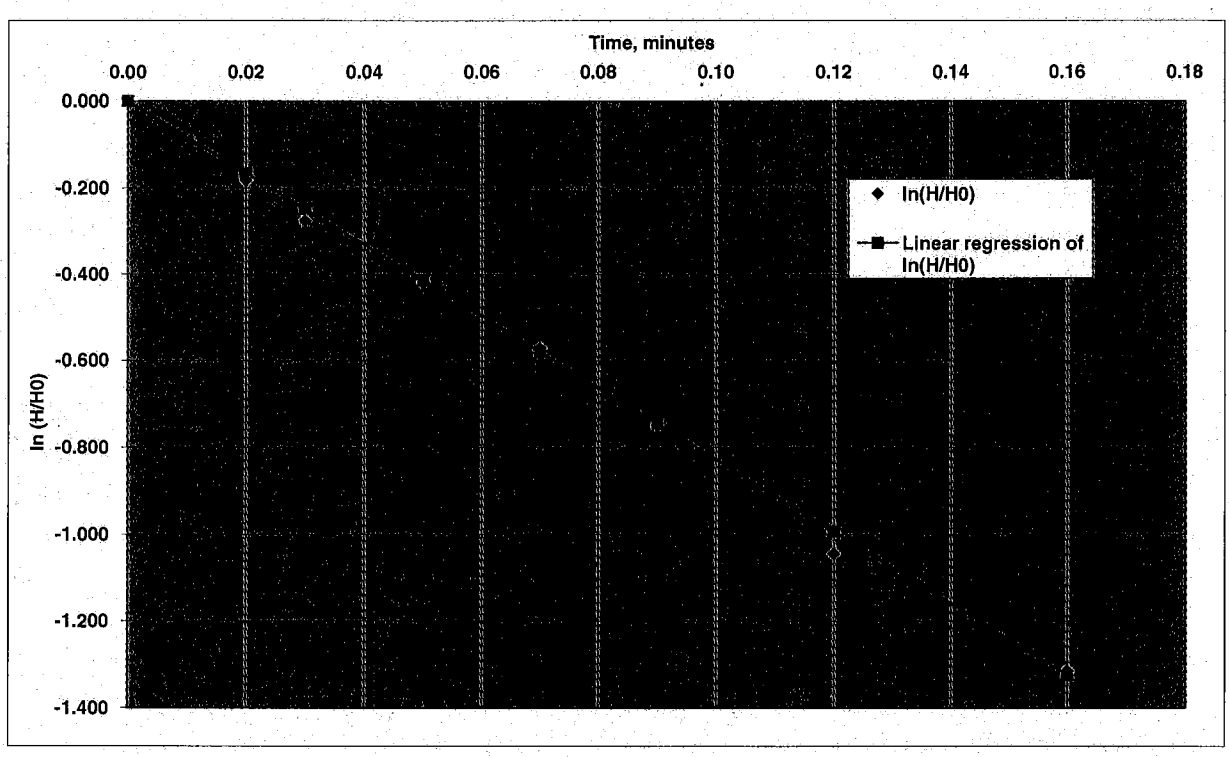
T_0: Time at which ln(H/H0)=-1

$K = r^2 * \ln(L/R)/(2LT_0)$

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: MCRD PARRIS IS- SITE 27 WELL/BORING NO.: MW-19

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2"Φ SCREEN LENGTH/DEPTH: 10 / 11.50 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 5.06. DATE: 8/16/08

TEST TYPE (Rising/Falling/Constant Head): RISING. CHECKED:

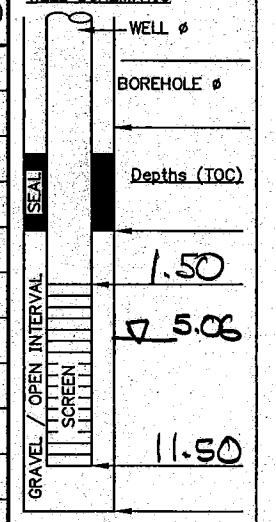
METHOD OF INDUCING WATER LEVEL CHANGE: 1 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

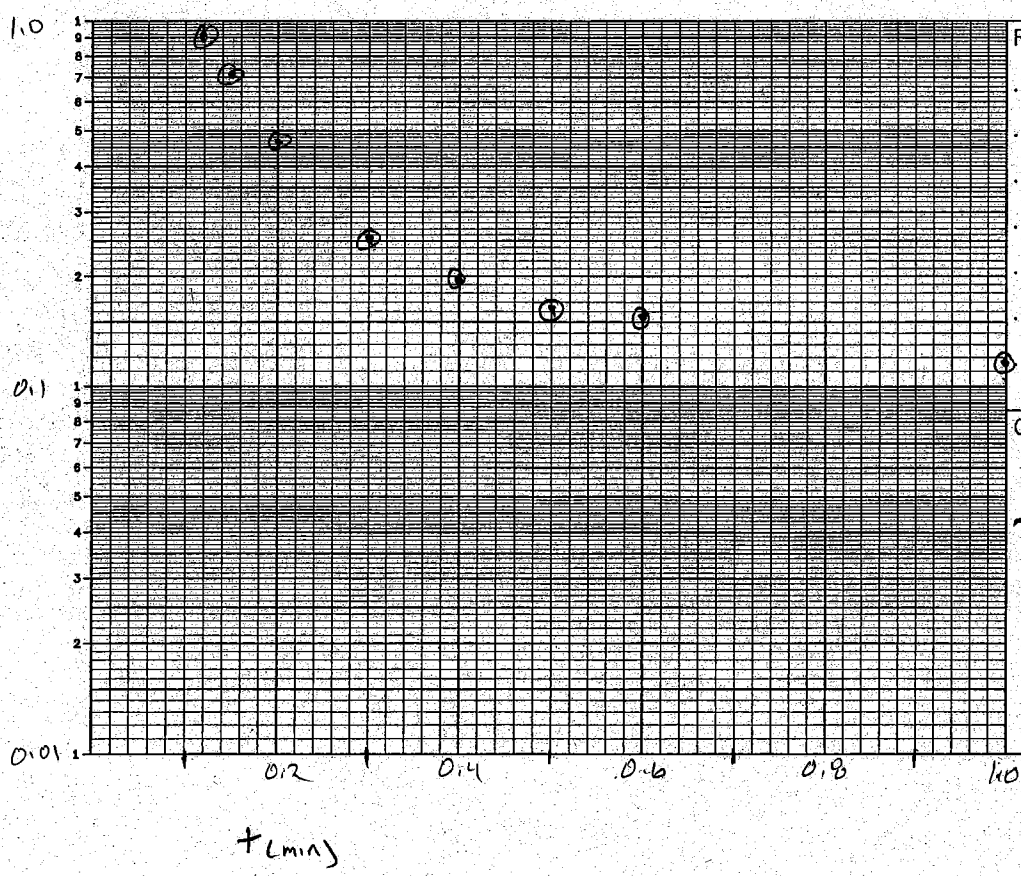
ACAD: FORM_HYDCONTST.dwg 07/06/99 INL

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)
.119		.901			
.15		.707			
.20		.462			
.30		.257			
.40		.199			
.50		.162			
.60		.154			
1.00		.117			
2.00		.081			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS, SKETCH MAPS, ETC.:

r = .083
R = .333
L = 6.44

Report Date:	8/16/2008 10:42
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-19 2008-08-16 10-40-55.wsl
Create Date	8/16/2008 10:42

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-19
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/16/2008 10:31
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	2.76524 (PSI)
Head Pressure	2.76472 (PSI)
Temperature	28.9636 (C)
Depth of Probe	6.38366 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/16/2008 10:37	Manual Start Command
8/16/2008 10:40	User Note: "Downloading log - Used Batt: 4% Memory: 20% User: Stanley.Conti"
8/16/2008 10:42	Manual Stop Command

Log Data:
Record Count 90

Date and Time	Elapsed Time Minutes		Sensor: Pres 35ft SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/16/2008 10:37	0		2.793	29.326	-0.065
8/16/2008 10:37	0.004		2.793	29.346	-0.064
8/16/2008 10:37	0.008		2.794	29.359	-0.066
8/16/2008 10:37	0.013		2.795	29.429	-0.069
8/16/2008 10:37	0.02		2.794	29.415	-0.067
8/16/2008 10:37	0.024		2.793	29.414	-0.065
8/16/2008 10:37	0.028		2.793	29.412	-0.065
8/16/2008 10:37	0.031		2.793	29.392	-0.065
8/16/2008 10:37	0.04		2.793	29.404	-0.065
8/16/2008 10:37	0.043		2.793	29.406	-0.065
8/16/2008 10:37	0.047		2.793	29.412	-0.064
8/16/2008 10:37	0.053		2.794	29.402	-0.066
8/16/2008 10:37	0.057		2.793	29.411	-0.065
8/16/2008 10:37	0.061		2.793	29.411	-0.064
8/16/2008 10:37	0.065		2.792	29.417	-0.061
8/16/2008 10:37	0.069		2.793	29.418	-0.063
8/16/2008 10:37	0.072		2.796	29.425	-0.071
8/16/2008 10:37	0.076		2.793	29.425	-0.063
8/16/2008 10:37	0.08		2.793	29.422	-0.064
8/16/2008 10:37	0.084		2.793	29.429	-0.064
8/16/2008 10:37	0.088		2.793	29.429	-0.063
8/16/2008 10:38	0.092		2.793	29.426	-0.065
8/16/2008 10:38	0.096		2.795	29.433	-0.069
8/16/2008 10:38	0.099		2.789	29.433	-0.054
8/16/2008 10:38	0.103	0	2.296	29.434	1.083
8/16/2008 10:38	0.107		2.424	29.439	0.787
8/16/2008 10:38	0.112		2.743	29.428	0.052
8/16/2008 10:38	0.119	.016	2.375	29.417	0.901
8/16/2008 10:38	0.126		2.388	29.411	0.872
8/16/2008 10:38	0.133	.03	2.409	29.407	0.823
8/16/2008 10:38	0.141		2.435	29.403	0.762
8/16/2008 10:38	0.15	.047	2.459	29.396	0.707
8/16/2008 10:38	0.158		2.479	29.398	0.66
8/16/2008 10:38	0.168	.065	2.503	29.393	0.606
8/16/2008 10:38	0.178		2.524	29.391	0.557
8/16/2008 10:38	0.188	.085	2.545	29.39	0.509
8/16/2008 10:38	0.199		2.565	29.388	0.462
8/16/2008 10:38	0.211		2.584	29.384	0.42
8/16/2008 10:38	0.224	.121	2.601	29.38	0.378
8/16/2008 10:38	0.237		2.616	29.378	0.345
8/16/2008 10:38	0.251		2.627	29.377	0.318
8/16/2008 10:38	0.266	.163	2.638	29.375	0.293

8/16/2008 10:38	0.282		2.648	29.376	0.27
8/16/2008 10:38	0.298		2.654	29.376	0.257
8/16/2008 10:38	0.316	.213	2.661	29.373	0.241
8/16/2008 10:38	0.335		2.667	29.373	0.228
8/16/2008 10:38	0.355		2.672	29.372	0.216
8/16/2008 10:38	0.376	.273	2.675	29.371	0.208
8/16/2008 10:38	0.398		2.679	29.373	0.199
8/16/2008 10:38	0.422		2.682	29.371	0.192
8/16/2008 10:38	0.447		2.686	29.368	0.183
8/16/2008 10:38	0.473		2.689	29.372	0.176
8/16/2008 10:38	0.501	.398	2.695	29.37	0.162
8/16/2008 10:38	0.531		2.694	29.371	0.164
8/16/2008 10:38	0.562		2.697	29.369	0.158
8/16/2008 10:38	0.596		2.699	29.368	0.154
8/16/2008 10:38	0.631	.528	2.701	29.37	0.147
8/16/2008 10:38	0.668		2.703	29.369	0.144
8/16/2008 10:38	0.708		2.705	29.368	0.139
8/16/2008 10:38	0.75	.647	2.707	29.369	0.134
8/16/2008 10:38	0.794		2.709	29.368	0.131
8/16/2008 10:38	0.841		2.71	29.368	0.127
8/16/2008 10:38	0.891		2.711	29.365	0.125
8/16/2008 10:38	0.944		2.714	29.367	0.119
8/16/2008 10:38	1	.897	2.715	29.367	0.117
8/16/2008 10:38	1.06		2.715	29.369	0.115
8/16/2008 10:39	1.12		2.717	29.368	0.112
8/16/2008 10:39	1.19		2.719	29.362	0.107
8/16/2008 10:39	1.26		2.719	29.367	0.108
8/16/2008 10:39	1.33		2.721	29.365	0.101
8/16/2008 10:39	1.41		2.723	29.367	0.098
8/16/2008 10:39	1.5	1.397	2.724	29.365	0.095
8/16/2008 10:39	1.58		2.725	29.366	0.092
8/16/2008 10:39	1.68		2.727	29.366	0.088
8/16/2008 10:39	1.78		2.728	29.365	0.085
8/16/2008 10:39	1.88		2.73	29.371	0.081
8/16/2008 10:39	1.99		2.73	29.369	0.081
8/16/2008 10:40	2.11		2.732	29.367	0.077
8/16/2008 10:40	2.24		2.733	29.368	0.075
8/16/2008 10:40	2.37		2.735	29.368	0.07
8/16/2008 10:40	2.51		2.736	29.368	0.068
8/16/2008 10:40	2.66		2.738	29.369	0.063
8/16/2008 10:40	2.82		2.739	29.371	0.061
8/16/2008 10:40	2.98		2.74	29.369	0.059
8/16/2008 10:41	3.16		2.742	29.372	0.054
8/16/2008 10:41	3.35		2.743	29.371	0.051
8/16/2008 10:41	3.55		2.744	29.371	0.049
8/16/2008 10:41	3.76		2.744	29.372	0.05
8/16/2008 10:41	3.98		2.746	29.373	0.045
8/16/2008 10:42	4.22		2.747	29.372	0.043

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	**PI027MW21**
Test No.:	**1**
Date:	**8/16/2008**
Geologist:	CONTI
Checked by / Date:	SURamer 6/28/11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.333
Screened / Monitored Interval Below Water Table, L (ft):	7.64
Static Water Level (Depth/ Elevation) (ft.):	7.26
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	0.83	0.00	-0.83	1.00	0.0000	0.00
	0.01	0.78	0.01	-0.78	0.94	-0.0621	-0.08
	0.02	0.68	0.02	-0.68	0.82	-0.1993	-0.15
	0.04	0.58	0.04	-0.58	0.70	-0.3584	-0.30
	0.06	0.49	0.06	-0.49	0.59	-0.5270	-0.45
	0.09	0.38	0.09	-0.38	0.46	-0.7813	-0.68
	0.14	0.30	0.14	-0.30	0.36	-1.0176	-1.05
x	0.21	0.26	0.00			0.0000	
x	0.32	0.22	0.00			0.0000	
x	0.44	0.20	0.00			0.0000	
x	0.69	0.17	0.00			0.0000	
x	0.94	0.15	0.00			0.0000	
x	1.44	0.12	0.00			0.0000	
x	2.05	0.10	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	7
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-7.514
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.034
Actual Y-intercept is set to 0.	0.000
T_0 (min):	0.133
K (ft/min):	1.07E-02
K (ft/day):	**15.394**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

T_0: Time at which ln(H/H0)=-1

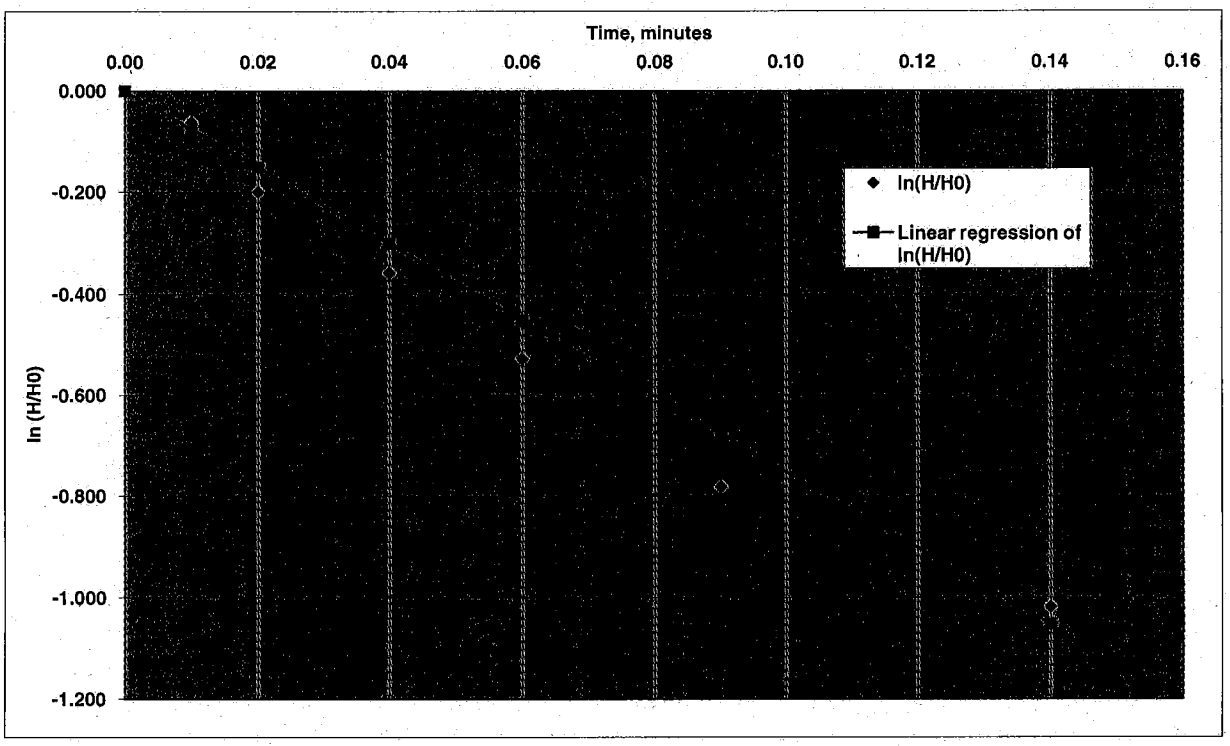
$K = r^2 * \ln(L/R)/(2LT_0)$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PROJECT NAME: MCRD PARRIS IS - SITE 27 WELL/BORING NO.: MW-21

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10 / 14.90 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 7.26' DATE: 8/16/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

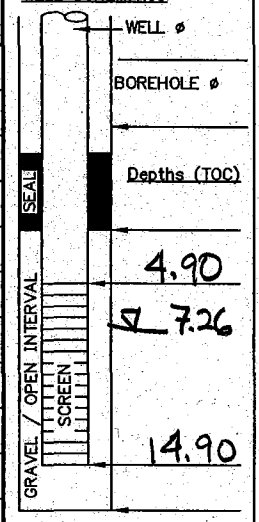
METHOD OF INDUCING WATER LEVEL CHANGE: 1 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

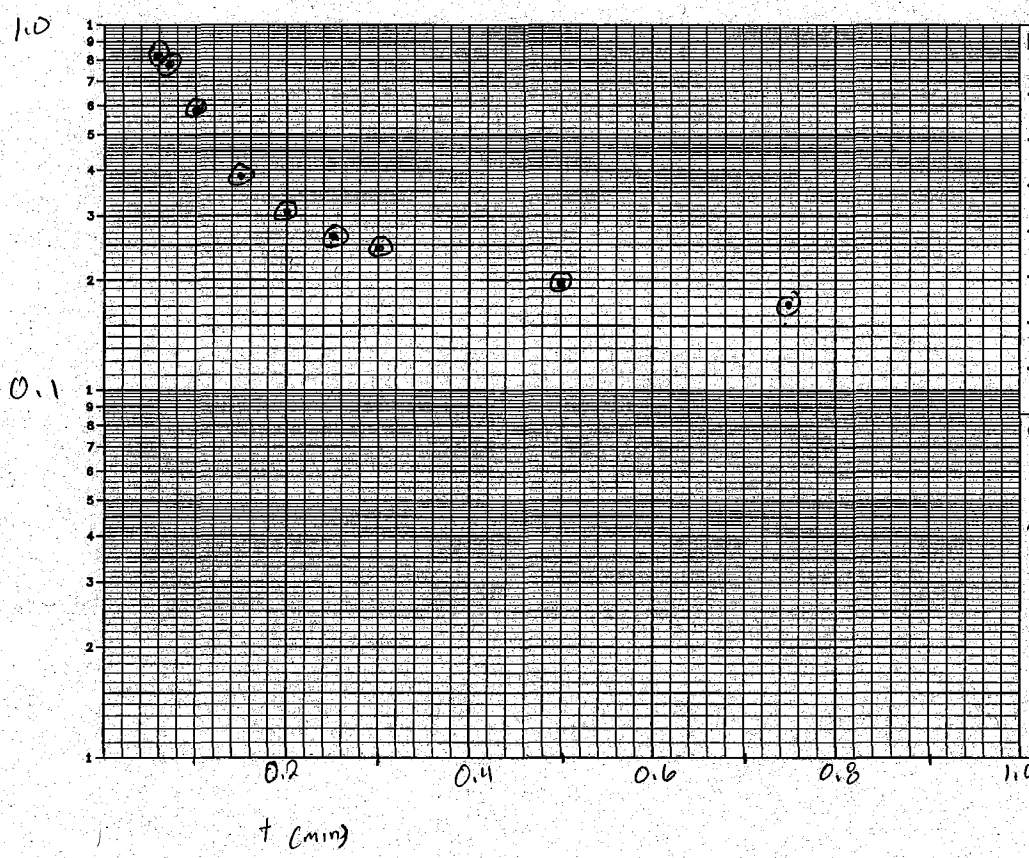
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

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)
.059		.826			
.071		.776			
.10		.583			
.15		.383			
.20		.304			
.25		.265			
.30		.245			
.50		.199			
.75		.171			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS, SKETCH MAPS, ETC.:

r = .083'
R = .333'
L = 7.64'

Report Date:	8/16/2008 12:08
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-21 2008-08-16 12-06-48.wsl
Create Date	8/16/2008 12:08

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-21
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/16/2008 11:56
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	3.17569 (PSI)
Head Pressure	3.17505 (PSI)
Temperature	24.8471 (C)
Depth of Probe	7.33108 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/16/2008 12:02	Manual Start Command
8/16/2008 12:06	User Note: "Downloading log - Used Batt: 4% Memory: 25% User: Stanley.Conti"
8/16/2008 12:07	Manual Stop Command

Log Data:
Record Count 94

Date and Time	Elapsed Time Minutes		Sensor: Pres 35ft SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/16/2008 12:02	0		3.203	22.975	-0.064
8/16/2008 12:02	0.004		3.204	22.993	-0.064
8/16/2008 12:02	0.008		3.203	23.008	-0.064
8/16/2008 12:02	0.013		3.206	23.076	-0.07
8/16/2008 12:02	0.02		3.204	23.061	-0.065
8/16/2008 12:02	0.024		3.204	23.059	-0.066
8/16/2008 12:02	0.028		3.204	23.062	-0.065
8/16/2008 12:02	0.031		3.204	23.035	-0.064
8/16/2008 12:02	0.04		3.204	23.046	-0.066
8/16/2008 12:02	0.043		3.199	23.053	-0.054
8/16/2008 12:02	0.047		2.821	23.055	0.818
8/16/2008 12:02	0.055		3.323	23.032	-0.339
8/16/2008 12:02	0.059	0	2.818	23.046	0.826
8/16/2008 12:02	0.063		2.876	23.051	0.693
8/16/2008 12:02	0.066		2.85	23.055	0.753
8/16/2008 12:02	0.071	.012	2.84	23.069	0.776
8/16/2008 12:02	0.075		2.845	23.074	0.763
8/16/2008 12:02	0.079		2.857	23.068	0.736
8/16/2008 12:02	0.082		2.87	23.071	0.706
8/16/2008 12:02	0.086	.023	2.881	23.071	0.68
8/16/2008 12:02	0.09		2.891	23.075	0.657
8/16/2008 12:02	0.093		2.901	23.075	0.634
8/16/2008 12:02	0.097		2.912	23.069	0.608
8/16/2008 12:02	0.101	.042	2.923	23.068	0.583
8/16/2008 12:02	0.106		2.935	23.066	0.557
8/16/2008 12:02	0.11		2.943	23.07	0.538
8/16/2008 12:02	0.114		2.95	23.069	0.522
8/16/2008 12:02	0.119	.06	2.963	23.064	0.49
8/16/2008 12:02	0.126		2.976	23.051	0.46
8/16/2008 12:02	0.133		2.988	23.043	0.433
8/16/2008 12:02	0.141		2.999	23.036	0.408
8/16/2008 12:02	0.15	.091	3.01	23.033	0.383
8/16/2008 12:02	0.158		3.018	23.031	0.363
8/16/2008 12:02	0.168		3.027	23.022	0.344
8/16/2008 12:02	0.178		3.034	23.028	0.327
8/16/2008 12:02	0.188		3.039	23.019	0.316
8/16/2008 12:02	0.199	.14	3.044	23.011	0.304
8/16/2008 12:02	0.211		3.049	23.007	0.293
8/16/2008 12:02	0.224		3.054	23.006	0.281
8/16/2008 12:02	0.237		3.058	23.003	0.272
8/16/2008 12:02	0.251	.207	3.061	23	0.265
8/16/2008 12:02	0.266		3.064	22.995	0.259

8/16/2008 12:02	0.282		3.067	22.993	0.252
8/16/2008 12:02	0.298		3.07	22.988	0.245
8/16/2008 12:02	0.316		3.073	22.988	0.238
8/16/2008 12:02	0.335		3.075	22.985	0.231
8/16/2008 12:02	0.355		3.078	22.984	0.226
8/16/2008 12:02	0.376	.317	3.08	22.98	0.222
8/16/2008 12:02	0.398		3.083	22.975	0.215
8/16/2008 12:02	0.422		3.085	22.973	0.21
8/16/2008 12:02	0.447		3.087	22.969	0.206
8/16/2008 12:02	0.473		3.088	22.964	0.203
8/16/2008 12:02	0.501	.442	3.089	22.961	0.199
8/16/2008 12:02	0.531		3.092	22.961	0.193
8/16/2008 12:02	0.562		3.093	22.959	0.19
8/16/2008 12:02	0.596		3.095	22.954	0.187
8/16/2008 12:02	0.631		3.097	22.949	0.182
8/16/2008 12:02	0.668		3.099	22.946	0.178
8/16/2008 12:02	0.708		3.1	22.941	0.175
8/16/2008 12:03	0.75	.691	3.102	22.937	0.171
8/16/2008 12:03	0.794		3.103	22.932	0.169
8/16/2008 12:03	0.841		3.105	22.931	0.163
8/16/2008 12:03	0.891		3.107	22.924	0.159
8/16/2008 12:03	0.944		3.108	22.916	0.157
8/16/2008 12:03	1	.941	3.11	22.914	0.151
8/16/2008 12:03	1.06		3.111	22.907	0.149
8/16/2008 12:03	1.12		3.112	22.903	0.146
8/16/2008 12:03	1.19		3.115	22.898	0.14
8/16/2008 12:03	1.26		3.116	22.892	0.137
8/16/2008 12:03	1.33		3.118	22.886	0.133
8/16/2008 12:03	1.41		3.119	22.884	0.13
8/16/2008 12:03	1.5	1.441	3.122	22.875	0.124
8/16/2008 12:03	1.58		3.123	22.868	0.121
8/16/2008 12:03	1.68		3.125	22.861	0.117
8/16/2008 12:04	1.78		3.127	22.856	0.112
8/16/2008 12:04	1.88		3.129	22.85	0.109
8/16/2008 12:04	1.99		3.13	22.841	0.106
8/16/2008 12:04	2.11	2.051	3.132	22.833	0.1
8/16/2008 12:04	2.24		3.134	22.826	0.097
8/16/2008 12:04	2.37		3.135	22.82	0.094
8/16/2008 12:04	2.51		3.138	22.812	0.087
8/16/2008 12:04	2.66		3.139	22.802	0.084
8/16/2008 12:05	2.82		3.139	22.797	0.084
8/16/2008 12:05	2.98		3.143	22.791	0.076
8/16/2008 12:05	3.16		3.144	22.781	0.072
8/16/2008 12:05	3.35		3.146	22.776	0.069
8/16/2008 12:05	3.55		3.147	22.768	0.066
8/16/2008 12:06	3.76		3.149	22.758	0.061
8/16/2008 12:06	3.98		3.151	22.751	0.057
8/16/2008 12:06	4.22		3.152	22.744	0.055
8/16/2008 12:06	4.47		3.154	22.738	0.05
8/16/2008 12:06	4.73		3.155	22.727	0.048
8/16/2008 12:07	5.01		3.158	22.722	0.042
8/16/2008 12:07	5.31		3.158	22.718	0.042

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	**PAI-27-MW48I**
Test No.:	**1**
Date:	**8/15/2008**
Geologist:	CONTI
Checked by / Date:	SLY Ramer 6/28/11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.177
Screened / Monitored Interval Below Water Table, L (ft):	5
Static Water Level (Depth/ Elevation) (ft.):	2.52
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	1.93	0.00	-1.93	1.00	0.0000	0.00
	0.07	1.74	0.07	-1.74	0.90	-0.1036	-0.01
	0.17	1.68	0.17	-1.68	0.87	-0.1387	-0.03
	0.42	1.58	0.42	-1.58	0.82	-0.2001	-0.07
	0.92	1.44	0.92	-1.44	0.75	-0.2929	-0.16
	2.03	1.16	2.03	-1.16	0.60	-0.5091	-0.35
	4.14	0.81	4.14	-0.81	0.42	-0.8682	-0.71
	5.54	0.64	5.54	-0.64	0.33	-1.1038	-0.95
	7.42	0.48	7.42	-0.48	0.25	-1.3915	-1.27
	9.92	0.34	9.92	-0.34	0.18	-1.7363	-1.69
x	14.92	0.19	0.00			0.0000	
x	21.02	0.13	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	10
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-0.171
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.111
Actual Y-intercept is set to 0.	0.000
T_0 (min):	5.854
K (ft/min):	3.96E-04
K (ft/day):	**0.570**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

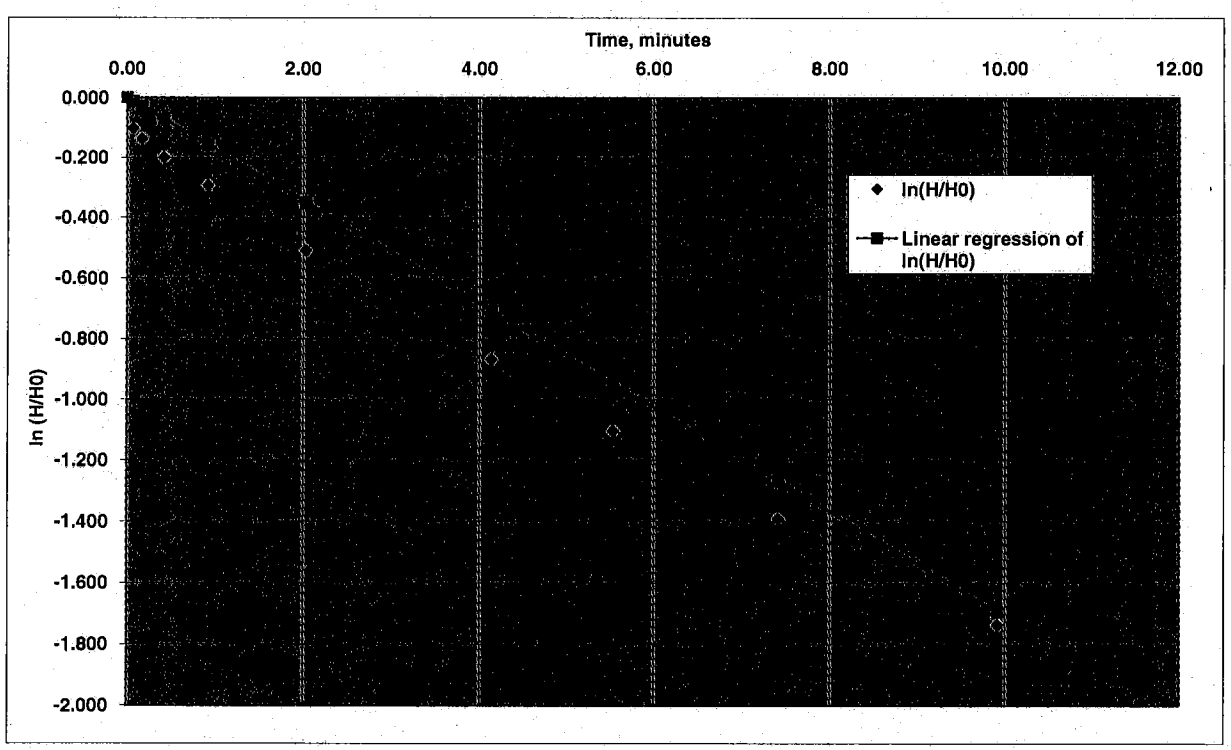
T_0: Time at which ln(H/H0)=-1

$K = r^2 * \ln(L/R)/(2LT_0)$

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



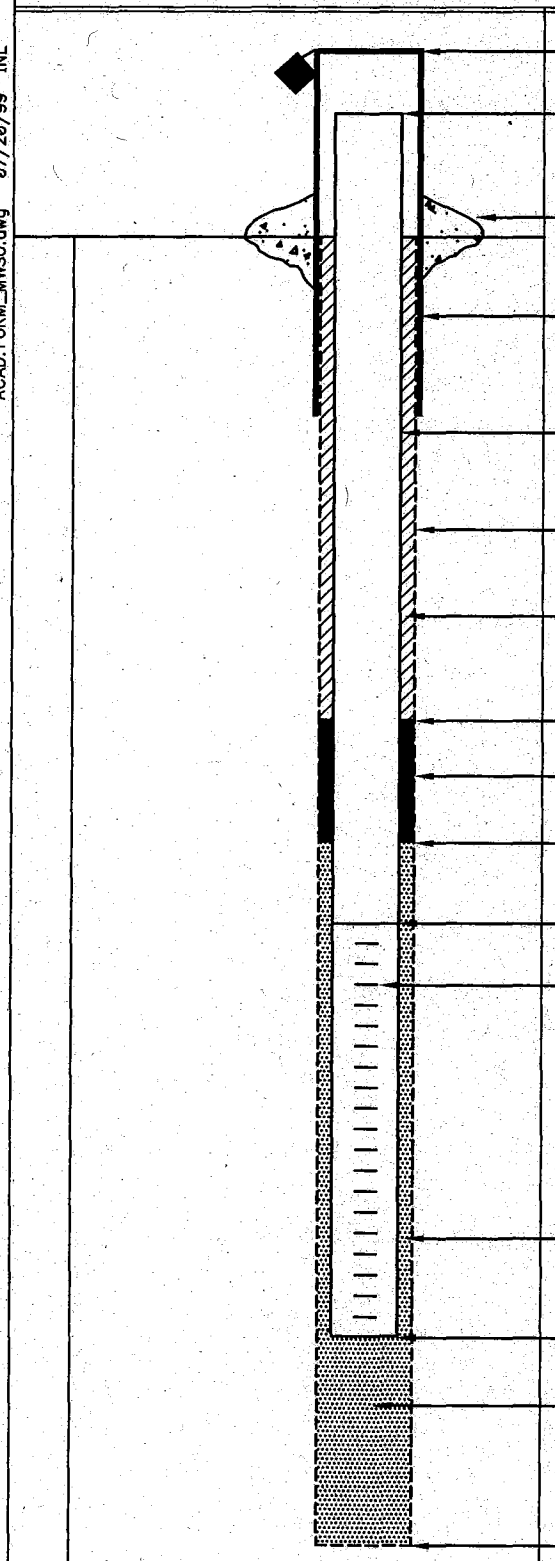
1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

WELL NO.: PAI - 27 MW48I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT: PARRIS ISLAND SITE 27	LOCATION: MW48I	DRILLER: CORDY CAMWELL
PROJECT NO.: 600455	BORING:	DRILLING METHOD: DPT
DATE BEGUN: 8/6/08	DATE COMPLETED: 8/9/08	DEVELOPMENT METHOD: PERISTALTIC
FIELD GEOLOGIST: CHARLIE WARNOCK		
GROUND ELEVATION: 15.23	DATUM:	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: — / —

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 14.98 / —

TYPE OF SURFACE SEAL: CONCRETE

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 4 1/4"

TYPE OF BACKFILL: GROUT

ELEVATION/DEPTH TOP OF SEAL: -1.27 / 16.5

TYPE OF SEAL: BENTONITE

DEPTH TOP OF SAND PACK: -3.27 18.5

ELEVATION/DEPTH TOP OF SCREEN: -4.27 / 19.5'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 5'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #1 SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: -9.27 / 24.5'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -9.77 / 25.0'

BACKFILL MATERIAL BELOW SAND: NO

ELEVATION/DEPTH OF HOLE: -9.77 / 25.0'

ACAD:FORM_MWSU.dwg 07/20/99 INL

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PAI-27

PROJECT NAME: MCRD PARRIS IS- SITE 27 WELL/BORING NO.: MW-48I

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 5 / 25.10 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 8.45' DATE: 8/15/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

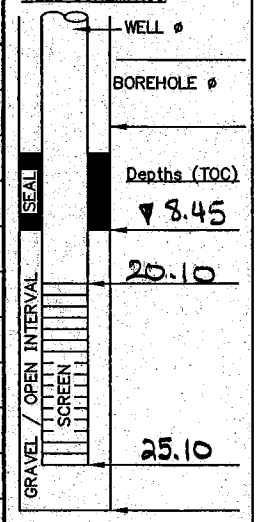
METHOD OF INDUCING WATER LEVEL CHANGE: 2 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

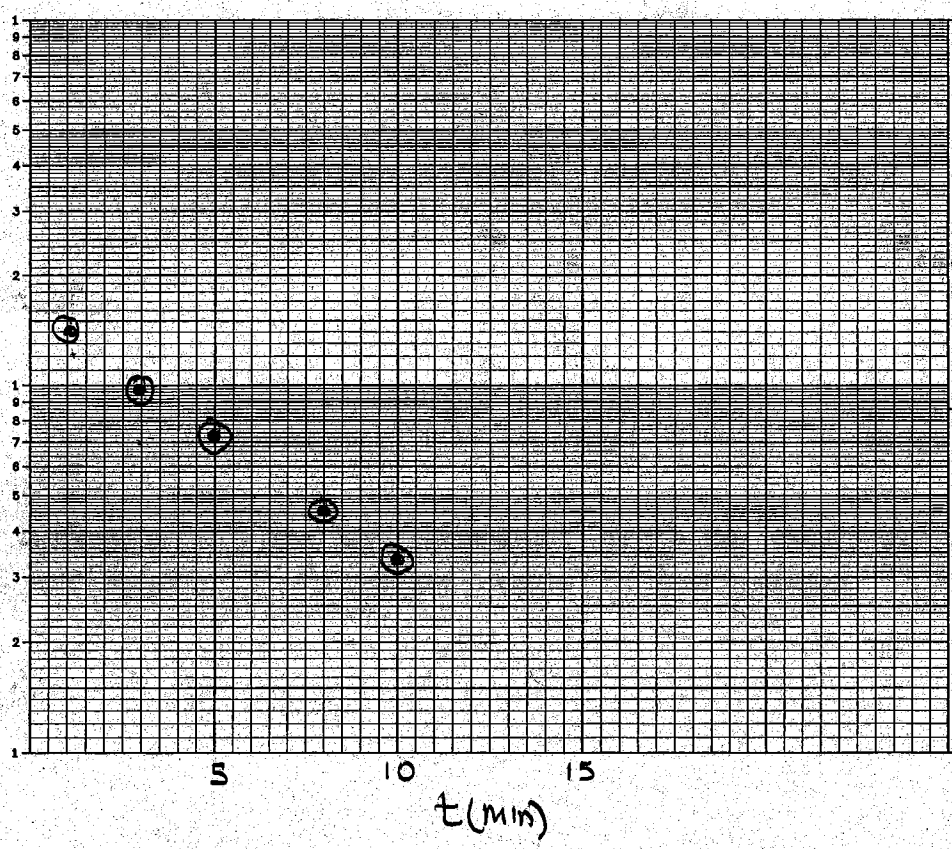
ACAD: FORM_HYDCONTST.dwg 07/06/99 INL

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)
.071		1.881			
.1		1.794			
1		1.435			
3		.994			
5		.711			
8		.452			
10		.339			
15		.193			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS, SKETCH MAPS, ETC.:

r = .083'
R = .177
L = 5'

Report Date:	8/15/2008 13:23
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-48I 2008-08-15 13-03-36.wsl
Create Date	8/15/2008 13:23

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-48I
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/15/2008 12:46
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	6.76378 (PSI)
Head Pressure	6.76475 (PSI)
Temperature	25.0308 (C)
Depth of Probe	15.6196 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/15/2008 13:02	Manual Start Command
8/15/2008 13:03	User Note: "Downloading log - Used Batt: 4% Memory: 7% User: Stanley.Conti"
8/15/2008 13:05	User Note: "Downloading log - Used Batt: 4% Memory: 7% User: Stanley.Conti"

8/15/2008 13:22 User Note: "Downloading log - Used Batt: 4% Memory: 7% User: Stanley.Conti"
8/15/2008 13:23 Manual Stop Command

Log Data:
Record Count 118

Date and Time	Elapsed Time Minutes		Sensor: Pres 35ft SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/15/2008 13:02	0		6.808	22.918	-0.103
8/15/2008 13:02	0.004		6.808	22.942	-0.103
8/15/2008 13:02	0.008		6.81	22.953	-0.106
8/15/2008 13:02	0.013		6.813	23.02	-0.114
8/15/2008 13:02	0.02		6.811	23.008	-0.108
8/15/2008 13:02	0.024		6.81	23.008	-0.107
8/15/2008 13:02	0.027		6.809	23.009	-0.105
8/15/2008 13:02	0.031		6.811	23.006	-0.109
8/15/2008 13:02	0.035		6.808	23.007	-0.101
8/15/2008 13:02	0.039		6.807	23.012	-0.1
8/15/2008 13:02	0.043		6.807	23.016	-0.101
8/15/2008 13:02	0.046		6.808	23.015	-0.102
8/15/2008 13:02	0.05		6.807	23.017	-0.099
8/15/2008 13:02	0.054		6.397	23.017	0.846
8/15/2008 13:02	0.058		6.123	23.012	1.48
8/15/2008 13:02	0.063		6.664	23.014	0.23
8/15/2008 13:02	0.067		6.548	23.016	0.497
8/15/2008 13:02	0.071		5.949	23.018	1.881
8/15/2008 13:02	0.075		6.057	23.017	1.632
8/15/2008 13:02	0.079	0	5.928	23.019	1.929
8/15/2008 13:02	0.083		5.981	23.018	1.809
8/15/2008 13:02	0.087		5.976	23.018	1.82
8/15/2008 13:02	0.092		5.982	23.019	1.806
8/15/2008 13:02	0.096		5.987	23.023	1.793
8/15/2008 13:02	0.1		5.987	23.022	1.794
8/15/2008 13:02	0.106		5.991	23.012	1.784
8/15/2008 13:02	0.112		5.996	23.007	1.773
8/15/2008 13:02	0.119		5.998	23.002	1.769
8/15/2008 13:02	0.126		6.002	22.997	1.76
8/15/2008 13:02	0.133		6.004	22.996	1.754
8/15/2008 13:02	0.141		6.008	22.992	1.745
8/15/2008 13:02	0.15	.071	6.01	22.986	1.74
8/15/2008 13:02	0.158		6.013	22.986	1.734
8/15/2008 13:02	0.168		6.015	22.983	1.729
8/15/2008 13:02	0.178		6.019	22.979	1.72
8/15/2008 13:02	0.188		6.021	22.978	1.714
8/15/2008 13:02	0.199		6.024	22.972	1.708
8/15/2008 13:02	0.211		6.027	22.971	1.701
8/15/2008 13:02	0.224		6.03	22.97	1.693
8/15/2008 13:02	0.237		6.033	22.969	1.688

8/15/2008 13:02	0.251	.172	6.036	22.967	1.68
8/15/2008 13:02	0.266		6.039	22.964	1.674
8/15/2008 13:02	0.282		6.043	22.963	1.665
8/15/2008 13:02	0.298		6.045	22.96	1.659
8/15/2008 13:02	0.316		6.049	22.961	1.651
8/15/2008 13:02	0.335		6.051	22.956	1.645
8/15/2008 13:02	0.355		6.056	22.956	1.635
8/15/2008 13:02	0.376		6.06	22.956	1.626
8/15/2008 13:02	0.398		6.063	22.954	1.618
8/15/2008 13:02	0.422		6.066	22.953	1.611
8/15/2008 13:02	0.447		6.069	22.952	1.603
8/15/2008 13:02	0.473		6.072	22.95	1.597
8/15/2008 13:02	0.501	.422	6.078	22.951	1.582
8/15/2008 13:02	0.531		6.083	22.951	1.573
8/15/2008 13:02	0.562		6.087	22.949	1.564
8/15/2008 13:02	0.596		6.091	22.947	1.553
8/15/2008 13:02	0.631		6.096	22.945	1.542
8/15/2008 13:02	0.668		6.101	22.941	1.531
8/15/2008 13:02	0.708		6.105	22.942	1.52
8/15/2008 13:02	0.75		6.111	22.942	1.507
8/15/2008 13:02	0.794		6.117	22.939	1.493
8/15/2008 13:02	0.841		6.123	22.937	1.48
8/15/2008 13:02	0.891		6.129	22.938	1.465
8/15/2008 13:03	0.944		6.136	22.934	1.45
8/15/2008 13:03	1	.921	6.143	22.933	1.435
8/15/2008 13:03	1.06		6.15	22.935	1.418
8/15/2008 13:03	1.12		6.157	22.932	1.402
8/15/2008 13:03	1.19		6.166	22.929	1.381
8/15/2008 13:03	1.26		6.173	22.926	1.364
8/15/2008 13:03	1.33		6.181	22.926	1.346
8/15/2008 13:03	1.41		6.189	22.921	1.327
8/15/2008 13:03	1.5		6.2	22.924	1.302
8/15/2008 13:03	1.58		6.207	22.919	1.285
8/15/2008 13:03	1.68		6.217	22.918	1.262
8/15/2008 13:03	1.78		6.227	22.917	1.239
8/15/2008 13:03	1.88		6.238	22.915	1.214
8/15/2008 13:04	1.99		6.248	22.912	1.191
8/15/2008 13:04	2.11	2.031	6.26	22.912	1.163
8/15/2008 13:04	2.24		6.271	22.909	1.138
8/15/2008 13:04	2.37		6.282	22.907	1.112
8/15/2008 13:04	2.51		6.295	22.905	1.083
8/15/2008 13:04	2.66		6.307	22.9	1.056
8/15/2008 13:04	2.82		6.32	22.903	1.025
8/15/2008 13:05	2.98		6.333	22.898	0.994
8/15/2008 13:05	3.16		6.345	22.898	0.966
8/15/2008 13:05	3.35		6.359	22.896	0.935
8/15/2008 13:05	3.55		6.371	22.893	0.907
8/15/2008 13:05	3.76		6.385	22.891	0.875
8/15/2008 13:06	3.98		6.399	22.893	0.842
8/15/2008 13:06	4.22	4.141	6.413	22.893	0.81
8/15/2008 13:06	4.47		6.428	22.892	0.775
8/15/2008 13:06	4.73		6.441	22.892	0.746

8/15/2008 13:07	5.01		6.456	22.89	0.711
8/15/2008 13:07	5.31		6.471	22.889	0.676
8/15/2008 13:07	5.62	5.541	6.485	22.888	0.644
8/15/2008 13:08	5.96		6.5	22.891	0.609
8/15/2008 13:08	6.31		6.514	22.889	0.576
8/15/2008 13:08	6.68		6.526	22.888	0.549
8/15/2008 13:09	7.08		6.542	22.89	0.513
8/15/2008 13:09	7.5	7.421	6.555	22.89	0.481
8/15/2008 13:10	7.94		6.568	22.89	0.452
8/15/2008 13:10	8.41		6.581	22.891	0.423
8/15/2008 13:10	8.91		6.593	22.888	0.394
8/15/2008 13:11	9.44		6.606	22.887	0.365
8/15/2008 13:12	10	9.921	6.617	22.89	0.339
8/15/2008 13:12	10.6		6.629	22.892	0.312
8/15/2008 13:13	11.2		6.638	22.894	0.29
8/15/2008 13:13	11.9		6.649	22.892	0.264
8/15/2008 13:14	12.6		6.657	22.893	0.246
8/15/2008 13:15	13.3		6.665	22.893	0.227
8/15/2008 13:16	14.1		6.674	22.894	0.208
8/15/2008 13:17	15	14.921	6.68	22.9	0.193
8/15/2008 13:17	15.8		6.686	22.899	0.178
8/15/2008 13:18	16.8		6.693	22.904	0.164
8/15/2008 13:19	17.8		6.697	22.907	0.154
8/15/2008 13:20	18.8		6.702	22.906	0.143
8/15/2008 13:21	19.9		6.706	22.91	0.133
8/15/2008 13:23	21.1	21.021	6.708	22.911	0.128

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	PAI-27-MW49S
Test No.:	1
Date:	8/16/2008
Geologist:	CONTI
Checked by / Date:	FCWRamer 6-28-11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.177
Screened / Monitored Interval Below Water Table, L (ft):	5.82
Static Water Level (Depth/ Elevation) (ft.):	6.88
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of $\ln(H/H0)$ (b=0)
	0.00	0.81	0.00	0.81	1.00	0.0000	0.00
	0.01	0.72	0.01	0.72	0.89	-0.1129	-0.11
	0.02	0.62	0.02	0.62	0.77	-0.2624	-0.22
	0.03	0.53	0.03	0.53	0.66	-0.4192	-0.34
	0.06	0.38	0.06	0.38	0.47	-0.7519	-0.67
	0.09	0.29	0.09	0.29	0.36	-1.0222	-1.01
	0.10	0.25	0.10	0.26	0.32	-1.1314	-1.12
x	0.15	0.21	0.00			0.0000	
x	0.20	0.18	0.00			0.0000	
x	0.27	0.16	0.00			0.0000	
x	0.36	0.15	0.00			0.0000	
x	0.44	0.14	0.00			0.0000	
x	0.69	0.11	0.00			0.0000	
x	0.94	0.09	0.00			0.0000	
x	1.44	0.07	0.00			0.0000	
x	2.05	0.06	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	7
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-11.242
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.031
Actual Y-intercept is set to 0.	0.000
T_0 (min):	0.089
K (ft/min):	2.34E-02
K (ft/day):	**33.707**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum\left(x^2\right)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

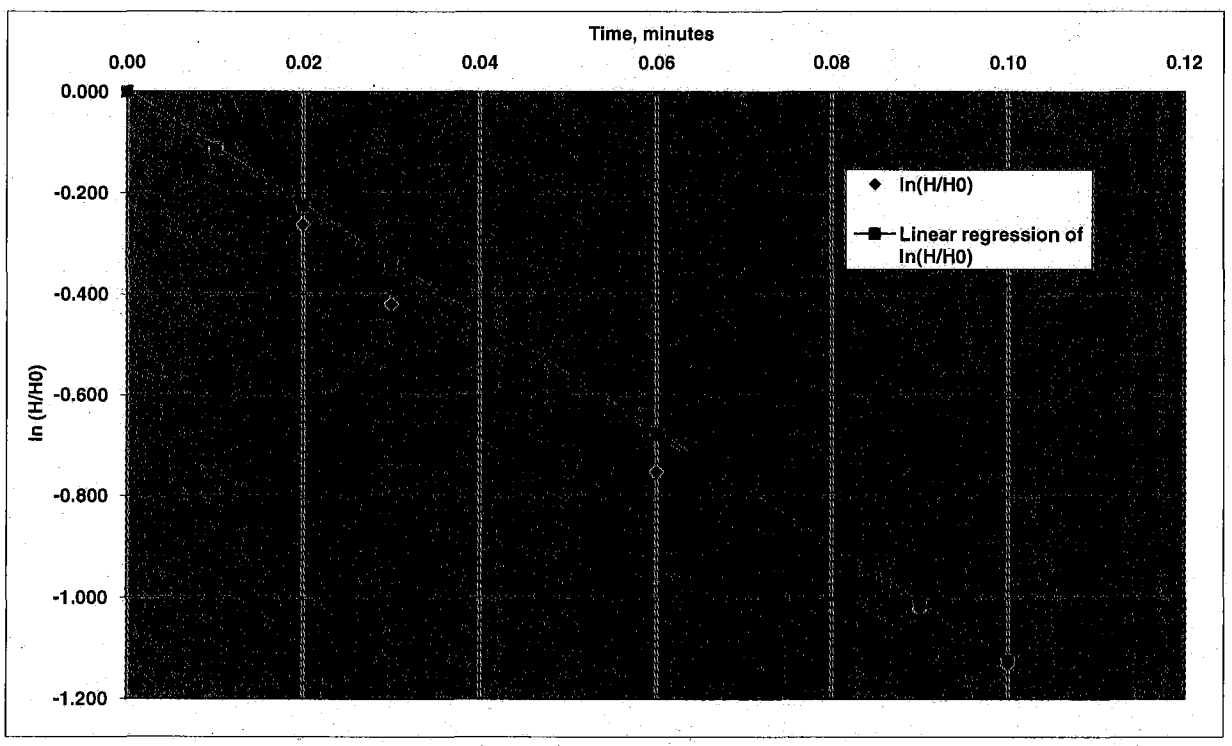
T_0: Time at which ln(H/H0)=-1

$K = r^2 * \ln(L/R)/(2LT_0)$

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



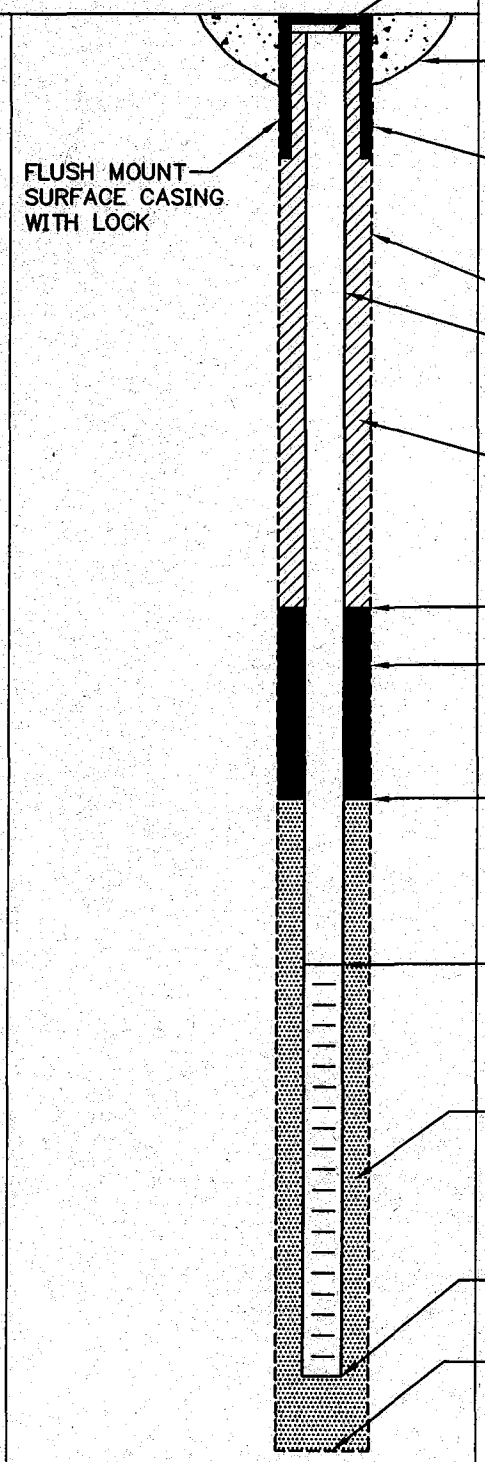
1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

WELL NO.: PA1-27MW49S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT PARRIS ISLAND SITE 27	LOCATION MW49S	DRILLER LOREY GANWELL
PROJECT NO. C00455	BORING /	DRILLING METHOD DPT
DATE BEGUN 8/8/08	DATE COMPLETED 8/8/08	
FIELD GEOLOGIST CHARLIE WARLIND		DEVELOPMENT METHOD PERISTALTIC
GROUND ELEVATION 13.49	DATUM	



ELEVATION TOP OF RISER: 13.24

TYPE OF SURFACE SEAL: CONCRETE

TYPE OF PROTECTIVE CASING:

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: GROUT

ELEVATION/DEPTH TOP OF SEAL: 11.49 / 2.0

TYPE OF SEAL: BENTONITE

ELEVATION/DEPTH TOP OF SAND: 10.99 / 2.5'

ELEVATION/DEPTH TOP OF SCREEN: 10.49 / 3.0'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 10'

TYPE OF SAND PACK: # 2 SAND

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: 0.49 / 13'

ELEVATION / DEPTH BOTTOM OF SAND: -0.01 / 13.5'

ELEVATION/DEPTH BOTTOM OF HOLE: -0.01 / 13.5'

BACKFILL MATERIAL BELOW SAND: NA

ACAD: FORM_MWFM.dwg 07/20/99 INL

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PAI-27-

PROJECT NAME: MCRD PARRIS IS- SITE 27 WELL/BORING NO.: MW 49S

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2"ϕ SCREEN LENGTH/DEPTH: 10' / 12.70 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 6.88 DATE: 8/18/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

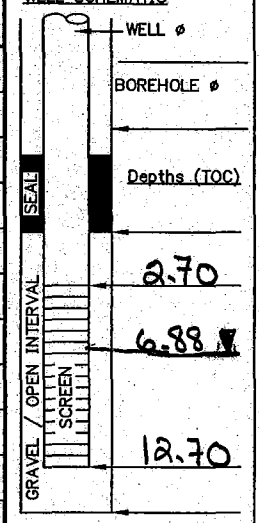
METHOD OF INDUCING WATER LEVEL CHANGE: 1 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

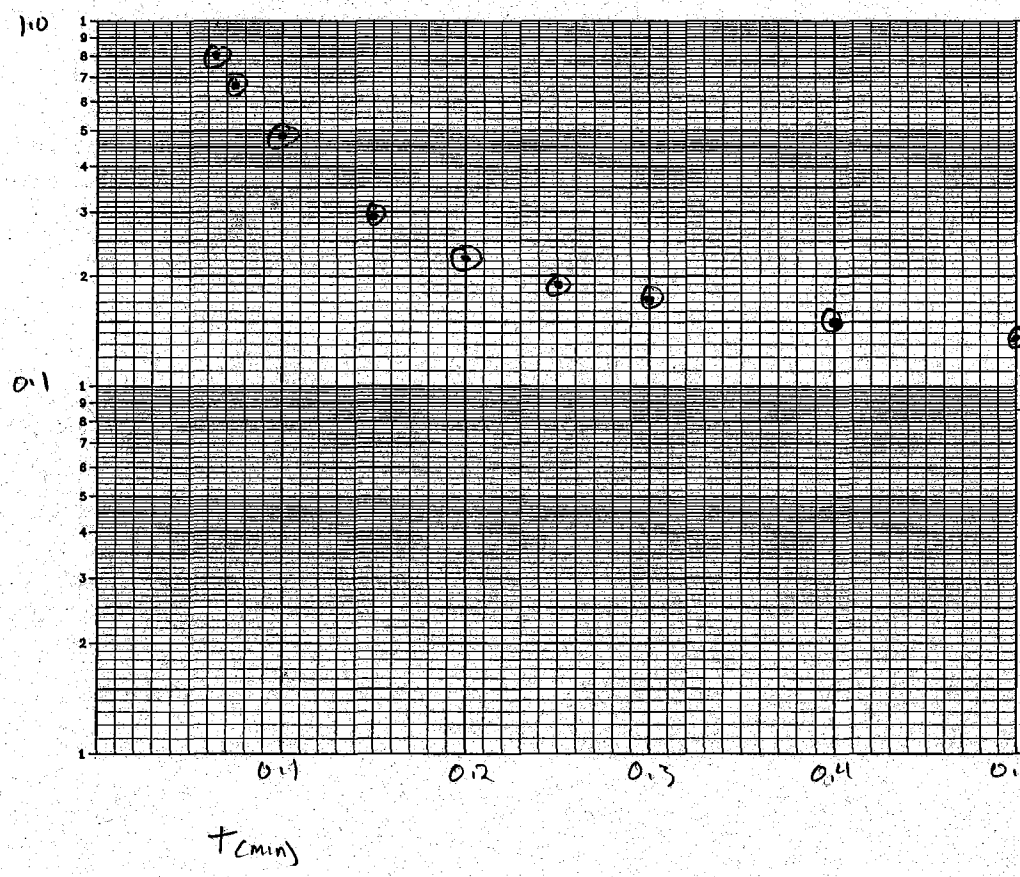
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

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)
.064		.806			
.076		.664			
.10		.481			
.15		.291			
.20		.224			
.25		.190			
.30		.171			
.40		.150			
.50		.135			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG ϕ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS, SKETCH MAPS, ETC.:

r = .083'
R = .177'
L = 5.82'

Report Date:	8/16/2008 9:29
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-49S 2008-08-16 09-27-10.wsl
Create Date	8/16/2008 9:28

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-49S
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/16/2008 9:18
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	2.29682 (PSI)
Head Pressure	2.29751 (PSI)
Temperature	28.5837 (C)
Depth of Probe	5.30487 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/16/2008 9:25	Manual Start Command
8/16/2008 9:27	User Note: "Downloading log - Used Batt: 4% Memory: 17% User: Stanley.Conti"
8/16/2008 9:28	Manual Stop Command

Log Data:
Record Count 83

Date and Time	Elapsed Time Minutes		Sensor: Pres 35 SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/16/2008 9:25	0		2.301	28.894	-0.01
8/16/2008 9:25	0.004		2.302	28.914	-0.012
8/16/2008 9:25	0.008		2.302	28.928	-0.013
8/16/2008 9:25	0.013		2.302	28.938	-0.012
8/16/2008 9:25	0.017		2.301	28.948	-0.011
8/16/2008 9:25	0.021		2.301	28.95	-0.01
8/16/2008 9:25	0.029		2.302	28.943	-0.011
8/16/2008 9:25	0.032		2.301	28.955	-0.011
8/16/2008 9:25	0.036		2.301	28.963	-0.009
8/16/2008 9:25	0.04		2.301	28.969	-0.01
8/16/2008 9:25	0.048		2.348	28.952	-0.118
8/16/2008 9:25	0.052		2.119	28.966	0.41
8/16/2008 9:25	0.055		1.765	28.97	1.228
8/16/2008 9:25	0.059		2.136	28.991	0.372
8/16/2008 9:25	0.064	0	1.948	28.99	0.806
8/16/2008 9:25	0.068		1.962	28.989	0.772
8/16/2008 9:25	0.071	.007	1.986	28.99	0.717
8/16/2008 9:25	0.076		2.009	28.993	0.664
8/16/2008 9:25	0.08	.016	2.027	28.987	0.624
8/16/2008 9:25	0.084		2.038	28.993	0.597
8/16/2008 9:25	0.088		2.055	28.999	0.559
8/16/2008 9:25	0.091	.027	2.066	28.998	0.532
8/16/2008 9:25	0.095		2.074	29.004	0.515
8/16/2008 9:25	0.099		2.089	29.002	0.481
8/16/2008 9:25	0.102	.038	2.097	29.003	0.46
8/16/2008 9:25	0.106		2.107	29.005	0.438
8/16/2008 9:25	0.112		2.119	28.991	0.41
8/16/2008 9:25	0.119	.055	2.133	28.982	0.379
8/16/2008 9:25	0.126		2.143	28.974	0.354
8/16/2008 9:25	0.133		2.152	28.973	0.333
8/16/2008 9:25	0.141		2.161	28.97	0.313
8/16/2008 9:25	0.15	.086	2.171	28.96	0.291
8/16/2008 9:25	0.158		2.177	28.958	0.276
8/16/2008 9:25	0.168	.104	2.184	28.957	0.261
8/16/2008 9:25	0.178		2.189	28.954	0.248
8/16/2008 9:25	0.188		2.196	28.953	0.233
8/16/2008 9:25	0.199		2.2	28.951	0.224
8/16/2008 9:25	0.211	.147	2.204	28.948	0.214
8/16/2008 9:25	0.224		2.209	28.946	0.203
8/16/2008 9:25	0.237		2.212	28.942	0.196
8/16/2008 9:25	0.251		2.215	28.941	0.19
8/16/2008 9:25	0.266	.202	2.218	28.938	0.183

8/16/2008 9:25	0.282		2.22	28.94	0.178
8/16/2008 9:25	0.298		2.223	28.941	0.171
8/16/2008 9:25	0.316		2.224	28.936	0.168
8/16/2008 9:25	0.335	.271	2.226	28.936	0.164
8/16/2008 9:25	0.355		2.228	28.936	0.158
8/16/2008 9:25	0.376		2.23	28.933	0.155
8/16/2008 9:25	0.398		2.232	28.932	0.15
8/16/2008 9:25	0.422	.358	2.234	28.932	0.145
8/16/2008 9:25	0.447		2.235	28.932	0.143
8/16/2008 9:25	0.473		2.237	28.93	0.138
8/16/2008 9:25	0.501	.437	2.238	28.929	0.135
8/16/2008 9:25	0.531		2.241	28.928	0.13
8/16/2008 9:25	0.562		2.242	28.928	0.127
8/16/2008 9:26	0.596		2.243	28.929	0.123
8/16/2008 9:26	0.631	.567	2.245	28.923	0.12
8/16/2008 9:26	0.668		2.246	28.924	0.117
8/16/2008 9:26	0.708		2.248	28.924	0.112
8/16/2008 9:26	0.75	.686	2.249	28.929	0.11
8/16/2008 9:26	0.794		2.251	28.923	0.106
8/16/2008 9:26	0.841		2.253	28.925	0.102
8/16/2008 9:26	0.891		2.254	28.925	0.099
8/16/2008 9:26	0.944		2.256	28.926	0.095
8/16/2008 9:26	1	.936	2.257	28.924	0.091
8/16/2008 9:26	1.06		2.258	28.927	0.089
8/16/2008 9:26	1.12		2.26	28.927	0.086
8/16/2008 9:26	1.19		2.263	28.923	0.079
8/16/2008 9:26	1.26		2.263	28.927	0.079
8/16/2008 9:26	1.33		2.264	28.926	0.076
8/16/2008 9:26	1.41		2.265	28.929	0.074
8/16/2008 9:26	1.5		2.268	28.927	0.068
8/16/2008 9:27	1.58	1.436	2.268	28.93	0.067
8/16/2008 9:27	1.68		2.271	28.928	0.06
8/16/2008 9:27	1.78		2.27	28.934	0.062
8/16/2008 9:27	1.88		2.272	28.935	0.057
8/16/2008 9:27	1.99		2.273	28.935	0.054
8/16/2008 9:27	2.11	2.046	2.274	28.934	0.052
8/16/2008 9:27	2.24		2.276	28.936	0.048
8/16/2008 9:27	2.37		2.277	28.935	0.046
8/16/2008 9:27	2.51		2.277	28.939	0.045
8/16/2008 9:28	2.66		2.28	28.935	0.039
8/16/2008 9:28	2.82		2.281	28.938	0.036

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	PAI-27-MW50I
Test No.:	1
Date:	8/16/2008
Geologist:	CONTI
Checked by / Date:	JCWRanner 6-28-11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.177
Screened / Monitored Interval Below Water Table, L (ft):	5
Static Water Level (Depth/ Elevation) (ft.):	6.95
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of $\ln(H/H0)$ (b=0)
	0.00	2.01	0.00	2.01	1.00	0.0000	0.00
	0.04	1.79	0.04	1.79	0.89	-0.1149	-0.74
	0.15	1.67	0.15	1.67	0.83	-0.1843	-0.35
	0.49	1.50	0.49	1.50	0.75	-0.2917	-0.21
	0.93	1.35	0.93	1.35	0.67	-0.3970	-0.21
	2.04	1.05	2.04	1.05	0.52	-0.6483	-0.27
	3.48	0.78	3.48	0.78	0.39	-0.9456	-0.30
	4.94	0.60	4.94	0.60	0.30	-1.2040	-1.13
x	7.43	0.42	0.00			0.0000	
x	9.93	0.32	0.00			0.0000	
x	14.93	0.23	0.00			0.0000	
x	19.73	0.20	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	8
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-0.229
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.128
Actual Y-intercept is set to 0.	0.000
T_0 (min):	4.364
K (ft/min):	5.31E-04
K (ft/day):	**0.765**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

T_0: Time at which ln(H/H0)=-1

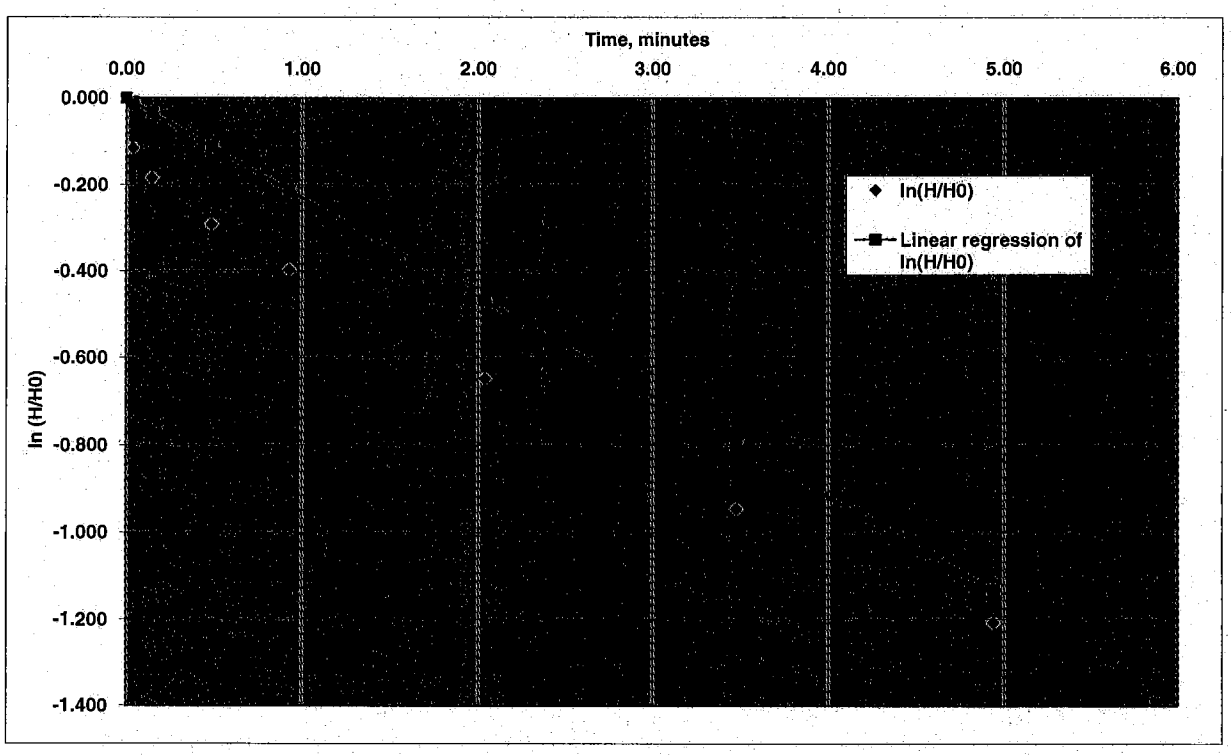
$K = r^2 * \ln(L/R)/(2LT_0)$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



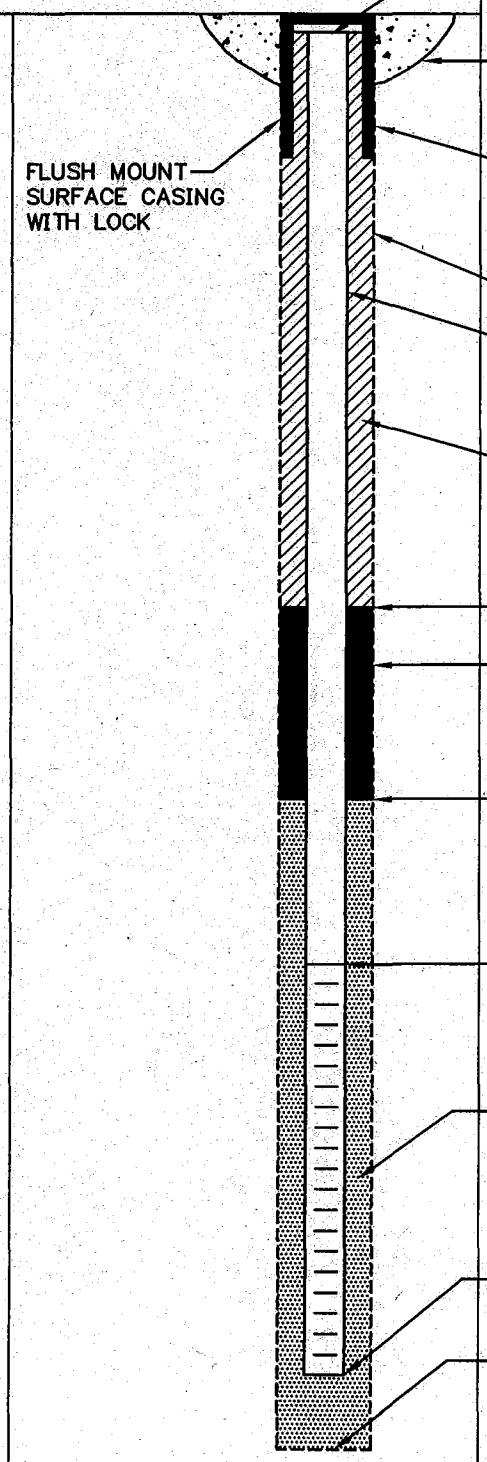
1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

WELL NO.: PAI-27MW50I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT: PARRIS ISLAND SITE 27	LOCATION: MW 50I	DRILLER: COREY CAMWOOD
PROJECT NO.: 600455	BORING:	DRILLING METHOD: DPT
DATE BEGUN: 8/6/08	DATE COMPLETED: 8/8/08	
FIELD GEOLOGIST: CHARLIE WARNER		DEVELOPMENT METHOD: PERISTALTIC
GROUND ELEVATION: 13.46	DATUM:	



ELEVATION TOP OF RISER: 13.23

TYPE OF SURFACE SEAL: CONCRETE

TYPE OF PROTECTIVE CASING:

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: GROUT

ELEVATION/DEPTH TOP OF SEAL: -2.54 / 16'

TYPE OF SEAL: BENTONITE

ELEVATION/DEPTH TOP OF SAND: -4.54 / 18'

ELEVATION/DEPTH TOP OF SCREEN: -5.54 / 19'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 5'

TYPE OF SAND PACK: #1 SAND

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: -10.54 / 24'

ELEVATION / DEPTH BOTTOM OF SAND: -11.04 / 24.5'

ELEVATION/DEPTH BOTTOM OF HOLE: -11.04 / 24.5'

BACKFILL MATERIAL BELOW SAND: NA

ACAD: FORM_MWFM.dwg 07/28/99 INL

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PAI-27-

PROJECT NAME: MCRD PARRIS IS- SITE 27 WELL/BORING NO.: MW-50I

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 5' / 24.1 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 6.95 DATE: 8/16/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

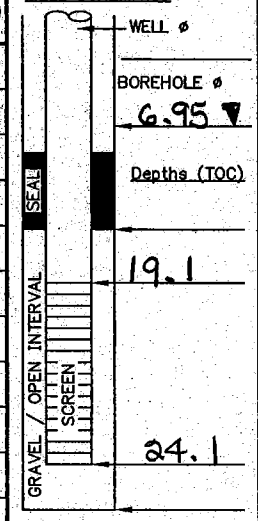
METHOD OF INDUCING WATER LEVEL CHANGE: 2 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

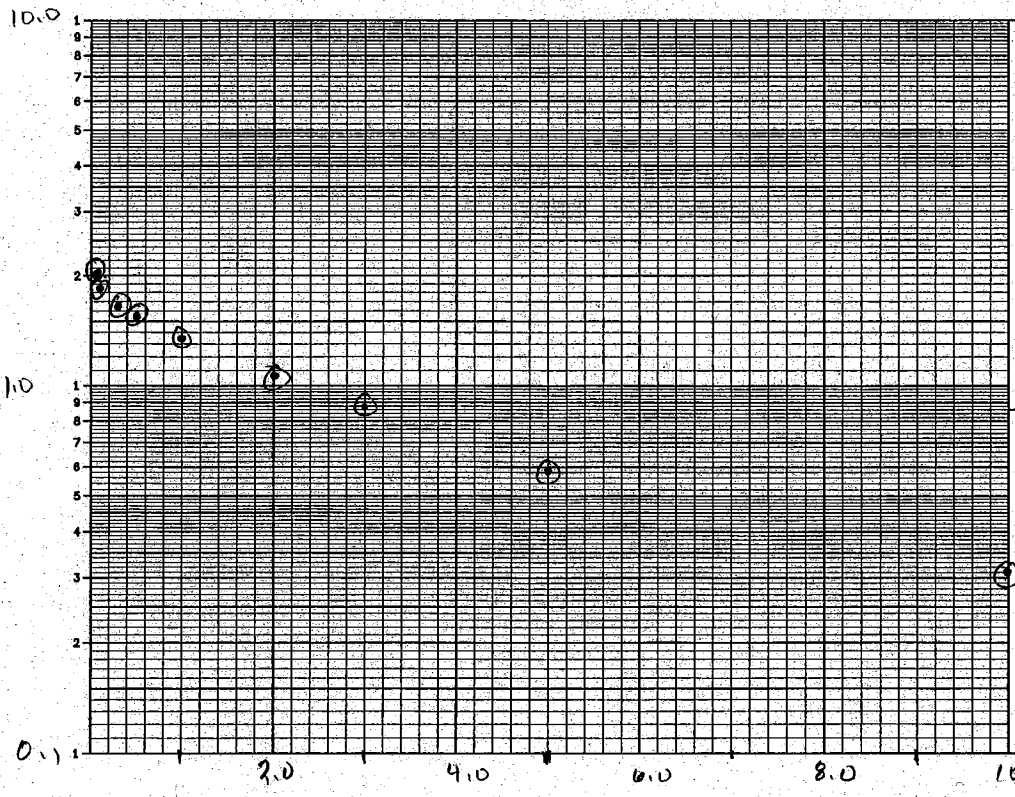
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

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)
.075		2.008			
.1		1.805			
.3		1.629			
.5		1.533			
1.0		1.345			
2.0		1.074			
3.0		.879			
5.0		.598			
10.0		.322			
15.0		.231			
18.8		.204			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS, SKETCH MAPS, ETC.:

r = .083
R = .177
L = 5'

Report Date:	8/16/2008 10:08
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-50I 2008-08-16 09-52-02.wsl
Create Date	8/16/2008 10:08

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-50I
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/16/2008 9:34
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	6.91086 (PSI)
Head Pressure	6.9093 (PSI)
Temperature	27.6578 (C)
Depth of Probe	15.9534 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/16/2008 9:48	Manual Start Command
8/16/2008 9:51	User Note: "Downloading log - Used Batt: 4% Memory: 18% User: Stanley.Conti"
8/16/2008 9:57	User Note: "Downloading log - Used Batt: 4% Memory: 18% User: Stanley.Conti"

8/16/2008 10:02 User Note: "Downloading log - Used Batt: 4% Memory: 18% User: Stanley.Conti"
8/16/2008 10:06 User Note: "Downloading log - Used Batt: 4% Memory: 18% User: Stanley.Conti"
8/16/2008 10:08 Manual Stop Command

Log Data:
Record Count 116

Date and Time	Elapsed Time Minutes		Sensor: Pres 35 SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/16/2008 9:48		0	6.95	25.823	-0.091
8/16/2008 9:48		0.004	6.95	25.845	-0.091
8/16/2008 9:48		0.008	6.95	25.858	-0.09
8/16/2008 9:48		0.013	6.954	25.924	-0.099
8/16/2008 9:48		0.02	6.952	25.913	-0.095
8/16/2008 9:48		0.024	6.951	25.911	-0.092
8/16/2008 9:48		0.028	6.949	25.914	-0.089
8/16/2008 9:48		0.031	6.95	25.891	-0.091
8/16/2008 9:48		0.04	6.95	25.9	-0.089
8/16/2008 9:48		0.043	6.943	25.905	-0.073
8/16/2008 9:48		0.047	6.461	25.911	1.038
8/16/2008 9:48		0.052	6.732	25.903	0.413
8/16/2008 9:48		0.056	6.864	25.908	0.108
8/16/2008 9:48		0.06	6.981	25.915	-0.162
8/16/2008 9:48		0.064	6.123	25.918	1.819
8/16/2008 9:48		0.067	6.439	25.92	1.089
8/16/2008 9:48		0.071	6.223	25.92	1.587
8/16/2008 9:48		0.075	0 6.041	25.919	2.008
8/16/2008 9:48		0.079	6.096	25.924	1.881
8/16/2008 9:48		0.082	6.102	25.925	1.867
8/16/2008 9:48		0.086	6.11	25.93	1.849
8/16/2008 9:48		0.09	6.118	25.93	1.831
8/16/2008 9:48		0.094	6.12	25.931	1.825
8/16/2008 9:48		0.097	6.124	25.931	1.817
8/16/2008 9:48		0.102	6.129	25.934	1.805
8/16/2008 9:48		0.106	6.131	25.932	1.8
8/16/2008 9:48		0.112	.037 6.135	25.924	1.791
8/16/2008 9:48		0.119	6.143	25.913	1.772
8/16/2008 9:48		0.126	6.147	25.907	1.763
8/16/2008 9:48		0.133	6.151	25.9	1.754
8/16/2008 9:48		0.141	6.155	25.897	1.745
8/16/2008 9:48		0.15	6.161	25.892	1.732
8/16/2008 9:48		0.158	6.163	25.89	1.726
8/16/2008 9:48		0.168	6.168	25.883	1.716
8/16/2008 9:48		0.178	6.17	25.882	1.71
8/16/2008 9:48		0.188	6.174	25.88	1.7
8/16/2008 9:48		0.199	6.179	25.877	1.691
8/16/2008 9:48		0.211	6.182	25.875	1.684
8/16/2008 9:48		0.224	.149 6.186	25.871	1.673

8/16/2008 9:48	0.237		6.189	25.872	1.666
8/16/2008 9:48	0.251		6.193	25.869	1.657
8/16/2008 9:48	0.266		6.198	25.867	1.645
8/16/2008 9:48	0.282		6.202	25.863	1.637
8/16/2008 9:48	0.298		6.205	25.863	1.629
8/16/2008 9:48	0.316		6.21	25.862	1.618
8/16/2008 9:48	0.335		6.215	25.861	1.608
8/16/2008 9:48	0.355		6.217	25.859	1.601
8/16/2008 9:48	0.376		6.223	25.856	1.588
8/16/2008 9:48	0.398		6.227	25.855	1.579
8/16/2008 9:48	0.422		6.233	25.858	1.566
8/16/2008 9:48	0.447		6.237	25.853	1.557
8/16/2008 9:48	0.473		6.242	25.853	1.544
8/16/2008 9:48	0.501		6.247	25.852	1.533
8/16/2008 9:48	0.531		6.253	25.851	1.52
8/16/2008 9:48	0.562	.487	6.26	25.849	1.503
8/16/2008 9:48	0.596		6.264	25.848	1.493
8/16/2008 9:49	0.631		6.271	25.845	1.477
8/16/2008 9:49	0.668		6.277	25.846	1.464
8/16/2008 9:49	0.708		6.283	25.848	1.449
8/16/2008 9:49	0.75		6.29	25.844	1.434
8/16/2008 9:49	0.794		6.297	25.847	1.417
8/16/2008 9:49	0.841		6.305	25.842	1.4
8/16/2008 9:49	0.891		6.312	25.841	1.382
8/16/2008 9:49	0.944		6.32	25.838	1.364
8/16/2008 9:49	1	.925	6.328	25.838	1.345
8/16/2008 9:49	1.06		6.337	25.836	1.325
8/16/2008 9:49	1.12		6.345	25.833	1.307
8/16/2008 9:49	1.19		6.354	25.835	1.285
8/16/2008 9:49	1.26		6.364	25.833	1.263
8/16/2008 9:49	1.33		6.373	25.83	1.242
8/16/2008 9:49	1.41		6.382	25.831	1.22
8/16/2008 9:49	1.5		6.393	25.826	1.196
8/16/2008 9:49	1.58		6.402	25.83	1.175
8/16/2008 9:50	1.68		6.413	25.823	1.149
8/16/2008 9:50	1.78		6.423	25.823	1.126
8/16/2008 9:50	1.88		6.434	25.818	1.101
8/16/2008 9:50	1.99		6.446	25.818	1.074
8/16/2008 9:50	2.11	2.035	6.458	25.817	1.046
8/16/2008 9:50	2.24		6.47	25.814	1.018
8/16/2008 9:50	2.37		6.481	25.812	0.992
8/16/2008 9:50	2.51		6.493	25.809	0.965
8/16/2008 9:51	2.66		6.506	25.81	0.934
8/16/2008 9:51	2.82		6.519	25.807	0.905
8/16/2008 9:51	2.98		6.53	25.804	0.879
8/16/2008 9:51	3.16		6.544	25.8	0.846
8/16/2008 9:51	3.35		6.561	25.801	0.808
8/16/2008 9:51	3.55	3.475	6.573	25.798	0.78
8/16/2008 9:52	3.76		6.584	25.796	0.756
8/16/2008 9:52	3.98		6.595	25.793	0.729
8/16/2008 9:52	4.22		6.609	25.79	0.696
8/16/2008 9:52	4.47		6.622	25.787	0.667

8/16/2008 9:53	4.73		6.635	25.785	0.638
8/16/2008 9:53	5.01	4.935	6.652	25.783	0.598
8/16/2008 9:53	5.31		6.659	25.78	0.582
8/16/2008 9:54	5.62		6.67	25.779	0.555
8/16/2008 9:54	5.96		6.684	25.774	0.525
8/16/2008 9:54	6.31		6.696	25.773	0.496
8/16/2008 9:55	6.68		6.706	25.77	0.474
8/16/2008 9:55	7.08		6.717	25.767	0.448
8/16/2008 9:55	7.5	7.425	6.727	25.77	0.424
8/16/2008 9:56	7.94		6.737	25.768	0.402
8/16/2008 9:56	8.41		6.747	25.764	0.379
8/16/2008 9:57	8.91		6.756	25.769	0.358
8/16/2008 9:57	9.44		6.764	25.767	0.34
8/16/2008 9:58	10	9.925	6.772	25.766	0.322
8/16/2008 9:58	10.6		6.78	25.766	0.302
8/16/2008 9:59	11.2		6.785	25.765	0.29
8/16/2008 10:00	11.9		6.792	25.762	0.275
8/16/2008 10:00	12.6		6.797	25.759	0.263
8/16/2008 10:01	13.3		6.802	25.759	0.251
8/16/2008 10:02	14.1		6.806	25.759	0.241
8/16/2008 10:03	15	14.925	6.811	25.76	0.231
8/16/2008 10:04	15.8		6.814	25.764	0.224
8/16/2008 10:05	16.8		6.818	25.762	0.214
8/16/2008 10:06	17.802		6.822	25.759	0.206
8/16/2008 10:07	18.8	18.725	6.822	25.762	0.204

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	PAI-27-MW51S
Test No.:	1
Date:	8/15/2008
Geologist:	CONTI
Checked by / Date:	SW Ramier 6-28-11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.177
Screened / Monitored Interval Below Water Table, L (ft):	10
Static Water Level (Depth/ Elevation) (ft.):	2.52
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of $\ln(H/H0)$ (b=0)
	0.00	0.86	0.00	0.86	1.00	0.0000	0.00
	0.02	0.79	0.02	0.79	0.92	-0.0849	-0.04
	0.07	0.68	0.07	0.68	0.79	-0.2546	-0.14
	0.13	0.58	0.13	0.58	0.67	-0.3939	-0.26
	0.19	0.51	0.19	0.51	0.59	-0.5225	-0.38
	0.28	0.44	0.28	0.44	0.51	-0.6702	-0.52
	0.42	0.33	0.42	0.33	0.39	-0.9676	-0.80
	0.67	0.19	0.67	0.19	0.22	-1.5099	-1.35
	0.92	0.12	0.92	0.12	0.14	-1.9644	-1.82
	1.42	0.05	1.42	0.05	0.06	-2.8449	-2.82
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	10
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-1.987
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.104
Actual Y-intercept is set to 0.	0.000
T_0 (min):	0.503
K (ft/min):	2.78E-03
K (ft/day):	**4.005**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

T_0: Time at which ln(H/H0)=-1

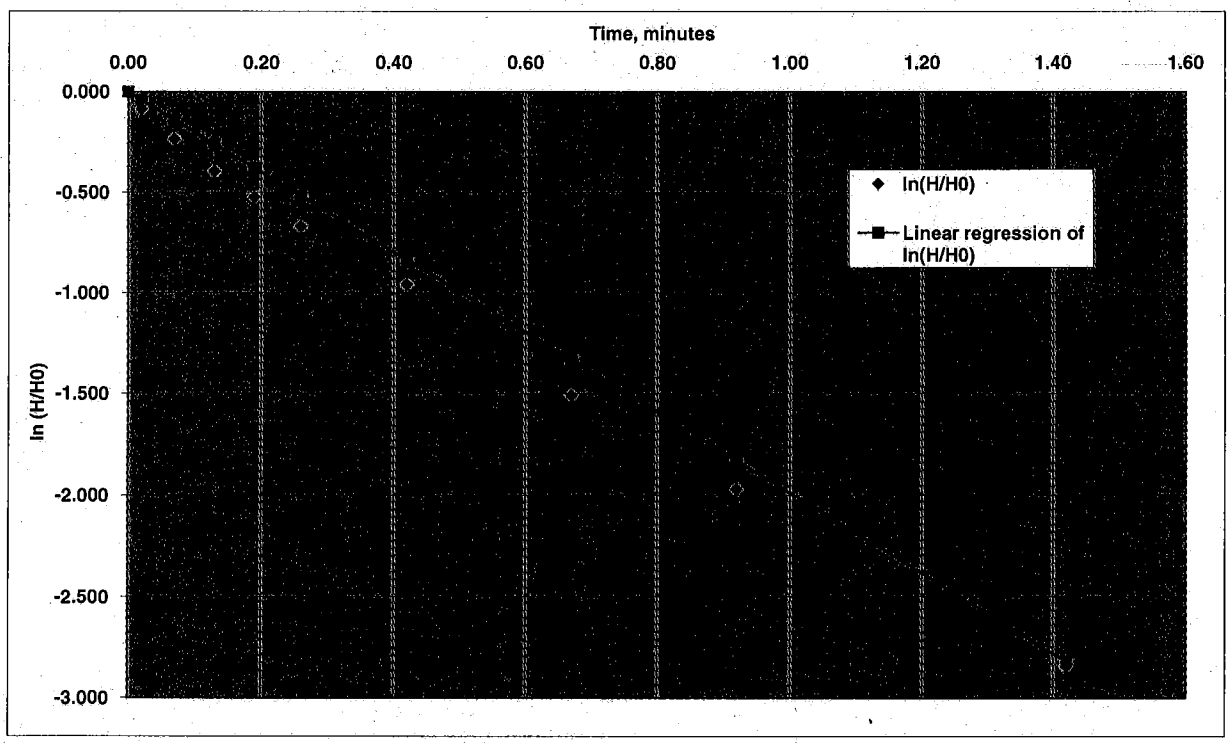
$K = r^2 * \ln(L/R)/(2LT_0)$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



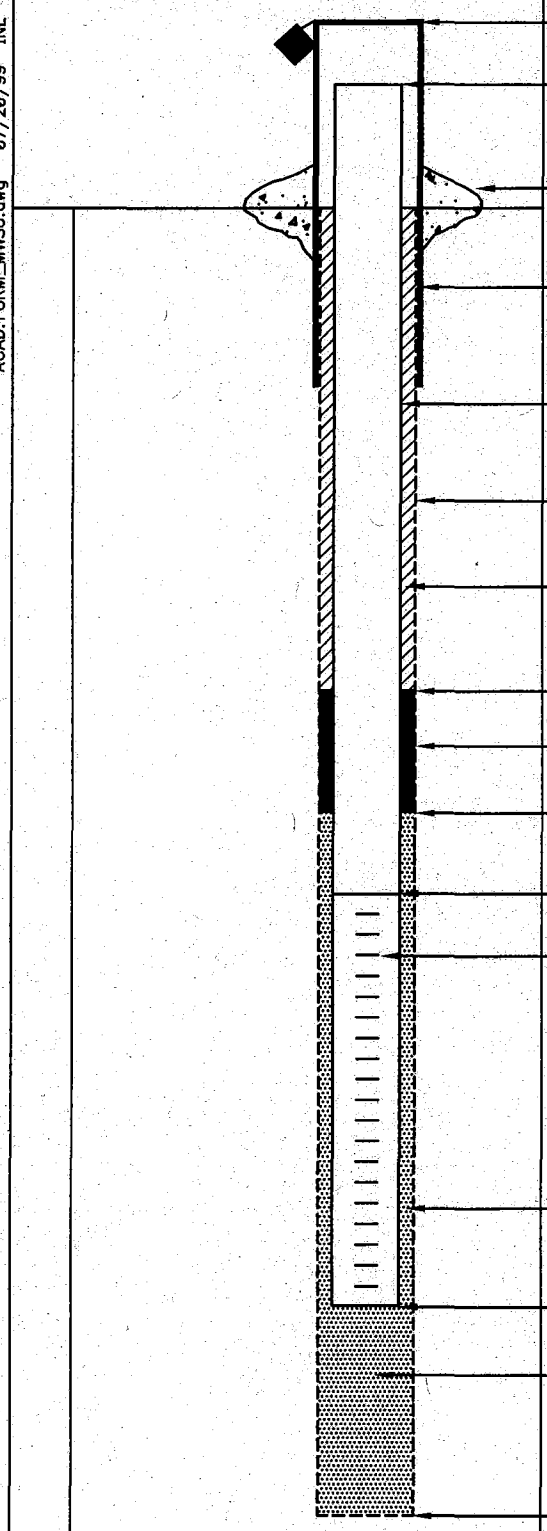
1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

WELL NO.: PAI-27MW 51S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT PARRIS ISLAND SITE 27	LOCATION MW 51S	DRILLER CORDY GAMMEL
PROJECT NO. G00455	BORING	DRILLING METHOD DPT
DATE BEGUN 8/8/08	DATE COMPLETED 8/8/08	
FIELD GEOLOGIST CHARLIE WARINO		DEVELOPMENT METHOD PERISTALTIC
GROUND ELEVATION 10.31	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: — / —

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 10.05 / —

TYPE OF SURFACE SEAL: CONCRETE

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 4 1/4"

TYPE OF BACKFILL: GROUT

ELEVATION/DEPTH TOP OF SEAL: 8.31 / 2.0'

TYPE OF SEAL: BENTONITE

DEPTH TOP OF SAND PACK: 7.81 2.5'

ELEVATION/DEPTH TOP OF SCREEN: 7.31 / 3.0'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #1 SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: -2.69 / 13'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -3.19 / 13.5'

BACKFILL MATERIAL BELOW SAND: #1 SAND

ELEVATION/DEPTH OF HOLE: -3.19 / 13.5'

ACAD: FORM_MWSU.dwg 07/20/99 INL

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PAI-27

PROJECT NAME: MCRD PARRIS IS- SITE 27 WELL/BORING NO.: 51S

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10 / TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 2.52' DATE: 8/15/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

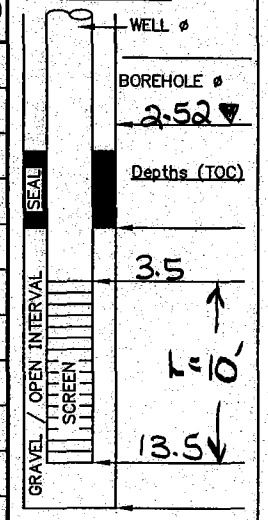
METHOD OF INDUCING WATER LEVEL CHANGE: 1 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

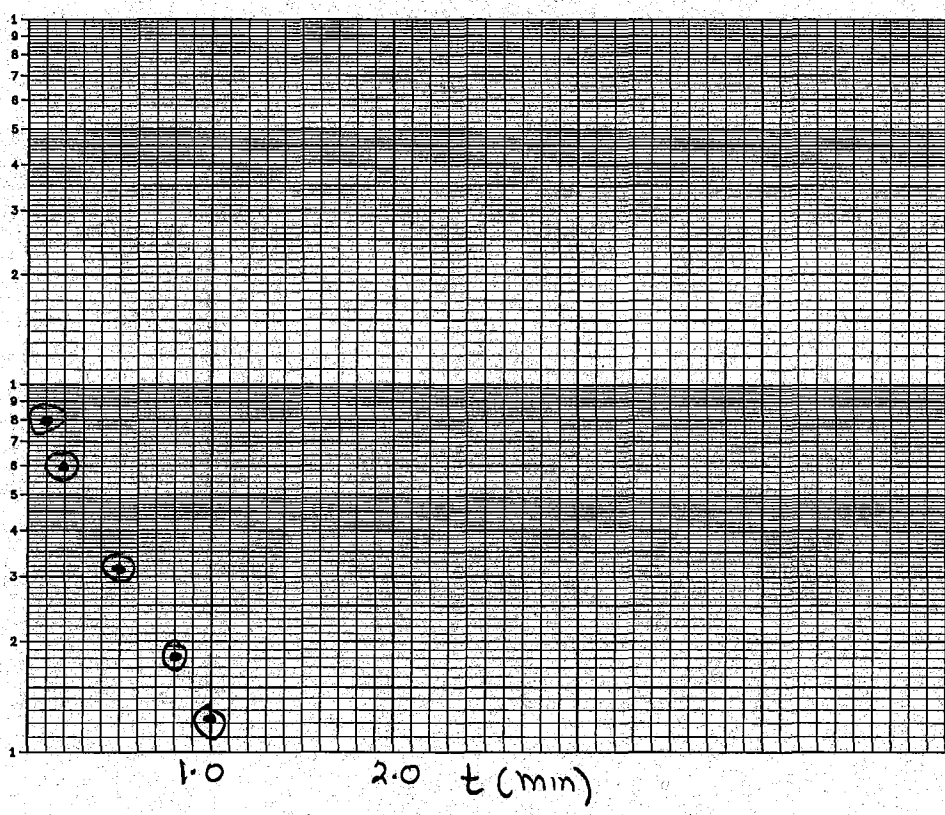
ACAD: FORM_HYDCONTST.dwg 07/06/99 INL

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)
.079		.863			
.1		.792			
.15		.679			
.2		.599			
.5		.311			
.8		.177			
1.0		.12			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS, SKETCH MAPS, ETC.:

r = .083'
R = .177'
L = 10'

Report Date:	8/15/2008 12:14
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-51S 2008-08-15 12-12-56.wsl
Create Date	8/15/2008 12:14

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-51S
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/15/2008 12:02
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	4.55954 (PSI)
Head Pressure	4.55895 (PSI)
Temperature	24.3572 (C)
Depth of Probe	10.5265 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/15/2008 12:09	Manual Start Command
8/15/2008 12:12	User Note: "Downloading log - Used Batt: 4% Memory: 6% User: Stanley.Conti"
8/15/2008 12:14	Manual Stop Command

Log Data:
Record Count 90

Date and Time	Elapsed Time Minutes		Sensor: Pres 35ft SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/15/2008 12:09	0		4.575	24.903	-0.035
8/15/2008 12:09	0.004		4.574	24.921	-0.033
8/15/2008 12:09	0.008		4.575	24.937	-0.035
8/15/2008 12:09	0.013		4.574	24.944	-0.033
8/15/2008 12:09	0.017		4.574	24.952	-0.033
8/15/2008 12:09	0.021		4.574	24.958	-0.034
8/15/2008 12:09	0.028		4.575	24.95	-0.035
8/15/2008 12:09	0.031		4.577	24.965	-0.04
8/15/2008 12:09	0.035		4.575	24.972	-0.036
8/15/2008 12:09	0.039		4.576	24.974	-0.038
8/15/2008 12:09	0.043		4.576	24.976	-0.039
8/15/2008 12:09	0.047		4.573	24.981	-0.031
8/15/2008 12:09	0.05		4.574	24.985	-0.034
8/15/2008 12:09	0.054		4.574	24.991	-0.034
8/15/2008 12:09	0.058		4.578	24.987	-0.042
8/15/2008 12:09	0.063		4.533	24.991	0.06
8/15/2008 12:09	0.067		4.344	24.992	0.498
8/15/2008 12:09	0.071		4.406	24.994	0.354
8/15/2008 12:09	0.075		4.25	24.994	0.714
8/15/2008 12:09	0.079	0	4.186	24.996	0.863
8/15/2008 12:09	0.083		4.192	24.996	0.849
8/15/2008 12:09	0.087		4.201	24.996	0.829
8/15/2008 12:09	0.092		4.206	24.998	0.817
8/15/2008 12:09	0.096		4.212	24.999	0.803
8/15/2008 12:09	0.1	.021	4.217	25	0.792
8/15/2008 12:09	0.106		4.224	24.995	0.775
8/15/2008 12:09	0.112		4.232	24.987	0.756
8/15/2008 12:09	0.119		4.24	24.981	0.738
8/15/2008 12:09	0.126		4.246	24.978	0.723
8/15/2008 12:09	0.133		4.252	24.977	0.71
8/15/2008 12:09	0.141		4.26	24.972	0.692
8/15/2008 12:09	0.15	.071	4.266	24.967	0.679
8/15/2008 12:09	0.158		4.272	24.968	0.663
8/15/2008 12:09	0.168		4.279	24.962	0.648
8/15/2008 12:09	0.178		4.287	24.961	0.629
8/15/2008 12:10	0.188		4.293	24.961	0.615
8/15/2008 12:10	0.199		4.3	24.957	0.599
8/15/2008 12:10	0.211	.132	4.307	24.953	0.583
8/15/2008 12:10	0.224		4.316	24.951	0.561
8/15/2008 12:10	0.237		4.324	24.949	0.543
8/15/2008 12:10	0.251		4.33	24.95	0.53
8/15/2008 12:10	0.266	.187	4.339	24.949	0.509

8/15/2008 12:10	0.282		4.347	24.948	0.492
8/15/2008 12:10	0.298		4.353	24.945	0.476
8/15/2008 12:10	0.316		4.362	24.947	0.455
8/15/2008 12:10	0.335	.256	4.37	24.942	0.437
8/15/2008 12:10	0.355		4.377	24.946	0.42
8/15/2008 12:10	0.376		4.387	24.943	0.399
8/15/2008 12:10	0.398		4.394	24.94	0.383
8/15/2008 12:10	0.422		4.401	24.939	0.365
8/15/2008 12:10	0.447		4.409	24.94	0.347
8/15/2008 12:10	0.473	.422	4.417	24.941	0.328
8/15/2008 12:10	0.501		4.425	24.937	0.311
8/15/2008 12:10	0.531		4.433	24.938	0.292
8/15/2008 12:10	0.562		4.441	24.941	0.275
8/15/2008 12:10	0.596		4.449	24.937	0.256
8/15/2008 12:10	0.631		4.456	24.937	0.239
8/15/2008 12:10	0.668		4.463	24.94	0.223
8/15/2008 12:10	0.708		4.47	24.937	0.207
8/15/2008 12:10	0.75	.671	4.477	24.937	0.191
8/15/2008 12:10	0.794		4.483	24.938	0.177
8/15/2008 12:10	0.841		4.489	24.94	0.162
8/15/2008 12:10	0.891		4.496	24.939	0.147
8/15/2008 12:10	0.944		4.502	24.936	0.134
8/15/2008 12:10	1	.921	4.507	24.936	0.12
8/15/2008 12:10	1.06		4.512	24.932	0.109
8/15/2008 12:10	1.12		4.517	24.935	0.098
8/15/2008 12:11	1.19		4.522	24.935	0.087
8/15/2008 12:11	1.26		4.528	24.937	0.072
8/15/2008 12:11	1.33		4.53	24.936	0.067
8/15/2008 12:11	1.41		4.535	24.937	0.057
8/15/2008 12:11	1.5	1.421	4.539	24.935	0.048
8/15/2008 12:11	1.58		4.541	24.936	0.042
8/15/2008 12:11	1.68		4.545	24.935	0.034
8/15/2008 12:11	1.78		4.548	24.939	0.028
8/15/2008 12:11	1.88		4.55	24.936	0.021
8/15/2008 12:11	1.99		4.553	24.938	0.016
8/15/2008 12:11	2.11		4.554	24.938	0.013
8/15/2008 12:12	2.24		4.555	24.938	0.011
8/15/2008 12:12	2.37		4.557	24.941	0.006
8/15/2008 12:12	2.51		4.559	24.94	0
8/15/2008 12:12	2.66		4.56	24.941	-0.001
8/15/2008 12:12	2.82		4.561	24.938	-0.003
8/15/2008 12:12	2.98		4.562	24.939	-0.005
8/15/2008 12:12	3.16		4.563	24.945	-0.009
8/15/2008 12:13	3.35		4.563	24.941	-0.009
8/15/2008 12:13	3.55		4.563	24.941	-0.008
8/15/2008 12:13	3.76		4.565	24.944	-0.012
8/15/2008 12:13	3.98		4.564	24.945	-0.011
8/15/2008 12:14	4.22		4.565	24.946	-0.014

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	PAI-27-MW52I
Test No.:	1
Date:	8/15/2008
Geologist:	CONTI
Checked by / Date:	JWRonnee 6-28-11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.177
Screened / Monitored Interval Below Water Table, L (ft):	5
Static Water Level (Depth/ Elevation) (ft.):	6.95
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	1.99	0.00	-1.99	1.00	0.0000	0.00
	0.05	1.78	0.05	-1.78	0.89	-0.1175	-0.01
	0.12	1.73	0.12	-1.73	0.87	-0.1400	-0.02
	0.33	1.62	0.33	-1.62	0.81	-0.2057	-0.07
	0.65	1.48	0.65	-1.48	0.74	-0.3361	-0.19
	0.90	1.38	0.90	-1.38	0.69	-0.4681	-0.16
	1.40	1.22	1.40	-1.22	0.61	-0.4803	-0.29
	2.01	1.06	2.0	-1.06	0.53	-0.6259	-0.40
	2.86	0.87	2.86	-0.87	0.44	-0.8274	-0.59
	4.12	0.67	4.12	-0.67	0.34	-1.0896	-0.82
	5.52	0.50	5.52	-0.50	0.25	-1.3863	-1.10
	7.40	0.35	7.40	-0.35	0.18	-1.7580	-1.49
	9.90	0.22	9.90	-0.22	0.11	-2.2073	-1.98
	14.90	0.10	14.90	-0.10	0.05	-2.9957	-2.98
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	14
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-0.200
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.174
Actual Y-intercept is set to 0.	0.000
T_0 (min):	5.001
K (ft/min):	4.64E-04
K (ft/day):	**0.668**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

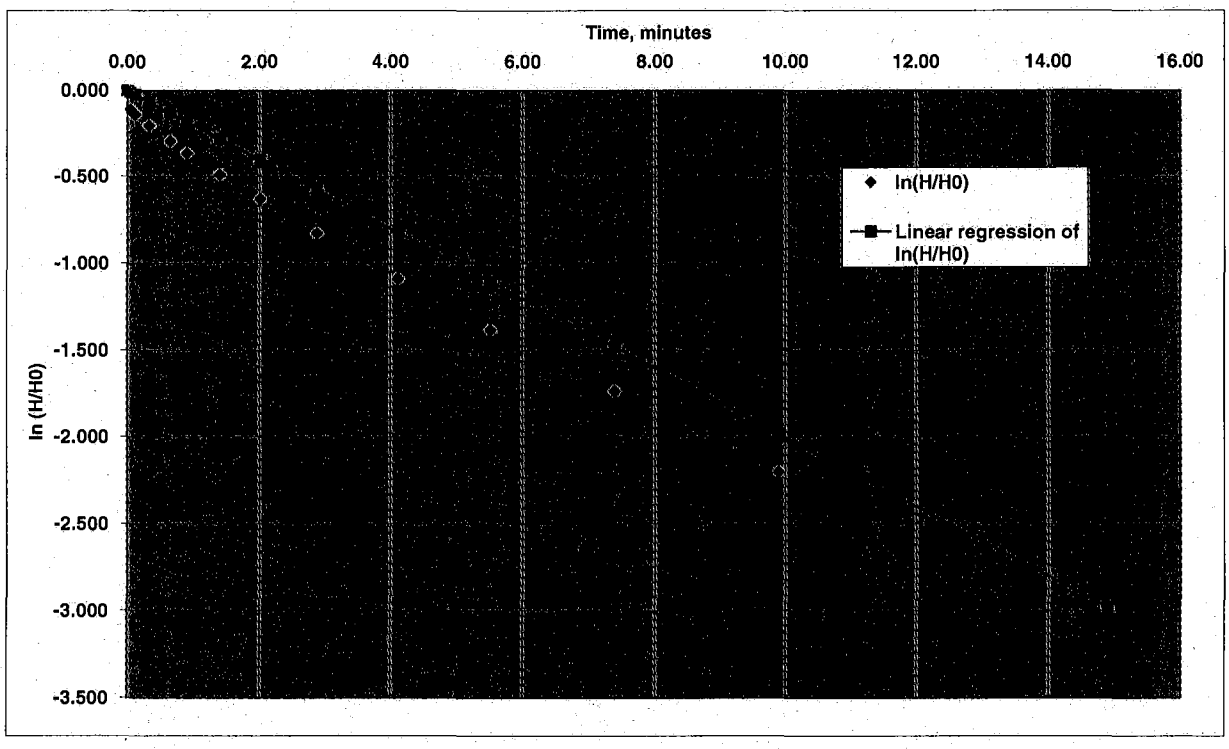
T_0: Time at which ln(H/H0)=-1

$K = r^2 * \ln(L/R)/(2LT_0)$

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



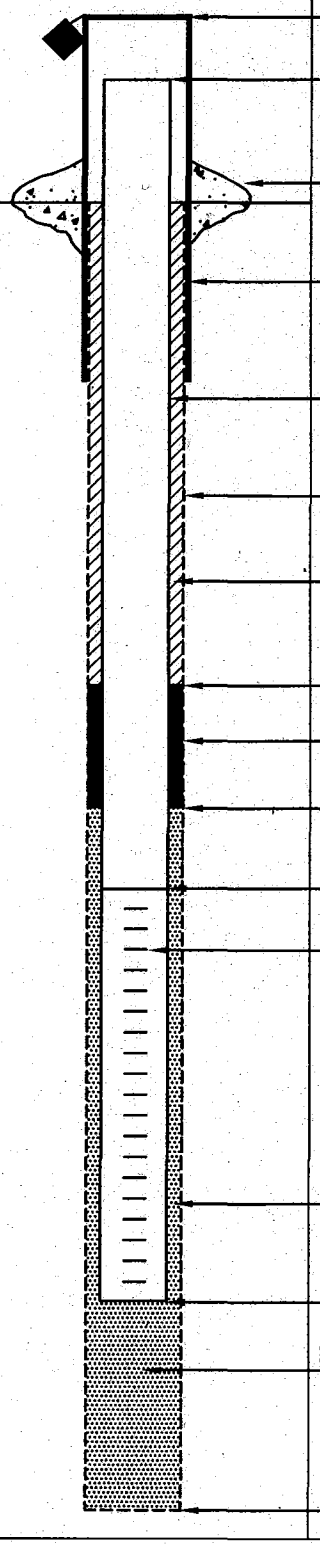
1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

WELL NO.: PA1-27MW52I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT: PARRIS ISLAND SITE 27	LOCATION: MW 52 I	DRILLER: COREY GARNWELL
PROJECT NO.: 600455	BORING:	DRILLING METHOD: DPT
DATE BEGUN: 8/6/08	DATE COMPLETED: 8/8/08	
FIELD GEOLOGIST: CHARLIE WORMOD		DEVELOPMENT METHOD: PERISTALTIC
GROUND ELEVATION: 10.25	DATUM:	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: — / —

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 10.00

TYPE OF SURFACE SEAL: CONCRETE

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 4 1/4"

TYPE OF BACKFILL: GROUT

ELEVATION/DEPTH TOP OF SEAL: -6.75 / 17'

TYPE OF SEAL: BENTONITE

DEPTH TOP OF SAND PACK: -8.75 19'

ELEVATION/DEPTH TOP OF SCREEN: -9.75 / 20'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 5'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #1 SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: -14.75 25'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -15.25 25.5'

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: -15.25 25.5'

ACAD:FORM_MWSU.dwg 07/28/99 INL

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PAI-27 -

PROJECT NAME: MCRD PARRIS IS- SITE 27 WELL/BORING NO.: 52I

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 5 / 24.80 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 6.95' DATE: 8/15/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

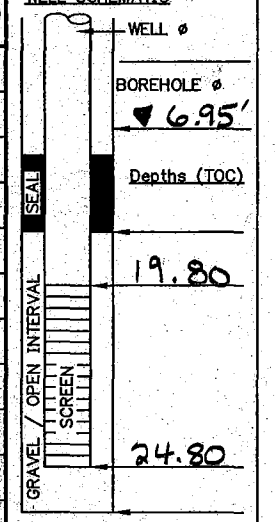
METHOD OF INDUCING WATER LEVEL CHANGE: 2 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

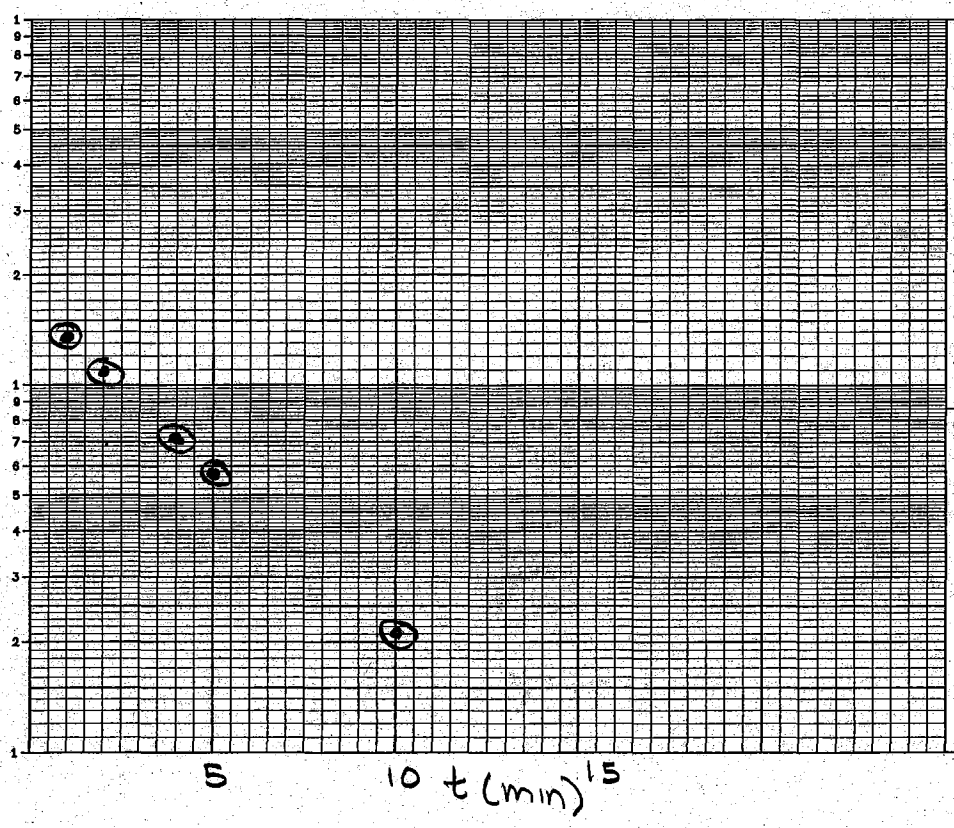
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

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)
.096		1.988			
.20		1.739			
.30		1.678			
1.0		1.383			
2.0		1.088			
4.0		.702			
5.0		.565			
8.0		.319			
10.0		.217			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS,SKETCH MAPS, ETC.:

r = .083'
R = .177
L = 5'

Report Date:	8/15/2008 11:51
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-52I 2008-08-15 11-37-40.wsl
Create Date	8/15/2008 11:51

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-52I
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/15/2008 11:18
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	7.50555 (PSI)
Head Pressure	7.50622 (PSI)
Temperature	24.2584 (C)
Depth of Probe	17.3316 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/15/2008 11:35	Manual Start Command
8/15/2008 11:37	User Note: "Downloading log - Used Batt: 4% Memory: 4% User: Stanley.Conti"
8/15/2008 11:47	User Note: "Downloading log - Used Batt: 4% Memory: 4% User: Stanley.Conti"

8/15/2008 11:50 User Note: "Downloading log - Used Batt: 4% Memory: 4% User: Stanley.Conti"
8/15/2008 11:50 Manual Stop Command

Log Data:
Record Count 112

Date and Time	Elapsed Time Minutes		Sensor: Pres 35ft SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/15/2008 11:35	0		7.513	22.428	-0.017
8/15/2008 11:35	0.004		7.514	22.45	-0.02
8/15/2008 11:35	0.008		7.514	22.462	-0.02
8/15/2008 11:35	0.013		7.517	22.508	-0.027
8/15/2008 11:35	0.018		7.517	22.502	-0.025
8/15/2008 11:35	0.022		7.513	22.503	-0.018
8/15/2008 11:35	0.026		7.515	22.504	-0.021
8/15/2008 11:35	0.03		7.513	22.506	-0.016
8/15/2008 11:35	0.034		7.514	22.51	-0.019
8/15/2008 11:35	0.037		7.513	22.511	-0.017
8/15/2008 11:35	0.042		7.514	22.511	-0.019
8/15/2008 11:35	0.046		7.513	22.51	-0.017
8/15/2008 11:35	0.05		7.513	22.515	-0.018
8/15/2008 11:35	0.054		7.513	22.515	-0.016
8/15/2008 11:35	0.058		7.513	22.518	-0.018
8/15/2008 11:35	0.063		7.509	22.519	-0.008
8/15/2008 11:35	0.067		7.078	22.519	0.988
8/15/2008 11:35	0.071		7.085	22.52	0.97
8/15/2008 11:35	0.075		7.305	22.522	0.464
8/15/2008 11:35	0.079		7.346	22.52	0.368
8/15/2008 11:35	0.083		6.979	22.523	1.215
8/15/2008 11:35	0.087		6.799	22.524	1.631
8/15/2008 11:35	0.092		6.666	22.527	1.938
8/15/2008 11:35	0.096	-0	6.645	22.523	1.988
8/15/2008 11:35	0.1		6.711	22.526	1.836
8/15/2008 11:35	0.106		6.707	22.517	1.843
8/15/2008 11:35	0.112		6.714	22.515	1.828
8/15/2008 11:35	0.119		6.721	22.506	1.81
8/15/2008 11:35	0.126		6.724	22.505	1.804
8/15/2008 11:35	0.133		6.726	22.498	1.8
8/15/2008 11:35	0.141		6.731	22.498	1.789
8/15/2008 11:35	0.15	.054	6.735	22.492	1.779
8/15/2008 11:35	0.158		6.738	22.489	1.772
8/15/2008 11:35	0.168		6.742	22.485	1.764
8/15/2008 11:35	0.178		6.746	22.484	1.754
8/15/2008 11:35	0.188		6.749	22.483	1.747
8/15/2008 11:35	0.199		6.752	22.482	1.739
8/15/2008 11:35	0.211	-115	6.757	22.479	1.729
8/15/2008 11:35	0.224		6.761	22.476	1.719
8/15/2008 11:35	0.237		6.763	22.474	1.713

8/15/2008 11:35	0.251		6.768	22.471	1.702
8/15/2008 11:35	0.266		6.772	22.468	1.694
8/15/2008 11:35	0.282		6.775	22.469	1.687
8/15/2008 11:35	0.298		6.779	22.466	1.678
8/15/2008 11:35	0.316		6.782	22.463	1.67
8/15/2008 11:35	0.335		6.786	22.463	1.661
8/15/2008 11:36	0.355		6.791	22.461	1.65
8/15/2008 11:36	0.376		6.796	22.46	1.638
8/15/2008 11:36	0.398		6.8	22.459	1.629
8/15/2008 11:36	0.422	.326	6.805	22.456	1.616
8/15/2008 11:36	0.447		6.81	22.457	1.605
8/15/2008 11:36	0.473		6.817	22.456	1.59
8/15/2008 11:36	0.501		6.822	22.454	1.579
8/15/2008 11:36	0.531		6.827	22.451	1.566
8/15/2008 11:36	0.562		6.833	22.449	1.552
8/15/2008 11:36	0.596		6.839	22.451	1.54
8/15/2008 11:36	0.631		6.847	22.451	1.522
8/15/2008 11:36	0.668		6.853	22.446	1.508
8/15/2008 11:36	0.708		6.859	22.446	1.493
8/15/2008 11:36	0.75	.654	6.865	22.444	1.478
8/15/2008 11:36	0.794		6.874	22.443	1.458
8/15/2008 11:36	0.841		6.883	22.44	1.438
8/15/2008 11:36	0.891		6.89	22.439	1.422
8/15/2008 11:36	0.944		6.899	22.437	1.399
8/15/2008 11:36	1	.904	6.907	22.433	1.383
8/15/2008 11:36	1.06		6.918	22.434	1.356
8/15/2008 11:36	1.12		6.926	22.43	1.339
8/15/2008 11:36	1.19		6.935	22.43	1.318
8/15/2008 11:36	1.26		6.944	22.428	1.296
8/15/2008 11:36	1.33		6.954	22.427	1.273
8/15/2008 11:37	1.41		6.964	22.425	1.249
8/15/2008 11:37	1.5	1.404	6.976	22.422	1.223
8/15/2008 11:37	1.58		6.986	22.421	1.198
8/15/2008 11:37	1.68		6.999	22.419	1.171
8/15/2008 11:37	1.78		7.01	22.416	1.143
8/15/2008 11:37	1.88		7.022	22.414	1.117
8/15/2008 11:37	1.99		7.034	22.414	1.088
8/15/2008 11:37	2.11	2.014	7.047	22.411	1.059
8/15/2008 11:37	2.24		7.06	22.408	1.029
8/15/2008 11:38	2.37		7.074	22.405	0.996
8/15/2008 11:38	2.51		7.087	22.404	0.967
8/15/2008 11:38	2.66		7.101	22.404	0.934
8/15/2008 11:38	2.82		7.115	22.401	0.901
8/15/2008 11:38	2.98	2.88	7.129	22.4	0.87
8/15/2008 11:38	3.16		7.144	22.395	0.836
8/15/2008 11:39	3.35		7.159	22.395	0.801
8/15/2008 11:39	3.55		7.174	22.392	0.766
8/15/2008 11:39	3.76		7.187	22.389	0.735
8/15/2008 11:39	3.98		7.201	22.389	0.702
8/15/2008 11:39	4.22	4.124	7.216	22.386	0.668
8/15/2008 11:40	4.47		7.233	22.382	0.63
8/15/2008 11:40	4.73		7.246	22.382	0.599

8/15/2008 11:40	5.01		7.261	22.38	0.565
8/15/2008 11:40	5.31		7.275	22.379	0.532
8/15/2008 11:41	5.62	5.524	7.289	22.377	0.5
8/15/2008 11:41	5.96		7.302	22.376	0.469
8/15/2008 11:41	6.31		7.317	22.375	0.436
8/15/2008 11:42	6.68		7.33	22.371	0.406
8/15/2008 11:42	7.08		7.343	22.374	0.375
8/15/2008 11:43	7.5	7.404	7.355	22.368	0.347
8/15/2008 11:43	7.94		7.368	22.368	0.319
8/15/2008 11:44	8.41		7.379	22.365	0.291
8/15/2008 11:44	8.91		7.388	22.362	0.272
8/15/2008 11:45	9.44		7.4	22.362	0.243
8/15/2008 11:45	10	9.904	7.412	22.362	0.217
8/15/2008 11:46	10.6		7.42	22.362	0.198
8/15/2008 11:46	11.2		7.426	22.361	0.183
8/15/2008 11:47	11.9		7.438	22.357	0.157
8/15/2008 11:48	12.6		7.444	22.356	0.142
8/15/2008 11:48	13.3		7.45	22.356	0.129
8/15/2008 11:49	14.1		7.458	22.356	0.11
8/15/2008 11:50	15	14.904	7.461	22.355	0.102

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	**PAI-27-MW53S**
Test No.:	**1**
Date:	**8/15/2008**
Geologist:	CONTI
Checked by / Date:	SWRamer 6/28/11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.177
Screened / Monitored Interval Below Water Table, L (ft):	4.75
Static Water Level (Depth/ Elevation) (ft.):	8.75
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	1.15	0.00	-1.15	1.00	0.0000	0.00
	0.02	0.91	0.02	-0.91	0.79	-0.2341	-0.10
	0.04	0.81	0.04	-0.81	0.70	-0.3505	-0.20
	0.06	0.77	0.06	-0.77	0.67	-0.4011	-0.31
	0.11	0.58	0.11	-0.58	0.50	-0.6845	-0.56
	0.17	0.43	0.17	-0.43	0.37	-0.9837	-0.87
	0.24	0.32	0.24	-0.32	0.28	-1.2792	-1.22
x	0.31	0.27	0.00			0.0000	
x	0.46	0.22	0.00			0.0000	
x	0.71	0.18	0.00			0.0000	
x	0.96	0.16	0.00			0.0000	
x	1.46	0.13	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	7
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-5.094
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.096
Actual Y-intercept is set to 0.	0.000
T_0 (min):	0.196
K (ft/min):	1.22E-02
K (ft/day):	**17.625**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum\left(x^2\right)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

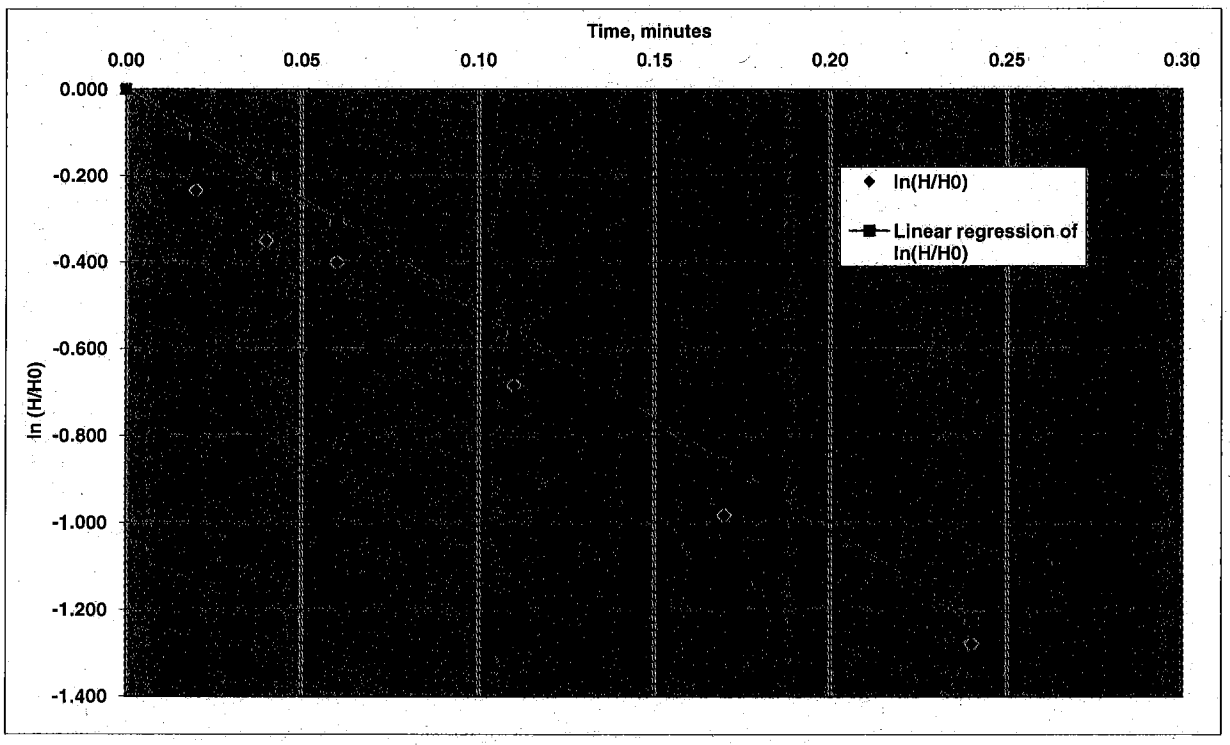
T_0: Time at which ln(H/H0)=-1

$K = r^2 * \ln(L/R)/(2LT_0)$

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



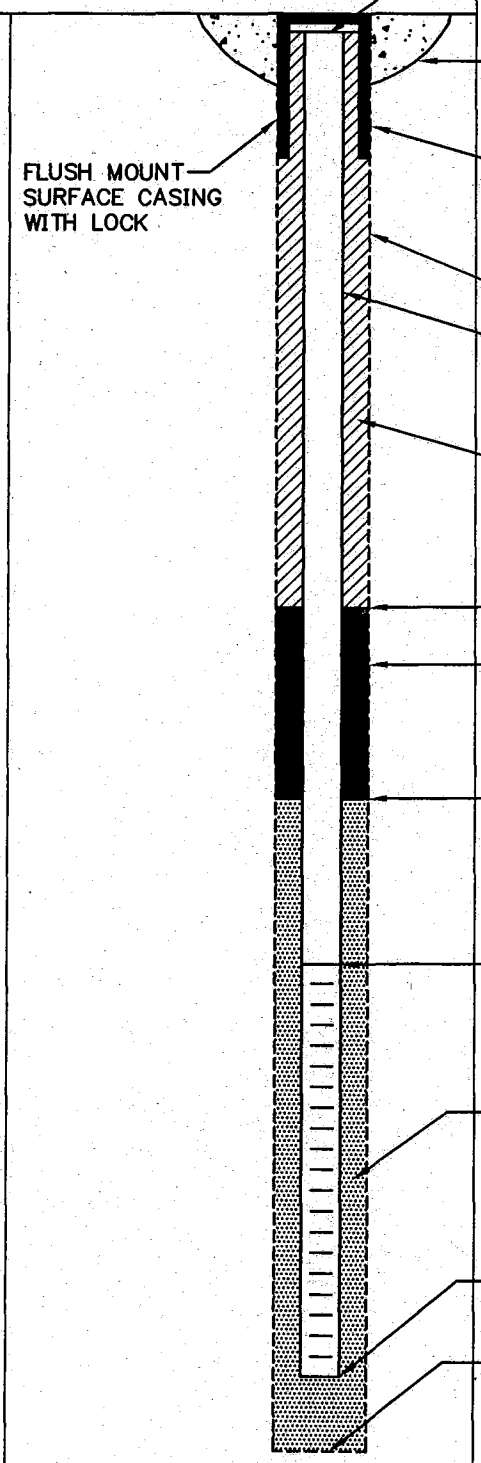
1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

WELL NO.: PA1-27MW53S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT PARRIS ISLAND SITE 27	LOCATION MW 53 S	DRILLER LOREY GAMWELL
PROJECT NO. G00455	BORING	DRILLING METHOD DPT
DATE BEGUN 8/9/08	DATE COMPLETED 8/9/08	
FIELD GEOLOGIST CHARLIE HARLING		DEVELOPMENT METHOD PERISTALTIC
GROUND ELEVATION 13.85	DATUM	



ELEVATION TOP OF RISER: 13.67

TYPE OF SURFACE SEAL: CONCRETE

TYPE OF PROTECTIVE CASING:

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: GROUT

ELEVATION/DEPTH TOP OF SEAL: 11.85 / 2'

TYPE OF SEAL: BENTONITE

ELEVATION/DEPTH TOP OF SAND: 11.35 / 2.5'

ELEVATION/DEPTH TOP OF SCREEN: 10.85 / 3'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 10'

TYPE OF SAND PACK: #1 SAND

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: 0.85 / 13'

ELEVATION / DEPTH BOTTOM OF SAND: 0.35 / 13.5'

ELEVATION/DEPTH BOTTOM OF HOLE: 0.35 / 13.5'

BACKFILL MATERIAL BELOW SAND: NA

ACAD:FORM_MWFM.dwg 07/20/99 INL

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PAI-27

PROJECT NAME: MCRD PARRIS IS- SITE 27 WELL/BORING NO.: MW-53S

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10 / 13.50 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 8.75 DATE: 8/15/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

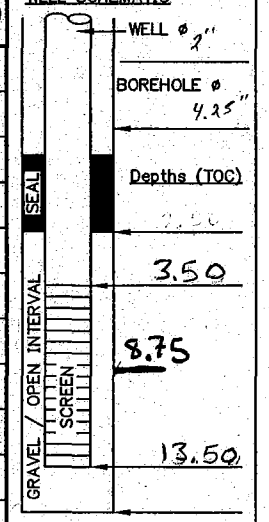
METHOD OF INDUCING WATER LEVEL CHANGE: 1 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

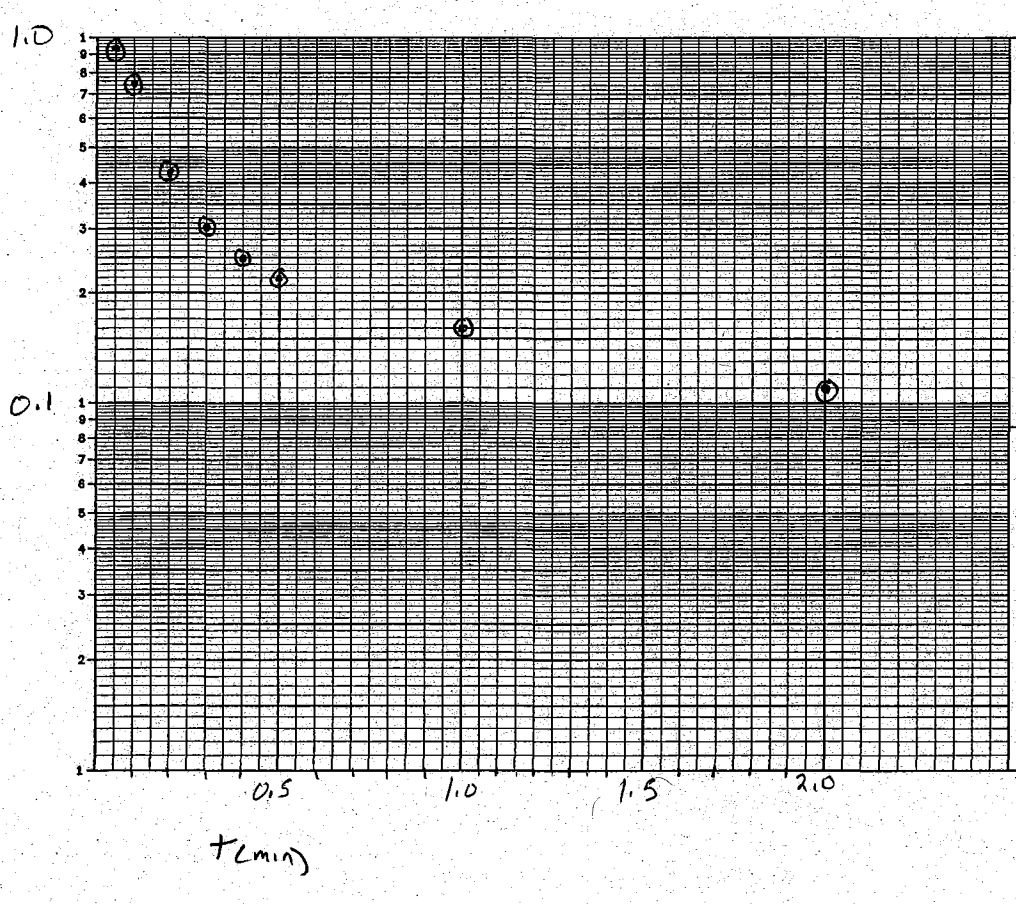
ACAD: FORM_HYDCONTST.dwg 07/06/99 INL

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)
.058		.94			
.10		.75			
.20		.43			
.30		.31			
.40		.25			
.50		.22			
1.00		.16			
2.00		.11			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

XD 4.546

CALCS, SKETCH MAPS, ETC.:

r = 0.083'
R = .177'
L = 4.75'

Report Date: ########
Report User Na Stanley.Conti
Report Comput NUSL1X25XC1

Log File Properties
File Name MW-53S 2008-08-15 09-40-18.wsl
Create Date ########

Device Properties
Device Level TROLL® 700
Site MCRD-Site 27
Device Name
Serial Number 126683
Firmware Versi 2.07

Log Configuration
Log Name MW-53S
Created By Stanley.Conti
Computer I NUSL1X25XC1
Application WinSitu.exe
Application 5.6.4.6
Create Dat ########
Notes Size 4096
Type True Logarithmic
Overwrite v Disabled
Scheduled Manual Start
Scheduled No Stop Time
Max Interv Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation
Level Level Depth To Water
Sp 0.999
Leve Set new reference
Level 0 (ft)
Level Refe 1.9462 (PSI)
1.94568 (PSI)
22.5279 (C)
[4.49251 (ft)

Other Log Settings
Zero Press 0.024158

Log Notes:

Date and Time	Note
8/15/2008 9:39	Manual Start Command
8/15/2008 9:40	User Note: "Downloading log - Used Batt: 4% Memory: 1% User: Stanley.Conti"
8/15/2008 9:42	User Note: "Downloading log - Used Batt: 4% Memory: 1% User: Stanley.Conti"

8/15/2008 9:44 Manual Stop Command

Log Data:
Record Count 93

Date and Time	Elapsed Ti Minutes		Sensor: Pr SN#: 1266 Pressure (I	Sensor: Pr SN#: 1266 Temperatu	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/15/2008 9:39	0		1.947	22.47	-0.002
8/15/2008 9:39	0.004		1.947	22.492	-0.002
8/15/2008 9:39	0.008		1.947	22.505	-0.002
8/15/2008 9:39	0.013		1.947	22.514	-0.002
8/15/2008 9:39	0.017		1.946	22.521	0
8/15/2008 9:39	0.021		1.947	22.529	-0.002
8/15/2008 9:39	0.025		1.947	22.532	-0.001
8/15/2008 9:39	0.029		1.947	22.54	-0.002
8/15/2008 9:39	0.033		1.947	22.543	-0.002
8/15/2008 9:39	0.038		1.929	22.548	0.039
8/15/2008 9:39	0.042	0	1.447	22.551	1.154
8/15/2008 9:39	0.046		1.747	22.551	0.46
8/15/2008 9:39	0.05		1.735	22.553	0.487
8/15/2008 9:39	0.054		1.55	22.556	0.915
8/15/2008 9:39	0.058		1.539	22.557	0.94
8/15/2008 9:39	0.063	.02	1.552	22.56	0.91
8/15/2008 9:39	0.067		1.563	22.563	0.885
8/15/2008 9:39	0.071		1.571	22.563	0.866
8/15/2008 9:39	0.075		1.579	22.563	0.848
8/15/2008 9:39	0.079		1.586	22.567	0.831
8/15/2008 9:39	0.083	.04	1.595	22.567	0.812
8/15/2008 9:39	0.088		1.601	22.57	0.796
8/15/2008 9:39	0.092		1.609	22.568	0.779
8/15/2008 9:39	0.096	.058	1.614	22.57	0.768
8/15/2008 9:39	0.1		1.622	22.571	0.748
8/15/2008 9:39	0.106		1.632	22.563	0.724
8/15/2008 9:39	0.112		1.641	22.557	0.704
8/15/2008 9:39	0.119		1.652	22.551	0.679
8/15/2008 9:39	0.126		1.663	22.549	0.654
8/15/2008 9:39	0.133		1.673	22.545	0.63
8/15/2008 9:39	0.141		1.685	22.541	0.604
8/15/2008 9:39	0.15	.108	1.696	22.539	0.577
8/15/2008 9:39	0.158		1.707	22.533	0.553
8/15/2008 9:39	0.168		1.718	22.529	0.527
8/15/2008 9:39	0.178		1.729	22.528	0.502
8/15/2008 9:39	0.188		1.74	22.531	0.476
8/15/2008 9:39	0.199		1.75	22.525	0.454
8/15/2008 9:39	0.211	.169	1.761	22.523	0.429
8/15/2008 9:39	0.224		1.771	22.522	0.404
8/15/2008 9:39	0.237		1.781	22.519	0.381
8/15/2008 9:39	0.251		1.79	22.519	0.362
8/15/2008 9:39	0.266		1.799	22.516	0.34
8/15/2008 9:39	0.282	.24	1.806	22.515	0.323

8/15/2008 9:39	0.298	1.812	22.512	0.309
8/15/2008 9:39	0.316	1.82	22.513	0.292
8/15/2008 9:39	0.335	1.825	22.509	0.279
8/15/2008 9:39	0.355 .313	1.831	22.509	0.267
8/15/2008 9:39	0.376	1.835	22.507	0.257
8/15/2008 9:39	0.398	1.839	22.507	0.248
8/15/2008 9:39	0.422	1.843	22.506	0.237
8/15/2008 9:39	0.447	1.846	22.504	0.23
8/15/2008 9:39	0.473	1.849	22.505	0.225
8/15/2008 9:39	0.501 .459	1.852	22.503	0.217
8/15/2008 9:39	0.531	1.855	22.502	0.21
8/15/2008 9:39	0.562	1.857	22.501	0.206
8/15/2008 9:39	0.596	1.859	22.5	0.202
8/15/2008 9:39	0.631	1.862	22.5	0.194
8/15/2008 9:39	0.668	1.864	22.498	0.19
8/15/2008 9:39	0.708	1.867	22.497	0.184
8/15/2008 9:39	0.75 .708	1.869	22.497	0.179
8/15/2008 9:39	0.794	1.871	22.497	0.173
8/15/2008 9:39	0.841	1.873	22.495	0.17
8/15/2008 9:40	0.891	1.875	22.494	0.165
8/15/2008 9:40	0.944	1.876	22.489	0.161
8/15/2008 9:40	1 .958	1.878	22.49	0.158
8/15/2008 9:40	1.06	1.88	22.488	0.153
8/15/2008 9:40	1.12	1.88	22.488	0.152
8/15/2008 9:40	1.19	1.882	22.483	0.149
8/15/2008 9:40	1.26	1.884	22.484	0.144
8/15/2008 9:40	1.33	1.886	22.483	0.14
8/15/2008 9:40	1.41	1.887	22.481	0.136
8/15/2008 9:40	1.5 1.458	1.889	22.478	0.133
8/15/2008 9:40	1.58	1.89	22.478	0.129
8/15/2008 9:40	1.68	1.893	22.479	0.124
8/15/2008 9:40	1.78	1.895	22.474	0.119
8/15/2008 9:41	1.88	1.896	22.472	0.115
8/15/2008 9:41	1.99	1.898	22.473	0.111
8/15/2008 9:41	2.11	1.899	22.471	0.109
8/15/2008 9:41	2.24	1.9	22.468	0.106
8/15/2008 9:41	2.37	1.901	22.468	0.103
8/15/2008 9:41	2.51	1.903	22.467	0.1
8/15/2008 9:41	2.66	1.905	22.466	0.095
8/15/2008 9:41	2.82	1.906	22.463	0.092
8/15/2008 9:42	2.98	1.907	22.464	0.092
8/15/2008 9:42	3.16	1.908	22.464	0.087
8/15/2008 9:42	3.35	1.91	22.465	0.083
8/15/2008 9:42	3.55	1.911	22.465	0.08
8/15/2008 9:42	3.76	1.912	22.463	0.079
8/15/2008 9:43	3.98	1.914	22.462	0.075
8/15/2008 9:43	4.22	1.915	22.463	0.072
8/15/2008 9:43	4.47	1.918	22.464	0.065
8/15/2008 9:43	4.73	1.918	22.466	0.065
8/15/2008 9:44	5.01	1.92	22.467	0.061

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	PAI-27-MW54I
Test No.:	1
Date:	8/15/2008
Geologist:	CONTI
Checked by / Date:	SWRamser 6-28-11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.177
Screened / Monitored Interval Below Water Table, L (ft):	5
Static Water Level (Depth/ Elevation) (ft.):	8.75
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	2.14	0.00	2.14	1.00	0.0000	0.00
	0.09	2.01	0.09	2.01	0.94	-0.0627	-0.01
	0.43	1.84	0.43	1.84	0.86	-0.1510	-0.07
	0.93	1.66	0.93	1.66	0.76	-0.2840	-0.13
	2.04	1.35	2.04	1.35	0.63	-0.4607	-0.33
	4.15	0.94	4.15	0.94	0.44	-0.8267	-0.67
	5.24	0.79	5.24	0.79	0.37	-0.9965	-0.85
	7.43	0.56	7.43	0.56	0.27	-1.3055	-1.20
	9.93	0.43	9.93	0.43	0.20	-1.6048	-1.61
x	14.93	0.28	0.00			0.0000	
x	24.92	0.18	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	9
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-0.162
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.085
Actual Y-intercept is set to 0.	0.000
T_0 (min):	6.185
K (ft/min):	3.75E-04
K (ft/day):	**0.540**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

T_0: Time at which ln(H/H0)=-1

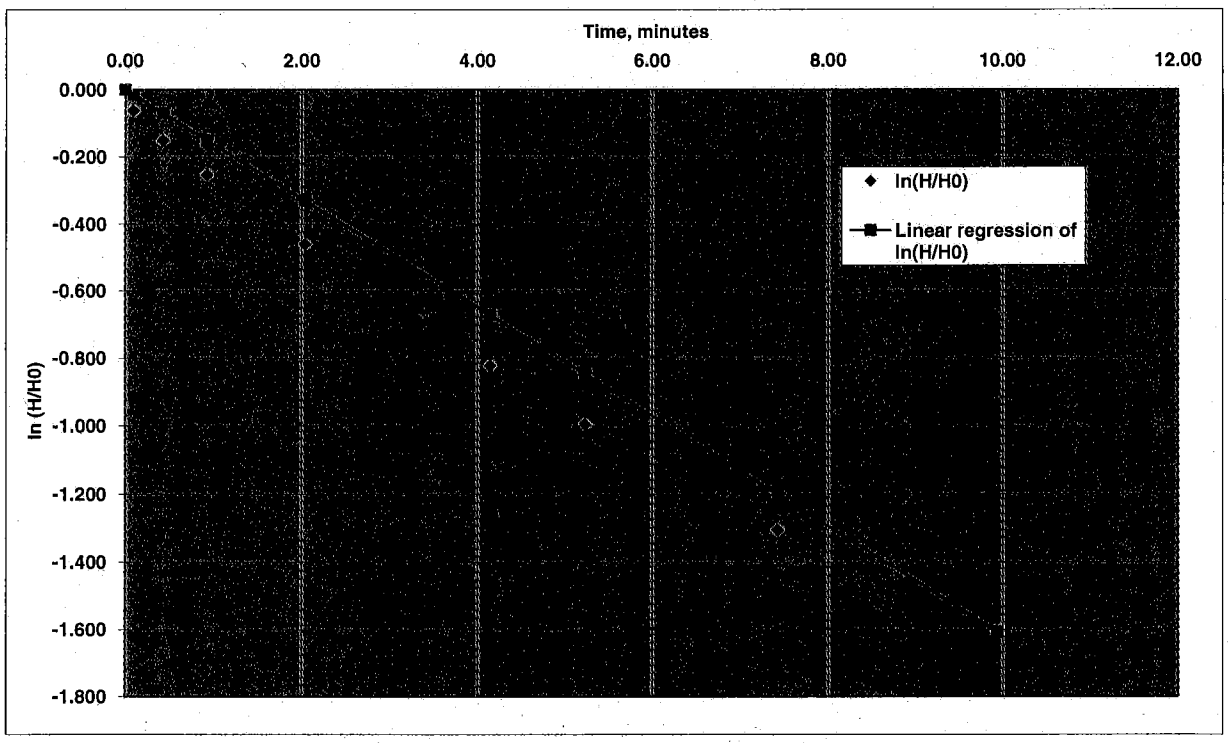
$K = r^2 * \ln(L/R)/(2LT_0)$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



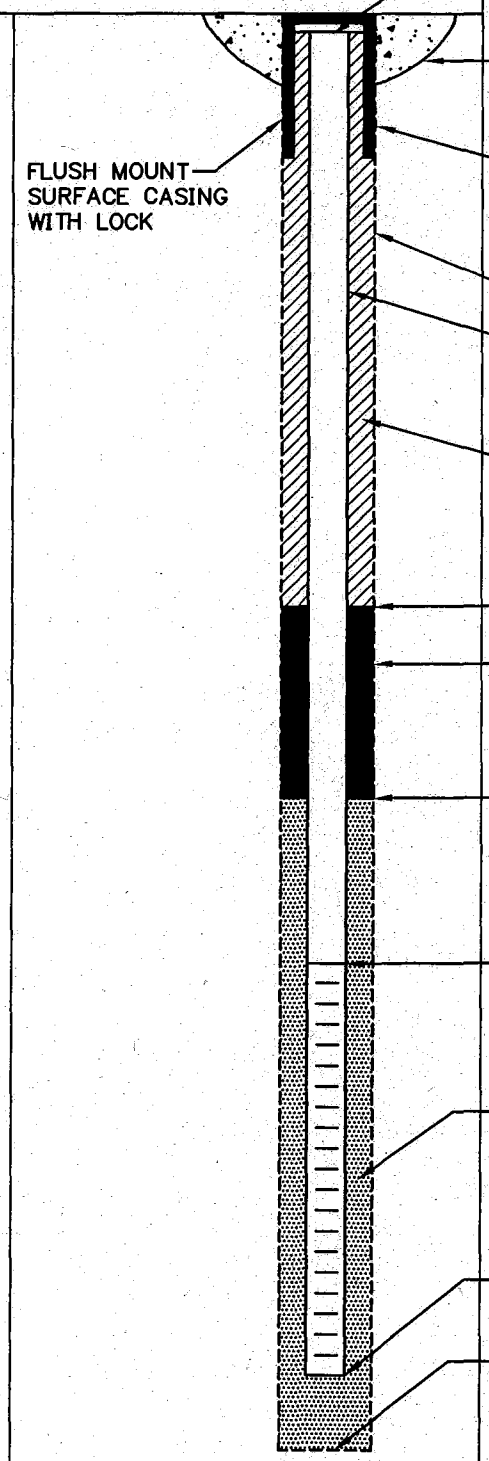
1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

WELL NO.: PA1-27MW54I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT: PARRIS ISLAND SITE 27	LOCATION: MW54I	DRILLER: COREY GAMWELL
PROJECT NO.: 600455	BORING:	DRILLING METHOD: DPT
DATE BEGUN: 8/6/08	DATE COMPLETED: 8/9/08	
FIELD GEOLOGIST: CHIRLIN WARNO		DEVELOPMENT METHOD: PERISTALTIC
GROUND ELEVATION: 13.82	DATUM:	



ELEVATION TOP OF RISER: 13.57

TYPE OF SURFACE SEAL: CONCRETE

TYPE OF PROTECTIVE CASING:

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: GROUT

ELEVATION/DEPTH TOP OF SEAL: -2.18 / 16'

TYPE OF SEAL: BENTONITE

ELEVATION/DEPTH TOP OF SAND: -4.18 / 18'

ELEVATION/DEPTH TOP OF SCREEN: -5.18 / 19'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 5'

TYPE OF SAND PACK: #1 SAND

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: -10.18 / 24'

ELEVATION / DEPTH BOTTOM OF SAND: -10.68 / 24.5'

ELEVATION/DEPTH BOTTOM OF HOLE: -10.68 / 24.5'

BACKFILL MATERIAL BELOW SAND: NA

ACAD:FORM_MWFM.dwg 07/20/99 INL

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PAI-27

PROJECT NAME: MCRD PARRIS IS - SITE 27 WELL/BORING NO.: MW-54I

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2 SCREEN LENGTH/DEPTH: 15 / 23.90 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 8.75 DATE: 8/15/08

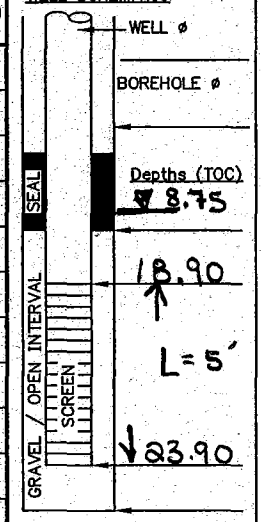
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: 2 SECTION SLUG PAGE 1 OF 1

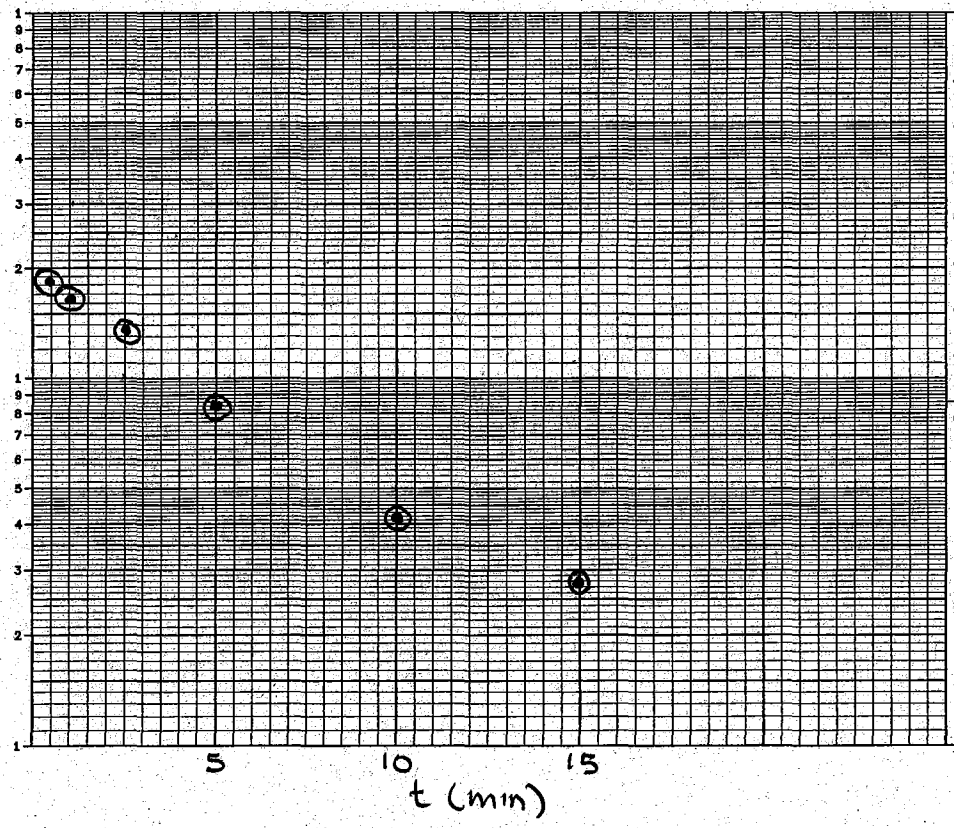
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

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)
.083		2.092			
.5		1.835			
1.0		1.658			
2.0		1.380			
5.0		.832			
10.0		.428			
15.0		.280			
20.0		.224			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

XD = -10.029

CALCS, SKETCH MAPS, ETC.:

r = .083'
R = .177
L = 5'

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

Report Date:	8/15/2008 10:57
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-54I 2008-08-15 10-31-38.wsl
Create Date	8/15/2008 10:54

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-54I
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/15/2008 10:02
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	6.27875 (PSI)
Head Pressure	6.27844 (PSI)
Temperature	21.7827 (C)
Depth of Probe	14.4967 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/15/2008 10:29	Manual Start Command
8/15/2008 10:31	User Note: "Downloading log - Used Batt: 4% Memory: 3% User: Stanley.Conti"
8/15/2008 10:34	User Note: "Downloading log - Used Batt: 4% Memory: 3% User: Stanley.Conti"

8/15/2008 10:46 User Note: "Downloading log - Used Batt: 4% Memory: 3% User: Stanley.Conti"
8/15/2008 10:51 User Note: "Downloading log - Used Batt: 4% Memory: 3% User: Stanley.Conti"
8/15/2008 10:52 Manual Stop Command

Log Data:
Record Count 119

Date and Time	Elapsed Time Minutes	Sensor: Pres 35ft SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/15/2008 10:29	0	6.223	21.258	0.128
8/15/2008 10:29	0.004	6.224	21.28	0.126
8/15/2008 10:29	0.008	6.223	21.292	0.13
8/15/2008 10:29	0.013	6.226	21.328	0.121
8/15/2008 10:29	0.018	6.224	21.324	0.127
8/15/2008 10:29	0.021	6.224	21.331	0.125
8/15/2008 10:29	0.025	6.224	21.334	0.126
8/15/2008 10:29	0.029	6.223	21.336	0.13
8/15/2008 10:29	0.033	6.223	21.343	0.129
8/15/2008 10:29	0.037	6.219	21.343	0.139
8/15/2008 10:29	0.042	6.169	21.344	0.253
8/15/2008 10:29	0.046	5.706	21.345	1.321
8/15/2008 10:29	0.05	5.953	21.347	0.752
8/15/2008 10:29	0.054	5.853	21.347	0.983
8/15/2008 10:29	0.058	5.857	21.349	0.973
8/15/2008 10:29	0.063	5.664	21.349	1.419
8/15/2008 10:29	0.067	5.4	21.351	2.03
8/15/2008 10:29	0.071	5.354	21.353	2.135
8/15/2008 10:29	0.075	5.36	21.356	2.122
8/15/2008 10:29	0.079	5.368	21.354	2.102
8/15/2008 10:29	0.083	5.373	21.354	2.092
8/15/2008 10:29	0.087	5.376	21.355	2.083
8/15/2008 10:29	0.092	5.38	21.36	2.075
8/15/2008 10:29	0.096	5.383	21.358	2.069
8/15/2008 10:29	0.1	5.383	21.359	2.067
8/15/2008 10:29	0.106	5.387	21.351	2.059
8/15/2008 10:29	0.112	5.39	21.346	2.052
8/15/2008 10:29	0.119	5.395	21.34	2.041
8/15/2008 10:29	0.126	5.397	21.338	2.035
8/15/2008 10:29	0.133	5.401	21.332	2.026
8/15/2008 10:29	0.141	5.404	21.331	2.021
8/15/2008 10:29	0.15	5.407	21.325	2.012
8/15/2008 10:29	0.158	.087 5.41	21.324	2.006
8/15/2008 10:29	0.168	5.414	21.32	1.997
8/15/2008 10:29	0.178	5.415	21.316	1.995
8/15/2008 10:29	0.188	5.42	21.319	1.983
8/15/2008 10:29	0.199	5.422	21.314	1.977
8/15/2008 10:29	0.211	5.425	21.312	1.971
8/15/2008 10:29	0.224	5.428	21.309	1.964

8/15/2008 10:29	0.237		5.433	21.308	1.953
8/15/2008 10:29	0.251		5.436	21.305	1.947
8/15/2008 10:29	0.266		5.438	21.303	1.941
8/15/2008 10:29	0.282		5.443	21.305	1.93
8/15/2008 10:29	0.298		5.446	21.303	1.923
8/15/2008 10:29	0.316		5.449	21.3	1.915
8/15/2008 10:29	0.335		5.453	21.298	1.906
8/15/2008 10:29	0.355		5.458	21.3	1.896
8/15/2008 10:29	0.376		5.462	21.297	1.886
8/15/2008 10:29	0.398		5.466	21.298	1.876
8/15/2008 10:30	0.422		5.47	21.297	1.867
8/15/2008 10:30	0.447		5.474	21.294	1.858
8/15/2008 10:30	0.473		5.482	21.292	1.84
8/15/2008 10:30	0.501	.43	5.484	21.292	1.835
8/15/2008 10:30	0.531		5.489	21.29	1.823
8/15/2008 10:30	0.562		5.494	21.29	1.811
8/15/2008 10:30	0.596		5.5	21.289	1.799
8/15/2008 10:30	0.631		5.506	21.288	1.785
8/15/2008 10:30	0.668		5.512	21.289	1.772
8/15/2008 10:30	0.708		5.518	21.286	1.756
8/15/2008 10:30	0.75		5.524	21.287	1.743
8/15/2008 10:30	0.794		5.531	21.284	1.727
8/15/2008 10:30	0.841		5.537	21.283	1.713
8/15/2008 10:30	0.891		5.545	21.284	1.694
8/15/2008 10:30	0.944		5.552	21.282	1.677
8/15/2008 10:30	1	.929	5.561	21.28	1.658
8/15/2008 10:30	1.06		5.569	21.283	1.639
8/15/2008 10:30	1.12		5.577	21.279	1.621
8/15/2008 10:30	1.19		5.586	21.278	1.599
8/15/2008 10:30	1.26		5.595	21.276	1.578
8/15/2008 10:30	1.33		5.604	21.278	1.557
8/15/2008 10:30	1.41		5.619	21.278	1.524
8/15/2008 10:31	1.5		5.625	21.278	1.509
8/15/2008 10:31	1.58		5.635	21.276	1.487
8/15/2008 10:31	1.68		5.646	21.276	1.462
8/15/2008 10:31	1.78		5.658	21.271	1.434
8/15/2008 10:31	1.88		5.67	21.27	1.406
8/15/2008 10:31	1.99		5.681	21.268	1.38
8/15/2008 10:31	2.11	2.039	5.694	21.271	1.35
8/15/2008 10:31	2.24		5.707	21.271	1.319
8/15/2008 10:31	2.37		5.72	21.267	1.29
8/15/2008 10:32	2.51		5.734	21.269	1.259
8/15/2008 10:32	2.66		5.747	21.268	1.228
8/15/2008 10:32	2.82		5.762	21.268	1.192
8/15/2008 10:32	2.98		5.777	21.267	1.159
8/15/2008 10:32	3.16		5.792	21.266	1.124
8/15/2008 10:32	3.35		5.807	21.266	1.089
8/15/2008 10:33	3.55		5.822	21.265	1.054
8/15/2008 10:33	3.76		5.838	21.265	1.018
8/15/2008 10:33	3.98		5.853	21.265	0.983
8/15/2008 10:33	4.22	4.149	5.87	21.265	0.943
8/15/2008 10:34	4.47		5.886	21.26	0.907

8/15/2008 10:34	4.73		5.902	21.26	0.87
8/15/2008 10:34	5.01		5.919	21.261	0.832
8/15/2008 10:34	5.31	5.239	5.935	21.261	0.794
8/15/2008 10:35	5.62		5.95	21.262	0.76
8/15/2008 10:35	5.96		5.966	21.26	0.723
8/15/2008 10:35	6.31		5.982	21.26	0.686
8/15/2008 10:36	6.68		5.998	21.259	0.649
8/15/2008 10:36	7.08		6.011	21.26	0.618
8/15/2008 10:37	7.5	7.429	6.027	21.26	0.581
8/15/2008 10:37	7.94		6.041	21.258	0.55
8/15/2008 10:37	8.41		6.054	21.259	0.519
8/15/2008 10:38	8.91		6.067	21.261	0.488
8/15/2008 10:39	9.44		6.081	21.261	0.456
8/15/2008 10:39	10	9.929	6.094	21.265	0.428
8/15/2008 10:40	10.6		6.104	21.263	0.403
8/15/2008 10:40	11.2		6.115	21.267	0.378
8/15/2008 10:41	11.9		6.126	21.266	0.353
8/15/2008 10:42	12.6		6.135	21.267	0.332
8/15/2008 10:42	13.3		6.143	21.266	0.313
8/15/2008 10:43	14.1		6.151	21.266	0.295
8/15/2008 10:44	15	14.929	6.157	21.269	0.28
8/15/2008 10:45	15.8		6.163	21.27	0.267
8/15/2008 10:46	16.8		6.169	21.269	0.253
8/15/2008 10:47	17.8		6.174	21.273	0.241
8/15/2008 10:48	18.8		6.178	21.272	0.232
8/15/2008 10:49	19.9		6.182	21.27	0.224
8/15/2008 10:50	21.1	21.029	6.185	21.27	0.216
8/15/2008 10:51	22.4		6.192	21.269	0.2

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	**PAI-27-MW55S**
Test No.:	**1**
Date:	**8/16/2008**
Geologist:	CONTI
Checked by / Date:	PLRammer 6/28/11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.177
Screened / Monitored Interval Below Water Table, L (ft):	8.55
Static Water Level (Depth/ Elevation) (ft.):	8.00
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	0.94	0.00	-0.94	1.00	0.0000	0.00
	0.02	0.72	0.02	-0.72	0.77	-0.2666	-0.09
	0.03	0.69	0.03	-0.69	0.73	-0.3092	-0.14
	0.06	0.59	0.06	-0.59	0.63	-0.4658	-0.28
	0.10	0.49	0.10	-0.49	0.52	-0.6515	-0.47
	0.14	0.41	0.14	-0.41	0.44	-0.8297	-0.65
	0.20	0.35	0.20	-0.35	0.37	-0.9879	-0.93
x	0.28	0.30	0.00			0.0000	
x	0.42	0.25	0.00			0.0000	
x	0.67	0.20	0.00			0.0000	
x	0.92	0.17	0.00			0.0000	
x	1.42	0.14	0.00			0.0000	
x	2.03	0.11	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	7
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-4.654
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.136
Actual Y-intercept is set to 0.	0.000
T_0 (min):	0.215
K (ft/min):	7.32E-03
K (ft/day):	**10.545**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum\left(x^2\right)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

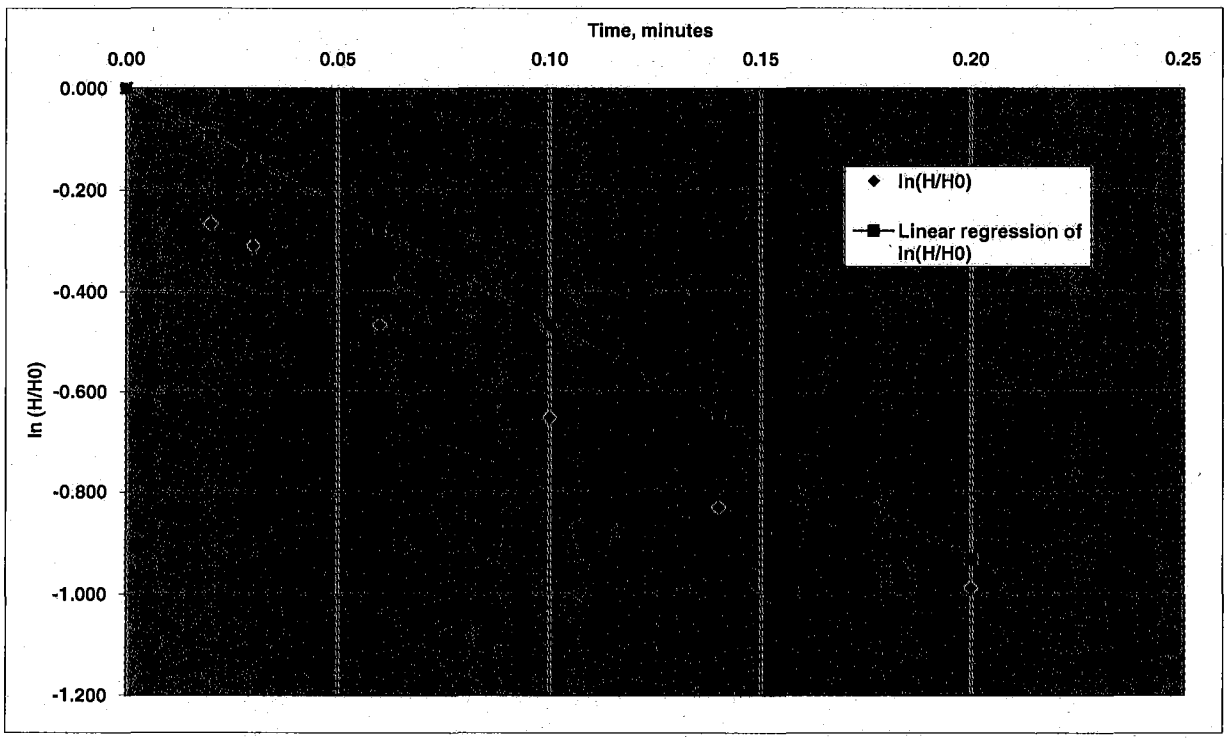
T_0: Time at which ln(H/H0)=-1

$K = r^2 * \ln(L/R)/(2LT_0)$

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



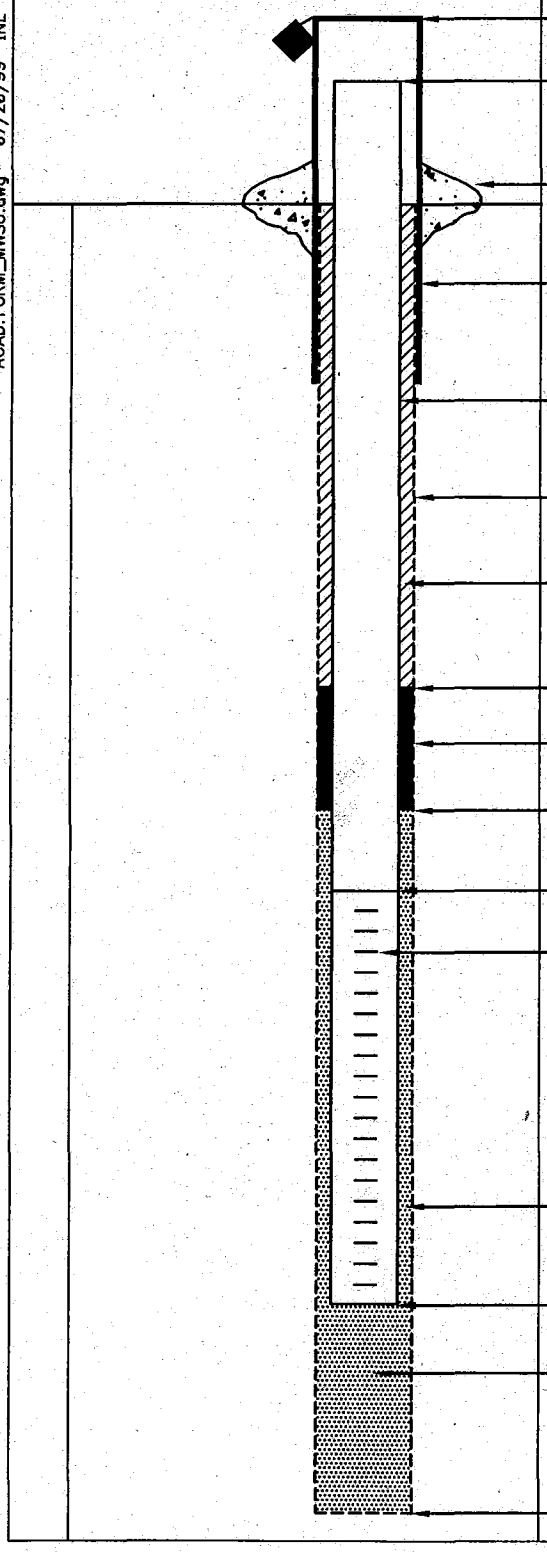
1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

WELL NO.: PAI-27 MW55S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT PARRIS ISLAND SITE 27	LOCATION MW55S	DRILLER CORDY GAMWELL
PROJECT NO. 600455	BORING	DRILLING METHOD DPT
DATE BEGUN 8/7/08	DATE COMPLETED 8/7/08	
FIELD GEOLOGIST CHARLIE WARING		DEVELOPMENT METHOD PERISTALTIC
GROUND ELEVATION 6.92	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 10.11/3.19

TYPE OF SURFACE SEAL: CONCRETE

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 4 1/4"

TYPE OF BACKFILL: GROUT

ELEVATION/DEPTH TOP OF SEAL: 4.92/2'

TYPE OF SEAL: BENTONITE

DEPTH TOP OF SAND PACK: 4.42/2.5'

ELEVATION/DEPTH TOP OF SCREEN: 3.92/5'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #1 SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: -6.08/13'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -6.58/13.5'

BACKFILL MATERIAL BELOW SAND: #1 SAND

ELEVATION/DEPTH OF HOLE: -6.58/13.5

ACAD: FORM_MWSU.dwg 07/28/99 TNL

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PAI-27-

PROJECT NAME: MCRD PARRIS IS- SITE 27 WELL/BORING NO.: MW-55S

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10 / 16.55 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 8.00 DATE: 8/16/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

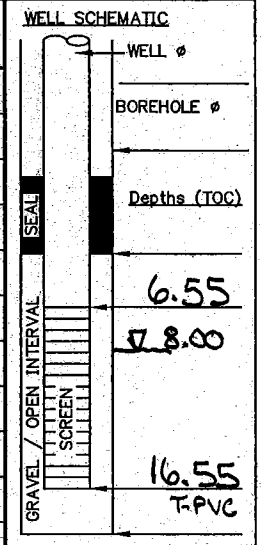
METHOD OF INDUCING WATER LEVEL CHANGE: 1 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

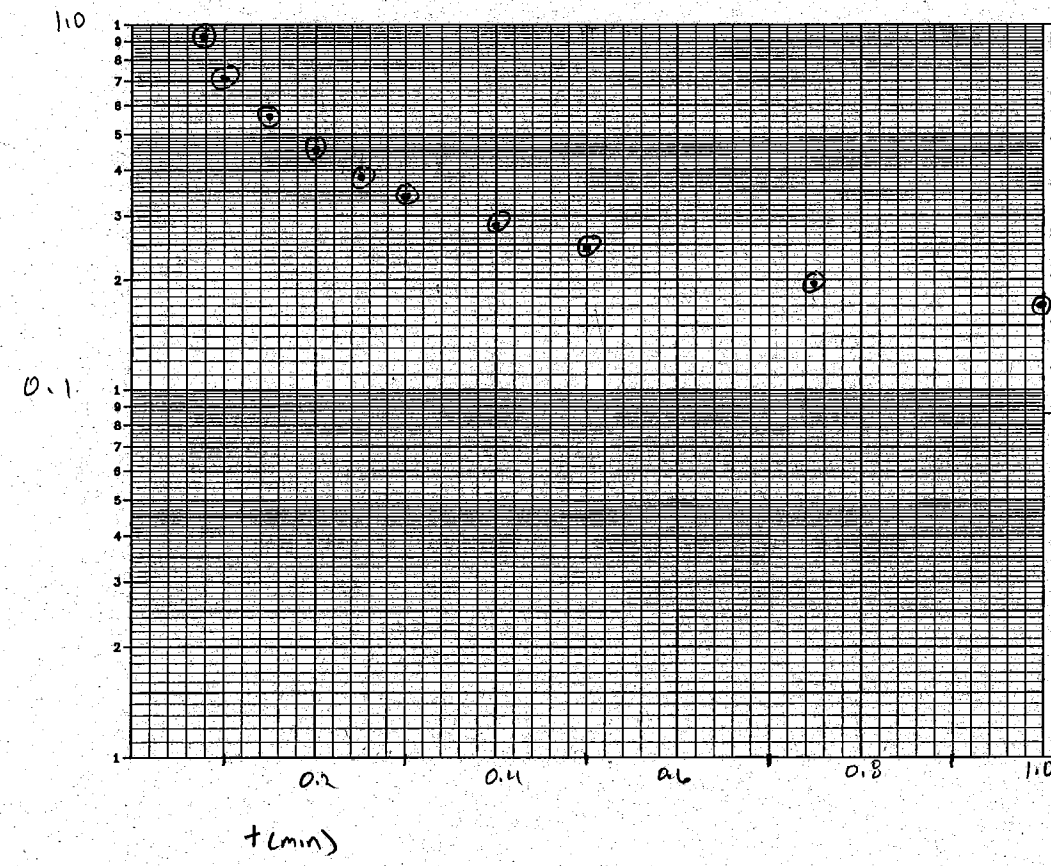
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

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)
.08		.936			
.10		.704			
.15		.561			
.20		.451			
.25		.380			
.30		.335			
.40		.282			
.50		.249			
.75		.199			
1.00		.17			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG.

CALCS, SKETCH MAPS, ETC.:

r = .083'
R = .177
L = 8.55

Report Date:	8/16/2008 11:16
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-55S 2008-08-16 11-13-39.wsl
Create Date	8/16/2008 11:15

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-55S
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/16/2008 11:04
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	3.3531 (PSI)
Head Pressure	3.35251 (PSI)
Temperature	25.6998 (C)
Depth of Probe	7.74085 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/16/2008 11:09	Manual Start Command
8/16/2008 11:13	User Note: "Downloading log - Used Batt: 4% Memory: 21% User: Stanley.Conti"
8/16/2008 11:15	Manual Stop Command

Log Data:
Record Count 94

Date and Time	Elapsed Time Minutes		Sensor: Pres 35f SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/16/2008 11:09	0		3.374	22.221	-0.047
8/16/2008 11:09	0.004		3.373	22.243	-0.047
8/16/2008 11:09	0.008		3.375	22.254	-0.05
8/16/2008 11:09	0.013		3.376	22.324	-0.053
8/16/2008 11:09	0.02		3.374	22.308	-0.049
8/16/2008 11:09	0.024		3.374	22.306	-0.048
8/16/2008 11:09	0.028		3.374	22.306	-0.049
8/16/2008 11:09	0.031		3.374	22.308	-0.047
8/16/2008 11:09	0.035		3.374	22.309	-0.048
8/16/2008 11:09	0.039		3.373	22.308	-0.046
8/16/2008 11:09	0.043		3.373	22.309	-0.045
8/16/2008 11:09	0.046		3.374	22.306	-0.048
8/16/2008 11:09	0.05		3.373	22.307	-0.047
8/16/2008 11:09	0.058		3.141	22.286	0.49
8/16/2008 11:10	0.062		3.014	22.293	0.783
8/16/2008 11:10	0.065		3.419	22.298	-0.152
8/16/2008 11:10	0.069		3.357	22.304	-0.009
8/16/2008 11:10	0.076		3.106	22.288	0.571
8/16/2008 11:10	0.08	0	2.948	22.294	0.936
8/16/2008 11:10	0.084		3.021	22.303	0.766
8/16/2008 11:10	0.088		3.027	22.303	0.753
8/16/2008 11:10	0.092		3.03	22.308	0.746
8/16/2008 11:10	0.096	.016	3.04	22.303	0.723
8/16/2008 11:10	0.1		3.048	22.308	0.704
8/16/2008 11:10	0.103		3.053	22.308	0.692
8/16/2008 11:10	0.107		3.057	22.309	0.683
8/16/2008 11:10	0.112	.032	3.053	22.305	0.693
8/16/2008 11:10	0.119		3.075	22.29	0.643
8/16/2008 11:10	0.126		3.083	22.279	0.623
8/16/2008 11:10	0.133		3.091	22.273	0.605
8/16/2008 11:10	0.141	.061	3.1	22.268	0.585
8/16/2008 11:10	0.15		3.11	22.261	0.561
8/16/2008 11:10	0.158		3.121	22.258	0.535
8/16/2008 11:10	0.168		3.132	22.249	0.512
8/16/2008 11:10	0.178	.098	3.141	22.245	0.489
8/16/2008 11:10	0.188		3.148	22.242	0.472
8/16/2008 11:10	0.199		3.158	22.237	0.451
8/16/2008 11:10	0.211		3.166	22.229	0.433
8/16/2008 11:10	0.224	.144	3.175	22.225	0.411
8/16/2008 11:10	0.237		3.181	22.221	0.397
8/16/2008 11:10	0.251		3.188	22.213	0.38
8/16/2008 11:10	0.266		3.196	22.211	0.364

8/16/2008 11:10	0.282	.202	3.202	22.203	0.35
8/16/2008 11:10	0.298		3.208	22.201	0.335
8/16/2008 11:10	0.316		3.213	22.195	0.323
8/16/2008 11:10	0.335		3.218	22.189	0.312
8/16/2008 11:10	0.355	.275	3.223	22.186	0.301
8/16/2008 11:10	0.376		3.226	22.176	0.293
8/16/2008 11:10	0.398		3.231	22.175	0.282
8/16/2008 11:10	0.422		3.235	22.166	0.274
8/16/2008 11:10	0.447		3.238	22.16	0.266
8/16/2008 11:10	0.473		3.241	22.155	0.259
8/16/2008 11:10	0.501	421	3.245	22.147	0.249
8/16/2008 11:10	0.531		3.248	22.139	0.242
8/16/2008 11:10	0.562		3.252	22.132	0.233
8/16/2008 11:10	0.596		3.255	22.123	0.226
8/16/2008 11:10	0.631		3.257	22.112	0.221
8/16/2008 11:10	0.668		3.261	22.104	0.213
8/16/2008 11:10	0.708		3.264	22.095	0.205
8/16/2008 11:10	0.75	.67	3.267	22.084	0.199
8/16/2008 11:10	0.794		3.269	22.074	0.194
8/16/2008 11:10	0.841		3.271	22.062	0.188
8/16/2008 11:10	0.891		3.274	22.052	0.182
8/16/2008 11:10	0.945		3.278	22.04	0.172
8/16/2008 11:10	1	.92	3.279	22.026	0.17
8/16/2008 11:10	1.06		3.282	22.015	0.165
8/16/2008 11:11	1.12		3.285	22.005	0.158
8/16/2008 11:11	1.19		3.286	21.99	0.156
8/16/2008 11:11	1.26		3.288	21.977	0.151
8/16/2008 11:11	1.33		3.29	21.965	0.145
8/16/2008 11:11	1.41		3.292	21.946	0.141
8/16/2008 11:11	1.5	1.42	3.295	21.931	0.135
8/16/2008 11:11	1.58		3.296	21.916	0.132
8/16/2008 11:11	1.68		3.298	21.896	0.128
8/16/2008 11:11	1.78		3.3	21.881	0.123
8/16/2008 11:11	1.88		3.302	21.864	0.117
8/16/2008 11:11	1.99		3.303	21.848	0.115
8/16/2008 11:12	2.11	2.03	3.305	21.828	0.111
8/16/2008 11:12	2.24		3.307	21.808	0.106
8/16/2008 11:12	2.37		3.309	21.792	0.102
8/16/2008 11:12	2.51		3.31	21.777	0.1
8/16/2008 11:12	2.66		3.315	21.756	0.088
8/16/2008 11:12	2.82		3.315	21.735	0.088
8/16/2008 11:12	2.98		3.315	21.718	0.088
8/16/2008 11:13	3.16		3.317	21.7	0.084
8/16/2008 11:13	3.35		3.318	21.682	0.081
8/16/2008 11:13	3.55		3.32	21.665	0.076
8/16/2008 11:13	3.76		3.323	21.648	0.07
8/16/2008 11:13	3.98		3.323	21.633	0.07
8/16/2008 11:14	4.22		3.326	21.616	0.064
8/16/2008 11:14	4.47		3.329	21.602	0.056
8/16/2008 11:14	4.73		3.329	21.587	0.055
8/16/2008 11:14	5.01		3.329	21.574	0.057
8/16/2008 11:15	5.31		3.33	21.558	0.054

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	PAI-27-MW56I
Test No.:	1
Date:	8/16/2008
Geologist:	CONTI
Checked by / Date:	SW Ramsey 6-28-11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.177
Screened / Monitored Interval Below Water Table, L (ft):	5
Static Water Level (Depth/ Elevation) (ft.):	7.20
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	1.75	0.00	-1.75	1.00	0.0000	0.00
	0.01	1.52	0.01	-1.52	0.87	-0.1409	-0.07
	0.02	1.36	0.02	-1.36	0.78	-0.2527	-0.13
	0.04	1.15	0.04	-1.15	0.66	-0.4109	-0.26
	0.08	0.89	0.08	-0.89	0.50	-0.6874	-0.53
	0.11	0.70	0.11	-0.70	0.40	-0.9163	-0.72
	0.15	0.53	0.15	-0.53	0.30	-1.1645	-0.95
	0.19	0.40	0.19	-0.40	0.23	-1.4756	-1.25
	0.29	0.23	0.29	-0.23	0.13	-2.0293	-1.91
	0.55	0.16	0.36	-0.16	0.09	-2.3922	-2.57
x	0.47	0.10	0.00			0.0000	
x	0.65	0.05	0.00			0.0000	
x	0.91	0.02	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	10
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-6.584
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.128
Actual Y-intercept is set to 0.	0.000
T_0 (min):	0.152
K (ft/min):	1.53E-02
K (ft/day):	**21.981**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

T_0: Time at which ln(H/H0)=-1

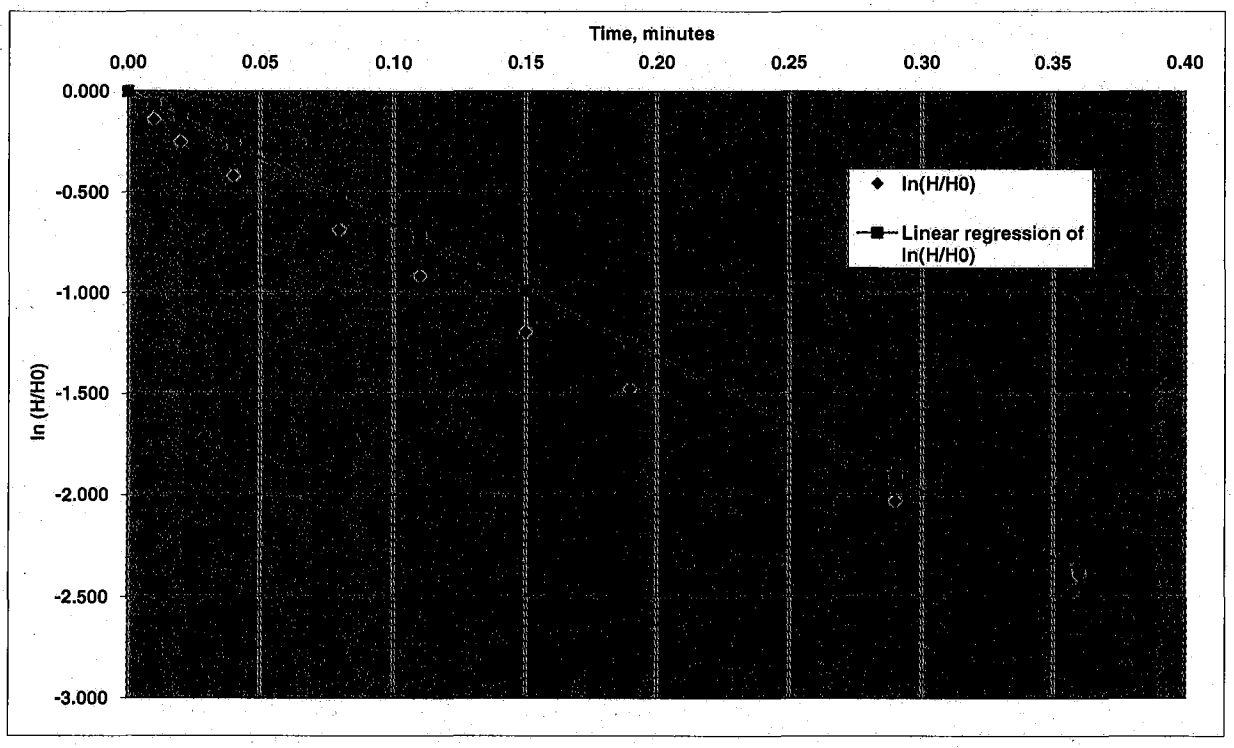
$K = r^2 * \ln(L/R)/(2LT_0)$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PAI-27

PROJECT NAME: MCRD PARRIS IS- SITE 27 WELL/BORING NO.: MW-56I

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 5' / 28.20 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 7.20 DATE: 8/16/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

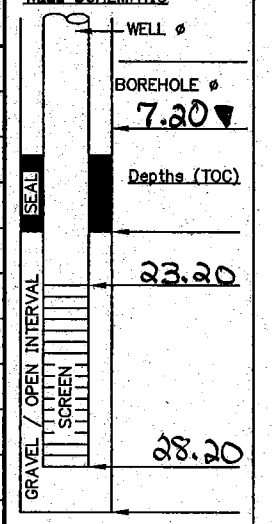
METHOD OF INDUCING WATER LEVEL CHANGE: 2 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

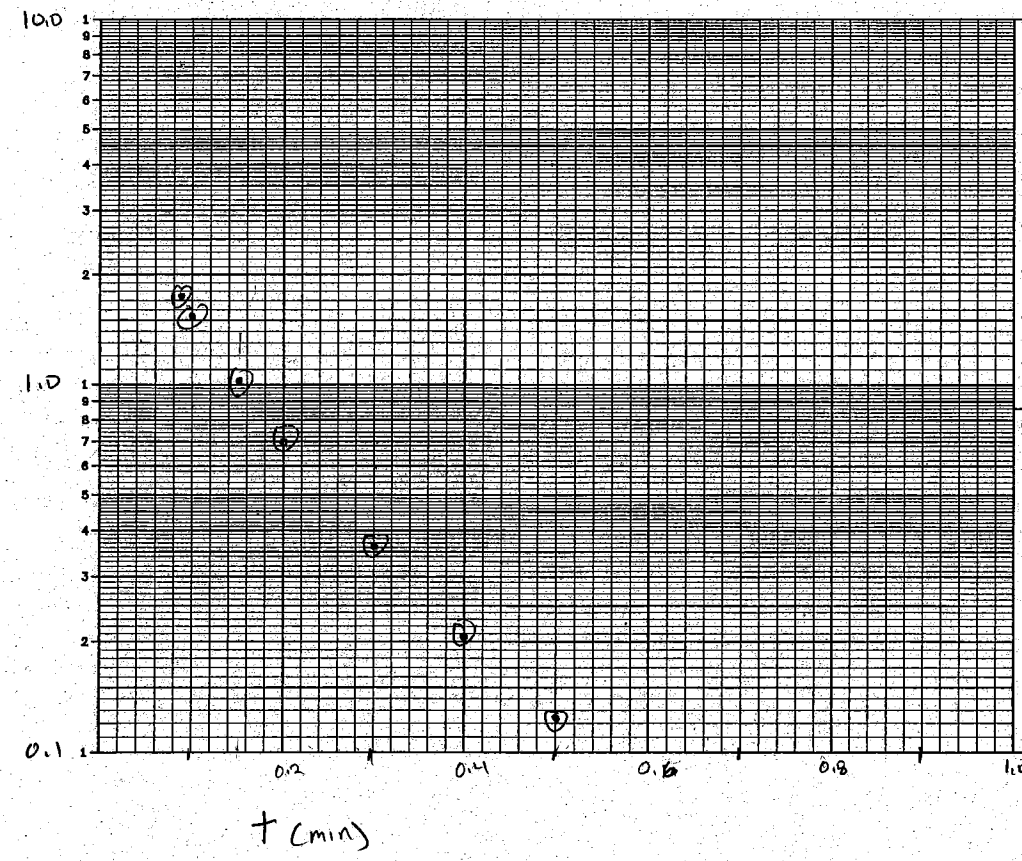
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

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)
.089		1.752			
.1		1.521			
.15		1.002			
.20		.696			
.30		.361			
.40		.205			
.50		.125			
.75		.046			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS, SKETCH MAPS, ETC.:

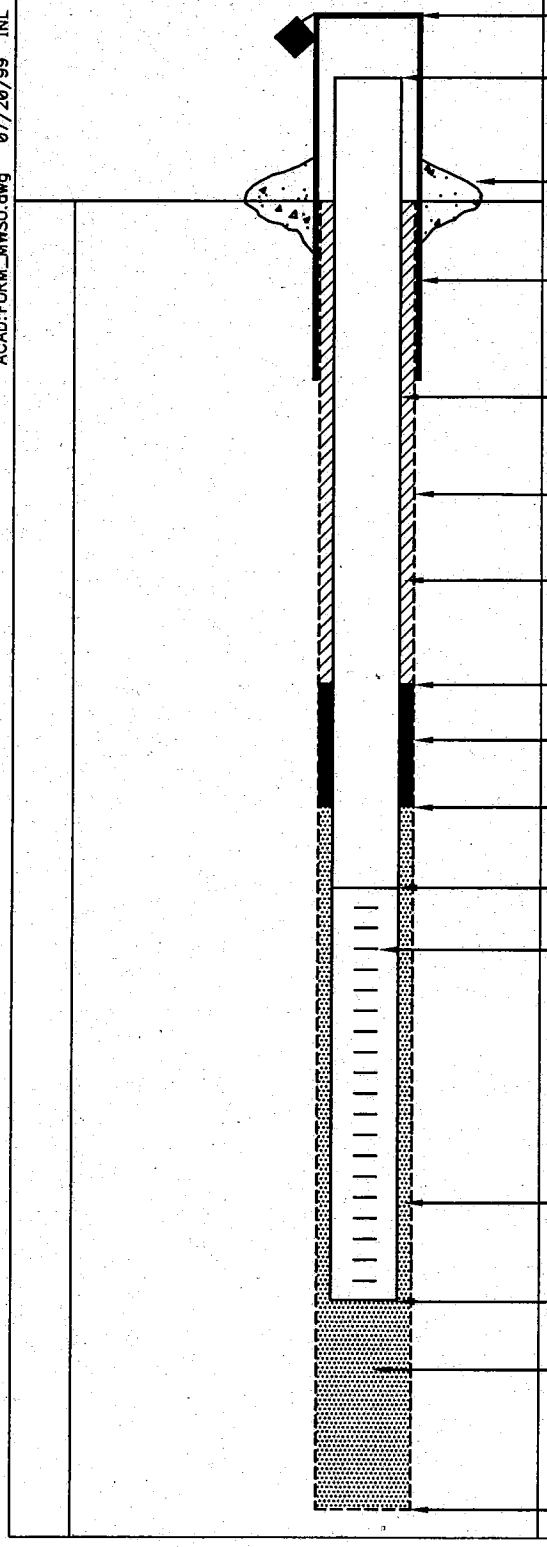
r = .083'
R = .177
L = 5'

WELL NO.: PAI - 27 MW S6I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT PARRIS ISLAND SITE 27	LOCATION MWS6I	DRILLER COREY CAMWELL
PROJECT NO. G00455	BORING	DRILLING METHOD DPT
DATE BEGUN 8/5/08	DATE COMPLETED 8/7/08	
FIELD GEOLOGIST CHARLIE HARING		DEVELOPMENT METHOD PERISTALTIC
GROUND ELEVATION 6.91	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: — / —

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 9.97/3.06

TYPE OF SURFACE SEAL: CONCRETE

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 4 1/4"

TYPE OF BACKFILL: GROUT

ELEVATION/DEPTH TOP OF SEAL: -9.09/ 16'

TYPE OF SEAL: BENTONITE

DEPTH TOP OF SAND PACK: -12.09/19'

ELEVATION/DEPTH TOP OF SCREEN: -13.09/ 20'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 5'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: # 1 SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: -18.09/ 25'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -17.59/ 24.5'

BACKFILL MATERIAL BELOW SAND: # 1 SAND

ELEVATION/DEPTH OF HOLE: -17.59/ 24.5'

ACAD:FORM_MWSU.dwg 07/20/99 INL

Report Date:	8/16/2008 11:35
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-56I 2008-08-16 11-34-08.wsl
Create Date	8/16/2008 11:35

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-56I
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/16/2008 11:22
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	8.63169 (PSI)
Head Pressure	8.63074 (PSI)
Temperature	20.8938 (C)
Depth of Probe	19.9281 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/16/2008 11:31	Manual Start Command
8/16/2008 11:34	User Note: "Downloading log - Used Batt: 4% Memory: 23% User: Stanley.Conti"
8/16/2008 11:35	Manual Stop Command

Log Data:
Record Count 85

Date and Time	Elapsed Time Minutes		Sensor: Pres 35ft SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/16/2008 11:31	0		8.639	19.981	-0.016
8/16/2008 11:31	0.004		8.639	20.001	-0.016
8/16/2008 11:31	0.008		8.64	20.013	-0.019
8/16/2008 11:31	0.013		8.643	20.083	-0.027
8/16/2008 11:31	0.02		8.641	20.069	-0.021
8/16/2008 11:31	0.024		8.64	20.068	-0.02
8/16/2008 11:31	0.028		8.639	20.069	-0.016
8/16/2008 11:31	0.031		8.64	20.047	-0.019
8/16/2008 11:31	0.04		8.64	20.057	-0.018
8/16/2008 11:31	0.043		8.638	20.065	-0.014
8/16/2008 11:31	0.047		8.637	20.068	-0.013
8/16/2008 11:31	0.055		8.64	20.051	-0.02
8/16/2008 11:31	0.059		8.579	20.057	0.121
8/16/2008 11:31	0.062		8.207	20.068	0.981
8/16/2008 11:31	0.066		8.296	20.067	0.774
8/16/2008 11:31	0.07		8.431	20.07	0.464
8/16/2008 11:31	0.074		8.292	20.073	0.785
8/16/2008 11:31	0.078		8.149	20.077	1.114
8/16/2008 11:31	0.082		7.964	20.074	1.541
8/16/2008 11:31	0.086		7.89	20.08	1.712
8/16/2008 11:31	0.089	0	7.873	20.082	1.752
8/16/2008 11:32	0.093		7.917	20.083	1.651
8/16/2008 11:32	0.097		7.949	20.086	1.575
8/16/2008 11:32	0.101	.012	7.973	20.088	1.521
8/16/2008 11:32	0.104		7.996	20.083	1.468
8/16/2008 11:32	0.109		8.023	20.082	1.406
8/16/2008 11:32	0.113	.024	8.042	20.083	1.362
8/16/2008 11:32	0.119		8.071	20.075	1.296
8/16/2008 11:32	0.126		8.104	20.065	1.219
8/16/2008 11:32	0.133	.044	8.133	20.06	1.15
8/16/2008 11:32	0.141		8.165	20.054	1.078
8/16/2008 11:32	0.15		8.198	20.046	1.002
8/16/2008 11:32	0.158		8.224	20.046	0.941
8/16/2008 11:32	0.168	.079	8.253	20.043	0.875
8/16/2008 11:32	0.178		8.281	20.036	0.809
8/16/2008 11:32	0.188		8.309	20.035	0.746
8/16/2008 11:32	0.199	.110	8.33	20.031	0.696
8/16/2008 11:32	0.211		8.356	20.029	0.637
8/16/2008 11:32	0.224		8.379	20.027	0.582
8/16/2008 11:32	0.237	.148	8.401	20.023	0.533
8/16/2008 11:32	0.251		8.421	20.022	0.486
8/16/2008 11:32	0.266		8.441	20.02	0.44

8/16/2008 11:32	0.282	.193	8.459	20.018	0.399
8/16/2008 11:32	0.298		8.475	20.017	0.361
8/16/2008 11:32	0.316		8.492	20.017	0.321
8/16/2008 11:32	0.335		8.506	20.016	0.291
8/16/2008 11:32	0.355		8.519	20.015	0.261
8/16/2008 11:32	0.376	.287	8.532	20.011	0.229
8/16/2008 11:32	0.398		8.543	20.01	0.205
8/16/2008 11:32	0.422		8.553	20.005	0.182
8/16/2008 11:32	0.447	.358	8.562	20.005	0.16
8/16/2008 11:32	0.473		8.57	20.006	0.143
8/16/2008 11:32	0.501		8.577	20.004	0.125
8/16/2008 11:32	0.531		8.584	20.002	0.109
8/16/2008 11:32	0.562	.473	8.591	20	0.095
8/16/2008 11:32	0.596		8.596	20.001	0.082
8/16/2008 11:32	0.631		8.6	19.998	0.074
8/16/2008 11:32	0.668		8.604	19.995	0.065
8/16/2008 11:32	0.708	.661	8.608	19.992	0.054
8/16/2008 11:32	0.75		8.612	19.992	0.046
8/16/2008 11:32	0.794		8.614	19.989	0.04
8/16/2008 11:32	0.841		8.616	19.988	0.037
8/16/2008 11:32	0.891		8.618	19.985	0.031
8/16/2008 11:32	0.944		8.62	19.983	0.027
8/16/2008 11:32	1	.911	8.622	19.981	0.023
8/16/2008 11:32	1.06		8.621	19.977	0.024
8/16/2008 11:33	1.12		8.622	19.977	0.021
8/16/2008 11:33	1.19		8.626	19.975	0.013
8/16/2008 11:33	1.26		8.625	19.975	0.016
8/16/2008 11:33	1.33		8.625	19.967	0.015
8/16/2008 11:33	1.41		8.628	19.968	0.01
8/16/2008 11:33	1.5		8.628	19.965	0.008
8/16/2008 11:33	1.58		8.629	19.964	0.005
8/16/2008 11:33	1.68		8.631	19.962	0.002
8/16/2008 11:33	1.78		8.631	19.955	0.002
8/16/2008 11:33	1.88		8.631	19.954	0.002
8/16/2008 11:33	1.99		8.632	19.952	-0.001
8/16/2008 11:34	2.11		8.633	19.951	-0.002
8/16/2008 11:34	2.24		8.633	19.945	-0.003
8/16/2008 11:34	2.37		8.632	19.945	-0.001
8/16/2008 11:34	2.51		8.632	19.942	-0.002
8/16/2008 11:34	2.66		8.632	19.939	-0.002
8/16/2008 11:34	2.82		8.634	19.938	-0.005
8/16/2008 11:34	2.98		8.637	19.935	-0.013
8/16/2008 11:35	3.16		8.634	19.935	-0.004

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	PAI-27-MW57S
Test No.:	1
Date:	8/16/2008
Geologist:	CONTI
Checked by / Date:	SW Ramer 6-28-11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.177
Screened / Monitored Interval Below Water Table, L (ft):	9.91
Static Water Level (Depth/ Elevation) (ft.):	3.29
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	1.04	0.00	1.04	1.00	0.0000	0.00
	0.01	0.88	0.01	0.88	0.85	-0.1671	-0.01
	0.03	0.83	0.03	0.83	0.80	-0.2256	-0.03
	0.05	0.81	0.05	0.81	0.78	-0.2499	-0.05
	0.08	0.79	0.08	0.79	0.76	-0.2749	-0.08
	0.11	0.76	0.11	0.76	0.73	-0.3137	-0.11
	0.15	0.73	0.15	0.73	0.70	-0.3639	-0.15
	0.21	0.70	0.21	0.70	0.67	-0.4055	-0.22
	0.32	0.64	0.32	0.64	0.62	-0.4855	-0.33
	0.44	0.59	0.44	0.59	0.57	-0.5660	-0.45
x	0.69	0.52	0.00			0.0000	
x	0.94	0.47	0.00			0.0000	
x	1.44	0.40	0.00			0.0000	
x	2.60	0.31	0.00			0.0000	
x	3.92	0.25	0.00			0.0000	
x	4.95	0.20	0.00			0.0000	
x	7.44	0.14	0.00			0.0000	
x	9.94	0.09	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	10
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-1.027
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.159
Actual Y-intercept is set to 0.	0.000
T_0 (min):	0.973
K (ft/min):	1.45E-03
K (ft/day):	**2.085**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

T_0: Time at which ln(H/H0)=-1

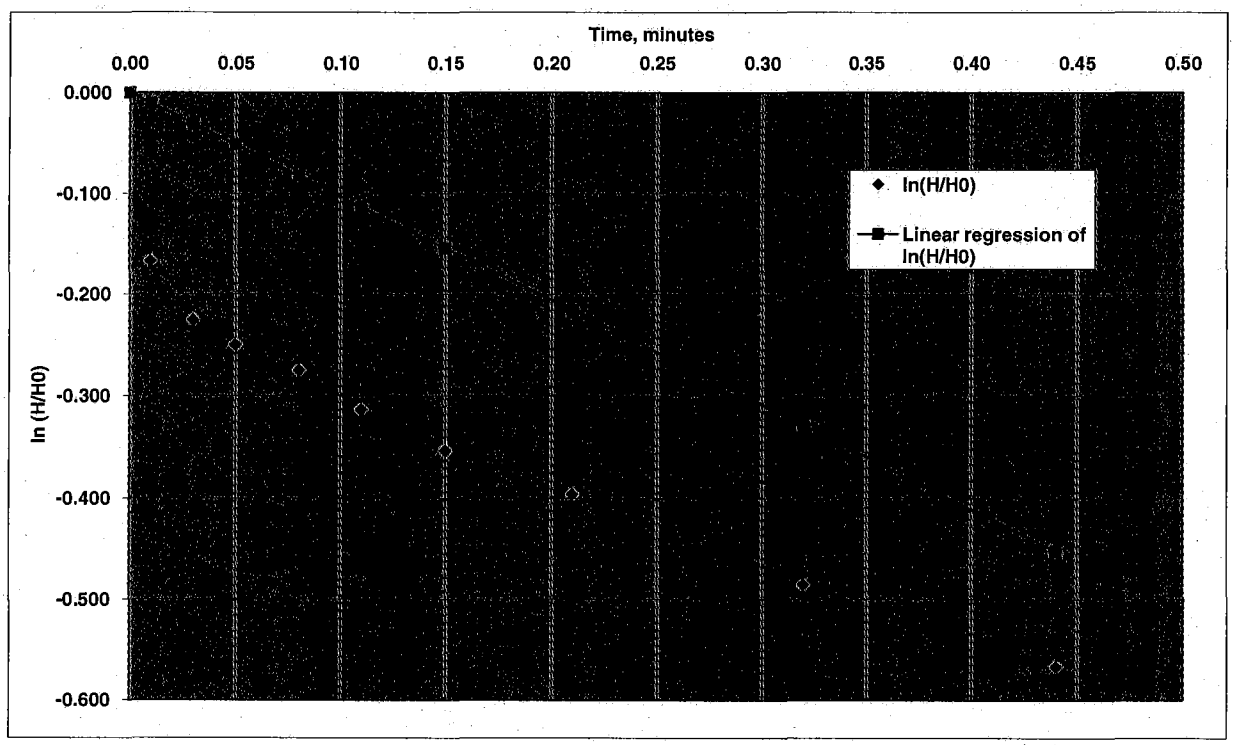
$K = r^2 * \ln(L/R)/(2LT_0)$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



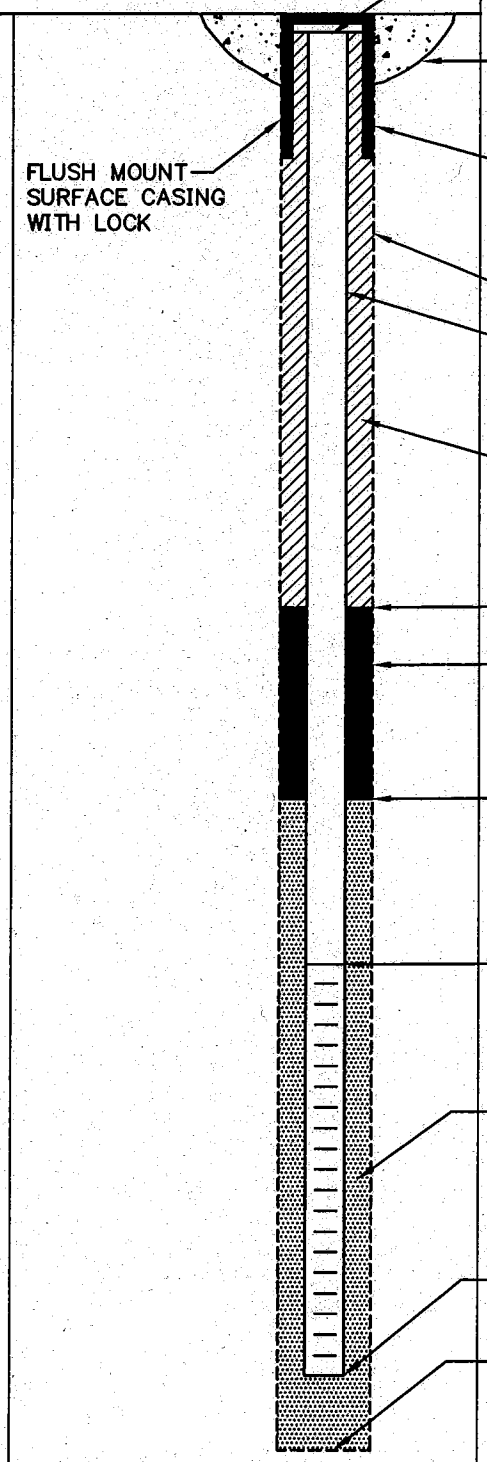
1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

WELL NO.: PA1 - 27MW57S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT: PARRIS ISLAND SITE 27	LOCATION: MW 57 S	DRILLER: LOREY GAMWELL
PROJECT NO.: 600455	BORING: -	DRILLING METHOD: DPT
DATE BEGUN: 8/5/08	DATE COMPLETED: 8/8/08	
FIELD GEOLOGIST: CHARLIE WARREN		DEVELOPMENT METHOD: PERISTALTIC
GROUND ELEVATION: 7.38	DATUM:	



ELEVATION TOP OF RISER: 7.20

TYPE OF SURFACE SEAL: CONCRETE

TYPE OF PROTECTIVE CASING:

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: GROUT

ELEVATION/DEPTH TOP OF SEAL: 5.38 / 2.0'

TYPE OF SEAL: BENTONITE

ELEVATION/DEPTH TOP OF SAND: 4.88 / 2.5'

ELEVATION/DEPTH TOP OF SCREEN: 4.38 / 3.0'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 10'

TYPE OF SAND PACK: #1 SAND

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: -5.62 / 13'

ELEVATION / DEPTH BOTTOM OF SAND: -6.12 / 13.5'

ELEVATION/DEPTH BOTTOM OF HOLE: -6.12 / 13.5

BACKFILL MATERIAL BELOW SAND: NA

ACAD: FORM_MWFM.dwg 07/20/99 INL

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PAI-27

PROJECT NAME: MCRD PARRIS IS- SITE 27 WELL/BORING NO.: MW-57S

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2"Φ SCREEN LENGTH/DEPTH: 10 / 13.20 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 3.29 DATE: 8/16/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

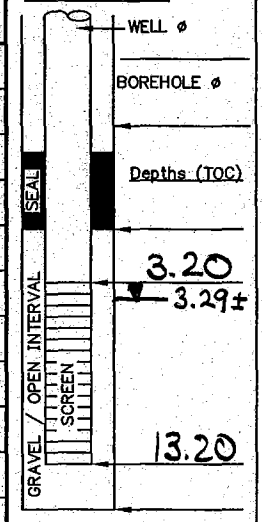
METHOD OF INDUCING WATER LEVEL CHANGE: L SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

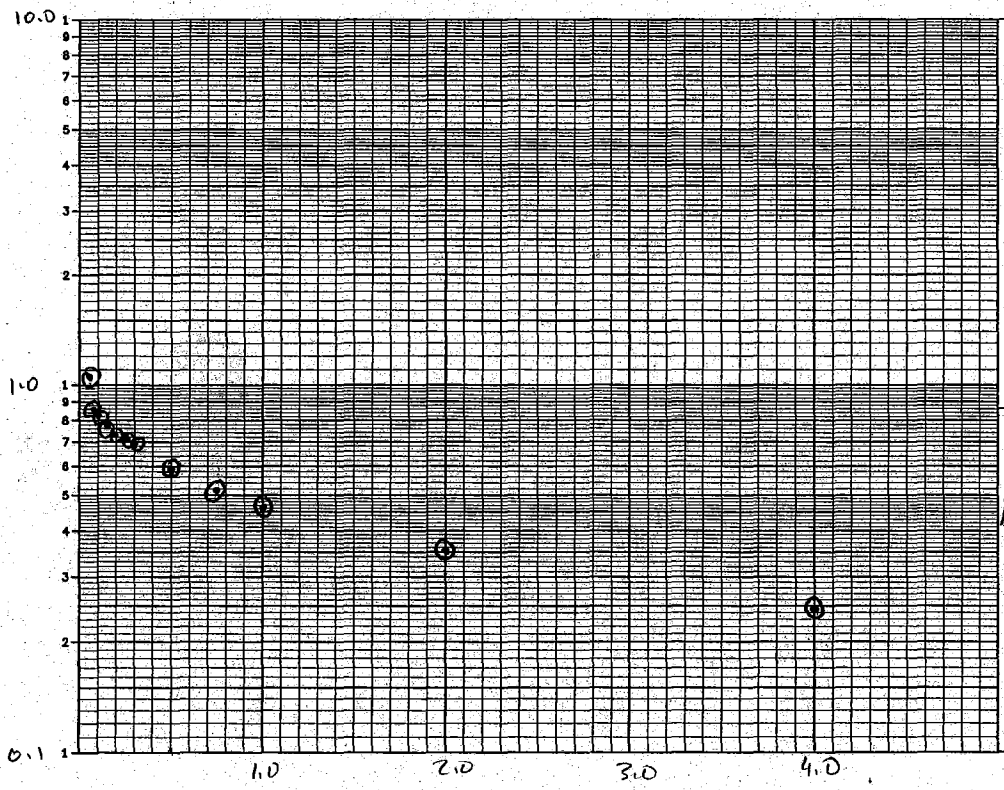
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

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)
.058		1.044			
.081		.847			
.10		.820			
.15		.773			
.20		.736			
.25		.709			
.30		.682			
.50		.590			
.75		.517			
1.00		.465			
2.00		.352			
4.00		.247			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:
SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS, SKETCH MAPS, ETC.:
r = .083
R = .177
L = 9.91

Report Date:	8/16/2008 13:20
Report User Name:	Stanley.Conti
Report Computer N:	NUSL1X25XC1

Log File Properties

File Name	MW-57S 2008-08-16 13-12-42.wsl
Create Date	8/16/2008 13:20

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-57S
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/16/2008 12:57
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	4.12481 (PSI)
Head Pressure	4.12388 (PSI)
Temperature	28.3931 (C)
Depth of Probe	9.5219 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/16/2008 13:07	Manual Start Command
8/16/2008 13:12	User Note: "Downloading log - Used Batt: 4% Memory: 26% User: Stanley.Conti"
8/16/2008 13:17	User Note: "Downloading log - Used Batt: 4% Memory: 26% User: Stanley.Conti"

8/16/2008 13:19 User Note: "Downloading log - Used Batt: 4% Memory: 26% User: Stanley.Conti"
8/16/2008 13:19 Manual Stop Command

Log Data:
Record Count 108

Date and Time	Elapsed Time Minutes		Sensor: Pres 35ft SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/16/2008 13:07	0		4.151	27.106	-0.06
8/16/2008 13:07	0.004		4.151	27.126	-0.06
8/16/2008 13:07	0.008		4.151	27.14	-0.061
8/16/2008 13:07	0.013		4.153	27.209	-0.066
8/16/2008 13:07	0.02		4.153	27.195	-0.064
8/16/2008 13:07	0.024		4.152	27.191	-0.062
8/16/2008 13:07	0.028		4.15	27.197	-0.059
8/16/2008 13:07	0.032		4.151	27.194	-0.061
8/16/2008 13:07	0.035		4.15	27.196	-0.059
8/16/2008 13:07	0.039		4.15	27.197	-0.059
8/16/2008 13:07	0.043		4.15	27.2	-0.058
8/16/2008 13:07	0.046		3.776	27.202	0.805
8/16/2008 13:07	0.05		3.751	27.205	0.862
8/16/2008 13:07	0.058	0	3.673	27.182	1.044
8/16/2008 13:07	0.062		3.73	27.191	0.912
8/16/2008 13:07	0.065		3.741	27.195	0.887
8/16/2008 13:07	0.069	.011	3.746	27.202	0.875
8/16/2008 13:07	0.078		3.754	27.182	0.857
8/16/2008 13:07	0.081		3.758	27.191	0.847
8/16/2008 13:07	0.085		3.76	27.194	0.842
8/16/2008 13:07	0.089	.031	3.766	27.201	0.828
8/16/2008 13:07	0.094		3.765	27.218	0.83
8/16/2008 13:07	0.098		3.767	27.215	0.826
8/16/2008 13:07	0.102		3.77	27.213	0.82
8/16/2008 13:07	0.106		3.771	27.214	0.816
8/16/2008 13:07	0.11	.052	3.774	27.214	0.809
8/16/2008 13:07	0.113		3.775	27.217	0.809
8/16/2008 13:07	0.119		3.779	27.21	0.8
8/16/2008 13:07	0.126		3.781	27.197	0.794
8/16/2008 13:07	0.133	.075	3.784	27.19	0.787
8/16/2008 13:08	0.141		3.785	27.184	0.784
8/16/2008 13:08	0.15		3.79	27.174	0.773
8/16/2008 13:08	0.158		3.792	27.174	0.768
8/16/2008 13:08	0.168	.110	3.797	27.168	0.757
8/16/2008 13:08	0.178		3.799	27.166	0.752
8/16/2008 13:08	0.188		3.803	27.162	0.744
8/16/2008 13:08	0.199		3.806	27.161	0.736
8/16/2008 13:08	0.211	.153	3.809	27.16	0.73
8/16/2008 13:08	0.224		3.812	27.156	0.722
8/16/2008 13:08	0.237		3.815	27.154	0.715

8/16/2008 13:08	0.251		3.818	27.149	0.709
8/16/2008 13:08	0.266	.208	3.822	27.148	0.699
8/16/2008 13:08	0.282		3.826	27.146	0.69
8/16/2008 13:08	0.298		3.83	27.145	0.682
8/16/2008 13:08	0.316		3.833	27.14	0.674
8/16/2008 13:08	0.335		3.838	27.142	0.662
8/16/2008 13:08	0.355		3.841	27.135	0.655
8/16/2008 13:08	0.376	.318	3.846	27.139	0.643
8/16/2008 13:08	0.398		3.85	27.137	0.635
8/16/2008 13:08	0.422		3.854	27.132	0.625
8/16/2008 13:08	0.447		3.859	27.133	0.614
8/16/2008 13:08	0.473		3.863	27.13	0.604
8/16/2008 13:08	0.501	.443	3.869	27.129	0.59
8/16/2008 13:08	0.531		3.873	27.124	0.582
8/16/2008 13:08	0.562		3.877	27.125	0.572
8/16/2008 13:08	0.596		3.883	27.123	0.558
8/16/2008 13:08	0.631		3.888	27.121	0.546
8/16/2008 13:08	0.668		3.893	27.12	0.535
8/16/2008 13:08	0.708		3.897	27.118	0.526
8/16/2008 13:08	0.75	.692	3.901	27.116	0.517
8/16/2008 13:08	0.794		3.905	27.115	0.506
8/16/2008 13:08	0.841		3.91	27.112	0.496
8/16/2008 13:08	0.891		3.915	27.11	0.484
8/16/2008 13:08	0.944		3.919	27.107	0.475
8/16/2008 13:08	1	.942	3.924	27.106	0.465
8/16/2008 13:08	1.06		3.928	27.096	0.455
8/16/2008 13:08	1.12		3.932	27.105	0.445
8/16/2008 13:09	1.19		3.936	27.101	0.436
8/16/2008 13:09	1.26		3.94	27.1	0.426
8/16/2008 13:09	1.33		3.944	27.096	0.416
8/16/2008 13:09	1.41		3.948	27.094	0.408
8/16/2008 13:09	1.5	1.442	3.953	27.093	0.396
8/16/2008 13:09	1.58		3.956	27.091	0.389
8/16/2008 13:09	1.68		3.96	27.089	0.38
8/16/2008 13:09	1.78		3.965	27.086	0.37
8/16/2008 13:09	1.88		3.969	27.087	0.359
8/16/2008 13:09	1.99		3.972	27.083	0.352
8/16/2008 13:09	2.11		3.975	27.083	0.345
8/16/2008 13:10	2.24		3.979	27.081	0.337
8/16/2008 13:10	2.37		3.983	27.078	0.327
8/16/2008 13:10	2.51		3.987	27.075	0.319
8/16/2008 13:10	2.66	2.602	3.99	27.076	0.311
8/16/2008 13:10	2.82		3.994	27.075	0.302
8/16/2008 13:10	2.98		3.997	27.072	0.296
8/16/2008 13:11	3.16		4.001	27.07	0.286
8/16/2008 13:11	3.35		4.006	27.07	0.275
8/16/2008 13:11	3.55		4.009	27.071	0.267
8/16/2008 13:11	3.76		4.014	27.069	0.255
8/16/2008 13:11	3.98	3.922	4.018	27.066	0.247
8/16/2008 13:12	4.22		4.023	27.066	0.235
8/16/2008 13:12	4.47		4.028	27.064	0.224
8/16/2008 13:12	4.73		4.032	27.064	0.214

8/16/2008 13:12	5.01	4.952	4.038	27.063	0.201
8/16/2008 13:13	5.31		4.042	27.061	0.19
8/16/2008 13:13	5.62		4.048	27.061	0.177
8/16/2008 13:13	5.96		4.053	27.061	0.165
8/16/2008 13:14	6.31		4.056	27.062	0.158
8/16/2008 13:14	6.68		4.062	27.059	0.146
8/16/2008 13:14	7.08	7.442	4.066	27.056	0.135
8/16/2008 13:15	7.5		4.07	27.055	0.126
8/16/2008 13:15	7.94		4.075	27.054	0.115
8/16/2008 13:16	8.41		4.078	27.051	0.108
8/16/2008 13:16	8.91		4.081	27.049	0.102
8/16/2008 13:17	9.44		4.085	27.049	0.093
8/16/2008 13:17	10	9.942	4.088	27.049	0.086
8/16/2008 13:18	10.6		4.09	27.049	0.081
8/16/2008 13:19	11.2		4.091	27.046	0.078
8/16/2008 13:19	11.9		4.095	27.042	0.068

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	PAI-27-MW58S
Test No.:	1
Date:	8/16/2008
Geologist:	CONTI
Checked by / Date:	SWRamsey 6-28-11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.177
Screened / Monitored Interval Below Water Table, L (ft):	10
Static Water Level (Depth/ Elevation) (ft.):	2.78
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	1.19	0.00	1.19	1.00	0.0000	0.00
	0.01	0.97	0.01	0.97	0.82	-0.2044	-0.01
	0.02	0.75	0.02	0.75	0.63	-0.4616	-0.01
	0.04	0.69	0.04	0.69	0.58	-0.5450	-0.03
	0.06	0.64	0.06	0.64	0.54	-0.6212	-0.04
	0.08	0.62	0.08	0.62	0.52	-0.6520	-0.06
	0.13	0.57	0.13	0.57	0.48	-0.7361	-0.09
	0.18	0.53	0.18	0.53	0.45	-0.8065	-0.13
	0.26	0.49	0.26	0.49	0.41	-0.8873	-0.19
	0.46	0.41	0.46	0.41	0.34	-1.0658	-0.34
	0.71	0.33	0.71	0.33	0.28	-1.2828	-0.52
	0.96	0.28	0.96	0.28	0.24	-1.4469	-0.70
	1.46	0.21	1.46	0.21	0.18	-1.7046	-1.07
	2.07	0.15	2.07	0.15	0.13	-2.0644	-1.51
x	3.12	0.10	0.00			0.0000	
x	4.97	0.07	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	14
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-0.730
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.503
Actual Y-intercept is set to 0.	0.000
T_0 (min):	1.370
K (ft/min):	1.02E-03
K (ft/day):	**1.471**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

T_0: Time at which ln(H/H0)=-1

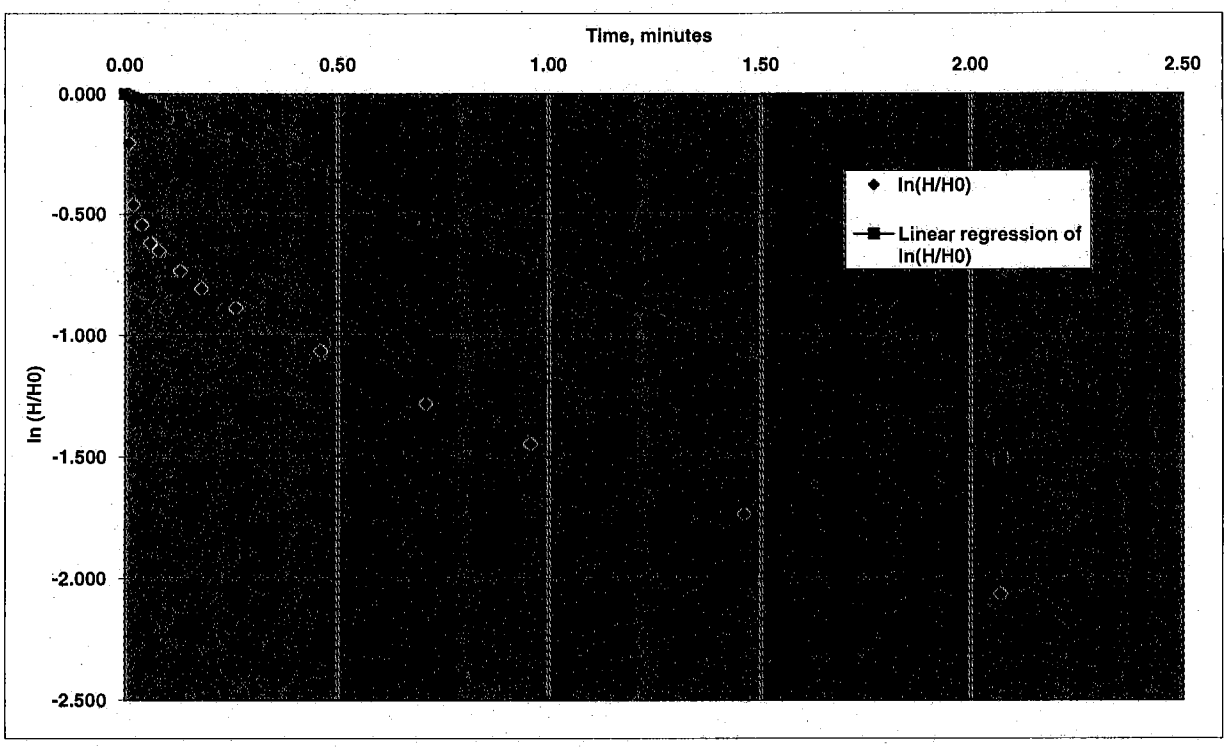
$K = r^2 * \ln(L/R)/(2LT_0)$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



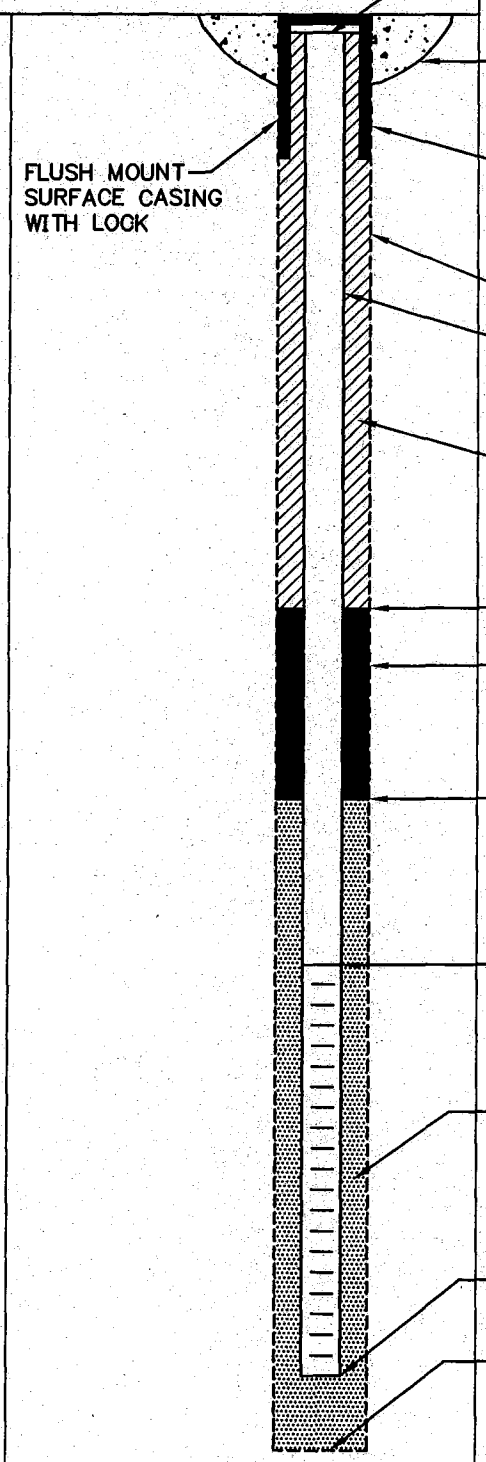
1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

WELL NO.: PA1-27MW58S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT PARRIS ISLAND SITE 27	LOCATION MW 58S	DRILLER CORDY CAMWELL
PROJECT NO. G00455	BORING	DRILLING METHOD DPT
DATE BEGUN 8/8/08	DATE COMPLETED 8/8/08	
FIELD GEOLOGIST CHARLES WARNO		DEVELOPMENT METHOD PERISTALTIC
GROUND ELEVATION 7.69	DATUM	



ELEVATION TOP OF RISER: 7.44

TYPE OF SURFACE SEAL: CONCRETE

TYPE OF PROTECTIVE CASING:

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: GROUT

ELEVATION/DEPTH TOP OF SEAL: 5.69 / 2'

TYPE OF SEAL:

ELEVATION/DEPTH TOP OF SAND: 5.19 / 2.5'

ELEVATION/DEPTH TOP OF SCREEN: 4.69 / 3'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 9

TYPE OF SAND PACK: #1 SAND

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: -4.31 / 12'

ELEVATION / DEPTH BOTTOM OF SAND: -4.81 / 12.5'

ELEVATION/DEPTH BOTTOM OF HOLE: -4.81 / 12.5'

BACKFILL MATERIAL BELOW SAND: NO

ACAD: FORM_MWFM.dwg 07/20/99 INL

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PAI-27

PROJECT NAME: MCRD PARRIS IS - SITE 27 WELL/BORING NO.: MW-58S

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2"Φ SCREEN LENGTH/DEPTH: 9 / 11.90 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 2.78 DATE: 8/16/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

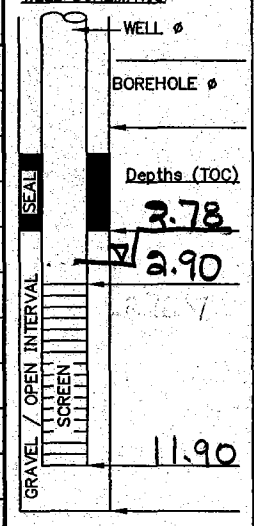
METHOD OF INDUCING WATER LEVEL CHANGE: 1 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

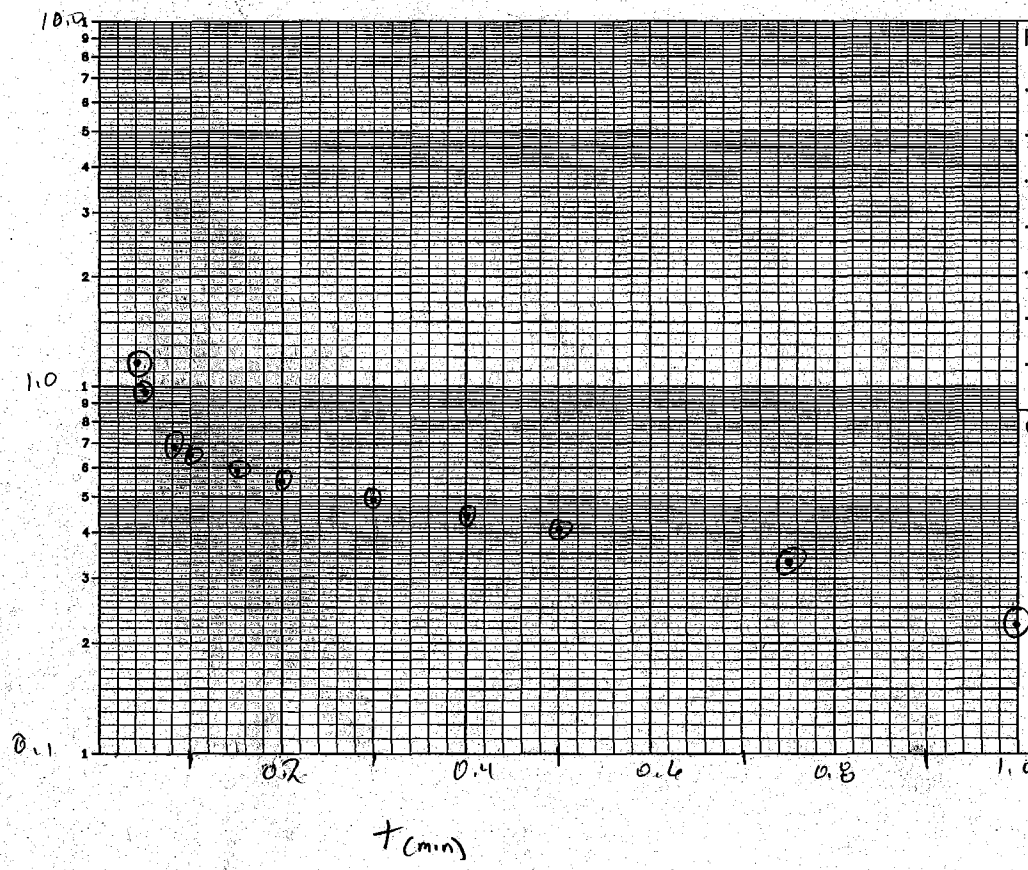
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

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)
.043		1.187			
.05		.971			
.081		.695			
.10		.653			
.15		.588			
.20		.547			
.30		.492			
.40		.445			
.50		.405			
.75		.330			
1.00		.277			
2.00		.163			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS, SKETCH MAPS, ETC.:

r = .083'
R = .177
L = 10'

Report Date:	8/16/2008 13:49
Report User Name:	Stanley.Conti
Report Computer Nar	NUSL1X25XC1

Log File Properties

File Name	MW-58S 2008-08-16 13-44-57.wsl
Create Date	8/16/2008 13:48

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-58S
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/16/2008 13:36
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	3.76107 (PSI)
Head Pressure	3.76122 (PSI)
Temperature	29.2219 (C)
Depth of Probe	8.68455 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/16/2008 13:43	Manual Start Command
8/16/2008 13:44	User Note: "Downloading log - Used Batt: 4% Memory: 28% User: Stanley.Conti"
8/16/2008 13:48	User Note: "Downloading log - Used Batt: 4% Memory: 28% User: Stanley.Conti"

8/16/2008 13:48 Manual Stop Command

Log Data:
Record Count 94

Date and Time	Elapsed Time Minutes		Sensor: Pres 35ft SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/16/2008 13:43	0		3.786	27.801	-0.058
8/16/2008 13:43	0.004		3.786	27.822	-0.059
8/16/2008 13:43	0.008		3.787	27.837	-0.061
8/16/2008 13:43	0.013		3.788	27.907	-0.063
8/16/2008 13:43	0.02		3.787	27.893	-0.059
8/16/2008 13:43	0.024		3.789	27.889	-0.063
8/16/2008 13:43	0.028		3.785	27.889	-0.056
8/16/2008 13:43	0.031		3.786	27.891	-0.058
8/16/2008 13:43	0.035		3.788	27.891	-0.062
8/16/2008 13:43	0.039		3.573	27.891	0.435
8/16/2008 13:43	0.043	0	3.247	27.897	1.187
8/16/2008 13:43	0.046		3.657	27.896	0.239
8/16/2008 13:43	0.05	.007	3.341	27.896	0.971
8/16/2008 13:43	0.058		3.424	27.876	0.779
8/16/2008 13:43	0.062		3.429	27.885	0.766
8/16/2008 13:43	0.065	.022	3.436	27.889	0.75
8/16/2008 13:43	0.069		3.442	27.897	0.736
8/16/2008 13:43	0.077		3.455	27.876	0.707
8/16/2008 13:43	0.081		3.46	27.884	0.695
8/16/2008 13:43	0.085	.042	3.463	27.887	0.688
8/16/2008 13:43	0.089		3.471	27.894	0.669
8/16/2008 13:43	0.095		3.475	27.919	0.661
8/16/2008 13:43	0.099		3.478	27.915	0.653
8/16/2008 13:43	0.103	.06	3.483	27.917	0.642
8/16/2008 13:43	0.107		3.483	27.914	0.641
8/16/2008 13:43	0.111		3.488	27.918	0.631
8/16/2008 13:43	0.116		3.489	27.913	0.628
8/16/2008 13:43	0.12	.077	3.492	27.914	0.621
8/16/2008 13:43	0.126		3.495	27.899	0.614
8/16/2008 13:43	0.133		3.499	27.889	0.604
8/16/2008 13:43	0.141		3.503	27.878	0.597
8/16/2008 13:43	0.15		3.507	27.873	0.588
8/16/2008 13:43	0.158		3.51	27.867	0.58
8/16/2008 13:43	0.168	.125	3.513	27.859	0.572
8/16/2008 13:43	0.178		3.517	27.855	0.563
8/16/2008 13:43	0.188		3.521	27.852	0.555
8/16/2008 13:43	0.199		3.524	27.849	0.547
8/16/2008 13:43	0.211		3.527	27.846	0.541
8/16/2008 13:43	0.224	.181	3.531	27.842	0.532
8/16/2008 13:43	0.237		3.534	27.842	0.525
8/16/2008 13:43	0.251		3.537	27.838	0.517

8/16/2008 13:43	0.266		3.542	27.837	0.506
8/16/2008 13:43	0.282		3.545	27.833	0.498
8/16/2008 13:43	0.298	.255	3.548	27.832	0.492
8/16/2008 13:43	0.316		3.552	27.829	0.484
8/16/2008 13:43	0.335		3.557	27.824	0.472
8/16/2008 13:43	0.355		3.56	27.822	0.464
8/16/2008 13:43	0.376		3.564	27.82	0.455
8/16/2008 13:43	0.398		3.569	27.819	0.445
8/16/2008 13:43	0.422		3.573	27.815	0.435
8/16/2008 13:43	0.447		3.576	27.812	0.427
8/16/2008 13:43	0.473		3.581	27.809	0.416
8/16/2008 13:43	0.501	.458	3.585	27.81	0.405
8/16/2008 13:43	0.531		3.59	27.804	0.396
8/16/2008 13:43	0.562		3.595	27.802	0.385
8/16/2008 13:43	0.596		3.599	27.799	0.373
8/16/2008 13:43	0.631		3.603	27.794	0.365
8/16/2008 13:43	0.668		3.608	27.79	0.353
8/16/2008 13:43	0.708		3.613	27.79	0.341
8/16/2008 13:43	0.75	.707	3.618	27.786	0.33
8/16/2008 13:43	0.794		3.622	27.781	0.322
8/16/2008 13:44	0.841		3.627	27.778	0.31
8/16/2008 13:44	0.891		3.631	27.771	0.3
8/16/2008 13:44	0.944		3.636	27.768	0.29
8/16/2008 13:44	1		3.641	27.764	0.277
8/16/2008 13:44	1.06	.957	3.645	27.761	0.269
8/16/2008 13:44	1.12		3.65	27.757	0.256
8/16/2008 13:44	1.19		3.654	27.752	0.247
8/16/2008 13:44	1.26		3.659	27.748	0.236
8/16/2008 13:44	1.33		3.663	27.744	0.225
8/16/2008 13:44	1.411		3.668	27.738	0.215
8/16/2008 13:44	1.5	1.457	3.672	27.734	0.205
8/16/2008 13:44	1.58		3.678	27.732	0.191
8/16/2008 13:44	1.68		3.68	27.725	0.186
8/16/2008 13:44	1.78		3.683	27.72	0.179
8/16/2008 13:45	1.88		3.687	27.717	0.171
8/16/2008 13:45	1.99		3.691	27.713	0.163
8/16/2008 13:45	2.11	2.067	3.695	27.707	0.151
8/16/2008 13:45	2.24		3.698	27.705	0.146
8/16/2008 13:45	2.37		3.701	27.699	0.138
8/16/2008 13:45	2.51		3.705	27.692	0.131
8/16/2008 13:45	2.66		3.707	27.689	0.124
8/16/2008 13:45	2.82		3.711	27.684	0.115
8/16/2008 13:46	2.98		3.714	27.68	0.108
8/16/2008 13:46	3.16	3.117	3.716	27.676	0.104
8/16/2008 13:46	3.35		3.72	27.673	0.096
8/16/2008 13:46	3.55		3.722	27.667	0.091
8/16/2008 13:46	3.76		3.724	27.665	0.086
8/16/2008 13:47	3.98		3.726	27.661	0.081
8/16/2008 13:47	4.22		3.728	27.657	0.077
8/16/2008 13:47	4.47		3.73	27.653	0.072
8/16/2008 13:47	4.73		3.731	27.652	0.07
8/16/2008 13:48	5.01	4.967	3.733	27.646	0.066

8/16/2008 13:48	5.31	3.734	27.648	0.063

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	PAI-27-MW59I
Test No.:	1
Date:	8/16/2008
Geologist:	CONTI
Checked by / Date:	SWRamer 6-28-11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.177
Screened / Monitored Interval Below Water Table, L (ft):	5
Static Water Level (Depth/ Elevation) (ft.):	2.78
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of $\ln(H/H0)$ (b=0)
	0.00	0.94	0.00	-0.94	1.00	0.0000	0.00
	0.01	0.86	0.01	-0.86	0.91	-0.0899	0.00
	0.02	0.83	0.02	-0.83	0.88	-0.1246	-0.01
	0.05	0.83	0.05	-0.83	0.88	-0.1246	-0.01
	0.09	0.81	0.09	-0.81	0.86	-0.1486	-0.03
	0.17	0.78	0.17	-0.78	0.83	-0.1886	-0.04
	0.33	0.69	0.33	-0.69	0.73	-0.3092	-0.14
	1.05	0.60	1.05	-0.60	0.64	-0.4490	-0.29
	1.82	0.50	1.82	-0.50	0.53	-0.6313	-0.48
	3.10	0.39	3.10	-0.39	0.41	-0.8797	-0.82
x	5.25	0.29	0.00			0.0000	
x	9.94	0.21	0.00			0.0000	
x	14.94	0.18	0.00			0.0000	
x	21.04	0.16	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	10
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-0.264
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.113
Actual Y-intercept is set to 0.	0.000
T_0 (min):	3.787
K (ft/min):	6.12E-04
K (ft/day):	**0.882**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

T_0: Time at which ln(H/H0)=-1

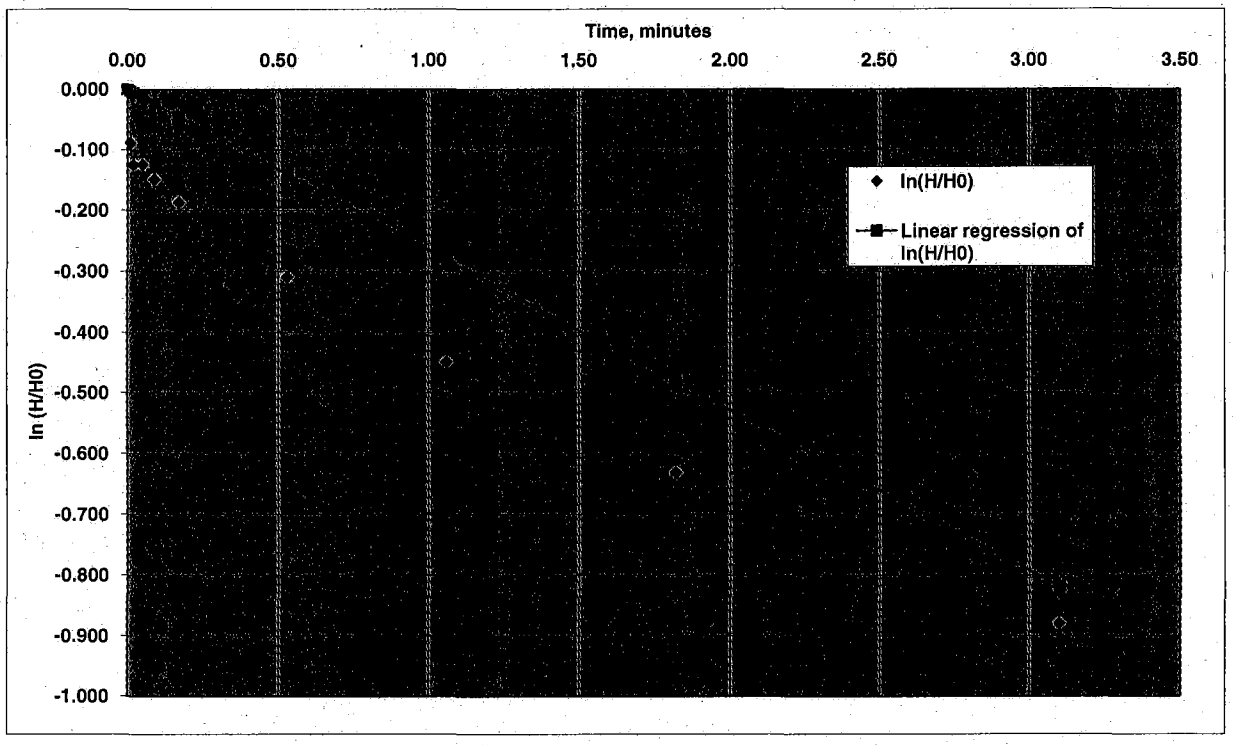
$K = r^2 * \ln(L/R)/(2LT_0)$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



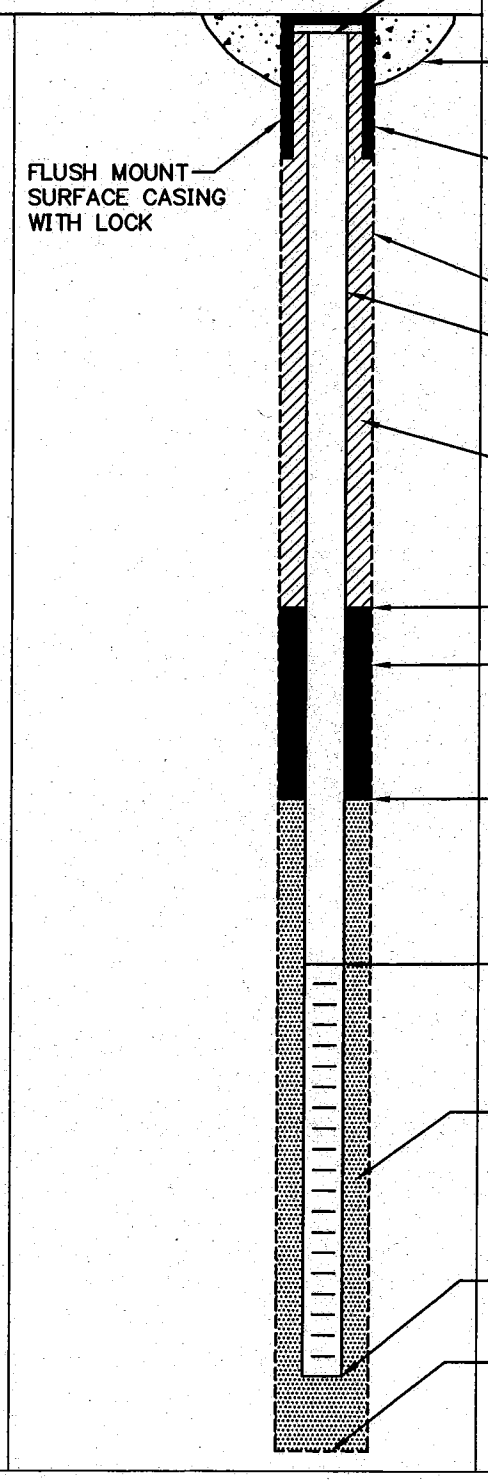
1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

WELL NO.: PA1-27MW59I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT PARRIS ISLAND SITE 27	LOCATION MW59I	DRILLER COREY GAMBOLL
PROJECT NO. 600455	BORING	DRILLING METHOD DPT
DATE BEGUN 8/6/08	DATE COMPLETED 8/8/08	
FIELD GEOLOGIST CHARLIE VARINO		DEVELOPMENT METHOD PERISTALTIC
GROUND ELEVATION 7.68	DATUM	



ELEVATION TOP OF RISER: 7.33

TYPE OF SURFACE SEAL: CONCRETE

TYPE OF PROTECTIVE CASING: STEEL

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: GROUT

ELEVATION/DEPTH TOP OF SEAL: -3.32/ 11'

TYPE OF SEAL: BENTONITE

ELEVATION/DEPTH TOP OF SAND: -5.82/ 13.5'

ELEVATION/DEPTH TOP OF SCREEN: -6.32/ 14'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 5

TYPE OF SAND PACK: #1 SAND

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: -11.32/ 19'

ELEVATION / DEPTH BOTTOM OF SAND: -11.82/ 19.5'

ELEVATION/DEPTH BOTTOM OF HOLE: -11.82/ 19.5'

BACKFILL MATERIAL BELOW SAND: NA

ACAD:FORM_MWFM.dwg 07/20/99 INL

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PAI-27

PROJECT NAME: MCRD PARRIS IS- SITE 27 WELL/BORING NO.: MW-59I

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2"Φ SCREEN LENGTH/DEPTH: 5 / 18.90 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 2.78 DATE: 8/16/08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

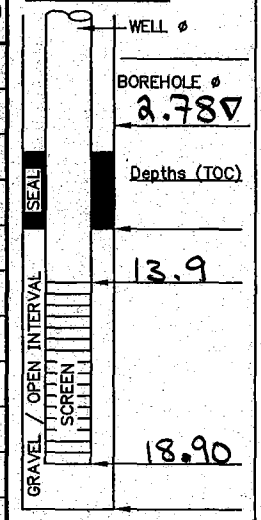
METHOD OF INDUCING WATER LEVEL CHANGE: 1 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

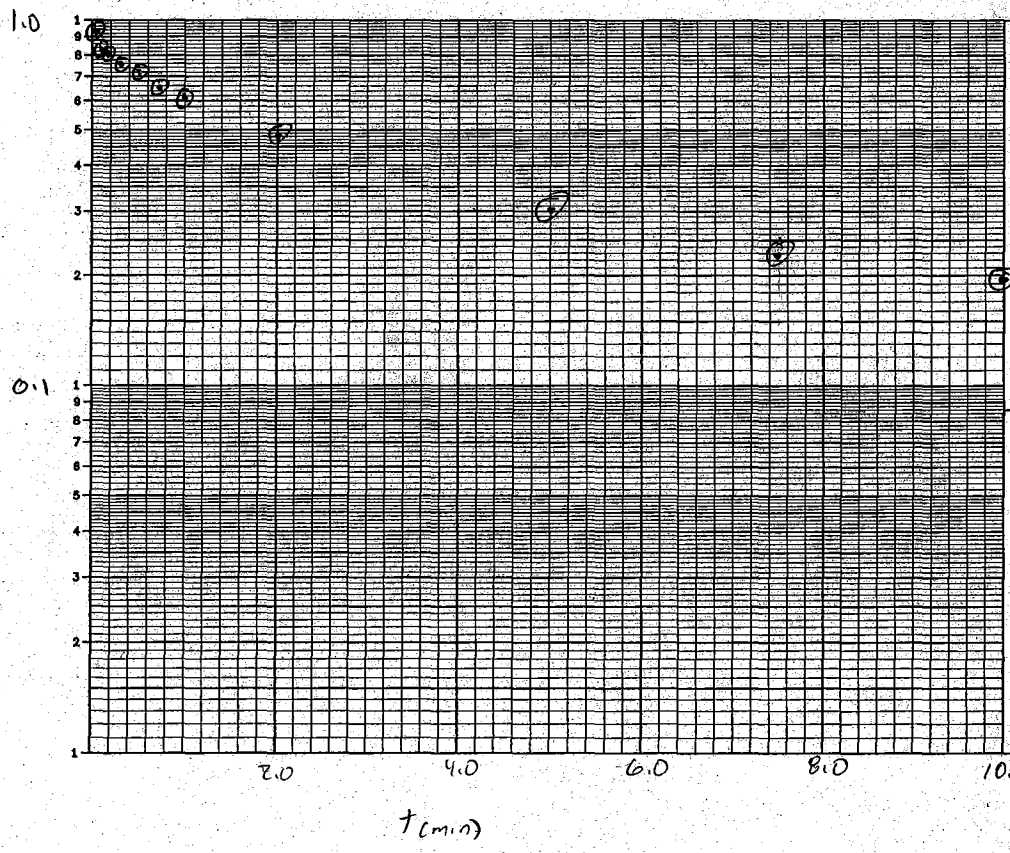
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

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)
.065		.937			
.10		.832			
.15		.810			
.3		.762			
.5		.711			
.75		.658			
1.0		.616			
2.0		.489			
5.0		.301			
7.5		.229			
10		.196			
15		.175			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS, SKETCH MAPS, ETC.:

r = .083
R = .177
L = 5'

Report Date:	8/16/2008 14:23
Report User Name	Stanley.Conti
Report Computer N	NUSL1X25XC1

Log File Properties

File Name	MW-59I 2008-08-16 14-02-18.wsl
Create Date	8/16/2008 14:23

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-59I
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/16/2008 13:53
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	6.73975 (PSI)
Head Pressure	6.73852 (PSI)
Temperature	26.9318 (C)
Depth of Probe	15.559 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/16/2008 13:59	Manual Start Command
8/16/2008 14:02	User Note: "Downloading log - Used Batt: 4% Memory: 29% User: Stanley.Conti"
8/16/2008 14:07	User Note: "Downloading log - Used Batt: 4% Memory: 29% User: Stanley.Conti"

8/16/2008 14:15 User Note: "Downloading log - Used Batt: 4% Memory: 29% User: Stanley.Conti"
8/16/2008 14:23 Manual Stop Command

Log Data:
Record Count 120

Date and Time	Elapsed Time Minutes		Sensor: Pres 35ft SN#: 126683 Pressure (PSI)	Sensor: Pres SN#: 126683 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/16/2008 13:59	0		6.775	25.449	-0.081
8/16/2008 13:59	0.004		6.774	25.468	-0.079
8/16/2008 13:59	0.008		6.775	25.482	-0.082
8/16/2008 13:59	0.013		6.778	25.55	-0.088
8/16/2008 13:59	0.02		6.776	25.534	-0.083
8/16/2008 13:59	0.024		6.775	25.534	-0.082
8/16/2008 13:59	0.028		6.773	25.532	-0.076
8/16/2008 13:59	0.031		6.773	25.539	-0.078
8/16/2008 13:59	0.035		6.765	25.537	-0.058
8/16/2008 13:59	0.039		6.776	25.541	-0.085
8/16/2008 13:59	0.043		6.773	25.538	-0.078
8/16/2008 13:59	0.046		6.526	25.541	0.494
8/16/2008 13:59	0.05		5.988	25.542	1.736
8/16/2008 13:59	0.058		6.738	25.518	0.004
8/16/2008 13:59	0.062		6.171	25.53	1.313
8/16/2008 13:59	0.065	0	6.334	25.536	0.937
8/16/2008 13:59	0.069		6.393	25.54	0.801
8/16/2008 13:59	0.077	-.012	6.369	25.518	0.855
8/16/2008 13:59	0.081		6.377	25.528	0.839
8/16/2008 13:59	0.085		6.374	25.534	0.844
8/16/2008 13:59	0.088	.023	6.379	25.538	0.833
8/16/2008 13:59	0.096		6.38	25.567	0.831
8/16/2008 13:59	0.099		6.379	25.562	0.832
8/16/2008 13:59	0.103		6.381	25.563	0.828
8/16/2008 13:59	0.107		6.381	25.56	0.828
8/16/2008 13:59	0.111	.046	6.382	25.555	0.826
8/16/2008 13:59	0.115		6.383	25.555	0.823
8/16/2008 13:59	0.119		6.385	25.556	0.819
8/16/2008 13:59	0.126		6.388	25.535	0.813
8/16/2008 13:59	0.133		6.387	25.533	0.815
8/16/2008 13:59	0.141		6.388	25.522	0.812
8/16/2008 13:59	0.15	.085	6.389	25.515	0.81
8/16/2008 13:59	0.158		6.391	25.509	0.804
8/16/2008 13:59	0.168		6.394	25.505	0.799
8/16/2008 13:59	0.178		6.393	25.5	0.8
8/16/2008 13:59	0.188		6.395	25.498	0.796
8/16/2008 13:59	0.199		6.397	25.495	0.792
8/16/2008 13:59	0.211		6.399	25.49	0.787
8/16/2008 13:59	0.224		6.4	25.484	0.784
8/16/2008 13:59	0.237	.172	6.402	25.484	0.78

8/16/2008 13:59	0.251		6.404	25.483	0.775
8/16/2008 13:59	0.266		6.406	25.477	0.771
8/16/2008 13:59	0.282		6.408	25.476	0.766
8/16/2008 13:59	0.298		6.41	25.472	0.762
8/16/2008 13:59	0.316		6.412	25.47	0.757
8/16/2008 13:59	0.335		6.415	25.466	0.75
8/16/2008 13:59	0.355		6.417	25.464	0.745
8/16/2008 13:59	0.376		6.419	25.462	0.742
8/16/2008 13:59	0.398		6.421	25.457	0.737
8/16/2008 13:59	0.422		6.423	25.456	0.732
8/16/2008 13:59	0.447		6.426	25.451	0.724
8/16/2008 13:59	0.473		6.429	25.45	0.718
8/16/2008 13:59	0.501		6.432	25.447	0.711
8/16/2008 13:59	0.531		6.435	25.444	0.704
8/16/2008 13:59	0.562		6.438	25.441	0.697
8/16/2008 13:59	0.596	.531	6.441	25.441	0.69
8/16/2008 13:59	0.631		6.444	25.436	0.682
8/16/2008 13:59	0.668		6.448	25.432	0.674
8/16/2008 13:59	0.708		6.451	25.427	0.666
8/16/2008 13:59	0.75		6.455	25.428	0.658
8/16/2008 13:59	0.794		6.458	25.422	0.651
8/16/2008 13:59	0.841		6.462	25.419	0.641
8/16/2008 13:59	0.891		6.465	25.414	0.634
8/16/2008 14:00	0.944		6.468	25.408	0.626
8/16/2008 14:00	1		6.473	25.405	0.616
8/16/2008 14:00	1.06		6.478	25.4	0.605
8/16/2008 14:00	1.12	1.055	6.48	25.394	0.6
8/16/2008 14:00	1.19		6.486	25.392	0.585
8/16/2008 14:00	1.26		6.491	25.386	0.575
8/16/2008 14:00	1.33		6.494	25.382	0.566
8/16/2008 14:00	1.41		6.499	25.379	0.556
8/16/2008 14:00	1.5		6.504	25.372	0.543
8/16/2008 14:00	1.58		6.512	25.368	0.526
8/16/2008 14:00	1.68		6.512	25.36	0.526
8/16/2008 14:00	1.78		6.518	25.356	0.512
8/16/2008 14:00	1.88	1.515	6.522	25.354	0.504
8/16/2008 14:01	1.99		6.528	25.348	0.489
8/16/2008 14:01	2.11		6.532	25.346	0.479
8/16/2008 14:01	2.24		6.538	25.339	0.466
8/16/2008 14:01	2.37		6.544	25.331	0.451
8/16/2008 14:01	2.51		6.55	25.328	0.439
8/16/2008 14:01	2.66		6.554	25.323	0.428
8/16/2008 14:01	2.82		6.56	25.318	0.415
8/16/2008 14:02	2.98		6.563	25.316	0.407
8/16/2008 14:02	3.16	3.095	6.571	25.31	0.39
8/16/2008 14:02	3.35		6.575	25.298	0.38
8/16/2008 14:02	3.55		6.581	25.301	0.367
8/16/2008 14:02	3.76		6.585	25.298	0.357
8/16/2008 14:03	3.98		6.59	25.294	0.345
8/16/2008 14:03	4.22		6.595	25.289	0.333
8/16/2008 14:03	4.47		6.601	25.285	0.321
8/16/2008 14:03	4.73		6.605	25.284	0.312

8/16/2008 14:04	5.01		6.609	25.288	0.301
8/16/2008 14:04	5.31	5.245	6.616	25.281	0.285
8/16/2008 14:04	5.62		6.619	25.284	0.279
8/16/2008 14:05	5.96		6.625	25.279	0.265
8/16/2008 14:05	6.31		6.63	25.283	0.253
8/16/2008 14:05	6.68		6.632	25.269	0.249
8/16/2008 14:06	7.08		6.636	25.268	0.24
8/16/2008 14:06	7.501		6.64	25.294	0.229
8/16/2008 14:07	7.94		6.643	25.277	0.224
8/16/2008 14:07	8.41		6.645	25.261	0.219
8/16/2008 14:08	8.91		6.649	25.255	0.21
8/16/2008 14:08	9.44		6.651	25.253	0.205
8/16/2008 14:09	10	9.935	6.655	25.254	0.196
8/16/2008 14:09	10.6		6.656	25.258	0.192
8/16/2008 14:10	11.2		6.656	25.257	0.193
8/16/2008 14:11	11.9		6.659	25.262	0.185
8/16/2008 14:11	12.6		6.661	25.257	0.181
8/16/2008 14:12	13.3		6.663	25.27	0.177
8/16/2008 14:13	14.1		6.664	25.253	0.174
8/16/2008 14:14	15	14.935	6.664	25.251	0.175
8/16/2008 14:14	15.8		6.666	25.266	0.17
8/16/2008 14:15	16.8		6.667	25.238	0.168
8/16/2008 14:16	17.8		6.669	25.229	0.164
8/16/2008 14:17	18.8		6.667	25.22	0.168
8/16/2008 14:19	19.9		6.668	25.216	0.166
8/16/2008 14:20	21.1	21.035	6.669	25.207	0.164
8/16/2008 14:21	22.4		6.669	25.201	0.164
8/16/2008 14:22	23.7		6.669	25.195	0.164

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	PAI-27-MW60I
Test No.:	1
Date:	8/16/2008
Geologist:	CONTI
Checked by / Date:	JWRamer 6-28-11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.177
Screened / Monitored Interval Below Water Table, L (ft):	5
Static Water Level (Depth/ Elevation) (ft.):	10.02
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	1.97	0.00	1.97	1.00	0.0000	0.00
	0.02	1.82	0.02	1.82	0.92	-0.0792	0.00
	0.05	1.79	0.05	1.79	0.91	-0.0958	0.00
	0.10	1.79	0.10	1.73	0.88	-0.1299	0.00
	0.34	1.64	0.34	1.64	0.83	-0.1823	0.04
	0.67	1.55	0.67	1.55	0.79	-0.2346	0.07
	0.92	1.49	0.92	1.49	0.76	-0.2703	0.10
	1.42	1.39	1.42	1.39	0.71	-0.3487	0.18
	2.16	1.26	2.16	1.26	0.64	-0.4469	0.24
	3.00	1.03	3.00	1.03	0.52	-0.6495	0.40
	4.93	0.92	4.93	0.92	0.47	-0.7614	0.54
	7.42	0.72	7.42	0.72	0.37	-1.0065	0.84
	9.92	0.58	9.92	0.58	0.29	-1.2429	1.09
x	14.92	0.40	0.00			0.0000	
x	21.02	0.28	0.00			0.0000	
x	29.72	0.21	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	13
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-0.110
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.129
Actual Y-intercept is set to 0.	0.000
T_0 (min):	9.091
K (ft/min):	2.55E-04
K (ft/day):	**0.367**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

T_0: Time at which ln(H/H0)=-1

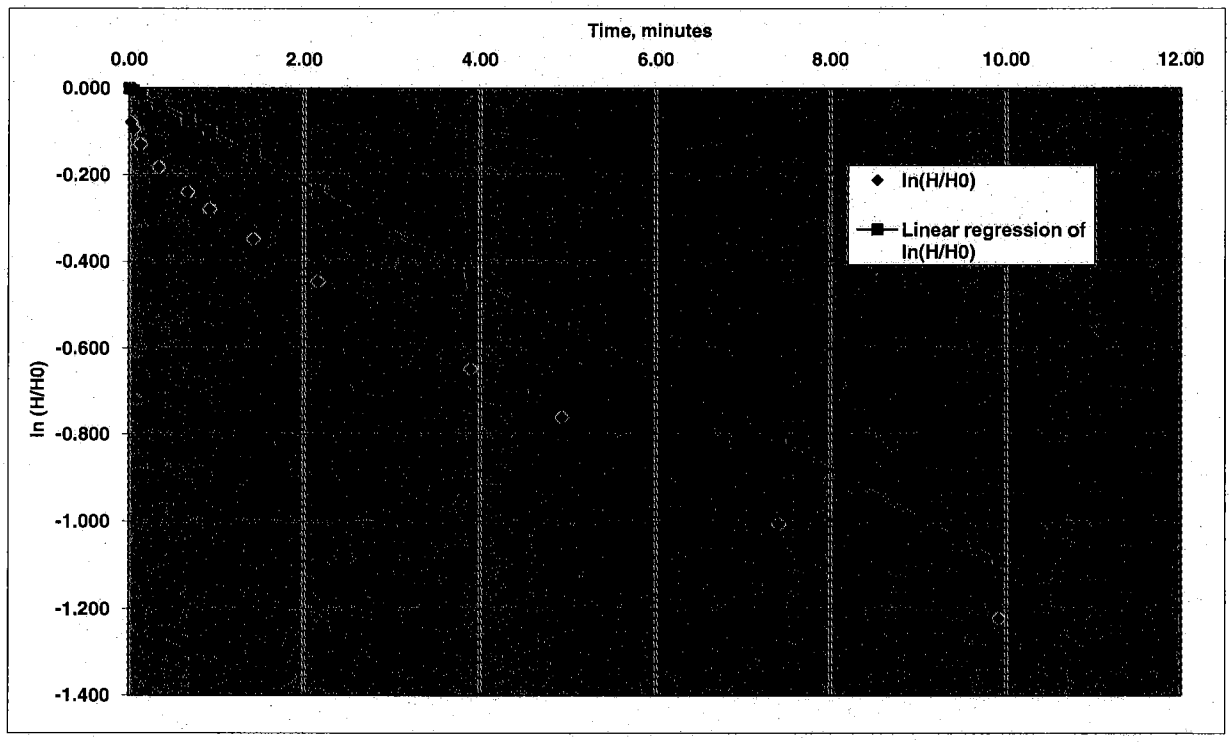
$K = r^2 * \ln(L/R)/(2LT_0)$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



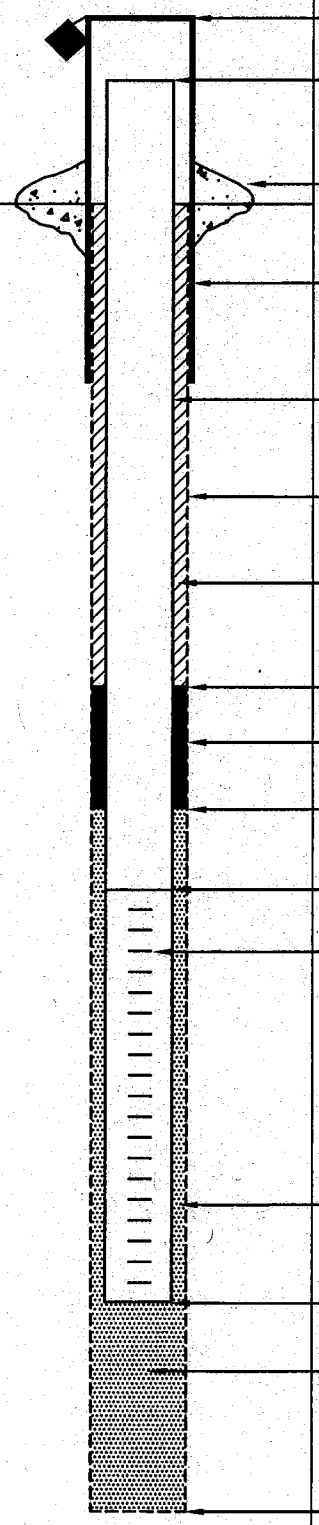
1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

WELL NO.: PAI-27MW601

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT: PARRIS ISLAND SITE 27	LOCATION: MW601	DRILLER: COREY GAMMWELL
PROJECT NO.: 600455	BORING:	DRILLING METHOD: DPT
DATE BEGUN: 8/5/08	DATE COMPLETED: 8/10/08	
FIELD GEOLOGIST: CHARLIE WARNO		DEVELOPMENT METHOD: PERISTALTIC
GROUND ELEVATION: 12.19	DATUM:	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: — / —

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 14.66 / 2.47

TYPE OF SURFACE SEAL: CONCRETE

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 4 1/4"

TYPE OF BACKFILL: GROUT

ELEVATION/DEPTH TOP OF SEAL: -3.81 / 16'

TYPE OF SEAL: BENTONITE

DEPTH TOP OF SAND PACK: -5.81 / 18'

ELEVATION/DEPTH TOP OF SCREEN: -6.81 / 19'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 5

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #1 SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: -11.81 / 24'

ELEVATION/DEPTH BOTTOM OF SAND PACK: -12.31 / 24.5'

BACKFILL MATERIAL BELOW SAND:

ELEVATION/DEPTH OF HOLE: -12.31 / 24.5'

ACAD:FORM_MWSU.dwg 07/20/99 INL

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PAI-27

PROJECT NAME: MCRD PARRIS IS- SITE 27 WELL/BORING NO.: MW-60I

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 5 / 26.90 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 10.02 DATE: 8/16/08

TEST TYPE (Rising/Falling/Constant Head): RISING. CHECKED:

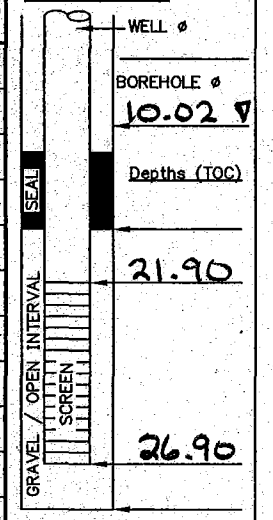
METHOD OF INDUCING WATER LEVEL CHANGE: 2 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

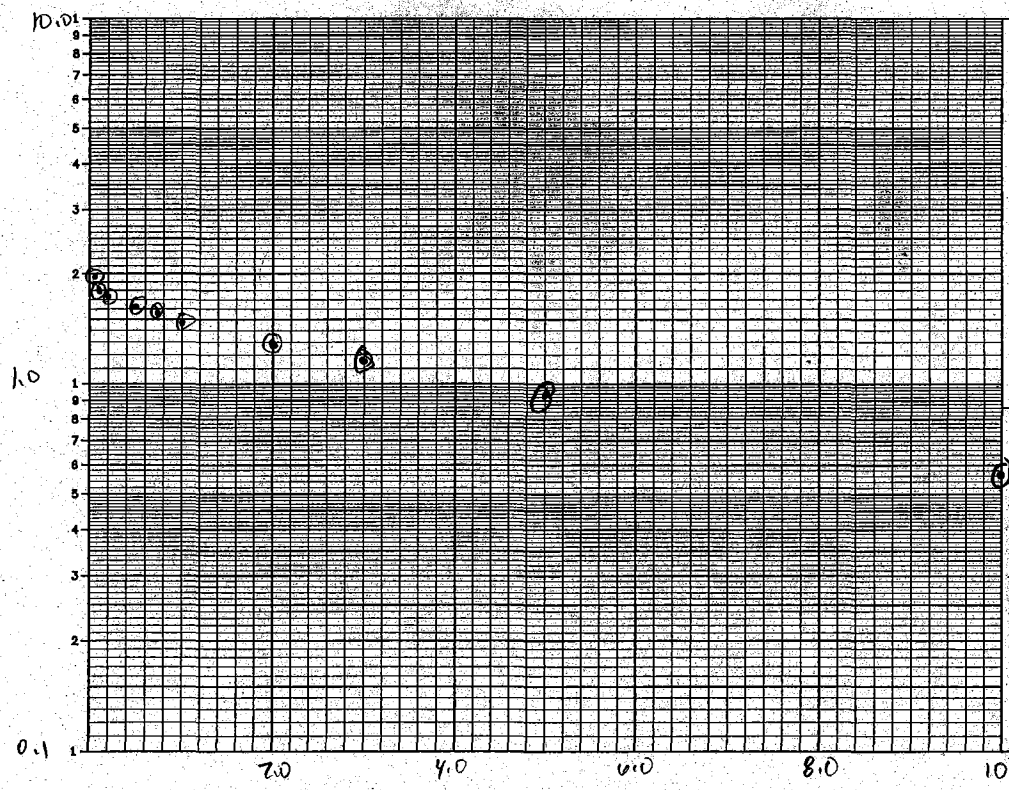
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

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)
.078		1.974			
.1		1.819			
.2		1.731			
.5		1.615			
.75		1.549			
1.0		1.488			
2.0		1.299			
3.0		1.151			
5.0		.918			
10.0		.576			
19.9		.300			
25		.243			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS,SKETCH MAPS, ETC.:

r = .083
R = .177
L = 5'

Report Date:	8/16/2008 15:34
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-60I 2008-08-16 15-18-32.wsl
Create Date	8/16/2008 15:34

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-60I
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/16/2008 14:42
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	7.18377 (PSI)
Head Pressure	7.18318 (PSI)
Temperature	26.2968 (C)
Depth of Probe	16.5857 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/16/2008 15:03	Manual Start Command
8/16/2008 15:18	User Note: "Downloading log - Used Batt: 4% Memory: 31% User: Stanley.Conti"
8/16/2008 15:23	User Note: "Downloading log - Used Batt: 4% Memory: 31% User: Stanley.Conti"

8/16/2008 15:34 Manual Stop Command

Log Data:
Record Count 124

Date and Time	Elapsed Time Minutes		Sensor: Pres 35ft SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/16/2008 15:03	0		7.22	23.537	-0.084
8/16/2008 15:03	0.004		7.222	23.557	-0.088
8/16/2008 15:03	0.008		7.221	23.568	-0.085
8/16/2008 15:03	0.013		7.224	23.642	-0.094
8/16/2008 15:03	0.02		7.222	23.627	-0.089
8/16/2008 15:03	0.024		7.222	23.625	-0.088
8/16/2008 15:03	0.028		7.219	23.625	-0.081
8/16/2008 15:03	0.031		7.222	23.604	-0.088
8/16/2008 15:03	0.04		7.221	23.612	-0.087
8/16/2008 15:03	0.043		7.22	23.617	-0.083
8/16/2008 15:03	0.047		7.221	23.624	-0.085
8/16/2008 15:03	0.055		6.888	23.603	0.683
8/16/2008 15:03	0.059		6.374	23.613	1.87
8/16/2008 15:03	0.063		6.977	23.621	0.476
8/16/2008 15:03	0.066		7.06	23.622	0.286
8/16/2008 15:03	0.075		6.385	23.662	1.844
8/16/2008 15:03	0.078	0	6.329	23.657	1.974
8/16/2008 15:03	0.082		6.379	23.654	1.858
8/16/2008 15:03	0.087		6.384	23.656	1.846
8/16/2008 15:03	0.09		6.389	23.655	1.836
8/16/2008 15:03	0.094		6.393	23.654	1.826
8/16/2008 15:03	0.098	.02	6.396	23.655	1.819
8/16/2008 15:03	0.102		6.402	23.652	1.805
8/16/2008 15:03	0.106		6.4	23.655	1.809
8/16/2008 15:03	0.11		6.402	23.654	1.804
8/16/2008 15:03	0.113		6.405	23.661	1.797
8/16/2008 15:03	0.119		6.407	23.653	1.793
8/16/2008 15:03	0.123		6.408	23.652	1.792
8/16/2008 15:03	0.126	.048	6.41	23.654	1.788
8/16/2008 15:03	0.133		6.411	23.636	1.784
8/16/2008 15:03	0.141		6.414	23.626	1.777
8/16/2008 15:03	0.15		6.419	23.613	1.767
8/16/2008 15:03	0.158		6.422	23.613	1.76
8/16/2008 15:03	0.168		6.426	23.604	1.749
8/16/2008 15:03	0.178		6.428	23.606	1.744
8/16/2008 15:03	0.188		6.431	23.602	1.738
8/16/2008 15:03	0.199		6.434	23.596	1.731
8/16/2008 15:03	0.211	.133	6.437	23.593	1.725
8/16/2008 15:03	0.224		6.44	23.587	1.718
8/16/2008 15:03	0.237		6.444	23.588	1.709

8/16/2008 15:03	0.251		6.445	23.585	1.706
8/16/2008 15:03	0.266		6.449	23.585	1.697
8/16/2008 15:03	0.282		6.452	23.581	1.69
8/16/2008 15:03	0.298		6.454	23.58	1.686
8/16/2008 15:03	0.316		6.458	23.577	1.676
8/16/2008 15:03	0.335		6.461	23.576	1.67
8/16/2008 15:03	0.355		6.464	23.575	1.661
8/16/2008 15:03	0.376		6.467	23.574	1.656
8/16/2008 15:03	0.398		6.471	23.57	1.646
8/16/2008 15:03	0.422	.344	6.474	23.57	1.638
8/16/2008 15:03	0.447		6.478	23.571	1.629
8/16/2008 15:03	0.473		6.48	23.568	1.626
8/16/2008 15:03	0.501		6.484	23.566	1.615
8/16/2008 15:03	0.531		6.489	23.564	1.604
8/16/2008 15:03	0.562		6.492	23.564	1.596
8/16/2008 15:03	0.596		6.496	23.564	1.587
8/16/2008 15:03	0.631		6.501	23.564	1.576
8/16/2008 15:03	0.668		6.505	23.559	1.566
8/16/2008 15:04	0.708		6.508	23.56	1.56
8/16/2008 15:04	0.75	.672	6.513	23.556	1.549
8/16/2008 15:04	0.794		6.519	23.553	1.535
8/16/2008 15:04	0.841		6.523	23.555	1.525
8/16/2008 15:04	0.891		6.529	23.555	1.511
8/16/2008 15:04	0.944		6.536	23.55	1.496
8/16/2008 15:04	1	.922	6.539	23.55	1.488
8/16/2008 15:04	1.06		6.546	23.547	1.473
8/16/2008 15:04	1.12		6.55	23.546	1.463
8/16/2008 15:04	1.19		6.557	23.546	1.448
8/16/2008 15:04	1.26		6.563	23.542	1.433
8/16/2008 15:04	1.33		6.569	23.541	1.419
8/16/2008 15:04	1.41		6.575	23.54	1.405
8/16/2008 15:04	1.5	1.422	6.583	23.537	1.387
8/16/2008 15:04	1.58		6.59	23.538	1.371
8/16/2008 15:05	1.68		6.598	23.534	1.353
8/16/2008 15:05	1.78		6.606	23.53	1.335
8/16/2008 15:05	1.88		6.613	23.529	1.318
8/16/2008 15:05	1.99		6.621	23.529	1.299
8/16/2008 15:05	2.11		6.63	23.527	1.279
8/16/2008 15:05	2.24	2.162	6.64	23.526	1.256
8/16/2008 15:05	2.37		6.648	23.523	1.237
8/16/2008 15:05	2.51		6.657	23.523	1.216
8/16/2008 15:05	2.66		6.665	23.52	1.197
8/16/2008 15:06	2.82		6.676	23.518	1.172
8/16/2008 15:06	2.98		6.685	23.517	1.151
8/16/2008 15:06	3.16		6.695	23.516	1.127
8/16/2008 15:06	3.35		6.707	23.516	1.101
8/16/2008 15:06	3.55		6.717	23.511	1.079
8/16/2008 15:07	3.76		6.728	23.51	1.052
8/16/2008 15:07	3.98	3.902	6.737	23.511	1.031
8/16/2008 15:07	4.221		6.752	23.505	0.998
8/16/2008 15:07	4.47		6.763	23.507	0.972
8/16/2008 15:08	4.73		6.775	23.504	0.944

8/16/2008 15:08	5.01	4.932	6.786	23.503	0.918
8/16/2008 15:08	5.31		6.798	23.503	0.89
8/16/2008 15:08	5.62		6.811	23.501	0.861
8/16/2008 15:09	5.96		6.824	23.499	0.832
8/16/2008 15:09	6.31		6.834	23.498	0.807
8/16/2008 15:10	6.68		6.848	23.499	0.776
8/16/2008 15:10	7.08		6.86	23.498	0.748
8/16/2008 15:10	7.5	7.422	6.873	23.498	0.718
8/16/2008 15:11	7.94		6.885	23.499	0.69
8/16/2008 15:11	8.41		6.898	23.498	0.661
8/16/2008 15:12	8.91		6.911	23.496	0.631
8/16/2008 15:12	9.44		6.922	23.499	0.605
8/16/2008 15:13	10	9.922	6.934	23.492	0.576
8/16/2008 15:13	10.6		6.947	23.494	0.547
8/16/2008 15:14	11.2		6.957	23.493	0.523
8/16/2008 15:15	11.9		6.969	23.495	0.496
8/16/2008 15:15	12.6		6.98	23.492	0.47
8/16/2008 15:16	13.3		6.99	23.493	0.447
8/16/2008 15:17	14.1		7.001	23.492	0.421
8/16/2008 15:18	15	14.922	7.011	23.493	0.398
8/16/2008 15:19	15.801		7.022	23.493	0.375
8/16/2008 15:20	16.8		7.03	23.496	0.356
8/16/2008 15:21	17.8		7.038	23.494	0.338
8/16/2008 15:22	18.8		7.045	23.495	0.32
8/16/2008 15:23	19.9		7.054	23.496	0.3
8/16/2008 15:24	21.1	21.022	7.061	23.494	0.284
8/16/2008 15:25	22.4		7.067	23.493	0.27
8/16/2008 15:27	23.7		7.073	23.493	0.256
8/16/2008 15:28	25.1		7.079	23.497	0.243
8/16/2008 15:29	26.6		7.084	23.493	0.231
8/16/2008 15:31	28.2		7.088	23.489	0.221
8/16/2008 15:33	29.8	29.722	7.093	23.489	0.21

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	PAI-27-MW61I
Test No.:	1
Date:	8/16/2008
Geologist:	CONTI
Checked by / Date:	EWRamer 6-28-11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.177
Screened / Monitored Interval Below Water Table, L (ft):	5
Static Water Level (Depth/ Elevation) (ft.):	8.50
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of $\ln(H/H0)$ (b=0)
	0.00	1.98	0.00	-1.98	1.00	0.0000	0.00
	0.02	1.65	0.02	-1.65	0.83	-0.1823	0.00
	0.03	1.58	0.03	-1.58	0.80	-0.2257	0.00
	0.05	1.55	0.05	-1.55	0.78	-0.2448	-0.01
	0.14	1.50	0.14	-1.50	0.76	-0.2776	-0.02
	0.44	1.41	0.44	-1.41	0.71	-0.3395	-0.05
	0.93	1.30	0.93	-1.30	0.66	-0.4207	-0.10
	1.43	1.22	1.43	-1.22	0.62	-0.4848	-0.16
	2.04	1.13	2.04	-1.13	0.57	-0.5603	-0.22
	3.28	0.99	3.28	-0.99	0.50	-0.6931	-0.36
x	4.94	0.84	4.94	-0.84	0.42	-0.8575	-0.54
	7.43	0.67	7.43	-0.67	0.34	-1.0836	-0.81
	9.93	0.54	9.93	-0.54	0.27	-1.2993	-1.08
x	14.93	0.38	0.00			0.0000	
x	21.03	0.29	0.00			0.0000	
x	26.13	0.22	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	13
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-0.109
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.243
Actual Y-intercept is set to 0.	0.000
T_0 (min):	9.174
K (ft/min):	2.53E-04
K (ft/day):	**0.364**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

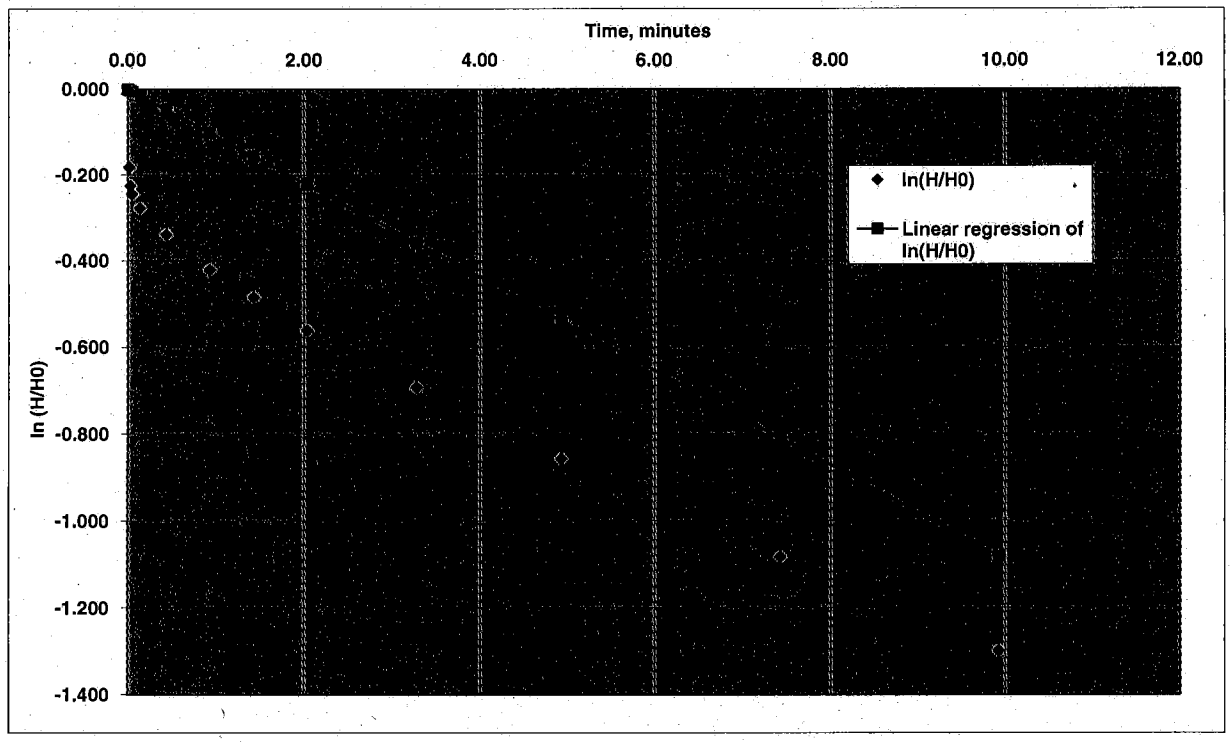
T_0: Time at which ln(H/H0)=-1

$K = r^2 * \ln(L/R)/(2LT_0)$

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



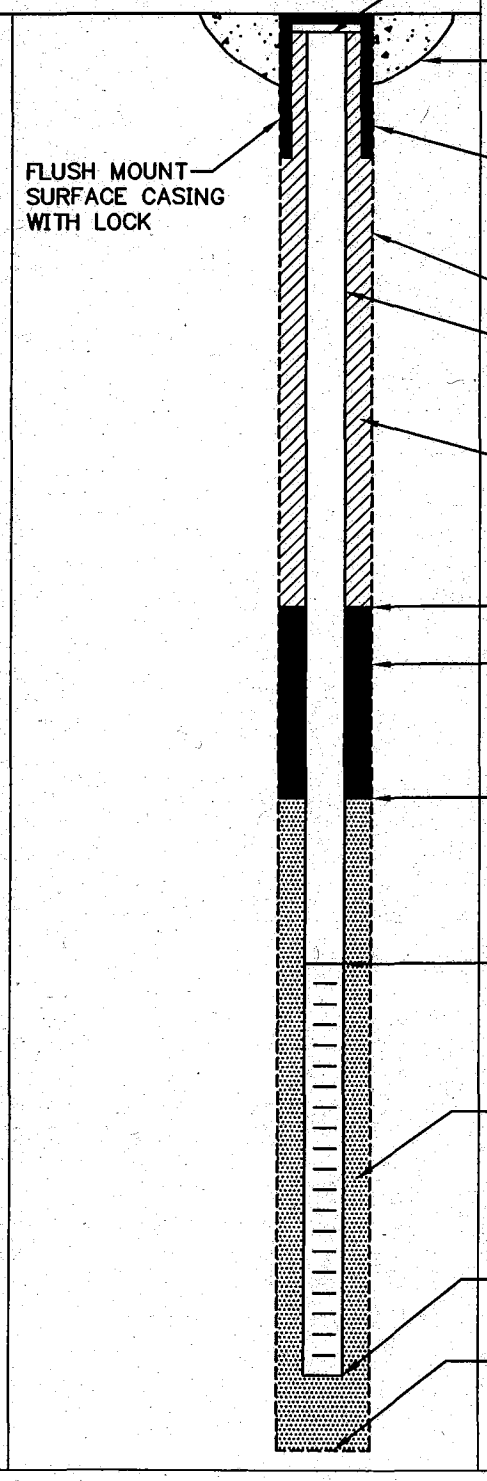
1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

WELL NO.: PAI - 27MW 61I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT: PARRIS ISLAND SITE 27	LOCATION: MW 61I	DRILLER: COREY GAMWELL
PROJECT NO.: 6004455	BORING:	DRILLING METHOD: DPT
DATE BEGUN: 8/6/08	DATE COMPLETED: 8/10/08	
FIELD GEOLOGIST: CHARLIE WARNO		DEVELOPMENT METHOD: PERISTALTIC
GROUND ELEVATION: 14.54	DATUM:	



ELEVATION TOP OF RISER: 14.13

TYPE OF SURFACE SEAL: CONCRETE

TYPE OF PROTECTIVE CASING: STEEL

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: GROUT

ELEVATION/DEPTH TOP OF SEAL: -1.46 / 16'

TYPE OF SEAL: BENTONITE

ELEVATION/DEPTH TOP OF SAND: -3.46 / 18'

ELEVATION/DEPTH TOP OF SCREEN: -4.96 / 19.5'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 5'

TYPE OF SAND PACK: #1 SAND

DIAMETER OF HOLE IN BEDROCK: NA

ELEVATION / DEPTH BOTTOM OF SCREEN: -9.96 / 24.5'

ELEVATION / DEPTH BOTTOM OF SAND: -10.46 / 25.0'

ELEVATION/DEPTH BOTTOM OF HOLE: -10.46 / 25.0'

BACKFILL MATERIAL BELOW SAND: NA

ACAD:FORM_MWFM.dwg 07/20/99 INL

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PAI 27

PROJECT NAME: MCRD PARRIS IS - SITE 27 WELL/BORING NO.: MW-61I

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 5 / 23.90 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 8.50 DATE: 8/16/08

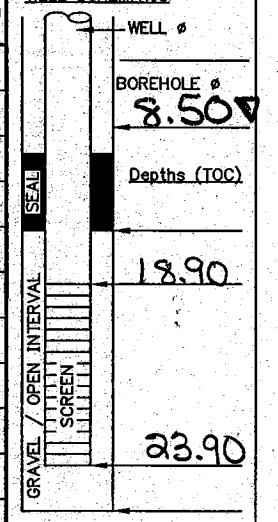
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: 2 SECTION SLUG PAGE 1 OF 1

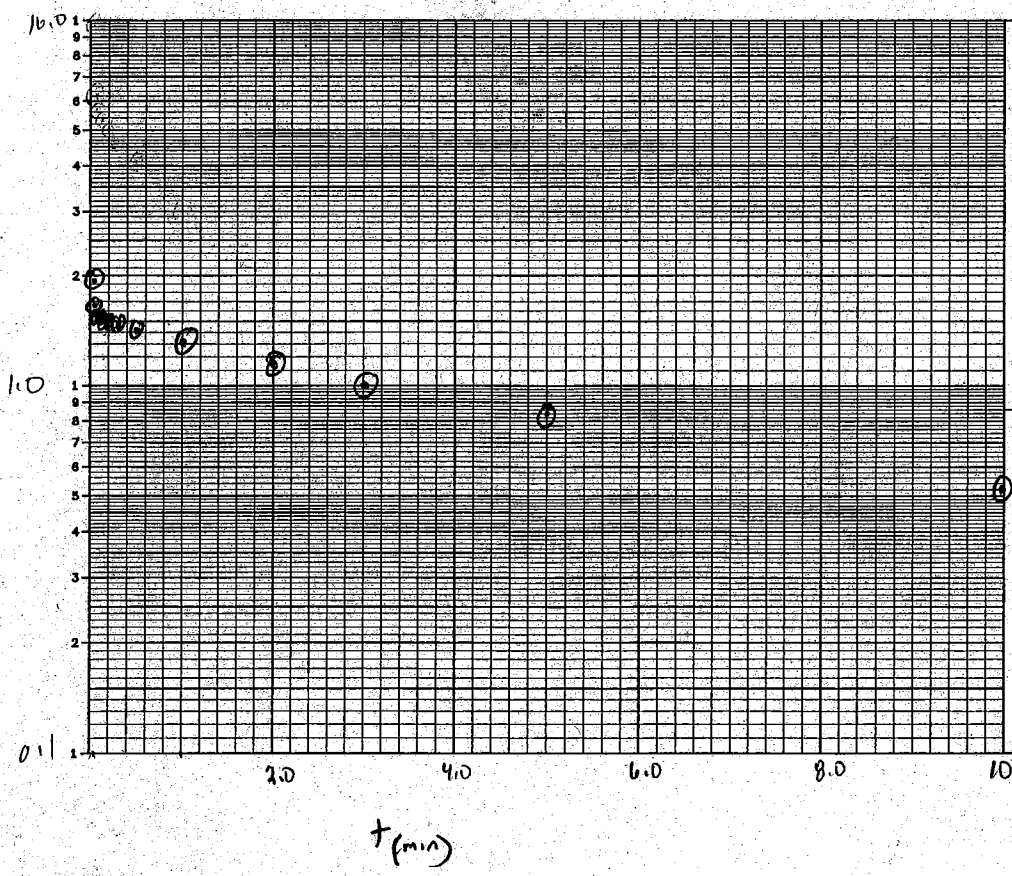
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC.

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)
.066		1.984	15.0	.382	
.091		1.616	20.0	.292	
.099		1.578	25.0	.234	
.15		1.533			
.20		1.505			
.30		1.466			
.5		1.408			
1.0		1.301			
2.0		1.143			
3.0		1.009			
5.0		.839			
10.0		.520			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:
SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS, SKETCH MAPS, ETC.:
r = .083'
R = .177
L = 5'

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

(2)

Report Date:	8/16/2008 16:30
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-61I 2008-08-16 16-05-12.wsl
Create Date	8/16/2008 16:30

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-61I
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/16/2008 15:48
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	6.53885 (PSI)
Head Pressure	6.53878 (PSI)
Temperature	28.459 (C)
Depth of Probe	15.0979 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/16/2008 16:02	Manual Start Command
8/16/2008 16:05	User Note: "Downloading log - Used Batt: 4% Memory: 32% User: Stanley.Conti"
8/16/2008 16:07	User Note: "Downloading log - Used Batt: 4% Memory: 32% User: Stanley.Conti"

8/16/2008 16:15 User Note: "Downloading log - Used Batt: 4% Memory: 32% User: Stanley.Conti"
8/16/2008 16:20 User Note: "Downloading log - Used Batt: 4% Memory: 32% User: Stanley.Conti"
8/16/2008 16:29 Manual Stop Command

Log Data:
Record Count 122

Date and Time	Elapsed Time Minutes		Sensor: Pres 35ft SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/16/2008 16:02	0		6.615	25.148	-0.177
8/16/2008 16:02	0.004		6.615	25.17	-0.177
8/16/2008 16:02	0.008		6.616	25.184	-0.178
8/16/2008 16:02	0.013		6.618	25.256	-0.182
8/16/2008 16:02	0.02		6.616	25.241	-0.179
8/16/2008 16:02	0.024		6.616	25.238	-0.178
8/16/2008 16:02	0.028		6.615	25.237	-0.176
8/16/2008 16:02	0.031		6.616	25.216	-0.178
8/16/2008 16:02	0.04		6.604	25.225	-0.151
8/16/2008 16:02	0.043		6.542	25.232	-0.008
8/16/2008 16:02	0.047		6.139	25.237	0.924
8/16/2008 16:02	0.055		6.292	25.216	0.57
8/16/2008 16:02	0.059		6.502	25.227	0.086
8/16/2008 16:02	0.063		6.224	25.236	0.727
8/16/2008 16:02	0.066	0	5.68	25.243	1.984
8/16/2008 16:02	0.075		5.949	25.279	1.362
8/16/2008 16:02	0.079		5.821	25.271	1.657
8/16/2008 16:02	0.082	-016	5.822	25.271	1.654
8/16/2008 16:02	0.086		5.874	25.286	1.534
8/16/2008 16:02	0.091		5.839	25.282	1.616
8/16/2008 16:02	0.095		5.867	25.271	1.55
8/16/2008 16:02	0.099	-033	5.855	25.266	1.578
8/16/2008 16:02	0.104		5.866	25.268	1.553
8/16/2008 16:02	0.109		5.861	25.266	1.565
8/16/2008 16:02	0.112		5.866	25.267	1.554
8/16/2008 16:02	0.116		5.865	25.271	1.557
8/16/2008 16:02	0.12	-054	5.867	25.268	1.551
8/16/2008 16:02	0.123		5.867	25.267	1.55
8/16/2008 16:02	0.127		5.868	25.271	1.548
8/16/2008 16:02	0.133		5.871	25.256	1.543
8/16/2008 16:02	0.141		5.872	25.24	1.539
8/16/2008 16:02	0.15		5.875	25.229	1.533
8/16/2008 16:02	0.158		5.878	25.225	1.527
8/16/2008 16:02	0.168		5.88	25.218	1.522
8/16/2008 16:02	0.178		5.883	25.212	1.513
8/16/2008 16:02	0.188		5.885	25.211	1.511
8/16/2008 16:02	0.199		5.887	25.209	1.505
8/16/2008 16:02	0.211	-145	5.889	25.204	1.5
8/16/2008 16:02	0.224		5.891	25.203	1.495

8/16/2008 16:02	0.237		5.893	25.199	1.49
8/16/2008 16:02	0.251		5.896	25.196	1.484
8/16/2008 16:02	0.266		5.898	25.193	1.479
8/16/2008 16:02	0.282		5.901	25.194	1.473
8/16/2008 16:02	0.298		5.904	25.191	1.466
8/16/2008 16:02	0.316		5.906	25.187	1.461
8/16/2008 16:02	0.335		5.909	25.186	1.454
8/16/2008 16:02	0.355		5.912	25.185	1.448
8/16/2008 16:02	0.376		5.915	25.184	1.441
8/16/2008 16:02	0.398		5.918	25.181	1.434
8/16/2008 16:02	0.422		5.92	25.179	1.428
8/16/2008 16:03	0.447		5.925	25.179	1.418
8/16/2008 16:03	0.473		5.926	25.178	1.415
8/16/2008 16:03	0.501	.435	5.929	25.175	1.408
8/16/2008 16:03	0.531		5.934	25.162	1.398
8/16/2008 16:03	0.562		5.935	25.171	1.394
8/16/2008 16:03	0.596		5.939	25.169	1.385
8/16/2008 16:03	0.631		5.942	25.169	1.378
8/16/2008 16:03	0.668		5.946	25.166	1.368
8/16/2008 16:03	0.708		5.95	25.163	1.36
8/16/2008 16:03	0.75		5.954	25.162	1.35
8/16/2008 16:03	0.794		5.958	25.16	1.341
8/16/2008 16:03	0.841		5.963	25.156	1.33
8/16/2008 16:03	0.891		5.967	25.155	1.321
8/16/2008 16:03	0.944		5.971	25.151	1.312
8/16/2008 16:03	1	.934	5.975	25.147	1.301
8/16/2008 16:03	1.06		5.981	25.145	1.289
8/16/2008 16:03	1.12		5.985	25.143	1.279
8/16/2008 16:03	1.19		5.991	25.139	1.266
8/16/2008 16:03	1.26		5.994	25.136	1.257
8/16/2008 16:03	1.33		6.001	25.132	1.242
8/16/2008 16:03	1.41		6.006	25.13	1.23
8/16/2008 16:04	1.5	1.434	6.012	25.124	1.215
8/16/2008 16:04	1.58		6.016	25.121	1.207
8/16/2008 16:04	1.68		6.024	25.115	1.189
8/16/2008 16:04	1.78		6.03	25.111	1.176
8/16/2008 16:04	1.88		6.036	25.109	1.162
8/16/2008 16:04	1.99		6.044	25.104	1.143
8/16/2008 16:04	2.11	2.044	6.05	25.099	1.129
8/16/2008 16:04	2.24		6.057	25.096	1.113
8/16/2008 16:04	2.37		6.065	25.092	1.095
8/16/2008 16:05	2.51		6.074	25.088	1.072
8/16/2008 16:05	2.66		6.076	25.085	1.068
8/16/2008 16:05	2.82		6.085	25.078	1.048
8/16/2008 16:05	2.98		6.094	25.072	1.028
8/16/2008 16:05	3.16		6.102	25.069	1.009
8/16/2008 16:05	3.35	3.284	6.111	25.064	0.987
8/16/2008 16:06	3.55		6.119	25.06	0.97
8/16/2008 16:06	3.76		6.129	25.055	0.947
8/16/2008 16:06	3.98		6.137	25.054	0.928
8/16/2008 16:06	4.22		6.146	25.05	0.906
8/16/2008 16:07	4.47		6.157	25.046	0.882

8/16/2008 16:07	4.73		6.165	25.043	0.864
8/16/2008 16:07	5.01	4.944	6.176	25.041	0.839
8/16/2008 16:07	5.311		6.187	25.037	0.813
8/16/2008 16:08	5.62		6.196	25.031	0.791
8/16/2008 16:08	5.96		6.206	25.032	0.769
8/16/2008 16:08	6.31		6.216	25.029	0.745
8/16/2008 16:09	6.68		6.228	25.024	0.718
8/16/2008 16:09	7.08		6.238	25.026	0.695
8/16/2008 16:10	7.5	7.434	6.249	25.022	0.67
8/16/2008 16:10	7.94		6.26	25.018	0.644
8/16/2008 16:10	8.41		6.27	25.02	0.621
8/16/2008 16:11	8.91		6.281	25.017	0.595
8/16/2008 16:12	9.44		6.292	25.015	0.57
8/16/2008 16:12	10	9.934	6.306	25.014	0.538
8/16/2008 16:13	10.6		6.313	25.014	0.52
8/16/2008 16:13	11.2		6.323	25.015	0.499
8/16/2008 16:14	11.9		6.335	25.013	0.471
8/16/2008 16:15	12.6		6.345	25.01	0.448
8/16/2008 16:15	13.3		6.353	25.012	0.429
8/16/2008 16:16	14.1		6.363	25.011	0.405
8/16/2008 16:17	15	14.934	6.373	25.009	0.382
8/16/2008 16:18	15.8		6.382	25.008	0.362
8/16/2008 16:19	16.8		6.39	25.009	0.344
8/16/2008 16:20	17.8		6.397	25.008	0.327
8/16/2008 16:21	18.8		6.406	25.007	0.308
8/16/2008 16:22	19.9		6.413	25.008	0.292
8/16/2008 16:23	21.1	21.034	6.419	25.004	0.276
8/16/2008 16:24	22.4		6.426	25.014	0.261
8/16/2008 16:26	23.7		6.432	25.031	0.247
8/16/2008 16:27	25.1		6.438	25.021	0.234
8/16/2008 16:29	26.6	26.53	6.443	25.019	0.221

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	PAI-27-MW63S
Test No.:	1
Date:	8/16/2008
Geologist:	CONTI
Checked by / Date:	SWRomer 6-28-11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.177
Screened / Monitored Interval Below Water Table, L (ft):	5.12
Static Water Level (Depth/ Elevation) (ft.):	11.38
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of $\ln(H/H0)$ (b=0)
	0.00	0.90	0.00	0.90	1.00	0.0000	0.00
	0.01	0.82	0.01	0.82	0.91	-0.0992	-0.10
	0.02	0.69	0.02	0.69	0.77	-0.2651	-0.21
	0.03	0.60	0.03	0.60	0.67	-0.4055	-0.31
	0.05	0.51	0.05	0.51	0.57	-0.5580	-0.52
	0.06	0.43	0.06	0.43	0.48	-0.7386	-0.62
	0.08	0.35	0.08	0.35	0.39	-0.9445	-0.93
	0.12	0.27	0.12	0.27	0.30	-1.2040	-1.24
x	0.18	0.21	0.00			0.0000	
x	0.26	0.17	0.00			0.0000	
x	0.34	0.14	0.00			0.0000	
x	0.44	0.12	0.00			0.0000	
x	0.62	0.08	0.00			0.0000	
x	0.94	0.07	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	8
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-10.350
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.049
Actual Y-intercept is set to 0.	0.000
T_0 (min):	0.097
K (ft/min):	2.36E-02
K (ft/day):	**33.983**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum (x^2)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum (x^2)\right) - \left(\sum x\right)^2}$$

T_0: Time at which ln(H/H0)=-1

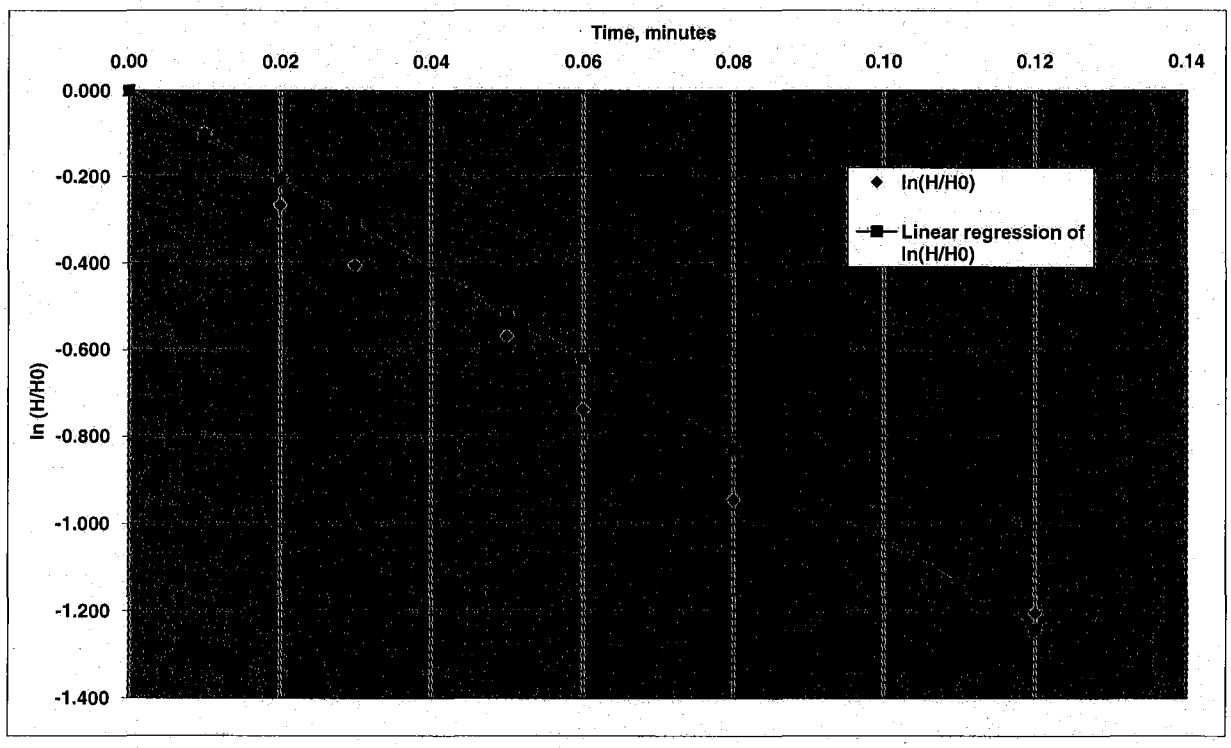
$K = r^2 * \ln(L/R)/(2LT_0)$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



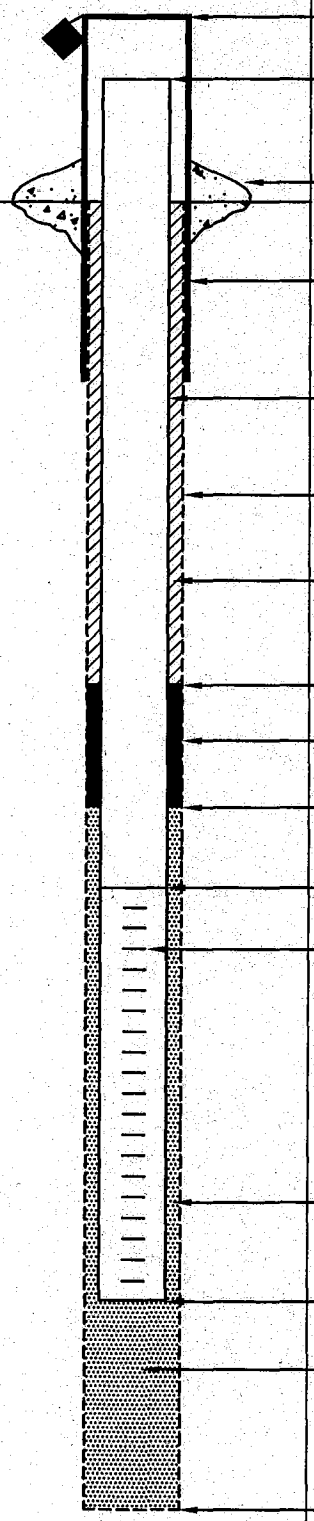
1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

WELL NO.: PAI-27MW63S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT PARRIS ISLAND	LOCATION MW63S	DRILLER CORVEY GAMWELL
PROJECT NO. 600455	BORING	DRILLING METHOD DPT
DATE BEGUN 8/5/08	DATE COMPLETED 8/10/08	
FIELD GEOLOGIST CHARLIE WARNO		DEVELOPMENT METHOD PERISTALTIC
GROUND ELEVATION 14.26	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: — / —

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 16.95/2.69

TYPE OF SURFACE SEAL: CONCRETE

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING: STEEL

RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 4 1/4"

TYPE OF BACKFILL: GROUT

ELEVATION/DEPTH TOP OF SEAL: 12.26/2.0'

TYPE OF SEAL: BENTONITE

DEPTH TOP OF SAND PACK: 11.76/2.5'

ELEVATION/DEPTH TOP OF SCREEN: 11.26/3'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #1 SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 1.26/13'

ELEVATION/DEPTH BOTTOM OF SAND PACK: 0.76/13.5'
BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: 0.76/13.5'

ACAD:FORM_MWSU.dwg 07/20/99 INL

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PAI 27

PROJECT NAME: MCRD PARRIS IS - SITE 27 WELL/BORING NO.: MW-63S

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10 / 16.50 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 11.38 DATE: 8/ /08

TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

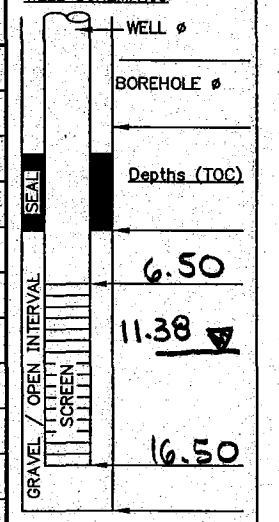
METHOD OF INDUCING WATER LEVEL CHANGE: 1 SECTION SLUG PAGE 1 OF 1

REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

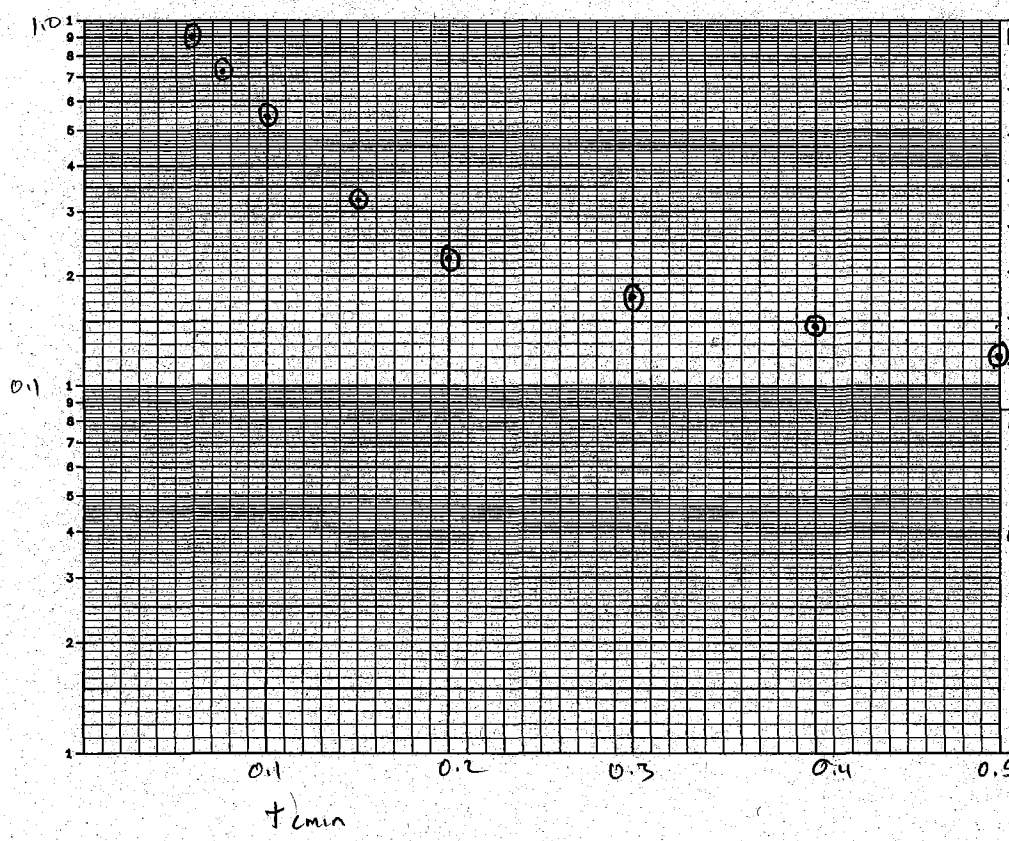
ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

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)
.059		.901			
.075		.724			
.10		.524			
.15		.322			
.20		.243			
.30		.178			
.40		.144			
.50		.120			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS, SKETCH MAPS, ETC.:

r = .083'
R = .177
L = 5.12

(R2)

Report Date:	8/16/2008 16:47
Report User Name:	Stanley.Conti
Report Computer Name:	NUSL1X25XC1

Log File Properties

File Name	MW-63S 2008-08-16 16-46-34.wsl
Create Date	8/16/2008 16:47

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-63S
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/16/2008 16:40
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	2.05571 (PSI)
Head Pressure	2.05503 (PSI)
Temperature	26.9382 (C)
Depth of Probe	4.74501 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/16/2008 16:44	Manual Start Command
8/16/2008 16:46	User Note: "Downloading log - Used Batt: 4% Memory: 34% User: Stanley.Conti"
8/16/2008 16:47	Manual Stop Command

Log Data:
Record Count 81

Date and Time	Elapsed Time Minutes		Sensor: Pres 35ft SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/16/2008 16:44	0		2.063	24.496	-0.018
8/16/2008 16:44	0.004		2.061	24.517	-0.013
8/16/2008 16:44	0.008		2.062	24.53	-0.015
8/16/2008 16:44	0.013		2.063	24.597	-0.016
8/16/2008 16:44	0.02		2.063	24.585	-0.018
8/16/2008 16:44	0.024		2.063	24.578	-0.017
8/16/2008 16:44	0.028		2.062	24.578	-0.014
8/16/2008 16:44	0.031		2.063	24.558	-0.017
8/16/2008 16:44	0.04		2.07	24.564	-0.034
8/16/2008 16:44	0.043		2.07	24.57	-0.034
8/16/2008 16:44	0.047		1.866	24.572	0.438
8/16/2008 16:44	0.055		2.14	24.552	-0.194
8/16/2008 16:44	0.059	0	1.666	24.562	0.901
8/16/2008 16:44	0.063		1.68	24.566	0.867
8/16/2008 16:44	0.066	.007	1.703	24.569	0.815
8/16/2008 16:44	0.075		1.742	24.609	0.724
8/16/2008 16:44	0.079	.02	1.756	24.6	0.692
8/16/2008 16:44	0.082		1.77	24.598	0.66
8/16/2008 16:44	0.086		1.791	24.62	0.612
8/16/2008 16:44	0.092	.033	1.797	24.609	0.597
8/16/2008 16:44	0.096		1.815	24.595	0.556
8/16/2008 16:44	0.101		1.829	24.581	0.524
8/16/2008 16:44	0.106	.047	1.835	24.577	0.509
8/16/2008 16:44	0.109		1.851	24.582	0.472
8/16/2008 16:44	0.113		1.857	24.586	0.459
8/16/2008 16:44	0.117		1.863	24.584	0.444
8/16/2008 16:44	0.12	.061	1.871	24.586	0.427
8/16/2008 16:44	0.124		1.88	24.585	0.405
8/16/2008 16:44	0.128		1.887	24.585	0.39
8/16/2008 16:44	0.133		1.894	24.575	0.374
8/16/2008 16:44	0.141	.082	1.906	24.558	0.347
8/16/2008 16:44	0.15		1.916	24.545	0.322
8/16/2008 16:44	0.158		1.925	24.536	0.302
8/16/2008 16:44	0.168		1.931	24.528	0.287
8/16/2008 16:44	0.178	.119	1.94	24.522	0.268
8/16/2008 16:44	0.188		1.946	24.519	0.254
8/16/2008 16:44	0.199		1.95	24.512	0.243
8/16/2008 16:44	0.211		1.956	24.506	0.229
8/16/2008 16:44	0.224		1.961	24.498	0.218
8/16/2008 16:44	0.237	.178	1.965	24.494	0.209
8/16/2008 16:44	0.251		1.968	24.489	0.202
8/16/2008 16:44	0.266		1.973	24.496	0.19

8/16/2008 16:44	0.282		1.976	24.483	0.184
8/16/2008 16:44	0.298		1.979	24.475	0.178
8/16/2008 16:44	0.316	.257	1.983	24.469	0.168
8/16/2008 16:44	0.335		1.986	24.465	0.161
8/16/2008 16:44	0.355		1.99	24.456	0.153
8/16/2008 16:44	0.376		1.992	24.453	0.147
8/16/2008 16:44	0.398	.339	1.993	24.445	0.144
8/16/2008 16:44	0.422		1.997	24.438	0.136
8/16/2008 16:44	0.447		2	24.432	0.129
8/16/2008 16:45	0.473		2.002	24.429	0.123
8/16/2008 16:45	0.501	.442	2.004	24.418	0.12
8/16/2008 16:45	0.531		2.006	24.411	0.114
8/16/2008 16:45	0.562		2.009	24.407	0.107
8/16/2008 16:45	0.596		2.011	24.398	0.102
8/16/2008 16:45	0.631		2.013	24.392	0.098
8/16/2008 16:45	0.668		2.016	24.382	0.093
8/16/2008 16:45	0.709		2.019	24.376	0.084
8/16/2008 16:45	0.75	.691	2.019	24.368	0.086
8/16/2008 16:45	0.794		2.021	24.359	0.08
8/16/2008 16:45	0.841		2.022	24.351	0.078
8/16/2008 16:45	0.891		2.024	24.346	0.073
8/16/2008 16:45	0.944		2.025	24.338	0.072
8/16/2008 16:45	1	.941	2.028	24.329	0.065
8/16/2008 16:45	1.06		2.029	24.32	0.061
8/16/2008 16:45	1.12		2.031	24.313	0.057
8/16/2008 16:45	1.19		2.033	24.303	0.052
8/16/2008 16:45	1.26		2.035	24.299	0.049
8/16/2008 16:45	1.33		2.035	24.291	0.048
8/16/2008 16:45	1.41		2.039	24.283	0.04
8/16/2008 16:46	1.5		2.04	24.275	0.036
8/16/2008 16:46	1.58		2.042	24.268	0.031
8/16/2008 16:46	1.68		2.043	24.261	0.029
8/16/2008 16:46	1.78		2.045	24.256	0.026
8/16/2008 16:46	1.88		2.047	24.249	0.021
8/16/2008 16:46	1.99		2.048	24.241	0.018
8/16/2008 16:46	2.11		2.049	24.235	0.014
8/16/2008 16:46	2.24		2.05	24.229	0.013
8/16/2008 16:46	2.37		2.053	24.224	0.007
8/16/2008 16:47	2.512		2.053	24.218	0.005

HYDRAULIC CONDUCTIVITY TEST DATA / CALCULATIONS

Note: Yellow cells are input cells, blue cells are automatically calculated

Project Name:	MCRD Site 27
Project No.:	112G00455
Method of Inducing Water Level Change:	SOLID SLUG
Reference Pt (Top of Casing, Transducer, etc):	TOP OF CASING
Test Type (Rising Head / Falling Head):	RISING

Well / Boring No.:	PAI-27-MW64S
Test No.:	1
Date:	8/15/2008
Geologist:	CONTI
Checked by / Date:	SWRamer 6-28-11

Well Radius, r (ft.):	0.0833
Radius of Sand/Gravel Pack Interval, R (ft):	0.177
Screened / Monitored Interval Below Water Table, L (ft):	6.63
Static Water Level (Depth/ Elevation) (ft.):	2.52
Baseline Reading for Test Data (SWL, Transducer Reading, etc):	0.00

TEST DATA

Note: To exclude a data point from the regression, place an "x" in the "exclude" column / data point's row. The first row cannot be excluded.

Exclude	Elapsed Time (min)	Measured Water Level (feet)	Elapsed Time (min)	Drawdown or Head (H) (feet)	H/H_0	$\ln(H/H_0)$	Linear Regression of ln(H/H0) (b=0)
	0.00	1.03	0.00	1.03	1.00	0.0000	0.00
	0.02	0.80	0.02	0.80	0.78	-0.2527	-0.14
	0.04	0.67	0.04	0.67	0.65	-0.4300	-0.27
	0.09	0.48	0.09	0.48	0.47	-0.7535	-0.61
	0.15	0.33	0.15	0.33	0.32	-1.1392	-1.02
	0.19	0.27	0.19	0.27	0.26	-1.3339	-1.36
x	0.28	0.20	0.00			0.0000	
x	0.33	0.16	0.00			0.0000	
x	0.43	0.14	0.00			0.0000	
x	0.61	0.12	0.00			0.0000	
x	0.74	0.11	0.00			0.0000	
x	0.94	0.09	0.00			0.0000	
x	1.44	0.07	0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	
			0.00			0.0000	

CALCULATION OF HYDRAULIC CONDUCTIVITY (K)[1]

Number of data points in the slug test:	6
Slope of the line that linearly approximates ln(h/h0) (m in y=mx+b):	-6.822
Y-intercept of the line that linearly approximates ln(h/h0) (b in y=mx+b):	-0.097
Actual Y-intercept is set to 0.	0.000
T_0 (min):	0.147
K (ft/min):	1.29E-02
K (ft/day):	**18.627**

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum\left(x^2\right)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

n: Number of data points. x: Elapsed time point. y: ln(H/H0) point

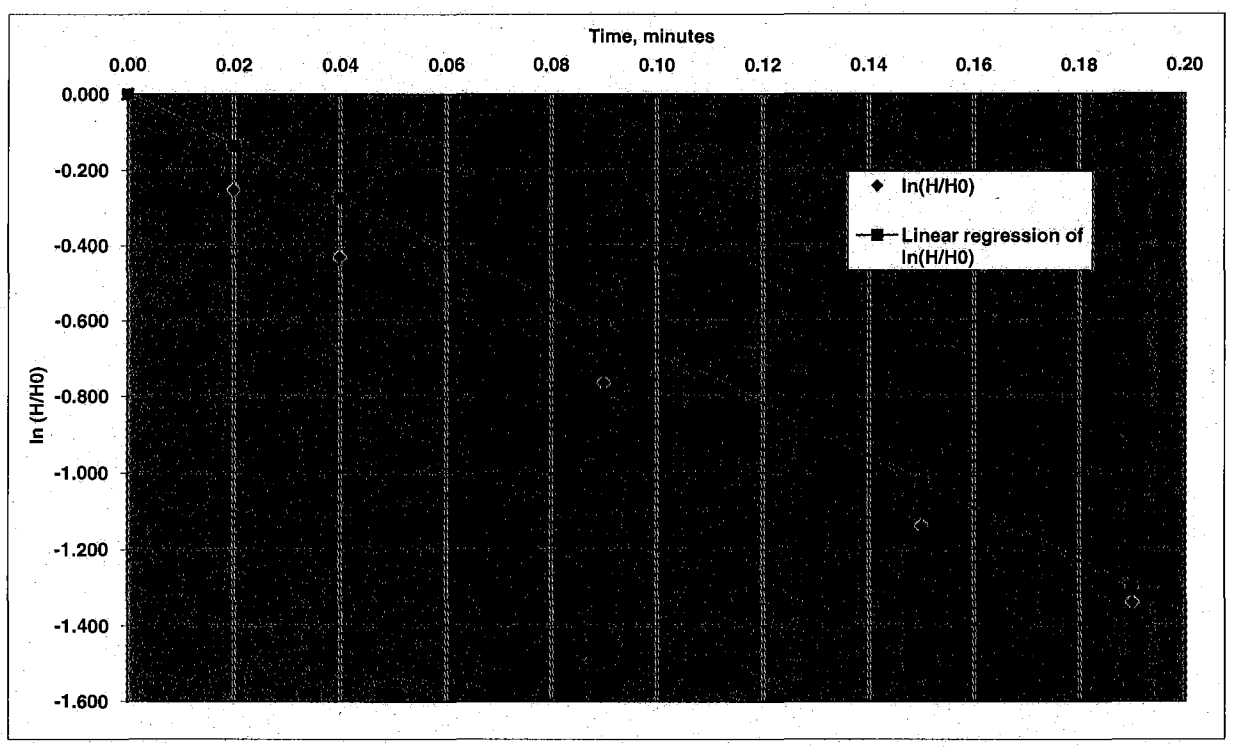
T_0: Time at which ln(H/H0)=-1

$K = r^2 * \ln(L/R)/(2LT_0)$

L: Screened/monitored interval below water table (ft)

r: Well radius (ft)

R: Gravel pack radius (ft)



1. HVORSLEV, M.J. 1951. Time Lag and Soil Permeability in Groundwater Observations. U.S. Arrmy Corps of Engineers. Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi.

WELL NO.: PA1-27MW64S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT: PARRIS ISLAND SITE 27	LOCATION: MW64S	DRILLER: COREY GAMWELL
PROJECT NO.: 6004485	BORING:	DRILLING METHOD: DPT
DATE BEGUN: 8/6/08	DATE COMPLETED: 8/10/08	
FIELD GEOLOGIST: CHARLIE WARNO		DEVELOPMENT METHOD: PERISTALTIC
GROUND ELEVATION: 14.36	DATUM:	

ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 16.91/2.55

TYPE OF SURFACE SEAL: CONCRETE

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING:

RISER PIPE I.D.: 2"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 4 1/4"

TYPE OF BACKFILL: GROUT

ELEVATION/DEPTH TOP OF SEAL: 12.36/2'

TYPE OF SEAL: BENTONITE

DEPTH TOP OF SAND PACK: 11.86/2.5'

ELEVATION/DEPTH TOP OF SCREEN: 11.36/3'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010" x 10'

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: #1 SAND

ELEVATION/DEPTH BOTTOM OF SCREEN: 1.36/13'

ELEVATION/DEPTH BOTTOM OF SAND PACK: 0.86/13.5'

BACKFILL MATERIAL BELOW SAND:

ELEVATION/DEPTH OF HOLE: 0.86/13.5'

ACAD:FORM_MWSU.dwg 07/20/99 INL

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

Tetra Tech NUS, Inc.

PAI-27

PROJECT NAME: MCRD PARRIS IS- SITE 27 WELL/BORING NO.: MW-64S

PROJECT NO.: 112G00455 GEOLOGIST: CONTI

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10' / 16.52 TEST NO.: 1

STATIC WATER LEVEL (Depth/Elevation): 9.89 DATE: 8/15/08

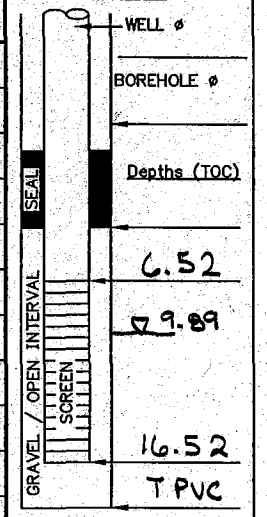
TEST TYPE (Rising/Falling/Constant Head): RISING CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: 1 SECTION SLUG PAGE 1 OF 1

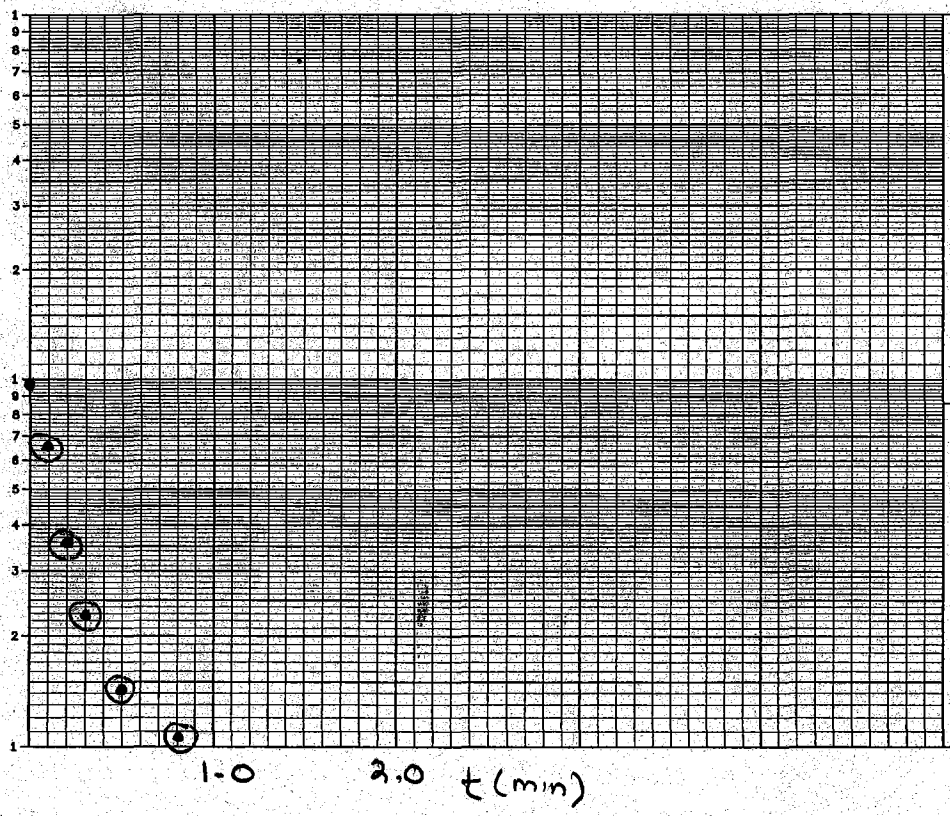
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

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)
.058		1.029			
.075		.799			
.10		.668			
.20		.359			
.30		.226			
.50		.144			
.80		.103			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:

SLUG Φ 1.25" = .104'
EACH SECT 30.75"
= 2.56' LONG

CALCS, SKETCH MAPS, ETC.:

r = .083
R = .177
L = 6.63

ACAD:FORM_HYDCONTST.dwg 07/06/99 INL

Report Date:	8/15/2008 14:13
Report User Name:	Stanley.Conti
Report Computer N:	NUSL1X25XC1

Log File Properties

File Name	MW-64S 2008-08-15 14-09-54.wsl
Create Date	8/15/2008 14:12

Device Properties

Device	Level TROLL® 700
Site	MCRD-Site 27
Device Name	
Serial Number	126683
Firmware Version	2.07

Log Configuration

Log Name	MW-64S
Created By	Stanley.Conti
Computer Name	NUSL1X25XC1
Application	WinSitu.exe
Application Version	5.6.4.6
Create Date	8/15/2008 14:02
Notes Size(bytes)	4096
Type	True Logarithmic
Overwrite when full	Disabled
Scheduled Start Time	Manual Start
Scheduled Stop Time	No Stop Time
Max Interval	Days: 0 hrs: 00 mins: 05 secs: 00

Level Reference Settings At Log Creation

Level Measurement Mode	Level Depth To Water
Specific Gravity	0.999
Level Reference Mode:	Set new reference
Level Reference Value:	0 (ft)
Level Reference Head Pressure	2.43947 (PSI)
Head Pressure	2.44018 (PSI)
Temperature	29.0875 (C)
Depth of Probe	5.63431 (ft)

Other Log Settings

Zero Pressure Offset:	0.0241575

Log Notes:

Date and Time	Note
8/15/2008 14:08	Manual Start Command
8/15/2008 14:09	User Note: "Downloading log - Used Batt: 4% Memory: 9% User: Stanley.Conti"
8/15/2008 14:10	User Note: "Downloading log - Used Batt: 4% Memory: 9% User: Stanley.Conti"

8/15/2008 14:11 Manual Stop Command

Log Data:
Record Count 84

Date and Time	Elapsed Time Minutes		Sensor: Pres 35ft SN#: 126683 Pressure (PSI)	Sensor: Pr SN#: 1266 Temperature (C)	Sensor: Pres 35ft SN#: 126683 Level Depth To Water (ft)
8/15/2008 14:08	0		2.447	24.48	-0.017
8/15/2008 14:08	0.004		2.446	24.5	-0.016
8/15/2008 14:08	0.008		2.447	24.513	-0.018
8/15/2008 14:08	0.013		2.449	24.584	-0.022
8/15/2008 14:08	0.02		2.448	24.569	-0.019
8/15/2008 14:08	0.024		2.449	24.566	-0.021
8/15/2008 14:08	0.028		2.448	24.566	-0.02
8/15/2008 14:08	0.031		2.45	24.566	-0.023
8/15/2008 14:08	0.035		2.473	24.569	-0.076
8/15/2008 14:08	0.039		2.446	24.568	-0.014
8/15/2008 14:08	0.043		2.095	24.57	0.797
8/15/2008 14:08	0.046		2.253	24.569	0.431
8/15/2008 14:08	0.05		2.415	24.571	0.056
8/15/2008 14:08	0.054		2.175	24.568	0.612
8/15/2008 14:08	0.058	0	1.994	24.565	1.029
8/15/2008 14:09	0.063		2.06	24.567	0.877
8/15/2008 14:09	0.067		2.069	24.565	0.856
8/15/2008 14:09	0.071		2.084	24.567	0.821
8/15/2008 14:09	0.075	.017	2.093	24.568	0.799
8/15/2008 14:09	0.079		2.109	24.566	0.763
8/15/2008 14:09	0.083		2.117	24.564	0.744
8/15/2008 14:09	0.088		2.127	24.565	0.722
8/15/2008 14:09	0.092		2.134	24.567	0.704
8/15/2008 14:09	0.096		2.142	24.57	0.686
8/15/2008 14:09	0.1	.042	2.15	24.567	0.668
8/15/2008 14:09	0.106		2.161	24.553	0.642
8/15/2008 14:09	0.112		2.171	24.552	0.62
8/15/2008 14:09	0.119		2.184	24.544	0.59
8/15/2008 14:09	0.126		2.195	24.54	0.564
8/15/2008 14:09	0.133		2.204	24.534	0.544
8/15/2008 14:09	0.141		2.218	24.531	0.512
8/15/2008 14:09	0.15	.092	2.231	24.523	0.482
8/15/2008 14:09	0.158		2.241	24.523	0.459
8/15/2008 14:09	0.168		2.253	24.516	0.431
8/15/2008 14:09	0.178		2.265	24.511	0.404
8/15/2008 14:09	0.188		2.274	24.508	0.381
8/15/2008 14:09	0.199		2.284	24.505	0.359
8/15/2008 14:09	0.211	.153	2.295	24.498	0.333
8/15/2008 14:09	0.224		2.304	24.497	0.312
8/15/2008 14:09	0.237		2.313	24.491	0.292
8/15/2008 14:09	0.251	.193	2.321	24.488	0.272

8/15/2008 14:09	0.266		2.329	24.486	0.255
8/15/2008 14:09	0.282		2.335	24.479	0.24
8/15/2008 14:09	0.298		2.342	24.477	0.226
8/15/2008 14:09	0.316		2.349	24.473	0.209
8/15/2008 14:09	0.335	.277	2.352	24.467	0.202
8/15/2008 14:09	0.355		2.357	24.466	0.192
8/15/2008 14:09	0.376		2.36	24.46	0.183
8/15/2008 14:09	0.398		2.365	24.457	0.173
8/15/2008 14:09	0.422	.364	2.369	24.454	0.164
8/15/2008 14:09	0.447		2.371	24.448	0.157
8/15/2008 14:09	0.473		2.373	24.442	0.153
8/15/2008 14:09	0.501	.443	2.377	24.439	0.144
8/15/2008 14:09	0.531		2.38	24.43	0.138
8/15/2008 14:09	0.562		2.382	24.426	0.132
8/15/2008 14:09	0.596		2.384	24.42	0.129
8/15/2008 14:09	0.631		2.386	24.414	0.125
8/15/2008 14:09	0.668	.610	2.388	24.408	0.12
8/15/2008 14:09	0.708		2.388	24.403	0.118
8/15/2008 14:09	0.75		2.391	24.395	0.112
8/15/2008 14:09	0.794	.736	2.392	24.386	0.109
8/15/2008 14:09	0.841		2.395	24.378	0.103
8/15/2008 14:09	0.891		2.398	24.37	0.097
8/15/2008 14:09	0.944		2.398	24.366	0.095
8/15/2008 14:09	1	.942	2.4	24.355	0.091
8/15/2008 14:09	1.06		2.402	24.345	0.087
8/15/2008 14:10	1.12		2.403	24.336	0.085
8/15/2008 14:10	1.19		2.404	24.328	0.082
8/15/2008 14:10	1.26		2.406	24.316	0.077
8/15/2008 14:10	1.33		2.407	24.308	0.074
8/15/2008 14:10	1.41		2.409	24.298	0.071
8/15/2008 14:10	1.5	1.442	2.411	24.287	0.066
8/15/2008 14:10	1.58		2.412	24.278	0.063
8/15/2008 14:10	1.68		2.415	24.264	0.058
8/15/2008 14:10	1.78		2.415	24.252	0.057
8/15/2008 14:10	1.88		2.417	24.238	0.053
8/15/2008 14:10	1.99		2.417	24.227	0.052
8/15/2008 14:11	2.11		2.418	24.213	0.049
8/15/2008 14:11	2.24		2.419	24.2	0.046
8/15/2008 14:11	2.37		2.42	24.19	0.044
8/15/2008 14:11	2.51		2.421	24.176	0.042
8/15/2008 14:11	2.66		2.423	24.163	0.038
8/15/2008 14:11	2.82		2.425	24.152	0.034
8/15/2008 14:11	2.98		2.426	24.137	0.03

C-19 SITE 9/16 SOIL BORING LOGS AND GROUNDWATER SAMPLE LOG SHEETS

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 9/16
PROJECT NUMBER: 112G02688
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 9/16-SO01
DATE: 8/5/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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						Brn	Silty SAND (VF)	SM	Grass at Top	0.0			
							VF SAND	SP		0.0			
						Lt Brn				0.0			
									moist	0.0			
5						Brn				0.0			
									Saturated	0.0			
										0.0			
										0.0			
						Orange				0.0			
10						Blue Gray	CLAY	CL		0.0			

* 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: Parris Island Site 9/16 BORING No.: 9/16-SO02
PROJECT NUMBER: 112G02698 DATE: 8/6/10
DRILLING COMPANY: ARM GEOLOGIST: S. Hill
DRILLING RIG: DPT DRILLER: B. Ewing

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			3			Brn	Silty SAND	SM	Grass on Top	0.0			
							VF SAND	SP		0.0			
						Lt Brn				0.0			
										0.0			
5						Brn			wet	0.0			
			4'							0.0			
						Blue Gray Brown Blue	CLAY w/sand	CL/SC		0.0			
										0.0			
						Gray	CLAY	CL		0.0			
10							SAND (VF) / SAND and CLAY	SP / SC		0.0			
			5'			Blue Gray	SAND (VF)	SP	Saturated	0.0			
										0.0			
										0.0			
						Blue Gray Orange	SAND & CLAY	SC		0.0			
15						Gray	VF SAND w/ Clay	SP		0.0			
			5'				VF SAND			0.0			
						DK Gray	CLAY (very soft)	CL		0.0			
										0.0			
										0.0			
20						DK Gray	Silty CLAY	CL/ML		0.0			

* 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 X No

Well I.D. #: PA1-9/16-TW01S
PA1-9/16-TW02S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 9/16
PROJECT NUMBER: 112G02688
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 9/16-SO03
DATE: 8/5/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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						H. Brn	Gravelly SAND	SP	Grass at surface	0.0			
						BRN	VF SAND			0.0			
										0.0			
										0.0			
5									wet	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): 0-0

Remarks: 0-1 fizzed / bubble w/sodium Bisulfite

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Parris Island Site 9/16
PROJECT NUMBER: 112G02168B
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 9/16 - SO04
DATE: 8/5/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4			DK Brn	Silty SAND Fill @ 0.5 (Asphalt)	SM	Grass on TOP Dry	0.0			
						Lt Brn	SAND	SP	moist	0.0			
										0.0			
						Brn / Lt Brn				0.0			
5							CLAY w/ little sand	CL		0.0			

* 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: Parris Island Site 9/16
PROJECT NUMBER: 112G02688
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 9/16-SO05
DATE: 8/5/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4'			Brn	Silty SAND	SM	Grass on top	0.0			
						lt Brn	VF SAND	SP		0.0			
						orange Brn				0.0			
						lt Brn				0.0			
5						↓	↓			0.0			

* 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: Parris Island Site 9/16
PROJECT NUMBER: 112G021688
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 9/16-SO06
DATE: 8/5/10
GEOLOGIST: S. Hill
DRILLER: B. Ewing

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			4'			Brn	Silty SAND	SM	Grass on Top	0.0			
						Lt Brn	VF SAND	SP		0.0			
							↓			0.0			
										0.0			
5									Moist	0.0			

* 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: Parris Island 9/16
PROJECT NUMBER: 112G02688
DRILLING COMPANY: ARM
DRILLING RIG: DPT

BORING No.: 9/16-SO07
DATE: 8/6/10
GEOLOGIST: S. Hill
DRILLER: B. Ewings

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			4			Brn	Silty SAND (VF)	SM	Grass @ Top	0.0			
						Brn	SAND (VF)	SP		0.0			
							↓			0.0			
						Brn Gray	CLAY w/little sand	CL	moist	0.0			
5						White Brn	SAND (VF)	SP	moist	0.0			
5			3			Orange	↓		wet	0.0			
						Blue Gray	CLAY	CL		0.0			
						Lt Brn	SAND (VF)		Saturated	0.0			
										0.0			
10										0.0			
			5							0.0			
										0.0			
										0.0			
										0.0			
15										0.0			
			5										
						Dk Gray	CLAY - soft w/ little silt	CL	silt				
20						↓	CLAY - w/silt + 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): 0.0

Remarks: PAI-9/16-TW035-Installed to 10' bgs
PAI-9/16-TW041-installed to 20' bgs

Converted to Well: Yes X No ____ Well I.D. #: PAI-9/16-TW-035
PAI-9/16-TW-041

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island Site 9/16
Project No.: 112G02688

[] Domestic Well Data
[X] Monitoring Well Data - TW
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-9/16-TW1S-01
Sample Location: PAI-9/16-TW1S
Sampled By: SEH
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (~~ppt~~ ~~%~~)	Other
Date: 8/7/10								
Time: 1255								
Method: LF	Clear	6.85	0.200	80.34	3.00	2.07	0.0	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8/7/10								
Method: LF	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 1" PVC								
Total Well Depth (TD): 9.9								
Static Water Level (WL): 5.9								
One Casing Volume (gal/L): 0.164								
Start Purge (hrs): 1200								
End Purge (hrs): 1255								
Total Purge Time (min): 55								
Total Vol. Purged (gal/L): 6 (including development)								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	yes
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	yes
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	yes
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	yes
Alkalinity/TDS	4°C	1 - 500mL HDPE	yes
TOC	H2SO4/ 4°C	2 - 40ml Vials	yes

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island Site 9/16
PROJECT NUMBER: 112G02668

WELL ID.: PAI-9/16-TW1S
DATE: 8/7/10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity ~~% or~~ ppt	Comments
0915	5.01		Start	development						Pumped dry 3 times ~1gal removed
1200	5.15	Start	LF purge							
1210	7.55	140	6.76	0.189	220	2.22	29.55	9	0.0	
1220	7.68	140	6.81	0.195	55	2.13	29.51	-4	0.0	
1230	7.60	140	6.84	0.194	30	1.92	30.19	-15	0.0	
1240	7.72	140	6.84	0.199	9.7	2.02	29.67	-16	0.0	
1245	7.88	140	6.85	0.200	3.9	2.00	30.20	-20	0.0	
1250	7.81	140	6.85	0.200	3.0	2.01	30.34	-22	0.0	
1255	collect sample									

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island Site 9/16
Project No.: 1129 02688

[] Domestic Well Data
[X] Monitoring Well Data – TW1
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-9/16-TW02I-01
Sample Location: TW2I
Sampled By: SEA
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity ppt (%)	Other
Date: 8/7/10								
Time: 1100								
Method: LF	Clear	6.39	0.345	25.14	7.3	0.76	0.1	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8/7/10								
Method: LF	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): –								
Well Casing Diameter & Material Type: 1" PVC								
Total Well Depth (TD): 17.56								
Static Water Level (WL): 6.22								
One Casing Volume (gal/L): 0.46								
Start Purge (hrs): 1020								
End Purge (hrs): 1100								
Total Purge Time (min): 40								
Total Vol. Purged (gal/L): 5 - including development								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	yes
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	yes
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	yes
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	yes
Alkalinity/TDS	4°C	1 - 500mL HDPE	yes
TOC	H2SO4/ 4°C	2 - 40ml Vials	yes

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Circle if Applicable:

MS/MSD	Duplicate ID No.:
–	–

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Parris Island Site 9/16
PROJECT NUMBER: 11260

WELL ID.: PA1-9/16-TW2I
DATE: 8/7/10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments
0950	6.22	~800	Develop well - pumping at high rate							sweeping screen
1000	7.2	~800	6.04	0.359	620	6.38	23.53	-24		
1015	end development (water is visibly clear) turn pump to lower rate.									
1020	Start LF Purge									
1030	7.35	175	6.41	0.363	100	0.87	24.82	-42	0.1	
1040	7.35	175	6.35	0.351	27	0.83	25.20	-43	0.1	
1050	7.35	175	6.40	0.350	11	0.77	25.22	-44	0.1	
1055	7.35	175	6.39	0.348	7.3	0.70	25.14	-45	0.1	
1100	collect Sample									

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: PARRIS ISLAND
Project No.: 112G02688

[] Domestic Well Data
[X] Monitoring Well Data - TW
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-9/16-TW035-01
Sample Location: TW03S
Sampled By: T. ROJAHN
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity ppt ~~(%)~~	~~Other~~ ORP mV
Date: 8-07-10								
Time: 1605								
Method: Peristaltic	CLEAR	6.49	0.180	27.4	5.66	1.87	0.0	-124

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 8-07-10								
Method: SAME	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 1" Dia PVC - Temp								
Total Well Depth (TD): 6.94'								
Static Water Level (WL): 10.14'								
One Casing Volume (gal/L): 0.13								
Start Purge (hrs): 0917								
End Purge (hrs): 1000								
Total Purge Time (min): 43								
Total Vol. Purged (gal/L): 1.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	✓
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	✓
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	✓
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	✓
Alkalinity/TDS	4°C	1 - 500mL HDPE	✓
TOC	H2SO4/ 4°C	2 - 40ml Vials	✓

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

3.2
×0.041
0.1312

Stick up = 0.33'
No odor
Dry well out 6 times - turbidity CLEAR.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Troy Rojahn

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: PARRIS ISLAND
PROJECT NUMBER: 112602688
WELL ID.: 9/16 TW03S
DATE: 8-07-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments Vol.	Color
0917	6.94	0	—	—	—	—	—	—	—		
0920	DRY	200	—	—	>1000	—	—	—	—	600 ml	LtTAN
0925	9.12	0									(MILKY)
0927	DRY	100	6.35	0.236	>1000	7.02	26.92	-238	0.0	800 ml	"
0935	8.50	0	—	—	—	—	—	—	—		"
0937	DRY	100	—	—	—	—	TR	—	—	1000 ml	"
0940	8.85	0	~~5.42~~ TR	—	—	—	TR	—	—		SL. TURBID
0942	DRY	100	—	—	—	—	—	—	—	1200 ml	"
0948	9.00	0	6.50	0.183	114	1.92	27.46	-116	0.0		"
0950	DRY	75	—	—	—	—	—	—	—	1350 ml	"
0958	9.00	0	6.49	0.180	5.66	1.87	27.40	-124	0.0		CLEAR
1000	DRY	75	—	—	—	—	—	—	—	1500 ml	"
1005	—	—	—	—	—	—	—	—	—	START SAMPLING	

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Parris Island
Project No.: 112G02688

[] Domestic Well Data
[X] Monitoring Well Data ~ TW
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PAI-9/16-TW04I-01
Sample Location: TW04I
Sampled By: T. Rojahn
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8-07-10	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: 1450	(Visual)	(S.U.)	(mS/cm)	(°C)	(NTU)	(mg/l)	PPT (%)	ORP (mV)
Method: Peristaltic	CLEAR	5.79	0.225	24.73	6.01	0.00	0.0	-101

PURGE DATA:

Date: 8-07-10	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method: SAME	See Low Flow Purge Sheet for Details							
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 1" ø PVC								
Total Well Depth (TD): 20.20								
Static Water Level (WL): 7.11								
One Casing Volume(gal/L): 13.09 X 0.041 = 2L OR 0.54 gal								
Start Purge (hrs): 1330								
End Purge (hrs): 1450								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L): 17.4								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl/4°C	3 - 40ml Vials	✓
SVOCs/PAH SIM	4°C	3 - 1 L Amber Bottles	✓
Pesticides/PCB	4°C	2 - 1 L Amber Bottles	✓
Metals (Total and Dissolved)	HNO3/ 4°C	1 - L HDPE	✓
Alkalinity/TDS	4°C	1 - 500mL HDPE	✓
TOC	H2SO4/ 4°C	2 - 40ml Vials	✓

OBSERVATIONS / NOTES:

1" MW = 0.041 gal/ft
2" MW = 0.163 gal/ft
4" MW = 0.653 gal/ft

Stick up 0.55'
No odor

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature]

LOW FLOW PURGE DATA SHEET

PAI-9116

PROJECT SITE NAME: PARRIS Island
PROJECT NUMBER: 112G02688
WELL ID.: TW041
DATE: 8-07-10

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Salinity % or ppt	Comments VOL.	Color
1330	7.11	0	—	—	—	—	—	—	—	START DEV.	TAN/MILKY
1350	7.82	350	5.88	0.234	19.8	0.96	24.39	-316	0.0	7000	CLEAR
1400	7.82	350	5.52	0.231	32.1	0.00	24.21	-256	0.0	10500	CLEAR
1410	7.49	140	5.55	0.231	28.7	0.00	24.83	-201	0.0	11900	CLEAR
1420	7.49	140	5.66	0.230	7.81	0.00	24.65	-161	0.0	13300	CLEAR
1425	7.49	140	5.68	0.228	6.39	0.00	25.15	-81	0.0	14700	CLEAR
1430	7.49	140	5.68	0.227	6.11	0.00	24.69	-83	0.0	15300	CLEAR
1435	7.49	140	5.74	0.226	5.93	0.00	24.73	-91	0.0	16000	CLEAR
1440	7.49	140	5.78	0.226	5.84	0.00	24.79	-99	0.0	16700	CLEAR
1445	7.49	140	5.79	0.225	6.01	0.00	24.73	-101	0.0	17400	CLEAR
1450	—	—	—	—	—	—	—	—	—	START SAMPLE	

SIGNATURE(S): [illegible]

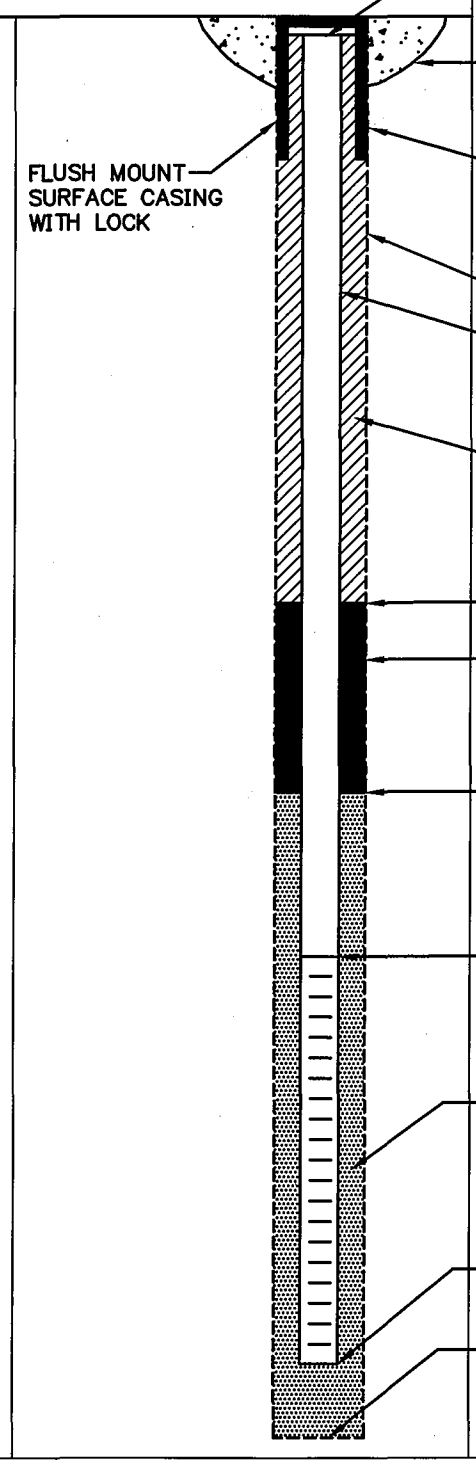
C-20 SITE 9/16 PERMANENT MONITORING WELL CONSTRUCTION SHEETS

WELL NO.: PAI-9/16-MW055

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT Site 9/16	LOCATION Site 9/16	DRILLER W. Ewing
PROJECT NO. 112G02688	BORING PAI-9/16-MW055	DRILLING METHOD #1505 DPT w/ Augers
DATE BEGUN 9/7/11	DATE COMPLETED 9/7/11	
FIELD GEOLOGIST S. Hill		DEVELOPMENT METHOD Purge/Surge whale
GROUND ELEVATION 14.47	DATUM	



ELEVATION TOP OF RISER: 14.20

TYPE OF SURFACE SEAL: Concrete

TYPE OF PROTECTIVE CASING: Stainless Steel

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: Bentonite Grout

ELEVATION/DEPTH TOP OF SEAL: 11.20/ 3'

TYPE OF SEAL: Bentonite pellets

ELEVATION/DEPTH TOP OF SAND: 9.20/ 5'

ELEVATION/DEPTH TOP OF SCREEN: 7.20/ 7'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010 x 10'

TYPE OF SAND PACK: #2 Sand

DIAMETER OF HOLE IN BEDROCK: N/A

ELEVATION / DEPTH BOTTOM OF SCREEN: -2.80/ 17'

ELEVATION / DEPTH BOTTOM OF SAND: -2.80/ 17'

ELEVATION/DEPTH BOTTOM OF HOLE: -2.80/ 17'

BACKFILL MATERIAL BELOW SAND: N/A

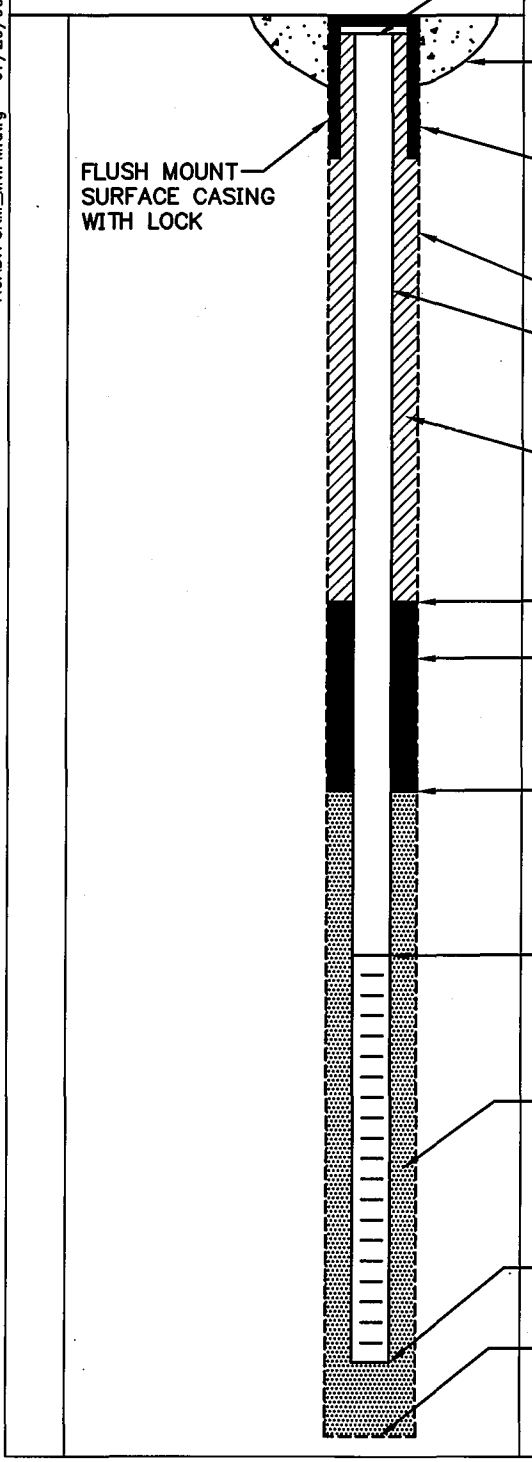
ACAD:FORM_MWFM.dwg 07/20/99 INL

WELL NO.: PA1-9/16-MW06I

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT Site 9/16	LOCATION Site 9/16	DRILLER W. Ewing #1505
PROJECT NO. 112G02688	BORING PA1-9/16-MW06I	DRILLING METHOD DPT w/Augers
DATE BEGUN 9/7/11	DATE COMPLETED 9/7/11	
FIELD GEOLOGIST S. Hill		DEVELOPMENT METHOD Purge / Surge Whale
GROUND ELEVATION 14.56	DATUM	



ELEVATION TOP OF RISER: 14.36

TYPE OF SURFACE SEAL: Concrete

TYPE OF PROTECTIVE CASING: Stainless Steel

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: Bentonite Grout

ELEVATION/DEPTH TOP OF SEAL: 6.38 / 8'

TYPE OF SEAL: Bentonite Pellets

ELEVATION/DEPTH TOP OF SAND: 4.38 / 10'

ELEVATION/DEPTH TOP OF SCREEN: 2.38 / 12'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010 x 10'

TYPE OF SAND PACK: # 2 Sand

DIAMETER OF HOLE IN BEDROCK: N/A

ELEVATION / DEPTH BOTTOM OF SCREEN: -7.62 / 22'

ELEVATION / DEPTH BOTTOM OF SAND: -7.62 / 22'

ELEVATION/DEPTH BOTTOM OF HOLE: -10.62 / 25'

BACKFILL MATERIAL BELOW SAND: Natural Collapse

ACAD:FORM_MWFM.dwg 07/20/99 INL

C-21 SITE 9/16 – MONITORING WELL DEVELOPMENT RECORDS

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

PAI- 9/16-

Well: MW05S
Site: 9/16
Date Installed: 9/7/11
Date Developed: 9/8/11
Dev. Method: Purge/Surge
Pump Type: Submersible

Depth to Bottom (ft.): 22'
Static Water Level Before (ft.):
Static Water Level After (ft.):
Screen Length (ft.): 10'
Specific Capacity:
Casing ID (in.): 2 in

Responsible Personnel: GB
Drilling Co.: ARM Environmental Services.
Project Name: PAI Site 9/16
Project Number: 112G02688

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.)
12:18	BEGIN DEVELOPMENT							
12:24				28.31	6.43	0.224	330	
12:33				28.26	6.35	0.219	82.4	
12:40				28.25	6.32	0.218	33.6	
12:45				28.26	6.32	0.216	21.6	
12:49		55		28.26	6.32	0.215	20.1	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: PAI-9/16 MW06I
Site: 9/16
Date Installed: 9/7/11
Date Developed: 9/8/11
Dev. Method: purge/swage
Pump Type: Submersible

Depth to Bottom (ft.): 22'
Static Water Level Before (ft.):
Static Water Level After (ft.):
Screen Length (ft.): 10'
Specific Capacity:
Casing ID (in.): 2"

Responsible Personnel: GB
Drilling Co.: ARM Environmental
Project Name: PAI Site 9/16
Project Number: 112G02688

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.)
11:30	BEGIN DEVELOPMENT.							
11:40		35		27.55	6.56	0.199	47.7	
11:45		45		27.52	6.50	0.210	30.2	
11:50		55		27.50	6.32	0.215	25.6	

C22 – SURVEY RECORDS

NOTES:

1. Horizontal data is based on North American Datum (NAD) 83.
2. Vertical data is based on North American Vertical Datum (NAVD) 88.
3. Survey requested by Tetra Tech NUS, Inc.

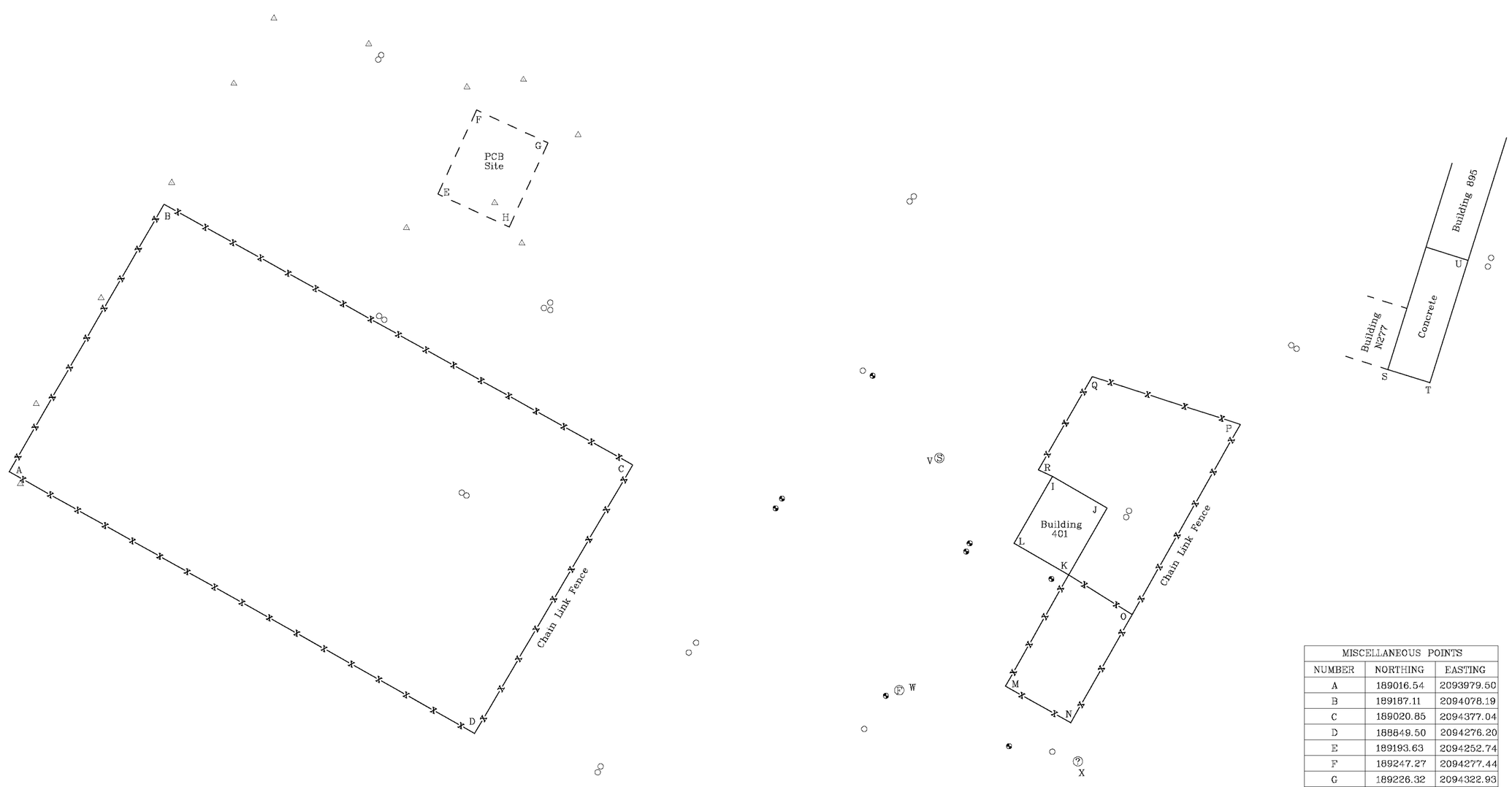
LEGEND:

- ○ Temporary Well
- Monitor Well
- △ Surface Soil Sample
- Ⓢ Sanitary Sewer Manhole
- Ⓕ Fiber Optic Manhole
- ⍰ Unknown Manhole

SC Grid

SURFACE SOIL SAMPLES			
NUMBER	NORTHING	EASTING	ELEVATION
	189266.69	2094307.30	8.61
	189231.38	2094342.23	10.32
	189261.90	2094271.31	8.28
	189188.14	2094289.04	9.80
	189172.14	2094232.77	8.66
	189162.21	2094306.36	10.62
	189289.48	2094208.78	6.99
	189305.83	2094148.27	6.10
	189264.18	2094122.71	6.73
	189201.00	2094083.12	5.99
	189127.36	2094038.06	6.15
	189059.82	2093996.69	6.51
	189008.77	2093986.58	7.05

TEMPORARY WELLS							
NUMBER	NORTHING	EASTING	ELEVATION	NUMBER	NORTHING	EASTING	ELEVATION
	188709.67	2094619.66	10.79		189152.94	2094924.36	11.83
	188713.54	2094621.20	10.86		189147.39	2094922.24	11.85
	188837.83	2094644.56	11.72		189094.95	2094800.32	12.87
	188852.39	2094524.59	15.30		189097.22	2094796.92	12.97
	188901.09	2094412.71	14.70		189189.03	2094553.57	13.94
	188907.37	2094417.44	14.80		189192.22	2094556.21	13.95
	189003.17	2094268.00	11.98		189279.51	2094214.73	7.55
	189001.33	2094271.02	12.10		189282.37	2094216.61	7.55
	189124.42	2094324.42	11.51		189115.86	2094215.30	9.36
	189121.00	2094320.38	11.47		189113.49	2094218.58	9.44
	189080.97	2094523.70	11.30		189119.73	2094324.45	11.60
	188991.56	2094693.48	13.10		188824.74	2094354.72	14.12
	188987.57	2094691.64	13.07		188828.50	2094356.56	14.09



MONITORING WELL LOCATIONS				
NUMBER	NORTHING	EASTING	PVC ELEVATION	GROUND ELEVATION
MW2I	188841.34	2094616.98	14.69	11.85
MW3	188948.08	2094643.99	13.24	13.38
MW4	188970.81	2094591.87	13.87	14.08
MW5I	188965.57	2094589.61	13.81	13.97
MW6	188873.53	2094538.42	17.84	14.97
MW9	188717.18	2094394.39	15.07	15.34
MW14	188999.36	2094472.17	16.79	13.96
MW15I	188993.18	2094468.10	16.71	13.96
MW16	189077.76	2094530.02	11.25	11.43

MISCELLANEOUS POINTS		
NUMBER	NORTHING	EASTING
A	189016.54	2093979.50
B	189187.11	2094078.19
C	189020.85	2094377.04
D	188649.50	2094276.20
E	189193.63	2094252.74
F	189247.27	2094277.44
G	189226.32	2094322.93
H	189172.68	2094298.23
I	189013.41	2094644.68
J	188993.35	2094679.48
K	188950.70	2094654.89
L	188970.76	2094620.09
M	188879.62	2094614.72
N	188856.32	2094656.27
O	188925.25	2094695.39
P	189046.70	2094764.39
Q	189077.22	2094670.02
R	189017.69	2094635.65
S	189081.70	2094858.48
T	189073.31	2094885.36
U	189151.37	2094909.70
V	189025.27	2094572.49
W	188877.09	2094546.93
X	188831.64	2094660.86

Plat
Sites 9, 19, 27, and 55
Marine Corps Recruit Depot
Located
Parris Island
Beaufort County, South Carolina

DATE: October 26, 2007 SCALE 1"= 50'

0 50 100

I hereby state that to the best of my knowledge, information, and belief, the survey shown hereon was made in accordance with the requirements of the Minimum Standards Manual for the Practice of Land Surveying in South Carolina, and meets or exceeds the requirements for a Class A survey as specified therein.

PALMETTO LAND SURVEYING, INC.
2065-D SAVANNAH HIGHWAY
CHARLESTON, SC 29417
PHONE(843)571-5191
FAX(843)571-7447

James G. Penington, P.L.S. No. 10291
Palmetto Land Surveying, Inc.
2065 D Savannah Highway
Charleston, S.C. 29417 571-5191

TTMCRD401.DWG

Sites 9, 19, 27, and 55
Marine Corps Recruit Depot
Parris Island

DATE: October 26, 2007

TEMPORARY WELLS							
NUMBER	NORTHING	EASTING	ELEVATION	NUMBER	NORTHING	EASTING	ELEVATION
TW 22S	188709.67	2094619.66	10.79	TW 35S	189152.94	2094924.36	11.83
TW 23I	188713.54	2094621.20	10.86	TW 36I	189147.39	2094922.24	11.85
TW 24S	188837.83	2094644.56	11.72	TW37S	189094.95	2094800.32	12.87
TW 25I	188852.39	2094524.59	15.30	TW38I	189097.22	2094796.92	12.97
TW 26S	188901.09	2094412.71	14.70	TW 39S	189189.03	2094553.57	13.94
TW 27I	188907.37	2094417.44	14.80	TW 40I	189192.22	2094556.21	13.95
TW 28S	189003.17	2094268.00	11.98	TW 41S	189279.51	2094214.73	7.55
TW 29I	189001.33	2094271.02	12.10	TW 42I	189282.37	2094216.61	7.55
TW 30S	189124.42	2094324.42	11.51	TW 43S	189115.86	2094215.30	9.36
TW 31I	189121.00	2094320.38	11.47	TW 44I	189113.49	2094218.58	9.44
TW 32I	189080.97	2094523.70	11.30	TW 45D	189119.73	2094324.45	11.60
TW 33S	188991.56	2094693.48	13.10	TW 46S	188824.74	2094354.72	14.12
TW 34I	188987.57	2094691.64	13.07	TW 47I	188828.50	2094356.56	14.09

SURFACE SOIL SAMPLES			
NUMBER	NORTHING	EASTING	ELEVATION
SO 01	189266.69	2094307.30	8.61
SO 02	189231.38	2094342.23	10.32
SO 03	189261.90	2094271.31	8.28
SO 04	189188.14	2094289.04	9.80
SO 05	189172.14	2094232.77	8.66
SO 06	189162.21	2094306.36	10.62
SO 07	189289.48	2094208.78	6.99
SO 08	189305.83	2094148.27	6.10
SO 09	189264.18	2094122.71	6.73
SO 10	189201.00	2094083.12	5.99
SO 11	189127.36	2094038.06	6.15
SO 12	189059.82	2093996.69	6.51
SO 13	189008.77	2093986.58	7.05

MONITORING WELL LOCATIONS				
NUMBER	NORTHING	EASTING	PVC ELEVATION	GROUND ELEVATION
MW2I	188841.34	2094616.98	14.69	11.85
MW3	188948.08	2094643.99	13.24	13.38
MW4	188970.81	2094591.87	13.87	14.08
MW5I	188965.57	2094589.61	13.81	13.97
MW6	188873.53	2094538.42	17.84	14.97
MW9	188717.18	2094394.39	15.07	15.34
MW14	188999.36	2094472.17	16.79	13.96
MW15I	188993.18	2094468.10	16.71	13.96
MW16	189077.76	2094530.02	11.25	11.43

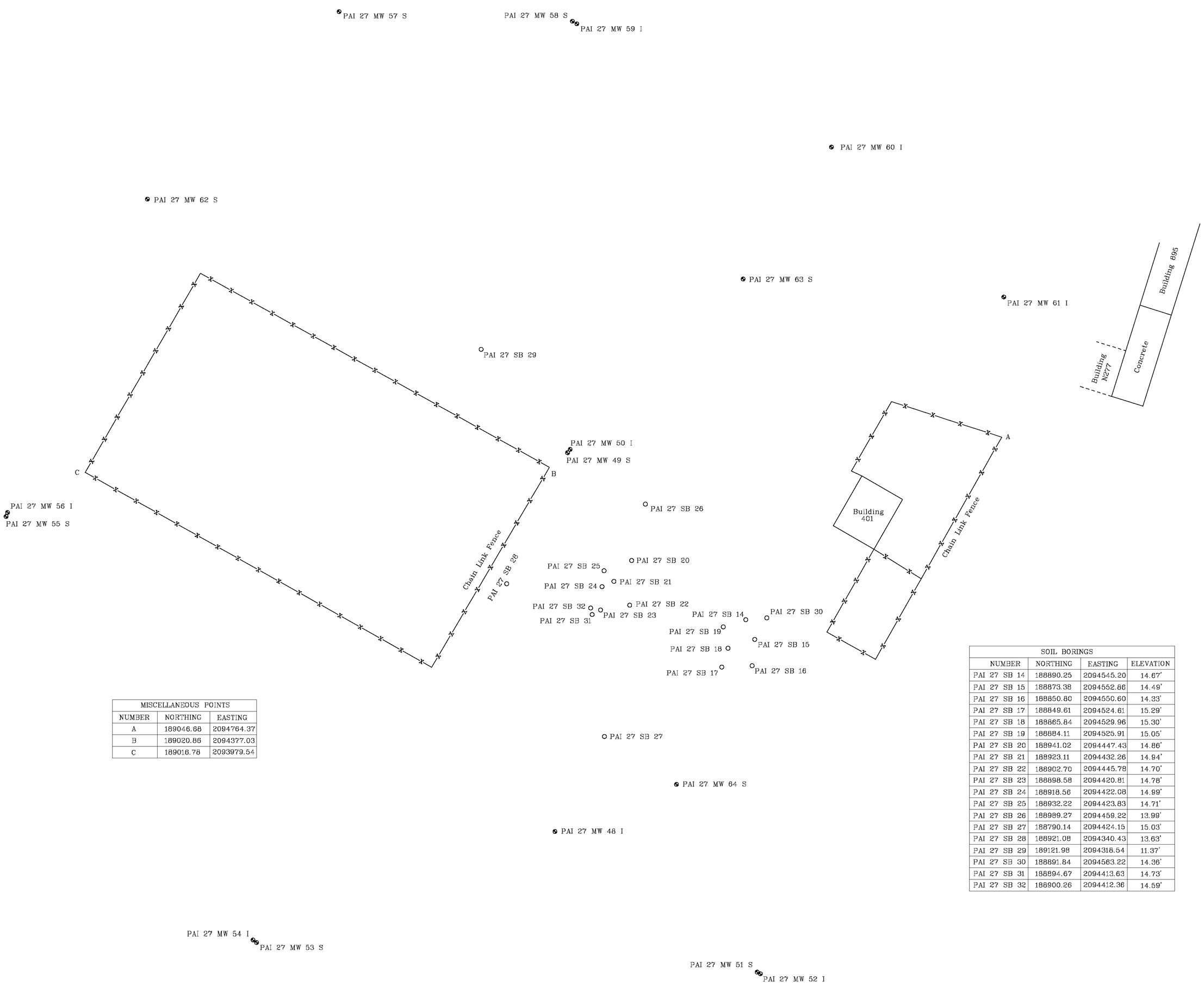
MISCELLANEOUS POINTS		
NUMBER	NORTHING	EASTING
Fence	189016.54	2093979.50
Fence	189187.11	2094078.19
Fence	189020.85	2094377.04
Fence	188849.50	2094276.20
PCB Site	189193.63	2094252.74
PCB Site	189247.27	2094277.44
PCB Site	189226.32	2094322.93
PCB Site	189172.68	2094298.23
Bldg. 401	189013.41	2094644.68
Bldg. 401	188993.35	2094679.48
Bldg. 401	188950.70	2094654.89
Bldg. 401	188970.76	2094620.09
Fence	188879.62	2094614.72
Fence	188856.32	2094656.27
Fence	188925.25	2094695.39
Fence	189046.70	2094764.39
Fence	189077.22	2094670.02
Fence	189017.69	2094635.65
Bldg. N277	189081.70	2094858.48
Concrete	189073.31	2094885.36
Bldg. 895	189151.37	2094909.70
Manhole	189025.27	2094572.49
Fiber Optic	188877.09	2094546.93
Manhole	188831.64	2094660.86

NOTES:

1. Horizontal data is based on North American Datum (NAD) 83.
2. Vertical data is based on North American Vertical Datum (NAVD) 88.
3. Survey requested by Tetra Tech NUS, Inc.

SC Grid

MONITORING WELL LOCATIONS				
NUMBER	NORTHING	EASTING	PVC ELEVATION	GROUND ELEVATION
PAI 27 MW 48 I	188708.72	2094381.76	14.98'	15.23'
PAI 27 MW 49 S	189033.38	2094392.57	13.24'	13.49'
PAI 27 MW 50 I	189036.22	2094394.80	13.23'	13.46'
PAI 27 MW 51 S	188588.75	2094554.91	10.05'	10.31'
PAI 27 MW 52 I	188587.31	2094557.69	10.00'	10.25'
PAI 27 MW 53 S	188614.08	2094126.22	13.67'	13.85'
PAI 27 MW 54 I	188616.31	2094123.13	13.57'	13.82'
PAI 27 MW 55 S	188978.73	2093911.71	10.11'	6.92'
PAI 27 MW 56 I	188982.16	2093912.94	9.97'	6.91'
PAI 27 MW 57 S	189411.40	2094196.89	7.20'	7.38'
PAI 27 MW 58 S	189403.13	2094396.67	7.44'	7.69'
PAI 27 MW 59 I	189400.98	2094400.47	7.33'	7.68'
PAI 27 MW 60 I	189295.31	2094618.54	14.66'	12.19'
PAI 27 MW 61 I	189166.62	2094766.19	14.13'	14.54'
PAI 27 MW 62 S	189250.67	2094032.71	9.94'	6.67'
PAI 27 MW 63 S	189182.28	2094542.91	16.95'	14.26'
PAI 27 MW 64 S	188749.14	2094485.82	16.91'	14.36'



MISCELLANEOUS POINTS		
NUMBER	NORTHING	EASTING
A	189046.68	2094764.37
B	189020.86	2094377.03
C	189016.78	2093979.54

SOIL BORINGS			
NUMBER	NORTHING	EASTING	ELEVATION
PAI 27 SB 14	188890.25	2094545.20	14.67'
PAI 27 SB 15	188873.38	2094552.66	14.49'
PAI 27 SB 16	188850.80	2094550.60	14.33'
PAI 27 SB 17	188849.61	2094524.61	15.29'
PAI 27 SB 18	188865.84	2094529.96	15.30'
PAI 27 SB 19	188884.11	2094525.91	15.05'
PAI 27 SB 20	188941.02	2094447.43	14.86'
PAI 27 SB 21	188923.11	2094432.26	14.94'
PAI 27 SB 22	188902.70	2094445.78	14.70'
PAI 27 SB 23	188898.58	2094420.81	14.78'
PAI 27 SB 24	188918.56	2094422.08	14.99'
PAI 27 SB 25	188932.22	2094423.83	14.71'
PAI 27 SB 26	188989.27	2094459.22	13.99'
PAI 27 SB 27	188790.14	2094424.15	15.03'
PAI 27 SB 28	188921.08	2094340.43	13.63'
PAI 27 SB 29	189121.98	2094318.54	11.37'
PAI 27 SB 30	188891.84	2094563.22	14.36'
PAI 27 SB 31	188894.67	2094413.63	14.73'
PAI 27 SB 32	188900.26	2094412.36	14.59'

LEGEND:

- Soil Boring
- Monitor Well

Plat
Site 27
Marine Corps Recruit Depot
Located
Parris Island
Beaufort County, South Carolina

DATE: September 2, 2007 SCALE 1"= 50'

0 50 100

I hereby state that to the best of my knowledge, information, and belief, the survey shown hereon was made in accordance with the requirements of the Minimum Standards Manual for the Practice of Land Surveying in South Carolina, and meets or exceeds the requirements for a Class A survey as specified therein.

PALMETTO LAND SURVEYING, INC.

2065-D SAVANNAH HIGHWAY
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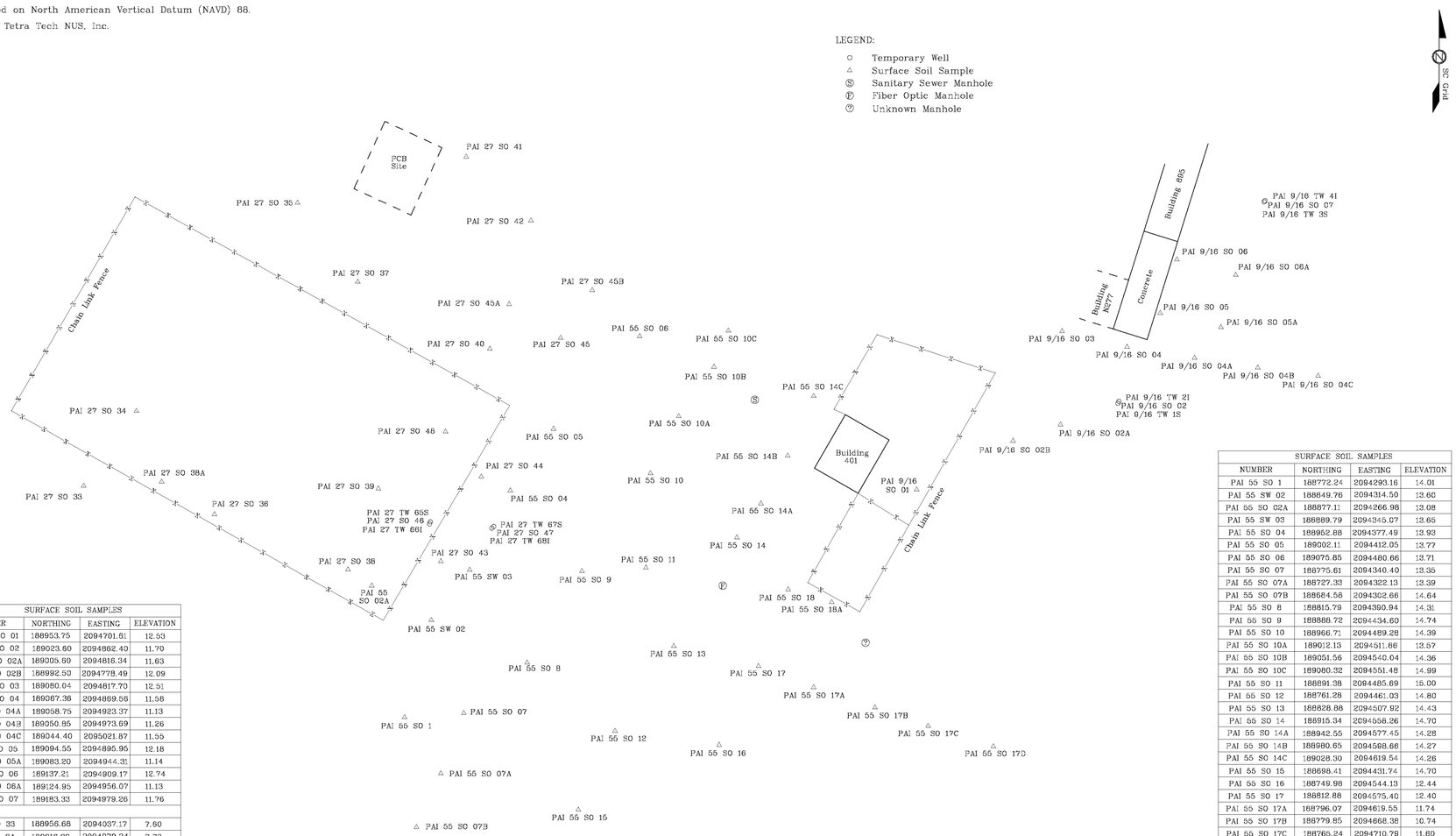
TTMCRD401.DWG

NOTES:

1. Horizontal data is based on North American Datum (NAD) 83.
2. Vertical data is based on North American Vertical Datum (NAVD) 88.
3. Survey requested by Tetra Tech NUS, Inc.

LEGEND:

- ○ Temporary Well
- △ Surface Soil Sample
- Ⓢ Sanitary Sewer Manhole
- Ⓕ Fiber Optic Manhole
- ⑦ Unknown Manhole



SURFACE SOIL SAMPLES			
NUMBER	NORTHING	EASTING	ELEVATION
PAI 9/16 SO 01	188953.75	2094701.61	12.53
PAI 9/16 SO 02	189023.60	2094862.40	11.70
PAI 9/16 SO 02A	189005.50	2094816.34	11.63
PAI 9/16 SO 02B	188992.50	2094778.49	12.09
PAI 9/16 SO 03	189080.04	2094817.70	12.51
PAI 9/16 SO 04	189067.36	2094869.56	11.58
PAI 9/16 SO 04A	189058.75	2094923.37	11.13
PAI 9/16 SO 04B	189050.85	2094973.59	11.26
PAI 9/16 SO 04C	189044.40	2095021.87	11.55
PAI 9/16 SO 05	189094.55	2094895.95	12.18
PAI 9/16 SO 05A	189083.20	2094944.31	11.14
PAI 9/16 SO 06	189137.21	2094909.17	12.74
PAI 9/16 SO 06A	189124.95	2094956.07	11.13
PAI 9/16 SO 07	189183.33	2094979.26	11.76
PAI 27 SO 33	188956.66	2094037.17	7.60
PAI 27 SO 34	189016.30	2094079.24	7.78
PAI 27 SO 35	189182.45	2094207.82	8.01
PAI 27 SO 36	188933.93	2094141.51	10.07
PAI 27 SO 37	189119.33	2094255.86	10.11
PAI 27 SO 38	188889.94	2094247.99	12.84
PAI 27 SO 38A	188960.12	2094099.44	8.87
PAI 27 SO 39	188954.44	2094272.24	12.78
PAI 27 SO 40	189065.94	2094361.16	12.98
PAI 27 SO 41	189219.10	2094342.37	10.56
PAI 27 SO 42	189168.15	2094394.02	12.83
PAI 27 SO 43	188896.58	2094322.06	13.54
PAI 27 SO 44	188964.07	2094354.33	13.65
PAI 27 SO 45	189074.64	2094417.71	13.52
PAI 27 SO 45A	189101.60	2094376.63	12.84
PAI 27 SO 45B	189112.69	2094442.89	13.43
PAI 27 SO 46	188927.00	2094313.38	13.39
PAI 27 SO 47	188923.52	2094363.37	13.90
PAI 27 SO 48	188999.93	2094325.85	13.10

SURFACE SOIL SAMPLES			
NUMBER	NORTHING	EASTING	ELEVATION
PAI 55 SO 1	188772.24	2094293.16	14.01
PAI 55 SW 02	188849.76	2094314.50	13.60
PAI 55 SO 02A	188877.11	2094266.98	13.08
PAI 55 SW 03	188889.79	2094345.07	13.65
PAI 55 SO 04	188952.88	2094377.49	13.93
PAI 55 SO 05	189002.11	2094412.05	13.77
PAI 55 SO 06	189075.85	2094480.66	13.71
PAI 55 SO 07	188775.61	2094340.40	13.35
PAI 55 SO 07A	188727.33	2094322.13	13.39
PAI 55 SO 07B	188684.58	2094302.66	14.64
PAI 55 SO 8	188815.79	2094390.94	14.31
PAI 55 SO 9	188888.72	2094434.60	14.74
PAI 55 SO 10	188966.71	2094489.28	14.39
PAI 55 SO 10A	189012.13	2094511.86	13.57
PAI 55 SO 10B	189051.56	2094540.04	14.36
PAI 55 SO 10C	189080.32	2094551.48	14.99
PAI 55 SO 11	188891.38	2094485.69	15.00
PAI 55 SO 12	188761.28	2094461.03	14.80
PAI 55 SO 13	188828.88	2094507.92	14.43
PAI 55 SO 14	188915.34	2094558.26	14.70
PAI 55 SO 14A	188942.55	2094577.45	14.28
PAI 55 SO 14B	188980.65	2094598.66	14.27
PAI 55 SO 14C	189028.30	2094619.54	14.26
PAI 55 SO 15	188698.41	2094431.74	14.70
PAI 55 SO 16	188749.98	2094544.13	12.44
PAI 55 SO 17	188812.88	2094575.40	12.40
PAI 55 SO 17A	188796.07	2094619.55	11.74
PAI 55 SO 17B	188779.85	2094668.38	10.74
PAI 55 SO 17C	188765.24	2094710.79	11.60
PAI 55 SO 17D	188748.95	2094762.86	11.96
PAI 55 SO 18	188874.10	2094599.23	12.73
PAI 55 SO 18A	188863.89	2094633.85	12.10

TEMPORARY WELLS				
NUMBER	NORTHING	EASTING	GROUND ELEVATION	PVC ELEVATION
PAI 9/16 TW 1S	189022.48	2094862.14	11.69	12.06
PAI 9/16 TW 2I	189024.07	2094862.90	11.72	12.10
PAI 9/16 TW 3S	189183.17	2094978.77	11.75	12.08
PAI 9/16 TW 4I	189184.01	2094979.54	11.77	12.33
PAI 27 TW 65S	188928.00	2094313.77	13.41	13.71
PAI 27 TW 66I	188926.33	2094313.06	13.38	13.72
PAI 27 TW 67S	188924.30	2094364.20	13.90	14.19
PAI 27 TW 68I	188922.91	2094362.67	13.90	14.23

Plat
Sites 9, 19, 27, and 55
Marine Corps Recruit Depot
Located
Parris Island
Beaufort County, South Carolina

DATE: August 11, 2010 SCALE 1"= 50'

0 50 100

I hereby state that to the best of my knowledge, information, and belief, the survey shown hereon was made in accordance with the requirements of the Minimum Standards Manual for the Practice of Land Surveying in South Carolina, and meets or exceeds the requirements for a Class A survey as specified therein.

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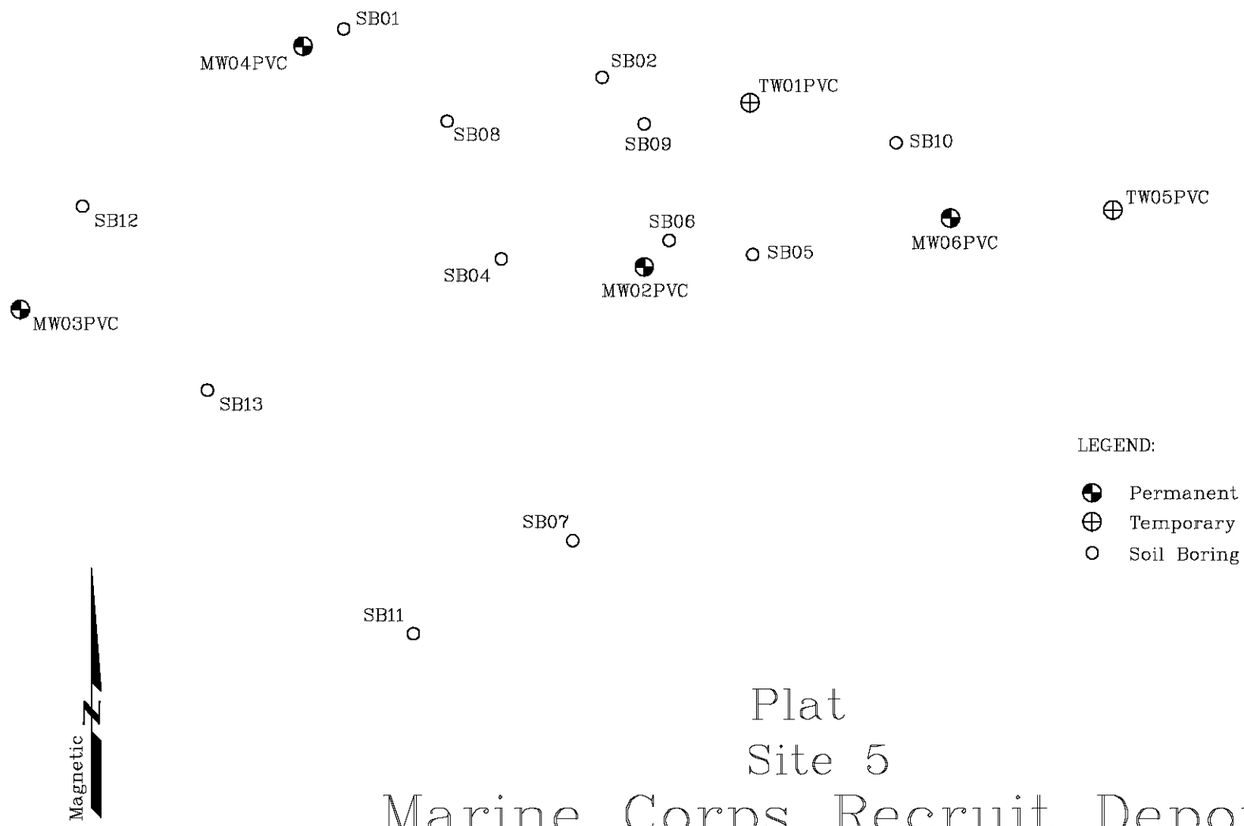

LEGEND:

- Permanent Well
- Temporary Well
- Soil Boring

NOTES:

1. Horizontal data is based on North American Datum (NAD) 83.
2. Vertical data is based on North American Vertical Datum (NAVD) 88.
3. Survey requested by Tetra Tech NUS, Inc.

Station	Northing	Easting	PVC Elevation	Ground Elevation
SB01	188797.95	2101572.78		6.82
SB02	188785.17	2101640.99		7.87
SB04	188737.27	2101614.37		7.48
SB05	188738.43	2101680.74		8.00
SB06	188742.16	2101658.68		7.81
SB07	188662.97	2101633.24		8.25
SB08	188773.61	2101600.07		7.09
SB09	188772.89	2101652.09		7.37
SB10	188767.92	2101718.59		7.76
SB11	188638.40	2101591.17		8.34
SB12	188751.18	2101503.81		6.92
SB13	188702.67	2101536.80		7.95
TW01PVC	188778.49	2101680.05	7.92	7.55
MW02PVC	188735.18	2101652.10	7.57	7.76
MW03PVC	188723.95	2101487.39	7.38	7.72
MW04PVC	188793.42	2101562.04	6.66	6.98
TW05PVC	188750.21	2101775.83	8.87	8.44
MW06PVC	188748.06	2101732.94	7.99	8.29

Plat
Site 5
Marine Corps Recruit Depot
Located
Parris Island
Beaufort County, South Carolina

DATE: September 8, 2011

SCALE 1"= 40'

0 40 80

I hereby state that to the best of my knowledge, information, and belief, the survey shown hereon was made in accordance with the requirements of the Minimum Standards Manual for the Practice of Land Surveying in South Carolina, and meets or exceeds the requirements for a Class A survey as specified therein.

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