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SAMPLING AND ANALYSIS PLAN MUNITIONS RESPONSE PROGRAM PHASE 2 SITE INSPECTION OF FIVE SMALL ARMS/SKEET RANGES NAS INDIAN HEAD MD

7/1/2011

TETRA TECH

Sampling and Analysis Plan
Munitions Response Program
Phase 2 Site Inspection of
Five Small Arms/Skeet Ranges

Naval Support Facility
Indian Head Stump Neck Annex
Indian Head, Maryland

Naval Facilities Engineering Command
Washington

Contract Number N62467-04-D-0055
Contract Task Order 423

July 2011

TETRA TECH

SAP Worksheet No. 1 – Title and Approval Page
(UFP-QAPP Manual Section 2.1)

FINAL
SAMPLING AND ANALYSIS PLAN
(Field Sampling Plan and Quality Assurance Project Plan)
July 2011

Munitions Response Program
Phase 2 Site Inspection of
Five Small Arms/Skeet Ranges
Naval Support Facility
Indian Head Stump Neck Annex
Indian Head, Maryland

Prepared for:
Naval Facilities Engineering Command Washington
1314 Harwood Street, S.E.
Washington Navy Yard, D.C. 20374-5018

Prepared by:
Tetra Tech NUS, Inc.
234 Mall Boulevard, Suite 260
King of Prussia, Pennsylvania 19406-2954

Prepared under:
Comprehensive Long-Term Environmental Action Navy
Contract No. N62467-04-D-0055
Contract Task Order 423

Review Signatures:

T.E. Johnston 7-5-11
Tom Johnston, PhD/CLEAN QAM/Date
Tetra Tech NUS, Inc.

Barbara Becker 7-5-11
Barbara Becker, PMP/Project Manager/Date
Tetra Tech NUS, Inc.

Approval Signatures:

– see next page –
Jonathan Tucker/Quality Assurance Officer/Date
NAVFAC Mid-Atlantic

Joseph Rail 7-6-11
Joe Rail, P.E./Remedial Project Manager/Date
NAVFAC Washington

Dennis Orenshaw 7-6-11
Dennis Orenshaw/ Remedial Project Manager/Date
USEPA Region 3

SAP Worksheet No. 1 -- Title and Approval Page
(UFP-QAPP Manual Section 2.1)

~~INTERNAL~~ DRAFT
SAMPLING AND ANALYSIS PLAN

(Field Sampling Plan and Quality Assurance Project Plan)
~~April~~ May 2011

Munitions Response Program
Phase 2 Site Inspection of
Five Small Arms/Skeet Ranges
Naval Support Facility
~~-~~Indian Head Stump Neck Annex
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Tom Johnston, PhD/CLEAN QAM/Date
Tetra Tech NUS, Inc.

Barbara Becker, PMP/Project Manager/Date
Tetra Tech NUS, Inc.

Digitally signed by TUCKER.JONATHAN.P.1239524180
Date: 2011.06.01 16:09:13 -04'00'

Approval Signatures:

Jonathan Tucker/Quality Assurance Officer/Date
NAVFAC Mid-Atlantic

Joe Rail, P.E./Remedial Project Manager/Date
NAVFAC Washington

Dennis Orenshaw/ Remedial Project Manager/Date
USEPA Region 3

Curtis DeTore/ Remedial Project Manager/Date
Maryland Department of the Environment

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EXECUTIVE SUMMARY

Tetra Tech NUS, Inc. (Tetra Tech) has prepared this Sampling and Analysis Plan (SAP) for the Phase 2 Site Inspection (SI) of five former Small Arms/Skeet Ranges (SASRs) located in the Stump Neck Annex portion of Naval Support Facility (NSF) Indian Head (IH), in Indian Head, Maryland, under Contract N62467-04-D-0055, Comprehensive Long-Term Environmental Action Navy (CLEAN), Contract Task Order (CTO) 423. The ranges to be investigated are: Marine Rifle Range (UXO-14), Old Skeet and Trap Range (UXO-15), Rum Point Skeet Range (UXO-16), Small Arms (Pistol) Range (UXO-17), and Roach Road Rifle Range (UXO-25). The data collected during this investigation, combined with data from previous investigations, will be used to determine whether contamination is present in groundwater at these sites and, if so, to initiate an evaluation of the nature and extent of this contamination and its associated risks to human health.

Introduction

The Navy has conducted various testing, training, and disposal activities related to military munitions at the NSF-IH Indian Head since it was established in 1890 as a Naval Ordnance Station. The general locations of the NSF-IH Main Installation and Stump Neck Annex are shown on **Figure 1**. The Stump Neck Annex covers approximately 1,100 acres on the Stump Neck peninsula at the confluence of the Potomac River and Chicamuxen Creek in Charles County, Maryland. The Main Installation is situated northeast of Stump Neck Annex, across Mattawoman Creek. Much of the Stump Neck peninsula lies within the Valley Firing Fan (**Figure 2**), which received fire from the Valley Gun Proving Site at the Main Installation from 1891 through 1921. General Smallwood State Park and private property lie east of Stump Neck Annex.

As a result of the Navy's explosives and munitions training activities, munitions and explosives of concern (MEC) and munitions constituents (MC) may be present at various sites throughout the Stump Neck Annex.[1] MEC is not a concern as a result of past operations conducted at the five SASRs that are the subject of this SAP; however, MEC is a concern at the ranges located within the Valley Firing Fan (i.e., the Marine Rifle Range and Old Skeet and Trap Range; see **Figures 2** and **3)**.

Previous CERCLA Activities

The Navy is following the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) process for the investigation of these sites. The initial phase of the CERCLA process, the Preliminary Assessment (PA), was completed in September 2005 (Malcolm Pirnie, 2005). It

[1] The term MEC includes discarded military munitions (DMM), unexploded ordnance (UXO)], and MC in high enough concentrations to pose an explosive hazard. MC is defined as any materials originating from UXO, DMM, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance and munitions.

recommended further investigation of the five SASRs at Stump Neck Annex, which were classified as "other than operational range" sites[2] and identified as Munitions Response Areas/Munitions Response Sites under the Munitions Response Program (MRP). The PA used five primary sources of information to support the facility data collection effort, including historical archives, personal interviews, installation data repositories (including the Administrative Record), visual surveys, and off-facility data sources and repositories such as local libraries and museums. The five SASRs, which are shown on **Figure 3**, are described in detail in the PA Report.

The next phase of the CERCLA process, the SI, was initiated in 2009 and documented in the SI Report (Tetra Tech, 2010). The primary objective of this initial SI phase was to determine whether further investigations or response actions were necessary for any of the sites identified in the PA to restore the sites to acceptable environmental conditions. The SI considered the background information provided in the PA and focused on the collection of site-specific environmental data that were used to support a screening-level risk evaluation to identify contaminants of potential concern (COPCs) at each of the five sites.

The initial SI field work was conducted from May through June 2009 and consisted of the collection of 451 soil and sediment samples, along with associated quality control samples (e.g., duplicates and blanks), in areas most likely to have been contaminated by former range operations. All soil and sediment samples were screened on site for lead by X-ray fluorescence (XRF), and some were also submitted to a fixed-base laboratory for analysis of select metals, polycyclic aromatic hydrocarbons (PAHs), and nitroglycerin (NG).

Data collected during the 2009 sampling and analysis were validated and compared to Project Action Limits (PALs) established in the SI SAP (Tetra Tech, 2009) for the human health and ecological risk screening evaluation. Soil and/or sediment concentrations of lead, other munitions-related metals, and PAHs exceeded their respective PALs for direct exposure pathways and, thus, were identified as possibly posing unacceptable risks to human and/or ecological receptors. In addition, concentrations of the following contaminants exceeded the soil-to-groundwater pathway PALs at various locations: antimony, arsenic, copper, PAHs, and NG. Lead is also of concern as a potential groundwater contaminant, although it does not have an associated soil-to-groundwater PAL, because it is the predominant metal contaminant present in soil at these sites, having been detected at concentrations exceeding the soil PAL at numerous locations.

[2] Closed, transferred, and transferring military ranges and sites not located on an operational range are considered "other than operational."

Phase 2 SI

Results of the 2009 SI fieldwork and risk screening were documented in the SI Report, which was finalized by the NSF IH Partnering Team in September 2010 (Tetra Tech, 2010). General recommendations for further action at the five SASRs included: 1) determination of potential impact to groundwater, and 2) remediation of contaminated soil. This Phase 2 SI is being conducted to evaluate impacts to groundwater and includes the collection of groundwater data to determine whether surface contaminants have migrated from soil to groundwater, as well as a human health risk screening to determine whether groundwater contaminant concentrations may pose an unacceptable risk to potential future human receptors. **Worksheet No. 10** contains the general and site-specific updated Conceptual Site Models (CSMs) for each of the five sites.

The Partnering Team met on March 23, 2011, to review the results of the 2009 SI, discuss the general CSMs, and establish the scope of Data Quality Objectives (DQOs) for the groundwater investigation. Attendees included representatives of the United States Department of the Navy, United States Environmental Protection Agency (USEPA) Region 3, Maryland Department of the Environment (MDE), and Tetra Tech (see **Worksheet No. 9** for attendees). The problem statement, information inputs, study area boundaries, analytic approach, and performance criteria described in **Worksheet No. 11** reflect the outcome of this discussion. The sampling design presented in **Worksheet No. 17** is based on the consensus decision to collect groundwater data at locations most likely to be impacted by contaminant releases from the overlying soil so that conservative risk screening results are obtained and the resulting remedy, if necessary, is protective of hypothetical future receptors (e.g., residents and construction workers).

This SAP was generated for and complies with applicable Navy, USEPA Region 3, and MDE requirements, regulations, guidance, and technical standards, as appropriate. This includes the Department of Defense (DoD), Department of Energy (DoE), and USEPA Interagency Data Quality Task Force (IDQTF) environmental requirements regarding federal facilities. The SAP is presented in the format of standard worksheets as specified in the Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP) guidance document (USEPA, 2005).

This SAP outlines the organization, project management, objectives, planned activities, measurement, data acquisition, assessment, oversight, and data review procedures associated with the planned investigation at the five small arms/skeet ranges. Protocols for sample collection, handling, and storage, chain of custody, laboratory and field analyses, data validation, and reporting are also addressed in this SAP. The investigation will be conducted in accordance with Tetra Tech Standard Operating Procedures (SOPs), which are included in **Appendix A**. The non-proprietary laboratory SOPs that will be followed for this project are included in **Appendix B**. The field work and sampling are scheduled to begin in August 2011. A complete schedule is detailed in SAP **Worksheet No. 16**. Field activities conducted under this

SAP will meet the requirements of the Site-Specific Health and Safety Plan, to be submitted under separate cover.

SAP Worksheets

List of Tables

List of Figures

ACRONYMS AND ABBREVIATIONS

amu	atomic mass unit
APPL	APPL Inc.
AR	Administrative Record
ATV	all-terrain vehicle
BaP	Benzo(a)pyrene
bgs	below ground surface
°C	degree Celsius
CAS	Chemical Abstracts Service
CCB	Continuing Calibration Blank
CCV	Continuing Calibration Verification
CEC	cation exchange capacity
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	Contract Laboratory Program
COPC	contaminant of potential concern
CSM	Conceptual Site Model
CTO	Contract Task Order
CWAP	Comprehensive Work Approval Process
%D	Percent Difference or Percent Drift
DAF	dilution attenuation factor
DDESB	Department of Defense Explosives Safety Board
DI	deionized
DL	Detection Limit
DMM	discarded military munitions
DO	dissolved oxygen
DoD	Department of Defense
DOE	Department of Energy
DPT	direct-push technology
DQI	Data Quality Indicator
DQO	Data Quality Objective
DVM	Data Validation Manager
EDD	Electronic Data Deliverable
ELAP	Environmental Laboratory Accreditation Program
FOL	Field Operations Leader
FTMR	Field Task Modification Request
GC/MS	Gas Chromatograph/Mass Spectrometer
GIS	Geographic Information System

ACRONYMS AND ABBREVIATIONS (Continued)

GPS	global positioning system
HA	hand auger
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HNO_3	Nitric Acid
HPLC	High-Pressure Liquid Chromatography
HSM	Health and Safety Manager
ICAL	Initial Calibration
ICB	Initial Calibration Blank
ICP-MS	Inductively Coupled Plasma-Mass Spectroscopy
ICS	Interference Check Standard
ICV	Initial Calibration Verification
IDQTF	Intergovernmental Data Quality Task Force
IDW	investigation-derived waste
IH	Indian Head
IS	Internal Standard
L	liter
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LIMS	Laboratory Information Management System
LOD	Limit of Detection
LOQ	Limit of Quantitation
MC	munitions constituents
MCL	Maximum Contaminant Level
MD	matrix duplicate
MDE	Maryland Department of the Environment
MDL	Method Detection Limit
MEC	munitions and explosives of concern
mL	milliliter
MPC	Measurement Performance Criterion
MRP	Munitions Response Program
MRS	Munitions Response Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
msl	mean sea level
mV	millivolt
NA	not applicable

ACRONYMS AND ABBREVIATIONS (Continued)

NAD83/1991	North American Datum of 1983, as adjusted in 1991
NAVD88	North American Vertical Datum of 1988
NAVFAC	Naval Facilities Engineering Command
NFA	No Further Action
NG	nitroglycerin
NGVD29	National Geodetic Vertical Datum of 1929
NIRIS	Naval Installation Restoration Information Solution
NSF	Naval Support Facility
NTU	nephelometric turbidity unit
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
PA	Preliminary Assessment
PAH	polycyclic aromatic hydrocarbon
PAL	Project Action Limit
PD	ponar dredge
PDF	Portable Document Format
PM	Project Manager
POC	Point of Contact
PPE	personal protective equipment
PQLG	Practical Quantitation Limit Goal
PQO	Project Quality Objective
PT	plastic trowel
QA	Quality Assurance
QAM	Quality Assurance Manager
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
QL	Quantitation Limit
QSM	Quality Systems Manual
%R	Percent Recovery
r	linear regression correlation coefficient
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RPD	Relative Percent Difference
RPM	Remedial Project Manager
RRT	Relative Retention Time

ACRONYMS AND ABBREVIATIONS (Continued)

RSD	Relative Standard Deviation
RSL	Regional Screening Level
RT	Retention Time
SAP	Sampling and Analysis Plan
SASR	Small Arms/Skeet Range
SB	soil boring
SDG	Sample Delivery Group
SI	Site Inspection
SIM	Selected Ion Monitoring
SOP	Standard Operating Procedure
SOW	Statement of Work
SQL	Structured Query Language
SSO	Site Safety Officer
TBD	To Be Determined
Tetra Tech	Tetra Tech NUS, Inc.
TOC	total organic carbon
TP	Technical Paper
UFP-QAPP	Uniform Federal Policy for Quality Assurance Project Plan
µg/L	microgram per liter
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
UXO	unexploded ordnance
VOA	volatile organic analysis
XRF	x-ray fluorescence

SAP Worksheet No. 2 -- SAP Identifying Information
(UFP-QAPP Manual Section 2.2.4)

Site Name/Number:	Naval Support Facility (NSF) - Indian Head (IH) Five Small Arms/Skeet Ranges (SASRs) – Stump Neck Annex
Operable Units:	Unexploded Ordnance (UXO)-14, -15, -16, -17, and -25
Contractor Name:	Tetra Tech NUS, Inc. (Tetra Tech)
Contract Number:	N62467-04-D-0055
Contract Title:	Comprehensive Long-Term Environmental Action Navy (CLEAN)
Work Assignment Number:	Contract Task Order (CTO) 423

1. This Sampling and Analysis Plan (SAP) was prepared in accordance with the requirements of the United States Environmental Protection Agency (USEPA) *Uniform Federal Policy for Quality Assurance Plans (UFP-QAPP)* (2005) and *EPA Guidance for Quality Assurance Project Plans*, EPA QA/G-5, QAMS (USEPA, 2002).

2. Identify regulatory program: Department of Defense (DoD) Military Munitions Response Program (MRP) using the general Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) process.

3. This SAP is a project-specific SAP.

4. List dates of scoping sessions that were held:

Scoping Session	Date
March 2011 Tier I Partnering Team Meeting	March 23, 2011

5. List dates and titles of any SAP documents written for previous Site work that are relevant to the current investigation.

Title	Date
Background Soil Investigation Report	October 2002
Preliminary Assessment - Stump Neck Annex	September 2005
QAPP/SAP for Munitions Response Program - Site Inspections at Five Small Arms/Skeet Ranges [Site Inspection (SI) SAP]	April 2009
Site Inspection Report for Munitions Response Program – Site Inspections at Five Small Arms/Skeet Ranges (SI Report)	September 2010

6. List organizational partners (stakeholders) and connection with lead organization: USEPA Region 3 (federal regulatory stakeholder), Maryland Department of the Environment (MDE) (state regulatory stakeholder), NSF-IH (property owner), Tetra Tech (Navy contractor)

7. Lead organization: United States Department of the Navy, Naval Facilities Engineering Command (NAVFAC) Washington

8. If any required SAP elements or required information are not applicable to the project or are provided elsewhere, then note the omitted SAP elements and provide an explanation for their exclusion below:

Not applicable (NA) because there are no exclusions.

Crosswalk Table: A crosswalk table is not necessary. All 37 worksheets are included herein, as directed by the Navy; therefore, no crosswalk table is provided as part of this worksheet.

SAP Worksheet No. 3 -- Distribution List
(UFP-QAPP Manual Section 2.3.1)

Name of SAP Recipient	Title/Role	Organization	Telephone Number	E-Mail or Mailing Address
Joseph Rail	Navy Remedial Project Manager (RPM)/ Manages Project Activities for the Navy	NAVFAC Washington	202-685-3105	joseph.rail@navy.mil
Jeffrey Bossart	Environmental Division Director, NSF-IH	NSF-IH	301-744-4705	jeffrey.bossart@navy.mil
Nick Carros	NSF-IH IR Project Manager/Facility Point of Contact (POC)	NAVFAC Washington	301-744-2263	nicholas.carros@navy.mil
Bonnie Capito (copy of final cover letter only)	Librarian and Records Manager/ Navy Administrative Record (AR)	NAVFAC Atlantic	757-322-4785	bonnie.capito@navy.mil
Jonathan Tucker (electronic upload)	NAVFAC Quality Assurance Officer (QAO)/Government Chemist	NAVFAC Mid-Atlantic	757-322-8341	jonathan.tucker@navy.mil
Dennis Orenshaw	USEPA RPM/Regulator Input	USEPA Region 3	215-814-3361	orenshaw.dennis@epa.gov
Curtis DeTore	MDE RPM/Regulator Input	MDE	410-537-3791	cdetore@mde.state.md.us
Scott Nesbit	Tetra Tech Activity Coordinator	Tetra Tech	412-921-8945	scott.nesbit@tetratech.com
Barbara Becker	Project Manager (PM)/Manages Project Activities	Tetra Tech	610-382-3770	barb.becker@tetratech.com
Fred Ramser	Field Operations Leader (FOL)/Site Safety Officer (SSO)/Manages Field Operation and Site Safety Issues	Tetra Tech	412-921-8838	fred.ramser@tetratech.com
Tom Johnston, PhD (electronic copy only)	CLEAN Quality Assurance (QA) Manager (QAM)/Manages Corporate QA Program and Implementation	Tetra Tech	412-921-8615	tom.johnston@tetratech.com

Name of SAP Recipient	Title/Role	Organization	Telephone Number	E-Mail or Mailing Address
Matt Soltis [Health and Safety Plan (HASP) only]	Health and Safety Manager (HSM)/ Manages Corporate Health and Safety Program	Tetra Tech	412-921-8912	matt.soltis@tetratech.com
Mark Traxler (electronic copy only)	Project Chemist/Provides Coordination with laboratory	Tetra Tech	610-382-1171	mark.traxler@tetratech.com
Joe Samchuck (electronic copy only)	Data Validation Manager (DVM)/ Manages Data Validation	Tetra Tech	421-921-8510	joseph.samchuck@tetratech.com
Glenn Wagner	NAVFAC Atlantic AR PM	Tetra Tech	412-921-8386	glenn.wagner@tetratech.com
Restoration Advisory Board (RAB) Members (final electronic version only)	NSF-IH RAB Members	NSF-IH RAB	Various	Various
Cynthia Clark (electronic copy only)	Laboratory PM/Representative for laboratory and analytical issues	APPL Inc. (APPL)	559-275-2175	cclark@applinc.com
To Be Determined (TBD) (electronic copy only)	Subcontractor PM/Provides direct-push technology (DPT) services	TBD	TBD	TBD
TBD (electronic only)	Utility Location Subcontractor PM/Provides utility location services	TBD	TBD	TBD

SAP Worksheet No. 4 -- Project Personnel Sign-Off Sheet

(UFP-QAPP Manual Section 2.3.2)

Certification that project personnel have read the text will be obtained by one of the following methods as applicable:

1. In the case of regulatory agency personnel with oversight authority, approval letters or e-mails will constitute verification that applicable sections of the SAP have been reviewed. Copies of regulatory agency approval letters/e-mails will be retained in the project files and are listed in **Worksheet No. 29** as project records.

2. E-mails will be sent to the Navy, Tetra Tech, and subcontractor project personnel who will be requested to verify by e-mail that they have read the applicable SAP/sections and the date on which they were reviewed. Copies of the verification e-mails will be included in the project files and are identified in **Worksheet No. 29**.

A copy of the signed **Worksheet No. 4** will be retained in the project files and is identified as a project document in **Worksheet No. 29**. Key personnel will be instructed to read the SAP prior to attending an internal site-specific kick-off meeting for field activities. The Tetra Tech PM will track when the reviews have been completed, obtain signatures, and ensure that the completed sign-off sheet is included in the central project file.

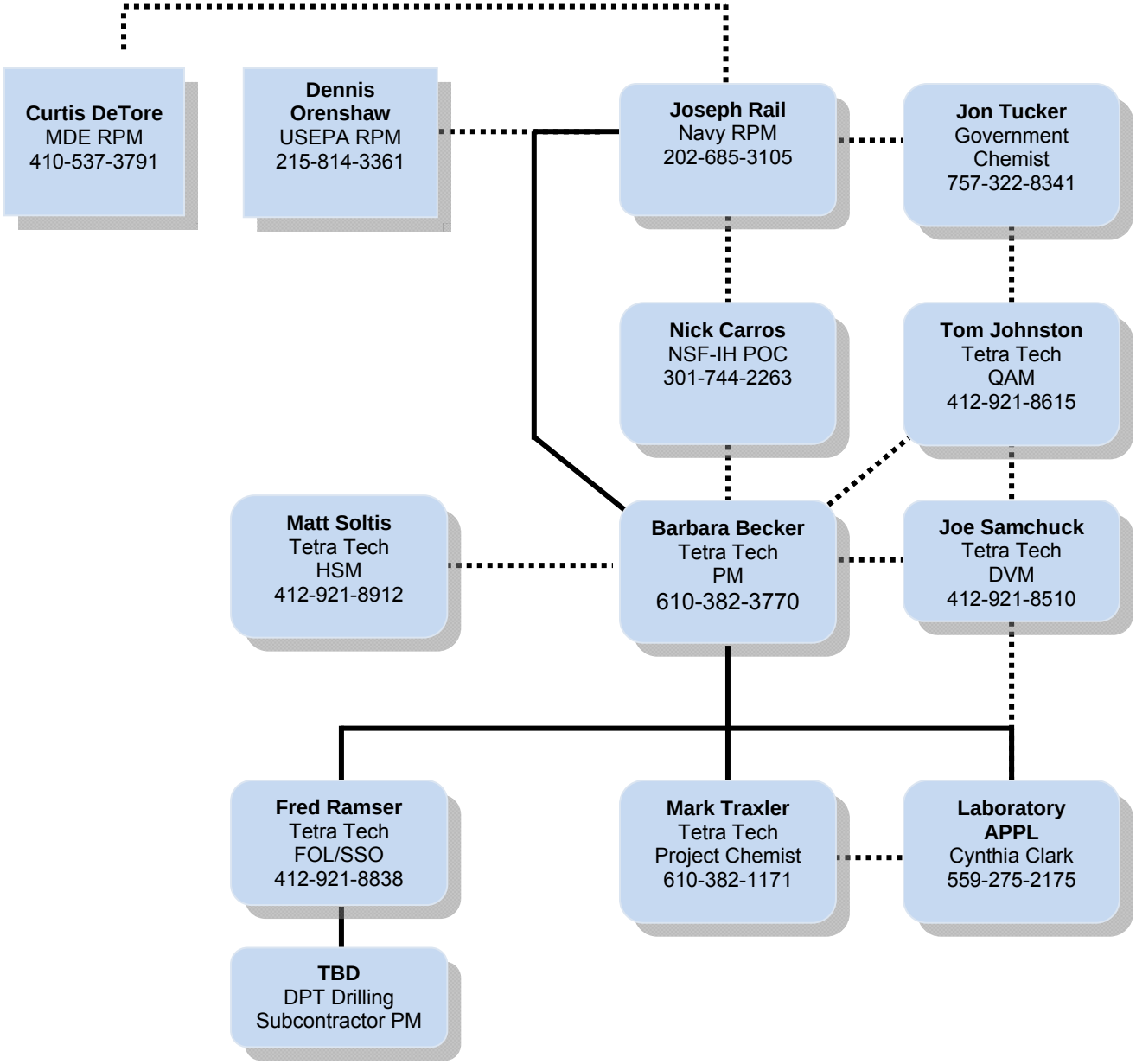
Name[(1)]	Organization/Title/Role	Telephone Number	Signature/E-Mail Receipt	SAP Section Reviewed	Date SAP Read
Navy and Regulator Partnering Team Personnel					
Joseph Rail	NAVFAC Washington/ Navy RPM/Manages project	202-685-3105	See **Worksheet No. 1** for signature	All	
Jeffrey Bossart	NSF-IH/Environmental Division Director/ Directs environmental activities at NSF-IH	301-744-4705		All	
Nick Carros	NAVFAC Washington/ IR Project Manager/Facility POC	301-744-2263		All	
Dennis Orenshaw	USEPA Region 3/ Federal regulatory RPM/ Manages project	215-814-3361	See **Worksheet No. 1** for signature	All	
Curtis DeTore	MDE/ State regulatory RPM/ Manages project	410-537-3791	See **Worksheet No. 1** for signature	All	
Tetra Tech Project Team Personnel					
Scott Nesbit	Tetra Tech Activity Coordinator/ Coordinates Tetra Tech activities at this facility	412-921-8945		All	

Name[1]	Organization/Title/Role	Telephone Number	Signature/E-Mail Receipt	SAP Section Reviewed	Date SAP Read
Barbara Becker	Tetra Tech/PM/Manages project activities	610-382-3770	See **Worksheet No. 1** for signature	All	
Fred Ramser	Tetra Tech/FOL/SSO/Manages field operation and site safety issues	412-921-8838		All	
Tom Johnston, PhD	Tetra Tech/QAM/Manages NAVFAC Contract QA program and implementation	412-921-8615	See **Worksheet No. 1** for signature	All	
Matt Soltis	Tetra Tech/HSM/Manages Corporate Health and Safety Program	412-921-8912	See HASP for signature	HASP only	
Mark Traxler	Tetra Tech/Project Chemist/ Provides coordination with laboratory	610-382-1171		All	
Joe Samchuck	Tetra Tech/DVM/Manages data validation	412-921-8510		**Worksheet Nos. 12, 14, 15, 19, 20, 23-28, 30,** and **34-37**	
Subcontractor Personnel					
Cynthia Clark	APPL/Laboratory PM/ Representative for laboratory and analytical issues	559-275-2175		**Worksheet Nos. 6, 12, 14, 15, 19, 20, 23-28, 30,** and **34-36**	
TBD	TBD/Utility Location Subcontractor PM/ Manages daily project activities	TBD		**Worksheet Nos. 6, 14, 17**, and **Figures 4-8**	
TBD	TBD/DPT Subcontractor PM/ Manages daily project activities	TBD		**Worksheet Nos. 6, 14, 17**, and **Figures 4-8**	

[1] Persons listed on this worksheet will be responsible for distributing the SAP to the appropriate people within their organization.

SAP Worksheet No. 5 -- Project Organizational Chart
(UFP-QAPP Manual Section 2.4.1)

Lines of Authority ——— Lines of Communication



SAP Worksheet No. 6 -- Communication Pathways
(UFP-QAPP Manual Section 2.4.2)

Communication Driver	Responsible Affiliation	Name	Phone Number and/or E-Mail	Procedure
SAP Amendments	Tetra Tech FOL/SSO Tetra Tech PM Navy RPM	Fred Ramser Barbara Becker Joseph Rail	412-921-8838 610-382-3770 202-685-3105	Tetra Tech FOL will verbally inform Tetra Tech PM within 24 hours of realizing a need for an amendment. Tetra Tech PM will document the proposed changes via a Field Task Modification Request (FTMR) form within 5 days and send the Navy RPM a concurrence letter within 7 days of identifying the need for change. SAP amendments will be submitted by Tetra Tech PM to the NAVFAC RPM for review and approval. Tetra Tech PM will send scope changes to Partnering Team via e-mail within 1 business day.
Changes in field work schedule	Tetra Tech PM Navy RPM NSF-IH POC	Barbara Becker Joseph Rail Nick Carros	610-382-3770 202-685-3105 301-744-2263	Tetra Tech PM will verbally inform Navy RPM on the day that a schedule change is known and will document via schedule impact letter within 1 business day of when the impact is realized.
Issues in the field that result in changes in scope of field work	Tetra Tech FOL/SSO Tetra Tech PM Navy RPM	Fred Ramser Barbara Becker Joseph Rail	412-921-8838 610-382-3770 202-685-3105	Tetra Tech FOL will inform Tetra Tech PM within 1 business day of when an issue is discovered. Tetra Tech PM will inform Navy RPM by close of the next working day. Navy RPM will issue scope change if warranted. The scope change is to be implemented before further work is executed. Tetra Tech PM will document the changes within 2 days of identifying the need for change on a FTMR form and obtain required approvals within 5 days of initiating the form.
Recommendations to stop work and initiate work upon corrective action	Tetra Tech FOL/SSO Tetra Tech PM Tetra Tech QAM Tetra Tech Project Chemist	Fred Ramser Barbara Becker Tom Johnston Mark Traxler	412-921-8838 610-382-3770 412-921-8615 610-382-1171	If Tetra Tech is the responsible party for a stop-work command, the Tetra Tech FOL will inform on-site personnel, subcontractor(s), Navy RPM, and the identified Partnering Team members within 1 hour (verbally or by e-mail) of recognizing the need to stop

Communication Driver	Responsible Affiliation	Name	Phone Number and/or E-Mail	Procedure
	Tetra Tech HSM Navy RPM NSF-IH POC	Matt Soltis Joseph Rail Nick Carros	412-921-8912 202-685-3105 301-744-2263	work. If a subcontractor is the responsible party, subcontractor PM must inform Tetra Tech FOL within 15 minutes of recognizing the need to stop work, and Tetra Tech FOL will then follow the procedure listed above.
Field data quality issues	Tetra Tech FOL/SSO Tetra Tech PM	Fred Ramser Barbara Becker	412-921-8838 610-382-3770	Tetra Tech FOL will inform Tetra Tech PM verbally or by e-mail on the same day that a field data quality issue is discovered.
Analytical data quality issues	APPL Laboratory PM Tetra Tech Project Chemist Tetra Tech DVM Tetra Tech PM Navy RPM	Cynthia Clark Mark Traxler Joseph Samchuck Barbara Becker Joseph Rail	559-275-2175 610-382-1171 412-921-8510 610-382-3770 202-685-3105	The Laboratory PM will notify (verbally or via e-mail) Tetra Tech Project Chemist within 1 business day of when an issue related to laboratory data is discovered. Tetra Tech Project Chemist will notify (verbally or via e-mail) data validation staff and Tetra Tech PM within 1 business day. Tetra Tech DVM or Project Chemist will notify Tetra Tech PM verbally or via e-mail within 48 hours of validation completion that a non-routine and significant laboratory quality deficiency is detected that could affect this project and/or other projects. Tetra Tech PM verbally advises Navy RPM within 24 hours of notification from Tetra Tech Project Chemist or DVM. Navy RPM will take corrective action appropriate for the identified deficiency. Examples of significant laboratory deficiencies include data reported that have a corresponding failed tune or initial calibration verification. Corrective actions may include a consult with Navy Chemist.
Site access and utilities clearance for intrusive activities	Tetra Tech FOL/SSO Navy RPM NSF-IH POC DPT Subcontractor	Fred Ramser Joseph Rail Nick Carros TBD	412-921-8838 202-685-3105 301-744-2263 TBD	Tetra Tech FOL will coordinate with facility personnel at least 7 days in advance of site access and with Tetra Tech subcontractor at least 3 days in advance of any intrusive activities for utility clearance of all well boring locations. Tetra Tech subcontractor will coordinate utility clearance with Maryland One-Call system prior to drilling.

SAP Worksheet No. 7 -- Personnel Responsibilities and Qualifications Table
(UFP-QAPP Manual Section 2.4.3)

Name[1]	Title/Role	Organizational Affiliation	Responsibilities
Joseph Rail	Navy RPM/Manages project	Navy	Oversees project implementation, including scoping and data review and evaluation.
Jeffrey Bossart	NSF-IH Environmental Division Director/Directs environmental activities at NSF-IH	Navy	Supports Navy RPM role and responsibilities.
Nick Carros	NSF-IH IR Project Manager/ Oversees daily site activities related to this project	Navy	Supports Navy RPM role and responsibilities and is Facility POC for scheduling and coordinating fieldwork.
Dennis Orenshaw	USEPA RPM/Provides regulator input	USEPA Region 3	Participates in scoping, data review and evaluation, and approves this SAP.
Curtis DeTore	State RPM/Provides regulator input	MDE	Participates in scoping, data review, evaluation, and approves this SAP.
Scott Nesbit	Tetra Tech Activity Coordinator/ Coordinates all facility work for Tetra Tech	Tetra Tech	Oversees all Tetra Tech project-related work at the facility.
Barbara Becker	PM/ Manages project on a daily basis	Tetra Tech	Oversees project, including financial, schedule, and technical day-to-day management of the project.
Fred Ramser	FOL/Manages field operations SSO/Oversees site activities to ensure that safety requirements are met	Tetra Tech	As FOL, supervises, coordinates, and performs field sampling activities. As SSO, responsible for on-site project specific health and safety training and monitoring site conditions. Details of these responsibilities are presented in the HASP.
Tom Johnston	QAM/Oversees program and project QA activities	Tetra Tech	Ensures that quality aspects of the CLEAN program are implemented, documented, and maintained.

Name[(1)]	Title/Role	Organizational Affiliation	Responsibilities
Matt Soltis	HSM/Oversees health and safety activities	Tetra Tech	Oversees the Tetra Tech CLEAN Program Health and Safety Program.
Mark Traxler	Project Chemist/Conducts data validation and reporting	Tetra Tech	Participates in project scoping, prepares laboratory scopes of work, and coordinates laboratory-related functions with laboratory. Oversees data quality reviews and QA of data validation deliverables.
Joseph Samchuck	DVM/Oversees data validation activities	Tetra Tech	Manages data validation activities within Tetra Tech, including ensuring QA of data validation deliverables, providing technical advice on data usability, and coordinating and maintaining the data validation review schedule.
Cynthia Clark	Laboratory PM/ Representative for laboratory and analytical issues	APPL	Coordinates analyses with laboratory chemists, ensures that scope of work is followed, provides QA of data packages, and communicates with Tetra Tech staff.
TBD	Utility Subcontractor/ Performs utility mark-out	TBD	Performs third-party utility clearance and mark-out (in addition to Maryland One-Call) at and near intrusive work according to Statement of Work (SOW).
TBD	DPT Subcontractor/ Performs DPT activities	TBD	Performs soil boring, macrocoring/soil sampling, and temporary well installation and development techniques according to SOW.

[1] In some cases, one person may be designated responsibilities for more than one position. For example, the FOL will also be responsible for SSO duties. This action will be performed only as credentials, experience, and availability permits.

SAP Worksheet No. 8 -- Special Personnel Training Requirements Table
(UFP-QAPP Manual Section 2.4.4)

Each site worker will be required to have completed appropriate Hazardous Waste Operations and Emergency Response (HAZWOPER) training specified in Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) 1910.120 (e). Project-specific safety requirements are addressed in greater detail in the site-specific HASP.

At sites located within the Valley Firing Fan (Marine Rifle Range and Old Skeet and Trap Range), UXO avoidance support will be provided during field operations. Safety personnel providing this support will meet the requirements of Department of Defense Explosive Safety Board (DDESB) Technical Paper (TP) 18 for UXO Technician II or higher and will follow procedures outlined in the Tetra Tech UXO Avoidance Standard Operating Procedure (SOP) included in the site-specific HASP.

SAP Worksheet No. 9 -- Project Scoping Session Participants Sheet
(UFP-QAPP Manual Section 2.5.1)

Project Name: Five SASRs Phase 2 SI **Projected Date(s) of Sampling**: August 2011 **Project Manager**: Barbara Becker	**Site Name**: Five SASRs **Site Location**: NSF-IH, Indian Head, Maryland
Date of Session: March 4, 2011 **Scoping Session Purpose:** Develop Project Quality Objectives (PQOs) for SI activities	

Name	Title	Affiliation	Phone No.	E-Mail Address	Project Role
Barbara Becker	PM	Tetra Tech	610-382-3770	barb.becker@tetratech.com	Manages project for Tetra Tech
Tom Johnston	QAM	Tetra Tech	412-921-8615	tom.johnston@tetratech.com	Tetra Tech QAM for CLEAN
Mark Traxler	Project Chemist	Tetra Tech	610-382-1171	mark.traxler@tetratech.com	Oversees project chemistry issues and coordinates with laboratory
Ralph Basinski	MRP Coordinator	Tetra Tech	412-921-8308	ralph.basinski@tetratech.com	Provides coordination among Tetra Tech MRP projects

Comments/Decisions: The participants met by teleconference to develop the project Data Quality Objectives (DQOs). Draft DQOs developed during the meeting are included in **Appendix C**.

Action Items: Tetra Tech will prepare the SAP based on the draft DQOs outlined during this meeting. Additional input will be sought from the following Tetra Tech personnel, who were involved in the 2009 SI field work and/or reporting:

- Fred Ramser – request information on site conditions, depth to groundwater, flow direction, tidal fluctuations, well drilling/construction methods, and well placement.
- Bob Jupin – confirm groundwater receptors and exposure pathways and clarify how low-level arsenic and antimony exceedances were addressed during the risk screening process.
- Ellen Berklite – request summaries of site histories and descriptions.

Consensus Decisions: Consensus was reached regarding the following items:

- Contaminants identified during the 2009 SI as posing a possible unacceptable health risk are the parameters of interest.
- Only human health risk is of concern because ecological receptors are not exposed to groundwater.
- Representative receptors include hypothetical future residents and occupational/construction workers.
- The technical approach should be biased toward groundwater most likely to be contaminated; subsequent investigations can be conducted to delineate nature and extent, if necessary.
- Risk screening values should be conservative so that if they are not exceeded, no further action can be recommended.

Project Name: Five SASRs Phase 2 SI **Projected Date(s) of Sampling**: August 2011 **Project Manager**: Barbara Becker	**Site Name**: Five SASRs **Site Location**: NSF-IH, Indian Head, Maryland

Date of Session: March 23, 2011
Scoping Session Purpose: Develop concurrence on PQOs for SI activities

Name	Title	Affiliation	Phone No.	E-Mail Address	Project Role
Joseph Rail	Navy RPM	NAVFAC	202-685-3105	joseph.rail@navy.mil	Manages project for Navy
Nick Carros	NSF-IH IR Project Manager	NAVFAC	301-744-2263	nicholas.carros@navy.mil	POC for Navy at IH
Dennis Orenshaw	USEPA Region 3 RPM	USEPA	215-814-3361	orenshaw.dennis@epa.gov	Manages project for USEPA
Curtis DeTore	MDE RPM	MDE	410-537-3791	cdetore@mde.state.md.us	Manages project for MDE
Barbara Becker	PM	Tetra Tech	610-382-3770	barb.becker@tetratech.com	Manages project for Tetra Tech
Tom Johnston (by phone)	QAM	Tetra Tech	412-921-8615	tom.johnston@tetratech.com	Tetra Tech QAM for CLEAN
Scott Nesbit	Activity Coordinator	Tetra Tech	412-921-8945	scott.nesbit@tetratech.com	Coordinates Tetra Tech activities at IH

Comments/Decisions: The meeting participants reviewed the results of the 2009 SI, discussed the general Conceptual Site Models (CSMs), and established the scope of DQOs for the groundwater investigation. Discussion details are presented in the meeting minutes (**Appendix C**).

Action Items: Tetra Tech will prepare the Draft SAP for submittal to the Navy and possibly on-board review at the next Partnering Team meeting.

Consensus Decisions: Consensus was reached on the following elements of the groundwater investigation:

- Temporary monitoring wells will be installed and sampled within the surficial aquifer at locations of greatest expected groundwater contamination at each site.
- Groundwater samples will be collected and analyzed for the Phase 1 SI target analytes that exceeded both applicable soil-to-groundwater Project Action Limits (PALs) and site background concentrations for soil.
- Target analytes will vary for each source area but will include one or more of the following based on the Phase 1 SI results: antimony, arsenic, copper, lead, polycyclic aromatic hydrocarbons (PAHs), and/or nitroglycerin (NG).

Project Name: Five SASRs Phase 2 SI **Projected Date(s) of Sampling**: August 2011 **Project Manager**: Barbara Becker	**Site Name**: Five SASRs **Site Location**: NSF-IH, Indian Head, Maryland

Date of Session: May 11, 2011
Scoping Session Purpose: Develop concurrence on PQOs for SI activities

Name	Title	Affiliation	Phone No.	E-Mail Address	Project Role
Joseph Rail	Navy RPM	NAVFAC	202-685-3105	joseph.rail@navy.mil	Manages project for Navy
Nick Carros	NSF-IH IR Project Manager	NAVFAC	301-744-2263	nicholas.carros@navy.mil	POC for Navy at IH
Dennis Orenshaw	USEPA Region 3 RPM	USEPA	215-814-3361	orenshaw.dennis@epa.gov	Manages project for USEPA
Curtis DeTore	MDE RPM	MDE	410-537-3791	cdetore@mde.state.md.us	Manages project for MDE
Barbara Becker	PM	Tetra Tech	610-382-3770	barb.becker@tetratech.com	Manages project for Tetra Tech
Scott Nesbit	Activity Coordinator	Tetra Tech	412-921-8945	scott.nesbit@tetratech.com	Coordinates Tetra Tech activities at IH

Comments/Decisions: Tetra Tech presented the DQOs and technical approach for the monitoring well installation and groundwater sampling described in the SAP, which is currently under review by the Navy Chemist. The objective was to discuss and obtain preliminary comments/concurrence from the Partnering Team to facilitate an expedited review of the document when it is formally transmitted in a few weeks.

Action Items: Tetra Tech will consider the comments provided at this meeting and incorporate them, as appropriate, in the SAP prior to submittal to the Partnering Team.

Consensus Decisions: Consensus was reached on the general approach presented at the meeting, with the following comments/recommendations regarding specific details of the plan:

- Temporary monitoring wells may not be left in place after the sampling event is over unless they are completed with flush-mount well-heads. (Stick-ups would create site interferences, especially at the amphibious landing training area at the Old Skeet and Trap Range.)
- If turbidity is anticipated to be a general concern at the proposed monitoring well locations, consider collecting/analyzing both unfiltered and filtered samples for metals analyses at all wells. Regulators raised no objections to using the filtered data for comparison to PALs during the risk screening evaluation.
- If there is no background groundwater data available for Stump Neck Annex, the background groundwater data collected previously for the Main Site may be used as benchmarks for evaluating the Phase 2 SI data.

- Decision Rule No. 2 should be revised to delete the phrase "or absence," because contaminant absence is already addressed by Decision Rule No. 1.
- Marine Rifle Range figure – If we don't want to install a well along the Firing Line that had the NG exceedance in soil due to it being located in a different MRP area, then we should move that well to coincide with one of the other Firing Lines that is within the Marine Rifle Range boundaries. Suggest we research whether one particular line was used more than the others, and sample groundwater on that line so we can stay consistent with our "worst case scenario" objectives. It may not be necessary to place a well at both Target Berms (i.e., just choose one), due to the similar uses/contamination at each. Since we are not sure whether groundwater is flowing toward the creek or toward the marsh in the vicinity of the Hillside Impact Area, we should place two wells rather than one to improve the likelihood of intercepting potential contamination.
- Rum Point Skeet Range figure – The legend needs to indicate antimony sampling at both locations.
- Small Arms (Pistol) Range – Move the well location back closer to the contaminated soil sample locations. Suggest we move it to where the tip of the red arrow is currently pointing on the figure.
- Investigation derived waste (i.e., soil cuttings from well borings) may be re-deposited at the same boring location from which it was derived.

SAP Worksheet No. 10 -- Conceptual Site Model
(UFP-QAPP Manual Section 2.5.2)

Worksheet No. 10 of the April 2009 SI SAP presented a detailed description of physical site conditions and configurations, histories, summaries of previous environmental inspections and investigations, and CSMs for the five SASRs at NSF-IH (i.e., Marine Rifle Range, Old Skeet and Trap Range, Rum Point Skeet Range, Small Arms (Pistol) Range, and Roach Road Rifle Range). **Worksheet No. 10** of this Phase 2 SI SAP summarizes the histories and physical descriptions of these sites, reviews the findings of the initial SI, and presents updated CSMs for each site. The updated CSMs incorporate analytical data and risk screening results from the 2009 Phase 1 SI, as applicable to the groundwater exposure pathway only.

10.1 SITE HISTORIES AND PHYSICAL DESCRIPTIONS

The Navy has conducted various testing, training, and disposal activities related to military munitions at the NSF-IH Indian Head since it was established in 1890 as a Naval Ordnance Station. The general locations of the NSF-IH Main Installation and Stump Neck Annex are shown on **Figure 1**. The Stump Neck Annex covers approximately 1,100 acres on the Stump Neck peninsula at the confluence of the Potomac River and Chicamuxen Creek in Charles County, Maryland. The Main Installation is situated northeast of Stump Neck Annex, across Mattawoman Creek. Much of the Stump Neck peninsula lies within the Valley Firing Fan (**Figure 2**), which received fire from the Valley Gun Proving Site at the Main Installation from 1891 through 1921. General Smallwood State Park and private property lie east of Stump Neck Annex.

As a result of the Navy's explosives and munitions training activities, munitions and explosives of concern (MEC) and munitions constituents (MC) may be present at various sites throughout the Stump Neck Annex.[3] MEC is not a concern as a result of past operations conducted at the five SASRs that are the subject of this SAP; however, MEC is a concern at the ranges located within the Valley Firing Fan (i.e., the Marine Rifle Range and Old Skeet and Trap Range; see **Figures 2** and **3**).

The Navy is following the CERCLA process for the investigation of these sites. The initial phase of the CERCLA process, the Preliminary Assessment (PA), was completed in September 2005 (Malcolm Pirnie, 2005). It recommended further investigation of the five SASRs at Stump Neck Annex, which were classified as "other than operational range" sites[4] and identified as Munitions Response Areas/Munitions Response Sites under the MRP. The PA used five primary sources of information to support the facility

[3] The term MEC includes discarded military munitions (DMM), unexploded ordnance (UXO)], and MC in high enough concentrations to pose an explosive hazard. MC is defined as any materials originating from UXO, DMM, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance and munitions.

[1] Closed, transferred, and transferring military ranges and sites not located on an operational range are considered "other than operational."

data collection effort, including historical archives, personal interviews, installation data repositories (including the AR), visual surveys, and off-facility data sources and repositories such as local libraries and museums. The five SASRs, which are shown on **Figure 3**, are described in detail in the PA Report.

The next phase of the CERCLA process, the SI, was initiated in 2009 in accordance with the SI SAP (Tetra Tech, 2009), and the results of that investigation are documented in the SI Report (Tetra Tech, 2010). The primary objective of this initial SI phase was to determine whether further investigations or response actions were necessary for any of the sites identified in the PA to restore the sites to acceptable environmental conditions. The SI considered the background information provided in the PA and focused on the collection of site-specific environmental data that were used to support a screening-level risk evaluation to identify contaminants of potential concern (COPCs) at each of the five sites. Results of the 2009 SI fieldwork and risk screening were documented in the SI Report, which was finalized by the NSF IH Partnering Team in September 2010 (Tetra Tech, 2010). General recommendations for further action at the five SASRs included: 1) determination of impact to groundwater, and 2) remediation of contaminated soils. Additional details on the results presented in the SI Report are provided in Section 10.2.

Individual site histories and physical descriptions are presented in the following subsections. Due to the lack of historical soil boring or well installation data from these sites, only limited information is included regarding site-specific subsurface conditions. Detailed information about regional and local climate, vegetation, soils, geology, and hydrogeology is available in the SI Report (Tetra Tech, 2010), PA Report (Malcolm Pirnie, 2005), Background Soil Investigation Report for Indian Head and Stump Neck Annex (Tetra Tech, 2002), Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Verification Report for Stump Neck Annex (Brown and Root, 1998), and the Soil Survey of Charles County (USDA, 1974). These sources of information were used as the basis for the site-specific summaries provided below.

10.1.1 Marine Rifle Range - UXO 14

The former Marine Rifle Range, shown on **Figure 4**, is estimated to be approximately 30 acres in size. This range is located south of Archer Avenue, within the Valley Firing Fan, and includes multiple Firing Lines, two Target Berms, and a Hillside Impact Area. During its estimated period of use, 1911 to 1918, the range was used for small-arms (.30-cal) rifle training. Two sets of Firing Lines, one for each Target Berm, were located at 100-meter intervals over a 1,000-meter span. Targets were mounted on each berm and held in place by a series of chains and mechanical supports. Bullets that were fired low and missed the targets tended to accumulate in the Target Berm soil at the base of the targets. Bullets that were fired high and missed the targets, or hit the targets and passed through, continued down range and accumulated in the Hillside Impact Area.

Surface elevations at the range vary from 5 to 60 feet above mean sea level (msl). The western portion of the range slopes slightly from 10 to 30 feet above msl, and the central and eastern portions of the range are relatively flat, with a general elevation of approximately 10 feet above msl. The Hillside Impact Area that borders the eastern side of the range slopes steeply from 5 to 60 feet above msl.

According to the Soil Survey of Charles County (USDA, 1974), soils in the general vicinity of this site consist of silty sand with gravel at the ground surface underlain by silty sand with clay. Specifically, Keyport silt, Elkton silt loam, and Mattapex silt loam are present at this site. These soil types generally have low permeability, thus impeding the downward movement of rainwater through the vadose zone. Vegetation at the Marine Rifle Range is a mixture of mowed grass, grassy fields, hardwood forest, and wetland.

The western portion of the Marine Rifle Range is partially developed, with a number of warehouse-type structures and parking lots, and the central and eastern portions of the range are mostly wooded, with sparsely distributed structures that appear to be abandoned. Wetlands are present in the eastern portion of the range between the Target Berms and Hillside Impact Area and also in the central portion of the range. Surface water runoff drains to these wetlands, unnamed tributaries, and drainage swales, ultimately flowing to the Potomac River. Based on the relatively flat topography of the area and the extensive vegetative ground cover, which impedes surface runoff, the potential for erosion is expected to be limited.

In the absence of historical site-specific data, it is assumed that shallow groundwater flow beneath the Marine Rifle Range follows the general topography and is connected to the area's dominant surface water bodies (i.e., Mattawoman Creek, Chicamuxen Creek, and Potomac River). Based on a review of available information (e.g., Background Report [Tetra Tech, 2002], RFI Report [Brown and Root, 1998]), depth to water is estimated at 5 to 10 feet below ground surface (bgs), with an inferred northward flow direction (toward the river). Due to the proximity of the site to the river, it is possible that groundwater at the Marine Rifle Range experiences tidally induced fluctuations in elevation and quality.

10.1.2 Old Skeet and Trap Range - UXO 15

The former Old Skeet and Trap Range, shown on **Figure 5**, is currently used for recreation and as a helicopter landing area. This site comprises approximately 29 acres north of Archer Avenue, between the Marine Rifle Range and Potomac River, and lies within the Valley Firing Fan. This site was reportedly used for small-arms recreational activities from sometime after 1967 until 1991. Shotguns were used to fire on clay targets launched from two separate firing points. Impacted targets would shatter and fall to the ground surface, and the shot pellets, because of their ballistic momentum, greater density, and spherical shape, would travel further down range before falling to the ground. Missed targets would fall to the ground intact, and the expended shot would continue along an undisturbed trajectory toward the river.

Topographic relief at the Old Skeet and Trap Range is relatively flat. The elevation of the entire range is approximately 16 feet above msl, and the site consists primarily of an open field with maintained grass. Surface runoff is to the north, toward the Potomac River, either directly or via a drainage ditch located along Archer Avenue. Although erosion on the range is considered to be minimal, surface soil contaminants may become mobile, particularly during extended periods of surface runoff. Transport would occur in the direction of Mattawoman Creek and the Potomac River.

According to the Soil Survey of Charles County (USDA, 1974), soils in the general vicinity of this site consist of Mattapex fine sandy loam with 0 to 2 percent slopes. These soils generally have a surface layer of sandy silt, available moisture capacity is high, and permeability is moderately low, impeding the downward movement of rainwater through the vadose zone. Geology at this site is characterized by unconsolidated fluvial and marine deposits overlying older, Precambrian, igneous and metamorphic bedrock.

In the absence of historical site-specific data, it is assumed that shallow groundwater flow beneath the Old Skeet and Trap Range follows the general topography and is connected to the area's dominant surface water bodies (i.e., Mattawoman Creek and Potomac River). Based on a review of available information, depth to water is estimated at 5 to 10 feet bgs, with an inferred northward flow direction (toward the Potomac River). Due to the close proximity of the site to the river, it is likely that groundwater experiences tidally induced fluctuations in elevation and quality.

10.1.3 Rum Point Skeet Range - UXO 16

The former Rum Point Skeet Range, shown on **Figure 6**, is a 900-foot-wide fan-shaped area that covers approximately 33 acres in the northeastern section of Stump Neck Annex. This site was used for small-arms (shotgun) recreational activities from 1991 until 2001. Shotguns were used to fire on clay targets launched from two concrete firing pads. Impacted targets would shatter and fall to the ground surface, and the shot pellets, because of their ballistic momentum, greater density, and spherical shape, would travel further down range before falling to the ground. Missed targets would fall to the ground intact, and the expended shot would continue along an undisturbed standard trajectory.

The general topography of the range slopes gently downward from southeast to northwest. More than 90 percent of the range is located in upland terrain, at or above an elevation of 30 feet above msl. The cleared area of the range is fairly flat; however, west of the cleared area, the land slopes downward toward a wetlands area and beyond. Surface runoff occurs in the direction of the wetlands. Vegetation is characterized by open fields with maintained grass surrounded by hardwood forests and wetlands. Based on the relatively flat topography of the area and extensive vegetative ground cover, which impedes surface runoff, erosion is considered to be limited.

According to the Soil Survey of Charles County (USDA, 1974), surface soil in the general vicinity of this site consists of a thick series of silty clays. Subsurface soil is a combination of Sassafras sandy loams with 0 to 5 percent slopes and moderate erodability. These soils form on upland terrains that are nearly level to moderately sloping and are well-drained soils with moderate permeability, allowing for downward migration of rainwater through the vadose zone.

Soil boring data obtained during the RFI Verification investigation (Brown and Root, 1998) at the Rum Point Landfill, located approximately 600 feet north of the Rum Point Skeet Range boundary, indicate the presence of a surface soil layer of a yellow-brown clay, silt, and sand mixture to a depth of between 12 and 20 feet bgs. This mixture is underlain by a distinct dark gray silt and fine sand layer containing shell fragments. Beneath this layer, green sand and very stiff clay are the predominant soil types. The dark gray silt/sand layer acts as a semi-confining unit to groundwater in the green sand.

In the absence of historical site-specific data, it is assumed that shallow groundwater flow beneath the Rum Point Skeet Range follows the general topography and is connected to the area's dominant surface water bodies (i.e., Mattawoman Creek, Chicamuxen Creek, and Potomac River). Based on a review of available information, depth to water is estimated at 15 to 20 feet bgs, with an inferred north-by-northwest flow direction. Due to the distance between the site and the river, neither groundwater elevation nor quality are expected to fluctuate in response to tides.

10.1.4 Small Arms (Pistol) Range - UXO 17

The former Small Arms (Pistol) Range, shown on **Figure 7**, was also previously known as the Old Pistol Range. It consists of approximately 2 acres located near the eastern perimeter of the Stump Neck peninsula and was used for small-arms training from the mid-1980s to 1991. The range contained three Firing Lines with north-south orientation, a Target Area, and a Hillside Impact Area on the eastern edge of the range. Bullets fired from the Firing Lines would have passed through or around the targets and accumulated in the Hillside Impact Area behind the targets.

Currently, the Small Arms (Pistol) Range is an open field bounded on the east by a steep upward slope that borders General Smallwood State Park. The topography is relatively flat over most of the site, which has an elevation of approximately 100 feet above msl. The Hillside Impact Area along the eastern boundary is a steeply sloping hill that rises to a maximum elevation of 130 feet above msl. Surface runoff from the site is to the west toward an unnamed tributary along the western boundary of the range, which ultimately flows to the Mattawoman Creek. There are no wetlands present at the site. Vegetation consists of tall grasses and hardwood trees.

According to the Soil Survey of Charles County (USDA, 1974), soils in the general vicinity of this site consist of silty loams and gravelly sandy loam. Specifically, site soils consist of moderately eroded Beltsville silt loam with 2 to 5 percent slopes and a moderately eroded Aura gravelly loam with 10 to 15 percent slopes, both of which are moderate to well-drained soils that allow for downward movement of rainwater through the vadose zone.

During the 2009 SI, it was evident that soils from the western face of the Target/Impact Area berm had slumped to the bottom of the slope, likely consolidating much of the contaminated soil from the impact area at this location. This material appears to be in the process of being eroded by overland flow processes. Because this site is located at a high point on Stump Neck Annex, there is a likelihood that surface water flow and soil contaminant transport could occur to nearby drainages to the north and south of the range, east of Rum Point Road. Both of those drainages flow into property that is beyond the boundary of Stump Neck Annex and is part of the adjacent General Smallwood State Park.

In the absence of historical site-specific data, it is assumed that shallow groundwater flow beneath the Small Arms (Pistol) Rifle Range follows the topography toward the unnamed tributary and is connected to the area's dominant surface water bodies (i.e., Mattawoman Creek and Potomac River). Based on a review of available information, depth to water is estimated at 20 to 30 feet bgs, with an inferred north-by-northwest flow direction. Due to the distance between the site and the river, neither groundwater elevation nor quality are expected to fluctuate in response to tides.

10.1.5 Roach Road Rifle Range - UXO 25

The former Roach Road Rifle Range, shown on **Figure 8**, is a 0.3-acre site that was used for small-arms (rifle and pistol) training from 1967 to 1986. The site is located in the central portion of Stump Neck Annex, directly west of Roach Road. The site contains eight firing stands, six targets, and a Hillside Impact Area on the western side of the range. Bullets fired from the firing stands would have passed through or around the targets and accumulated in the Hillside Impact Area behind the targets.

The terrain at the Roach Road Rifle Range is relatively flat, with an elevation of approximately 50 feet above msl. The majority of the site slopes gently downward toward the north. There are no surface water bodies or wetlands present at the site. Surface runoff is to the north, toward Chicamuxen Creek, which drains to the Potomac River. Vegetation consists of a mixture of shrubs and forest. Due to the relatively flat topography of the area and predominant vegetative ground cover, the potential for erosion is limited.

According to the Soil Survey of Charles County (USDA, 1974), soils in the general vicinity of this site consist of silty sand with gravel at the ground surface underlain by silty sand with clay. Specifically, Aura gravelly sandy loam is present at the range. This soil type is generally a well-draining gravelly soil that

allow for the downward movement of rainwater through the vadose zone. Soil boring data from the 2009 SI at Area 8 (Tetra Tech, 2010), located approximately 400 feet northeast of the Roach Road Rifle Range boundary, indicate that surficial deposits consist of gravel, sand, silt, clay, and peat mixtures with irregular bedding and an aggregate thickness of 0 to approximately 40 feet bgs.

In the absence of historical site-specific data, it is assumed that shallow groundwater flow beneath the Roach Road Rifle Range follows the general topography and is connected to the area's dominant surface water bodies (i.e., Mattawoman Creek and Potomac River). Based on a review of available information, depth to water is estimated at 25 to 30 feet bgs, with an inferred northeast-by-north flow direction. Due to the distance between the site and the river, neither groundwater elevation nor quality are expected to fluctuate in response to tides.

10.2 MAY AND JUNE 2009 SAMPLING AND ANALYSIS

The Phase 1 SI conducted for the five SASRs located at NSF-IH Stump Neck Annex is documented in the SI Report (Tetra Tech, 2010). The report includes detailed descriptions of field activities and presents the results of laboratory analysis, data evaluation, and human health and ecological risk screening.

The 2009 SI field program was conducted in May through June 2009 in accordance with the SI SAP (Tetra Tech, 2009). Sampling activities included the collection of 451 soil and sediment samples, along with associated quality control (QC) samples (e.g., duplicates and blanks) by hand auger (HA), DPT, plastic trowel (PT), or ponar dredge (PD) at 410 locations in areas most likely to have been contaminated by former range operations. HA soil samples were collected from 369 locations at depths ranging from 0 to 3 feet bgs, and DPT soil samples were collected from seven locations at depths ranging from 0 to 10 feet bgs. PT sediment samples were collected from nine locations at depths of 0 to 0.5 foot bgs, and PD sediment samples were collected from 25 locations at depths of 0 to 0.5 foot bgs.

Surface and subsurface soil were evaluated through the collection of both discrete and composite samples from locations biased toward areas containing visible evidence of lead shot accumulation or clay target fragments and toward other areas most likely to have been contaminated by past operations at the site (e.g., Firing Lines, Target Berms). Sediment sample locations were biased toward areas of anticipated lead shot deposition in open water and near the shoreline at the Old Skeet and Trap Range.

Details of the 2009 SI sample collection and analysis are summarized by SASR in **Table 10-1**. The indicated analyses represent the contaminants most likely to be present at each sampling location based on historical site layout and usage. For example, at each site, contaminants associated with weapons discharge (e.g., metals, explosives) were evaluated at sampling locations in firing areas, contaminants associated with spent munitions (e.g., metals) were evaluated at sampling locations in firing range target/impact areas and skeet range shot fall areas where bullet accumulations where observed, and

constituents of clay targets (e.g., PAHs) were evaluated at sampling locations in skeet range target areas where skeet fragments were observed.

All soil and sediment samples collected during the 2009 SI were analyzed in the field for lead using a portable x-ray fluorescence (XRF) spectrometer. After initial screening by XRF, samples were selected in accordance with the SI SAP for analysis of select metals (antimony, arsenic, copper, lead, tin, and zinc), PAHs, explosives (NG), and miscellaneous parameters [cation exchange capacity (CEC), pH, and total organic carbon (TOC)] at an approved fixed-base laboratory. Analytical results were validated, reviewed, and compared to PALs established in the SAP for human health and ecological risk screening. Where sufficient data existed, metals concentrations were also statistically compared to background concentrations of soil constituents at NSF-IH.

Soil and/or sediment concentrations of lead, other munitions-related metals, and PAHs exceeded their respective PALs for direct exposure pathways and, thus, were identified as possibly posing unacceptable risks to human and ecological receptors. Potential exposure based on migration to groundwater was evaluated by comparing the soil data to PALs based on USEPA Regional Screening Levels (RSLs) for the soil-to-groundwater pathway using a dilution attenuation factor (DAF) of 1. This screening method provided conservative results by assuming that 100 percent of the contaminants present in soil would migrate to groundwater, with no dilution or attenuation, and that these contaminants would then become available for consumption as tap water. Contaminants detected at concentrations exceeding the soil-to-groundwater pathway PALs were antimony, arsenic, copper, PAHs, and NG. Lead is also of concern as a potential groundwater contaminant, although it does not have an associated soil-to-groundwater PAL, because it is the predominant metal contaminant present in soil at these sites, having been detected at concentrations exceeding the soil PAL at numerous locations.

Table 10-2 lists the soil contaminants that exceeded both the lowest human health PALs, which in most cases are the soil-to-groundwater PALs, and background concentrations in each contaminant source area (e.g., firing line, target berm/impact area, shot fall area, clay target area) at each SASR during the 2009 SI. Based on the Phase 1 SI risk screening results, these contaminants are considered to be COPCs and, as such, are assumed to have the potential to migrate to groundwater in concentrations that may pose an unacceptable health risk to future human receptors. **Figures 4 through 8** depict the SI soil sampling locations with the highest concentrations of COPCs in each source area at each SASR. These locations represent areas assumed to have the greatest potential for surficial groundwater impact due to infiltration of surface soil contaminants.

10.3 CONCEPTUAL SITE MODELS

The SI Report (Tetra Tech, 2010) presented updated CSMs for the five SASRs, which incorporated the analytical data collected during the 2009 SI and considered direct exposure of human and ecological receptors to contaminants in soil and sediment. The CSMs presented in this Phase 2 SI SAP consider

potential exposure to groundwater, which is a complete pathway only for human receptors because ecological receptors would not normally be expected to encounter groundwater. Although groundwater is not currently used at any of the five sites, possible future land use may include residential and/or construction worker scenarios.

With respect to groundwater, contaminants in surface and subsurface soil at each SASR may migrate into the shallow aquifer via infiltration of precipitation and then flow toward local surface water bodies. Based on a review of hydrogeological data, it is unlikely that contaminants in shallow groundwater would migrate to the deeper aquifers that are used as drinking water supplies, although shallow groundwater is considered a potential localized exposure medium to individuals who may encounter it in an open excavation or use it for irrigation purposes.

No receptors are currently exposed to groundwater at the five SASRs. However, unforeseen changes in land use (i.e., base closure and redevelopment) may result in the hypothetical future exposure of certain types of individuals. For this evaluation, construction workers and residents were selected to represent the plausible range of future receptor sensitivities and exposures. These receptors may be exposed to groundwater by means of ingestion (either intentional or incidental) and/or dermal contact.

Site-specific CSMs describing the potential exposure sources, pathways, and receptors related to potential future groundwater exposure at the five SASRs are summarized below.

10.3.1 Marine Rifle Range - UXO 14

Figure 4 shows the site layout and maximum COPC soil concentrations at the Marine Rifle Range. As reflected on this figure, sources of soil contamination that exceeded screening criteria at the site include NG, antimony, and copper in the Firing Line area and copper and lead on the tops and uprange (western) slopes of Target Berm 1, Target Berm 2, and the Hillside Impact Area at locations of bullet accumulation.

Three-dimensional CSM illustrations for this site are included on **Figure 9** for the Target Berm Area and Firing Lines and **Figure 10** for the Hillside Impact Area. An Exposure Pathway Analysis diagram is presented as **Figure 11**.

10.3.2 Old Skeet and Trap Range - UXO 15

Figure 5 shows the site layout and maximum COPC soil concentrations at the Old Skeet and Trap Range. As reflected on this figure, sources of soil contamination at the site include: NG and antimony near the Firing Points, PAHs in the vicinity of the Firing Points, collocated with clay target remains, and antimony and lead in the Target Areas, collocated with accumulations of lead shot.

A three-dimensional CSM illustration for this site is included as **Figure 12**, and an Exposure Pathway Analysis diagram is presented as **Figure 13**.

10.3.3 Rum Point Skeet Range - UXO 16

Figure 6 shows the site layout and maximum COPC soil concentrations at the Rum Point Skeet Range. As reflected on this figure, sources of soil contamination at the site include PAHs in the vicinity of the Firing Points, collocated with clay target remains, and lead in the Target Area, collocated with accumulations of lead shot.

A three-dimensional CSM illustration for this site is included as **Figure 14**, and an Exposure Pathway Analysis diagram is presented as **Figure 15**.

10.3.4 Small Arms (Pistol) Range - UXO 17

Figure 7 shows the site layout and maximum COPC soil concentrations at the Small Arms (Pistol) Range. As reflected on this figure, sources of soil contamination at the site include NG in the Firing Line area and antimony, arsenic, and lead on the uprange (western) side of the Target Area slope at locations of bullet accumulation.

A three-dimensional CSM illustration for this site is included as **Figure 16**, and an Exposure Pathway Analysis diagram is presented as **Figure 17**.

10.3.5 Roach Road Rifle Range - UXO 25

Figure 8 shows the site layout and maximum COPC soil concentrations at the Roach Road Rifle Range. As reflected on this figure, sources of soil contamination at the site are limited to antimony, copper, and lead on the uprange (eastern) side of the Target Area slope at locations of bullet accumulation.

A three-dimensional CSM illustration for this site is included as **Figure 18**, and an Exposure Pathway Analysis diagram is presented as **Figure 19**.

SAP Worksheet No. 11 -- Project Quality Objectives/Systematic Planning Process Statements
(UFP-QAPP Manual Section 2.6.1)

The following text describes the development of PQOs using USEPA's DQO Systematic Planning Process.

11.1 PROBLEM STATEMENT

Analyses of soil and sediment samples collected at the five SASRs during the first phase of the SI have identified the presence of site-related contaminants at concentrations that are potentially harmful to human and ecological receptors because they exceed risk-based screening criteria (and site-specific background concentrations for metals) and are, thus, considered COPCs. Soil and sediment have been investigated, and the extent of horizontal and vertical contamination is well defined in those media. The problem is that underlying groundwater has not yet been investigated, nor has it been adequately considered in the risk evaluation. To determine whether exposure of human receptors to groundwater at these sites may pose an unacceptable risk, a groundwater investigation must be conducted and the data generated must be considered in the human health risk screening evaluation. The ecological risk evaluation will be unaffected because ecological receptors are not typically exposed to groundwater.

The COPCs for groundwater at these sites are limited to those target analytes detected in soil overlying the groundwater at concentrations exceeding both conservative risk-based screening levels and site background concentrations for metals. These COPCs include the following:

- Certain PAHs associated with clay skeet targets.
- NG associated with firing point/firing line activities.
- Lead, antimony, arsenic, and copper associated with expended munitions at target areas, shot fall areas, and to some extent firing point/firing line areas.

The range of COPCs varies by site and by specific location within each site. Upon collecting groundwater data to fill the existing data gaps, risk evaluations can be completed for groundwater exposure at each of the five SASRs to determine whether risks to human health are potentially unacceptable and, if so, whether actions to evaluate options for reducing the unacceptable risks are warranted.

11.2 INFORMATION INPUTS

The following physical and chemical data are required to resolve the problem:

1. Chemical data: Groundwater concentrations of PAHs, NG, and/or total and dissolved metals (antimony, arsenic, copper, lead) to support a determination of whether contamination is present and, if present, to initiate a delineation of the nature and extent of contamination from soil COPCs in

groundwater and to support human health risk screening evaluation. These data will be obtained from analysis of groundwater samples collected from the populations described in Section 11.3. Applicable sampling methods and analytical groups are presented in **Worksheet No. 18**, and analytical methods are presented in **Worksheet No. 19**.

2. Groundwater quality data: Field parameters of pH, specific conductivity, turbidity, temperature, oxidation-reduction potential (ORP), and dissolved oxygen (DO) to ensure the representativeness of groundwater samples.

3. Groundwater level measurements: Water level measurements to provide information regarding depths to groundwater because groundwater is more likely to have been contaminated by SASR activities at sites with shallow groundwater levels than at sites with deeper groundwater.

4. Dissolved metals data: Groundwater concentrations of dissolved metals, to provide additional data at locations where the sample matrix is highly turbid [i.e., turbidity measurements are greater than 10 nephelometric turbidity units (NTUs)]. Total metals data are generally used for risk screening comparisons to PALs (see PALs below). However, previous groundwater sampling results such as those documented in the Background Report (Tetra Tech, 2002) indicate that turbidity may be an issue throughout the IH installation, thus limiting the ability of total metals data to represent actual groundwater conditions. In addition, the use of temporary wells, while sufficient for collecting organic parameter concentration data in groundwater, may not be optimal for metals because of a potential for increased turbidity compared to groundwater collected from permanent wells. The increased turbidity is caused by entrained soil, which contains relatively high concentrations of metals. Nevertheless, the speed and reduced cost associated with installation of temporary wells is considered to be an acceptable compromise. In anticipation of turbidity issues during this investigation, dissolved metals concentrations must be measured, in addition to total metals concentrations, to provide a deeper understanding of the nature of contamination and to support site-specific human health risk calculations.

5. Sample location data: Sample location coordinates and depths must be measured. Horizontal coordinates may be measured with equal effectiveness using a global positioning system (GPS) or by a state-licensed surveyor. Depth intervals are best measured using a tape measure or other device with similar accuracy and precision (e.g., water level meter). The horizontal coordinates must be documented using the Maryland Coordinate System, which is based on the North American Datum of 1983, as adjusted in 1991 (NAD83/1991) for easting and northing; and the vertical coordinates must be documented using the National Geodetic Vertical Datum of 1929 (NGVD29) or North American Vertical Datum of 1988 (NAVD88) to accurately map the sampling locations.

Project Action Limits

PALs are necessary to evaluate groundwater data. The PALs to be used in this investigation consist of the lowest of the following values:

- RSLs for tap water under a residential land use scenario (USEPA, 2010).
- Federal Primary and Secondary Maximum Contaminant Levels (MCLs) for drinking water (USEPA, 2009).

This Phase 2 SI SAP requires COPC data that can be used to characterize the potential groundwater impact at each site and complete a risk screening evaluation. To identify COPCs, surface and subsurface soil laboratory results from the Phase 1 SI were compared to medium-specific human health and ecological PALs as part of the risk screening process. Surface and subsurface soil PALs were set at the lowest matrix-specific, risk-based, or regulatory human health and ecological screening criteria appropriate for the sites. The complete list of applicable groundwater PALs corresponding to the COPCs for each site is presented in **Worksheet No. 15**.

To conduct comparisons of site data to PALs, the selected laboratory must be able to achieve Limits of Quantitation (LOQs) that are low enough to measure constituent concentrations less than the PALs. In cases where conventional test methods are not able to achieve LOQs that are lower than the PALs (such as for arsenic and selected PAHs), decision rules must be in place for determining whether the constituent poses a potentially unacceptable risk. Analytical data reported by the laboratory will use the following reporting conventions:

- All concentrations less than Detection Limits (DLs) will be considered non-detects and will be reported as Limit of Detection (LOD) values with a "U" qualifier.
- Concentrations between the DL and LOQ will be reported as estimated values with a “J” qualifier.

In the event that a target analyte has a PAL between the LOD and LOQ, the “J” flagged data will be accepted to achieve project goals. The inability to quantifiably compare individual analytes to PALs with confidence will be discussed in the risk evaluation uncertainty analysis.

PALs are included in **Worksheet No. 15** to ensure that laboratory sensitivity is sufficient to meet project goals.

11.3 STUDY AREA BOUNDARIES

The groundwater of interest for this investigation is the top 5 feet of the surficial aquifer at each site. Although not currently used for drinking water production, this shallow formation contains the groundwater

most likely to have been impacted by migration from soil contaminants deposited during range operations. In general, groundwater samples must be collected from the surficial aquifer at the locations of greatest COPC (i.e., lead, NG, and/or PAH) concentrations in the soil based on Phase 1 SI results (Tetra Tech, 2010) to ensure that the data generated represent worst-case site conditions.

Results of recent investigations at other sites within Stump Neck Annex suggest that surficial groundwater will be encountered at the following estimated depths at each site:

Estimated Depth to Groundwater (feet bgs)

- Marine Rifle Range (UXO 14) 5 to 10
- Old Skeet and Trap Range (UXO 15) 1 to 5
- Rum Point Skeet Range (UXO 16) 15 to 25
- Small Arms (Pistol) Range (UXO 17) 20 to 30
- Roach Road Rifle Range (UXO 25) 25 to 30

COPC concentrations are not expected to change significantly during the course of this investigation. Groundwater flow may be influenced by tidal fluctuations at the Marine Rifle Range and Old Skeet and Trap Range due to the sites' proximities to the Potomac River and/or Mattawoman Creek. Although the impact is not expected to be large, groundwater samples at these two sites will be collected during low tide to minimize potential variations that could be caused by fluctuations in surface water. Low tide is also considered to be the tidal elevation that represents the greatest opportunity for detecting contaminants that have leached from soil because the shallow groundwater at or near low tide has spent the previous half-tide cycle in contact with site soil.

The following are the COPCs (i.e., target analytes) identified for each source area at each site:

Site	Area of Interest	Soil PAL Exceedances
Marine Rifle Range	Firing Line Area	NG, Sb, Cu, As(1)
	Target Berms	Pb, Cu, As(1)
	Hillside Impact Area	Pb, Cu, Sb(1), As(1)
Old Skeet and Trap Range	Firing Points/Target Area	NG, PAHs, Sb, As(1)
	NW Shot Fall Area	Pb, Sb, As(1)
	NE Shot Fall Area	Pb, Sb, As(1)
Rum Point Skeet Range	Firing Points/Target Area	PAHs, Sb
	Shot Fall Area	Pb, Sb(1), As(1)
Small Arms (Pistol) Range	Firing Line Area	NG, As(1), Sb(1)
	Target Area	Pb, Sb, As
Roach Road Rifle Range	Target Area	Pb, Sb, Cu, As(1)

As = arsenic; Cu = copper; Pb = lead; Sb = antimony.

1 Arsenic and antimony soil concentrations were determined to be statistically consistent with background at the indicated areas of interest and do not require analysis in groundwater.

11.4 ANALYTIC APPROACH

The decision rules for this Phase 2 SI are as follows:

Decision Rule #1 (Applicable Individually to Each Site)

If groundwater concentrations of all contaminants measured (e.g., NG, PAHs, and/or filtered metals) at each monitoring location are less than the respective groundwater PALs (or LOQs in cases where the LOQ is higher than the PAL), then conclude that there is no unacceptable risk associated with groundwater at that site and recommend No Further Action (NFA) with respect to groundwater; otherwise, convene the Partnering Team to assess whether enough data have been collected to complete the risk screening and proceed to Decision Rule #2.

Decision Rule #2

If the Partnering Team determines, based on Phase 2 SI data, that the presence of groundwater contamination has been adequately documented, then proceed with completing the groundwater human health risk screening evaluation; otherwise, convene the Partnering Team to assess whether additional data collection to characterize the nature and extent of groundwater contamination is warranted. At a minimum, this evaluation must consider the following factors relative to the existing CSM:

- Frequency of detection for each constituent
- Frequency and magnitude of PAL exceedance for each constituent
- Background concentrations of metals that exceed PALs
- Magnitude of concentrations within, and on the perimeter of, the investigated areas
- Identities of COPCs and their estimated contributions to unacceptable levels of risk

Note: The tendency to collect more data will increase as spatial concentration patterns indicate that a potentially unacceptable risk exists outside the investigated areas, that the levels or distribution of groundwater contaminants are not known to a satisfactory degree of confidence, or that the groundwater data indicate that the CSM is in significant error.

11.5 PERFORMANCE OR ACCEPTANCE CRITERIA

This Phase 2 SI has been designed to generate groundwater data at locations most likely to be impacted by contamination in overlying soil so that worst-case conditions can be evaluated. The well placement strategy enables reliable conclusions to be drawn if no groundwater PAL exceedances are detected, while allowing for flexibility in the design of a follow-on investigation in the event that exceedances are detected.

If all data are collected as planned and no data points are missing or rejected for quality reasons, then the investigation completeness will be considered satisfactory. If any data gaps are identified, including missing or rejected data, the Partnering Team will assess whether a claim of having obtained project objectives is reasonable based on the quantity and types of data gaps. All Partnering Team members will be involved in rendering the final conclusion by consensus regarding adequacy of the data.

11.6 PLANS FOR OBTAINING THE DATA

The plans for obtaining data along with the sampling designs and rationales are described in detail in **Worksheet No. 17**.

SAP Worksheet No. 12 -- Measurement Performance Criteria Table – Field Quality Control Samples
(UFP-QAPP Manual Section 2.6.2)

QC Sample	Analytical Group	Frequency	Data Quality Indicators (DQIs)	Measurement Performance Criteria (MPCs)	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
Equipment Rinsate Blank	All analytical groups	One per 20 samples per matrix per sampling equipment(1)	Bias/ Contamination	No analytes ≥ ½ LOQ, except common laboratory contaminants, which must be < LOQ.	S & A
Filtered Rinsate Blank	Dissolved metals	One per filter brand	Bias/ Contamination	No analytes ≥ ½ LOQ, except common laboratory contaminants, which must be < LOQ.	S & A
Field Duplicate	All analytical groups	One per 10 field samples	Precision	Values > 5X LOQ: Relative Percent Difference (RPD) must be ≤30 (aqueous) (3)(4); ≤50 (solids)(3)(4).	S & A
Cooler Temperature Indicator	All analytical groups	One per cooler	Representativeness	Temperature must be less than or equal to 6 degrees Celsius (°C), but samples must not be frozen.	S

1 Equipment rinsate blanks will be collected if non-dedicated submersible pumps or other equipment are used.
2 If duplicate values for non-metals are less than five times the LOQ, the absolute difference should be less than or equal to two times the LOQ.
3 If duplicate values for metals are less than five times the LOQ, the absolute difference should be less than or equal to four times the LOQ.

SAP Worksheet No. 13 -- Secondary Data Criteria and Limitations Table
(UFP-QAPP Manual Section 2.7)

Secondary Data	Data Source (originating organization, report title and date)	Data Generator(s) (originating organization, data types, data generation/collection dates)	How Data Will Be Used	Limitations on Data Use
Site histories and physical descriptions	Preliminary Assessment Report, September 2005	Malcolm Pirnie (with agreement from the Navy, USEPA, and MDE) reviewed historical documents and conducted interviews to assemble a comprehensive assessment of MRP sites.	These data will be used by the Partnering Team when evaluating whether the groundwater data indicate a significant change in the CSM.	None.
Background groundwater data	Background Soil Investigation Report, October 2002	Tetra Tech (with agreement from the Navy, USEPA, and MDE) collected soil and groundwater data throughout the facility to establish background values for soil and groundwater at NSF-IH in 1997.	Background groundwater data provided in **Appendix A** of this report may be useful for comparisons of Phase 2 SI data to background.	Potentially limited groundwater data set, because only five of the background wells are located on Stump Neck Annex.
Phase 1 SI results	Site Inspection Report, September 2010	Tetra Tech (with agreement from the Navy, USEPA, and MDE) collected surface and subsurface soil data throughout the five SASRs to identify and delineate COPCs in soil in 2009.	Data were used to complete the human health risk screening evaluation for soil exposure, which provided the basis for determining groundwater sampling locations. These data will also be included in the Phase 2 SI Report to document soil conditions at the site.	None, the data were fully validated with no significant quality deficiencies identified.

SAP Worksheet No. 14 -- Summary of Project Tasks
(UFP-QAPP Manual Section 2.8.1)

14.1 FIELD INVESTIGATION TASK PLAN

Project-specific SOPs for field tasks identified in this worksheet are provided in **Appendix A**, and these tasks are described briefly below. The Phase 2 SI field tasks are as follows:

- Mobilization and demobilization
- Site-specific health and safety training
- Utility clearance
- Monitoring equipment calibration
- Sample collection tasks
- Well borings and lithologic soil sampling
- Temporary well installation and development
- Groundwater level measurements
- Temporary well groundwater sampling
- Investigation-derived waste (IDW) management
- GPS locating
- Field decontamination procedures
- Field documentation procedures
- Sample custody and shipment tasks
- QC tasks

14.1.1 Mobilization and Demobilization

Mobilization will consist of the delivery of all equipment, materials, and supplies to the site, the complete assembly in satisfactory working order of all such equipment at the site, and the satisfactory storage at the site of all such materials and supplies, along with the acquisition of personnel and vehicle base access badges. Tetra Tech will coordinate with the facility to identify locations for the storage of equipment and supplies. Site-specific health and safety training for all Tetra Tech employees and subcontractors will be provided as part of the site mobilization.

Demobilization will consist of the prompt and timely removal of all equipment, materials, and supplies from the site following completion of the work. Demobilization includes the cleanup and removal of IDW generated during the conduct of the investigation.

14.1.2 Site-Specific Health and Safety Training

Health and safety requirements are addressed on **Worksheet No. 8** and in greater detail in the site-specific HASP.

14.1.3 Utility Clearance

Prior to commencing any work at Stump Neck Annex, the Comprehensive Work Approval Process (CWAP) will be followed. The CWAP will identify constraints in the work area, such as the locations of eagle's nests, archeological sites, wetlands, etc., that may affect work at the site and other requirements that must be met prior to commencing work, such as locating underground utilities, etc.

The Tetra Tech FOL will coordinate with facility personnel to obtain general information regarding utilities located in the vicinity of the well boring locations. Tetra Tech will mobilize a subcontractor to clear the individual drilling locations before any intrusive work is performed. Utilities that are identified in the field but not shown or incorrectly located on the CWAP figure will be marked directly on the figure, and the marked-up figure will be returned to the Facility POC for inclusion in the NSF-IH Geographic Information System (GIS) database.

14.1.4 Monitoring Equipment Calibration

Monitoring equipment calibration procedures are described in **Worksheet No. 22**.

14.1.5 Sample Collection Tasks

Sample labeling will be performed in accordance with **SOP-01**, and the sample numbering scheme will be in accordance with **SOP-02**. Methods for recording field data will be in accordance with **SOP-03**, and selection of sample containers, sample preservation, packaging, and shipping will be in accordance with **SOP-04**.

The sampling and analysis program is outlined in **Worksheet No. 18**, and sampling requirements for each type of analyses (i.e., bottleware, preservation, holding time) are listed in **Worksheet No. 19**. Field and laboratory QC samples will also be collected as outlined in **Worksheet No. 20**.

14.1.6 Well Borings and Lithologic Soil Sampling

Soil samples will be obtained for lithologic purposes from the well borings using DPT dual-tube methods. The proposed well boring locations are presented on **Figures 4 through 8**. The DPT vehicle will be a track-mounted all-terrain vehicle (ATV). Soil cores will be collected continuously to the target depth at each location by advancing a macrocore sampler (4 or 5 feet long) to approximately 8 feet below the top of the first water-bearing zone encountered. The macrocore sampler will be withdrawn and the soils will be described in accordance with **SOP-05**. When lithologic soil sampling is completed, each well boring will be converted into a temporary well for the purpose of collecting samples of groundwater for chemical analyses.

14.1.7 Temporary Well Installation and Development

Temporary wells will be installed across the first water-bearing zone encountered. These wells are located to provide data to determine if contaminants are migrating from the ground surface to underlying groundwater. Proposed locations are shown on **Figures 4 through 8**. The temporary wells will be installed using DPT dual-tube drilling methods, constructed with nominal 1-inch inside diameter polyvinyl chloride (PVC) pre-packed screens, and abandoned immediately following sample collection in accordance with **SOP-06**. Each of the temporary wells will be developed in accordance with **SOP-07**.

14.1.8 Groundwater Level Measurements

Prior to the start of sampling, the depth to the static water level in each well will be measured using an electronic water level meter in accordance with **SOP-08**. The depth will be measured in units of feet with respect to the top of the PVC well riser. The stick-up length of the PVC well riser will be measured from the ground surface to the reference measuring point to determine the depth to the water below the ground surface. Water levels will be recorded on a Tetra Tech water level measurement form. The water level meter will be decontaminated prior to use and between each monitoring well (see Section 14.1.12).

14.1.9 Groundwater Sampling

All temporary wells will be purged prior to sampling using low-flow sampling techniques in accordance with **SOP-09** and **SOP-10**. Groundwater samples will be collected in accordance with **SOP-11**.

Worksheet Nos. 17 and **18** specify the groundwater sample locations and analytes for this investigation, and **Worksheet No. 23** specifies the analytical methods to be used. After collection, the samples will be placed in a cooler, chilled with ice, and shipped under chain-of-custody protocol to APPL for analysis.

14.1.10 Investigation-Derived Waste Management

Waste soil and water generated during temporary well installation and groundwater sampling will be handled in accordance with **SOP-12**.

Soil IDW will consist of the soil cuttings produced during the drilling of boreholes for temporary monitoring well installations. The waste soil will be staged at each borehole location until groundwater sampling and removal of the temporary monitoring well at that location are completed. Soil cuttings will then be returned to the empty boreholes from which they were derived. Excess soil that cannot be returned to its borehole location will be containerized and subject to waste characterization sampling and analysis.

Waste water will be generated during DPT groundwater sampling, temporary well development, well purging and sampling, and decontamination procedures (see Section 14.1.12). All aqueous IDW will be containerized and subject to waste characterization sampling and analyses. Containerized waste water and excess soil cuttings, if any, will be sampled for the project target analytes (PAHs, metals, and NG). Tetra Tech will review the analytical results and, with concurrence from the Navy and NSF-IH, determine the appropriate disposition of the waste based on the characterization results. The drummed waste will then be transported and disposed off site by the IDW subcontractor at a Navy-approved disposal facility.

Used personal protective equipment (PPE) will be bagged and disposed of as regular trash in an appropriate facility waste container.

14.1.11 Global Positioning System Locating

A GPS survey conducted by Tetra Tech will be used to locate all temporary well sampling points in accordance with **SOP-13**. The northing and easting coordinates will be recorded and referenced to the Maryland State Grid. The GPS equipment will be checked on control monuments before and after day's use, and these checks will be documented in the field notebook. The GPS SOP requires a minimum of six satellites to capture a position to ensure sub-meter accuracy; however, for this project, sub-meter accuracy for sampling locations is not required. If sub-meter accuracy is not attainable at a location for any reason such as trees, valleys, or any other interference, this will be documented in the field notes, and locations will be established using standard survey methods.

14.1.12 Field Decontamination Procedures

Decontamination of equipment will be conducted in accordance with **SOP-14**. Decontamination fluids will be containerized and characterized for appropriate disposal with other IDW in accordance with **SOP-12**.

Sample containers will be provided certified clean (I-Chem 300, or equivalent) from the analytical laboratory. Decontamination of non-dedicated sampling equipment (e.g., pumps) will be conducted prior to and between sampling at each location using a laboratory-grade detergent and water solution followed by tap and deionized water rinses. All downhole drilling equipment, including drill rods and augers, will be decontaminated prior to beginning work and between all boreholes using a high-pressure steam wash. The water to be used for steam cleaning will be from a potable source.

14.1.13 Field Documentation Procedures

Field documentation will be performed in accordance with **SOP-03**. A summary of all field activities will be properly recorded in a bound logbook with consecutively numbered pages that cannot be removed. Logbooks will be assigned to field personnel and will be stored in a secured area when not in use.

All entries will be written in ink, and no erasures will be made. If an incorrect entry is made, striking a single line through the incorrect information will make the correction; the person making the correction will initial and date the change. Boring logs, sampling forms, and other field forms will also be used to document field activities.

14.1.14 Sample Custody and Shipment Tasks

Sample custody and shipment tasks are discussed in **Worksheet No. 27**.

14.1.15 Quality Control Tasks

QA/QC samples will be collected at frequencies listed in **Worksheet No. 12**.

14.2 ADDITIONAL PROJECT-RELATED TASKS

Additional project-related tasks include the following, as summarized below:

- Analytical tasks
- Data generation procedures
- Data management
- Assessment and oversight
- Data review
- Project reports

14.2.1 Analytical Tasks

APPL is a current DoD Environmental Laboratory Accreditation Program (ELAP) accredited laboratory. A copy of the laboratory accreditation for APPL is included in **Appendix B**. Analyses will be performed in accordance with the analytical methods identified in **Worksheet No. 19**. APPL will perform chemical analyses following laboratory-specific SOPs (**Worksheet Nos. 19** and **23**) developed based on the analytical methods listed in **Worksheet Nos. 19** and **30**. Copies of the non-proprietary laboratory SOPs are included in **Appendix B**. All proprietary laboratory SOPs (SOPs not in **Appendix B** but identified in **Worksheet No. 23**) have been reviewed by the Tetra Tech Project Chemist and found to be suitable for this project.

Results will be reported in each analytical data package and electronic data deliverable (EDD). This information will also be included in the project database that will eventually be uploaded to the Naval Installation Restoration Information Solution (NIRIS).

The analytical data packages provided by APPL will be in a Contract Laboratory Program (CLP)-like format and will be fully validatable and contain raw data, summary forms for all sample and laboratory method blank data, and summary forms containing all method-specific QC information [results, recoveries, Relative Percent Differences (RPDs), Relative Standard Deviations (RSDs), and/or Percent Differences (%Ds), etc.].

14.2.2 Data Generation Procedures

Project documentation and records include the following:

- Field sample collection and field measurement records, as described in **Worksheet Nos. 27** and **29**
- Data assessment documents and records as listed in **Worksheet No. 29**

Data recording formats are described in **Worksheet No. 27**.

14.2.3 Data Management

Data management tasks, including data handling, tracking, storage, archiving, retrieval, and security processes, are addressed in **Worksheet No. 29**.

14.2.4 Assessment and Oversight

Refer to **Worksheet No. 32** for assessment findings and corrective actions and to **Worksheet No. 33** for QA Management Reports.

14.2.5 Data Review

Data verification is described in **Worksheet No. 34**, data validation is described in **Worksheet Nos. 35** and **36**, and the usability assessment is described in **Worksheet No. 37**.

14.2.6 Project Reports

A Draft Phase 2 SI Report will be prepared and submitted to the Navy and regulators (i.e., the Partnering Team) for review. The report will include a summary of the work performed in accordance with the approved SAP, field modifications as documented by the Tetra Tech FOL, summary and analysis of analytical results, updated CSMs, a human health risk screening evaluation, and conclusions and recommendations for the five SASRs.

Tetra Tech will respond to comments received on the draft report. The final version of the report will be submitted in hardcopy and electronic format to the Partnering Team and AR.

SAP Worksheet No. 15 -- Reference Limits and Evaluation Table
(UFP-QAPP Manual Section 2.8.1)

Matrix: Groundwater
Analytical Group: Low-Level PAHs

Analyte	CAS Number	PAL (µg/L)	PAL Reference[(1)]	PQLG (µg/L)	APPL Value		
					LOQ (µg/L)	LOD (µg/L)	DL (µg/L)
Acenaphthene	83-32-9	220	T-RSL	73	0.2	0.12	0.06
Acenaphthylene	208-96-8	220	T-RSL	73	0.2	0.12	0.06
Anthracene	120-12-7	1,100	T-RSL	370	0.2	0.10	0.05
Benzo(a)anthracene	**56-55-3**	**0.029**	**T-RSL**	**0.0097**	**0.2**	**0.14**	**0.07**
Benzo(a)pyrene	**50-32-8**	**0.0029**	**T-RSL**	**0.00097**	**0.2**	**0.14**	**0.07**
Benzo(b)fluoranthene	**205-99-2**	**0.029**	**T-RSL**	**0.0097**	**0.2**	**0.12**	**0.06**
Benzo(g,h,i)perylene	191-24-2	110	T-RSL	37	0.2	0.16	0.08
Benzo(k)fluoranthene	207-08-9	0.29	T-RSL	0.097	0.2	0.14	0.07
Chrysene	218-01-9	2.9	T-RSL	0.97	0.2	0.10	0.05
Dibenzo(a,h)anthracene	**53-70-3**	**0.0029**	**T-RSL**	**0.00097**	**0.2**	**0.10**	**0.05**
Fluoranthene	206-44-0	150	T-RSL	50	0.2	0.16	0.08
Fluorene	86-73-7	150	T-RSL	50	0.2	0.12	0.06
Indeno(1,2,3-c,d)pyrene	**193-39-5**	**0.029**	**T-RSL**	**0.0097**	**0.2**	**0.14**	**0.07**
Naphthalene	**91-20-3**	**0.14**	**T-RSL**	**0.047**	**0.2**	**0.10**	**0.05**
Phenanthrene	85-01-8	110	T-RSL	37	0.2	0.14	0.07
Pyrene	129-00-0	110	T-RSL	37	0.2	0.16	0.08

CAS – Chemical Abstracts Service.
µg/L – Micrograms per liter.

PQLG – Practical Quantitation Limit Goal

1 The PAL references for groundwater are: T-RSL - USEPA Regions 3, 6, and 9 Regional Screening Level for Tapwater, adjusted to one-tenth of value for non-carcinogens (November 2010); MCL – USEPA Maximum Contaminant Level (December 2009).

Bolded rows indicate that the PAL is between the laboratory LOQ and LOD. The Partnering Team has agreed to accept these data for decision making if results less than the LOQ are "J" qualified and the results are discussed in the uncertainty section of the Risk Assessment.

Shaded and bolded rows indicate that the PAL is less than the LOD. In these cases, the Partnering Team has agreed to report non-detected results at the LOD, and any limitations on data use that result from having DLs that are greater than PALs will be described in the Phase 2 SI Report.

Matrix: Groundwater
Analytical Group: Nitroglycerin

Analyte	CAS Number	PAL (µg/L)	PAL Reference[(1)]	PQLG (µg/L)	APPL Value		
					LOQ (µg/L)	LOD (µg/L)	DL (µg/L)
Nitroglycerin	**55-63-0**	**0.37**	**T-RSL**	**0.12**	**0.5**	**0.26**	**0.13**

[1] The PAL references for groundwater are: T-RSL - USEPA Regions 3, 6, and 9 Regional Screening Level for Soil, Tapwater, adjusted to 1/10 of value for noncarcinogens (November, 2010); MCL – USEPA Maximum Contaminant Level (December, 2009).

Bolded rows indicate that the PAL is between the laboratory LOQ and LOD. The Partnering Team has agreed to accept this data for decision making if results below the LOQ are "J" qualified and the results are discussed in the uncertainties section of the Risk Assessment.

Shaded and Bolded rows indicate the PAL is less than the LOD; in these cases, the Partnering Team has agreed to report non-detected results at the LOD and any limitations on data use that result from having detection limits that are greater than PALs will be described in the Phase 2 SI Report.

Matrix: Groundwater
Analytical Group: Metals (Total and Dissolved)

Analyte	CAS Number	PAL (µg/L)	PAL Reference[1]	PQLG (µg/L)	APPL Value		
		HHRA	HHRA		LOQ (µg/L)	LOD (µg/L)	DL (µg/L)
Antimony	7440-36-0	1.5	T-RSL	0.50	0.20	0.02	0.01
Arsenic	**7440-38-2**	**0.045**	**T-RSL**	**0.015**	**0.20**	**0.18**	**0.09**
Copper	7440-50-8	150	T-RSL	50	0.50	0.26	0.13
Lead	7439-92-1	15	MCL	5.0	0.50	0.22	0.11

[1] The PAL references for groundwater are: T-RSL - USEPA Regions 3, 6, and 9 Regional Screening Level for Soil, Tapwater, adjusted to 1/10 of value for noncarcinogens (November, 2010); MCL – USEPA Maximum Contaminant Level (December, 2009).

Bolded rows indicate that the PAL is between the laboratory LOQ and LOD. The Partnering Team has agreed to accept this data for decision making if results below the LOQ are "J" qualified and the results are discussed in the uncertainties section of the Risk Assessment.

Shaded and Bolded rows indicate the PAL is less than the LOD; in these cases, the Partnering Team has agreed to report non-detected results at the LOD and any limitations on data use that result from having detection limits that are greater than PALs will be described in the Phase 2 SI Report.

SAP Worksheet No. 16 -- Project Schedule/Timeline Table

(UFP-QAPP Manual Section 2.8.2)

Activity	Organization	Anticipated Delivery Date
Submit Internal Draft Phase 2 SI SAP	Tetra Tech	4/22/11
Navy Review Complete	Navy	5/23/11
Submit Draft Phase 2 SI SAP	Tetra Tech	5/31/11
Regulator Review Complete	USEPA and MDE	6/28/11
Receive Comments/Comment Resolution	Tetra Tech	7/13/11
Submit Final Phase 2 SI SAP	Tetra Tech	7/20/11
Mobilization and Field Investigation	Tetra Tech	8/4/11
Complete Field Investigation and Demobilization	Tetra Tech	8/24/11
Laboratory Analysis	APPL	9/23/11
Data Validation	Tetra Tech	10/7/11
Database Entry	Tetra Tech	10/14/11
Submit Internal Draft Phase 2 SI Report	Tetra Tech	1/4/12
Navy Review	Navy	2/1/12
Submit Draft Phase 2 SI Report	Tetra Tech	2/22/12
Regulator Review	USEPA and MDE	3/21/12
Receive Comments/Comment Resolution	Tetra Tech	3/28/12
Submit Final Phase 2 SI Report	Tetra Tech	4/4/12

SAP Worksheet No. 17 -- Sampling Design and Rationale
(UFP-QAPP Manual Section 3.1.1)

Soil data from the Phase 1 sampling event were used to determine the locations where contaminants with reported soil concentrations that pose potentially unacceptable risks are most likely to migrate to groundwater at unacceptable concentrations. Groundwater samples will be collected from specific areas of interest within the five SASRs to determine whether the concentrations of target analytes that exceeded soil PALs (and site-specific background levels for metals) might also exceed applicable risk-based human health screening values (i.e., groundwater PALs) in the underlying groundwater.

Chemicals present in soil at the five SASRs at levels that exceed soil PALs (and site-specific background levels for metals), which have the highest potential to impact groundwater at unacceptable levels, include the following:

- PAHs: Multiple PAHs associated with clay skeet targets were documented at elevated levels in soil within certain areas near the firing points of the two skeet ranges, which is consistent with their operational histories.

- NG: NG associated with firing lines was documented at elevated levels in soil within certain areas near the firing lines and firing points of three ranges, which is consistent with their operational histories.

- Metals: Metals associated with expended munitions were documented at elevated levels in soil within certain areas of all five ranges, predominantly in the target areas, which is consistent with their operational histories. Lead is typically the most significant metals contaminant because it is present in the greatest concentrations and poses the greater risk to receptors; however, other metals that are target analytes in this investigation based on levels detected in soil at various locations include antimony, arsenic, and copper. (At many locations, arsenic and/or antimony results were determined to be consistent with background levels and, thus, PAL exceedances are not of concern.)

The proposed biased sampling approach is based on assumptions regarding potential contaminant distribution, knowledge of historical site activities, the CSMs (including expected groundwater flow directions), and previous soil sampling investigation results. The sample locations were selected to provide sufficient data to indicate to the Partnering Team's satisfaction whether contamination present in site soils has migrated to the underlying surficial groundwater.

Samples will be submitted to APPL for chemical analyses. The analytical methods and laboratory SOPs are identified in **Worksheet No. 23**. The total numbers of sample analyses for each analyte or analytical group are tabulated in **Worksheet Nos. 15, 18**, and **20**. **Worksheet No. 19** presents a summary of the sample analyses, container types and volumes, preservation requirements, and holding times for the

samples to be collected. All groundwater samples to be collected for metals analysis will be analyzed for both total and dissolved metals to gain a complete understanding of how the metals are partitioned between the solid and dissolved phases.

Field QC samples will be collected as part of the investigation, including field duplicates and equipment rinsate blanks. **Worksheet No. 20** presents the field QC sample summary. Also, additional sample volume will be collected as necessary for laboratory QC analysis of matrix spike (MS) and matrix spike duplicate (MSD) samples (low-level PAHs and NG) or MS and matrix duplicate (MD) samples (total and dissolved metals).

All sample locations will be marked with a wooden stake or brightly colored pin flag. Coordinates will be determined by GPS at each individual sample location, which will allow for future repeatable investigations or guide in any remedial action. All sample location markers will be removed prior to final demobilization.

Groundwater sampling activities at the following sites are described in this SAP:

- Marine Rifle Range - UXO 14
- Old Skeet and Trap Range - UXO 15
- Rum Point Skeet Range - UXO 16
- Small Arms (Pistol) Range - UXO 17
- Roach Road Rifle Range - UXO 25

17.1 FIELD SAMPLING PROGRAM FOR THE MARINE RIFLE RANGE - UXO 14

The Marine Rifle Range consists of four areas of interest: the Firing Line area, two Target Berm areas west of the marsh (Target Berm 1 and Target Berm 2), and the Hillside Impact Area east of the marsh. At the Firing Line area, elevated levels of NG, antimony, and copper were detected in surface soil. At the three other areas, elevated concentrations of copper and lead were detected in surface soil. Therefore, groundwater will be collected for these target analytes to determine whether any of the soil contaminants have migrated to the groundwater. Proposed sampling locations are presented on **Figure 4**.

A total of four temporary wells will be installed and sampled at the Marine Rifle Range. The estimated depth to water at this site is 5 to 10 feet bgs.

At the Firing Line area, one well will be located downgradient of the soil sample location with a soil PAL exceedance of NG. This location will be situated on the 200-yard Firing Line associated with the northern Target Berm, to represent one of the most frequently used Firing Line locations at the range. One

groundwater sample will be collected from this location and analyzed for NG, antimony, and copper, which are the three contaminants that exceeded soil PALs within the Firing Line area.

One temporary well will be installed in the vicinity of the Target Berms, at the base of the western face of Target Berm 1. A groundwater sample will be collected from this well and analyzed for copper and lead. Groundwater data from this well will be extrapolated to represent Target Berm 2, as well, because the two berms have similar contaminant concentrations and distributions.

At the Hillside Impact Area, two wells will be installed at the base of the western face, one near each end of the hill. Groundwater samples will be collected from both wells and analyzed for copper and lead. The collection of data at both locations will help ensure that potentially contaminated groundwater is intercepted whether it is flowing north toward the Potomac River or south toward the Chicamuxen Creek. Groundwater flow direction in the vicinity of the marsh is difficult to estimate because of the low relief and proximity to both the Chicamuxen Creek (to the south) and the Potomac River (to the north). Groundwater may be tidally influenced by the Potomac River during low tide; groundwater may flow toward the Potomac River during high tide or it may flow toward the marsh. Groundwater flow data from other Stump Neck sites adjacent to the Chicamuxen Creek show that groundwater is recharged from the Chicamuxen Creek and flows north toward the Potomac River. Therefore, wells will be placed near both ends of the hill because of the low gradient and uncertain groundwater flow direction. These wells will be sampled during low tide to minimize the potential for surface water recharge impact on groundwater quality.

17.2 FIELD PROGRAM FOR THE OLD SKEET AND TRAP RANGE – UXO 15

Elevated concentrations of PAHs, NG, antimony, and lead were detected in surface soil at the Old Skeet and Trap Range; therefore, groundwater samples will be collected and analyzed for these target analytes to determine whether any soil contaminants have migrated to groundwater. Proposed sampling locations are presented on **Figure 5**.

A total of three temporary wells will be installed and sampled at the Old Skeet and Trap Range. The wells will be placed at soil sample locations with PAL exceedances. Groundwater is assumed to flow toward the Potomac and is likely to be tidally influenced; therefore, groundwater samples will be collected during low tide to minimize the surface water recharge impact on groundwater quality.

At the Firing Points, a groundwater sample will be collected and analyzed for PAHs, NG, and antimony, and at both the northwestern and northeastern portions of the Shot Fall Area, groundwater samples will be collected and analyzed for antimony and lead.

17.3 FIELD PROGRAM FOR THE RUM POINT SKEET RANGE - UXO 16

Elevated concentrations of PAHs, antimony, and lead were detected in surface soil at the Rum Point Skeet Range; therefore, groundwater will be collected and analyzed for these target analytes to determine whether any soil contaminants have migrated to groundwater. Proposed sampling locations are presented on **Figure 6**.

A total of two temporary wells will be installed and sampled at the Rum Point Skeet Range. Groundwater is assumed to flow north by northwest toward the unnamed tributary that discharges into Mattawoman Creek. Wells will be placed in the vicinity of the soil sample locations with soil PAL exceedances.

At the Firing Points/Target Area, a groundwater sample will be collected and analyzed for PAHs and antimony. In the northwestern portion of the Shot Fall Area, a groundwater sample will be collected and analyzed for lead and antimony. (Antimony will be analyzed in the Shot Fall Area because the soil exceedance at the Firing Point could potentially impact groundwater at this location.)

17.4 FIELD PROGRAM FOR THE SMALL ARMS (PISTOL) RANGE - UXO 17

Elevated concentrations of NG and antimony, arsenic, and lead were detected in surface soil at the Small Arms (Pistol) Range; therefore, groundwater will be collected and analyzed for these target analytes to determine whether any soil contaminants have migrated to groundwater. Proposed sampling locations are presented on **Figure 7**.

A single temporary well will be installed and sampled at the Small Arms (Pistol) Range to investigate both the Target Area and Firing Line area. Groundwater is assumed to flow north by northwest toward the unnamed tributary that discharges into Mattawoman Creek. The well will be placed in the vicinity of both source areas (i.e., north of the Firing Line area) to intercept groundwater that may contain contaminants originating at soil sample locations with PAL exceedances in either the Target Area or Firing Line area. A groundwater sample will be collected and analyzed for NG, antimony, arsenic, and lead.

17.5 FIELD PROGRAM FOR THE ROACH ROAD RIFLE RANGE - UXO 25

Elevated concentrations of the metals antimony, copper, and lead were detected in surface soil at the Roach Road Rifle Range; therefore, groundwater will be collected and analyzed for these target analytes to determine whether any soil contaminants have migrated to groundwater. Proposed sampling locations are presented on **Figure 8**.

One temporary well will be installed and sampled at the Roach Road Rifle Range. Groundwater is assumed to flow north by northwest toward Chicamuxen Creek. The well will be placed directly

downgradient of the soil sample locations with PAL exceedances, which are in the Target Area. A groundwater sample will be collected and analyzed for antimony, copper, and lead.

SAP Worksheet No. 18 -- Sampling Locations and Methods/SOP Requirements Table

(UFP-QAPP Manual Section 3.1.1)

Sample Location	Estimated Sample Depth[1] (feet bgs)	Sampling SOP[2]	Laboratory Analyses						Field Analyses						
			Antimony	Arsenic	Copper	Lead	Low-Level PAHs	Nitroglycerin	Water Level	Temperature	pH	Specific Conductance	ORP	DO	Turbidity
Marine Rifle Range (UXO 14)															
X14GW001 - Firing Line Area	10-15	SOP-08, -09, -10, -11	•	B	•			•							
X14GW002- Target Berm Area	10-15			B	•	•			•	•	•	•	•	•	•
X14GW003 - Hillside Impact Area - N	10-15		B	B	•	•			•	•	•	•	•	•	•
X14GW004 - Hillside Impact Area - S[3]	10-15		B	B	•	•			•	•	•	•	•	•	•
Old Skeet and Trap Range (UXO 15)															
X15GW001 – Target Area/Firing Points[3]	5-10	SOP-08, -09, -10, -11	•	B			•	•	•	•	•	•	•	•	•
X15GW002 – NW Shot Fall Area	5-10		•	B		•			•	•	•	•	•	•	•
X15GW003 – NE Shot Fall Area	5-10		•	B		•			•	•	•	•	•	•	•
Rum Point Skeet Range (UXO 16)															
X16GW001 - Firing Points/Target Area	20-30	SOP-08, -09, -10, -11	•				•		•	•	•	•	•	•	•
X16GW002 - NW Shot Fall Area	15-25		B[4]	B		•			•	•	•	•	•	•	•
Small Arms (Pistol) Range (UXO 17)															
X17GW001 - Firing Line/Target Areas	30-40	SOP-08, -09, -10, -11	•	•		•		•	•	•	•	•	•	•	•
Roach Road Rifle Range (UXO 25)															
X25GW001 - Target Area	30-40	SOP-08, -09, -10, -11	•	B	•	•			•	•	•	•	•	•	•

B = Target analyte concentrations in soil were determined to be statistically consistent with background concentrations, so it will not be analyzed in groundwater at this location.

1 Depths are estimated for proposed wells. Actual depths may vary based on site conditions. Well screens will be placed across the first water-bearing zone.

2 SOP or worksheet that describes the sample collection procedures (**Worksheet No. 21**).

3 Field duplicate locations are as follows: for metals, the Marine Rifle Range Hillside Impact Area location because it includes all of the metals of interest and the levels were the greatest, and the Small Arms (Pistol) Range Target Area because arsenic concentrations were not determined to be consistent with background concentrations at this location; for NG and low-level PAHs, the Old Skeet and Trap Range Firing Points location because it includes both of these analytes.

4 Although soil concentrations of antimony are consistent with background in the Northwest Shot Fall Area, antimony will be analyzed because the soil exceedance at the Firing Point is upgradient of the Shot Fall Area and could potentially impact groundwater at this location.

SAP Worksheet No. 19 -- Analytical SOP Requirements Table

(UFP-QAPP Manual Section 3.1.1)

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference[1]	Containers (number, size, and type)	Sample Volume (units)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation / analysis)
Groundwater and aqueous field QC samples	Low- Level PAHs	SW-846 3510C/8270D SIM APPL ANA8270DSIM	Two 1-liter (L) amber glass bottles	1,000 mL (each)	Cool to ≤6 °C. Do not freeze.	7 days for preparation; 40 days to analysis
	Nitroglycerin	SW-846 3535A/8330B APPL HPL8330B	Two 1-L amber glass bottles	1,000 mL (each)	Cool to ≤6 °C. Do not freeze.	7 days for preparation; 40 days to analysis
	Metals (Total, and Dissolved)	SW-846 3010A/6020A APPL ANA6020A	One 500-milliliter (mL) polyethylene bottle (one for total, one for dissolved)	100 mL	Nitric acid (HNO_3) to pH < 2; Cool to ≤6 °C. Do not freeze.	180 days to analysis

SAP Worksheet No. 20 -- Field Quality Control Sample Summary Table
(UFP-QAPP Manual Section 3.1.1)

Matrix	Analytical Group	No. of Sampling Locations	No. of Field Duplicates	No. of MS/MSDs(1)	No. of Equip. Blanks	No. of VOA Trip Blanks	Total No. of Samples to Lab
Groundwater	Low Level PAHs	2	1	1/1	0	NA	3
Groundwater	NG	3	1	1/1	0	NA	4
Groundwater	Total Metals	11	2	1/1	0	NA	13
Groundwater	Dissolved Metals	11	2	1/1	1(2)	NA	14

1 Although MS/MSD samples are not typically considered field QC samples, they are included here because location determination is often established in the field. MS/MSD samples are not included in the total number of samples sent to the laboratory. For total and dissolved metals, an MD will be collected in place of an MSD.
2 The equipment blank for dissolved metals will be obtained by passing rinse water through a 0.45-micron filter.
VOA – Volatile organic analysis.

SAP Worksheet No. 21 -- Project Sampling SOP References Table

(UFP-QAPP Manual Section 3.1.2)

Reference Number	Title, Revision Date and/or Number	Originating Organization of Sampling SOP	Equipment Type	Modified for Project Work? (Y/N)	Comments
SOP-01	Sample Labeling (Revision 0, April 2011)	Tetra Tech	NA	Y	Contained in Appendix A.
SOP-02	Sample Identification Nomenclature (Revision 0, April 2011)	Tetra Tech	NA	Y	Contained in Appendix A.
SOP-03	Sample Custody and Documentation of Field Activities (Revision 0, April 2011)	Tetra Tech	Field logbook, sample log sheets, boring logs	Y	Contained in Appendix A.
SOP-04	Sample Preservation, Packaging, and Shipping (Revision 0, April 2011)	Tetra Tech	NA	Y	Contained in Appendix A.
SOP-05	Lithologic Soil Sample Logging (Revision 0, April 2011)	Tetra Tech	General field supplies	Y	Contained in Appendix A.
SOP-06	Temporary Monitoring Well Installation and Abandonment (Revision 1, May 2011)	Tetra Tech	Health and safety equipment, well drilling and installation equipment, hydrogeologic equipment	Y	Contained in Appendix A.
SOP-07	Temporary Well Development (Revision 0, April 2011)	Tetra Tech	NA	Y	Contained in Appendix A.
SOP-08	Measurement of Water Levels (Revision 0, April 2011)	Tetra Tech	NA	Y	Contained in Appendix A.
SOP-09	Low-Flow Well Purging and Stabilization (Revision 0, April 2011)	Tetra Tech	Submersible pump, multi-parameter meter, turbidimeter	Y	Contained in Appendix A.
SOP-10	Calibration and Care of Water Quality Meters (Revision 0, April 2011)	Tetra Tech	Multi-parameter meter, turbidimeter	Y	Contained in Appendix A.
SOP-11	Groundwater Sampling (Revision 0, April 2011)	Tetra Tech	Multi-parameter water quality meter	Y	Contained in Appendix A.
SOP-12	Management of Investigation-Derived Waste (Revision 1, May 2011)	Tetra Tech	NA	Y	Contained in Appendix A.
SOP-13	Global Positioning System (Revision 0, April 2011)	Tetra Tech	GPS unit	Y	Contained in Appendix A.
SOP-14	Decontamination of Field Sampling Equipment (Revision 0, April 2011)	Tetra Tech	Decontamination equipment, scrub brushes, 5-gallon buckets, spray bottles, phosphate-free detergent, deionized (DI) water	Y	Contained in Appendix A.

SAP Worksheet No. 22 -- Field Equipment Calibration, Maintenance, Testing, and Inspection Table

(UFP-QAPP Manual Section 3.1.2.4)

Field Equipment	Activity[1]	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[2]	Comments
DPT Rig	Inspection	Daily	Equipment Inspection Sheet Criteria	Correct deficiencies before operating	DPT subcontractor/ Tetra Tech FOL or designee	**SOP-05**	None.
Electric Water Level Indicator	Visual Inspection Field checks as per manufacturer	Daily Once upon receiving from vendor	0.01-foot accuracy	Operator correction or replacement	Tetra Tech FOL or designee	**SOP-08**, manufacturer's guidance manual	None.
Water Quality Meter (YSI Series 600 or equivalent)	Visual Inspection Calibration/ Verification	Daily Beginning and end of day	Manufacturer's guidance	Operator correction or replacement	Tetra Tech FOL or designee	**SOP-09, -10**, manufacturer's guidance manual	None.
Turbidity Meter (LaMotte 2020 or equivalent)	Visual Inspection Calibration/ Verification	Daily Beginning and end of day	Manufacturer's guidance; calibrations must bracket expected values; Initial Calibration Verification (ICV) must be less than 10 NTUs.	Operator correction or replacement	Tetra Tech FOL or designee	**SOP-09, SOP-10**, manufacturer's guidance manual	None.
Submersible Pump	Visual Inspection	Daily	Equipment Inspection Sheet Criteria	Replace	Tetra Tech FOL or designee	Manufacturer's guidance manual	None.

1 Activities may include calibration, verification, testing, maintenance, and/or inspection.
2 Specify the appropriate reference letter or number from the Project Sampling SOP References table (**Worksheet No. 21**).

SAP Worksheet No. 23 -- Analytical SOP References Table
(UFP-QAPP Manual Section 3.2.1)

Lab SOP Number	Title, Revision Date, and / or Number	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Variance to QSM? (Y/N)	Modified for Project Work? (Y/N)
SEP004	625/8270 Separatory Funnel Extraction of Water (EPA Method 3510C (Revision 19, 09/17/10) (1)	Definitive	Groundwater and aqueous field QC samples – low- level PAHs	NA/ Preparation	APPL	N	N
ANA8270D SIM	Polynuclear Aromatic Hydrocarbons by Selective Ion Monitoring (SIM), Modified EPA Method 8270D (Revision 2, 02/07/10)(1)	Definitive	Groundwater and aqueous field QC samples – low- level PAHs	Gas Chromatograph/ Mass Spectrometer (GC/MS)	APPL	N	N
MWE3535	Solid Phase Extraction for Aqueous Explosive Samples (Revision 10, 08/20/10)(1)	Definitive	Groundwater and aqueous field QC samples – NG	NA/ Preparation	APPL	N	N
HPL8330B	Instrument Analysis of Explosives by Using EPA 8330B (Revision 2, 06/23/10) (1)	Definitive	Groundwater and aqueous field QC samples – NG	High-Performance Liquid Chromatography (HPLC)	APPL	N	N
PRE3010A	Acid Digestion of Aqueous Samples and Extracts for Total and Dissolved Metals for Analysis by ICP Spectroscopy or ICP Mass Spectroscopy by EPA Method 3010A (Revision 7, 06/25/10)(1)	Definitive	Groundwater and aqueous field QC samples – metals	NA/Preparation	APPL	N	N
ANA6020A	Inductively Coupled Plasma-Mass Spectrometry by EPA Method 6020A (Revision 16, 05/26/10)(1)	Definitive	Groundwater and aqueous field QC samples – metals	Inductively Coupled Plasma - Mass Spectroscopy (ICP-MS)	APPL	N	N

Copies of the non-proprietary Laboratory SOPs are included in **Appendix B**.
1 SOPs are not published in Appendix B because the APPL SOPs contain proprietary information; however, the SOPs can be provided to the Partnering Team for review upon request.
QSM – Quality Systems Manual.

SAP Worksheet No. 24 -- Analytical Instrument Calibration Table

(UFP-QAPP Manual Section 3.2.2)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person Responsible for Corrective Action	SOP Reference[(1)]
GC/MS Low-Level PAHs	Tuning	Prior to Initial Calibration (ICAL) and at the beginning of each 12-hour analytical sequence.	Must meet the ion abundance criteria required by the method. No samples may be accepted without a valid tune.	Manual tuning; replacement of the ion source or filament.	Analyst, Supervisor	ANA8270DSIM
	ICAL – A minimum five-point calibration curve is analyzed	Prior to sample analysis.	Option 1: %RSD must be ≤15% for each target analyte. If not met, Option 2: Linear regression correlation coefficient (r) must be ≥ 0.995.	Repeat calibration if criterion is not met.	Analyst, Supervisor	
	ICV - Second source	Once after each ICAL, prior to beginning a sample run.	The Percent Recovery (%R) of all target analytes must be within 70-130% of the true value.	Correct problem and verify second source standard. Reanalyze ICAL.	Analyst, Supervisor	
	Retention Time (RT) Window Position Establishment	Once per ICAL for each target analyte and surrogate.	Position will be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	NA.	Analyst, Supervisor	
	Evaluation of Relative Retention Times (RRTs)	With each sample.	RRT of each target analyte must be within ± 0.06 RRT units.	Correct problem, then rerun ICAL.	Analyst, Supervisor	
	Continuing Calibration Verification (CCV)	Daily before analysis and every 12 hours after the analysis of the tuning standard.	All target analytes and surrogates must be ≤20 Percent Difference or Percent Drift (%D).	Correct problem, rerun CCV. Reanalyze all samples since last successful CCV. If that fails, repeat ICAL.	Analyst, Supervisor	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person Responsible for Corrective Action	SOP Reference[(1)]
HPLC NG	ICAL – A minimum five-point calibration curve is analyzed	Prior to sample analysis.	%RSD for NG must be ≤ 15%. If not met, r must be ≥ 0.995.	Repeat calibration, if criterion is not met.	Analyst, Supervisor	HPL8330B
	ICV - Second source	Once after each ICAL, prior to beginning a sample run.	The %R of NG must be within 80-120% of the true value.	Investigate problem and verify second source standard. Reanalyze ICAL.	Analyst, Supervisor	
	RT Window Position Establishment	At method set-up and after major maintenance.	RT width is ± 3 times standard deviation for each analyte RT from 72-hour study	NA.	Analyst, Supervisor	
	Evaluation of RRTs	Once per ICAL and at the beginning of the analytical shift for establishment of RT, and with each CCV for verification of RT.	Using the midpoint standard or the CCV at the beginning of the analytical shift for RT establishment, and analyte must fall within established window during RT verification.	NA.	Analyst, Supervisor	
	CCV	After every 10 samples and at the end of the analytical sequence.	All target analytes and surrogates must be ≤20%D.	Correct problem, rerun CCV. Reanalyze all samples since last successful CCV. If that fails, repeat ICAL.	Analyst, Supervisor	
ICP-MS Metals	Tuning	Prior to samples being analyzed.	Mass calibration must fall within 10%. Resolution must be within 0.9 atomic mass unit (amu) peak width for Be, Co, and In and within 0.8 amu peak width for Mg and Pb. For stability, RSD must be ≤ 5% for five replicate analyses.	Retune and/or clean or replace source, then reanalyze tuning solutions. No samples may be accepted without a valid tune.	Analyst, Supervisor	ANA6020A

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person Responsible for Corrective Action	SOP Reference(1)
	ICAL – A minimum one-point calibration curve is analyzed	Daily ICAL prior to sample analysis.	When calibration is performed using multi-level standards, r must be ≥ 0.995.	Correct problem then repeat ICAL.	Analyst, Supervisor	
	ICV - Second source	Once after each ICAL, prior to beginning a sample run.	The %R of all target analytes must be within 90-110 % of the true value.	Correct problem then repeat ICAL.	Analyst, Supervisor	
	Initial Calibration Blank (ICB)	Before beginning a sample sequence.	No analytes detected > 2x Method Detection Limit (MDL).	Correct the problem, then reprepare and reanalyze.	Analyst, Supervisor	
	CCV	After each 10 field samples and at the end of the analytical sequence.	The %R of all target analytes must be within 90-110 % of the true value.	Terminate analysis; recalibrate and reanalyze the samples.	Analyst, Supervisor	
	Continuing Calibration Blank (CCB)	After the initial CCV, after every 10 samples, and at the end of the sequence.	No analyte detected > 2x MDL.	Investigate the source of contamination, reanalyze, reanalyze any samples not bracketed by passing CCBs.	Analyst, Supervisor	
	Low-Level Check Standard (if a one-point calibration)	Daily after ICAL and before samples.	The %R of all target analytes must be within 70-130 % of the true value.	Investigate and perform necessary equipment maintenance. Recalibrate and reanalyze all affected samples.	Analyst, Supervisor	
	Interference Check Sample (ICS) - ICSA and ICSB	At the beginning of an analytical run.	The absolute value of ICS A recoveries must be < LOD and ICS B %Rs must be within 80-120 % of the true value.	Investigate and perform necessary equipment maintenance. Recalibrate and reanalyze all affected samples.	Analyst, Supervisor	

1 Specify the appropriate reference letter or number from the Analytical SOP References table (**Worksheet No. 23**).

SAP Worksheet No. 25 -- Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

(UFP-QAPP Manual Section 3.2.3)

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference(1)
GC/MS	Replace/clean ion source; clean injector; replace liner; replace/clip capillary column.	Low-level PAHs	Ion source, injector liner, column, column flow	Prior to ICAL and as necessary.	Acceptable ICAL and CCV.	Correct the problem and repeat ICAL or CCV.	Analyst, Supervisor	ANA8270DSIM
HPLC	Change guard cartridge, inlet filter, and frit; change analytical column; replace mobile phase daily.	NG	Review pressure profile, check peak tailing, decreased sensitivity, retention time changes, etc.	Prior to ICAL and as necessary.	Acceptable ICAL and CCV.	Correct the problem and repeat ICAL or CCV.	Analyst, Supervisor	HPL8330B
ICP-MS	Clean plasma torch; clean filters; clean spray and nebulizer chambers; replace pump tubing.	Metals	Torch, filters, nebulizer chamber, pump, pump tubing	Prior to ICAL and as necessary.	Acceptable ICAL and CCV.	Correct the problem and repeat ICAL or CCV.	Analyst, Supervisor	ANA6020A

1 Specify the appropriate reference letter or number from the Analytical SOP References table (**Worksheet No. 23**).

SAP Worksheet No. 26 -- Sample Handling System
(UFP-QAPP Manual Appendix A)

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): FOL or designee/Tetra Tech
Sample Packaging (Personnel/Organization): FOL or designee/Tetra Tech
Coordination of Shipment (Personnel/Organization): FOL or designee/Tetra Tech
Type of Shipment/Carrier: Overnight courier service (FedEx)
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Sample Custodian/APPL
Sample Custody and Storage (Personnel/Organization): Sample Custodian/APPL
Sample Preparation (Personnel/Organization): Preparation laboratory staff/APPL
Sample Determinative Analysis (Personnel/Organization): GC/MS Lab, HPLC Lab, and ICP-MS Lab personnel/APPL
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): 60 days from submittal of final report
Sample Extract/Digestate Storage (No. of days from extraction/digestion): 60 days from submittal of final report
Biological Sample Storage (No. of days from sample collection): NA
SAMPLE DISPOSAL
Personnel/Organization: Sample Custodian/APPL
Number of Days from Analysis: 60 days from submittal of final report

SAP Worksheet No. 27 -- Sample Custody Requirements Table
(UFP-QAPP Manual Section 3.3.3)

Field Sample Custody Procedures

APPL will provide pre-preserved sample containers for sample collection. Following sample collection into the appropriate bottleware, all samples will be immediately placed on ice in a cooler. Glass sample containers will be enclosed in bubble wrap to protect the bottleware during shipment. The cooler will be secured using strapping tape and at least two signed custody seals. Sample coolers will be delivered to a local courier location for priority overnight delivery to the laboratory for analysis. Samples will be preserved as appropriate based on the analytical method. Samples will be maintained at or less than 6 °C (but not be frozen) until delivery to the laboratory.

Proper chain-of-custody procedures will be followed throughout all phases of sample collection and handling to establish the evidentiary integrity of samples. These protocols will be used to demonstrate that the samples were handled and transferred in a manner that would eliminate possible tampering. Samples for the laboratory will be packaged and shipped in accordance with **SOP-04** (**Appendix A**).

Chain-of-Custody Procedures

After collection, each sample will be maintained in the sampler's custody until formally transferred to another party (e.g., FedEx). For all samples collected, chain-of-custody forms will document the date and time of sample collection, the sampler's name, and the names of all others who subsequently held custody of the sample. Specifications for chemical analyses will also be documented on the chain-of-custody form. **SOP-03** provides further details on the chain-of-custody procedure (**Appendix A**). Chain-of-custody requirements are also documented with instructions contained in each shipment from the laboratory.

Laboratory Sample Custody Procedures

The laboratory sample custody procedures (receipt of samples, archiving, and disposal) documented in APPL SOPs will be followed. Coolers will be received and checked for proper temperature. A sample cooler receipt form will be completed to note sample conditions and identify any deficiencies. The chain-of-custody form will be compared against the sample containers received for correctness. Samples will be logged into the Laboratory Information Management System (LIMS) and assigned a unique log number that can be tracked through processing. The Tetra Tech PM or Project Chemist will be notified of any problems by the APPL Laboratory PM.

Sample Designation System

Each sample collected for analysis will be assigned a unique sample tracking number. This number will consist of a two-segment alphanumeric code that identifies the site, sample type (sample medium or QC sample designation), sample location, and sample depth indicator. **SOP-02** addresses sample identification nomenclature (**Appendix A**). All pertinent information regarding sample identification will be recorded in the field logbooks and on sample log sheets where appropriate.

SAP Worksheet No. 28 -- Laboratory QC Samples Table

(UFP-QAPP Manual Section 3.4)

Matrix	Groundwater and aqueous field QC samples
Analytical Group	Low-level PAHs
Analytical Method/SOP Reference	SW-846 8270D SIM APPL ANA8270DSIM

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	MPC
Method Blank	One per batch of 20 or fewer samples per matrix.	No analytes ≥½ LOQ.	Re-extract and reanalyze, except when the analysis resulted in a non-detect. If not enough sample exists for a re-extraction, then flag the effected sample results.	Analyst, Supervisor, Data Validator	Bias/ Contamination	Same as QC Acceptance Limits.
Surrogate	All field and QC samples. Three per sample: Nitrobenzene-d_5 2-Fluorobiphenyl Terphenyl-d_{14}	%Rs must be within laboratory statistically-derived control limits (**Appendix B**).	Check integrations for errors, check calculations for errors, and check instrument performance. Re-extract and re-analyze the samples if the above show no problems or flag the data if sample matrix interference is present. Laboratory PM will contact the Tetra Tech Project Chemist to determine the course of action.	Analyst, Supervisor, Data Validator	Accuracy/Bias	Same as QC Acceptance Limits.
Internal Standards(IS)	Every field sample, standard, and QC sample. Six per sample – 1,4-Dichlorobenzene-d_4 Naphthalene-d_8 Acenaphthene-d_{10} Phenanthrene-d_{10} Chrysene-d_{12} Perylene-d_{12}	Retention times for IS must be within ± 30 seconds and the response areas must be within -50% to +100% of ICAL mid-point standard.	Inspect MS or GC for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning.	Analyst, Supervisor, Data Validator	Accuracy/Bias	Same as QC Acceptance Limits.

Matrix	Groundwater and aqueous field QC samples
Analytical Group	Low-level PAHs
Analytical Method/SOP Reference	SW-846 8270D SIM APPL ANA8270DSIM

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	MPC
Laboratory Control Sample (LCS)	One per batch of 20 or fewer samples per matrix.	%Rs must be within laboratory statistically-derived control limits (**Appendix B**).	If LCS %R exceeds the acceptance range and there are no positive findings for that compound, no further action is taken. If there are positive findings, reanalyze the LCS and all effected samples or flag the results. If %R is below the acceptance range, reanalyze the LCS and all effected samples.	Analyst, Supervisor, Data Validator	Accuracy / Bias	Same as QC Acceptance Limits.
MS/MSD	One per batch of 20 or fewer samples per matrix.	%Rs should be within laboratory statistically-derived control limits (**Appendix B**). RPD between MS and MSD should be ≤30%.	Evaluate the sample spiked for matrix interference and flag the data as necessary. Examine the project DQOs and the Laboratory PM will contact the Tetra Tech Project Chemist to determine the course of action.	Analyst, Supervisor, Data Validator	Accuracy / Bias Precision	Same as QC Acceptance Limits.
Results between the DL and LOQ	NA.	Apply "J" qualifier to results detected between DL and LOQ.	None.	Analyst, Supervisor, Data Validator	Accuracy	Same as QC Acceptance Limits.

Matrix	Groundwater and aqueous field QC samples
Analytical Group	NG
Analytical Method/SOP Reference	SW-846 8330B APPL HPL8330B

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	MPC
Method Blank	One per batch of 20 or fewer samples per matrix.	No analytes ≥½ LOQ.	Re-clean, retest, re-extract, reanalyze, and/or qualify data.	Analyst, Supervisor, Data Validator	Bias / Contamination	Same as QC Acceptance Limits.
Surrogates	All field and QC samples. One per sample: 2-Dinitrobenzene	%R must be within 70-130% (**Appendix B**).	Check integrations for errors, check calculations for errors, and check instrument performance. Re-extract and re-analyze the samples if the above show no problems or flag the data if sample matrix interference is present. Laboratory PM will contact the Tetra Tech Project Chemist to determine the course of action.	Analyst, Supervisor, Data Validator	Accuracy / Bias	Same as QC Acceptance Limits.
LCS	One per batch of 20 or fewer samples per matrix.	%R for NG must be within 70-130% (aqueous) (**Appendix B**).	If LCS %R exceeds the acceptance range and there are no positive findings for that compound, no further action is taken. If there are positive findings, reanalyze the LCS and all effected samples or flag the results. If %R is below the acceptance range, reanalyze the LCS and all effected samples.	Analyst, Supervisor, Data Validator	Accuracy / Bias	Same as QC Acceptance Limits.
MS/MSD	One per batch of 20 or fewer samples per matrix.	%R for NG should be within 70-130% (aqueous) (**Appendix B**). RPD between MS and MSD should be ≤20%.	Evaluate the sample spiked for matrix interference and flag the data as necessary. Examine the project DQOs and the Laboratory PM will contact the Tetra Tech Project Chemist to determine the course of action.	Analyst, Supervisor, Data Validator	Accuracy / Bias Precision	Same as QC Acceptance Limits.

Matrix	Groundwater and aqueous field QC samples
Analytical Group	NG
Analytical Method/SOP Reference	SW-846 8330B APPL HPL8330B

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	MPC
Triplicates	One per batch of 20 or fewer samples per matrix.	%RSD should be ≤20%, if sample results are > LOQ.	For samples with responses above the LOQ, re-extraction and re-analysis is required. For triplicates that fall outside the acceptance criteria with responses below the LOQ, the Laboratory PM will contact the Tetra Tech Project Chemist to decide if re-extraction is necessary.	Analyst, Supervisor, Data Validator	Precision	Same as QC Acceptance Limits.
Second Column Confirmation	All positive results must be confirmed.	Results between primary and second column - RPD must be ≤ 40%.	None. Apply "Y" flag if RPD >40% and discuss in the case narrative.	Analyst, Supervisor, Data Validator	Precision	Same as QC Acceptance Limits.
Results between the DL and LOQ	NA.	Apply "J" qualifier to results detected between DL and LOQ.	None.	Analyst, Supervisor, Data Validator	Accuracy	Same as QC Acceptance Limits.

Matrix	Groundwater and aqueous field QC samples
Analytical Group	Metals
Analytical Method/ SOP Reference	SW-846 6020A APPL ANA6020A

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	MPC
Method Blank	One per batch of 20 or fewer samples per matrix.	No analytes ≥½ LOQ.	Repeat analysis. Evaluate systems for contamination sources and repeat the batch as necessary.	Analyst, Supervisor, Data Validator	Bias / Contamination	Same as QC Acceptance Limits.
LCS	One per batch of 20 or fewer samples per matrix.	%Rs must be 80-120%.	Investigate source of problem. Redigest and reanalyze all associated samples.	Analyst, Supervisor, Data Validator	Accuracy / Bias	Same as QC Acceptance Limits.
MS	One per batch of 20 or fewer samples per matrix.	The %R should be within 80-120%, if sample < 4x spike added. RPD between MS and MSD should be ≤20%.	Dilute and re-spike/re-analyze to determine if interferences can be overcome by sample dilution. Prepare post-digestion spike for analytes outside limits. Flag data as possible matrix interference.	Analyst, Supervisor, Data Validator	Accuracy / Bias	Same as QC Acceptance Limits.
Duplicate Sample	One per batch of 20 or fewer samples per matrix (if MSD is not included).	RPD between duplicate samples should be ≤20%, if both results are >5x LOQ.	Evaluate sample homogeneity and flag as necessary.	Analyst, Supervisor, Data Validator	Precision	Same as QC Acceptance Limits.
Serial Dilution	One per batch of 20 or fewer samples per matrix on failure of MS/MSD.	The 5-fold dilution result must agree within ± 10%D of the original sample result.	Flag result or dilute and reanalyze sample to eliminate interference. Applicable when the concentration is >50x the LOQ. If the %D is >10%, then perform post-digestion spike solution.	Analyst, Supervisor, Data Validator	Precision	Same as QC Acceptance Limits.
Post-Digestion Spike	When serial dilution test fails or when all analyte concentrations are <50 x LOD.	The %R must be within 75-125% of expected value to verify the absence of an interference. Spike addition should produce a concentration of 10-100x LOQ.	Narrate.	Analyst, Supervisor, Data Validator	Accuracy / Bias	Same as QC Acceptance Limits.
IS	Every calibration blank, standard, and ICS.	IS intensity must be within 80-120% of intensity of the IS in the original calibration blank.	Terminate analysis, correct problem, recalibrate, verify new ICAL, and reanalyze all effected samples.	Analyst, Supervisor, Data Validator	Precision	Same as QC Acceptance Limits.

Matrix	Groundwater and aqueous field QC samples
Analytical Group	Metals
Analytical Method/ SOP Reference	SW-846 6020A APPL ANA6020A

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	MPC
IS	Every sample.	IS intensity must recover >70% of intensity of the IS in the original calibration blank.	Reanalyze sample at five-fold dilution with addition of appropriate amounts of IS; repeat until the IS intensities recover above 70%.	Analyst, Supervisor, Data Validator	Precision	Same as QC Acceptance Limits.
Results between the DL and LOQ	NA.	Apply "J" qualifier to results detected between DL and LOQ.	None.	Analyst, Supervisor, Data Validator	Accuracy	Same as QC Acceptance Limits.

Method acceptance criteria for accuracy results are interim guidelines. Actual acceptance criteria are updated based on the requirements of SW-846 Method 8000B and the laboratory's QC requirements as defined in their Laboratory QA Manual and are provided to the Tetra Tech Project Chemist by the Laboratory PM for use in data validation.

SAP Worksheet No. 29 -- Project Documents and Records Table
(UFP-QAPP Manual Section 3.5.1)

Document	Where Maintained
Field Documents Field Logbook (and sampling notes) Field Sample Forms (e.g. boring logs, sample log sheets, drilling logs, etc.) Chain-of-Custody Records Sample Shipment Air Bills Sampling Instrument Calibration Logs Photographs FTMR Forms This SAP Field Sampling SOPs Health and Safety Plan	Field documents will be maintained in the project file located in the Tetra Tech King of Prussia, Pennsylvania, office.
Laboratory Documents Sample Receipt, Custody, and Tracking Records Equipment Calibration Logs Analysis Run Logs Corrective Action Forms Reported Results for Standards, QC Checks, and QC Samples Raw Data Data Completeness Checklists	Laboratory documents will be included in the hardcopy and Portable Document Format (PDF) deliverables from the laboratory. Laboratory data deliverables will be maintained in the Tetra Tech King of Prussia, Pennsylvania, project file and in long-term data package storage at a third-party professional document storage firm. Electronic data results will be maintained in a database on a password-protected Structured Query Language (SQL) server.
Assessment Findings All versions of this SAP All letter and e-mail correspondence with regulatory agencies, including approvals and comments Data Validation Memoranda (includes tabulated data summary forms)	All assessment documents will be maintained in the Tetra Tech King of Prussia, Pennsylvania, project file.
Reports Five Small Arms/Skeet Ranges Site Inspection Report	All versions of the five SASR SI Report and all support documents (e.g., data validation reports) will be stored in hardcopy in the Tetra Tech King of Prussia, Pennsylvania, project file and electronically in the server library.

Data Handling and Management - After the Phase 2 SI is completed, the field sampling log sheets will be organized by date and medium and filed in the project files. The field logbooks for this project will be used only for this site and will also be categorized and maintained in the project files after the completion of the field program. Project personnel completing concurrent field sampling activities may maintain multiple field logbooks. When possible, logbooks will be segregated by sampling activity. The field logbooks will be titled based on date and activity. The data-handling procedures to be followed by APPL will meet the requirements of the technical specifications. The electronic data results will be automatically downloaded into the Tetra Tech database in accordance with the proprietary Tetra Tech processes.

Data Tracking and Control - The Tetra Tech PM (or designee) is responsible for the overall tracking and control of data generated for the project, as follows:

- **Data Tracking**. Data will be tracked from generation to archiving in the Tetra Tech project-specific files. The Tetra Tech Project Chemist (or designee) is responsible for tracking the samples collected and shipped to APPL. Upon receipt of the data packages from APPL, the Tetra Tech Project Chemist will oversee the data validation effort, which includes verifying that the data packages are complete and that results for all samples have been delivered by APPL.

- **Data Storage, Archiving, and Retrieval**. The data packages received from APPL will be tracked in the data validation logbook. After the data are validated, the data packages will be entered into the Tetra Tech CLEAN file system and archived in secure files. The field records including field logbooks, sample log sheets, chain-of-custody records, and field calibration logs will be submitted by the Tetra Tech FOL to be entered into the CLEAN file system prior to archiving in secure project files. The project files are audited for accuracy and completeness. At the completion of the Navy contract, the records will be stored by Tetra Tech.

- **Data Security**. Access to Tetra Tech project files is restricted to designated personnel only. Records can only be borrowed temporarily from the project file using a sign-out system. The Tetra Tech Data Manager maintains the electronic data files, and access to the data files is restricted to qualified personnel only. File and data backup procedures are routinely performed.

SAP Worksheet No. 30 -- Analytical Services Table
(UFP-QAPP Manual Section 3.5.2.3)

Matrix	Analytical Group	Sample Locations/ID Number	Analytical Method	Data Package Turnaround Time	Laboratory/Organization (name and address, contact person and telephone number)	Backup Laboratory/ Organization (name and address, contact person and telephone number)
Groundwater and Aqueous Field QC Samples	Low-Level PAHs	See **Worksheet No. 18**	SW-846 8270D SIM	21 Calendar days	APPL Inc. 908 N. Temperance Avenue Clovis, CA 93611 Cynthia Clark 559-275-2175	NA
	NG		SW-846 8330B			
	Select Metals (total dissolved)		SW-846 6020A			

SAP Worksheet No. 31 -- Planned Project Assessments Table
(UFP-QAPP Manual Section 4.1.1)

Assessment Type	**Frequency**	**Internal or External**	**Organization Performing Assessment**	**Person(s) Responsible for Performing Assessment** (title and organizational affiliation)	**Person(s) Responsible for Responding to Assessment Findings** (title and organizational affiliation)	**Person(s) Responsible for Identifying and Implementing Corrective Actions** (title and organizational affiliation)	**Person(s) Responsible for Monitoring Effectiveness of Corrective Action** (title and organizational affiliation)
Laboratory Systems Audit(1)	Every 2 years	External	DoD ELAP Accrediting Body	DoD ELAP Accrediting Body Auditor	Laboratory QA Manager or Laboratory Manager, APPL	Laboratory QA Manager or Laboratory Manager, APPL	Laboratory QA Manager or Laboratory Manager, APPL

1 APPL is DoD ELAP accredited for all analytical groups and target analytes required for this project. The DoD ELAP accreditation documentation is included in **Appendix B**.

SAP Worksheet No. 32 -- Assessment Findings and Corrective Action Responses Table
(UFP-QAPP Manual Section 4.1.2)

Assessment Type	**Nature of Deficiencies Documentation**	**Individual(s) Notified of Findings** (name, title, organization)	**Time Frame of Notification**	**Nature of Corrective Action Response Documentation**	**Individual(s) Receiving Corrective Action Response** (name, title, organization)	**Time Frame for Response**
Laboratory Systems Audit	Written audit report	Laboratory QA Manager, APPL	Specified by DOD ELAP Accrediting Body	Letter	DOD ELAP Accrediting Body	Specified by DOD ELAP Accrediting Body

SAP Worksheet No. 33 -- QA Management Reports Table

(UFP QAPP Manual Section 4.2)

Type of Report	Frequency (daily, weekly monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (title and organizational affiliation)	Report Recipient(s) (title and organizational affiliation)
Data validation report	Per Sample Delivery Group (SDG)	Within 2 weeks of receiving the data from the laboratory	DVM or designee, Tetra Tech	PM and project file, Tetra Tech
Project monthly progress report	Monthly for duration of the project	Monthly	PM, Tetra Tech	Navy RPM, Navy; CLEAN QAM, Program Manager, and project file, Tetra Tech
Laboratory QA report	When significant plan deviations result from unanticipated circumstances	Immediately upon detection of problem (on the same day)	Laboratory PM, APPL	PM and project file, Tetra Tech

SAP Worksheet No. 34 -- Verification (Step I) Process Table
(UFP-QAPP Manual Section 5.2.1)

Verification Input	Description	Internal/ External	Responsible for Verification (name, organization)
Chain-of-Custody Forms	The Tetra Tech FOL or designee will review and sign each chain-of-custody form to verify that all samples listed are included in the shipment to the laboratory and that the sample information is accurate. The forms will be signed by the sampler and a copy will be retained for the project file, Tetra Tech PM, and Tetra Tech data validators.	Internal	Sampler and FOL, Tetra Tech
	The Laboratory Sample Custodian will review the sample shipment for completeness and integrity and will sign accepting the shipment. The Tetra Tech data validators will check that each chain-of-custody form was signed and dated by the Tetra Tech FOL or designee relinquishing the samples and also by the Laboratory Sample Custodian receiving the samples for analyses.	Internal/ External	1 - Laboratory Sample Custodian, APPL 2 - Data Validators, Tetra Tech
SAP Sample Tables/ Chain-of-Custody Forms	Verify that all proposed samples listed in the SAP tables have been collected.	Internal	FOL or designee, Tetra Tech
Sample Log Sheets	Verify that information recorded in the log sheets is accurate and complete.	Internal	FOL or designee, Tetra Tech
SAP Field Logs/ Analytical Data Packages	Ensure that all sampling SOPs were followed. Verify that deviations have been documented and that MPCs have been achieved. Particular attention should be given to verify that samples were correctly identified, that sampling location coordinates are accurate, and that documentation establishes an unbroken trail of documented chain of custody from sample collection to report generation. Verify that the correct sampling and analytical methods/SOPs were applied. Verify that the sampling plan was implemented and carried out as written and that any deviations are documented.	Internal	PM or designee, Tetra Tech
SAP/Analytical SOPs/ Analytical Data Packages	Ensure that all laboratory SOPs were followed. Verify that the correct analytical methods/SOPs were applied.	Internal	Laboratory QAM, APPL
SAP/Laboratory SOPs/ Raw Data/ Applicable Control Limits Tables	Establish that all method QC samples were analyzed and in control as listed in the analytical SOPs. If method QA is not in control, the Laboratory QAM will contact the Tetra Tech PM verbally or via e-mail for guidance prior to report preparation.	Internal	Laboratory QAM, APPL
SAP/Chain-of-Custody Forms	Check that field QC samples listed in **Worksheet No. 20** were collected as required.	Internal	FOL or designee, Tetra Tech

Verification Input	Description	Internal/ External	Responsible for Verification (name, organization)
EDDs/Analytical Data Packages	Each EDD will be verified against the chain-of-custody and hard-copy data package for accuracy and completeness. Laboratory analytical results will be verified and compared to the electronic analytical results for accuracy. Sample results will be evaluated for laboratory contamination and will be qualified for false positives using the laboratory method/preparation blank summaries. Positive results reported between the DL and the LOQ will be qualified as estimated. Extraneous laboratory qualifiers will be removed from the validation qualifier.	External	Data Validators, Tetra Tech
Analytical Data Packages	All analytical data packages will be verified internally for completeness by the laboratory performing the work. The Laboratory QAM will sign the case narrative for each data package.	Internal	Laboratory QAM, APPL
	Each data package will be verified for completeness by the Tetra Tech Data Validator. Missing information will be requested by the Tetra Tech Data Validator from the Laboratory PM.	External	Data Validators, Tetra Tech

Verification includes field data verification and laboratory data verification. Verification inputs as per **Worksheet No. 34** will be checked.

SAP Worksheet No. 35 -- Validation (Steps IIa and IIb) Process Table
(UFP-QAPP Manual Section 5.2.2) (Figure 37 UFP-QAPP Manual) (Table 9 UFP-QAPP Manual)

Step IIa / IIb	Validation Input	Description	Responsible for Validation (name, organization)
IIa	SAP/Sample Log Sheets	Ensure that sample locations are correct and in accordance with the SAP proposed locations. Document any discrepancies in the final report.	PM, FOL, or designee, Tetra Tech
IIa	Chain-of-Custody Forms	Ensure that the custody and integrity of the samples were maintained from collection to analysis and that custody records are complete and any deviations are recorded. Review that the samples were shipped and store at the required temperature and that sample pH values for chemically preserved samples meet the requirements listed in **Worksheet No. 19**. Ensure that the analyses were performed within the holding times listed in **Worksheet No. 19**.	Project Chemist or Data Validators, Tetra Tech
IIa/IIb	SAP/Laboratory Data Packages/ EDDs	Ensure that the laboratory QC samples listed in **Worksheet No. 28** were analyzed and that the MPCs listed in **Worksheet No. 12** were met for all field samples and QC analyses. Check that specified field QC samples were collected and analyzed and that the analytical QC criteria established for this project were met.	Project Chemist or Data Validators, Tetra Tech
		Check the field sampling precision by calculating RPDs for field duplicate samples. Check the laboratory precision by reviewing the RPD or %D values from laboratory duplicate analyses, MS/MSDs, and LCS/LCSDs, if available. Ensure compliance with the methods and project MPC accuracy goals listed in **Worksheet No. 12**.	
		Check that the laboratory recorded the temperature and pH of chemically preserved samples at sample receipt to ensure sample integrity from sample collection to analysis.	
		Review the chain-of-custody forms generated in the field to ensure that the required analytical samples have been collected, appropriate sample identifications have been used, and correct analytical methods have been applied. The Tetra Tech Data Validator will verify that elements of the data package required for validation are present, and if not, the laboratory will be contacted and the missing information will be requested. Validation will be performed as per **Worksheet No. 36**. Check that all data have been transferred correctly and completely to the final SQL database.	

Step IIa / IIb	Validation Input	Description	Responsible for Validation (name, organization)
IIb	SAP/Laboratory Data Packages/ EDDs	Ensure that the project LOQs listed in **Worksheet No. 15** were achieved.	Project Chemist or Data Validators, Tetra Tech
		Discuss the impact on reported DLs due to matrix interferences or sample dilutions performed because of the high concentration of one or more other contaminants on the other target compounds reported as non-detected. Document this usability issue and inform the Tetra Tech PM. Review and add PALs to the laboratory EDDs. Flag samples and notify the Tetra Tech PM of samples that exceed PALs listed in **Worksheet No. 15**.	
		Ensure that all QC samples specified in the SAP were collected and analyzed and that the associated results were within prescribed SAP acceptance limits. Ensure that QC samples and standards prescribed in analytical SOPs were analyzed and within the prescribed control limits. If any significant QC deviations occur, the Laboratory QAM shall have contacted the Tetra Tech PM.	
		Summarize deviations from methods, procedures, or contracts in the Data Validation Report. Determine the impact of any deviations from sampling or analytical methods and SOPs requirements and the impacts of matrix interferences on analytical results. Qualify data results based on method or QC deviation and explain all data qualifications. Print a copy of the project database qualified data depicting data qualifiers and data qualifiers codes that summarize the reasons for data qualifications. Determine if the data met the MPCs and determine the impact of any deviations on the technical usability of the data.	

SAP Worksheet No. 36 -- Analytical Data Validation (Steps IIa and IIb) Summary Table
(UFP-QAPP Manual Section 5.2.2.1)

Step IIa/ IIb	Matrix	Analytical Group	Validation Criteria	Data Validator (title and organizational affiliation)
IIa and IIb	Groundwater	Low-Level PAHs	A full (Level IV) data validation will be performed using criteria for SW-846 Method 8270D Selected Ion Monitoring (SIM) listed in **Worksheets Nos. 12, 15, 24, 25**, and **28**, and the current DoD QSM. If not included in the aforementioned, the logic outlined in the Region 3 Modifications to the National Functional Guidelines for Organic Data Review (USEPA, 1994) should be used to apply qualifiers to data.	Data Validator, Tetra Tech
IIa and IIb	Groundwater	NG	A full (Level IV) data validation will be performed using criteria for SW-846 Method 8330B listed in **Worksheets Nos. 12, 15, 24, 25**, and **28**, and the current DoD QSM. If not included in the aforementioned, the logic outlined in the Region 3 Modifications to the National Functional Guidelines for Organic Data Review (USEPA, 1994) should be used to apply qualifiers to data.	Data Validator, Tetra Tech
IIa and IIb	Groundwater	Metals	A full (Level IV) data validation will be performed using criteria for SW-846 Method 6020A listed in **Worksheets Nos. 12, 15, 24, 25**, and **28**, and the current DoD QSM. If not included in the aforementioned, the logic outlined in the Region 3 Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (USEPA, 1993) should be used to apply qualifiers to data.	Data Validator, Tetra Tech

SAP Worksheet No. 37 -- Usability Assessment
(UFP-QAPP Manual Section 5.2.3)

Data Usability Assessment

The usability of the data generated during the project directly affects whether project objectives can be achieved. The following characteristics will be evaluated at a minimum. The results of these evaluations will be included in the project report. The characteristics will be evaluated for multiple concentration levels if the evaluator determines that this is necessary. To the extent required by the type of data being reviewed, the assessors will consult with other technically competent individuals to render sound technical assessments of these DQI characteristics:

Completeness

- For each matrix that was scheduled to be sampled, the Tetra Tech FOL acting on behalf of the Partnering Team will prepare a table comparing planned samples and analyses to collected samples and analyses. If deviations from the scheduled sample collection or analyses are identified, the Tetra Tech PM and Project Risk Assessor will determine whether the deviations compromise the ability to meet project objectives. If they do, the Tetra Tech PM will consult with the Navy RPM and other Partnering Team members, as necessary (determined by the Navy RPM), to develop appropriate corrective actions.

Precision

- The Tetra Tech Project Chemist acting on behalf of the Partnering Team will determine whether precision goals for field duplicates and laboratory duplicates were met. This will be accomplished by comparing duplicate results to precision goals identified in **Worksheet Nos. 12** and **28**. This will also include a comparison of field and laboratory precision with the expectation that laboratory duplicate results will be no less precise than field duplicate results. If the goals are not met, or if data have been flagged as estimated (J qualifier), limitations on the use of the data will be described in the project report.

Accuracy

- The Tetra Tech Project Chemist acting on behalf of the Partnering Team will determine whether the accuracy/bias goals were met for project data. This will be accomplished by comparing %Rs of LCS, LCS Duplicate (LCSD), MS, MSD, and surrogate compounds to accuracy goals identified in **Worksheet No. 28**. This assessment will include an evaluation of field and laboratory contamination, instrument calibration variability, and analyte recoveries for surrogates, MSs, and LCDs. If the goals are not met, limitations on the use of the data will be described in the project report. Bias of the qualified results and a description of the impact of identified non-compliances on a specific data package or on the overall project data will be described in the project report.

Representativeness

- A Project Scientist identified by the Tetra Tech PM and acting on behalf of the Partnering Team will determine whether the data are adequately representative of intended populations, both spatially and temporally. This will be accomplished by verifying that samples were collected and processed for analysis in accordance with this SAP, by reviewing spatial and temporal data variations, and by comparing these characteristics to expectations. The usability report will describe the representativeness of the data for each matrix and analytical fraction. This will not require quantitative comparisons unless professional judgment of the Project Scientist indicates that a quantitative analysis is required.

Comparability

- The Tetra Tech Project Chemist acting on behalf of the Partnering Team will determine whether the data generated under this project are sufficiently comparable to historical site data generated by different methods and for samples collected using different procedures and under different site conditions. This will be accomplished by comparing overall precision and bias among data sets for each matrix and analytical fraction. This will not require quantitative comparisons unless professional judgment of the Tetra Tech Project Chemist indicates that such quantitative analysis is required.

Sensitivity

- The Tetra Tech Project Chemist acting on behalf of the Partnering Team will determine whether project sensitivity goals listed in **Worksheet No. 15** were achieved. The overall sensitivity and quantitation limits from multiple data sets for each matrix and analysis will be compared. If sensitivity goals are not achieved, the limitations on the data will be described. The Tetra Tech Project Chemist will enlist the help of the Tetra Tech Risk Assessor to evaluate deviations from planned sensitivity goals.

Project Assumptions and Data Outliers

- The Tetra Tech PM and designated team members will evaluate whether project assumptions are valid. This will typically be a qualitative evaluation but may be supported by quantitative evaluations. The type of evaluation depends on the assumption being tested. Quantitative assumptions include assumptions related to data distributions (e.g., normal or log-normal) and estimates of data variability. Potential outliers will be removed if a review of the associated indicates that the results have an assignable cause the renders them inconsistent with the remainder of the data. During this evaluation, the team will consider whether outliers could be indications of unanticipated site conditions. Consideration will be given to whether outliers represent an unanticipated site condition.

Describe the evaluative procedures used to assess overall measurement error associated with the project:

After completion of data validation, the data and data quality will be reviewed to determine whether sufficient data of acceptable quality are available for decision making. In addition to the evaluations described above, a series of inspections and statistical analyses will be performed to estimate these characteristics. The statistical evaluations will include a compilation of simple summary statistics for target analytes, such as maximum concentration, minimum concentration, number of samples with non-detected results, number of samples with detected results, and the proportion of samples with detected and non-detected results. The team members identified by the Tetra Tech PM will assess whether the data collectively support the attainment of project objectives. They will consider whether any missing or rejected data have compromised the ability to make decisions or to make the decisions with the desired level of confidence. The data will be evaluated to determine whether missing or rejected data can be compensated for by other data. Although rejected data will generally not be used, there may be reason to use them in a weight of evidence argument, especially when they supplement data that have not been rejected. If rejected data are used, their use will be supported by technically defensible rationales.

For mathematical manipulations, non-detected values will be represented by a concentration equal to one-half the sample-specific reporting limit. Duplicate results (original and duplicate) will not be averaged for the purpose of representing the range of concentrations; however, the average of the original and duplicate samples will be used to represent the concentration at a particular sampled location.

Identify the personnel responsible for performing the usability assessment:

The Tetra Tech PM, Project Chemist, FOL, and Project Scientist will be responsible for conducting the listed data usability assessments. The data usability assessment will be reviewed with the Navy RPM, USEPA RPM, and MDE RPM. If deficiencies affecting the attainment of project objectives are identified, the review will take place either in a face–to-face meeting or a teleconference, depending on the extent of identified deficiencies. If no significant deficiencies are identified, the data usability assessment will simply be documented in the project report and reviewed during the normal document review cycle.

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:

The data will be presented in tabular format, including data qualifications such as estimation (J, UJ) or rejection (R). Written documentation will support the non-compliance estimated or rejected data results. The project report will identify and describe the data usability limitations and suggest resampling or other corrective actions, if necessary.

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TABLES

TABLE 10-1

SUMMARY OF 2009 SITE INSPECTION SAMPLING AND ANALYSIS
NAVAL SUPPORT FACILITY INDIAN HEAD
INDIAN HEAD, MARYLAND - FIVE SMALL ARMS RANGES

Site Name	Site Size (Acres)	Study Area Size (Acres)	Samples Collected					Samples Analyzed at the Fixed Base Laboratory
			Discrete Surface Soil	Composite Surface Soil	Subsurface Soil	Near Shore Sediment	Open Water Sediment	
Marine Rifle Range (UXO 14)	30.44							
Firing Lines (Nine Total) Each:		NA		9 composite surface soil samples (0-1.0 feet) via hand auger				**Metals** - 32 soil **PAHs** - 9 soil **TOC** - 4 soil
Target Berm 1		0.418	35 discrete surface soil samples - 0-1.0 feet via hand auger					
Target Berm 2		0.337	35 discrete surface soil samples - 0-1.0 feet via hand auger					
Hillside Impact Area		2.686	64 discrete surface soil samples - 0-1.0 feet via hand auger		4 discrete subsurface soil samples - 2 at 1-2 feet and 1 at 2-3 feet via hand auger			
Old Skeet and Trap Range (UXO 15)	29.33							
Open Water (Sediment)		17.935					25 open water sediment samples via ponar dredge	**Metals** - 18 soil and 5 sediment **PAH** - 2 soil and 3 sediment **TOC** - 2 soil and 2 sediment **Nitroglycerin** - 2 soil composite
Near Shore (Sediment)		NA				9 near shore sediment samples via plastic trowel		
Range Area		4.379	73 discrete surface samples 0-1.0 feet via hand auger	4 composite surface soil samples 0-1.0 feet via hand auger at the firing points	6 discrete subsurface samples 1.0-2.0 via hand auger			
Rum Point Skeet Range (UXO 16)	33.45							
Range Area		13.774	92 discrete surface samples 0-1.0 feet via hand auger	2 composite surface soil samples 0-1 foot via hand auger at the firing points				**Metals** - 25 soil **Nitroglycerin** - 2 surface soil **PAHs** - 21 discrete and 2 composite soil **TOC** - 4 soil

TABLE 10-1

SUMMARY OF 2009 SITE INSPECTION SAMPLING AND ANALYSIS
NAVAL SUPPORT FACILITY INDIAN HEAD
INDIAN HEAD, MARYLAND - FIVE SMALL ARMS RANGES

Site Name	Site Size (Acres)	Study Area Size (Acres)	Samples Collected					Samples Analyzed at the Fixed Base Laboratory
			Discrete Surface Soil	Composite Surface Soil	Subsurface Soil	Near Shore Sediment	Open Water Sediment	
Small Arms Range (UXO 17)	2.41							
Firing Lines (Three Total) Each:		NA		3 composite surface soil samples 0-1 foot via hand auger				**Metals** - 25 soil **Nitroglycerin** - 3 soil **TOC** - 4 soil
Range Area		0.264	20 discrete surface soil samples 0-1 foot via hand auger, 7 discrete surface soil samples 0-4 feet via DPT		3 discrete subsurface soil samples 1-2 feet via hand auger, 20 discrete subsurface soil samples greater than 4 feet via DPT			
Roach Road Rifle Range (UXO 25)	0.27							
Range Area		0.230	33 discrete surface samples 0-1.0 feet via hand auger	1 composite surface soil sample 0-1 foot via hand auger at the firing point.				**Metals** - 33 soil **Nitroglycerin** - 1 surface soil **TOC** - 4 soil

Note: Duplicates were collected in addition to the samples counted in the sample summary at a rate of one duplicate per 10 field samples collected.

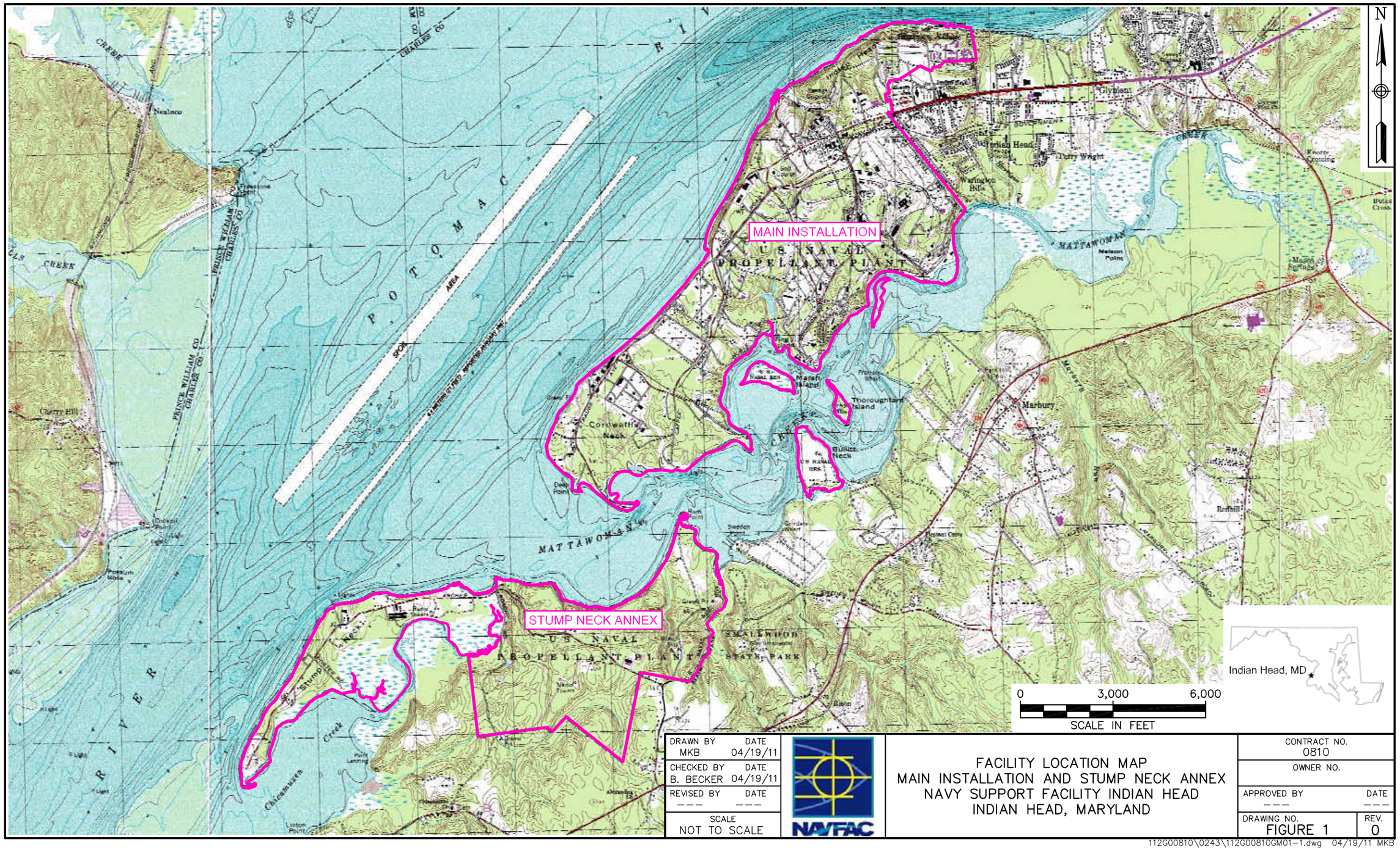
Table 10-2
Soil Contaminants Exceeding Both PAL and Background at Each Source Area

Site	Area	Parameter	Lowest PAL (mg/kg)	Maximum (mg/kg)	Sample Location
Marine Rifle Range	Firing Line Area	Antimony	0.27	1.4	X14SB004C
		Arsenic	0.0013	3.3	X14SB004C
		Copper	46	52.5	X14SB004C
		Nitroglycerine	0.0017	0.8 J	X14SB009C
	Target Berm 1	Arsenic	0.0013	2.9	X14SB035
		Copper	46	107	X14SB035
		Lead	400	543	X14SB035
	Target Berm 2	Arsenic	0.0013	3.3	X14SB072
		Copper	46	88.6	X14SB058
		Lead	400	606	X14SB058
	Hillside Impact Area	Antimony	0.27	0.32	X14SB134
		Arsenic	0.0013	7.3	X14SB134
		Copper	46	276	X14SB120
		Lead	400	904	X14SB134
Old Skeet and Trap Range	Firing Points/Target Area	Antimony	0.27	0.68	X15SB077C
		Arsenic	0.0013	2.7	X15SB078C
		Benzo(a)anthracene	14	33,000	X15SB053
		Benzo(a)pyrene	4.6	42,000	X15SB053
		Benzo(b)	47	41,000	X15SB053
		Benzo(k)	460	18,000	X15SB038
		Chrysene	1,400	43,000	X15SB053
		Dibenzo	16	7,600	X15SB053
		Indeno	150	27,000	X15SB053
		Naphth	0.56	330	X15SB050
		BaP Equivalent	1,500	59,903	X15SB053
		Nitroglycerine	0.0017	3.7 J	X15SB077C
	NW Shot Fall Area	Antimony	0.27	4.8 J	X15SB064
		Arsenic	0.0013	7.2	X15SB007
		Lead	400	940	X15SB064
	NE Shot Fall Area	Antimony	0.27	0.61 J	X15SB072
		Arsenic	0.0013	2.2	X15SB073
		Lead	400	658	X16SB072
Rum Point Skeet Range	Firing Points/Target Area	Antimony	0.27	0.42 L	X16SB081C
		Benzo(a)anthracene	14	2,400	X16SB076
		Benzo(a)pyrene	4.6	3,200	X16SB076
		Benzo(b)	47	1,000	X16SB076
		Benzo(k)	460	200 L	X16SB076
		Chrysene	1,400	3,000	X16SB076
		Dibenzo	16	540	X16SB076
		Indeno	150	260 L	X16SB076
		Naphth	0.56	7.2 L	X16SB076
		BaP Equivalent	1,500	4,111	X16SB076
	NW Shot Fall Area	Antimony	0.27	1.2	X16SB079
		Arsenic	0.0013	6.5	X16SB061
		Lead	400	616	X16SB008
Small Arms (Pistol) Range	Target Area	Antimony	0.27	6.0	X17SB014
		Arsenic	0.0013	8.7	X17SB014
		Lead	400	706	X17SB014
	Firing Line Area	Antimony	0.27	1.3 L	X17SB010C
		Arsenic	0.0013	6.2	X17SB010C
		Nitroglycerine	0.0017	20.4	X17SB008C
Roach Road Rifle Range	Target Area	Antimony	0.27	12.2 L	X25SB020
		Arsenic	0.0013	22.6	X25SB016
		Copper	46	370	X25SB020
		Lead	400	3,450	X25SB020

Identified as exceeding PAL and background, thus a target analyte for groundwater in this SAP.
Identified as exceeding PAL, but not exceeding background, thus not a target analyte for groundwater in this SAP.

Notes:
BaP Equivalent - Benzo(a)pyrene (BaP) equivalent is calculated using appropriate risk-based ratios to collectively summarize all seven carcinogenic PAHs.
"J" Qualifier - Value is reported as estimated, usually due to an exceedance of project QC criteria for field duplicates, laboratory duplicates, and/or serial dilution.
"L" Qualifier - Value is reported as estimated and is biased low.

FIGURES



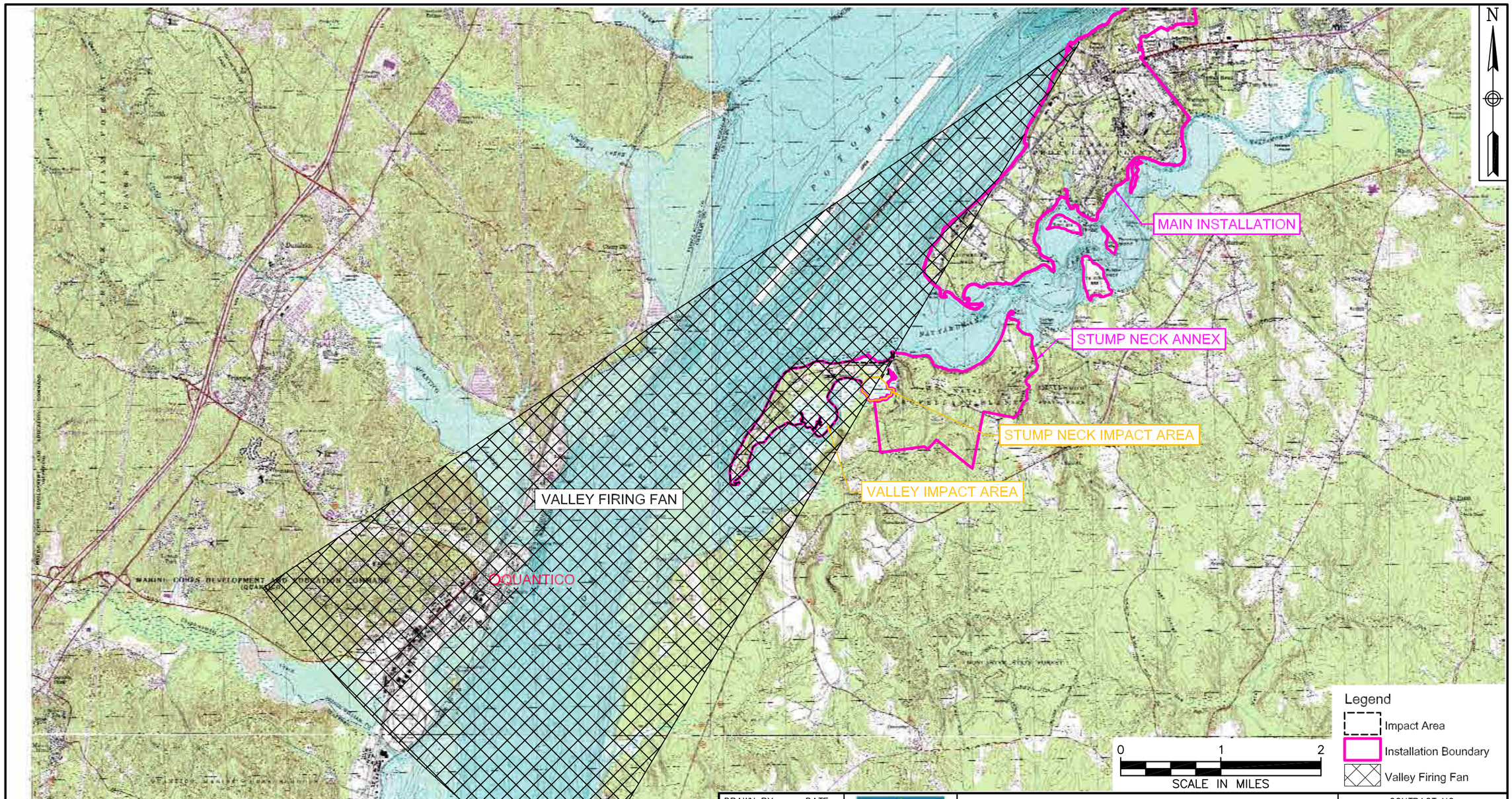
DRAWN BY MKB	DATE 04/19/11
CHECKED BY B. BECKER	DATE 04/19/11
REVISED BY ---	DATE ---
SCALE NOT TO SCALE	

NAVFAC

FACILITY LOCATION MAP
MAIN INSTALLATION AND STUMP NECK ANNEX
NAVY SUPPORT FACILITY INDIAN HEAD
INDIAN HEAD, MARYLAND

CONTRACT NO. 0810	
OWNER NO.	
APPROVED BY ---	DATE ---
DRAWING NO. FIGURE 1	REV. 0

112G00810\0243\112G00810GM01-1.dwg 04/19/11 MKB



DRAWN BY MKB	DATE 04/19/11		CONTRACT NO. 0810
CHECKED BY B. BECKER	DATE 04/19/11	FACILITY LOCATION MAP VALLEY FIRING FAN NAVAL SUPPORT FACILITY INDIAN HEAD INDIAN HEAD, MARYLAND	OWNER NO.
REVISED BY ---	DATE ---		APPROVED BY --- / DATE ---
SCALE NOT TO SCALE			DRAWING NO. FIGURE 2 / REV. 0

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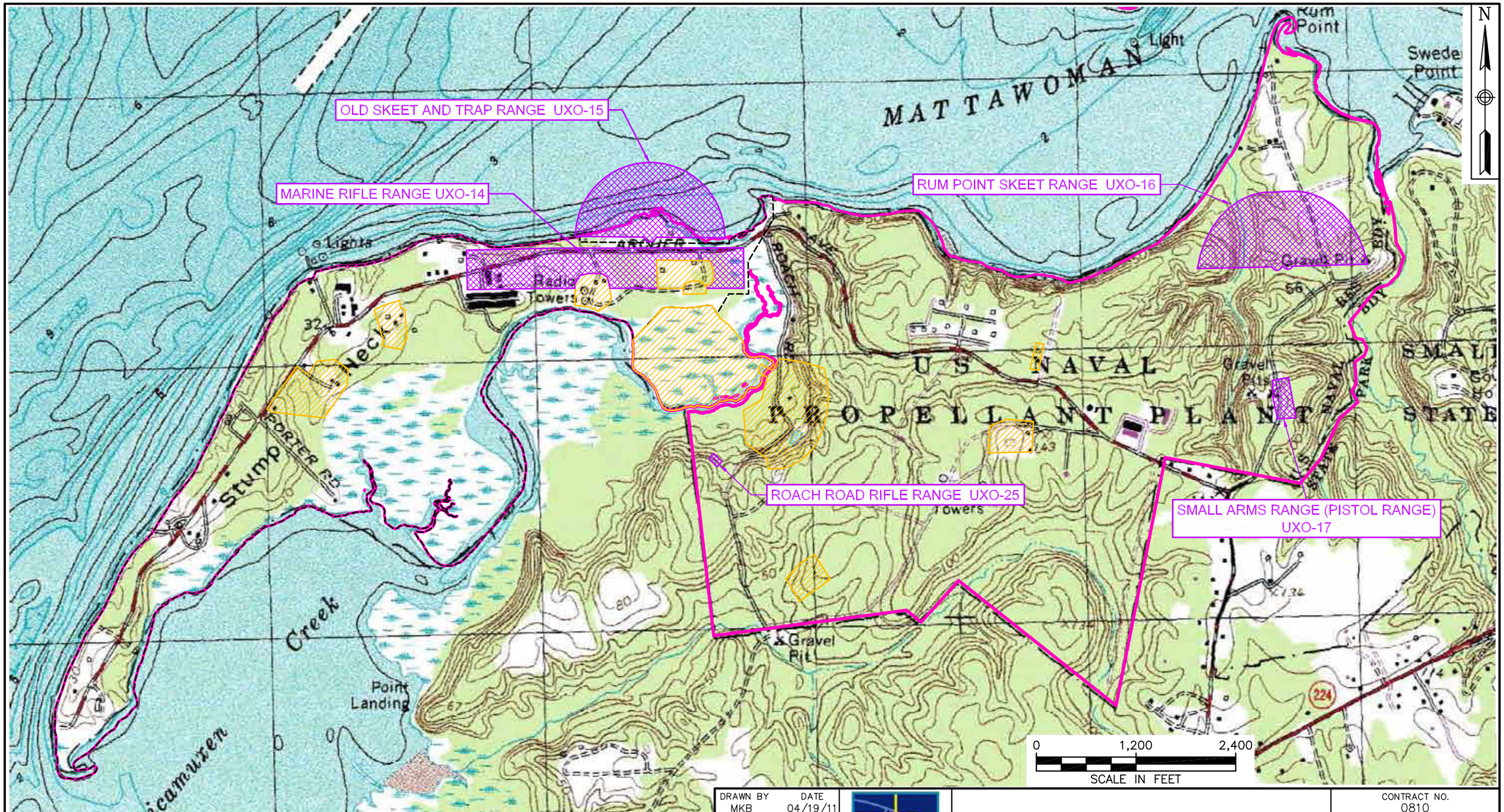

Legend

- MRP Site Boundary - Small Arms/Skeet Range
- MRP Site Boundary - MEC Site Not Included In This Investigation
- Boundary Of Site Within Valley Firing Fan
- Installation Boundary

DRAWN BY MKB	DATE 04/19/11	
CHECKED BY B. BECKER	DATE 04/19/11	
REVISED BY ---	DATE ---	
SCALE NOT TO SCALE		

NAVFAC

SMALL ARMS RANGE LOCATION MAP
NAVAL SUPPORT FACILITY INDIAN HEAD
INDIAN HEAD, MARYLAND

CONTRACT NO. 0810	
OWNER NO.	
APPROVED BY ---	DATE ---
DRAWING NO. FIGURE 3	REV. 0

112G00810\0243\112G00810GM01-3.dwg 04/19/11 MKB

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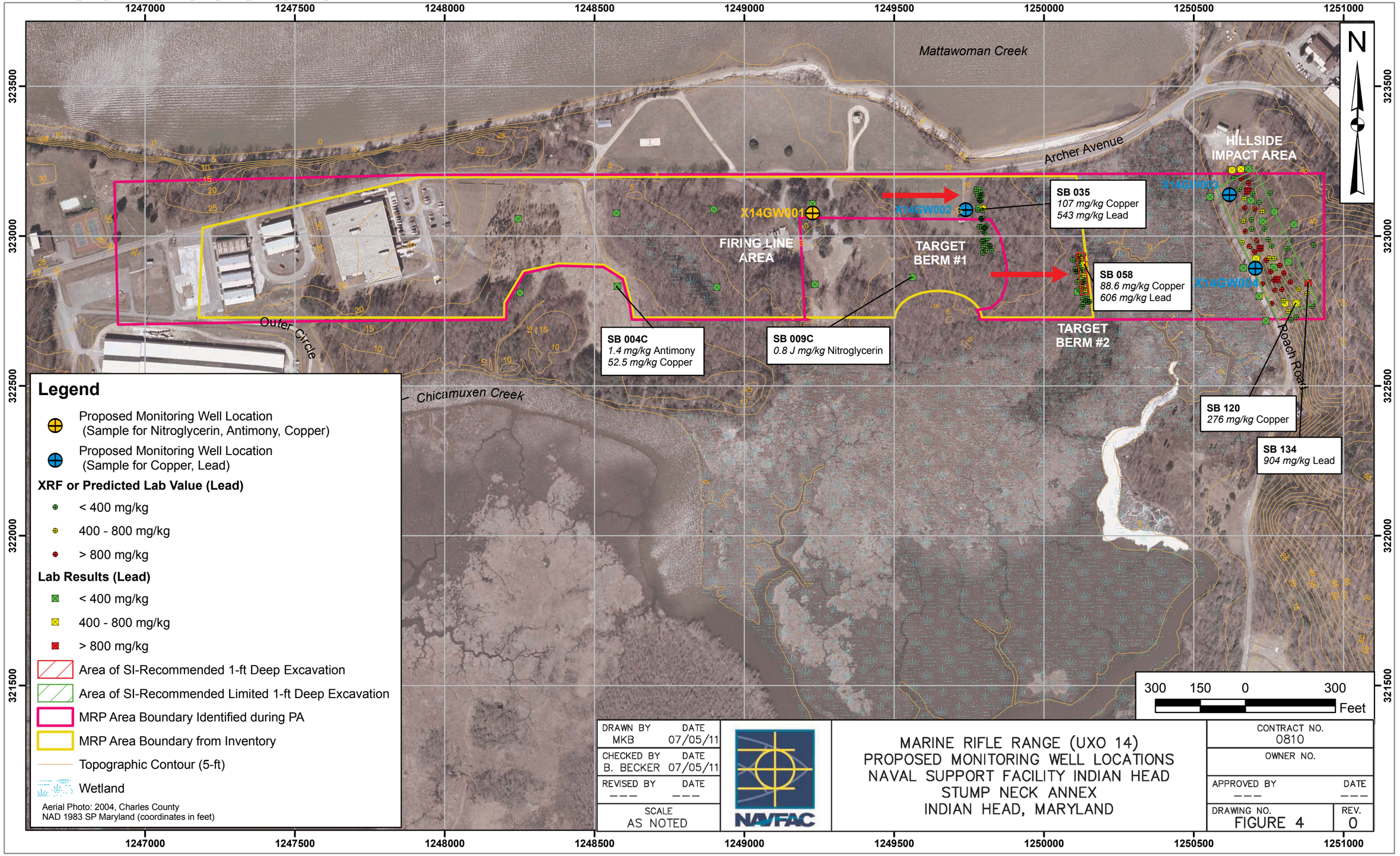


Legend

- Proposed Monitoring Well Location (Sample for Nitroglycerin, Antimony, Copper)
- Proposed Monitoring Well Location (Sample for Copper, Lead)

XRF or Predicted Lab Value (Lead)

- < 400 mg/kg
- 400 - 800 mg/kg
- > 800 mg/kg

Lab Results (Lead)

- < 400 mg/kg
- 400 - 800 mg/kg
- > 800 mg/kg
- Area of SI-Recommended 1-ft Deep Excavation
- Area of SI-Recommended Limited 1-ft Deep Excavation
- MRP Area Boundary Identified during PA
- MRP Area Boundary from Inventory
- Topographic Contour (5-ft)
- Wetland

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

DRAWN BY MKB	DATE 07/05/11
CHECKED BY B. BECKER	DATE 07/05/11
REVISED BY ---	DATE ---
SCALE AS NOTED	

NAVFAC

MARINE RIFLE RANGE (UXO 14)
PROPOSED MONITORING WELL LOCATIONS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NO. 0810	
OWNER NO.	
APPROVED BY ---	DATE ---
DRAWING NO. FIGURE 4	REV. 0

P:/GIS/INDIANHEAD_NSWC_NEW/MXD/SN_OLD_SKEET_TRAP_RANGE_SOIL_REMOVAL_SAP.MXD 04/19/11 MKB

1249000 1249500

323500

N

NW SHOT FALL AREA

NE SHOT FALL AREA

X15GW002

X15GW003

X15GW001

TARGET AREA

FIRING POINTS

SB 064
4.8 J mg/kg Antimony
940 mg/kg Lead

SB 053
59,903 mg/kg BaP

SB 072
0.61 J mg/kg Antimony
658 mg/kg Lead

SB 077C
3.7 J mg/kg Nitroglycerin
0.68 mg/kg Antimony

Legend

- Proposed Monitoring Well Location (Sample for PAHs, Nitroglycerin, Antimony)
- Proposed Monitoring Well Location (Sample for Antimony, Lead)
- Metals PAL Exceedance in Soil Sample
- Clay Target Remains, BaP >1500 ug/kg
- Former Trap House Location
- Area of SI-Recommended 1-ft Deep Excavation
- Area of SI-Recommended 2-ft Deep Excavation
- MRP Area Boundary Identified during PA
- Installation Boundary

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

60 30 0 60 Feet

DRAWN BY MKB	DATE 04/19/11
CHECKED BY B. BECKER	DATE 04/19/11
REVISED BY ---	DATE ---
SCALE AS NOTED	

NAVFAC

OLD SKEET AND TRAP RANGE (UXO 15)
PROPOSED MONITORING WELL LOCATIONS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NO. 0810	
OWNER NO.	
APPROVED BY ---	DATE ---
DRAWING NO. FIGURE 5	REV. 0

1249000 1249500

P:/GIS/INDIANHEAD_NSWC_NEW/MXD/SN_RUM_PT_SKEET_RANGE_SOIL_REMOVAL_SAP.MXD 05/26/11 MKB

1256000 1256500 1257000

323500 323000

N

SHOT FALL AREA

SB 008
616 mg/kg Lead

X16GW002

TARGET AREA

SB 076
4,111 mg/kg BaP

X16GW001

SB 081C
0.42 L mg/kg Antimony

LEFT FIRING POINT

RIGHT FIRING POINT

Skeet Range Way

oint Road

Legend

- Proposed Monitoring Well Location (Sample for PAHs, Antimony)
- Proposed Monitoring Well Location (Sample for Lead, Antimony)
- Metals Exceedance Location
- XRF Sample Location
- Clay Pigeon Remains, BaP > 1500 ug/kg
- Area of SI-Recommended 1-ft Deep Excavation
- Area of SI-Recommended 2-ft Deep Excavation
- MRP Area Boundary Identified During PA
- Left Firing Point Shot Fall Zone
- Maximum Shot Fall Zone
- Right Firing Point Shot Fall Zone
- Surface Drainage
- Topographic Contour (5-ft)
- Wetland

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

100 50 0 100 Feet

DRAWN BY MKB	DATE 05/26/11
CHECKED BY B. BECKER	DATE 05/26/11
REVISED BY ---	DATE ---
SCALE AS NOTED	

NAVFAC

RUM POINT SKEET RANGE (UXO 16)
PROPOSED MONITORING WELL LOCATIONS
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NO. 0810	
OWNER NO.	
APPROVED BY ---	DATE ---
DRAWING NO. FIGURE 6	REV. 0

P:/GIS/INDIANHEAD_NSWC_NEW/MXD/SN_PISTOL_RANGE_SOIL_REMOVAL_SAP.MXD 05/26/11 MKB

1256500

1257000

321500

N

Rum Point Road

TARGET AREA

X17GW001

FIRING LINE AREA

SB 008C
20.4 mg/kg Nitroglycerin

SB 014
6.0 mg/kg Antimony
8.7 mg/kg Arsenic
706 mg/kg Lead

Legend

Proposed Monitoring Well Location
(Sample for Nitroglycerin, Antimony, Arsenic, Lead)

XRF Results (Lead)

- < 400
- 400 - 800 mg/kg
- > 800 mg/kg

Lab Results (Lead)

- < 400 mg/kg
- 400 - 800 mg/kg
- Firing Line
- Area of SI-Recommended 1-ft Deep Excavation
- Area of SI-Recommended 4-ft Deep Excavation
- MRP Area Boundary Identified during PA
- Surface Drainage
- Topographic Contour (5-ft)
- Firing Direction

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

50 25 0 50
Feet

DRAWN BY MKB	DATE 05/26/11
CHECKED BY B. BECKER	DATE 05/26/11
REVISED BY ---	DATE ---
SCALE AS NOTED	

NAVFAC

SMALL ARMS (PISTOL) RANGE (UXO 17)
PROPOSED MONITORING WELL LOCATION
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NO. 0810	
OWNER NO.	
APPROVED BY ---	DATE ---
DRAWING NO. FIGURE 7	REV. 0

L:\GIS\INDIANHEAD_NSWC_NEW\MXD\SN_ROACH_RIFLE_RANGE_SOIL_REMOVAL_SAP.MXD 04/19/11 MKB

1249800 1249900 1250000

320700 320600

N

40 45 50 55 60 65

TARGET AREA

FIRING LINE AREA

Former Roach Road

SB 020
12.2 L mg/kg Antimony
370 mg/kg Copper
3,470 mg/kg Lead

X25CW001

Legend

- Proposed Monitoring Well Location (Sample for Antimony, Copper, Lead)

Predicted Lab Value (Lead)

- < 400 mg/kg

Lab Results (Lead)

- < 400 mg/kg
- 400 - 800 mg/kg
- > 800 mg/kg
- Area of SI-Recommended 1-ft Deep Excavation
- Firing Stand
- Primary Impact Area
- MRP Area Boundary, Identified During SI
- Targets
- Walkway
- Topographic Contour (5-ft)
- Firing Direction

Aerial Photo: 2004, Charles County
NAD 1983 SP Maryland (coordinates in feet)

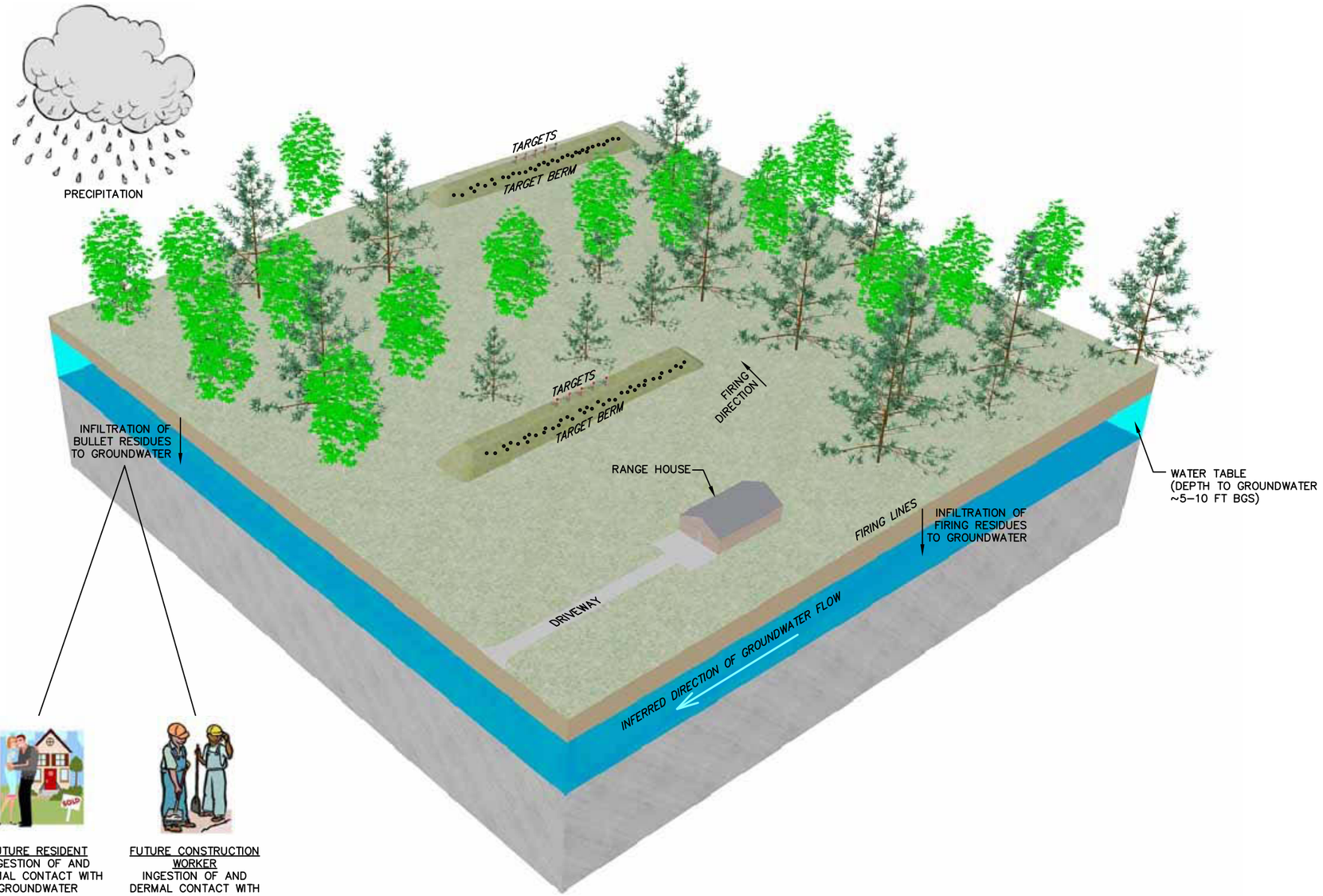
25 12.5 0 25 Feet

DRAWN BY MKB	DATE 04/19/11
CHECKED BY B. BECKER	DATE 04/19/11
REVISED BY ---	DATE ---
SCALE AS NOTED	

NAVFAC

ROACH ROAD RIFLE RANGE (UXO 25)
PROPOSED MONITORING WELL LOCATION
NAVAL SUPPORT FACILITY INDIAN HEAD
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NO. 0810	
OWNER NO.	
APPROVED BY ---	DATE ---
DRAWING NO. FIGURE 8	REV. 0



FUTURE RESIDENT
INGESTION OF AND DERMAL CONTACT WITH GROUNDWATER

FUTURE CONSTRUCTION WORKER
INGESTION OF AND DERMAL CONTACT WITH GROUNDWATER

LEGEND

AREA OF BULLET ACCUMULATION

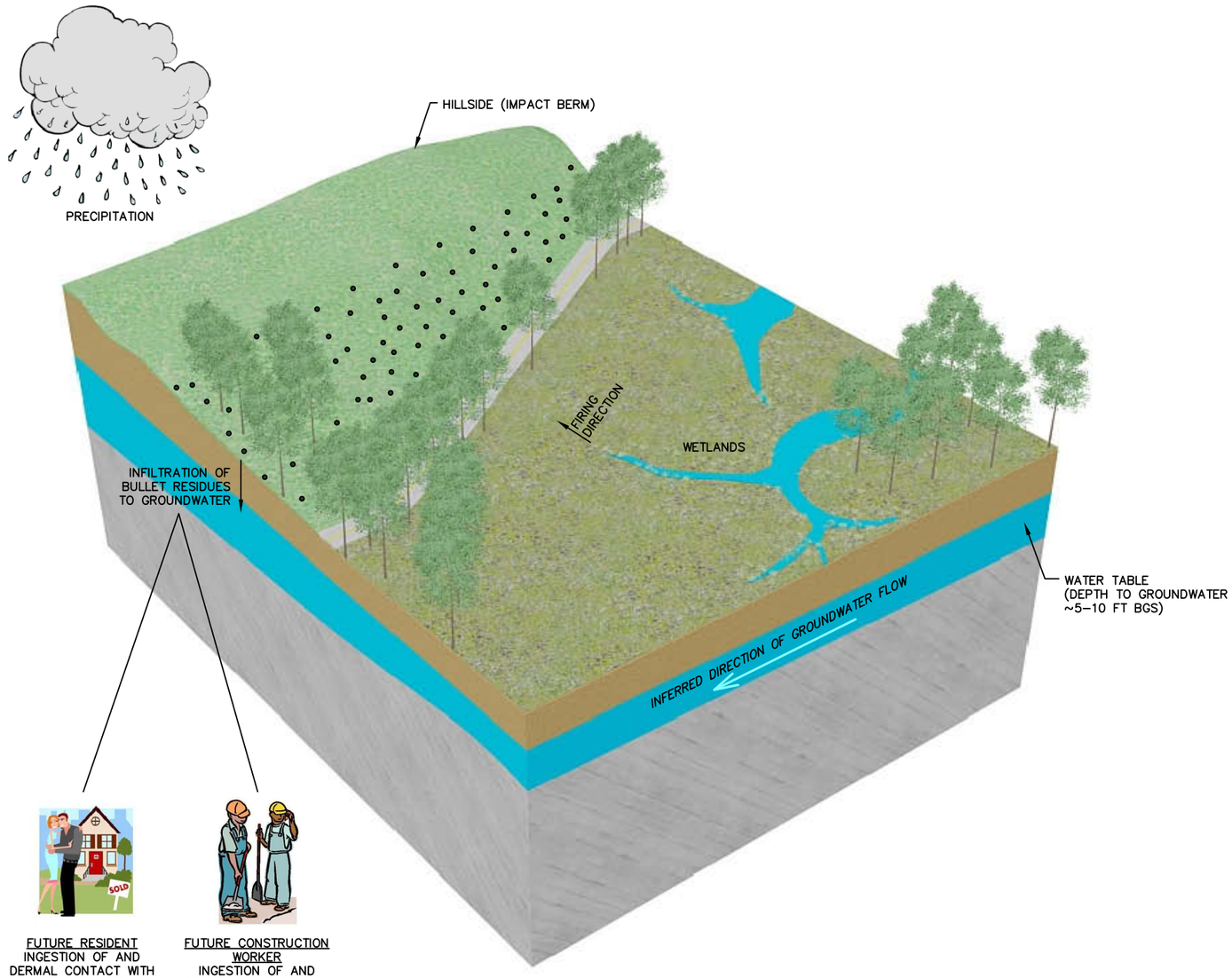
DRAWN BY MKB	DATE 04/19/11
CHECKED BY B. BECKER	DATE 04/19/11
REVISED BY ---	DATE ---
SCALE NOT TO SCALE	

NAVFAC

MARINE RIFLE RANGE (UXO 14)
TARGET BERM AREA
CONCEPTUAL SITE MODEL FOR GROUNDWATER
NAVAL SUPPORT FACILITY
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NO. 0810	
OWNER NO.	
APPROVED BY ---	DATE ---
DRAWING NO. FIGURE 9	REV. 0

112G00810\0243\112G00810CSM05.dwg 04/19/11 MKB



LEGEND

AREA OF BULLET ACCUMULATION

DRAWN BY MKB	DATE 04/19/11
CHECKED BY B. BECKER	DATE 04/19/11
REVISED BY ---	DATE ---
SCALE NOT TO SCALE	

NAVFAC

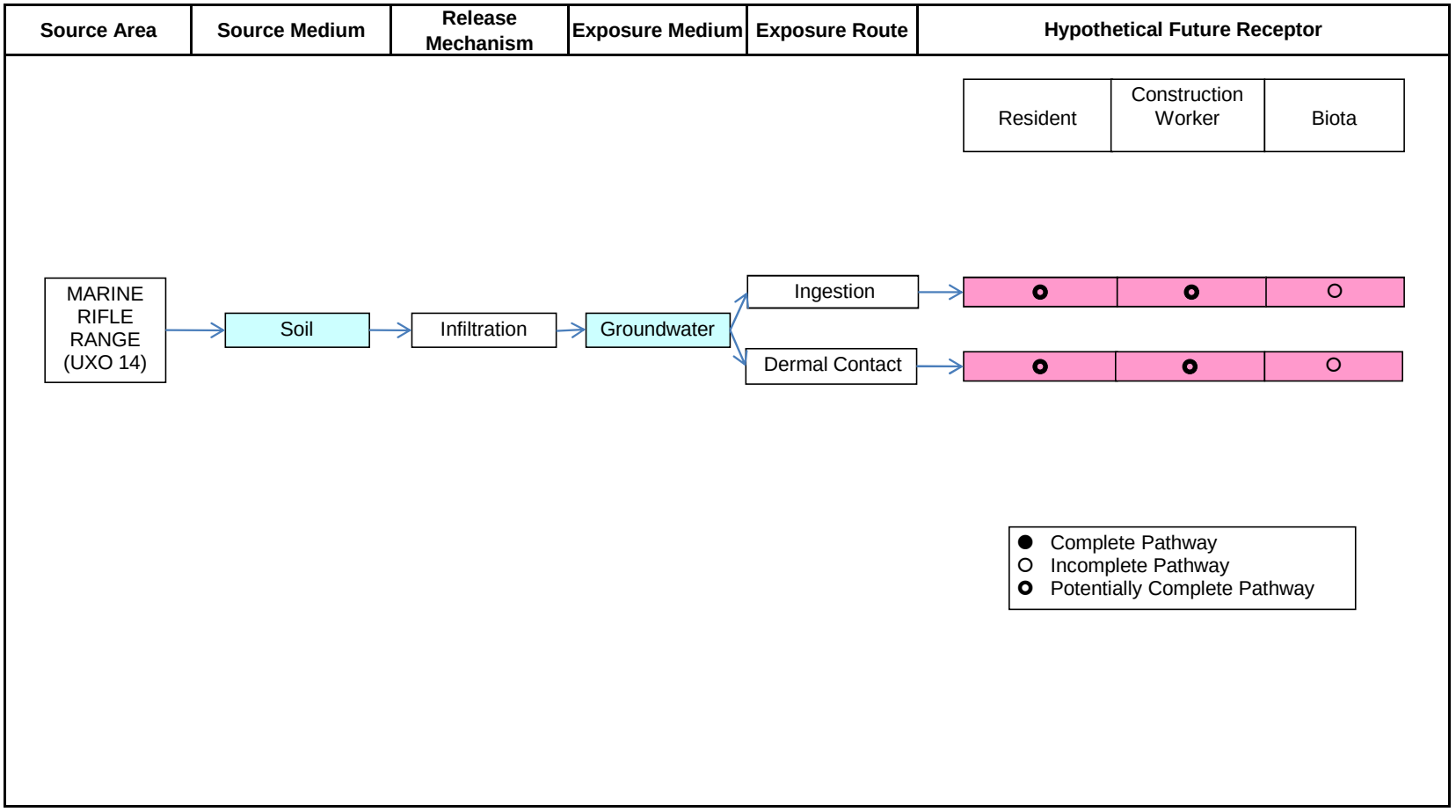
MARINE RIFLE RANGE (UXO 14)
HILLSIDE IMPACT AREA
CONCEPTUAL SITE MODEL FOR GROUNDWATER
NAVAL SUPPORT FACILITY
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NO. 0810	
OWNER NO.	
APPROVED BY ---	DATE ---
DRAWING NO. FIGURE 10	REV. 0

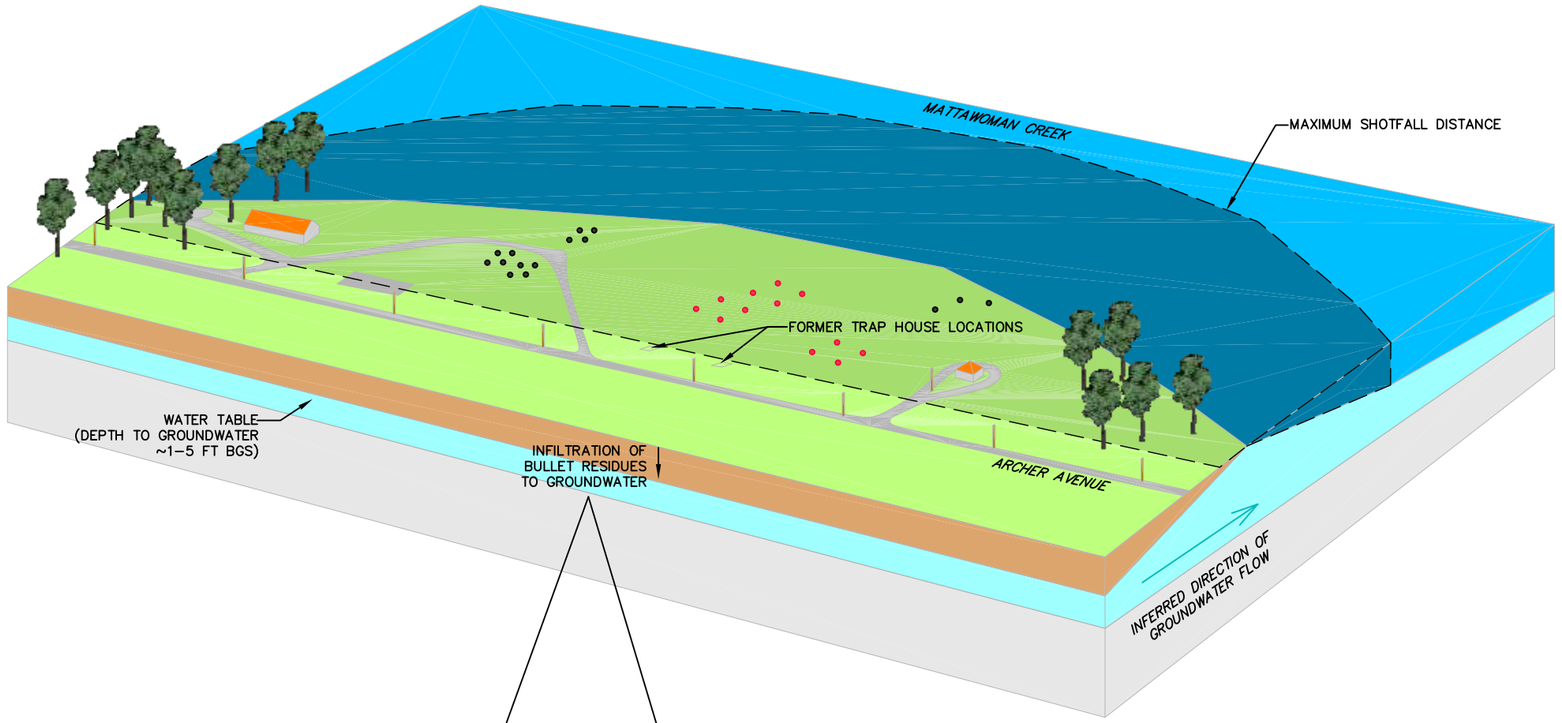
112G00810\0243\112G00810CSM01.dwg 04/19/11 MKB

FIGURE 11

MARINE RIFLE RANGE (UXO 14)
MUNITIONS CONSTITUENTS EXPOSURE PATHWAY ANALYSIS (GROUNDWATER)
NAVAL SUPPORT FACILITY INDIAN HEAD
INDIAN HEAD, MARYLAND



PRECIPITATION



FUTURE RESIDENT
INGESTION OF AND
DERMAL CONTACT WITH
GROUNDWATER

FUTURE CONSTRUCTION
WORKER
INGESTION OF AND
DERMAL CONTACT WITH
GROUNDWATER

LEGEND

AREA OF LEAD SHOT ACCUMULATION

CLAY TARGETS

DRAWN BY MKB	DATE 04/19/11
CHECKED BY B. BECKER	DATE 04/19/11
REVISED BY ---	DATE ---
SCALE NOT TO SCALE	

NAVFAC

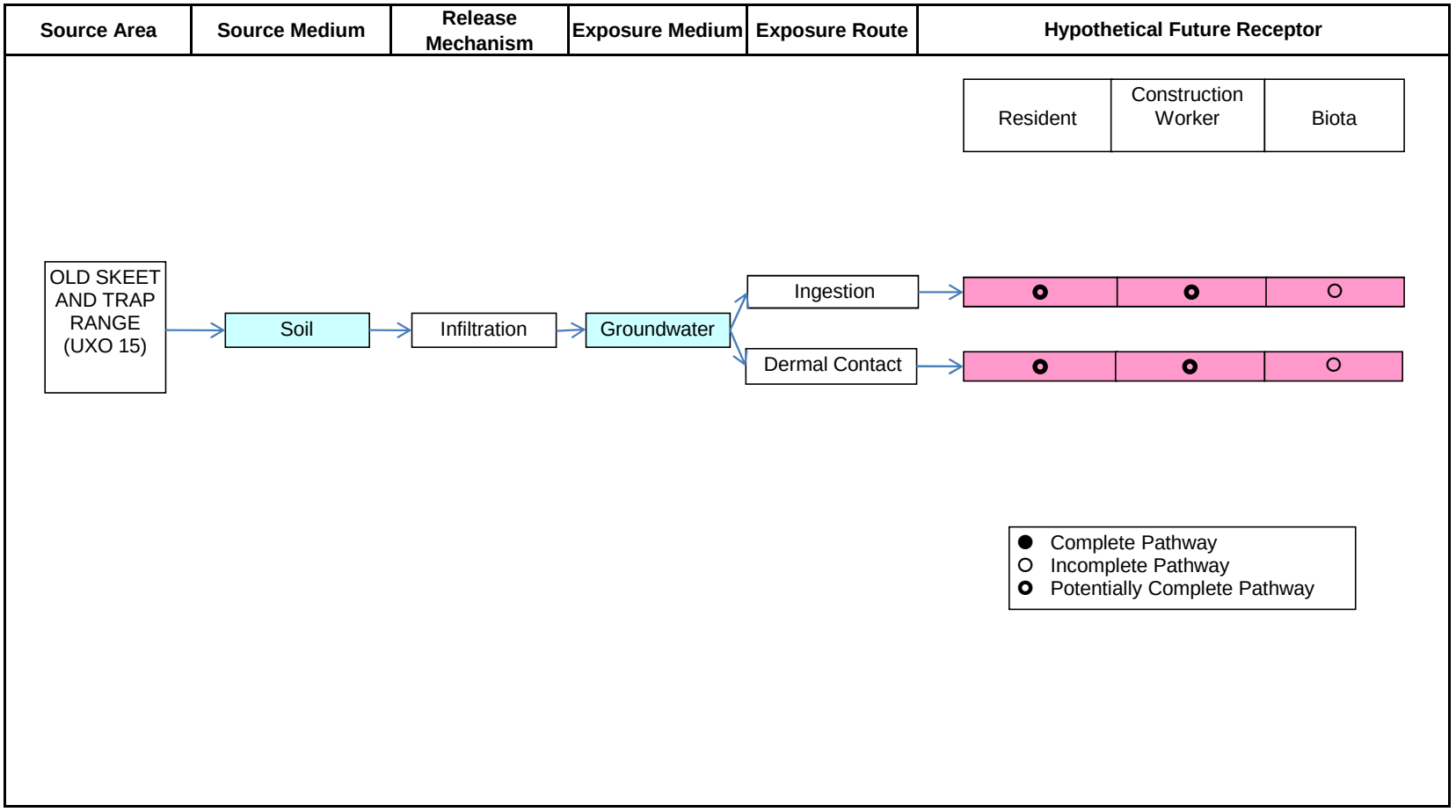
OLD SKEET & TRAP RANGE (UXO 16)
CONCEPTUAL SITE MODEL FOR GROUNDWATER
NAVAL SUPPORT FACILITY
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

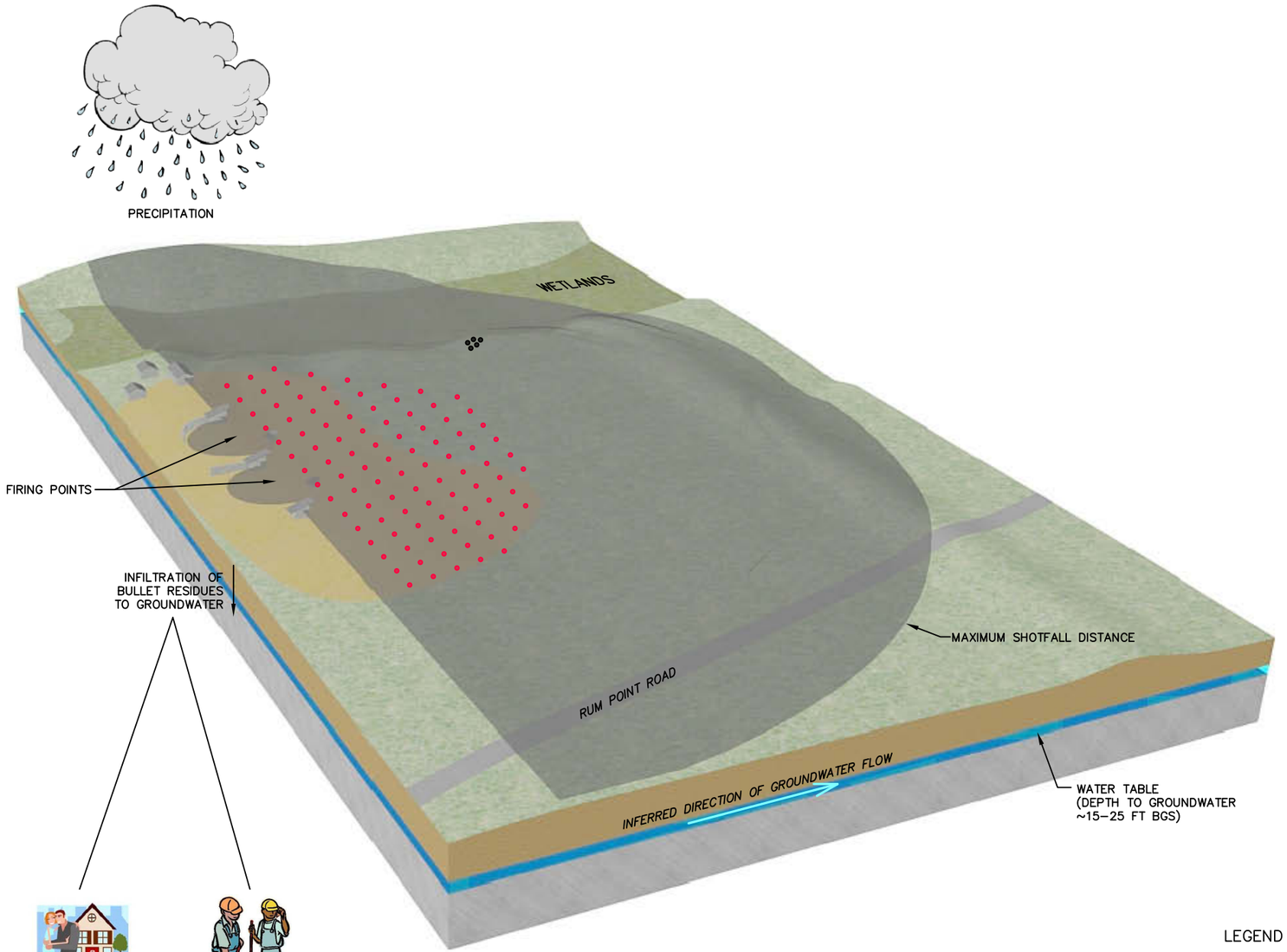
CONTRACT NO. 0810	
OWNER NO.	
APPROVED BY ---	DATE ---
DRAWING NO. FIGURE 12	REV. 0

112G00810\0243\112G00810CSM06.dwg 04/19/11 MKB

FIGURE 13

OLD SKEET AND TRAP RANGE (UXO 15)
MUNITIONS CONSTITUENTS EXPOSURE PATHWAY ANALYSIS (GROUNDWATER)
NAVAL SUPPORT FACILITY INDIAN HEAD
INDIAN HEAD, MARYLAND



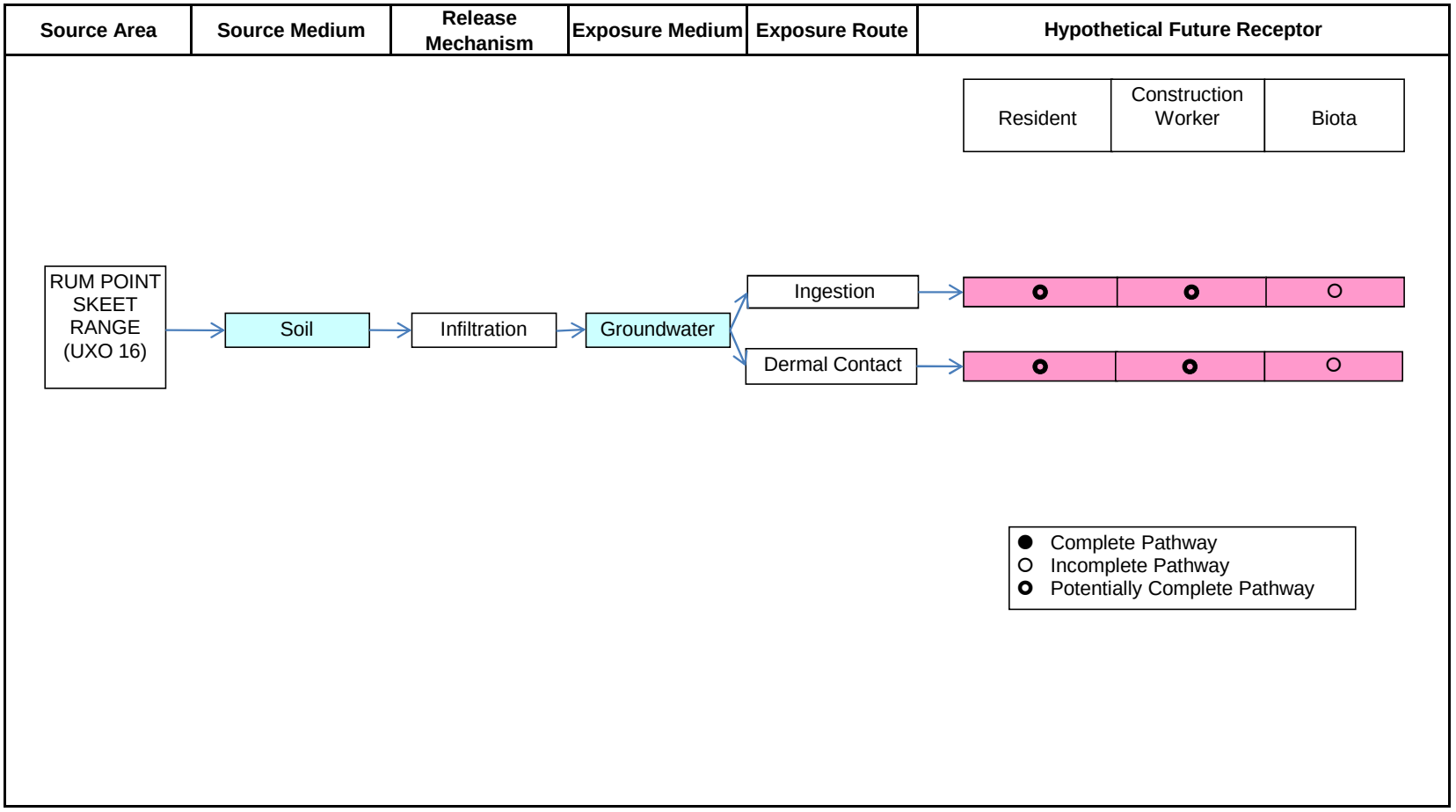


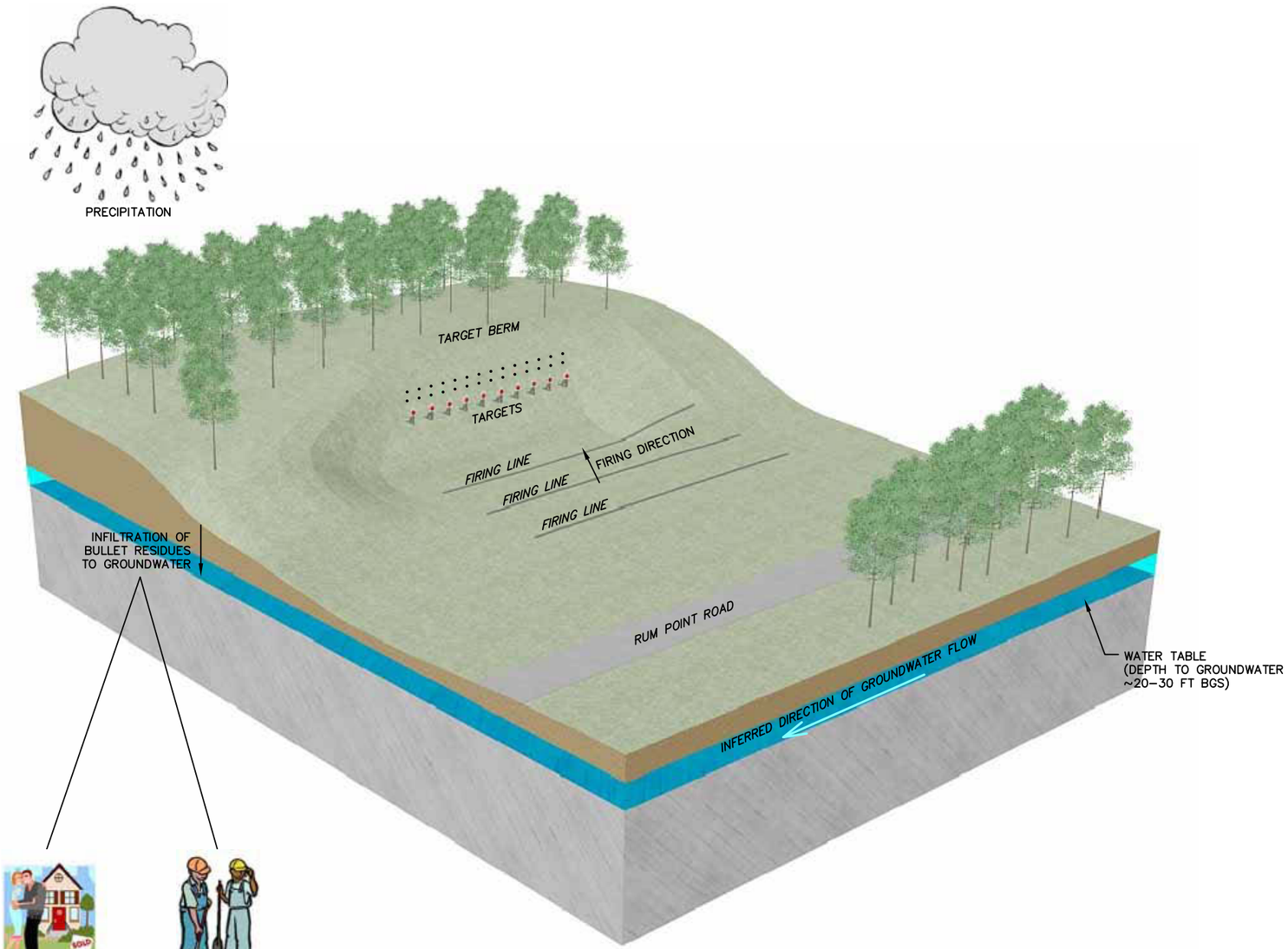
DRAWN BY MKB	DATE 04/19/11	RUM POINT SKEET RANGE (UXO 16) CONCEPTUAL SITE MODEL FOR GROUNDWATER NAVAL SUPPORT FACILTY STUMP NECK ANNEX INDIAN HEAD, MARYLAND	CONTRACT NO. 0810
CHECKED BY B. BECKER	DATE 04/19/11		OWNER NO.
REVISED BY ---	DATE ---		APPROVED BY --- DATE ---
SCALE NOT TO SCALE			DRAWING NO. FIGURE 14 REV. 0

112G00810\0243\112G00810CSM02.dwg 04/019/11 MKB

FIGURE 15

RUM POINT SKEET RANGE (UXO 16)
MUNITIONS CONSTITUENTS EXPOSURE PATHWAY ANALYSIS (GROUNDWATER)
NAVAL SUPPORT FACILITY INDIAN HEAD
INDIAN HEAD, MARYLAND





FUTURE RESIDENT
INGESTION OF AND DERMAL CONTACT WITH GROUNDWATER

FUTURE CONSTRUCTION WORKER
INGESTION OF AND DERMAL CONTACT WITH GROUNDWATER

LEGEND

AREA OF BULLET ACCUMULATION

DRAWN BY MKB	DATE 04/19/11
CHECKED BY B. BECKER	DATE 04/19/11
REVISED BY ---	DATE ---
SCALE NOT TO SCALE	

NAVFAC

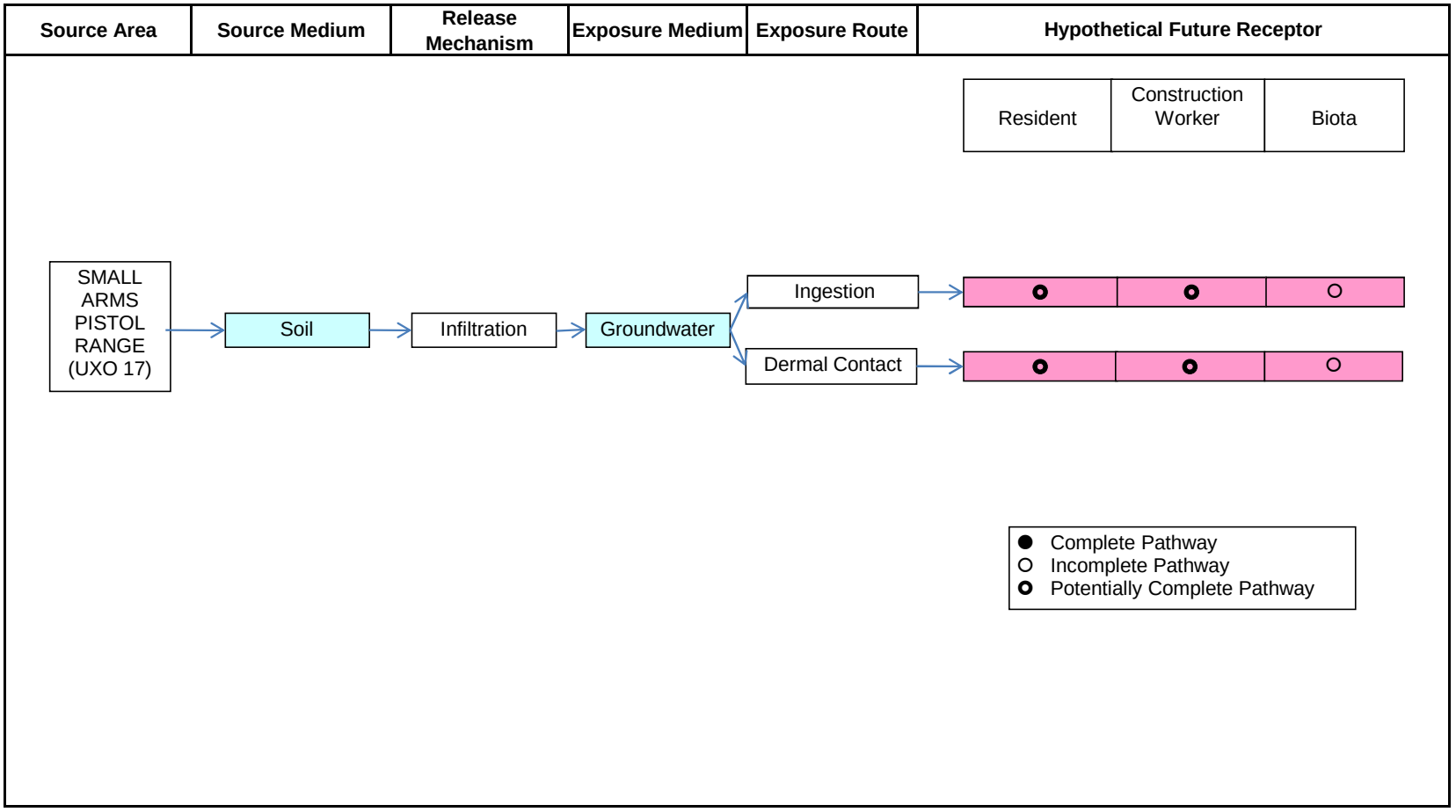
SMALL ARMS (PISTOL) RANGE (UX0 17)
CONCEPTUAL SITE MODEL FOR GROUNDWATER
NAVAL SUPPORT FACILITY
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

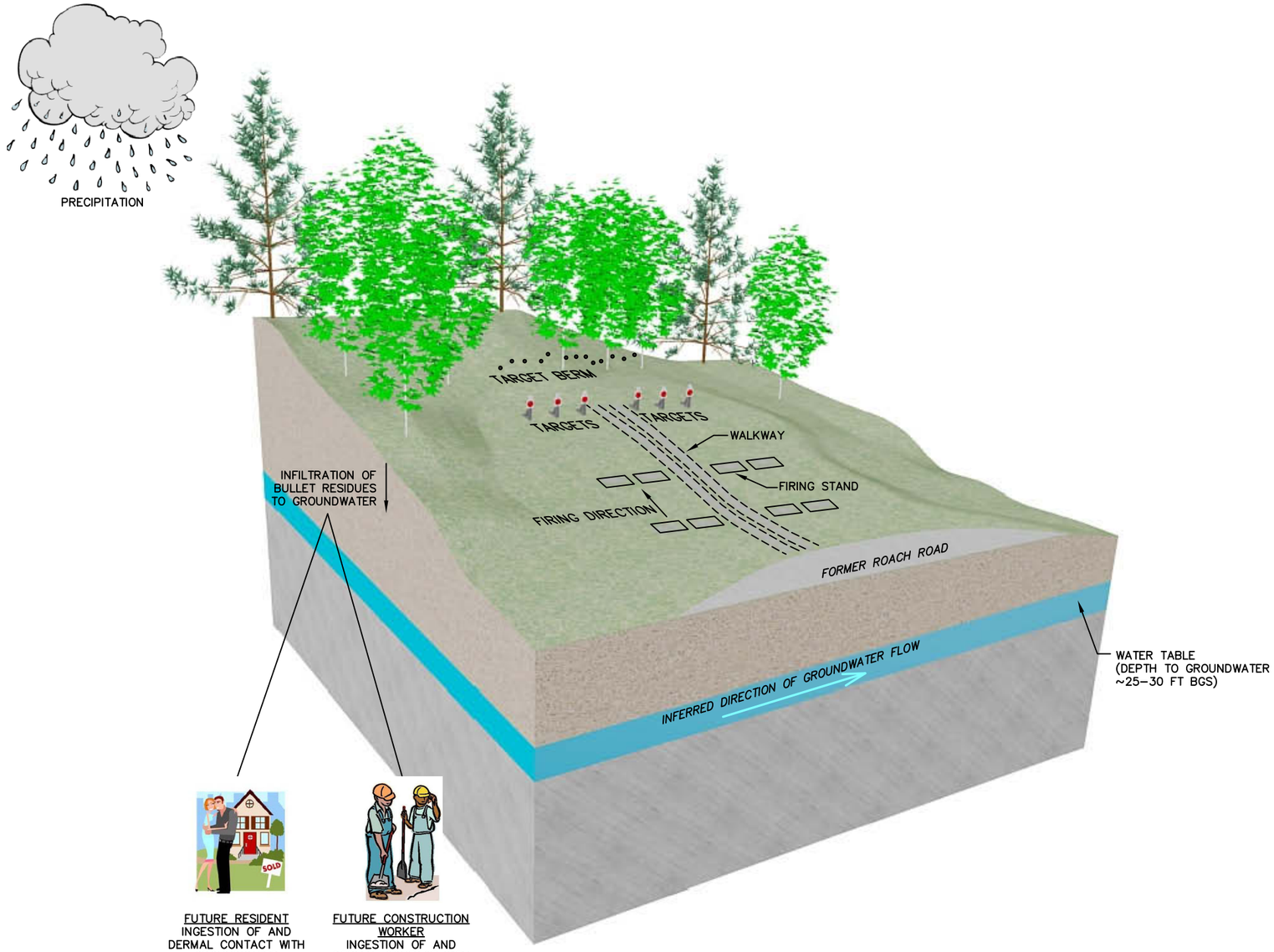
CONTRACT NO. 0810	
OWNER NO.	
APPROVED BY ---	DATE ---
DRAWING NO. FIGURE 16	REV. 0

112G00810\0243\112G00810CSM03.dwg 04/19/11 MKB

FIGURE 17

SMALL ARMS (PISTOL) RANGE (UXO 17)
MUNITIONS CONSTITUENTS EXPOSURE PATHWAY ANALYSIS (GROUNDWATER)
NAVAL SUPPORT FACILITY INDIAN HEAD
INDIAN HEAD, MARYLAND





LEGEND

AREA OF BULLET ACCUMULATION

DRAWN BY MKB	DATE 04/19/11
CHECKED BY B. BECKER	DATE 04/19/11
REVISED BY ---	DATE ---
SCALE NOT TO SCALE	

NAVFAC

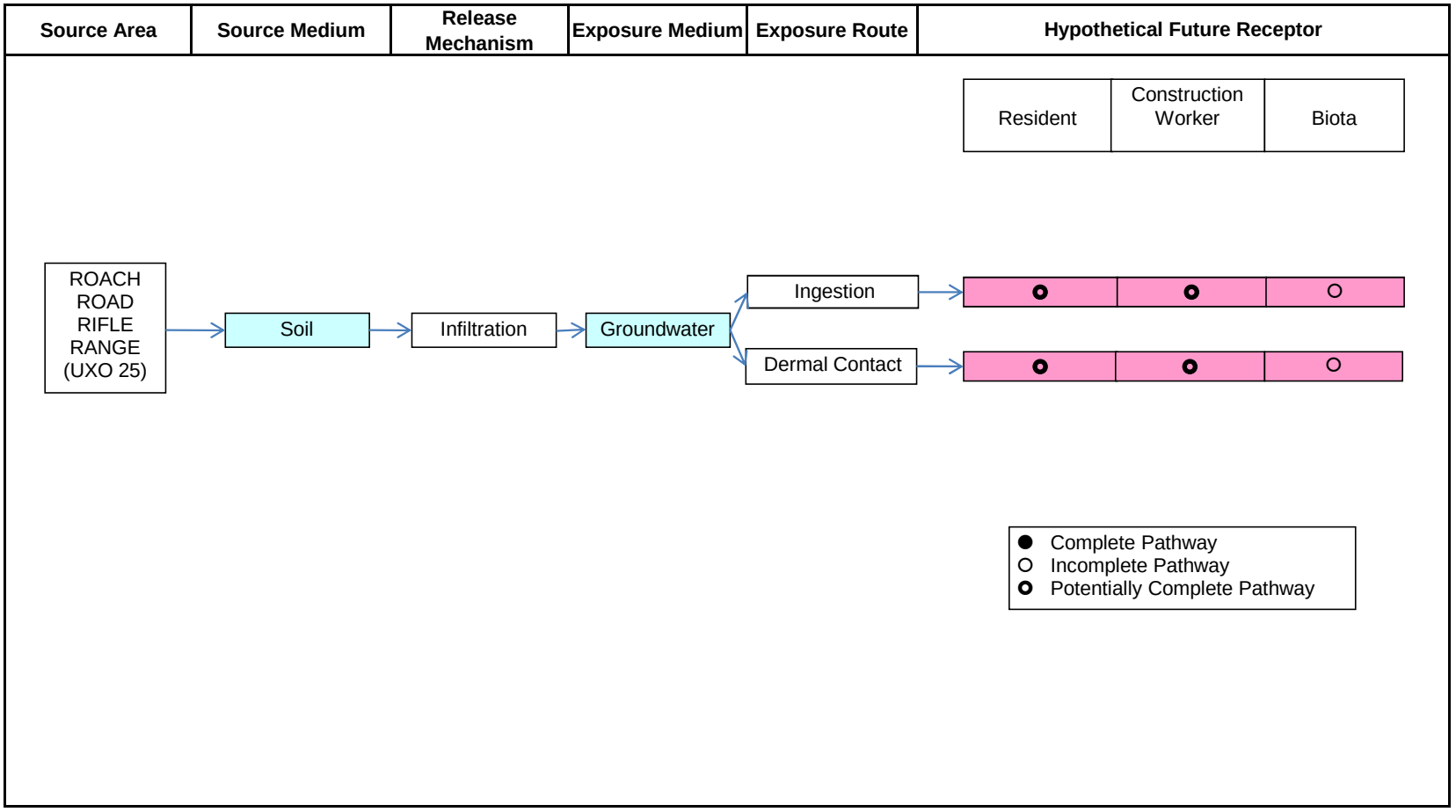
ROACH ROAD RIFLE RANGE (UXO 25)
CONCEPTUAL SITE MODEL FOR GROUNDWATER
NAVAL SUPPORT FACILITY
STUMP NECK ANNEX
INDIAN HEAD, MARYLAND

CONTRACT NO. 0810	
OWNER NO.	
APPROVED BY ---	DATE ---
DRAWING NO. FIGURE 18	REV. 0

112G00810\0243\112G00810CSM04.dwg 04/19/11 MKB

FIGURE 19

ROACH ROAD RIFLE RANGE (UXO 25)
MUNITIONS CONSTITUENTS EXPOSURE PATHWAY ANALYSIS (GROUNDWATER)
NAVAL SUPPORT FACILITY INDIAN HEAD
INDIAN HEAD, MARYLAND



APPENDIX A

TETRA TECH STANDARD OPERATING PROCEDURES
AND
FIELD FORMS

APPENDIX A

SOP TABLE OF CONTENTS

STANDARD OPERATING PROCEDURE

SOP-01

SAMPLE LABELING

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the procedures to be used for labeling sample containers. Sample labels are used to document the sample ID, date, time, analysis to be performed, preservative, matrix, sampler, and the analytical laboratory. A sample label will be attached to each sample container. The label for each container will contain identical information.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

Writing utensil (indelible ink black pen)
Disposable medical-grade gloves (e.g. latex, nitrile)
Sample logsheets
Required sample containers: All sample containers for analysis by fix-based laboratories will be supplied and deemed certified clean by the laboratory.
Preprinted sample labels
Chain-of-custody records
Sealable polyethylene bags
Heavy-duty cooler
Ice

3.0 PROCEDURES

3.1 The following information will be electronically printed on each sample label prior to the field activities.

- Contract Task Order number (CTO 423)
- Project location (NSF Indian Head Stump Neck Annex)
- Sample location
- Preservative
- Analysis to be performed
- Matrix type

- Laboratory name

3.2 Complete the label by filling in the sample ID and time of collection at the well head during sample collection event.

3.3 Select the containers that are appropriate for a given sample. Complete the associated sample label and affix to the sample container.

3.4 Fill the appropriate containers with sample material. Securely close the container lids without overtightening.

3.5 Check to determine if the information printed on the label is correct.

3.6 Place the sample container in a Ziplock plastic bag and place in a cooler containing ice.

Example of a sample label is attached at the end of this SOP.

4.0 ATTACHMENTS

1. Sample Label

ATTACHMENT 1
SAMPLE LABEL

<table>
<tr><td colspan="3">Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh, 15220
(412)921-7090
Project:
Location:
CTO:</td></tr>
<tr><td colspan="2">Sample No:</td><td>Matrix:</td></tr>
<tr><td>Date:</td><td>Time:</td><td>Preserve:</td></tr>
<tr><td colspan="3">Analysis:</td></tr>
<tr><td colspan="2">Sampled by:</td><td>Laboratory</td></tr>
</table>

STANDARD OPERATING PROCEDURE
SOP-02

SAMPLE IDENTIFICATION NOMENCLATURE

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to establish a consistent sample nomenclature system that will facilitate subsequent data management at the Naval Support Facility (NSF) Indian Head Stump Neck Annex. The sample nomenclature system has been devised such that the following objectives can be attained.

- Sorting of data by site, location, or matrix
- Maintenance of consistency (field, laboratory, and database sample numbers)
- Accommodation of all project-specific requirements
- Accommodation of laboratory sample number length constraints
- Ease of sample identification

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

Writing utensil (preferably black pen with indelible ink)
Sample container labels

3.0 SAMPLE IDENTIFICATION NOMENCLATURE

3.1 Samples

All samples will be properly labeled with a sample label affixed to the sample container. Each sample will be assigned a unique sample tracking number.

3.1.1 Sample Numbering Scheme

Use a sample tracking number consisting of a four- or five-segment alpha-numeric code that identifies the sample's associated Unexploded Ordnance (UXO) site, sample type, location, and for aqueous samples, where applicable, whether a sample is filtered.

The alphanumeric coding to be used is explained in the following diagram and subsequent definitions:

ANN	AA	NNN or NN	MMYY
UXO Site Number	Matrix	Sample Location Number	Date - month and year sample collected

Character Type:

A = Alpha

N = Numeric

UXO Number (ANN):

UXO-14 = X14

UXO-15 = X15

UXO-16 = X16

UXO-17 = X17

UXO-25 = X25

Matrix Code (AA):

GW = Groundwater Sample

Location Number (NNN or NN):

Well identification number (i.e., well X14GW001 = 001)

Date (mmyy):

This code section will be used to record the date when the sample is collected, month and year. This is utilized in lieu of a sample round designation.

3.1.2 Examples of Sample Nomenclature

A groundwater sample collected from UXO-14, well X14GW001, on June 19, 2011 would be labeled as X14GW0010611.

3.2 Field Quality Assurance/Quality Control (QA/QC) Sample Nomenclature

Field QA/QC samples are described in this SAP. They will be designated using a different coding system than the one used for regular field samples.

3.2.1 QC and IDW Sample Numbering

Use the QC and IDW code consisting of a three- to four-segment alpha-numeric code that identifies the sample QC type, the date the sample was collected, and the number of this type of QC sample collected on a particular date.

AA or AAA	NNNNNN	NN
QC Type or IDW	Date	Sequence Number (per sampling event)

Character Type:

A = Alpha

N = Numeric

QC Types:

FD = Field Duplicate

IDW = investigation derived waste

Record the time of sampling on the Chain-of-Custody Form, labels, and tags for field duplicate samples with 0000 so that the samples are "blind" to the laboratory. Record notes detailing the sample number, time, date, and type on the sample log sheets and document the location of the duplicate sample (sample log sheets are not provided to the laboratory).

3.2.2 Examples of Field QA/QC Sample Nomenclature

The first field duplicate of the round at UXO-14 for groundwater sample collected on June 24, 2011 would be designated as FD06241101.

The first IDW sample collected from soil waste collected on June 30, 2011 would be designated as IDW06301101, second IDW sample collected the same day from water waste would be designated as IDW06301102.

STANDARD OPERATING PROCEDURE

SOP-03

SAMPLE CUSTODY AND DOCUMENTATION OF FIELD ACTIVITIES

1.0 PURPOSE

This Standard Operating Procedure (SOP) establishes the procedures for sample custody and documentation of field sampling and field analyses activities.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

The following logbooks, forms, labels, and equipment are required.

Writing utensil (preferably black pen with indelible ink)
Site logbook
Field logbook
Sample label
Chain-of-Custody Form
Custody seals
Equipment calibration log
Soil and Sediment Sample Log Sheet
Surface Water Sample Log Sheet

3.0 PROCEDURES

This section describes custody and documentation procedures. All entries made into the logbooks, custody documents, logs, and log sheets described in this SOP must be made in indelible ink (black is preferred). No erasures are permitted. If an incorrect entry is made, the entry will be crossed out with a single strike mark, initialed, and dated.

3.1 Site Logbook

The site logbook is a hard-bound, paginated, controlled-distribution record book in which all major on-site activities are documented. At a minimum, the following activities and events will be recorded (daily) in the site logbook:

- All field personnel present
- Arrival/departure of site visitors
- Arrival/departure of equipment
- Start or completion of sampling activities
- Daily on-site activities performed each day
- Sample pickup information
- Health and safety issues
- Weather conditions

The site logbook is initiated at the start of the first on-site activity (e.g., site visit or initial reconnaissance survey). Entries are to be made for every day that on-site activities take place.

The following information must be recorded on the cover of each site logbook:

- Project name
- Project number
- Book number
- Start date
- End date

Information recorded daily in the site logbook need not be duplicated in other field notebooks but must summarize the contents of these other notebooks and refer to specific page locations in these notebooks for detailed information (where applicable). At the completion of each day's entries, the site logbook must be signed and dated by the Tetra Tech Field Operations Leader (FOL).

3.2 Field Logbooks

The field logbook is a separate dedicated notebook used by field personnel to document his or her activities in the field. This notebook is hardbound and paginated.

3.3 Sample Labels

Adhesive sample container labels must be completed and applied to every sample container. Information on the label includes the project name, location, sample number, date, time, preservative, analysis, matrix, sampler's initials, and the name of the laboratory performing the analysis.

3.4 Chain-of-Custody Form

The Chain-of-Custody Form (COC) is a multi-part form that is initiated as samples are acquired and accompanies a sample (or group of samples) as it is transferred from person to person. Each COC is numbered. This form must accompany any samples collected for laboratory chemical analysis. A copy of a blank COC form is attached at the end of this SOP.

The Tetra Tech FOL must include the name of the laboratory in the upper right hand corner section to ensure that the samples are forwarded to the correct location. If more than one COC is necessary for any cooler, the FOL will indicate "Page __ of __" on each COC. The original (top) signed copy of the COC will be placed inside a sealable polyethylene bag and taped inside the lid of the shipping cooler. Once the samples are received at the laboratory, the sample custodian checks the contents of the cooler(s) against the enclosed COC(s). Any problems are noted on the enclosed COC Form (bottle breakage, discrepancies between the sample labels, COC form, etc.) and will be resolved through communication between the laboratory point-of-contact and the Project Manager (PM). The COC form is signed and retained by the laboratory and becomes part of the sample's corresponding analytical data package.

3.5 Custody Seal

The custody seal is an adhesive-backed label, and it is part of the chain-of-custody process and is used to prevent tampering with samples after they have been collected in the field and sealed in coolers for transit to the laboratory. The custody seals are signed and dated by the samplers and affixed across the opening edges of each cooler (two seals per cooler) containing environmental samples. The laboratory sample custodian will examine the custody seal for evidence of tampering and will notify the Tetra Tech PM if evidence of tampering is observed.

3.6 Equipment Calibration Log

The Equipment Calibration Log is used to document calibration of measuring equipment used in the field. The Equipment Calibration Log documents that the manufacturer's instructions were followed for calibration of the equipment, including frequency and type of standard or calibration device. An Equipment Calibration Log must be maintained for each electronic measuring device requiring calibration. Entries must be made for each day the equipment is used.

3.7 Sample Log Sheets

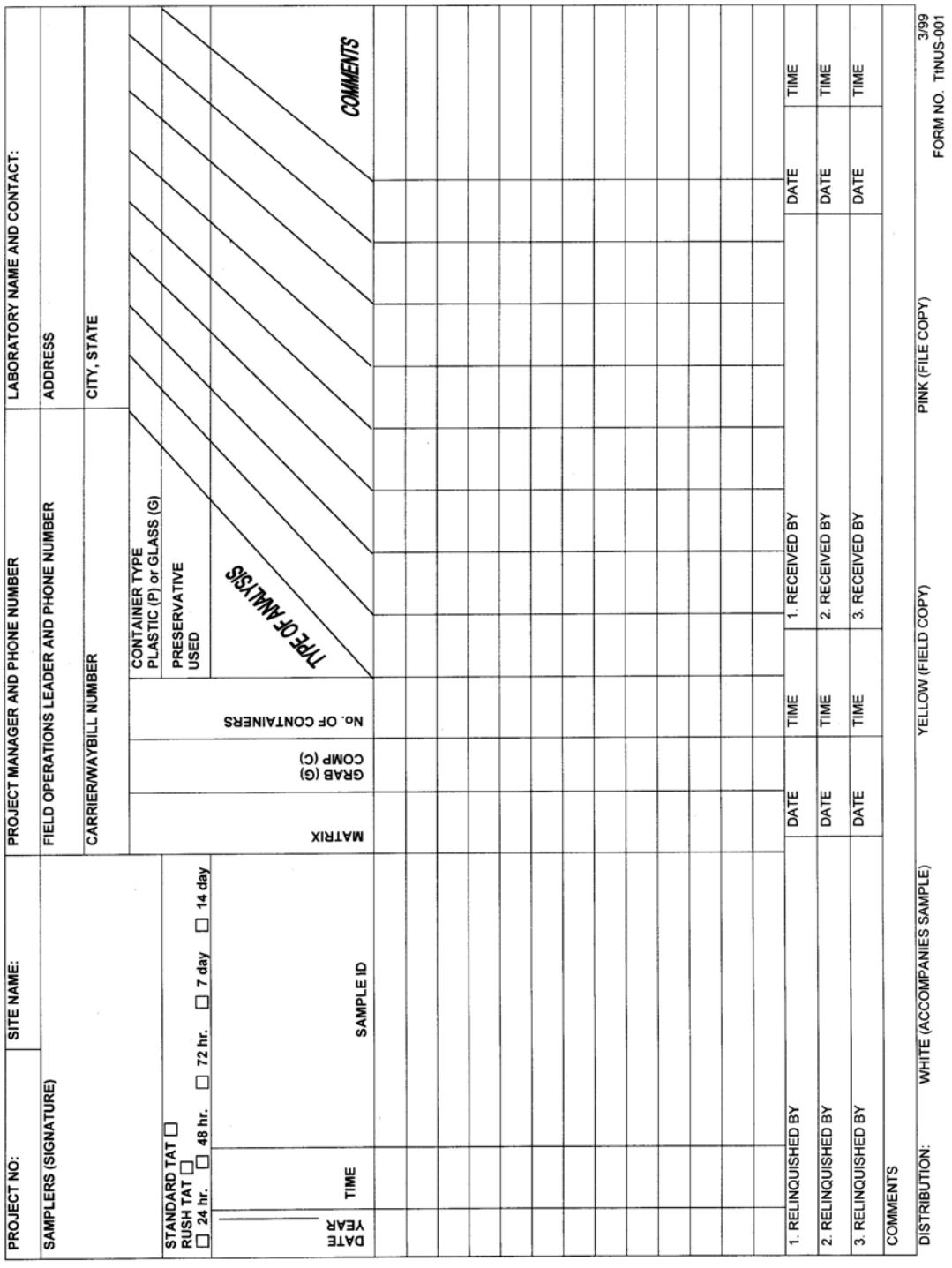
The Soil and Sediment Sample Log Sheets are used to document the sampling of soils and sediments. The surface water sample log sheets are used to document the sampling of surface waters.

4.0 ATTACHMENTS

1. Chain-of-Custody Record
2. Equipment Calibration Log
3. Soil and Sediment Sample Log
4. Surface water Sample Log

ATTACHMENT 1

CHAIN-OF-CUSTODY RECORD



ATTACHMENT 2

EQUIPMENT CALIBRATION LOG

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : ______________________ INSTRUMENT NAME/MODEL: ______________________

SITE NAME: ______________________ MANUFACTURER: ______________________

PROJECT No.: ______________________ SERIAL NUMBER: ______________________

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		

ATTACHMENT 3

SOIL AND SEDIMENT SAMPLE LOG SHEET

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: _____
Project No.: _____

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other: _____
[] QA Sample Type: _____

Sample ID No.: _____
Sample Location: _____
Sampled By: _____
C.O.C. No.: _____

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

ATTACHMENT 4

SURFACE WATER SAMPLE LOG SHEET

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: _____
Project No.: _____

[] Stream
[] Spring
[] Pond
[] Lake
[] Other: _____
[] QA Sample Type: _____

Sample ID No.: _____
Sample Location: _____
Sampled By: _____
C.O.C. No.: _____

Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	ORP
Date:	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	mV
Time:								
Depth:								
Method:								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

STANDARD OPERATING PROCEDURE

SOP-04

SAMPLE PRESERVATION, PACKAGING, AND SHIPPING

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the procedures for sample preservation, packaging, and shipping to be used in handling soil, sediment, and aqueous samples.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

Shipping labels

Custody seals

Chain-of-custody (COC) form(s)

Sample containers with preservatives: All sample containers for analysis by fixed-base laboratories will be supplied, with preservatives added (if required) and deemed certified clean by the laboratory.

Sample shipping containers (coolers): All sample shipping containers are supplied by the laboratory.

Packaging material: Bubble wrap, sealable polyethylene bags, strapping tape, etc.

3.0 PROCEDURES FOR SAMPLE PRESERVATION, PACKAGING, AND SHIPPING

3.1 The laboratory provides sample containers with preservative already included (as required) for the analytical parameter for which the sample is to be analyzed. All samples will be held, stored, and shipped at less than 6°C. This will be accomplished through refrigeration (used to hold samples prior to shipment) and/or ice.

3.2 The sampler shall maintain custody of the samples until the samples are relinquished to another custodian or to the common carrier.

3.3 Check that each sample container is properly labeled, the container lid is securely fastened, and the container is sealed in a polyethylene bag.

3.4 If the container is glass, place the sample container into a bubble-out shipping bag and seal the bag using the self-sealing, pressure sensitive tape supplied with the bag.

3.5 Inspect the insulated shipping cooler. Check for any cracks, holes, broken handles, etc. If the cooler has a drain plug, make certain it is sealed shut, both inside and outside of the cooler. If the cooler is questionable for shipping, the cooler must be discarded.

3.6 Line the cooler with large plastic bag, and line the bottom of the cooler with a layer of bubble wrap. Place the sample containers into the shipping cooler in an upright position (containers will be upright, with the exception of any 40-mL vials). Continue filling the cooler with ice until the cooler is nearly full and the movement of the sample containers is limited.

3.7 Wrap the large plastic bag closed and secure with tape.

3.8 Place the original (top) signed copy of the COC form inside a sealable polyethylene bag. Tape the bag to the inside of the lid of the shipping cooler.

3.9 Close the cooler and seal the cooler with approximately four wraps of strapping tape at each end of the cooler. Prior to wrapping the last wrap of strapping tape, apply a signed and dated custody seal to each side of the cooler (one per side). Cover the custody seal with the last wrap of tape. This will provide a tamper evident custody seal system for the sample shipment.

3.10 Affix shipping labels to each of the coolers, ensuring all of the shipping information is filled in properly. Overnight (e.g., FedEx Priority Overnight) courier services will be used for all sample shipments.

3.11 All samples will be shipped to the laboratory no more than 72 hours after collection. Under no circumstances should sample hold times be exceeded.

STANDARD OPERATING PROCEDURE
NUMBER SOP-05

LITHOLOGIC SOIL SAMPLE LOGGING

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the standard procedures and technical guidance on the logging of soil cores collected at the Naval Support Facility (NSF) Indian Head Stump Neck Annex.

2.0 FIELD FORMS AND EQUIPMENT

Knife
Ruler (marked in tenths and hundredths of feet)
Boring Log: An example of this form is attached.
Writing utensil

3.0 RESPONSIBILITIES

A field geologist or engineer is responsible for supervising all boring activities and assuring that each borehole is properly and completely logged.

4.0 PROCEDURES FOR BOREHOLE AND SAMPLE LOGGING

To maintain a consistent classification of soil, it is imperative that the field geologist understands and accurately uses the field classification system described in this SOP. This identification is based on visual examination and manual tests.

4.1 USCS Classification

Soils are to be classified according to the Unified Soil Classification System (USCS). This method of classification is detailed in Figure 1 (attached to this SOP).

This method of classification identifies soil types on the basis of grain size and cohesiveness.

Fine-grained soils, or fines, are smaller than the No. 200 sieve and are of two types: silt (M) and clay (C). Some classification systems define size ranges for these soil particles, but for field classification

purposes, they are identified by their respective behaviors. Organic material (O) is a common component of soil but has no distinguishable size range; it is recognized by its composition. The careful study of the USCS will aid in developing the competence and consistency necessary for the classification of soils.

Coarse-grained soils will be divided into categories: rock fragments, sand, or gravel. The terms "sand" and "gravel" not only refer to the size of the soil particles but also to their depositional history. To insure accuracy in description, the term "rock fragments" will be used to indicate angular granular materials resulting from the breakup of rock. The sharp edges that are typically observed indicate little or no transport from their source area; and therefore, the term provides additional information in reconstructing the depositional environment of the soils encountered. When the term "rock fragments" is used, it will be followed by a size designation such as "(1/4 inchΦ-1/2 inchΦ)" or "coarse-sand size" either immediately after the entry or in the remarks column. The USCS classification would not be affected by this variation in terms.

4.2 Color

Describe soil colors utilizing a single color descriptor preceded, when necessary, by a modifier to denote variations in shade or color mixtures. A soil could therefore be referred to as "gray" or "light gray" or "blue-gray." Because color can be utilized in correlating units between sampling locations, it is important for color descriptions to be consistent from one boring to another.

Colors must be described while the sample is still moist. Break or split soil samples vertically to render the colors clearly visible. Samplers tend to smear the sample surface, creating color variations between the sample interior and exterior.

Use the term "mottled" to indicate soils irregularly marked with spots of different colors. Mottling in soils usually indicates poor aeration and lack of good drainage.

4.3 Relative Density and Consistency

To classify the relative density and/or consistency of a soil, the geologist is to first identify the soil type. Granular soils contain predominantly sands and gravels. They are noncohesive (particles do not adhere well when compressed). Finer-grained soils (silts and clays) are cohesive (particles will adhere together when compressed).

Granular soils are given the USCS classifications GW, GP, GM, SW, SP, SM, GC, or SC (see Figure 1).

The consistency of cohesive soils is determined by performing field tests and identifying the consistency as shown in the following table.

CONSISTENCY FOR COHESIVE SOILS

Consistency	Standard Penetration Resistance (Blows per Foot)	Unconfined Compressive Strength (Tons/Sq. Foot by pocket penetration)	Field Identification
Very soft	0 to 2	Less than 0.25	Easily penetrated several inches by fist.
Soft	2 to 4	0.25 to 0.50	Easily penetrated several inches by thumb.
Medium stiff	4 to 8	0.50 to 1.0	Can be penetrated several inches by thumb with moderate effort.
Stiff	8 to 15	1.0 to 2.0	Readily indented by thumb but penetrated only with great effort.
Very stiff	15 to 30	2.0 to 4.0	Readily indented by thumbnail.
Hard	Over 30	More than 4.0	Indented with difficulty by thumbnail.

Cohesive soils are given the USCS classifications ML, MH, CL, CH, OL, or OH (see Figure 1).

The consistency of cohesive soils is determined by hand by determining the resistance to penetration by the thumb. The thumb determination methods are conducted on a selected sample of the soil, preferably the lowest 0.5 foot of the sample. Break the sample in half and push the thumb into the end of the sample to determine the consistency. Do not determine consistency by attempting to penetrate a rock fragment. If the sample is decomposed rock, classify it as a soft decomposed rock rather than a hard soil. The designations used to describe the consistency of cohesive soils are shown in the above-listed table.

4.4 Weight Percentages

In nature, soils consist of particles of varying size and shape and are combinations of the various grain types. The following terms are useful in the description of soil:

Terms of Identifying Proportion of the Component	Defining Range of Percentages by Weight
Trace	0 - 10 percent
Some	11 - 30 percent
Adjective form of the soil type (e.g., sandy)	31 - 50 percent

Examples:

- Silty fine sand: 50 to 69 percent fine sand, 31 to 50 percent silt.
- Medium to coarse sand, some silt: 70 to 80 percent medium to coarse sand, 11 to 30 percent silt.
- Fine sandy silt, trace clay: 50 to 68 percent silt, 31 to 49 percent fine sand, 1 to 10 percent clay.
- Clayey silt, some coarse sand: 70 to 89 percent clayey silt, 11 to 30 percent coarse sand.

4.5 Moisture

Moisture content is estimated in the field according to four categories: dry, moist, wet, and saturated. In dry soil, there appears to be little or no water. Saturated samples have all the water they can hold. Moist and wet classifications are somewhat subjective and often are determined by the individual's judgment. A suggested approach for this would be to call a soil wet if rolling it in the gloved hand or on a porous surface liberates water (i.e., dirties or muddies the surface). Whatever method is adopted for describing moisture, it is important that the method used by an individual remains consistent throughout an entire field activity.

4.6 Classification of Soil Grain Size for Chemical Analysis

To determine the gross grain size classification (e.g., clay, silt, and sand) from the USCS classification described above, use the following table.

Gross Soil Grain Size Classification	USCS Abbreviation	Description
Clay	CL	inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays,.
	CH	inorganic clays of high plasticity, fat clays.
	OH	organic clays of medium to high plasticity, organic silts.
Silt	ML	inorganic silts and very fine sands, rock four, silty or clayey fine sands with slight plasticity.
	OL	organic silts and organic silty clays of low plasticity..
	MH	inorganic silts, micaceous or diatomaceous fine sand or silty soils.
Sand	SW	well graded sands, gravelly sands, little or no fines.
	SP	poorly graded sands, gravelly sands, little or no fines.
	SM	silty sands, sand-silt mixtures.
	SC	clayey sands, sand-clay mixtures.

4.7 Summary of Soil Classification

In summary, soils will be classified in a similar manner by each geologist/engineer at a project site. The hierarchy of classification is as follows:

- Density and/or consistency
- Color
- Plasticity (optional)
- Soil types
- Moisture content
- Other distinguishing features
- Grain size
- Depositional environment

4.0 ATTACHMENTS

1. Figure 1 - Unified Soil Classification System
2. Boring Log

ATTACHMENT 1

FIGURE 1 - UNIFIED SOIL CLASSIFICATION SYSTEM

Unified Soil Classification System

Coarse Grained Soils (more than half of soil > No. 200 sieve)	Gravels (More than half of coarse fraction > no. 4 sieve size)		GW	Well graded gravels or gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
			GM	Sandy gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-silt mixtures
	Sands (More than half of coarse fraction < no. 4 sieve size)		SW	Well graded sands or gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
			SM	Silty sands, sand-silt mixtures
			SC	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
Fine Grained Soils (more than half of soil < No. 200 sieve)	Silts and Clays LL = < 50		ML	Inorganic silts and very fine sands, rock flour, silty fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays LL = > 50		MH	Inorganic silts, micaceous or diatomaceous fine sand or silty soils, elastic silts
			CH	Inorganic silts of high plasticity, fat clays
			OH	Organic clays of high plasticity, organic silty clays, organic silts
Highly Organic Soils			Pt	Peat and other highly organic soils

Grain Size Chart

Classification	Range of Grain Sizes	
	U.S. Standard Sieve Size	Grain Size In Millimeters
Boulders	Above 12"	Above 305
Cobbles	12" to 3"	305 to 76.2
Gravel	3" to No. 4	76.2 to 7.76
coarse	3" to 3/4"	76.2 to 4.76
fine	3/4"to No.4	19.1 to 4.76
Sand	No. 4 to No. 200	4.76 to 0.074
coarse	No.4 to No. 10	4.76 to 2.00
medium	No. 10 to No. 40	2.00 to 0.420
fine	No. 40 to No. 200	0.420 to 0.074
Silt and Clay	Below No. 200	Below 0.074

Relative Density (SPT)

SANDS AND GRAVELS	BLOWS/FOOT
VERY LOOSE	0 – 4
LOOSE	4 – 10
MEDIUM DENSE	10 – 30
DENSE	32 – 50
VERY DENSE	OVER 50

Consistency (SPT)

SILTS AND CLAYS	BLOWS/FOOT
VERY SOFT	0 – 2
SOFT	2 – 4
MEDIUM STIFF	4 – 8
STIFF	8 – 16
VERY STIFF	16 – 22
HARD	OVER 32

ATTACHMENT 2

BORING LOG

Tetra Tech NUS, Inc.

BORING LOG

Page ___ of ___

PROJECT NAME: _____ BORING No.: _____
PROJECT NUMBER: _____ DATE: _____
DRILLING COMPANY: _____ GEOLOGIST: _____
DRILLING RIG: _____ 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	MATERIAL DESCRIPTION: Color	MATERIAL DESCRIPTION: Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	PID/FID Reading (ppm): Sampler BZ	PID/FID Reading (ppm): Borehole**	PID/FID Reading (ppm): Driller BZ**

* 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. #: _____

STANDARD OPERATING PROCEDURE
SOP-06

TEMPORARY MONITORING WELL INSTALLATION AND ABANDONMENT

1.0 PURPOSE

This procedure provides general guidance and information pertaining to proper design and installation of temporary groundwater monitoring wells. The methods described herein are specific for temporary monitoring well construction at NSF Indian Head and the NSF Indian Head – Stump Neck Annex.

2.0 RESPONSIBILITIES

Driller - The driller provides adequate and operable equipment, sufficient quantities of materials, and an experienced and efficient labor force capable of performing all phases of proper monitoring well installation and construction. The drilling contractor personnel must have all the health and safety training required to perform the work, as specified in the health and safety plan. All well drilling activities shall be performed under the direct supervision of a driller licensed in the State of Maryland. The driller is also responsible for obtaining, in advance, any required permits for drilling and monitoring well installation and construction for the State of Maryland.

Field Geologist - The field geologist supervises and documents well installation and construction performed by the driller and ensures that the screen interval for each monitoring well is properly placed to provide representative groundwater data from the monitored interval. Geotechnical engineers, field technicians, or other suitable trained personnel may also serve in this capacity.

Site Safety Officer – The site safety officer is responsible for clearing the drill site for underground and overhead utilities or other potentially hazardous obstructions.

3.0 REQUIRED EQUIPMENT/ITEMS

The following list includes equipment and items required for monitoring well installation:

Health and safety equipment as required by the HASP and the site safety officer.

Well drilling and installation equipment with associated materials (typically supplied by the driller). Wells can be installed using direct push techniques (DPT) drilling methods or hollow-stem auger (HSA). The preferred method is DPT, but if DPT is not feasible, HSA will be used.

Hydrogeologic equipment (weighted engineer's tape, water-level indicator, retractable engineer's rule, electronic calculator, clipboard, mirror and flashlight for observing downhole activities, paint and ink marker for marking monitoring wells, sample jars, well installation forms, boring logs, soil sample log forms, chain-of-custody records, sample coolers with ice, and a field notebook).

4.0 WELL DESIGN, CONSTRUCTION, AND ABANDONMENT

Temporary wells shall be constructed using nominal 1-inch ID, PVC riser and nominal 1-inch ID, PVC factory slotted screen (0.010 slot) pre-packed screen. Clean silica sand of U.S. Standard Sieve Size No. 20 to 40 will be used for the sand pack, 100 percent certified pure sodium bentonite will be used for the seal above the sand pack and hydrated.

DPT - The temporary well will be installed by driving a nominal 3-inch ID drill casing (with an expendable tip) to the desired depth. After the casing has been advanced to approximately 8 feet below the first water bearing zone, a 10-foot-long screen attached to the riser pipe will be lowered to the bottom through the casing. The casing will then be withdrawn from the ground, exposing the pre-pack screen to the formation material. The saturated formation material may collapse around the screen, and the remaining annular space around the screen will be filled with silica sand to at least 1 to 2 feet above the screen. The depths of backfill materials will be constantly monitored, if possible, during well installation using a weighted stainless-steel or fiberglass tape measure. A bentonite seal will then be installed to the ground surface or at least ten feet above the sand-pack completing the temporary well construction.

HSA – The temporary well will be installed by driving a nominal 3 ½ or 4 ½ -inch ID drill HSA to the desired depth if DPT is not feasible. After the HSA has been advanced to approximately 8 feet below the first water bearing zone, a 10-foot-long screen attached to the riser pipe will be lowered to the bottom through the HSA. The HSA will then be withdrawn from the ground, exposing the pre-pack screen to the formation material. The saturated formation material may collapse around the screen, and the remaining annular space around the screen will be filled with silica sand to at least 1 to 2 feet above the screen. The depths of backfill materials will be constantly monitored, if possible, during well installation using a weighted stainless-steel or fiberglass tape measure. A bentonite seal will then be installed to the ground surface or at least ten feet above the sand-pack completing the temporary well construction.

The annular space at the ground surface will be covered with plastic sheeting around the riser if needed to prevent infiltration of surface runoff or rainwater into the annulus. The riser pipe will be capped to prevent rain water from entering into the well and will remain in place until the point is abandoned.

Once the well has been sampled by Tetra Tech personnel, the Subcontractor shall abandon the well in accordance with State of Maryland regulations COMAR 26.04.04.11. This requires that the PVC screen and riser be removed from the boring and the boring backfilled with cement/bentonite grout from the bottom up using a tremie pipe.

5.0 DOCUMENTATION OF FIELD ACTIVITIES

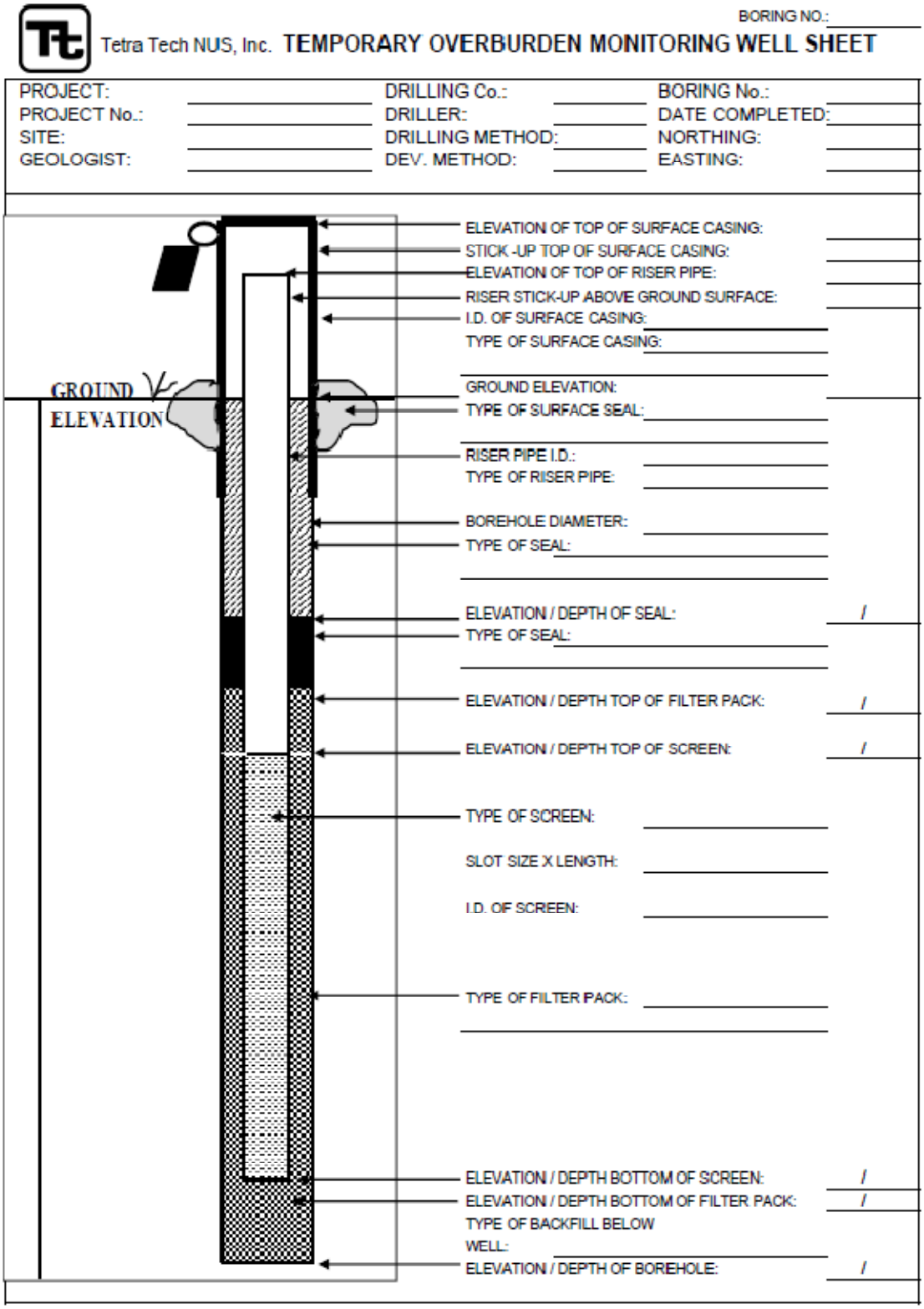
A critical part of monitoring well installation is recording of significant details and events in the site logbook, on field forms, and in a field logbook. Details of borehole logging are contained in SOP-05.

6.0 ATTACHMENTS

1. Overburden Monitoring Well Sheet

ATTACHMENT 1

OVERBURDEN MONITORING WELL SHEET



STANDARD OPERATING PROCEDURE

SOP-07

TEMPORARY WELL DEVELOPMENT

1.0 PURPOSE

This procedure provides general guidance and information pertaining to proper development of temporary wells. The methods described herein are specific for monitoring wells located at NSF Indian Head – Stump Neck Annex.

2.0 RESPONSIBILITIES

The drilling contractor or Tetra Tech personnel shall provide adequate and operable equipment, sufficient quantities of materials, and an experienced and efficient labor force capable of developing monitoring wells. The field personnel must have all the health and safety training required to perform the work, as specified in the health and safety plan (HASP).

3.0 REQUIRED EQUIPMENT/ITEMS

The following list includes equipment and items required for monitoring well development:

Health and safety equipment as required by the HASP and the site safety officer.

Well development equipment with associated materials (supplied by the driller or Tetra Tech)
Peristaltic and/or 0.75" submersible bladder pump.

Hydrogeologic equipment (water-level indicator, electronic calculator, clipboard, paint and ink marker, well development forms, and a field notebook).

4.0 PROCEDURES

Development of the temporary wells will be accomplished using a peristaltic pump or bladder pump and polyethylene (PE) tubing.

4.1 Insert the intake end of a length of PE tubing to the bottom of the screen point and attach a length of silicon tubing (approximately 1 foot) to the discharge end of the PE tubing. The silicon tubing

will be threaded around the rotor of the pump and out of the pump. Or attach PE twin-line tubing to the bladder pump and lower in to well to approximately two feet off the bottom of the well. The bladder pump will be activated using an environmental standard compressed gas cylinder and control system.

4.2 The PE tubing or bladder pump will be lifted and lowered slightly while the pump is operating. The maximum pump rate will be approximately 2 liters per minute during development. However, the yield of the formation will dictate the pumping rate.

4.3 Measurement of pH, specific conductance, turbidity, dissolved oxygen (DO), oxidation-reduction potential (ORP), and temperature shall be recorded every 5 to 10 minutes during the development process using a water quality meter and flow-through cell.

4.4 The temporary monitoring well will be pumped until discharge water is visibly clear, the turbidity readings do not improve over time, or the well screen goes dry.

4.5 Sampling will commence in accordance with SOP-08 through SOP-11.

5.0 ATTACHMENTS

1. Monitoring Well Development Record

ATTACHMENT 1

MONITORING WELL DEVELOPMENT RECORD

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Page ___ of ___

Well: _____ Depth to Bottom (ft.): _____ Responsible Personnel: _____
Site: _____ Static Water Level Before (ft.): _____ Drilling Company: _____
Date Installed: _____ Static Water Level After (ft.): _____ Project Name: _____
Date Developed: _____ Screen Length (ft.): _____ Project Number: _____
Dev. Method: _____ One Well Volume (gal/L): _____ PID Readings: Bore Hole____ppm
Pump Type: _____ Casing ID (in.): _____ PID Readings: Breathing Zone____ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units____)	Turbidity (NTU)	Remarks (odor, color, etc.)

STANDARD OPERATING PROCEDURE

SOP-08

MEASUREMENT OF WATER LEVELS IN MONITORING WELLS

1.0 PURPOSE

This Standard Operating Procedure (SOP) establishes procedures for determining water levels in monitoring wells.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

The following equipment and field forms are required for determining water levels in monitoring wells.

Ground Water Level Measurement Form: A copy of the Ground Water Level Measurement Form is attached.

Bound field logbook

Well key

Writing utensil

Electronic water-level indicator: The water-level indicator must have a cable of sufficient length to reach the water surface and be capable of measurements of 0.01 foot.

Decontamination supplies: SOP-14 describes decontamination procedures including decontamination supplies.

3.0 WATER-LEVEL MEASUREMENT PROCEDURES

3.1 Check the operation of the electronic water-level indicator or interface meter.

3.2 Record the well identification (ID), date, and time (using military time) on the Ground Water-Level Measurement Form.

3.3 Unlock the well and remove the well cap.

3.4 Place the well cap on a clean piece of plastic.

3.5 Ensure that the water-level indicator probe has been decontaminated before use, in accordance with the procedures outlined in SOP-14.

3.6 Slowly lower the probe into the well riser pipe until an audible and/or visible signal is produced, indicating contact with the water surface.

3.7 Read the ground water-level measurement from the top of the inner casing at the surveyed reference point to the nearest 0.01 foot.

3.10 Record the water-level measurement on the Ground Water Level Measurement Form.

3.11 Wind the meter cable measuring tape back onto the spool.

3.12 Replace the well cap and lock.

3.13 Decontaminate the meter's probe and cable following the procedures outlined in SOP-14.

3.13 Containerize any decontamination fluids and PPE in accordance with the procedures described in SOP-11.

4.0 ATTACHMENTS

1. Ground Water Level Measurement Sheet

ATTACHMENT 1

GROUND WATER LEVEL MEASUREMENT SHEET

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: _____ **Project No.:** _____
Location: _____ **Personnel:** _____
Weather Conditions: _____ **Measuring Device:** _____
Tidally Influenced: Yes ___ No ___ **Remarks:** _____

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth From TOC (feet)*	Water Level Indicator Reading (feet)*	Groundwater Elevation (feet)*	Comments

* All measurements to the nearest 0.01 foot

Page ___ of ___

STANDARD OPERATING PROCEDURE

SOP-09

LOW-FLOW WELL PURGING AND STABILIZATION

1.0 PURPOSE

This Standard Operating Procedure (SOP) establishes the procedure for well purging and stabilization utilizing low-flow techniques.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

The following field forms and equipment are required for low-flow purging.

Low-Flow Purge Data Sheet: A copy of this form is attached at the end of this SOP.
Bound field logbook
Writing utensil
Well key
Electronic water-level indicator: The water-level indicator must have a cable of sufficient length to reach the water surface and be capable of measurements of 0.01 foot.
Submersible Bladder Pump: QED Sample Pro or equivalent using twin bonded ¼-inch polyethylene (PE) tubing.
Electronic Programmable Controller, MP-10: This controller regulates air flow in a bladder pump.
Cylinder of compressed nitrogen with regulator: Compressed gas serves as the power source for the bladder pump.
Peristaltic Pump: Using siliclastic tubing and ¼-inch PE tubing.
Water-quality meters: These units measure and display field parameters in the field including turbidity, pH, dissolved oxygen (DO), oxidation-reduction potential (ORP), temperature, and specific conductance (see SOP-10).
Flow-through cell adapter for water-quality meter
Purge water containers
Graduated cylinder and stopwatch: Used to calculate flow rate.
Decontamination supplies: SOP-14 describes required decontamination supplies.
Disposable medical-grade gloves (e.g., latex, nitrile)

3.0 PROCEDURES FOR WELL PURGING

3.1 Prior to mobilizing to the site, clean, check for proper operation, and calibrate above equipment in accordance with manufacturer requirements as necessary.

3.2 Measure the static water-level of the well with respect to the top of the PVC riser. Record the information on the Groundwater Sample Log Sheet (see SOP-11) and the Low-Flow Purge Data Sheet.

3.3 Purge wells using either a submersible bladder pump or surface peristaltic pump. For wells with depths to water level exceeding the capacity of the peristaltic pump (about 27 feet to water), use a submersible bladder pump to purge and sample the well. Follow steps 3.5 through 3.9 for bladder pump procedures; skip to step 3.10 for peristaltic pump procedures.

3.4 Connect the pump controller to the well pump air supply by following the instructions in the pump control manual. The pump controller must be turned off when it is being connected.

3.6 Connect the nitrogen cylinder to the pump controller. The nitrogen cylinder valve must be closed and the regulator line pressure set at zero pounds per square inch (psi) when it is being connected.

3.7 Following the instructions found in the water-quality meter manual, connect the flow-through cell to the pump discharge line (at the well cap).

3.8 Place the discharge tubing from the flow-through cell to direct the purge water discharge into the graduated cylinder or purge water container.

3.9 Following the instructions in the pump controller manual, start pumping water from the well.

3.10 Peristaltic pump may also be used to purge and sample groundwater monitoring wells. Attach well tubing to the input side of the pump via the siliclastic tubing and the out from the pump to the input side of the flow through cell.

3.11 Start with the initial pump rate set at approximately 0.1 liters per minute. Use the graduated cylinder and stopwatch to measure the pumping rate. Adjust pumping rates as necessary (the pumping rate shall not exceed 0.5 liters per minute) to prevent drawdown from exceeding 0.3 foot

during purging. If the well goes dry during the purge process allow it to recover 80% then proceed to sample the well in accordance with SOP-11.

3.12 Measure the well water level using the water-level meter every 5 to 10 minutes pending the pumping rate. Typically, higher the flow rate the shorter the time period between measurements. Record the well water level on the Low-Flow Purge Data Form (attached at the end of this SOP).

3.13 Every 5 to 10 minutes, record on the Low-Flow Purge Data Form the water-quality parameters (pH, specific conductance, temperature, turbidity, oxidation-reduction potential, and dissolved oxygen) measured by the water-quality meter and turbidity meter. If the cell needs to be cleaned during purging operations, continue pumping (allow the pump to discharge into a container) and disconnect the cell. Rinse the cell with distilled water. After cleaning is completed, reconnect the flow-through cell and continue purging. Document the cell cleaning on the Low-Flow Purge Data Form.

3.14 Measure the flow rate using a graduated cylinder. Remeasure the flow rate any time the pump rate is adjusted.

3.15 During purging, check for the presence of bubbles in the flow-through cell. The presence of bubbles is an indication that connections are not tight. If bubbles are observed, check for loose connections.

3.16 Stabilization is achieved and sampling can begin when three consecutive readings, taken at 5- to 10-minute intervals, are within the following limits:

- pH $\pm$ 0.1 standard units
- Specific conductivity $\pm$ 5%
- Temperature $\pm$ 0.2 degrees C
- Turbidity less than 10 NTUs
- Dissolved oxygen $\pm$ 10%

If the above conditions have still not been met after the well has been purged for 2 hours, purging will be considered complete and sampling can begin.

Record the final well stabilization parameters from the Low-Flow Purge Data From onto the Groundwater Sample Log Form.

If there is a need to leave a well during purging, there are two options:

- One, if the sampler must move for 30 minutes or less but still has a clear line of sight to the well; the sampler may leave the pump running and watch the well from a distance until he or she is able to return to the well.

- Two, if for whatever reason, the sampler must stop purging for an extended period of time or a clear line of sight cannot be maintained, the pump and cell will be shut down. All equipment and supplies will be loaded into the sample vehicle, and the well will be secured before the sampler departs.

In both cases, the time purging was stopped and restarted will be noted on the Low-Flow Purge Data Form.

3.17 Rinse the flow-through cell, the water-quality meter probes, and the turbidity cell with analyte-free water and pack the cell and meters for transport.

4.0 ATTACHMENTS

1. Low-Flow Purge Data Sheet

ATTACHMENT 1

LOW-FLOW PURGE DATA SHEET

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT : _____ WELL ID.: _____
PROJECT NUMBER: _____ DATE: _____
PROJECT SITE NAME: _____ WEATHER: _____

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (gal/L)	Flowrate (mL/min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments

Pump Intake Depth _____

Water Quality Meter (S/N) _____
Control Box Type (S/N) _____
Turbidity Meter (S/N) _____

SIGNATURE(S): _____

PAGE__OF__

STANDARD OPERATING PROCEDURE
NUMBER SOP-10

CALIBRATION AND CARE OF WATER QUALITY METERS

1.0 PURPOSE

This Standard Operating Procedure (SOP) establishes the procedures for the calibration and maintenance of field instruments used to measure water quality and for the proper documentation of calibration and maintenance at the NSF Indian Head – Stump Neck Annex facility. The YSI 556 MPS Environmental Monitoring System will be used to measure pH, temperature, oxidation-reduction potential (ORP), specific conductance (SC), and dissolved oxygen (DO). The turbidity in water will be measured using a LaMotte 2020e or equivalent. The procedures for the YSI 556 MPS are provided in Section 3 and Section 4 provides the procedures for the LaMotte 2020e.

2.0 FIELD FORMS AND EQUIPMENT LIST

The following logbooks, forms, equipment, and supplies are required:

Site logbook
Equipment calibration log sheet
YSI Model 556 MPS with on board barometer and Sonde: multi-parameter water-quality meter with flow through cell.
LaMotte 2020e Turbidity Meter
Equipment manuals
Calibration kits
Deionized water, paper towels, spray bottle, etc.
Disposable medical-grade gloves (e.g., latex, nitrile)

3.0 YSI PROCEDURES

This section describes the calibration procedure for the YSI Model 556 MPS. The meter is supplied with an instruction manual. The manual will be on site and will be used as the calibration guidance document for the meter's calibration. This procedure will list requirements for frequency of calibration and checks to be performed on the meter.

The YSI Model 556 MPS and Sonde is a multi-parameter, water-quality meter that with the flow through cell attached, the meter has the ability to measure water-quality parameters in ground water via a pump discharge line. By performing the measurements in the discharge line coming directly from the well, the parameters are measured before the ground water comes in contact with the atmosphere. The parameters measured by the YSI for this field effort are as follows:

- DO
- Conductivity
- Temperature
- pH
- ORP

3.1 Documentation

The Equipment Calibration Log is used to document calibration of measuring equipment used in the field. The Equipment Calibration Log documents that the manufacturer's instructions were followed for calibration of the equipment, including the frequency of calibration, type of standards used, and checks performed on calibration during the course of using the equipment. An Equipment Calibration Log must be maintained for each measuring device that requires calibration. Entries must be made for each day the equipment is used. A blank Equipment Calibration Log form is attached at the end of this SOP.

3.2 Calibration

The following YSI parameters DO, conductivity, and pH must be calibrated prior to the start of each day of use. Calibration and calibration checks will be documented in the field logbook and on the Equipment Calibration Log. The name, lot number, and expiration date for all calibration buffers and standards used will be recorded on the Equipment Calibration Log. The meter's model, serial number, and name of rental company will also be recorded on the equipment calibration form.

3.3 Tips for Good Calibration

- The DO calibration is a water-saturated air calibration. Make certain to loosen the calibration cup seal to allow pressure to equilibrate before calibrating.

- Make certain that sensors are completely submersed in solution and readings are stable when calibration values are entered.

- Use a small amount of calibration solution (previously used solution may be used, then discarded for this purpose) to pre-rinse the sonde.

- Fill a bucket with ambient temperature water to rinse the sonde between calibration solutions.

- Make sure to rinse and dry the probe between calibration solutions. This will reduce carry-over contamination and increase the accuracy of the calibration.

3.4 MAINTENANCE

The YSI Meter will be rented for the duration of field effort. Therefore, little field maintenance will be required. For any maintenance other than the routine cleaning, calibrating, or battery charging, the instrument should be returned to the vendor and a replacement sent immediately to the job site.

3.4.1 Meter Storage

For this field effort, the meter storage will be short term, [i.e. over night or between work shifts (4-day break)]. During these breaks, charge the meter. Place one-half inch of tap or distilled water in the meter calibration cup thread the cup onto the sonde. The key for short-term storage of probes is to use a minimal amount of water so the calibration cup will remain at 100 percent humidity. The water level must be low enough so that none of the probes are actually immersed. Proper storage of the sonde between usages will extend its life and will also ensure that the unit is ready for use as quickly as possible for the next application.

Multi-parameter short term storage key points:

- Use enough water to provide humidity but not enough to cover the probe surfaces.
- Make sure the storage vessel is sealed to minimize evaporation.
- Check periodically to make certain that water is still present.

3.4.2 Probe Cleaning

- Rinse the probe thoroughly with potable water.
- Rinse and soak the probe in deionized water.
- If stronger cleaning is required, Wash the probe in a mild solution of Liquinox and water and wipe with paper towels and/or cotton swabs.

Note: Reagents that are used to calibrate and check the YSI may be hazardous. Review the health and safety plan, Appendix D of the equipment manual, and Material Safety Data Sheets (MSDSs), all of which are on file in the field trailer.

4.0 LAMOTTE TURBIDITY METER PROCEDURES

This section describes the calibration procedure for the LaMotte 2020e turbidity meter. The meter is supplied with an instruction manual. The manual will be on site and will be used as the calibration guidance document for the meter's calibration.

4.1 Calibrate the LaMotte 2020e prior to the start of each day of use.

4.2 Document the calibration in the field logbook and on the Equipment Calibration Log. Record on the Equipment Calibration Log the name, lot number, and expiration date for all calibration standards used .

4.3 Record the meter's model, serial number, and name of rental company on the equipment calibration form.

ATTACHMENTS

1. Equipment Calibration Log

ATTACHMENT 1
EQUIPMENT CALIBRATION LOG

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : ____________________ INSTRUMENT NAME/MODEL: ____________________

SITE NAME: ____________________ MANUFACTURER: ____________________

PROJECT No.: ____________________ SERIAL NUMBER: ____________________

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		

STANDARD OPERATING PROCEDURE
SOP-11

GROUNDWATER SAMPLING

1.0 PURPOSE

This Standard Operating Procedure (SOP) establishes the procedure for collecting groundwater samples from permanent and temporary monitoring wells. Low-flow sampling techniques will be used for groundwater sampling at the NSF Indian Head and the NSF Indian Head – Stump Neck Annex facility.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

The following field forms and equipment are required for low-flow sampling of monitoring wells:

Writing utensil (preferably black ink)

Stainless steel Geoprobe Screen Point Groundwater Sampler (or equivalent)

Groundwater Sample Log Form: A copy of this form is attached at the end of this SOP.

Low Flow Purge Data Sheet: A copy of this form is attached at the end of this SOP.

Bound field log book

Chain-of-Custody Form

Bladder pump: With accessories: twin bonded PE ¼-inch tubing, MP-10 control box, nitrogen gas cylinder, and nitrogen regulator.

Peristaltic pump: Silicon and ¼-inch PE tubing.

Required sample containers with appropriate preservative: All sample containers for analysis by fixed-base laboratories will be supplied and deemed certified clean by the laboratory.

Surgical gloves

Water-level indicator

0.45-micron filter cartridge: If the metal analysis requires field filtering.

Bucket: to collect development/purge water

Calculator, wristwatch, and timer

Stainless steel clamps

Plastic storage bags

Shipping containers with ice

3.0 SAMPLING PROCEDURES

3.1 Groundwater sampling may be initiated when the well has been purged and stabilized in accordance with SOP-09.

3.2 Record the sample start time (using military time) on the Groundwater Sample Log Sheet. Record the field measurements for pH, oxidation-reduction potential (ORP), specific conductance, temperature, dissolved oxygen (DO), and turbidity.

3.3 With the pump continuing to run, disconnect the flow-through cell from the pump discharge tube and immediately start filling sample bottles directly from the pump discharge. All sample containers will be supplied by the laboratory, and the laboratory will pre-preserve all sample containers, where appropriate.

3.4 Allow the pump discharge to flow gently down the inside of the container with minimal turbulence when filling sample containers. Avoid immersing the discharge tube into the sample as the sample container is being filled.

3.5 Cap each container immediately after filling.

3.6 Record the sample time on the Groundwater Sample Log Form, the sample label, and the sample label.

3.7 Place the tagged sample container into a plastic storage bag and then into a cooler containing ice.

3.8 Enter the proper information on the Chain-of-Custody Form for each sample container (see SOP-03).

3.9 Repeat steps 3.3 through 3.9 for each sample container collected.

3.10 The pump rate should not be adjusted after sampling has commenced. If it becomes necessary to adjust the pump rate, document the change on the Groundwater Sample Log Form.

3.11 All samples will be collected into pre-preserved bottles (if required) supplied by an approved laboratory. All samples will be collected in the following sequence (where applicable):

- Other organics
- Metals
- Other Inorganics
- Filtered Metals

3.12 Filtered aliquots of groundwater may be collected and analyzed for dissolved metals. Without turning off the pump, attach a disposable, inline, 0.45-um filter cartridge at the end of the discharge tube. Fill sample containers marked for dissolved metals so that the laboratory knows that these aliquots are distinct sample fractions and that the results should be reported as dissolved analytes.

3.13 Repeat steps 3.5 through 3.9 for the filtered sample containers.

3.14 After completion of sample collection, remove the bladder pump (if bladder pump is used for sampling) from the well and decontaminate the pump following the procedures in SOP-14.

3.15 Proceed to abandon the temporary well as per SOP-06.

3.16 All equipment should be cleaned and packed into the sample vehicle, along with the sample cooler for transport. Disposable gloves, tubing, and other equipment should be placed in a plastic trash bag and handled as investigation-derived waste (SOP-12).

4.0 ATTACHMENTS

1. Groundwater Sample Log Sheet

ATTACHMENT 1

GROUNDWATER SAMPLE LOG SHEET

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: _____
Project No.: _____

[] Domestic Well Data
[] Monitoring Well Data
[] Other Well Type: _____
[] QA Sample Type: _____

Sample ID No.: _____
Sample Location: _____
Sampled By: _____
C.O.C. No.: _____
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: / Time: / Method:	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other

PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method:								
Monitor Reading (ppm):								
Well Casing Diameter & Material Type:								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

STANDARD OPERATING PROCEDURE
NUMBER SOP-12

MANAGEMENT OF INVESTIGATION-DERIVED WASTE

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes how investigation-derived waste (IDW) will be collected and managed during the field investigations at the NSF Indian Head facility. The following types of IDW will be generated during this investigation:

- Residual soil remaining from subsurface DPT drilling activities
- Well development water and purge water related to monitoring well installation and sampling
- Decontamination solutions
- Personal protective equipment and clothing (PPE)
- Miscellaneous trash and incidental items

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

Health and safety equipment (with PPE)
Decontamination equipment
Field logbook and indelible ink pen
Plastic sheeting and/or tarps
55-gallon drums with sealable lids
IDW labels for drums
Wastewater container tanks
Plastic garbage bags

3.0 PROCEDURES

Management of IDW includes the collection, segregation, temporary storage, classification, final disposal, and documentation of the waste-handling activities.

3.1 Liquid and Soil Wastes

Liquid wastes that will be generated during the site activities include well development water, well purge water (collected during low-flow sampling), and decontamination solutions from drilling and sampling equipment. Soil wastes include soil cuttings generated during borehole drilling.

3.1.1 Transfer wastewaters, including monitoring well purge water, to 55-gallon drums. Purge water will be collected at the well using 5-gallon spill proof containers which will then be used to transport the waste water to the 55-gallon drums marshaled at a central location on the NSF Indian Head facility for proper disposal.

3.1.2 Stage waste soils at the location of generation until groundwater sampling and removal of the temporary monitoring well at that location are completed. To the extent possible, return waste soils to the empty boreholes from which they were derived. Excess soil that cannot be returned to the boreholes will be containerized in 55-gallon drums, marshaled at the same location as the waste water drums, and sampled for waste characterization. Based on the characterization results, drums of waste soil will be transported and appropriately disposed off site by the IDW subcontractor at a Navy-approved disposal facility.

3.1.3 The location and number of drums used for the completion of work will be documented in the field note book. Each drum will be labeled and the following information will be placed on the label.

- Contents (soil or water)
- Site (i.e., UXO 14, 15, 17, 17, or 25)
- Location (NSF Indian Head)
- Volume of waste in the drum
- Date and time the waste was placed in the drum
- The NSF Indian Head program manager name and contact phone number

3.2 PPE, Pump Discharge Tubing, Direct-Push Technology (DPT) Sample Liners, and Incidental Trash

All PPE wastes, pump discharge tubes, DPT sample liners, and incidental trash materials (e.g., wrapping or packing materials from supply cartons, waste paper) must be decontaminated (if contaminated), double bagged, securely tied shut, and placed in a designated waste receptacle at NSF Indian Head.

STANDARD OPERATING PROCEDURE

SOP-13

GLOBAL POSITIONING SYSTEM

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the Field Technicians with basic instructions for operating a handheld Global Positioning System (GPS) unit allowing them to set GPS parameters in the receiver, record GPS positions on the field device, and update existing Geographic Information System (GIS) data. This SOP is specific to GIS quality data collection for Trimble-specific hardware and software.

If possible, the Trimble GeoXM or GeoXH Operators Manual should be downloaded onto the operator's personal computer for reference before or while in the field. The manual can be downloaded at http://trl.trimble.com/docushare/dsweb/Get/Document-311749/TerraSyncReferenceManual.pdf

Unless the operator is proficient in the setup and operation of the GPS unit, the Project Manager (or designee) should have the GPS unit shipped to the project-specific contact listed below in the Pittsburgh, Pennsylvania office at least five working days prior to field mobilization so project-specific shape files, data points, background images, and correct coordinate systems can be uploaded into the unit.

Tetra Tech NUS, Inc.
Attn: John Wright
661 Anderson Drive, Bldg #7
Pittsburgh, PA 15220

2.0 REQUIRED EQUIPMENT

The following hardware and software should be utilized for locating and establishing GPS points in the field:

2.1 Required GPS Hardware

- Hand-held GPS Unit capable of sub-meter accuracy (i.e. Trimble GeoXM or Trimble GeoXH). This includes the docking cradle, a/c adapter, stylus, and USB cable for data transfer.

Optional Accessories:

  - External antenna
  - Range pole
  - Hardware clamp (for mounting Geo to range pole)
  - GeoBeacon
- Indelible marker
- Non-metallic pin flags for temporary marking of positions

2.2 Required GPS Software

The following software is required to transfer data from the handheld GPS unit to a personal computer:

- Trimble TerraSync version 2.6 or later (pre-loaded onto GPS unit from vendor)

- Microsoft ActiveSync version 4.2 or later. Download to personal computer from: http://www.microsoft.com/windowsmobile/en-us/downloads/eulas/eula_activesync45_1033.mspx?ProductID=76

- Trimble Data Transfer Utility (freeware version 2.1 or later). Download to personal computer from: http://www.trimble.com/datatransfer.shtml

3.0 START-UP PROCEDURES

Prior to utilizing the GPS in the field, ensure the unit is fully charged. The unit may come charged from the vendor, but an overnight charge is recommended prior to fieldwork.

The Geo-series GPS units require a docking cradle for both charging and data transfer. The Geo-series GPS unit is docked in the cradle by first inserting the far domed end in the top of the cradled, then gently seating the contact end into the latch. The power charger is then connected to the cradle at the back end using the twist-lock connector. Attach a USB cable as needed between the cradle (B end) and the laptop/PC (A end).

It is recommended that the user also be familiar and check various Windows Mobile settings. One critical setting is the Power Options. The backlight should be set as needed to conserve power when not in use.

Start Up:

1) Power on the GPS unit by pushing the small green button located on the lower right front of the unit.

2) Utilizing the stylus that came with the GPS unit, launch **TerraSync** from the Windows Operating System by tapping on the start icon located in the upper left hand corner of the screen and then tap on **TerraSync** from the drop-down list.

3) If the unit does not default to the Setup screen, tap the Main Menu (uppermost left tab, just below the Windows icon) and select Setup.

4) If the unit was previously shipped to the Pittsburgh office for setup, you can skip directly to Section 4.0. However, to confirm or change settings, continue on to Section 3.1.

3.1 Confirm Setup Settings

Use the Setup section to confirm the TerraSync software settings. To open the Setup section, tap the Main Menu and select Setup.

1) Coordinate System
   a. Tap on the Coordinate System.
   b. Verify the project specs are correct for your specific project by scrolling through the various settings. Edit as needed and then tap OK; otherwise, tap Cancel to return to Setup Menu. **Note:** It is always best to utilize the Cancel tab rather than the OK tab if no changes are made since configurations are easily changed by mistake.
   c. Tap on the Units.
   d. Verify the user preferences are correct for your specific project by scrolling through the various settings. Edit as needed and then tap OK; otherwise, tap Cancel to return to Setup Menu.
   e. Tap Real-time Settings.
   f. Verify the Real-time Settings are correct for your specific project by scrolling through the various settings. Edit as needed and then tap OK; otherwise, tap Cancel to return to Setup Menu.
   g. The GPS unit is now configured correctly for your specific project.

4.0 ANTENNA CONNECTION

1) If a connection has been properly made with the internal antenna, a satellite icon along with the number of usable satellites will appear at the top of the screen next to the battery icon. If no connection is made (e.g.: no satellite icon), tap on the GPS tab to connect antenna.
2) At this point the GPS unit is ready to begin collecting data.

5.0 COLLECTING NEW DATA IN THE FIELD

1) From the Main Menu select Data.
2) From the Sub Menu (located below the Data tab) select New which will bring up the New Data File menu.
3) An auto-generated filename appears and should be edited for your specific project. If the integral keyboard does not appear, tap the small keyboard icon at the bottom of the screen.
4) After entering the file name, tap Create to create the new file.
5) Confirm antenna height if screen appears. Antenna height is the height that the GPS unit will be held from the ground surface (Typically 3 to 4 feet).
6) The Choose Feature screen appears.

5.1 Collecting Features

1) If not already open, the Collect Feature screen can be opened by tapping the Main Menu and selecting Data. The Sub Menu should default to Collect.
2) **Do not begin the data logging process until you are at the specific location for which you intend to log the data.**
3) A known reference or two should be shot at the beginning and at the end of each day in which the GPS unit is being used. This allows for greater accuracy during post-processing of the data.
4) Upon arriving at the specific location, tap on Point_generic as the Feature Name.
5) Tap Create to begin data logging.
6) In the Comment Box enter sample ID or location-specific information.
7) Data logging can be confirmed by viewing the writing pencil icon in the upper part of the screen. Also, the logging counter will begin. As a Rule of Thumb, accumulate a minimum of 20 readings on the counter, per point, as indicated by the logging counter before saving the GPS data.
8) Once the counter has reached a minimum number of counts (i.e. 20), tap on OK to save the data point to the GPS unit. Confirm the feature. All data points are automatically saved within the GPS unit.
9) Repeat steps 2 through 8, giving each data point a unique name or number.

Note: If the small satellite icon or the pencil icon is blinking, this is an indication the GPS unit is not collecting data. A possible problem may be too few satellites. While still in data collection mode, tap on Main Menu in upper left hand corner of the screen and select Status. Skyplot will display as the default showing the number of available satellites. To increase productivity (number of usable satellites) use the stylus to move the pointer on the productivity and precision line to the left. This will decrease precision, but increase productivity. The precision and productivity of the GPS unit can be adjusted as the number of usable satellites changes throughout the day. To determine if GPS is correctly recording data, see Section 5.2.

5.2 Viewing Data or Entering Additional Data Points to the Current File

1) To view the stored data points in the current file, tap on the Main Menu and select Map. Stored data points for that particular file will appear. Use the +/- and <-/-> icons in lower left hand corner of screen to zoom in/out and to manipulate current view.
2) To return to data collection, tap on the Main Menu and select Data. You are now ready to continue to collect additional data points.

5.3 Viewing Data or Entering Data Points from an Existing File

1) To view data points from a previous file, tap on Main Menu and select Data, then select File Manager from the Sub Menu.
4) Highlight the file you want to view and select Map from the Main Menu.
5) To add data points to this file, tap on Main Menu and select Data. Continue to collect additional data points.

6.0 NAVIGATION

This section provides instructions on navigating to saved data points in an existing file within the GPS unit.

1) From the Main Menu select Map.
2) Using the Select tool, pick the point on the map to where you want to navigate.
3) The location you select will have a box placed around the point.
4) From the Options menu, choose the Set Nav Target (aka set navigation target).
5) The location will now have double blue flags indicating this point is you navigation target.
6) From the Main Menu select Navigation.
7) The dial and data on this page will indicate what distance and direction you need to travel to reach the desired target.
8) Follow the navigation guide until you reach the point you select.
9) Repeat as needed for any map point by going back to Step 1.

7.0 PULLING IN A BACKGROUND FILE

This section provides instructions on pulling in a pre-loaded background file. These files are helpful in visualizing your current location.

1) From the Main Menu select Map, then tap on Layers, select the background file from drop down list.
2) Select the project-specific background file from the list of available files.
3) Once the selected background file appears, the operator can manipulate the screen utilizing the +/- and <-/-> functions at the bottom of the screen.
4) In operating mode, the operator's location will show up on the background file as a floating "x".

8.0 DATA TRANSFER

This section provides instructions on how to transfer stored data on the handheld GPS unit to a personal computer. Prior to transferring data from the GPS unit to a computer, Microsoft ActiveSync and Trimble Data Transfer Utility software must be downloaded to the computer from the links provided in Section 2.2 (Required GPS Software). If a leased computer is utilized in which the operator can not download files, see the Note at the end of Section 8.0.

1) See Attachment A at the end of this SOP for instructions on how to transfer data from the GPS to a personal computer.

Note: If you are unable to properly transfer data from the GPS unit to a personal computer, the unit should be shipped to the project-specific contact listed in Section 1.0 where the data will be transferred and the GPS unit then shipped back to the vendor.

9.0 SHUTTING DOWN

This section provides instruction for properly shutting down the GPS unit.

1) When shutting down the GPS unit for the day, first click on the "X" in the upper right hand corner.
2) You will be prompted to ensure you want to exit TerraSync. Select Yes.
3) Power off the GPS unit by pushing the small green button located on the bottom face of the unit.
4) Place the GPS unit in its cradle to recharge the battery overnight. Ensure the green charge light is visible on the charging cradle.

ATTACHMENT A

How to Transfer Trimble GPS Data between Data Collector and PC
original 11/21/06 (5/1/08 update) – John Wright

Remember – Coordinate System, Datum, and Units are critical!!!

Trimble Data Collection Devices:
Standard rental systems include the Trimble ProXR/XRS backpack and the newer handheld GeoXT or GeoXH units. Some of the older backpack system may come with either a RECON "PDA-style" or a TSCe or TSC1 alpha-numeric style data collector.

The software on all of the above units should be Trimble TerraSync (v 2.53 or higher – current version is 3.20) and to the user should basically look and function similar. The newer units and software versions (which should always be requested when renting) include enhancements for data processing, real-time display functions, and other features.

Data Transfer:
Trimble provides a free transfer utility program to aid in the transfer of GIS and field data. The Data Transfer Utility is a standalone program that will run on a standard office PC or laptop.

To connect a field data collector such as a RECON, GeoXM, GeoXT, GeoXH, or ProXH, you must first have Microsoft ActiveSync installed to allow the PC and the data collector to talk to one another. A standard USB cable is also needed to connect the two devices.

A CD or USB drive is provided with the data collector for use in data transfer. If needed, these programs are also available without charge via the web at:

• **Trimble Data Transfer Utility** (v 1.38) program to download the RECON or GeoXH field data to your PC: http://www.trimble.com/datatransfer.shtml

• **ActiveSync** from Microsoft to connect the data collector to the PC. The latest version (v4.5) can be found at: http://www.microsoft.com/windowsmobile/activesync/default.mspx
(see page 2 for data transfer instructions)

To Transfer Data Collected in the Field:

• Install the Data Transfer and ActiveSync software installed on your PC
• Connect the RECON or GeoXH to your PC via an A/B USB cable (blade end and square end type "HP printer" style)
• ActiveSync should auto-detect the connection and recognize the data collector
• Make sure the data file desired is CLOSED in TerraSync prior to transfer
• Connect via ActiveSync as a guest (not a partnership)
• Run the Trimble Data Transfer Utility program on your PC
• Select "***GIS Datalogger on Windows CE***" or similar selection
• Hit the green connect icon to the right - the far right area should say "***Connected to ....***" if successful
• Select the "***Receive***" data tab (under device)
• Select "***Data***" from file types on the right
• Find the file(s) needed for data transfer. You can sort the data files by clicking on the date/time header
• Select or browse to a C-drive folder you can put this file for emailing
• When the file appears on the list, hit the "***Transfer All***"
• Go to your Outlook or other email, send a message to: John.Wright@tetratech.com (or GIS department)
• Attach the file(s) you downloaded from your C-drive. For each TerraSync data file created you should have a packet of multiple data files. All need to be sent as a group – make sure you attach all files (the number of files may vary – examples include: ssf, obx, obs, gix, giw, gis, gip, gic, dd, and car)

To Transfer GIS Data from PC to the Field Device (must be converted in Pathfinder Office):

• Obtain GIS file(s) desired from GIS Department and have converted to Trimble extension
• Contact John Wright (John.Wright@tetratech.com) if needed for file conversion and upload support
• The GIS file(s) can be quickly converted if requested and sent back to the field user in the needed "Trimble xxx.imp" extension via email – then quickly downloaded from Outlook to your PC for transfer
• Install the Data Transfer and ActiveSync software installed on your PC
• Connect the RECON or GeoXH to your PC via an A/B USB cable (blade end and square end type "HP printer" style)
• ActiveSync should auto-detect the connection and recognize the data collector
• Connect via ActiveSync as a guest (not a partnership)
• Run the Trimble Data Transfer Utility program on your PC
• Select "***GIS Datalogger on Windows CE***" or similar selection
• Hit the green connect icon to the right - the far right area should say "***Connected to ....***" if successful
• Select the "**Send**" data tab (under device)
• Select "**Data**" from file types on the right (you can also send background files)
• Browse to the location of the data on your PC (obtain the file from Pathfinder Office or from the person who converted the data for field use)
• Select the options as appropriate for the name and location of the data file to go on the data collector (usually you can choose main memory or a data storage card)
• When the file(s) appears on the list, hit the "***Transfer All***"
• Run TerraSync on the field device and open the existing data files. Your transferred file should appear (make sure you have selected Main Memory, Default, or Storage Card as appropriate)

STANDARD OPERATING PROCEDURE

SOP-14

DECONTAMINATION OF FIELD SAMPLING EQUIPMENT

1.0 PURPOSE

This Standard Operating Procedure (SOP) establishes the procedures to be followed when decontaminating non-dedicated field sampling equipment during the field investigations at the Naval Support Facility (NSF) Indian Head Stump Neck Annex.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

Waterproof pens
Non-latex rubber or plastic gloves
Cotton gloves
Field logbook
Potable water
Deionized water
LiquiNox detergent
Brushes, spray bottles, paper towels, etc.
55-gallon drum or other container to collect and transport decontamination fluids

3.0 DECONTAMINATION PROCEDURES

3.1 Don non-latex and/or cotton gloves and decontaminate sampling equipment (in accordance with the following steps) prior to field sampling and between samples.

3.2 Rinse the equipment with potable water. Rinsing may be conducted by spraying with water from a spray bottle or by dipping. Collect the potable water rinsate into a container. For heavy drilling equipment, the subcontractor will use high pressure steam rinse to decontaminate drilling tools. For these larger tools, skip to Step 3.6 of this SOP; otherwise, continue with the next step for smaller drilling tools used for soil sampling.

3.3 Wash the equipment with a solution of LiquiNox detergent. Prepare the LiquiNox wash solution in accordance with the instructions on the LiquiNox container. Collect the LiquiNox wash solution into a container. Use brushes or sprays as appropriate for the equipment to remove debris. If

oily residue has accumulated on the sampling equipment, remove the residue with an isopropanol wash and repeat the Liquinox wash.

3.4 Rinse the equipment with potable water. Rinsing may be conducted by spraying with water from a spray bottle or by dipping. Collect the potable water rinsate into a container.

3.5 Rinse the equipment with deionized water. Rinsing may be conducted by spraying with water from a spray bottle or by dipping. To collect a rinsate blanks, collect the deionized water rinsate into the appropriate sample container.

3.6 Remove excess water by air drying, shaking, or by wiping with paper towels as necessary.

3.7 Document decontamination by recording it in the field logbook.

3.8 Containerize decontamination solutions in accordance with the procedures described in the SAP.

APPENDIX B

LABORATORY STANDARD OPERATING PROCEDURES

CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board/ACLASS
500 Montgomery Street, Suite 625, Alexandria, VA 22314, 877-344-3044

This is to certify that

APPL, Inc.
908 N. Temperance Avenue
Clovis, CA 93611

has been assessed by ACLASS
and meets the requirements of

DoD-ELAP

while demonstrating technical competence in the field(s) of

TESTING

Refer to the accompanying Scope(s) of Accreditation for information regarding the types of tests to which this accreditation applies.

ADE-1410
Certificate Number

ACLASS Approval
Certificate Valid: 10/23/2009-10/23/2011
Version No. 001

SCOPE OF DoD-ELAP ACCREDITATION

APPL, Inc.

908 N. Temperance Avenue, Clovis, CA 93611
Diane Anderson Phone: 559-275-2175

TESTING

Valid to: October 23, 2011 Certificate Number: ADE- 1410

I. Environmental

MATRIX	SPECIFIC TEST or GROUP of ANALYTES	SPECIFICATION OR STANDARD METHOD (all SW846 unless specified)	* KEY EQUIPMENT OR TECHNOLOGY USED
Water / Wastewater	Acid Digestion for Metals Analysis	3010A	
Solid / Solid Waste	Acid digestion for Metals Analysis	3050B	
Water / Wastewater	Mercury Digestion and Analysis	245.1 / 7470A	AAS
Solid / Solid Waste	Mercury Digestion and Analysis	7471B	AAS
Water / Wastewater	Microwave assisted Acid Digestion for Metals Analysis	3015	Microwave
Solid / Solid Waste	Microwave assisted Acid Digestion for Metals Analysis	3051A	Microwave
Water / Wastewater	Purge and Trap for Aqueous Samples	5030B / 5030C	
Solid / Solid Waste	Closed-system purge and trap extraction for VOA analysis	5035 / 5035A	
Water / Wastewater	Separatory Funnel Extraction	3510C	
Solid / Solid Waste	Ultrasonic Extraction	3550B	Ultrasonic waterbath
Solid / Solid Waste	Soxhlet Extraction	3540C	Soxhlet Extractors

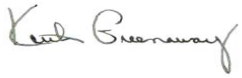
MATRIX	SPECIFIC TEST or GROUP of ANALYTES	SPECIFICATION OR STANDARD METHOD (all SW846 unless specified)	* KEY EQUIPMENT OR TECHNOLOGY USED
Water / Wastewater	Liquid-Liquid Extraction	3520C	Liquid-Liquid Extractor
Water / Wastewater / Solid / Solid Waste	Silica gel cleanup	3630C	
Solid / Solid Waste	Incremental sampling	8330B, Appendix A	Puck mill grinder
Water / Wastewater / Solid / Solid Waste	Sulfur cleanup	3660B	
Water / Wastewater / Solid / Solid Waste	Sulfuric acid – permanganate cleanup	3665A	
Water / Wastewater / Solid / Solid Waste	Gel permeation cleanup	3640A	
Solid / Solid Waste	TCLP extraction	1311	Rotary Tumbler
Solid / Solid Waste	SPLP extraction	1312	Rotary Tumbler
Solid / Solid Waste	Waste Extraction Test (WET)	CCR Chapter 11, Article 5, Appendix II	Rotary Tumbler
Water / Wastewater	Total Dissolved Solids	160.1 / 2540C	Gravimetric
Water / Wastewater	Total Suspended Solids	160.2 / 2540D	Gravimetric
Water / Wastewater	Anion analysis	300.0 / 9056 / 9056A	Dionex Ion Chromatography
Solid / Solid Waste	Anion analysis	9056 / 9056A	Dionex Ion Chromatography
Water / Wastewater / Solid / Solid Waste	Perchlorate analysis	314.0	Dionex Ion Chromatography
Water / Wastewater / Solid / Solid Waste	Ammonia	350.1	Lachat Flow Injection Analysis
Water / Wastewater / Solid / Solid Waste	TKN	351.2	Lachat Flow Injection Analysis
Water / Wastewater / Solid / Solid Waste	Nitrate / Nitrite	353.2	Lachat Flow Injection Analysis
Water / Wastewater / Solid / Solid Waste	Sulfide	376.1	Titrimetric
Water	Fluoride	9214	Ion Selective Electrode

MATRIX	SPECIFIC TEST or GROUP of ANALYTES	SPECIFICATION OR STANDARD METHOD (all SW846 unless specified)	* KEY EQUIPMENT OR TECHNOLOGY USED
Drinking Water / Water / Wastewater / Solid / Solid Waste	PCB Congeners	1668	High Resolution GC/MS
Water / Wastewater / Solid / Solid Waste	Perchlorate	6850	HPLC/Electrospray Ionization/MS
Water / Wastewater	Oil & Grease	1664A	Gravimetric
Water / Wastewater	Oil & Grease	5520B	Gravimetric
Water / Wastewater	TRPH	5520BF	Gravimetric
Water / Wastewater / Solid / Solid Waste	Total Metals	6010B / 6010C	ICP
Water / Wastewater / Solid / Solid Waste	Total Metals	6020 / 6020A	ICP/MS
Water / Wastewater / Solid / Solid Waste	Hexavalent Chromium	7196A	UV/Vis
Solid / Solid Waste	Alkaline digestion of Hexavalent Chromium	3060A	
Water / Wastewater	Hexavalent Chromium	218.6 / 7199	Dionex Ion Chromatography
Water / Wastewater / Solid / Solid Waste	Total Cyanide Distillation	9010B / 9010C	Midi-Distillation unit
Water / Wastewater / Solid / Solid Waste	Total Cyanide Analysis	9014	UV/Vis
Water / Wastewater	Corrosivity - pH	9040B	Ion Selective Electrode
Solid / Solid Waste	Corrosivity - pH	9045C / 9045D	Ion Selective Electrode
Water / Wastewater / Solid / Solid Waste	Chlorinated & Brominated Hydrocarbons	8011	GC/ECD
Water / Wastewater / Solid / Solid Waste	DRO/GRO	8015B/C/D	GC/FID
Water / Wastewater / Solid / Solid Waste	BTEX	8021B	GC/PID
Water / Solid	OP Pesticides	614 / 8141A / 8141B	GC/ECD
Water / Waste Water	OP Pesticides	614	GC/ECD

MATRIX	SPECIFIC TEST or GROUP of ANALYTES	SPECIFICATION OR STANDARD METHOD (all SW846 unless specified)	* KEY EQUIPMENT OR TECHNOLOGY USED
Water / Waste Water	OCL Pesticides	608	GC/ECD
Water / Wastewater / Solid / Solid Waste	OCL Pesticides	8081A / 8081B	GC/ECD
Water / Waste Water	PCB	608	GC/ECD
Water / Wastewater / Solid / Solid Waste	PCB	8082 / 8082A	GC/ECD
Water / Waste Water	Herbicides	615	GC/ECD
Water / Wastewater / Solid / Solid Waste	Herbicides	8151A	GC/ECD
Water / Wastewater / Solid / Solid Waste	VOA	8260B / 8260C	GC/MS
Water / Wastewater / Solid / Solid Waste	PAH	8270 SIM	GC/MS
Water / Waste Water	Semi-VOA	625	GC/MS
Water / Wastewater / Solid / Solid Waste	Semi-VOA	8270C / 8270D	GC/MS
Water / Wastewater / Solid / Solid Waste	Dioxins	8290	HRGC/HRMS
Water / Wastewater / Solid / Solid Waste	Nitroaromatics & Nitramines & Nitroguanadine	8330A / 8330B / 8321A&B	HPLC
Water / Wastewater / Solid / Solid Waste	Carbamates	8321A / 8321B	HPLC
Solid / Solid Waste	Ignitability	1030	
Solid / Solid Waste	TOC	Walkley-Black	Titration

Notes:

1. ** = As Applicable*
2. *This scope is part of and must be included with the Certificate of Accreditation No. ADE- 1410*



Vice President

DoD ELAP -- PT Performance Summary Review					
Lab Name :	**APPL, Inc.**				
City/State :	Clovis, CA				
PT Provider Used :	ERA, Absolute, RTC, APG				
PartName	PartNumber	NELACCode	AnalyteName	EPAmethod#	PT results
pH	4060	1900	pH	EPA 150.2	**Approved**
WP pH @ 25°C	55061	1900	pH	EPA 150.2	**Approved**
Solids (Total Solids, TSS, & TDS)	55085	1955	Total Dissolved Solids (TDS)	EPA 160.1	**Approved**
WP Minerals #1	55144	1955	Total Dissolved Solids @ 180°C	EPA 160.1	**Approved**
Solids	4030	1705	Total Dissolved Solids at 180C	EPA 160.1	**Approved**
Solids (Total Solids, TSS, & TDS)	55085	1960	Non-Filterable Residue (TSS)	EPA 160.2	**Approved**
Solids	4030	1960	Total Suspended Solids	EPA 160.2	**Approved**
Oil & Grease	4120	1860	Oil & Grease	EPA 1664A	**Approved**
Oil & Grease - n-Hexadecane & Stear	55084	1860	Oil & Grease	EPA 1664A	**Approved**
PCB Congeners in Water	PEO-403	9070	2,2',3,4,4',5,5'-Heptachlorobiphenyl (PCB 180)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	9025	2,2',3,4,4',5'-Hexachlorobiphenyl (PCB 138)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	9040	2,2',4,4',5,5'-Hexachlorobiphenyl (PCB 153)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	8980	2,2',4,5,5'-Pentachlorobiphenyl (PCB 101)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	8955	2,2',5,5'-Tetrachlorobiphenyl (PCB 52)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	9085	2,3,3',4,4',5,5'-Heptachlorobiphenyl (PCB 189)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	9050	2,3,3',4,4',5-Hexachlorobiphenyl (PCB 156)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	9045	2,3,3',4,4',5'-Hexachlorobiphenyl (PCB 157)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	8985	2,3,3',4,4'-Pentachlorobiphenyl (PCB 105)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	9055	2,3',4,4',5,5'-Hexachlorobiphenyl (PCB 167)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	9005	2,3,4,4',5-Pentachlorobiphenyl (PCB 114)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	8995	2,3',4,4',5-Pentachlorobiphenyl (PCB 118)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	9000	2,3',4,4',5'-Pentachlorobiphenyl (PCB 123)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	8936	2,4,4'-Trichlorobiphenyl (PCB 28)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	9060	3,3',4,4',5,5'-Hexachlorobiphenyl (PCB 169)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	9015	3,3',4,4',5-Pentachlorobiphenyl (PCB 126)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	8965	3,3',4,4'-Tetrachlorobiphenyl (PCB 77)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	8970	3,4,4',5-Tetrachlorobiphenyl (PCB 81)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	9025	PCB (129)+(138)+(163)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	9040	PCB (153)+(168)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	9046	PCB (156)+(157)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	9070	PCB (180)+(193)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	8936	PCB (20)+(28)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	8980	PCB (90)+(101)+(113)	EPA 1668	**Approved**
PCB Congeners in Water	PEO-403	8870	PCBs, total	EPA 1668	**Approved**
Bromide	4850	1540	Bromide	EPA 300.0	**Approved**
CWA Anions	55131	1540	Bromide (Br)	EPA 300.0	**Approved**
Minerals	4050	1575	Chloride	EPA 300.0	**Approved**
WP Minerals #1	55144	1575	Chloride	EPA 300.0	**Approved**
Fluoride	4420	1730	Fluoride	EPA 300.0	**Approved**
WP Minerals #2	55145	1730	Fluoride	EPA 300.0	**Approved**
WP & DMRQA Nutrients	55035	1810	Nitrate as N	EPA 300.0	**Approved**
WP Nitrate & Nitrite	55130	1810	Nitrate as N	EPA 300.0	**Approved**
Nutrients	4020	1810	Nitrate Nitrogen as N	EPA 300.0	**Approved**
Nitrate-Nitrite as N	4770	1820	Nitrate-Nitrite as N	EPA 300.0	**Approved**
WP Nitrate & Nitrite	55130	1820	Nitrite + Nitrate as N	EPA 300.0	**Approved**
Nitrite as N	4780	1840	Nitrite as N	EPA 300.0	**Approved**
WP Nitrate & Nitrite	55130	1840	Nitrite as N	EPA 300.0	**Approved**
Nutrients	4020	1870	Orthophosphate as P	EPA 300.0	**Approved**
WP & DMRQA Nutrients	55035	1870	Orthophosphate as P	EPA 300.0	**Approved**
Minerals	4050	2000	Sulfate	EPA 300.0	**Approved**
WP Minerals #2	55145	2000	Sulfate	EPA 300.0	**Approved**
Miscellaneous Analytes	PEI-051	1540	Bromide	EPA 300.0	**Approved**
Minerals	PEI-051	1575	Chloride	EPA 300.0	**Approved**
Minerals	PEI-051	1730	Fluoride	EPA 300.0	**Approved**
Nutrients	PEI-051	1805	Nitrate as N	EPA 300.0	**Approved**
Nutrients	PEI-051	1820	Nitrate+nitrite as N	EPA 300.0	**Approved**
Nutrients	PEI-051	1840	Nitrite as N	EPA 300.0	**Approved**
Nutrients	PEI-051	1870	Orthophosphate as P	EPA 300.0	**Approved**
Minerals	PEI-051	2000	Sulfate	EPA 300.0	**Approved**
WP Perchlorate	55116	1895	Perchlorate	EPA 314.0	**Approved**
Fluoride	4420	1730	Fluoride	EPA 340.2	**Approved**
WP Minerals #2	55145	1730	Fluoride	EPA 340.2	**Approved**
WP & DMRQA Nutrients	55035	1515	Ammonia as N	EPA 350.1	**Approved**
Nutrients	4020	1515	Ammonia Nitrogen as N	EPA 350.1	**Approved**
Nutrients	4020	1795	Total Kjeldahl Nitrogen	EPA 351.2	**Approved**
WP & DMRQA Nutrients #2	55064	1795	Total Kjeldahl Nitrogen	EPA 351.2	**Approved**
WP & DMRQA Nutrients	55035	1810	Nitrate as N	EPA 353.2	**Approved**
WP Nitrate & Nitrite	55130	1810	Nitrate as N	EPA 353.2	**Approved**
Nutrients	4020	1810	Nitrate Nitrogen as N	EPA 353.2	**Approved**
Nitrate-Nitrite as N	4770	1820	Nitrate-Nitrite as N	EPA 353.2	**Approved**

WP Nitrate & Nitrite	55130	1820	Nitrite + Nitrate as N	EPA 353.2	**Approved**
Nitrite as N	4780	1840	Nitrite as N	EPA 353.2	**Approved**
WP Nitrate & Nitrite	55130	1840	Nitrite as N	EPA 353.2	**Approved**
Sulfide	4900	2005	Sulfide	EPA 376.1	**Approved**
Sulphide	55042	2005	Sulphide	EPA 376.1	**Approved**
MBAS	4430	2025	MBAS	EPA 425.1	**Approved**
Trace Metals	4070	1000	Aluminum	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1000	Aluminum	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1000	Aluminum	EPA 6010B	**Approved**
Trace Metals 1	PEI-034-1	1000	Aluminum, Al	EPA 6010B	**Approved**
Trace Metals	4070	1005	Antimony	EPA 6010B	**Approved**
WP Trace Elements	55025	1005	Antimony	EPA 6010B	**Approved**
Trace Metals 2	PEI-034-2	1005	Antimony, Sb	EPA 6010B	**Approved**
Trace Metals	4070	1010	Arsenic	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1010	Arsenic	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1010	Arsenic	EPA 6010B	**Approved**
Trace Metals 1	PEI-034-1	1010	Arsenic, As	EPA 6010B	**Approved**
WP Trace Elements	55025	1015	Barium	EPA 6010B	**Approved**
Trace Metals	586	1015	Barium	EPA 6010B	**Approved**
Trace Metals	4070	1020	Beryllium	EPA 6010B	**Approved**
WP Trace Elements	55025	1020	Beryllium	EPA 6010B	**Approved**
Trace Metals 1	PEI-034-1	1020	Beryllium, Be	EPA 6010B	**Approved**
Trace Metals	4070	1025	Boron	EPA 6010B	**Approved**
WP Trace Elements	55025	1025	Boron	EPA 6010B	**Approved**
WP Trace Elements	55025	1025	Boron	EPA 6010B	**Approved**
Trace Metals 2	PEI-034-2	1025	Boron, B	EPA 6010B	**Approved**
Trace Metals	4070	1030	Cadmium	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1030	Cadmium	EPA 6010B	**Approved**
WP Minerals #1	55144	1035	Calcium	EPA 6010B	**Approved**
WP Minerals #1	55144	1550	Calcium Hardness (CaCO3)	EPA 6010B	**Approved**
Trace Metals	4070	1040	Chromium	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1040	Chromium	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1050	Cobalt	EPA 6010B	**Approved**
Trace Metals	586	1050	Cobalt	EPA 6010B	**Approved**
Trace Metals	4070	1055	Copper	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1055	Copper	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1055	Copper	EPA 6010B	**Approved**
Trace Metals	4070	1070	Iron	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1070	Iron	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1070	Iron	EPA 6010B	**Approved**
Trace Metals	4070	1075	Lead	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1075	Lead	EPA 6010B	**Approved**
WP Minerals #1	55144	1085	Magnesium	EPA 6010B	**Approved**
Trace Metals	4070	1090	Manganese	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1090	Manganese	EPA 6010B	**Approved**
Trace Metals 1	PEI-034-1	1090	Manganese, Mn	EPA 6010B	**Approved**
Trace Metals	4070	1100	Molybdenum	EPA 6010B	**Approved**
WP Trace Elements	55025	1100	Molybdenum	EPA 6010B	**Approved**
WP Trace Elements	55025	1100	Molybdenum	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1105	Nickel	EPA 6010B	**Approved**
Trace Metals	586	1105	Nickel	EPA 6010B	**Approved**
WP Minerals #2	55145	1125	Potassium	EPA 6010B	**Approved**
Trace Metals	4070	1140	Selenium	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1140	Selenium	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1140	Selenium	EPA 6010B	**Approved**
Trace Metals 1	PEI-034-1	1140	Selenium, Se	EPA 6010B	**Approved**
Trace Metals	4070	1150	Silver	EPA 6010B	**Approved**
WP Trace Elements	55025	1150	Silver	EPA 6010B	**Approved**
WP Trace Elements	55025	1150	Silver	EPA 6010B	**Approved**
Trace Metals 2	PEI-034-2	1150	Silver, Ag	EPA 6010B	**Approved**
WP Minerals #2	55145	1155	Sodium	EPA 6010B	**Approved**
Trace Metals	4070	1160	Strontium	EPA 6010B	**Approved**
WP Trace Elements	55025	1160	Strontium	EPA 6010B	**Approved**
WP Trace Elements	55025	1160	Strontium	EPA 6010B	**Approved**
Trace Metals 2	PEI-034-2	1160	Strontium, Sr	EPA 6010B	**Approved**
Trace Metals	4070	1165	Thallium	EPA 6010B	**Approved**
WP Trace Elements	55025	1165	Thallium	EPA 6010B	**Approved**
WP Trace Elements	55025	1165	Thallium	EPA 6010B	**Approved**
Trace Metals	4070	1175	Tin	EPA 6010B	**Approved**
WP Tin	55095	1175	Tin	EPA 6010B	**Approved**
Barium & Tin	PEI-034-5	1175	Tin, Sn	EPA 6010B	**Approved**
Trace Metals	4070	1180	Titanium	EPA 6010B	**Approved**
WP Trace Elements	55025	1180	Titanium	EPA 6010B	**Approved**
WP Trace Elements	55025	1180	Titanium	EPA 6010B	**Approved**
Trace Metals 2	PEI-034-2	1180	Titanium, Ti	EPA 6010B	**Approved**
WP Minerals #1	55144	1755	Total Hardness (CaCO3)	EPA 6010B	**Approved**
Trace Metals	4070	1185	Vanadium	EPA 6010B	**Approved**

WP & DMRQA Trace Elements	55024	1185	Vanadium	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1185	Vanadium	EPA 6010B	**Approved**
Trace Metals	4070	1190	Zinc	EPA 6010B	**Approved**
WP & DMRQA Trace Elements	55024	1190	Zinc	EPA 6010B	**Approved**
Trace Metals	4070	1000	Aluminum	EPA 6020	**Approved**
Trace Metals	4070	1005	Antimony	EPA 6020	**Approved**
WP Trace Elements	55025	1005	Antimony	EPA 6020	**Approved**
Trace Metals	4070	1010	Arsenic	EPA 6020	**Approved**
WP & DMRQA Trace Elements	55024	1010	Arsenic	EPA 6020	**Approved**
Trace Metals	4070	1015	Barium	EPA 6020	**Approved**
Trace Metals	4070	1020	Beryllium	EPA 6020	**Approved**
WP Trace Elements	55025	1020	Beryllium	EPA 6020	**Approved**
Trace Metals	4070	1025	Boron	EPA 6020	**Approved**
Trace Metals	586	1025	Boron	EPA 6020	**Approved**
Trace Metals	PEI-034	1025	Boron, B	EPA 6020	**Approved**
Trace Metals	4070	1030	Cadmium	EPA 6020	**Approved**
WP & DMRQA Trace Elements	55024	1030	Cadmium	EPA 6020	**Approved**
Trace Metals	4070	1040	Chromium	EPA 6020	**Approved**
Trace Metals	4070	1050	Cobalt	EPA 6020	**Approved**
WP & DMRQA Trace Elements	55024	1050	Cobalt	EPA 6020	**Approved**
Trace Metals	4070	1055	Copper	EPA 6020	**Approved**
WP & DMRQA Trace Elements	55024	1055	Copper	EPA 6020	**Approved**
WP & DMRQA Trace Elements	55024	1070	Iron	EPA 6020	**Approved**
Trace Metals	586	1070	Iron	EPA 6020	**Approved**
Trace Metals	4070	1075	Lead	EPA 6020	**Approved**
WP & DMRQA Trace Elements	55024	1075	Lead	EPA 6020	**Approved**
Trace Metals	4070	1090	Manganese	EPA 6020	**Approved**
WP & DMRQA Trace Elements	55024	1090	Manganese	EPA 6020	**Approved**
Trace Metals	4070	1100	Molybdenum	EPA 6020	**Approved**
WP Trace Elements	55025	1100	Molybdenum	EPA 6020	**Approved**
Trace Metals	4070	1105	Nickel	EPA 6020	**Approved**
WP & DMRQA Trace Elements	55024	1105	Nickel	EPA 6020	**Approved**
Trace Metals	4070	1140	Selenium	EPA 6020	**Approved**
WP & DMRQA Trace Elements	55024	1140	Selenium	EPA 6020	**Approved**
Trace Metals	4070	1150	Silver	EPA 6020	**Approved**
Trace Metals	4070	1160	Strontium	EPA 6020	**Approved**
WP Trace Elements	55025	1160	Strontium	EPA 6020	**Approved**
Trace Metals	4070	1165	Thallium	EPA 6020	**Approved**
WP Trace Elements	55025	1165	Thallium	EPA 6020	**Approved**
Trace Metals	4070	1175	Tin	EPA 6020	**Approved**
WP Trace Elements	55025	1180	Titanium	EPA 6020	**Approved**
Trace Metals	4070	1185	Vanadium	EPA 6020	**Approved**
WP & DMRQA Trace Elements	55024	1185	Vanadium	EPA 6020	**Approved**
Trace Metals	4070	1190	Zinc	EPA 6020	**Approved**
WP & DMRQA Trace Elements	55024	1190	Zinc	EPA 6020	**Approved**
Trace Metals 1	PEI-034-1	1000	Aluminum, Al	EPA 6020	**Approved**
Trace Metals 2	PEI-034-2	1005	Antimony, Sb	EPA 6020	**Approved**
Trace Metals 1	PEI-034-1	1010	Arsenic, As	EPA 6020	**Approved**
Barium & Tin	PEI-034-5	1015	Barium, Ba	EPA 6020	**Approved**
Trace Metals 1	PEI-034-1	1020	Beryllium, Be	EPA 6020	**Approved**
Trace Metals 1	PEI-034-1	1030	Cadmium, Cd	EPA 6020	**Approved**
Trace Metals 1	PEI-034-1	1040	Chromium, Cr (total)	EPA 6020	**Approved**
Trace Metals 1	PEI-034-1	1050	Cobalt, Co	EPA 6020	**Approved**
Trace Metals 1	PEI-034-1	1055	Copper, Cu	EPA 6020	**Approved**
Trace Metals 1	PEI-034-1	1070	Iron, Fe	EPA 6020	**Approved**
Trace Metals 1	PEI-034-1	1075	Lead, Pb	EPA 6020	**Approved**
Trace Metals 1	PEI-034-1	1090	Manganese, Mn	EPA 6020	**Approved**
Trace Metals 2	PEI-034-2	1100	Molybdenum, Mo	EPA 6020	**Approved**
Trace Metals 1	PEI-034-1	1105	Nickel, Ni	EPA 6020	**Approved**
Trace Metals 1	PEI-034-1	1140	Selenium, Se	EPA 6020	**Approved**
Trace Metals 2	PEI-034-2	1150	Silver, Ag	EPA 6020	**Approved**
Barium & Tin	PEI-034-5	1175	Tin, Sn	EPA 6020	**Approved**
Trace Metals 2	PEI-034-2	1180	Titanium, Ti	EPA 6020	**Approved**
Trace Metals 1	PEI-034-1	1185	Vanadium, V	EPA 6020	**Approved**
Trace Metals 1	PEI-034-1	1190	Zinc, Zn	EPA 6020	**Approved**
Pesticides (WP)	4460	7355	4,4'-DDD	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7355	4,4'-DDD	EPA 608	**Approved**
Pesticides (WP)	4460	7360	4,4'-DDE	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7360	4,4'-DDE	EPA 608	**Approved**
Pesticides (WP)	4460	7365	4,4'-DDT	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7365	4,4'-DDT	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7810	4,4'-Methoxychlor	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7110	a-BHC	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7240	a-Chlordane	EPA 608	**Approved**
Pesticides (WP)	4460	7025	Aldrin	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7025	Aldrin	EPA 608	**Approved**
Pesticides (NELAC)	4460	7110	alpha-BHC	EPA 608	**Approved**

Pesticides (NELAC)	4460	7240	alpha-Chlordane	EPA 608	**Approved**
WP PCBs in Water	38091	8880	Aroclor 1016	EPA 608	**Approved**
WP PCBs in Water	38094	8880	Aroclor 1016	EPA 608	**Approved**
WP PCBs in Water	832S	8880	Aroclor 1016	EPA 608	**Approved**
PCBs in Water	4130	8880	Aroclor 1016	EPA 608	**Approved**
PCBs in Oil	4140	8880	Aroclor 1016 in Oil	EPA 608	**Approved**
PCBs in Water	4130	8880	Aroclor 1016 Sample 1	EPA 608	**Approved**
PCBs in Water	4130	8880	Aroclor 1016 Sample 2	EPA 608	**Approved**
PCBs in Water	832S	8885	Aroclor 1221	EPA 608	**Approved**
WP PCBs in Water	38091	8885	Aroclor 1221	EPA 608	**Approved**
WP PCBs in Water	38094	8885	Aroclor 1221	EPA 608	**Approved**
PCBs in Water	4130	8885	Aroclor 1221	EPA 608	**Approved**
PCBs in Oil	4140	8885	Aroclor 1221 in Oil	EPA 608	**Approved**
WP PCBs in Water	38091	8890	Aroclor 1232	EPA 608	**Approved**
WP PCBs in Water	38094	8890	Aroclor 1232	EPA 608	**Approved**
WP PCBs in Water	832S	8890	Aroclor 1232	EPA 608	**Approved**
PCBs in Water	4130	8890	Aroclor 1232	EPA 608	**Approved**
PCBs in Oil	4140	8890	Aroclor 1232 in Oil	EPA 608	**Approved**
PCBs in Water	4130	8890	Aroclor 1232 Sample 1	EPA 608	**Approved**
PCBs in Water	4130	8890	Aroclor 1232 Sample 2	EPA 608	**Approved**
WP PCBs in Water	832S	8895	Aroclor 1242	EPA 608	**Approved**
WP PCBs in Water	38091	8895	Aroclor 1242	EPA 608	**Approved**
WP PCBs in Water	38094	8895	Aroclor 1242	EPA 608	**Approved**
PCBs in Water	4130	8895	Aroclor 1242	EPA 608	**Approved**
PCBs in Oil	4140	8895	Aroclor 1242 in Oil	EPA 608	**Approved**
PCBs in Water	4130	8895	Aroclor 1242 Sample 1	EPA 608	**Approved**
PCBs in Water	4130	8895	Aroclor 1242 Sample 2	EPA 608	**Approved**
WP PCBs in Water	38091	8900	Aroclor 1248	EPA 608	**Approved**
WP PCBs in Water	38094	8900	Aroclor 1248	EPA 608	**Approved**
PCBs in Oil	4140	8900	Aroclor 1248 in Oil	EPA 608	**Approved**
PCBs in Water	4130	8900	Aroclor 1248 Sample 1	EPA 608	**Approved**
PCBs in Water	4130	8900	Aroclor 1248 Sample 2	EPA 608	**Approved**
PCBs in Water	832S	8905	Aroclor 1254	EPA 608	**Approved**
WP PCBs in Water	38091	8905	Aroclor 1254	EPA 608	**Approved**
WP PCBs in Water	38094	8905	Aroclor 1254	EPA 608	**Approved**
PCBs in Water	4130	8905	Aroclor 1254	EPA 608	**Approved**
PCBs in Oil	4140	8905	Aroclor 1254 in Oil	EPA 608	**Approved**
PCBs in Water	4130	8905	Aroclor 1254 Sample 1	EPA 608	**Approved**
PCBs in Water	4130	8905	Aroclor 1254 Sample 2	EPA 608	**Approved**
WP PCBs in Water	38091	8910	Aroclor 1260	EPA 608	**Approved**
WP PCBs in Water	38094	8910	Aroclor 1260	EPA 608	**Approved**
WP PCBs in Water	832S	8910	Aroclor 1260	EPA 608	**Approved**
PCBs in Water	4130	8910	Aroclor 1260	EPA 608	**Approved**
PCBs in Oil	4140	8910	Aroclor 1260 in Oil	EPA 608	**Approved**
PCBs in Water	4130	8910	Aroclor 1260 Sample 1	EPA 608	**Approved**
PCBs in Water	4130	8910	Aroclor 1260 Sample 2	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7115	b-BHC	EPA 608	**Approved**
Pesticides (NELAC)	4460	7115	beta-BHC	EPA 608	**Approved**
WP Pesticide Amp 2	38046	7250	Chlordane (total)	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7105	d-BHC	EPA 608	**Approved**
Pesticides (NELAC)	4460	7105	delta-BHC	EPA 608	**Approved**
Pesticides (WP)	4460	7470	Dieldrin	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7470	Dieldrin	EPA 608	**Approved**
Pesticides (NELAC)	4460	7510	Endosulfan I	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7510	Endosulfan I	EPA 608	**Approved**
Pesticides (NELAC)	4460	7515	Endosulfan II	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7515	Endosulfan II	EPA 608	**Approved**
Pesticides (NELAC)	4460	7520	Endosulfan sulfate	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7520	Endosulfan sulfate	EPA 608	**Approved**
Pesticides (NELAC)	4460	7540	Endrin	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7540	Endrin	EPA 608	**Approved**
Pesticides (NELAC)	4460	7530	Endrin aldehyde	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7530	Endrin aldehyde	EPA 608	**Approved**
Pesticides (NELAC)	4460	7535	Endrin Ketone	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7535	Endrin ketone	EPA 608	**Approved**
Pesticides (NELAC)	4460	7120	gamma-BHC (Lindane)	EPA 608	**Approved**
Pesticides (NELAC)	4460	7245	gamms-Chlordane	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7120	g-BHC (Lindane)	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7245	g-Chlordane	EPA 608	**Approved**
Pesticides (WP)	4460	7685	Heptachlor	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7685	Heptachlor	EPA 608	**Approved**
Pesticides (WP)	4460	7690	Heptachlor epoxide	EPA 608	**Approved**
WP Organochlorine Pesticides	38122	7690	Heptachlor epoxide	EPA 608	**Approved**
Pesticides (NELAC)	4460	7810	Methoxychlor	EPA 608	**Approved**
WP PCBs in Transformer Oil	38092	8880	PCB in Oil 1016 or 1242	EPA 608	**Approved**
WP PCBs in Water	38094	8880	PCB in Oil 1016 or 1242	EPA 608	**Approved**
WP PCBs in Transformer Oil	38092	8905	PCB in Oil 1254	EPA 608	**Approved**

WP PCBs in Water	38094	8905	PCB in Oil 1254	EPA 608	**Approved**
WP PCBs in Transformer Oil	38092	8910	PCB in Oil 1260	EPA 608	**Approved**
WP PCBs in Water	38094	8910	PCB in Oil 1260	EPA 608	**Approved**
Total Chlordane	4160	7250	Total Chlordane	EPA 608	**Approved**
Toxaphene	4270	8250	Toxaphene	EPA 608	**Approved**
WP Acrolein & Acrylonitrile	38123	8250	Toxaphene	EPA 608	**Approved**
Herbicides	4440	8655	2,4,5-T	EPA 615	**Approved**
WP Herbicide Acid Mix #2	38136	8655	2,4,5-T	EPA 615	**Approved**
Herbicides	4440	8650	2,4,5-TP (Silvex)	EPA 615	**Approved**
Herbicides	4440	8545	2,4-D	EPA 615	**Approved**
WP Acrolein & Acrylonitrile	38123	8545	2,4-D (2,4-Dichlorophenoxyacetic acid)	EPA 615	**Approved**
Herbicides	4440	8560	2,4-DB	EPA 615	**Approved**
WP Herbicide Acid Mix #2	38136	8560	2,4-DB	EPA 615	**Approved**
Herbicides	4440	8600	3,5-Dichlorobenzoic acid	EPA 615	**Approved**
WP Herbicide Acid Mix #2	38136	8600	3,5-Dichlorobenzoic acid	EPA 615	**Approved**
Herbicides	4440	6500	4-Nitrophenol	EPA 615	**Approved**
WP Herbicide Acid Mix #2	38136	6500	4-Nitrophenol	EPA 615	**Approved**
Herbicides	4440	8505	Acifluorfen	EPA 615	**Approved**
WP Acrolein & Acrylonitrile	38123	8505	Acifluorfen	EPA 615	**Approved**
Herbicides	4440	8530	Bentazon	EPA 615	**Approved**
WP Herbicide Acid Mix #2	38136	8530	Bentazon	EPA 615	**Approved**
Herbicides	4440	8540	Chloramben	EPA 615	**Approved**
Herbicides	4440	8550	Dacthal diacid (DCPA)	EPA 615	**Approved**
Herbicides	4440	8555	Dalapon	EPA 615	**Approved**
WP Acrolein & Acrylonitrile	38123	8555	Dalapon	EPA 615	**Approved**
Herbicides	4440	8595	Dicamba	EPA 615	**Approved**
WP Acrolein & Acrylonitrile	38123	8595	Dicamba	EPA 615	**Approved**
Herbicides	4440	8605	Dichloroprop	EPA 615	**Approved**
WP Herbicide Acid Mix #2	38136	8605	Dichloroprop	EPA 615	**Approved**
Herbicides	4440	8620	Dinoseb	EPA 615	**Approved**
WP Acrolein & Acrylonitrile	38123	8620	Dinoseb (2-sec-Butyl-4,6-dinitrophenol)	EPA 615	**Approved**
Herbicides	4440	7775	MCPA	EPA 615	**Approved**
Herbicides	4440	7780	MCPP	EPA 615	**Approved**
Herbicides	4440	6605	Pentachlorophenol	EPA 615	**Approved**
WP Acrolein & Acrylonitrile	38123	6605	Pentachlorophenol	EPA 615	**Approved**
Herbicides	4440	8645	Picloram	EPA 615	**Approved**
WP Acrolein & Acrylonitrile	38123	8645	Picloram	EPA 615	**Approved**
WP Acrolein & Acrylonitrile	38123	8650	Silvex (2,4,5-TP)	EPA 615	**Approved**
Volatiles	4170	5105	1,1,1,2-Tetrachloroethane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5105	1,1,1,2-Tetrachloroethane	EPA 624	**Approved**
Volatiles	4170	5160	1,1,1-Trichloroethane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5160	1,1,1-Trichloroethane	EPA 624	**Approved**
Volatiles	4170	5110	1,1,2,2-Tetrachloroethane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5110	1,1,2,2-Tetrachloroethane	EPA 624	**Approved**
Volatiles	4170	5165	1,1,2-Trichloroethane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5165	1,1,2-Trichloroethane	EPA 624	**Approved**
WP Oxygenates	38157	5185	1,1,2-Trichlorotrifluoroethane	EPA 624	**Approved**
Volatiles	4170	4630	1,1-Dichloroethane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4630	1,1-Dichloroethane	EPA 624	**Approved**
Volatiles	4170	4640	1,1-Dichloroethene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4640	1,1-Dichloroethene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4670	1,1-Dichloropropene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5150	1,2,3-Trichlorobenzene	EPA 624	**Approved**
Volatiles	4170	5180	1,2,3-Trichloropropane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5180	1,2,3-Trichloropropane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5210	1,2,4-Trimethylbenzene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4570	1,2-Dibromo-3-chloropropane	EPA 624	**Approved**
Volatiles	4170	4585	1,2-Dibromoethane (EDB)	EPA 624	**Approved**
Volatile Aromatics	4450	4610	1,2-Dichlorobenzene	EPA 624	**Approved**
Volatiles	4170	4610	1,2-Dichlorobenzene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4610	1,2-Dichlorobenzene	EPA 624	**Approved**
Volatiles	4170	4635	1,2-Dichloroethane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4635	1,2-Dichloroethane	EPA 624	**Approved**
Volatiles	4170	4655	1,2-Dichloropropane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4655	1,2-Dichloropropane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5215	1,3,5-Trimethylbenzene	EPA 624	**Approved**
Volatile Aromatics	4450	4615	1,3-Dichlorobenzene	EPA 624	**Approved**
Volatiles	4170	4615	1,3-Dichlorobenzene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4615	1,3-Dichlorobenzene	EPA 624	**Approved**
Volatile Aromatics	4450	4620	1,4-Dichlorobenzene	EPA 624	**Approved**
Volatiles	4170	4620	1,4-Dichlorobenzene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4620	1,4-Dichlorobenzene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4665	2,2-Dichloropropane	EPA 624	**Approved**
Volatiles	4170	4410	2-Buranone (Methyl ethyl ketone)	EPA 624	**Approved**
WP Ketones	38134	4410	2-Butanone	EPA 624	**Approved**
Volatiles	4170	4500	2-Chloroethyl vinyl ether	EPA 624	**Approved**
WP 2-Chloroethyl vinyl ether	38128	4500	2-Chloroethyl vinyl ether	EPA 624	**Approved**

Volatiles in Non-Potable Water	38083	4535	2-Chlorotoluene	EPA 624	**Approved**
Volatiles	4170	4860	2-Hexanone	EPA 624	**Approved**
WP Ketones	38134	4860	2-Hexanone	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4540	4-Chlorotoluene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4995	4-Methyl-2-pentanone	EPA 624	**Approved**
WP Ketones	38134	4995	4-Methyl-2-pentanone	EPA 624	**Approved**
Volatiles	4170	4995	4-Methyl-2-pentanone (MIBK)	EPA 624	**Approved**
Volatiles	4170	4315	Acetone	EPA 624	**Approved**
WP Ketones	38134	4315	Acetone	EPA 624	**Approved**
Volatiles	4170	4325	Acrolein	EPA 624	**Approved**
WP Acrolein & Acrylonitrile	38123	4325	Acrolein	EPA 624	**Approved**
Volatiles	4170	4340	Acrylonitrile	EPA 624	**Approved**
WP Acrolein & Acrylonitrile	38123	4340	Acrylonitrile	EPA 624	**Approved**
CWA BTEX & MTBE	38166	4375	Benzene	EPA 624	**Approved**
Volatile Aromatics	4450	4375	Benzene	EPA 624	**Approved**
Volatiles	4170	4375	Benzene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4375	Benzene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4385	Bromobenzene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4390	Bromochloromethane	EPA 624	**Approved**
Volatiles	4170	4395	Bromodichloromethane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4395	Bromodichloromethane	EPA 624	**Approved**
Volatiles	4170	4400	Bromoform	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4400	Bromoform	EPA 624	**Approved**
Volatiles	4170	4950	Bromomethane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4950	Bromomethane	EPA 624	**Approved**
Volatiles	4170	4450	Carbon disulfide	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4450	Carbon disulphide	EPA 624	**Approved**
Volatiles	4170	4455	Carbon tetrachloride	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4455	Carbon tetrachloride	EPA 624	**Approved**
Volatiles	4170	4475	Chlorobenzene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4475	Chlorobenzene	EPA 624	**Approved**
Volatiles	4170	4485	Chloroethane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4485	Chloroethane	EPA 624	**Approved**
Volatiles	4170	4505	Chloroform	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4505	Chloroform	EPA 624	**Approved**
Volatiles	4170	4960	Chloromethane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4960	Chloromethane	EPA 624	**Approved**
Volatiles	4170	4645	cis-1,2-Dichloroethene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4645	cis-1,2-Dichloroethene	EPA 624	**Approved**
Volatiles	4170	4680	cis-1,3-Dichloropropene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4680	cis-1,3-Dichloropropene	EPA 624	**Approved**
Volatiles	4170	4575	Dibromochloromethane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4575	Dibromochloromethane	EPA 624	**Approved**
Volatiles	4170	4595	Dibromomethane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4595	Dibromomethane	EPA 624	**Approved**
Volatiles	4170	4625	Dichlorodifluoromethane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4625	Dichlorodifluoromethane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4765	Ethyl benzene	EPA 624	**Approved**
CWA BTEX & MTBE	38166	4765	Ethylbenzene	EPA 624	**Approved**
Volatile Aromatics	4450	4765	Ethylbenzene	EPA 624	**Approved**
Volatiles	4170	4765	Ethylbenzene	EPA 624	**Approved**
Volatiles	4170	4835	Hexachlorobutadiene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4835	Hexachlorobutadiene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4840	Hexachloroethane	EPA 624	**Approved**
WP Oxygenates	38157	9375	Isopropyl ether (DIPE)	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4900	Isopropylbenzene	EPA 624	**Approved**
CWA BTEX & MTBE	38166	5000	Methyl tert-butyl ether (MTBE)	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5000	Methyl tert-butyl ether (MTBE)	EPA 624	**Approved**
WP Oxygenates	38157	5000	Methyl tert-butyl ether (MTBE)	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4975	Methylene chloride	EPA 624	**Approved**
Volatiles	4170	4975	Methylene chloride (Dichloromethane)	EPA 624	**Approved**
Volatiles	4170	5000	Methyl-t-butylether (MTBE)	EPA 624	**Approved**
Volatiles	4170	5005	Naphthalene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5005	Naphthalene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4435	n-Butyl benzene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5090	n-Propylbenzene	EPA 624	**Approved**
WP Oxygenates	38157	5090	n-Propylbenzene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4910	p-Isopropyl toluene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4440	sec-Butyl benzene	EPA 624	**Approved**
Volatiles	4170	5100	Styrene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5100	Styrene	EPA 624	**Approved**
WP Oxygenates	38157	4370	tert-Amyl methyl ether (TAME)	EPA 624	**Approved**
WP Oxygenates	38157	4420	tert-Butyl alcohol (t-Butanol)	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4445	tert-Butyl benzene	EPA 624	**Approved**
WP Oxygenates	38157	4770	tert-Butyl ethyl ether (ETBE)	EPA 624	**Approved**
Volatiles	4170	5115	Tetrachloroethene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5115	Tetrachloroethene	EPA 624	**Approved**

CWA BTEX & MTBE	38166	5140	Toluene	EPA 624	**Approved**
Volatile Aromatics	4450	5140	Toluene	EPA 624	**Approved**
Volatiles	4170	5140	Toluene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5140	Toluene	EPA 624	**Approved**
CWA BTEX & MTBE	38166	5260	Total Xylenes	EPA 624	**Approved**
Volatile Aromatics	4450	5260	Total Xylenes	EPA 624	**Approved**
Volatiles	4170	5260	Total Xylenes	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5260	Total Xylenes	EPA 624	**Approved**
Volatiles	4170	4700	trans-1,2-Dichloroethene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4700	trans-1,2-Dichloroethene	EPA 624	**Approved**
Volatiles	4170	4685	trans-1,3-Dichloropropene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	4685	trans-1,3-Dichloropropene	EPA 624	**Approved**
Volatiles	4170	5170	Trichloroethene	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5170	Trichloroethene	EPA 624	**Approved**
Volatiles	4170	5175	Trichlorofluoromethane	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5175	Trichlorofluoromethane	EPA 624	**Approved**
Volatiles	4170	5225	Vinyl acetate	EPA 624	**Approved**
Volatiles	4170	5235	Vinyl Chloride	EPA 624	**Approved**
Volatiles in Non-Potable Water	38083	5235	Vinyl chloride	EPA 624	**Approved**
Base Neutral Extractables	4200	6715	1,2,4,5-Tetrachlorobenzene	EPA 625	**Approved**
Base Neutral Extractables	4200	5155	1,2,4-Trichlorbenzene	EPA 625	**Approved**
WP Base/Neutrals	711	5155	1,2,4-Trichlorobenzene	EPA 625	**Approved**
Base Neutral Extractables	4200	4610	1,2-Dichlorobenzene	EPA 625	**Approved**
WP Base/Neutrals	711	4610	1,2-Dichlorobenzene	EPA 625	**Approved**
Base Neutral Extractables	4200	4615	1,3-Dichlorobenzene	EPA 625	**Approved**
WP Base/Neutrals	711	4615	1,3-Dichlorobenzene	EPA 625	**Approved**
Base Neutral Extractables	4200	4620	1,4-Dichlorobenzene	EPA 625	**Approved**
WP Base/Neutrals	711	4620	1,4-Dichlorobenzene	EPA 625	**Approved**
Acid Extractables	4190	6735	2,3,4,6-Tetrachlorophenol	EPA 625	**Approved**
Acids	712	6735	2,3,4,6-Tetrachlorophenol	EPA 625	**Approved**
Acid Extractables	4190	6835	2,4,5-Trichlorophenol	EPA 625	**Approved**
Acids	712	6835	2,4,5-Trichlorophenol	EPA 625	**Approved**
Acids	712	6840	2,4,6-Trichlorophenol	EPA 625	**Approved**
Acid Extractables	4190	6840	2,4,6-Trichlorphenol	EPA 625	**Approved**
Acid Extractables	4190	6000	2,4-Dichlorophenol	EPA 625	**Approved**
Acids	712	6000	2,4-Dichlorophenol	EPA 625	**Approved**
Acid Extractables	4190	6130	2,4-Dimethylphenol	EPA 625	**Approved**
Acids	712	6130	2,4-Dimethylphenol	EPA 625	**Approved**
Acid Extractables	4190	6175	2,4-Dinitrophenol	EPA 625	**Approved**
Acids	712	6175	2,4-Dinitrophenol	EPA 625	**Approved**
WP Base/Neutrals	711	6185	2,4-Dinitrotoluene	EPA 625	**Approved**
Base Neutral Extractables	4200	6185	2,4-Dinitrotoluene (2,4-DNT)	EPA 625	**Approved**
Acid Extractables	4190	6005	2,6-Dichlorophenol	EPA 625	**Approved**
Acids	712	6005	2,6-Dichlorophenol	EPA 625	**Approved**
WP Base/Neutrals	711	6190	2,6-Dinitrotoluene	EPA 625	**Approved**
Base Neutral Extractables	4200	6190	2,6-Dinitrotoluene (2,6-DNT)	EPA 625	**Approved**
Base Neutral Extractables	4200	5795	2-Chloronaphthalene	EPA 625	**Approved**
WP Base/Neutrals	711	5795	2-Chloronaphthalene	EPA 625	**Approved**
Acid Extractables	4190	5800	2-Chlorophenol	EPA 625	**Approved**
Acids	712	5800	2-Chlorophenol	EPA 625	**Approved**
Acid Extractables	4190	6360	2-Methyl-4,6-Dinitrophenol	EPA 625	**Approved**
Base Neutral Extractables	4200	6385	2-Methylnaphthalene	EPA 625	**Approved**
WP Base/Neutrals	711	6385	2-Methylnaphthalene	EPA 625	**Approved**
Acid Extractables	4190	6400	2-Methylphenol	EPA 625	**Approved**
Acids	712	6400	2-Methylphenol	EPA 625	**Approved**
WP Base/Neutrals	711	6460	2-Nitroaniline	EPA 625	**Approved**
Base Neutral Extractables	4200	6460	2-Nitroaniline	EPA 625	**Approved**
Acid Extractables	4190	6490	2-Nitrophenol	EPA 625	**Approved**
Acids	712	6490	2-Nitrophenol	EPA 625	**Approved**
Acid Extractables	4190	6410	3 & 4-Methylphenol	EPA 625	**Approved**
Base Neutral Extractables	4200	5945	3,3'-Dichlorobenzidine	EPA 625	**Approved**
WP Base/Neutrals	711	5945	3,3'-Dichlorobenzidine	EPA 625	**Approved**
Acid Extractables	4190	6405	3-Methylphenol	EPA 625	**Approved**
Base Neutral Extractables	4200	6465	3-Nitroaniline	EPA 625	**Approved**
WP Base/Neutrals	711	6465	3-Nitroaniline	EPA 625	**Approved**
Acids	712	6360	4,6-Dinitro-2-methylphenol	EPA 625	**Approved**
Base Neutral Extractables	4200	5660	4-Bromophenyl phenyl ether	EPA 625	**Approved**
WP Base/Neutrals	711	5660	4-Bromophenyl-phenylether	EPA 625	**Approved**
Acid Extractables	4190	5700	4-Chloro-3-methylphenol	EPA 625	**Approved**
Acids	712	5700	4-Chloro-3-methylphenol	EPA 625	**Approved**
Base Neutral Extractables	4200	5745	4-Chloroaniline	EPA 625	**Approved**
WP Base/Neutrals	711	5745	4-Chloroaniline	EPA 625	**Approved**
Base Neutral Extractables	4200	5825	4-Chlorophenyl-phenylether	EPA 625	**Approved**
WP Base/Neutrals	711	5825	4-Chlorophenyl-phenylether	EPA 625	**Approved**
Acids	712	6410	4-Methylphenol	EPA 625	**Approved**
Base Neutral Extractables	4200	6470	4-Nitroaniline	EPA 625	**Approved**
WP Base/Neutrals	711	6470	4-Nitroaniline	EPA 625	**Approved**

Acid Extractables	4190	6500	4-Nitrophenol	EPA 625	**Approved**
Acids	712	6500	4-Nitrophenol	EPA 625	**Approved**
Base Neutral Extractables	4200	5500	Acenaphthene	EPA 625	**Approved**
PAH-GC & GCMS	4880	5500	Acenaphthene	EPA 625	**Approved**
WP Base/Neutrals	711	5500	Acenaphthene	EPA 625	**Approved**
Base Neutral Extractables	4200	5505	Acenaphthylene	EPA 625	**Approved**
PAH-GC & GCMS	4880	5505	Acenaphthylene	EPA 625	**Approved**
WP Base/Neutrals	711	5505	Acenaphthylene	EPA 625	**Approved**
Base Neutral Extractables	4200	5545	Aniline	EPA 625	**Approved**
WP Base/Neutrals	711	5545	Aniline	EPA 625	**Approved**
Base Neutral Extractables	4200	5555	Anthracene	EPA 625	**Approved**
PAH-GC & GCMS	4880	5555	Anthracene	EPA 625	**Approved**
WP Base/Neutrals	711	5555	Anthracene	EPA 625	**Approved**
Base Neutral Extractables	4200	5595	Benzidine	EPA 625	**Approved**
WP Base/Neutrals	711	5595	Benzidine	EPA 625	**Approved**
Base Neutral Extractables	4200	5575	Benzo(a)anthracene	EPA 625	**Approved**
PAH-GC & GCMS	4880	5575	Benzo(a)anthracene	EPA 625	**Approved**
WP Base/Neutrals	711	5575	Benzo(a)anthracene	EPA 625	**Approved**
Base Neutral Extractables	4200	5580	Benzo(a)pyrene	EPA 625	**Approved**
PAH-GC & GCMS	4880	5580	Benzo(a)pyrene	EPA 625	**Approved**
WP Base/Neutrals	711	5580	Benzo(a)pyrene	EPA 625	**Approved**
Base Neutral Extractables	4200	5585	Benzo(b)fluoranthene	EPA 625	**Approved**
PAH-GC & GCMS	4880	5585	Benzo(b)fluoranthene	EPA 625	**Approved**
WP Base/Neutrals	711	5585	Benzo(b)fluoranthene	EPA 625	**Approved**
Base Neutral Extractables	4200	5590	Benzo(g,h,I)perylene	EPA 625	**Approved**
PAH-GC & GCMS	4880	5590	Benzo(g,h,I)perylene	EPA 625	**Approved**
WP Base/Neutrals	711	5590	Benzo(g,h,I)perylene	EPA 625	**Approved**
Base Neutral Extractables	4200	5600	Benzo(k)fluoranthene	EPA 625	**Approved**
PAH-GC & GCMS	4880	5600	Benzo(k)fluoranthene	EPA 625	**Approved**
WP Base/Neutrals	711	5600	Benzo(k)fluoranthene	EPA 625	**Approved**
Acid Extractables	4190	5610	Benzoic Acid	EPA 625	**Approved**
Acids	712	5610	Benzoic acid	EPA 625	**Approved**
Base Neutral Extractables	4200	5630	Benzyl alcohol	EPA 625	**Approved**
WP Base/Neutrals	711	5630	Benzyl alcohol	EPA 625	**Approved**
Base Neutral Extractables	4200	5670	Benzyl butyl phthalate	EPA 625	**Approved**
Base Neutral Extractables	4200	5760	bis(2-Chloroethoxy) methane	EPA 625	**Approved**
WP Base/Neutrals	711	5760	bis(2-Chloroethoxy) methane	EPA 625	**Approved**
Base Neutral Extractables	4200	5765	bis(2-Chloroethyl) ether	EPA 625	**Approved**
WP Base/Neutrals	711	5765	bis(2-Chloroethyl)ether	EPA 625	**Approved**
Base Neutrals Extractables	4200	5780	bis(2-Chloroisopropyl) ether	EPA 625	**Approved**
WP Base/Neutrals	711	5780	bis(2-Chloroisopropyl) ether	EPA 625	**Approved**
Base Neutral Extractables	4200	6255	bis(2-Ethylhexyl) phthalate	EPA 625	**Approved**
WP Base/Neutrals	711	6255	bis(2-Ethylhexyl) phthalate	EPA 625	**Approved**
WP Base/Neutrals	711	5670	Butylbenzylphthalate	EPA 625	**Approved**
Base Neutral Extractables	4200	5680	Carbazole	EPA 625	**Approved**
WP Base/Neutrals	711	5680	Carbazole	EPA 625	**Approved**
Base Neutral Extractables	4200	5855	Chrysene	EPA 625	**Approved**
PAH-GC & GCMS	4880	5855	Chrysene	EPA 625	**Approved**
WP Base/Neutrals	711	5855	Chrysene	EPA 625	**Approved**
Base Neutrals Extractables	4200	5895	Dibenz(a,h) anthracene	EPA 625	**Approved**
PAH-GC & GCMS	4880	5895	Dibenz(a,h) anthracene	EPA 625	**Approved**
WP Base/Neutrals	711	5895	Dibenz(a,h) anthracene	EPA 625	**Approved**
Base Neutral Extractables	4200	5905	Dibenzofuran	EPA 625	**Approved**
WP Base/Neutrals	711	5905	Dibenzofuran	EPA 625	**Approved**
Base Neutral Extractables	4200	6070	Diethyl phthalate	EPA 625	**Approved**
WP Base/Neutrals	711	6070	Diethylphthalate	EPA 625	**Approved**
Base Neutral Extractables	4200	6135	Dimethyl phthalate	EPA 625	**Approved**
WP Base/Neutrals	711	6135	Dimethyl phthalate	EPA 625	**Approved**
Base Neutral Extractables	4200	5925	Di-n-butylphthalate	EPA 625	**Approved**
WP Base/Neutrals	711	5925	Di-n-butylphthalate	EPA 625	**Approved**
Base Neutral Extractables	4200	6200	Di-n-octylphthalate	EPA 625	**Approved**
WP Base/Neutrals	711	6200	Di-n-octylphthalate	EPA 625	**Approved**
Base Neutral Extractables	4200	6265	Fluioranthene	EPA 625	**Approved**
PAH-GC & GCMS	4880	6265	Fluoranthene	EPA 625	**Approved**
WP Base/Neutrals	711	6265	Fluoranthene	EPA 625	**Approved**
Base Neutral Extractables	4200	6270	Fluorene	EPA 625	**Approved**
PAH-GC & GCMS	4880	6270	Fluorene	EPA 625	**Approved**
WP Base/Neutrals	711	6270	Fluorene	EPA 625	**Approved**
Base Neutral Extractables	4200	6275	Hexachlorobenzene	EPA 625	**Approved**
WP Base/Neutrals	711	6275	Hexachlorobenzene	EPA 625	**Approved**
Base Neutral Extractables	4200	4835	Hexachlorobutadiene	EPA 625	**Approved**
WP Base/Neutrals	711	4835	Hexachlorobutadiene	EPA 625	**Approved**
Base Neutral Extractables	4200	6285	Hexachlorocyclopentadiene	EPA 625	**Approved**
WP Base/Neutrals	711	6285	Hexachlorocyclopentadiene	EPA 625	**Approved**
Base Neutral Extractables	4200	4840	Hexachloroethane	EPA 625	**Approved**
WP Base/Neutrals	711	4840	Hexachloroethane	EPA 625	**Approved**
Base Neutral Extractables	4200	6315	Indeno (1,2,3-cd) pyrene	EPA 625	**Approved**

PAH-GC & GCMS	4880	6315	Indeno (1,2,3-cd) pyrene	EPA 625	**Approved**
WP Base/Neutrals	711	6315	Indeno (1,2,3-cd) pyrene	EPA 625	**Approved**
WP Base/Neutrals	711	6320	Isophorone	EPA 625	**Approved**
Base Neutral Extractables	4200	6320	Isophorone	EPA 625	**Approved**
Base Neutral Extractables	4200	5005	Naphthalene	EPA 625	**Approved**
PAH-GC & GCMS	4880	5005	Naphthalene	EPA 625	**Approved**
WP Base/Neutrals	711	5005	Naphthalene	EPA 625	**Approved**
WP Base/Neutrals	711	5015	Nitrobenzene	EPA 625	**Approved**
Base Neutral Extractables	4200	5015	Nitrobenzene (NB)	EPA 625	**Approved**
Base Neutral Extractables	4200	6530	N-nitrosodimethylamine	EPA 625	**Approved**
WP Base/Neutrals	711	6530	N-Nitrosodimethylamine	EPA 625	**Approved**
Base Neutral Extractables	4200	6545	N-Nitroso-di-n-propylamine	EPA 625	**Approved**
WP Base/Neutrals	711	6545	N-Nitroso-di-n-propylamine	EPA 625	**Approved**
Base Neutral Extractables	4200	6535	N-nitrosodiphenylamine	EPA 625	**Approved**
WP Base/Neutrals	711	6535	N-Nitrosodiphenylamine	EPA 625	**Approved**
Acid Extractables	4190	6605	Pentachlorophenol	EPA 625	**Approved**
Acids	712	6605	Pentachlorophenol	EPA 625	**Approved**
Acid Extractables	4190	6605	Pentachlorphenol	EPA 625	**Approved**
Base Neutral Extractables	4200	6615	Phenanthrene	EPA 625	**Approved**
PAH-GC & GCMS	4880	6615	Phenanthrene	EPA 625	**Approved**
WP Base/Neutrals	711	6615	Phenanthrene	EPA 625	**Approved**
Acid Extractables	4190	6625	Phenol	EPA 625	**Approved**
Acids	712	6625	Phenol	EPA 625	**Approved**
Base Neutral Extractables	4200	6665	Pyrene	EPA 625	**Approved**
PAH-GC & GCMS	4880	6665	Pyrene	EPA 625	**Approved**
WP Base/Neutrals	711	6665	Pyrene	EPA 625	**Approved**
Base Neutral Extractables	4200	5095	Pyridine	EPA 625	**Approved**
WP Base/Neutrals	711	5095	Pyridine	EPA 625	**Approved**
Base/Neutrals 1	PEO-121-1	5500	Acenaphthene	EPA 625	**Approved**
Base/Neutrals 1	PEO-121-1	5505	Acenaphthylene	EPA 625	**Approved**
Base/Neutrals 1	PEO-121-1	5555	Anthracene	EPA 625	**Approved**
Base/Neutrals 1	PEO-121-1	5575	Benzo(a)anthracene	EPA 625	**Approved**
Base/Neutrals 1	PEO-121-1	5580	Benzo(a)pyrene	EPA 625	**Approved**
Base/Neutrals 1	PEO-121-1	5585	Benzo(b)fluoranthene	EPA 625	**Approved**
Base/Neutrals 1	PEO-121-1	5601	Benzo(b+k)fluoranthene	EPA 625	**Approved**
Base/Neutrals 1	PEO-121-1	5590	Benzo(g,h,I)perylene	EPA 625	**Approved**
Base/Neutrals 1	PEO-121-1	5600	Benzo(k)fluoranthene	EPA 625	**Approved**
Base/Neutrals 1	PEO-121-1	5855	Chrysene	EPA 625	**Approved**
Base/Neutrals 1	PEO-121-1	5895	Dibenz(a,h) anthracene	EPA 625	**Approved**
Base/Neutrals 1	PEO-121-1	6265	Fluoranthene	EPA 625	**Approved**
Base/Neutrals 1	PEO-121-1	6270	Fluorene	EPA 625	**Approved**
Base/Neutrals 1	PEO-121-1	6315	Indeno (1,2,3-cd) pyrene	EPA 625	**Approved**
Base/Neutrals 1	PEO-121-1	5005	Naphthalene	EPA 625	**Approved**
Base/Neutrals 1	PEO-121-1	6615	Phenanthrene	EPA 625	**Approved**
Base/Neutrals 1	PEO-121-1	6665	Pyrene	EPA 625	**Approved**
WP Perchlorate	55116	1895	Perchlorate	EPA 6850	**Approved**
WP Hexavalent Chromium	55096	1045	Chromium VI	EPA 7196A	**Approved**
Hexavalent Chromium	4180	1045	Chromium, Hexavalent	EPA 7196A	**Approved**
WP Hexavalent Chromium	55096	1045	Chromium VI	EPA 7199	**Approved**
Hexavalent Chromium	4180	1045	Chromium, Hexavalent	EPA 7199	**Approved**
Trace Metals	4070	1095	Mercury	EPA 7470A	**Approved**
WP & DMRQA Trace Elements	55024	1095	Mercury	EPA 7470A	**Approved**
Trace Metals 1	PEI-034-1	1095	Mercury, Hg	EPA 7470A	**Approved**
PT Diesel Fuel #2 in Water	38114	9369	#2 Fuel Oil (Diesel)	EPA 8015B	**Approved**
Diesel Range Organics (DRO)	4830	9369	Diesel Range Organics (DRO)	EPA 8015B	**Approved**
Gasoline Range Organics (GRO)	4840	9408	Gasoline Range Organics	EPA 8015B	**Approved**
PT Unleaded Gasoline in Water	38116	9408	Unleaded Gasoline 93 Octane	EPA 8015B	**Approved**
BTEX	4230	4375	Benzene	EPA 8021B	**Approved**
BTEX & MTBE in Water	643	4375	Benzene	EPA 8021B	**Approved**
BTEX	4230	4765	Ethylbenzene	EPA 8021B	**Approved**
BTEX & MTBE in Water	643	4765	Ethylbenzene	EPA 8021B	**Approved**
BTEX	4230	5000	Methyl-t-butylether (MTBE)	EPA 8021B	**Approved**
BTEX & MTBE in Water	643	5000	tert-Butyl methyl ether (MTBE)	EPA 8021B	**Approved**
BTEX	4230	5140	Toluene	EPA 8021B	**Approved**
BTEX & MTBE in Water	643	5140	Toluene	EPA 8021B	**Approved**
BTEX	4230	5260	Total Xylenes	EPA 8021B	**Approved**
BTEX & MTBE in Water	643	5260	Xylenes, total	EPA 8021B	**Approved**
Pesticides (WP)	4460	7355	4,4'-DDD	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7355	4,4'-DDD	EPA 8081A	**Approved**
Pesticides (WP)	4460	7360	4,4'-DDE	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7360	4,4'-DDE	EPA 8081A	**Approved**
Pesticides (WP)	4460	7365	4,4'-DDT	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7365	4,4'-DDT	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7810	4,4'-Methoxychlor	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7110	a-BHC	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7240	a-Chlordane	EPA 8081A	**Approved**
Pesticides (WP)	4460	7025	Aldrin	EPA 8081A	**Approved**

WP Organochlorine Pesticides	38122	7025	Aldrin	EPA 8081A	**Approved**
Pesticides (NELAC)	4460	7110	alpha-BHC	EPA 8081A	**Approved**
Pesticides (NELAC)	4460	7240	alpha-Chlordane	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7115	b-BHC	EPA 8081A	**Approved**
Pesticides (NELAC)	4460	7115	beta-BHC	EPA 8081A	**Approved**
WP Pesticide Amp 3	38047	7250	Chlordane (total)	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7105	d-BHC	EPA 8081A	**Approved**
Pesticides (NELAC)	4460	7105	delta-BHC	EPA 8081A	**Approved**
Pesticides (WP)	4460	7470	Dieldrin	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7470	Dieldrin	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7510	Endosulfan I	EPA 8081A	**Approved**
Pesticides (NELAC)	4460	7515	Endosulfan II	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7515	Endosulfan II	EPA 8081A	**Approved**
Pesticides (NELAC)	4460	7520	Endosulfan sulfate	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7520	Endosulfan sulfate	EPA 8081A	**Approved**
Pesticides (NELAC)	4460	7540	Endrin	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7540	Endrin	EPA 8081A	**Approved**
Pesticides (NELAC)	4460	7530	Endrin aldehyde	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7530	Endrin aldehyde	EPA 8081A	**Approved**
Pesticides (NELAC)	4460	7535	Endrin Ketone	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7535	Endrin ketone	EPA 8081A	**Approved**
Pesticides (NELAC)	4460	7120	gamma-BHC (Lindane)	EPA 8081A	**Approved**
Pesticides (NELAC)	4470	7120	gamma-BHC (Lindane)	EPA 8081A	**Approved**
Pesticides (NELAC)	4470	7245	gamma-Chlordane	EPA 8081A	**Approved**
Pesticides (NELAC)	4460	7245	gamms-Chlordane	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7120	g-BHC (Lindane)	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7245	g-Chlordane	EPA 8081A	**Approved**
Pesticides (WP)	4460	7685	Heptachlor	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7685	Heptachlor	EPA 8081A	**Approved**
Pesticides (WP)	4460	7690	Heptachlor epoxide	EPA 8081A	**Approved**
WP Organochlorine Pesticides	38122	7690	Heptachlor epoxide	EPA 8081A	**Approved**
Pesticides (NELAC)	4460	7810	Methoxychlor	EPA 8081A	**Approved**
Total Chlordane	4160	7250	Total Chlordane	EPA 8081A	**Approved**
Toxaphene	4270	8250	Toxaphene	EPA 8081A	**Approved**
WP Acrolein & Acrylonitrile	38123	8250	Toxaphene	EPA 8081A	**Approved**
WP PCBs in Water	38091	8880	Aroclor 1016	EPA 8082	**Approved**
WP PCBs in Water	38094	8880	Aroclor 1016	EPA 8082	**Approved**
WP PCBs in Water	832S	8880	Aroclor 1016	EPA 8082	**Approved**
PCBs in Oil	4140	8880	Aroclor 1016 in Oil	EPA 8082	**Approved**
PCBs in Water	4130	8880	Aroclor 1016 Sample 1	EPA 8082	**Approved**
PCBs in Water	4130	8880	Aroclor 1016 Sample 2	EPA 8082	**Approved**
PCBs in Water	PEO-020	8912	Aroclor 1016/1242	EPA 8082	**Approved**
PCBs in Water	832S	8885	Aroclor 1221	EPA 8082	**Approved**
WP PCBs in Water	38091	8885	Aroclor 1221	EPA 8082	**Approved**
WP PCBs in Water	38094	8885	Aroclor 1221	EPA 8082	**Approved**
PCBs in Oil	4140	8885	Aroclor 1221 in Oil	EPA 8082	**Approved**
WP PCBs in Water	38091	8890	Aroclor 1232	EPA 8082	**Approved**
WP PCBs in Water	38094	8890	Aroclor 1232	EPA 8082	**Approved**
WP PCBs in Water	832S	8890	Aroclor 1232	EPA 8082	**Approved**
PCBs in Oil	4140	8890	Aroclor 1232 in Oil	EPA 8082	**Approved**
PCBs in Water	4130	8890	Aroclor 1232 Sample 1	EPA 8082	**Approved**
WP PCBs in Water	832S	8895	Aroclor 1242	EPA 8082	**Approved**
WP PCBs in Water	38091	8895	Aroclor 1242	EPA 8082	**Approved**
WP PCBs in Water	38094	8895	Aroclor 1242	EPA 8082	**Approved**
PCBs in Oil	4140	8895	Aroclor 1242 in Oil	EPA 8082	**Approved**
PCBs in Water	4130	8895	Aroclor 1242 Sample 1	EPA 8082	**Approved**
PCBs in Water	4130	8895	Aroclor 1242 Sample 2	EPA 8082	**Approved**
WP PCBs in Water	38091	8900	Aroclor 1248	EPA 8082	**Approved**
WP PCBs in Water	38094	8900	Aroclor 1248	EPA 8082	**Approved**
PCBs in Oil	4140	8900	Aroclor 1248 in Oil	EPA 8082	**Approved**
PCBs in Water	4130	8900	Aroclor 1248 Sample 1	EPA 8082	**Approved**
PCBs in Water	4130	8900	Aroclor 1248 Sample 2	EPA 8082	**Approved**
WP PCBs in Water	38091	8905	Aroclor 1254	EPA 8082	**Approved**
WP PCBs in Water	38094	8905	Aroclor 1254	EPA 8082	**Approved**
PCBs in Oil	4140	8905	Aroclor 1254 in Oil	EPA 8082	**Approved**
PCBs in Water	4130	8905	Aroclor 1254 Sample 1	EPA 8082	**Approved**
PCBs in Water	4130	8905	Aroclor 1254 Sample 2	EPA 8082	**Approved**
WP PCBs in Water	38091	8910	Aroclor 1260	EPA 8082	**Approved**
WP PCBs in Water	38094	8910	Aroclor 1260	EPA 8082	**Approved**
WP PCBs in Water	832S	8910	Aroclor 1260	EPA 8082	**Approved**
PCBs in Water	4130	8910	Aroclor 1260 Sample 1	EPA 8082	**Approved**
PCBs in Water	4130	8910	Aroclor 1260 Sample 2	EPA 8082	**Approved**
PCBs in Water	PEO-020	8880	Aroclor-1016 (PCB-1016)	EPA 8082	**Approved**
PCBs in Water	PEO-020	8885	Aroclor-1221 (PCB-1221)	EPA 8082	**Approved**
PCBs in Water	PEO-020	8890	Aroclor-1232 (PCB-1232)	EPA 8082	**Approved**
PCBs in Water	PEO-020	8895	Aroclor-1242 (PCB-1242)	EPA 8082	**Approved**
PCBs in Water	PEO-020	8900	Aroclor-1248 (PCB-1248)	EPA 8082	**Approved**

PCBs in Water	PEO-020	8905	Aroclor-1254 (PCB-1254)	EPA 8082	**Approved**
PCBs in Water	PEO-020	8910	Aroclor-1260 (PCB-1260)	EPA 8082	**Approved**
WP PCBs in Transformer Oil	38092	8880	PCB in Oil 1016 or 1242	EPA 8082	**Approved**
WP PCBs in Water	38094	8880	PCB in Oil 1016 or 1242	EPA 8082	**Approved**
WP PCBs in Transformer Oil	38092	8905	PCB in Oil 1254	EPA 8082	**Approved**
WP PCBs in Water	38094	8905	PCB in Oil 1254	EPA 8082	**Approved**
WP PCBs in Transformer Oil	38092	8910	PCB in Oil 1260	EPA 8082	**Approved**
WP PCBs in Water	38094	8910	PCB in Oil 1260	EPA 8082	**Approved**
OP Pesticides/Herbicides	4810	7075	Azinphos-methyl	EPA 8141A	**Approved**
WP Organophosphorous Pesticides	38135	7075	Azinphosmethyl (Guthion)	EPA 8141A	**Approved**
OP Pesticides/Herbicides	4810	7300	Chlorpyrifos	EPA 8141A	**Approved**
OP Pesticides/Herbicides	4810	7390	Demeton O&S	EPA 8141A	**Approved**
WP Organophosphorous Pesticides	38135	7390	Demeton, (Mix of Isomers O:S [35%:56%])	EPA 8141A	**Approved**
OP Pesticides/Herbicides	4810	7410	Diazinon	EPA 8141A	**Approved**
WP Organophosphorous Pesticides	38135	7410	Diazinon	EPA 8141A	**Approved**
OP Pesticides/Herbicides	4810	8610	Dichlorvos (DDVP)	EPA 8141A	**Approved**
OP Pesticides/Herbicides	4810	7475	Dimethoate	EPA 8141A	**Approved**
OP Pesticides/Herbicides	4810	8625	Disulfoton	EPA 8141A	**Approved**
WP Organophosphorous Pesticides	38135	8625	Disulfoton	EPA 8141A	**Approved**
OP Pesticides/Herbicides	4810	7565	Ethion	EPA 8141A	**Approved**
WP Organophosphorous Pesticides	38135	7565	Ethion	EPA 8141A	**Approved**
OP Pesticides/Herbicides	4810	7570	Ethoprop	EPA 8141A	**Approved**
OP Pesticides/Herbicides	4810	7580	Famphur	EPA 8141A	**Approved**
OP Pesticides/Herbicides	4810	7770	Malathion	EPA 8141A	**Approved**
WP Organophosphorous Pesticides	38135	7770	Malathion	EPA 8141A	**Approved**
WP Organophosphorous Pesticides	38135	7955	Parathion ethyl	EPA 8141A	**Approved**
WP Organophosphorous Pesticides	38135	7825	Parathion methyl	EPA 8141A	**Approved**
OP Pesticides/Herbicides	4810	7955	Parathion, ethyl	EPA 8141A	**Approved**
OP Pesticides/Herbicides	4810	7825	Parathion, methyl	EPA 8141A	**Approved**
OP Pesticides/Herbicides	4810	7985	Phorate	EPA 8141A	**Approved**
OP Pesticides/Herbicides	4810	8000	Phosmet	EPA 8141A	**Approved**
OP Pesticides/Herbicides	4810	8110	Ronnel	EPA 8141A	**Approved**
OP Pesticides/Herbicides	4810	8200	Stirophos (Tetrachlorvinphos)	EPA 8141A	**Approved**
Herbicides	4440	8655	2,4,5-T	EPA 8151A	**Approved**
WP Herbicide Acid Mix #2	38136	8655	2,4,5-T	EPA 8151A	**Approved**
Herbicides	4440	8650	2,4,5-TP (Silvex)	EPA 8151A	**Approved**
Herbicides	4440	8545	2,4-D	EPA 8151A	**Approved**
WP Acrolein & Acrylonitrile	38123	8545	2,4-D (2,4-Dichlorophenoxyacetic acid)	EPA 8151A	**Approved**
Herbicides	4440	8560	2,4-DB	EPA 8151A	**Approved**
WP Herbicide Acid Mix #2	38136	8560	2,4-DB	EPA 8151A	**Approved**
Herbicides	4440	8600	3,5-Dichlorobenzoic acid	EPA 8151A	**Approved**
WP Herbicide Acid Mix #2	38136	8600	3,5-Dichlorobenzoic acid	EPA 8151A	**Approved**
Herbicides	4440	6500	4-Nitrophenol	EPA 8151A	**Approved**
WP Herbicide Acid Mix #2	38136	6500	4-Nitrophenol	EPA 8151A	**Approved**
Herbicides	4440	8505	Acifluorfen	EPA 8151A	**Approved**
WP Acrolein & Acrylonitrile	38123	8505	Acifluorfen	EPA 8151A	**Approved**
Herbicides	4440	8530	Bentazon	EPA 8151A	**Approved**
WP Herbicide Acid Mix #2	38136	8530	Bentazon	EPA 8151A	**Approved**
Herbicides	4440	8540	Chloramben	EPA 8151A	**Approved**
Herbicides	4440	8550	Dacthal diacid (DCPA)	EPA 8151A	**Approved**
Herbicides	4440	8555	Dalapon	EPA 8151A	**Approved**
WP Acrolein & Acrylonitrile	38123	8555	Dalapon	EPA 8151A	**Approved**
Herbicides	4440	8595	Dicamba	EPA 8151A	**Approved**
WP Acrolein & Acrylonitrile	38123	8595	Dicamba	EPA 8151A	**Approved**
Herbicides	4440	8605	Dichloroprop	EPA 8151A	**Approved**
WP Herbicide Acid Mix #2	38136	8605	Dichloroprop	EPA 8151A	**Approved**
Herbicides	4440	8620	Dinoseb	EPA 8151A	**Approved**
WP Acrolein & Acrylonitrile	38123	8620	Dinoseb (2-sec-Butyl-4,6-dinitrophenol)	EPA 8151A	**Approved**
Herbicides	4440	7775	MCPA	EPA 8151A	**Approved**
Herbicides	4440	7780	MCPP	EPA 8151A	**Approved**
Herbicides	4440	6605	Pentachlorophenol	EPA 8151A	**Approved**
WP Acrolein & Acrylonitrile	38123	6605	Pentachlorophenol	EPA 8151A	**Approved**
Herbicides	4440	8645	Picloram	EPA 8151A	**Approved**
WP Acrolein & Acrylonitrile	38123	8645	Picloram	EPA 8151A	**Approved**
WP Acrolein & Acrylonitrile	38123	8650	Silvex (2,4,5-TP)	EPA 8151A	**Approved**
Volatile Organic Compounds 3B	PEO-120-3B	5105	1,1,1,2-Tetrachloroethane	EPA 8260B	**Approved**
Volatiles	4170	5105	1,1,1,2-Tetrachloroethane	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5105	1,1,1,2-Tetrachloroethane	EPA 8260B	**Approved**
Volatile Organic Compounds 2	PEO-120-2	5160	1,1,1-Trichloroethane	EPA 8260B	**Approved**
Volatiles	4170	5160	1,1,1-Trichloroethane	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5160	1,1,1-Trichloroethane	EPA 8260B	**Approved**
Volatile Organic Compounds 3A	PEO-120-3A	5110	1,1,2,2-Tetrachloroethane	EPA 8260B	**Approved**
Volatiles	4170	5110	1,1,2,2-Tetrachloroethane	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5110	1,1,2,2-Tetrachloroethane	EPA 8260B	**Approved**
Volatile Organic Compounds 3A	PEO-120-3A	5165	1,1,2-Trichloroethane	EPA 8260B	**Approved**
Volatiles	4170	5165	1,1,2-Trichloroethane	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5165	1,1,2-Trichloroethane	EPA 8260B	**Approved**

WP Oxygenates	38157	5185	1,1,2-Trichlorotrifluoroethane	EPA 8260B	**Approved**
Volatile Organic Compounds 3A	PEO-120-3A	4630	1,1-Dichloroethane	EPA 8260B	**Approved**
Volatiles	4170	4630	1,1-Dichloroethane	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4630	1,1-Dichloroethane	EPA 8260B	**Approved**
Volatiles	4170	4640	1,1-Dichloroethene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4640	1,1-Dichloroethene	EPA 8260B	**Approved**
Volatile Organic Compounds 3A	PEO-120-3A	4640	1,1-Dichloroethylene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4670	1,1-Dichloropropene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5150	1,2,3-Trichlorobenzene	EPA 8260B	**Approved**
Volatile Organic Compounds 3B	PEO-120-3B	5180	1,2,3-Trichloropropane	EPA 8260B	**Approved**
Volatiles	4170	5180	1,2,3-Trichloropropane	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5180	1,2,3-Trichloropropane	EPA 8260B	**Approved**
Volatiles	4170	5155	1,2,4-Trichlorobenzene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5155	1,2,4-Trichlorobenzene	EPA 8260B	**Approved**
Volatile Organic Compounds 1	PEO-120-1	5210	1,2,4-Trimethylbenzene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5210	1,2,4-Trimethylbenzene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4570	1,2-Dibromo-3-chloropropane	EPA 8260B	**Approved**
Volatile Organic Compounds 3B	PEO-120-3B	4570	1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260B	**Approved**
Volatiles	4170	4570	1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260B	**Approved**
Volatiles	4170	4585	1,2-Dibromoethane (EDB)	EPA 8260B	**Approved**
Volatile Organic Compounds 3B	PEO-120-3B	4585	1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260B	**Approved**
Volatile Aromatics	4450	4610	1,2-Dichlorobenzene	EPA 8260B	**Approved**
Volatile Organic Compounds 1	PEO-120-1	4610	1,2-Dichlorobenzene	EPA 8260B	**Approved**
Volatiles	4170	4610	1,2-Dichlorobenzene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4610	1,2-Dichlorobenzene	EPA 8260B	**Approved**
Volatile Organic Compounds 2	PEO-120-2	4635	1,2-Dichloroethane	EPA 8260B	**Approved**
Volatiles	4170	4635	1,2-Dichloroethane	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4635	1,2-Dichloroethane	EPA 8260B	**Approved**
Volatile Organic Compounds 3A	PEO-120-3A	4655	1,2-Dichloropropane	EPA 8260B	**Approved**
Volatiles	4170	4655	1,2-Dichloropropane	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4655	1,2-Dichloropropane	EPA 8260B	**Approved**
Volatile Organic Compounds 1	PEO-120-1	5215	1,3,5-Trimethylbenzene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5215	1,3,5-Trimethylbenzene	EPA 8260B	**Approved**
Volatile Aromatics	4450	4615	1,3-Dichlorobenzene	EPA 8260B	**Approved**
Volatile Organic Compounds 1	PEO-120-1	4615	1,3-Dichlorobenzene	EPA 8260B	**Approved**
Volatiles	4170	4615	1,3-Dichlorobenzene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4615	1,3-Dichlorobenzene	EPA 8260B	**Approved**
Volatile Aromatics	4450	4620	1,4-Dichlorobenzene	EPA 8260B	**Approved**
Volatile Organic Compounds 1	PEO-120-1	4620	1,4-Dichlorobenzene	EPA 8260B	**Approved**
Volatiles	4170	4620	1,4-Dichlorobenzene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4620	1,4-Dichlorobenzene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4665	2,2-Dichloropropane	EPA 8260B	**Approved**
WP Ketones	38134	4410	2-Butanone	EPA 8260B	**Approved**
Volatiles	4170	4410	2-Butanone (Methyl ethyl ketone)	EPA 8260B	**Approved**
Volatile Organic Compounds 3B	PEO-120-3B	4410	2-Butanone (Methyl ethyl ketone, MEK)	EPA 8260B	**Approved**
Volatile Organic Compounds 3B	PEO-120-3B	4500	2-Chloroethyl vinyl ether	EPA 8260B	**Approved**
Volatiles	4170	4500	2-Chloroethyl vinyl ether	EPA 8260B	**Approved**
WP 2-Chloroethyl vinyl ether	38128	4500	2-Chloroethyl vinyl ether	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4535	2-Chlorotoluene	EPA 8260B	**Approved**
Volatile Organic Compounds 3A	PEO-120-3A	4860	2-Hexanone	EPA 8260B	**Approved**
Volatiles	4170	4860	2-Hexanone	EPA 8260B	**Approved**
WP Ketones	38134	4860	2-Hexanone	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4540	4-Chlorotoluene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4995	4-Methyl-2-pentanone	EPA 8260B	**Approved**
WP Ketones	38134	4995	4-Methyl-2-pentanone	EPA 8260B	**Approved**
Volatile Organic Compounds 3A	PEO-120-3A	4995	4-Methyl-2-pentanone (MIBK)	EPA 8260B	**Approved**
Volatiles	4170	4995	4-Methyl-2-pentanone (MIBK)	EPA 8260B	**Approved**
Volatile Organic Compounds 3B	PEO-120-3B	4315	Acetone	EPA 8260B	**Approved**
Volatiles	4170	4315	Acetone	EPA 8260B	**Approved**
WP Ketones	38134	4315	Acetone	EPA 8260B	**Approved**
Volatile Organic Compounds 3B	PEO-120-3B	4320	Acetonitrile	EPA 8260B	**Approved**
Volatiles	4170	4325	Acrolein	EPA 8260B	**Approved**
WP Acrolein & Acrylonitrile	38123	4325	Acrolein	EPA 8260B	**Approved**
Volatile Organic Compounds 3B	PEO-120-3B	4325	Acrolein (Propenal)	EPA 8260B	**Approved**
Volatile Organic Compounds 3B	PEO-120-3B	4340	Acrylonitrile	EPA 8260B	**Approved**
Volatiles	4170	4340	Acrylonitrile	EPA 8260B	**Approved**
WP Acrolein & Acrylonitrile	38123	4340	Acrylonitrile	EPA 8260B	**Approved**
CWA BTEX & MTBE	38166	4375	Benzene	EPA 8260B	**Approved**
Volatile Aromatics	4450	4375	Benzene	EPA 8260B	**Approved**
Volatile Organic Compounds 1	PEO-120-1	4375	Benzene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4375	Benzene	EPA 8260B	**Approved**
Volatiles	4170	4375	Beznene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4385	Bromobenzene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4390	Bromochloromethane	EPA 8260B	**Approved**
Volatile Organic Compounds 2	PEO-120-2	4395	Bromodichloromethane	EPA 8260B	**Approved**
Volatiles	4170	4395	Bromodichloromethane	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4395	Bromodichloromethane	EPA 8260B	**Approved**

Volatile Organic Compounds 2	PEO-120-2	4400	Bromoform	EPA 8260B	**Approved**
Volatiles	4170	4400	Bromoform	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4400	Bromoform	EPA 8260B	**Approved**
Volatiles	4170	4950	Bromomethane	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4950	Bromomethane	EPA 8260B	**Approved**
Volatiles	4170	4450	Carbon disulfide	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4450	Carbon disulphide	EPA 8260B	**Approved**
Volatile Organic Compounds 2	PEO-120-2	4455	Carbon tetrachloride	EPA 8260B	**Approved**
Volatiles	4170	4455	Carbon tetrachloride	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4455	Carbon tetrachloride	EPA 8260B	**Approved**
Volatile Organic Compounds 2	PEO-120-2	4475	Chlorobenzene	EPA 8260B	**Approved**
Volatiles	4170	4475	Chlorobenzene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4475	Chlorobenzene	EPA 8260B	**Approved**
Volatile Organic Compounds 3A	PEO-120-3A	4485	Chloroethane	EPA 8260B	**Approved**
Volatiles	4170	4485	Chloroethane	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4485	Chloroethane	EPA 8260B	**Approved**
Volatile Organic Compounds 2	PEO-120-2	4505	Chloroform	EPA 8260B	**Approved**
Volatiles	4170	4505	Chloroform	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4505	Chloroform	EPA 8260B	**Approved**
Volatiles	4170	4960	Chloromethane	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4960	Chloromethane	EPA 8260B	**Approved**
Volatiles	4170	4645	cis-1,2-Dichloroethene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4645	cis-1,2-Dichloroethene	EPA 8260B	**Approved**
Volatile Organic Compounds 3A	PEO-120-3A	4645	cis-1,2-Dichloroethylene	EPA 8260B	**Approved**
Volatile Organic Compounds 3A	PEO-120-3A	4680	cis-1,3-Dichloropropene	EPA 8260B	**Approved**
Volatiles	4170	4680	cis-1,3-Dichloropropene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4680	cis-1,3-Dichloropropene	EPA 8260B	**Approved**
Volatile Organic Compounds 2	PEO-120-2	4575	Dibromochloromethane	EPA 8260B	**Approved**
Volatiles	4170	4575	Dibromochloromethane	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4575	Dibromochloromethane	EPA 8260B	**Approved**
Volatile Organic Compounds 3B	PEO-120-3B	4595	Dibromomethane	EPA 8260B	**Approved**
Volatiles	4170	4595	Dibromomethane	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4595	Dibromomethane	EPA 8260B	**Approved**
Volatiles	4170	4625	Dichloridifluoromethane	EPA 8260B	**Approved**
Volatile Organic Compounds 3B	PEO-120-3B	4625	Dichlorodifluoromethane	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4625	Dichlorodifluoromethane	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4765	Ethyl benzene	EPA 8260B	**Approved**
CWA BTEX & MTBE	38166	4765	Ethylbenzene	EPA 8260B	**Approved**
Volatile Aromatics	4450	4765	Ethylbenzene	EPA 8260B	**Approved**
Volatile Organic Compounds 1	PEO-120-1	4765	Ethylbenzene	EPA 8260B	**Approved**
Volatiles	4170	4765	Ethylbenzene	EPA 8260B	**Approved**
Volatiles	4170	4835	Hexachlorobutadiene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4835	Hexachlorobutadiene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4840	Hexachloroethane	EPA 8260B	**Approved**
WP Oxygenates	38157	9375	Isopropyl ether (DIPE)	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4900	Isopropylbenzene	EPA 8260B	**Approved**
Volatile Organic Compounds 1	PEO-120-1	5240	m+p-Xylene	EPA 8260B	**Approved**
Volatile Organic Compounds 3A	PEO-120-3A	4950	Methyl bromide (Bromomethane)	EPA 8260B	**Approved**
Volatile Organic Compounds 3A	PEO-120-3A	4960	Methyl chloride (Chloromethane)	EPA 8260B	**Approved**
CWA BTEX & MTBE	38166	5000	Methyl tert-butyl ether (MTBE)	EPA 8260B	**Approved**
Volatile Organic Compounds 1	PEO-120-1	5000	Methyl tert-butyl ether (MTBE)	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5000	Methyl tert-butyl ether (MTBE)	EPA 8260B	**Approved**
WP Oxygenates	38157	5000	Methyl tert-butyl ether (MTBE)	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4975	Methylene chloride	EPA 8260B	**Approved**
Volatile Organic Compounds 2	PEO-120-2	4975	Methylene chloride (Dichloromethane)	EPA 8260B	**Approved**
Volatiles	4170	4975	Methylene chloride (Dichloromethane)	EPA 8260B	**Approved**
Volatiles	4170	5000	Methyl-t-butylether (MTBE)	EPA 8260B	**Approved**
Volatile Organic Compounds 1	PEO-120-1	5005	Naphthalene	EPA 8260B	**Approved**
Volatiles	4170	5005	Naphthalene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5005	Naphthalene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4435	n-Butyl benzene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5090	n-Propylbenzene	EPA 8260B	**Approved**
WP Oxygenates	38157	5090	n-Propylbenzene	EPA 8260B	**Approved**
Volatile Organic Compounds 1	PEO-120-1	5250	o-Xylene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4910	p-Isopropyl toluene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4440	sec-Butyl benzene	EPA 8260B	**Approved**
Volatile Organic Compounds 3A	PEO-120-3A	5100	Styrene	EPA 8260B	**Approved**
Volatiles	4170	5100	Styrene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5100	Styrene	EPA 8260B	**Approved**
WP Oxygenates	38157	4370	tert-Amyl methyl ether (TAME)	EPA 8260B	**Approved**
WP Oxygenates	38157	4420	tert-Butyl alcohol (t-Butanol)	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4445	tert-Butyl benzene	EPA 8260B	**Approved**
WP Oxygenates	38157	4770	tert-Butyl ethyl ether (ETBE)	EPA 8260B	**Approved**
Volatiles	4170	5115	Tetrachloroethene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5115	Tetrachloroethene	EPA 8260B	**Approved**
Volatile Organic Compounds 2	PEO-120-2	5115	Tetrachloroethylene (Perchloroethylene)	EPA 8260B	**Approved**
CWA BTEX & MTBE	38166	5140	Toluene	EPA 8260B	**Approved**

Volatile Aromatics	4450	5140	Toluene	EPA 8260B	**Approved**
Volatile Organic Compounds 1	PEO-120-1	5140	Toluene	EPA 8260B	**Approved**
Volatiles	4170	5140	Toluene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5140	Toluene	EPA 8260B	**Approved**
CWA BTEX & MTBE	38166	5260	Total Xylenes	EPA 8260B	**Approved**
Volatile Aromatics	4450	5260	Total Xylenes	EPA 8260B	**Approved**
Volatiles	4170	5260	Total Xylenes	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5260	Total Xylenes	EPA 8260B	**Approved**
Volatiles	4170	4700	trans-1,2-Dichloroethene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4700	trans-1,2-Dichloroethene	EPA 8260B	**Approved**
Volatile Organic Compounds 3A	PEO-120-3A	4700	trans-1,2-Dichloroethylene	EPA 8260B	**Approved**
Volatile Organic Compounds 3A	PEO-120-3A	4685	trans-1,3-Dichloropropene	EPA 8260B	**Approved**
Volatiles	4170	4685	trans-1,3-Dichloropropene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	4685	trans-1,3-Dichloropropene	EPA 8260B	**Approved**
Volatiles	4170	5170	Trichloroethene	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5170	Trichloroethene	EPA 8260B	**Approved**
Volatile Organic Compounds 2	PEO-120-2	5170	Trichloroethene (Trichloroethylene)	EPA 8260B	**Approved**
Volatile Organic Compounds 3A	PEO-120-3A	5175	Trichlorofluoromethane	EPA 8260B	**Approved**
Volatiles	4170	5175	Trichlorofluoromethane	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5175	Trichlorofluoromethane	EPA 8260B	**Approved**
Volatile Organic Compounds 3B	PEO-120-3B	5225	Vinyl acetate	EPA 8260B	**Approved**
Volatiles	4170	5225	Vinyl acetate	EPA 8260B	**Approved**
Volatile Organic Compounds 3A	PEO-120-3A	5235	Vinyl chloride	EPA 8260B	**Approved**
Volatiles	4170	5235	Vinyl chloride	EPA 8260B	**Approved**
Volatiles in Non-Potable Water	38083	5235	Vinyl chloride	EPA 8260B	**Approved**
Volatile Organic Compounds 1	PEO-120-1	5260	Xylene, total	EPA 8260B	**Approved**
Base Neutral Extractables	4200	6715	1,2,4,5-Tetrachlorobenzene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5155	1,2,4-Trichlorbenzene	EPA 8270C	**Approved**
WP Base/Neutrals	711	5155	1,2,4-Trichlorobenzene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	4610	1,2-Dichlorobenzene	EPA 8270C	**Approved**
WP Base/Neutrals	711	4610	1,2-Dichlorobenzene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	4615	1,3-Dichlorobenzene	EPA 8270C	**Approved**
WP Base/Neutrals	711	4615	1,3-Dichlorobenzene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	4620	1,4-Dichlorobenzene	EPA 8270C	**Approved**
WP Base/Neutrals	711	4620	1,4-Dichlorobenzene	EPA 8270C	**Approved**
Acid Extractables	4190	6735	2,3,4,6-Tetrachlorophenol	EPA 8270C	**Approved**
Acids	712	6735	2,3,4,6-Tetrachlorophenol	EPA 8270C	**Approved**
Acid Extractables	4190	6835	2,4,5-Trichlorophenol	EPA 8270C	**Approved**
Acids	712	6835	2,4,5-Trichlorophenol	EPA 8270C	**Approved**
Acids	712	6840	2,4,6-Trichlorophenol	EPA 8270C	**Approved**
Acid Extractables	4190	6840	2,4,6-Trichlorphenol	EPA 8270C	**Approved**
Acid Extractables	4190	6000	2,4-Dichlorophenol	EPA 8270C	**Approved**
Acids	712	6000	2,4-Dichlorophenol	EPA 8270C	**Approved**
Acid Extractables	4190	6130	2,4-Dimethylphenol	EPA 8270C	**Approved**
Acids	712	6130	2,4-Dimethylphenol	EPA 8270C	**Approved**
Acid Extractables	4190	6175	2,4-Dinitrophenol	EPA 8270C	**Approved**
Acids	712	6175	2,4-Dinitrophenol	EPA 8270C	**Approved**
WP Base/Neutrals	711	6185	2,4-Dinitrotoluene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6185	2,4-Dinitrotoluene (2,4-DNT)	EPA 8270C	**Approved**
Acid Extractables	4190	6005	2,6-Dichlorophenol	EPA 8270C	**Approved**
Acids	712	6005	2,6-Dichlorophenol	EPA 8270C	**Approved**
WP Base/Neutrals	711	6190	2,6-Dinitrotoluene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6190	2,6-Dinitrotoluene (2,6-DNT)	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5795	2-Chloronaphthalene	EPA 8270C	**Approved**
WP Base/Neutrals	711	5795	2-Chloronaphthalene	EPA 8270C	**Approved**
Acid Extractables	4190	5800	2-Chlorophenol	EPA 8270C	**Approved**
Acids	712	5800	2-Chlorophenol	EPA 8270C	**Approved**
Acid Extractables	4190	6360	2-Methyl-4,6-Dinitrophenol	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6385	2-Methylnaphthalene	EPA 8270C	**Approved**
WP Base/Neutrals	711	6385	2-Methylnaphthalene	EPA 8270C	**Approved**
Acid Extractables	4190	6400	2-Methylphenol	EPA 8270C	**Approved**
Acids	712	6400	2-Methylphenol	EPA 8270C	**Approved**
WP Base/Neutrals	711	6460	2-Nitroaniline	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6460	2-Nitroaniline	EPA 8270C	**Approved**
Acid Extractables	4190	6490	2-Nitrophenol	EPA 8270C	**Approved**
Acids	712	6490	2-Nitrophenol	EPA 8270C	**Approved**
Acid Extractables	4190	6410	3 & 4-Methylphenol	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5945	3,3'-Dichlorobenzidine	EPA 8270C	**Approved**
WP Base/Neutrals	711	5945	3,3'-Dichlorobenzidine	EPA 8270C	**Approved**
Acid Extractables	4190	6405	3-Methylphenol	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6465	3-Nitroaniline	EPA 8270C	**Approved**
WP Base/Neutrals	711	6465	3-Nitroaniline	EPA 8270C	**Approved**
Acids	712	6360	4,6-Dinitro-2-methylphenol	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5660	4-Bromophenyl phenyl ether	EPA 8270C	**Approved**
WP Base/Neutrals	711	5660	4-Bromophenyl-phenylether	EPA 8270C	**Approved**
Acid Extractables	4190	5700	4-Chloro-3-methylphenol	EPA 8270C	**Approved**
Acids	712	5700	4-Chloro-3-methylphenol	EPA 8270C	**Approved**

Base Neutral Extractables	4200	5745	4-Chloroaniline	EPA 8270C	**Approved**
WP Base/Neutrals	711	5745	4-Chloroaniline	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5825	4-Chlorophenyl-phenylether	EPA 8270C	**Approved**
WP Base/Neutrals	711	5825	4-Chlorophenyl-phenylether	EPA 8270C	**Approved**
Acids	712	6410	4-Methylphenol	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6470	4-Nitroaniline	EPA 8270C	**Approved**
WP Base/Neutrals	711	6470	4-Nitroaniline	EPA 8270C	**Approved**
Acid Extractables	4190	6500	4-Nitrophenol	EPA 8270C	**Approved**
Acids	712	6500	4-Nitrophenol	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5500	Acenaphthene	EPA 8270C	**Approved**
Base/Neutrals 1	PEO-121-1	5500	Acenaphthene	EPA 8270C	**Approved**
CWA Low Level PAH Mix	38010	5500	Acenaphthene	EPA 8270C	**Approved**
PAH-GC & GCMS	4880	5500	Acenaphthene	EPA 8270C	**Approved**
WP Base/Neutrals	711	5500	Acenaphthene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5505	Acenaphthylene	EPA 8270C	**Approved**
Base/Neutrals 1	PEO-121-1	5505	Acenaphthylene	EPA 8270C	**Approved**
CWA Low Level PAH Mix	38010	5505	Acenaphthylene	EPA 8270C	**Approved**
PAH-GC & GCMS	4880	5505	Acenaphthylene	EPA 8270C	**Approved**
WP Base/Neutrals	711	5505	Acenaphthylene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5545	Aniline	EPA 8270C	**Approved**
WP Base/Neutrals	711	5545	Aniline	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5555	Anthracene	EPA 8270C	**Approved**
Base/Neutrals 1	PEO-121-1	5555	Anthracene	EPA 8270C	**Approved**
CWA Low Level PAH Mix	38010	5555	Anthracene	EPA 8270C	**Approved**
PAH-GC & GCMS	4880	5555	Anthracene	EPA 8270C	**Approved**
WP Base/Neutrals	711	5555	Anthracene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5595	Benzidine	EPA 8270C	**Approved**
WP Base/Neutrals	711	5595	Benzidine	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5575	Benzo(a)anthracene	EPA 8270C	**Approved**
Base/Neutrals 1	PEO-121-1	5575	Benzo(a)anthracene	EPA 8270C	**Approved**
CWA Low Level PAH Mix	38010	5575	Benzo(a)anthracene	EPA 8270C	**Approved**
PAH-GC & GCMS	4880	5575	Benzo(a)anthracene	EPA 8270C	**Approved**
WP Base/Neutrals	711	5575	Benzo(a)anthracene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5580	Benzo(a)pyrene	EPA 8270C	**Approved**
Base/Neutrals 1	PEO-121-1	5580	Benzo(a)pyrene	EPA 8270C	**Approved**
PAH-GC & GCMS	4880	5580	Benzo(a)pyrene	EPA 8270C	**Approved**
WP Base/Neutrals	711	5580	Benzo(a)pyrene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5585	Benzo(b)fluoranthene	EPA 8270C	**Approved**
Base/Neutrals 1	PEO-121-1	5585	Benzo(b)fluoranthene	EPA 8270C	**Approved**
CWA Low Level PAH Mix	38010	5585	Benzo(b)fluoranthene	EPA 8270C	**Approved**
PAH-GC & GCMS	4880	5585	Benzo(b)fluoranthene	EPA 8270C	**Approved**
WP Base/Neutrals	711	5585	Benzo(b)fluoranthene	EPA 8270C	**Approved**
Base/Neutrals 1	PEO-121-1	5601	Benzo(b+k)fluoranthene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5590	Benzo(g,h,I)perylene	EPA 8270C	**Approved**
Base/Neutrals 1	PEO-121-1	5590	Benzo(g,h,I)perylene	EPA 8270C	**Approved**
CWA Low Level PAH Mix	38010	5590	Benzo(g,h,I)perylene	EPA 8270C	**Approved**
PAH-GC & GCMS	4880	5590	Benzo(g,h,I)perylene	EPA 8270C	**Approved**
WP Base/Neutrals	711	5590	Benzo(g,h,I)perylene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5600	Benzo(k)fluoranthene	EPA 8270C	**Approved**
Base/Neutrals 1	PEO-121-1	5600	Benzo(k)fluoranthene	EPA 8270C	**Approved**
CWA Low Level PAH Mix	38010	5600	Benzo(k)fluoranthene	EPA 8270C	**Approved**
PAH-GC & GCMS	4880	5600	Benzo(k)fluoranthene	EPA 8270C	**Approved**
WP Base/Neutrals	711	5600	Benzo(k)fluoranthene	EPA 8270C	**Approved**
Acid Extractables	4190	5610	Benzoic Acid	EPA 8270C	**Approved**
Acids	712	5610	Benzoic acid	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5630	Benzyl alcohol	EPA 8270C	**Approved**
WP Base/Neutrals	711	5630	Benzyl alcohol	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5670	Benzyl butyl phthalate	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5760	bis(2-Chloroethoxy) methane	EPA 8270C	**Approved**
WP Base/Neutrals	711	5760	bis(2-Chloroethoxy) methane	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5765	bis(2-Chloroethyl) ether	EPA 8270C	**Approved**
WP Base/Neutrals	711	5765	bis(2-Chloroethyl)ether	EPA 8270C	**Approved**
Base Neutrals Extractables	4200	5780	bis(2-Chloroisopropyl) ehter	EPA 8270C	**Approved**
WP Base/Neutrals	711	5780	bis(2-Chloroisopropyl) ether	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6255	bis(2-Ethylhexyl) phthalate	EPA 8270C	**Approved**
WP Base/Neutrals	711	6255	bis(2-Ethylhexyl) phthalate	EPA 8270C	**Approved**
WP Base/Neutrals	711	5670	Butylbenzylphthalate	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5680	Carbazole	EPA 8270C	**Approved**
WP Base/Neutrals	711	5680	Carbazole	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5855	Chrysene	EPA 8270C	**Approved**
Base/Neutrals 1	PEO-121-1	5855	Chrysene	EPA 8270C	**Approved**
CWA Low Level PAH Mix	38010	5855	Chrysene	EPA 8270C	**Approved**
PAH-GC & GCMS	4880	5855	Chrysene	EPA 8270C	**Approved**
WP Base/Neutrals	711	5855	Chrysene	EPA 8270C	**Approved**
Base/Neutrals 1	PEO-121-1	5895	Dibenz(a,h) anthracene	EPA 8270C	**Approved**
PAH-GC & GCMS	4880	5895	Dibenz(a,h) anthracene	EPA 8270C	**Approved**
WP Base/Neutrals	711	5895	Dibenz(a,h) anthracene	EPA 8270C	**Approved**

CWA Low Level PAH Mix	38010	5895	Dibenz(a,h) anthracene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5905	Dibenzofuran	EPA 8270C	**Approved**
WP Base/Neutrals	711	5905	Dibenzofuran	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5895	Dibesz(a,h) anthracene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6070	Diethyl phthalate	EPA 8270C	**Approved**
WP Base/Neutrals	711	6070	Diethylphthalate	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6135	Dimethyl phthalate	EPA 8270C	**Approved**
WP Base/Neutrals	711	6135	Dimethyl phthalate	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5925	Di-n-butylphthalate	EPA 8270C	**Approved**
WP Base/Neutrals	711	5925	Di-n-butylphthalate	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6200	Di-n-octylphthalate	EPA 8270C	**Approved**
WP Base/Neutrals	711	6200	Di-n-octylphthalate	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6265	Fluioranthene	EPA 8270C	**Approved**
Base/Neutrals 1	PEO-121-1	6265	Fluoranthene	EPA 8270C	**Approved**
CWA Low Level PAH Mix	38010	6265	Fluoranthene	EPA 8270C	**Approved**
PAH-GC & GCMS	4880	6265	Fluoranthene	EPA 8270C	**Approved**
WP Base/Neutrals	711	6265	Fluoranthene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6270	Fluorene	EPA 8270C	**Approved**
Base/Neutrals 1	PEO-121-1	6270	Fluorene	EPA 8270C	**Approved**
CWA Low Level PAH Mix	38010	6270	Fluorene	EPA 8270C	**Approved**
PAH-GC & GCMS	4880	6270	Fluorene	EPA 8270C	**Approved**
WP Base/Neutrals	711	6270	Fluorene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6275	Hexachlorobenzene	EPA 8270C	**Approved**
WP Base/Neutrals	711	6275	Hexachlorobenzene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	4835	Hexachlorobutadiene	EPA 8270C	**Approved**
WP Base/Neutrals	711	4835	Hexachlorobutadiene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6285	Hexachlorocyclopentadiene	EPA 8270C	**Approved**
WP Base/Neutrals	711	6285	Hexachlorocyclopentadiene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	4840	Hexachloroethane	EPA 8270C	**Approved**
WP Base/Neutrals	711	4840	Hexachloroethane	EPA 8270C	**Approved**
CWA Low Level PAH Mix	38010	6315	Indeno (1,2,3,cd) pyrene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6315	Indeno (1,2,3-cd) pyrene	EPA 8270C	**Approved**
PAH-GC & GCMS	4880	6315	Indeno (1,2,3-cd) pyrene	EPA 8270C	**Approved**
Base/Neutrals 1	PEO-121-1	6315	Indeno (1,2,3-cd) pyrene	EPA 8270C	**Approved**
WP Base/Neutrals	711	6315	Indeno (1,2,3-cd) pyrene	EPA 8270C	**Approved**
WP Base/Neutrals	711	6320	Isophorone	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6320	Isophorone	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5005	Naphthalene	EPA 8270C	**Approved**
Base/Neutrals 1	PEO-121-1	5005	Naphthalene	EPA 8270C	**Approved**
CWA Low Level PAH Mix	38010	5005	Naphthalene	EPA 8270C	**Approved**
PAH-GC & GCMS	4880	5005	Naphthalene	EPA 8270C	**Approved**
WP Base/Neutrals	711	5005	Naphthalene	EPA 8270C	**Approved**
WP Base/Neutrals	711	5015	Nitrobenzene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5015	Nitrobenzene (NB)	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6530	N-nitrosodimethylamine	EPA 8270C	**Approved**
WP Base/Neutrals	711	6530	N-Nitrosodimethylamine	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6545	N-Nitroso-di-n-propylamine	EPA 8270C	**Approved**
WP Base/Neutrals	711	6545	N-Nitroso-di-n-propylamine	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6535	N-nitrosodiphenylamine	EPA 8270C	**Approved**
WP Base/Neutrals	711	6535	N-Nitrosodiphenylamine	EPA 8270C	**Approved**
Acid Extractables	4190	6605	Pentachlorophenol	EPA 8270C	**Approved**
Acids	712	6605	Pentachlorophenol	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6615	Phenanthrene	EPA 8270C	**Approved**
Base/Neutrals 1	PEO-121-1	6615	Phenanthrene	EPA 8270C	**Approved**
CWA Low Level PAH Mix	38010	6615	Phenanthrene	EPA 8270C	**Approved**
PAH-GC & GCMS	4880	6615	Phenanthrene	EPA 8270C	**Approved**
WP Base/Neutrals	711	6615	Phenanthrene	EPA 8270C	**Approved**
Acid Extractables	4190	6625	Phenol	EPA 8270C	**Approved**
Acids	712	6625	Phenol	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6665	Pyrene	EPA 8270C	**Approved**
Base/Neutrals 1	PEO-121-1	6665	Pyrene	EPA 8270C	**Approved**
CWA Low Level PAH Mix	38010	6665	Pyrene	EPA 8270C	**Approved**
PAH-GC & GCMS	4880	6665	Pyrene	EPA 8270C	**Approved**
WP Base/Neutrals	711	6665	Pyrene	EPA 8270C	**Approved**
Base Neutral Extractables	4200	5095	Pyridine	EPA 8270C	**Approved**
WP Base/Neutrals	711	5095	Pyridine	EPA 8270C	**Approved**
Base Neutral Extractables	4200	6715	1,2,4,5-Tetrachlorobenzene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5155	1,2,4-Trichlorbenzene	EPA 8270D	**Approved**
WP Base/Neutrals	711	5155	1,2,4-Trichlorobenzene	EPA 8270D	**Approved**
WP Base/Neutrals	711	4610	1,2-Dichlorobenzene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	4610	1,2-Dichlorobenzene	EPA 8270D	**Approved**
WP Base/Neutrals	711	4615	1,3-Dichlorobenzene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	4615	1,3-Dichlorobenzene	EPA 8270D	**Approved**
WP Base/Neutrals	711	4620	1,4-Dichlorobenzene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	4620	1,4-Dichlorobenzene	EPA 8270D	**Approved**
Acids	712	6735	2,3,4,6-Tetrachlorophenol	EPA 8270D	**Approved**
Acid Extractables	4190	6735	2,3,4,6-Tetrachlorophenol	EPA 8270D	**Approved**

Acids	712	6835	2,4,5-Trichlorophenol	EPA 8270D	**Approved**
Acid Extractables	4190	6835	2,4,5-Trichlorophenol	EPA 8270D	**Approved**
Acids	712	6840	2,4,6-Trichlorophenol	EPA 8270D	**Approved**
Acid Extractables	4190	6840	2,4,6-Trichlorphenol	EPA 8270D	**Approved**
Acids	712	6000	2,4-Dichlorophenol	EPA 8270D	**Approved**
Acid Extractables	4190	6000	2,4-Dichlorophenol	EPA 8270D	**Approved**
Acids	712	6130	2,4-Dimethylphenol	EPA 8270D	**Approved**
Acid Extractables	4190	6130	2,4-Dimethylphenol	EPA 8270D	**Approved**
Acids	712	6175	2,4-Dinitrophenol	EPA 8270D	**Approved**
Acid Extractables	4190	6175	2,4-Dinitrophenol	EPA 8270D	**Approved**
WP Base/Neutrals	711	6185	2,4-Dinitrotoluene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6185	2,4-Dinitrotoluene (2,4-DNT)	EPA 8270D	**Approved**
Acids	712	6005	2,6-Dichlorophenol	EPA 8270D	**Approved**
Acid Extractables	4190	6005	2,6-Dichlorophenol	EPA 8270D	**Approved**
WP Base/Neutrals	711	6190	2,6-Dinitrotoluene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6190	2,6-Dinitrotoluene (2,6-DNT)	EPA 8270D	**Approved**
WP Base/Neutrals	711	5795	2-Chloronaphthalene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5795	2-Chloronaphthalene	EPA 8270D	**Approved**
Acids	712	5800	2-Chlorophenol	EPA 8270D	**Approved**
Acid Extractables	4190	5800	2-Chlorophenol	EPA 8270D	**Approved**
Acid Extractables	4190	6360	2-Methyl-4,6-Dinitrophenol	EPA 8270D	**Approved**
WP Base/Neutrals	711	6385	2-Methylnaphthalene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6385	2-Methylnaphthalene	EPA 8270D	**Approved**
Acids	712	6400	2-Methylphenol	EPA 8270D	**Approved**
Acid Extractables	4190	6400	2-Methylphenol	EPA 8270D	**Approved**
WP Base/Neutrals	711	6460	2-Nitroaniline	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6460	2-Nitroaniline	EPA 8270D	**Approved**
Acids	712	6490	2-Nitrophenol	EPA 8270D	**Approved**
Acid Extractables	4190	6490	2-Nitrophenol	EPA 8270D	**Approved**
WP Base/Neutrals	711	5945	3,3'-Dichlorobenzidine	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5945	3,3'-Dichlorobenzidine	EPA 8270D	**Approved**
Acid Extractables	4190	6405	3-Methylphenol	EPA 8270D	**Approved**
WP Base/Neutrals	711	6465	3-Nitroaniline	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6465	3-Nitroaniline	EPA 8270D	**Approved**
Acids	712	6360	4,6-Dinitro-2-methylphenol	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5660	4-Bromophenyl phenyl ether	EPA 8270D	**Approved**
WP Base/Neutrals	711	5660	4-Bromophenyl-phenylether	EPA 8270D	**Approved**
Acids	712	5700	4-Chloro-3-methylphenol	EPA 8270D	**Approved**
Acid Extractables	4190	5700	4-Chloro-3-methylphenol	EPA 8270D	**Approved**
WP Base/Neutrals	711	5745	4-Chloroaniline	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5745	4-Chloroaniline	EPA 8270D	**Approved**
WP Base/Neutrals	711	5825	4-Chlorophenyl-phenylether	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5825	4-Chlorophenyl-phenylether	EPA 8270D	**Approved**
Acids	712	6410	4-Methylphenol	EPA 8270D	**Approved**
Acid Extractables	4190	6410	4-Methylphenol	EPA 8270D	**Approved**
WP Base/Neutrals	711	6470	4-Nitroaniline	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6470	4-Nitroaniline	EPA 8270D	**Approved**
Acids	712	6500	4-Nitrophenol	EPA 8270D	**Approved**
Acid Extractables	4190	6500	4-Nitrophenol	EPA 8270D	**Approved**
WP Base/Neutrals	711	5500	Acenaphthene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5500	Acenaphthene	EPA 8270D	**Approved**
WP Base/Neutrals	711	5505	Acenaphthylene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5505	Acenaphthylene	EPA 8270D	**Approved**
WP Base/Neutrals	711	5545	Aniline	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5545	Aniline	EPA 8270D	**Approved**
WP Base/Neutrals	711	5555	Anthracene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5555	Anthracene	EPA 8270D	**Approved**
WP Base/Neutrals	711	5595	Benzidine	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5595	Benzidine	EPA 8270D	**Approved**
WP Base/Neutrals	711	5575	Benzo(a)anthracene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5575	Benzo(a)anthracene	EPA 8270D	**Approved**
WP Base/Neutrals	711	5580	Benzo(a)pyrene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5580	Benzo(a)pyrene	EPA 8270D	**Approved**
WP Base/Neutrals	711	5585	Benzo(b)fluoranthene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5585	Benzo(b)fluoranthene	EPA 8270D	**Approved**
WP Base/Neutrals	711	5590	Benzo(g,h,I)perylene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5590	Benzo(g,h,I)perylene	EPA 8270D	**Approved**
WP Base/Neutrals	711	5600	Benzo(k)fluoranthene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5600	Benzo(k)fluoranthene	EPA 8270D	**Approved**
Acids	712	5610	Benzoic acid	EPA 8270D	**Approved**
Acid Extractables	4190	5610	Benzoic Acid	EPA 8270D	**Approved**
WP Base/Neutrals	711	5630	Benzyl alcohol	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5630	Benzyl alcohol	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5670	Benzyl butyl phthalate	EPA 8270D	**Approved**
WP Base/Neutrals	711	5760	bis(2-Chloroethoxy) methane	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5760	bis(2-Chloroethoxy) methane	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5765	bis(2-Chloroethyl) ether	EPA 8270D	**Approved**

WP Base/Neutrals	711	5765	bis(2-Chloroethyl)ether	EPA 8270D	**Approved**
WP Base/Neutrals	711	5780	bis(2-Chloroisopropyl) ether	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5780	bis(2-Chloroisopropyl) ether	EPA 8270D	**Approved**
WP Base/Neutrals	711	6255	bis(2-Ethylhexyl) phthalate	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6255	bis(2-Ethylhexyl) phthalate	EPA 8270D	**Approved**
WP Base/Neutrals	711	5670	Butylbenzylphthalate	EPA 8270D	**Approved**
WP Base/Neutrals	711	5680	Carbazole	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5680	Carbazole	EPA 8270D	**Approved**
WP Base/Neutrals	711	5855	Chrysene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5855	Chrysene	EPA 8270D	**Approved**
WP Base/Neutrals	711	5895	Dibenz(a,h) anthracene	EPA 8270D	**Approved**
WP Base/Neutrals	711	5905	Dibenzofuran	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5905	Dibenzofuran	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5895	Dibesz(a,h) anthracene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6070	Diethyl phthalate	EPA 8270D	**Approved**
WP Base/Neutrals	711	6070	Diethylphthalate	EPA 8270D	**Approved**
WP Base/Neutrals	711	6135	Dimethyl phthalate	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6135	Dimethyl phthalate	EPA 8270D	**Approved**
WP Base/Neutrals	711	5925	Di-n-butylphthalate	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5925	Di-n-butylphthalate	EPA 8270D	**Approved**
WP Base/Neutrals	711	6200	Di-n-octylphthalate	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6200	Di-n-octylphthalate	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6265	Fluioranthene	EPA 8270D	**Approved**
WP Base/Neutrals	711	6265	Fluoranthene	EPA 8270D	**Approved**
WP Base/Neutrals	711	6270	Fluorene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6270	Fluorene	EPA 8270D	**Approved**
WP Base/Neutrals	711	6275	Hexachlorobenzene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6275	Hexachlorobenzene	EPA 8270D	**Approved**
WP Base/Neutrals	711	4835	Hexachlorobutadiene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	4835	Hexachlorobutadiene	EPA 8270D	**Approved**
WP Base/Neutrals	711	6285	Hexachlorocyclopentadiene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6285	Hexachlorocyclopentadiene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	4840	Hexachloroehane	EPA 8270D	**Approved**
WP Base/Neutrals	711	4840	Hexachloroethane	EPA 8270D	**Approved**
WP Base/Neutrals	711	6315	Indeno (1,2,3-cd) pyrene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6315	Indeno (1,2,3-cd) pyrene	EPA 8270D	**Approved**
WP Base/Neutrals	711	6320	Isophorone	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6320	Isophorone	EPA 8270D	**Approved**
WP Base/Neutrals	711	5005	Naphthalene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5005	Naphthalene	EPA 8270D	**Approved**
WP Base/Neutrals	711	5015	Nitrobenzene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5015	Nitrobenzene (NB)	EPA 8270D	**Approved**
WP Base/Neutrals	711	6530	N-Nitrosodimethylamine	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6530	N-nitrosodimethylamine	EPA 8270D	**Approved**
WP Base/Neutrals	711	6545	N-Nitroso-di-n-propylamine	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6545	N-Nitroso-di-n-propylamine	EPA 8270D	**Approved**
WP Base/Neutrals	711	6535	N-Nitrosodiphenylamine	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6535	N-nitrosodiphenylamine	EPA 8270D	**Approved**
Acids	712	6605	Pentachlorophenol	EPA 8270D	**Approved**
Acid Extractables	4190	6605	Pentachlorophenol	EPA 8270D	**Approved**
WP Base/Neutrals	711	6615	Phenanthrene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6615	Phenanthrene	EPA 8270D	**Approved**
Acids	712	6625	Phenol	EPA 8270D	**Approved**
Acid Extractables	4190	6625	Phenol	EPA 8270D	**Approved**
WP Base/Neutrals	711	6665	Pyrene	EPA 8270D	**Approved**
Base Neutral Extractables	4200	6665	Pyrene	EPA 8270D	**Approved**
WP Base/Neutrals	711	5095	Pyridine	EPA 8270D	**Approved**
Base Neutral Extractables	4200	5095	Pyridine	EPA 8270D	**Approved**
Dioxin	PEO-258	9420	1,2,3,4,6,7,8-Hpcdf	EPA 8290	**Approved**
2,3,7,8-Tetrachlorodibenzo-p-dioxin	38186	9618	2,3,7,8-Tetrachlorodibenzo-p-dioxin	EPA 8290	**Approved**
WP Carbamates	38156	7205	Carbofuran	EPA 8321A	**Approved**
WP Carbamates	38156	7505	Diuron	EPA 8321A	**Approved**
WP Carbamates	38156	7750	Methomyl	EPA 8321A	**Approved**
WP Carbamates	38156	7940	Oxamyl	EPA 8321A	**Approved**
WP Carbamates	38156	8075	Propham	EPA 8321A	**Approved**
Herbicides	PEO-094	8620	Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8321A	**Approved**
CWA Nitroaromatics in Water	38172	6885	1,3,5-Trinitrobenzene	EPA 8330	**Approved**
CWA Nitroaromatics in Water	38172	6160	1,3-Dinitrobenzene	EPA 8330	**Approved**
CWA Nitroaromatics in Water	38172	9651	2,4,6-Trinitrotoluene	EPA 8330	**Approved**
CWA Nitroaromatics in Water	38172	6185	2,4-Dinitrotoluene	EPA 8330	**Approved**
CWA Nitroaromatics in Water	38172	6190	2,6-Dinitrotoluene	EPA 8330	**Approved**
CWA Nitroaromatics in Water	38172	9303	2-Amino-4,6-dinitrotoluene	EPA 8330	**Approved**
CWA Nitroaromatics in Water	38172	9507	2-Nitrotoluene	EPA 8330	**Approved**
CWA Nitroaromatics in Water	38172	9510	3-Nitrotoluene	EPA 8330	**Approved**
CWA Nitroaromatics in Water	38172	9306	4-Amino-2,6-dinitrotoluene	EPA 8330	**Approved**
CWA Nitroaromatics in Water	38172	9513	4-Nitrotoluene	EPA 8330	**Approved**
CWA Nitroaromatics in Water	38172	9522	HMX	EPA 8330	**Approved**

CWA Nitroaromatics in Water	38172	9432	RDX	EPA 8330	**Approved**
CWA Nitroaromatics in Water	38172	6415	Tetryl	EPA 8330	**Approved**
CWA Nitroaromatics in Water	38172	6885	1,3,5-Trinitrobenzene	EPA 8330A	**Approved**
Low Level Nit/Nit	PEO-251	6885	1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8330A	**Approved**
CWA Nitroaromatics in Water	38172	6160	1,3-Dinitrobenzene	EPA 8330A	**Approved**
Low Level Nit/Nit	PEO-251	6160	1,3-Dinitrobenzene (1,3-DNB)	EPA 8330A	**Approved**
CWA Nitroaromatics in Water	38172	9651	2,4,6-Trinitrotoluene	EPA 8330A	**Approved**
Low Level Nit/Nit	PEO-251	9651	2,4,6-Trinitrotoluene (2,4,6-TNT)	EPA 8330A	**Approved**
Low Level Nit/Nit	PEO-251	6185	2,4-Dinitrotoluene (2,4-DNT)	EPA 8330A	**Approved**
CWA Nitroaromatics in Water	38172	6190	2,6-Dinitrotoluene	EPA 8330A	**Approved**
Low Level Nit/Nit	PEO-251	6190	2,6-Dinitrotoluene (2,6-DNT)	EPA 8330A	**Approved**
CWA Nitroaromatics in Water	38172	9303	2-Amino-4,6-dinitrotoluene	EPA 8330A	**Approved**
Low Level Nit/Nit	PEO-251	9303	2-Amino-4,6-dinitrotoluene (2am-dnt)	EPA 8330A	**Approved**
CWA Nitroaromatics in Water	38172	9507	2-Nitrotoluene	EPA 8330A	**Approved**
Low Level Nit/Nit	PEO-251	9507	2-Nitrotoluene	EPA 8330A	**Approved**
CWA Nitroaromatics in Water	38172	9510	3-Nitrotoluene	EPA 8330A	**Approved**
Low Level Nit/Nit	PEO-251	9510	3-Nitrotoluene	EPA 8330A	**Approved**
CWA Nitroaromatics in Water	38172	9306	4-Amino-2,6-dinitrotoluene	EPA 8330A	**Approved**
Low Level Nit/Nit	PEO-251	9306	4-Amino-2,6-dinitrotoluene (4-am-dnt)	EPA 8330A	**Approved**
CWA Nitroaromatics in Water	38172	9513	4-Nitrotoluene	EPA 8330A	**Approved**
Low Level Nit/Nit	PEO-251	9513	4-Nitrotoluene	EPA 8330A	**Approved**
CWA Nitroaromatics in Water	38172	9522	HMX	EPA 8330A	**Approved**
Low Level Nit/Nit	PEO-251	9522	HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine)	EPA 8330A	**Approved**
CWA Nitroaromatics in Water	38172	5015	Nitrobenzene	EPA 8330A	**Approved**
Low Level Nit/Nit	PEO-251	5015	Nitrobenzene	EPA 8330A	**Approved**
Low Level Nit/Nit	PEO-251	6485	Nitroglycerin	EPA 8330A	**Approved**
CWA Nitroaromatics in Water	38172	9432	RDX	EPA 8330A	**Approved**
Low Level Nit/Nit	PEO-251	9432	RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	EPA 8330A	**Approved**
CWA Nitroaromatics in Water	38172	6415	Tetryl	EPA 8330A	**Approved**
Low Level Nit/Nit	PEO-251	6415	Tetryl (Methyl-2,4,6-trinitrophenylnitramine)	EPA 8330A	**Approved**
Total Cyanide	4090	1645	Total Cyanide	EPA 9010B	**Approved**
Total Cyanide	PEI-031	1645	Total cyanide	EPA 9010B	**Approved**
Total Cyanide	4090	1645	Total Cyanide	EPA 9014	**Approved**
CWA Anions	55131	1540	Bromide (Br)	EPA 9056	**Approved**
WP Minerals #1	55144	1575	Chloride	EPA 9056	**Approved**
Fluoride	4420	1730	Fluoride	EPA 9056	**Approved**
WP Minerals #2	55145	1730	Fluoride	EPA 9056	**Approved**
WP & DMRQA Nutrients	55035	1810	Nitrate as N	EPA 9056	**Approved**
Nutrients	4020	1810	Nitrate Nitrogen as N	EPA 9056	**Approved**
Nitrate-Nitrite as N	4770	1820	Nitrate-Nitrite as N	EPA 9056	**Approved**
Nitrite as N	4780	1840	Nitrite as N	EPA 9056	**Approved**
Nutrients	4020	1870	Orthophosphate as P	EPA 9056	**Approved**
WP & DMRQA Nutrients	55035	1870	Orthophosphate as P	EPA 9056	**Approved**
Miscellaneous Analytes	PEI-051	1540	Bromide	EPA 9056	**Approved**
Minerals	PEI-051	1575	Chloride	EPA 9056	**Approved**
Minerals	PEI-051	1730	Fluoride	EPA 9056	**Approved**
Nutrients	PEI-051	1805	Nitrate as N	EPA 9056	**Approved**
Nutrients	PEI-051	1820	Nitrate+nitrite as N	EPA 9056	**Approved**
Nutrients	PEI-051	1840	Nitrite as N	EPA 9056	**Approved**
Nutrients	PEI-051	1870	Orthophosphate as P	EPA 9056	**Approved**
Minerals	PEI-051	2000	Sulfate	EPA 9056	**Approved**
Demand	4010	2040	Total organic carbon (TOC)	EPA 9060	**Approved**
Demands	PEI-026	2040	Total organic carbon (TOC)	EPA 9060	**Approved**
Fluoride	4420	1730	Fluoride	EPA 9214	**Approved**
Minerals	4050	1505	Alkalinity as CaCO3	SM 2320B	**Approved**
Solids (Total Solids, TSS, & TDS)	55085	1955	Total Dissolved Solids (TDS)	SM 2540C	**Approved**
Solids	4030	1705	Total Dissolved Solids at 180C	SM 2540C	**Approved**
Solids	4030	1960	Total Suspended Solids	SM 2540D	**Approved**
CWA UV 254 Absorbance/ DOC	55088	1710	Dissolved Organic Carbon	SM 5310B	**Approved**
Demand	4010	2040	Total Organic Carbon	SM 5310B	**Approved**
WP & DMRQA Demands	55055	2040	Total Organic Carbon	SM 5310B	**Approved**
Demands	PEI-026	2040	Total organic carbon (TOC)	SM 5310B	**Approved**
Oil & Grease	4120	1860	Oil & Grease	SM 5520B	**Approved**
MBAS	4430	2025	MBAS	SM 5540C	**Approved**
WP MBAS	55083	2025	MBAS	SM 5540C	**Approved**

DoD ELAP -- PT performance summary review					
Lab Name :	**APPL, Inc.**				
City/State :	Clovis, CA				
PT Provider Used :	ERA, Absolute, RTC, APG				
PartName	PartNumber	NELACCode	AnalyteName	EPAmethod#	PT Results
WS Chromium VI	55112	1045	Chromium VI	EPA 218.6	**Approved**
Trace Metals	5070	1095	Mercury	EPA 245.1	**Approved**
WS Trace Elements	55012	1095	Total Mercury	EPA 245.1	**Approved**
WS Inorganic Disinfection By-Products	55010	1540	Bromide	EPA 300.0	**Approved**
Minerals	5080	1575	Chloride	EPA 300.0	**Approved**
WS Minerals Mix #1	55122	1575	Chloride	EPA 300.0	**Approved**
Nutrients	5140	1730	Fluoride	EPA 300.0	**Approved**
WS NO3-, NO2-, F, PO4-3, and NO3- & NO2- as N	55011	1730	Fluoride	EPA 300.0	**Approved**
WS NO3-, NO2-, F, PO4-3, and NO3- & NO2- as N	55011	1820	Nitrate and Nitrite as N	EPA 300.0	**Approved**
WS NO3-, NO2-, F, PO4-3, and NO3- & NO2- as N	55011	1810	Nitrate as N	EPA 300.0	**Approved**
Nutrients	5140	1810	Nitrate Nitrogen as N	EPA 300.0	**Approved**
Nitrate+Nitrite as N	5860	1820	Nitrate+Nitrite as N	EPA 300.0	**Approved**
Nutrients	5140	1840	Nitrite as N	EPA 300.0	**Approved**
WS NO3-, NO2-, F, PO4-3, and NO3- & NO2- as N	55011	1840	Nitrite as N	EPA 300.0	**Approved**
Nutrients	5140	1870	Orthophosphate as P	EPA 300.0	**Approved**
Minerals	5080	2000	Sulfate	EPA 300.0	**Approved**
WS Sulphate/TOC	55070	2000	Sulfate	EPA 300.0	**Approved**
Perchlorate	5610	1895	Perchlorate	EPA 314.0	**Approved**
WS Perchlorate	55099	1895	Perchlorate	EPA 314.0	**Approved**
Nutrients	5140	1730	Fluoride	EPA 340.2	**Approved**
SDWA Nutrients	55165	1515	Ammonia as N	EPA 350.1	**Approved**
WS NO3-, NO2-, F, PO4-3, and NO3- & NO2- as N	55011	1820	Nitrate and Nitrite as N	EPA 353.2	**Approved**
WS NO3-, NO2-, F, PO4-3, and NO3- & NO2- as N	55011	1810	Nitrate as N	EPA 353.2	**Approved**
Nutrients	5140	1810	Nitrate Nitrogen as N	EPA 353.2	**Approved**
Nitrate+Nitrite as N	5860	1820	Nitrate+Nitrite as N	EPA 353.2	**Approved**
Nutrients	5140	1840	Nitrite as N	EPA 353.2	**Approved**
WS NO3-, NO2-, F, PO4-3, and NO3- & NO2- as N	55011	1840	Nitrite as N	EPA 353.2	**Approved**
WS NO3-, NO2-, F, PO4-3, and NO3- & NO2- as N	55011	1870	Orthophosphate as P	EPA 353.2	**Approved**
Nutrients	5140	1870	Orthophosphate as P	EPA 353.2	**Approved**
SDWA Nutrients	55165	1910	Total Phosphorus	EPA 365.2	**Approved**
MBAS	5470	2025	MBAS	EPA 425.1	**Approved**
Perchlorate	5610	1895	Perchlorate	EPA 6850	**Approved**
WS Perchlorate	55099	1895	Perchlorate	EPA 6850	**Approved**
pH	5060	1900	pH	EPA 9040B	**Approved**
UV 254/DOC	5480	1710	Dissolved Organic Carbon (DOC)	EPA 9060	**Approved**
Total Organic Carbon (TOC)	5250	2040	Total Organic Carbon	EPA 9060	**Approved**
Nutrients	5140	1730	Fluoride	EPA 9214	**Approved**
Minerals	5080	1505	Alkalinity	SM 2320B	**Approved**
Minerals	5080	1955	Total Dissolved Solids	SM 2540C	**Approved**
SDWA Solids (Total Solids, TSS, & TDS)	55161	1955	Total Dissolved Solids	SM 2540C	**Approved**
Solids	5150	1705	Total Dissolved Solids	SM 2540C	**Approved**
SDWA Solids (Total Solids, TSS, & TDS)	55161	1960	Non-Filterable Residue (TSS)	SM 2540D	**Approved**
Solids	5150	1960	Total Suspended Solids	SM 2540D	**Approved**
MBAS	5470	2025	MBAS	SM 5540C	**Approved**
WS MBAS	55106	2025	MBAS	SM 5540C	**Approved**

DoD ELAP -- PT Performance Summary Review					
Lab Name :	APPL, Inc.				
City/State :	Clovis, CA				
PT Provider Used :	ERA, RTC, Absolute, APG				
PartName	PartNumber	NELACCode	AnalyteName	EPAmethod#	PT Results
n-Hexadecane & Stearic acid	55084	1860	Oil & Grease	EPA 1664A	**Approved**
PCB Congeners in Soil	SPE-068	9070	2,2',3,4,4',5,5'-Heptachlorobiphenyl (PCB 180)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	9025	2,2',3,4,4',5'-Hexachlorobiphenyl (PCB 138)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	9040	2,2',4,4',5,5'-Hexachlorobiphenyl (PCB 153)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	8980	2,2',4,5,5'-Pentachlorobiphenyl (PCB 101)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	8955	2,2',5,5'-Tetrachlorobiphenyl (PCB 52)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	9085	2,3,3',4,4',5,5'-Heptachlorobiphenyl (PCB 189)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	9050	2,3,3',4,4',5-Hexachlorobiphenyl (PCB 156)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	9045	2,3,3',4,4',5'-Hexachlorobiphenyl (PCB 157)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	8985	2,3,3',4,4'-Pentachlorobiphenyl (PCB 105)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	9055	2,3',4,4',5,5'-Hexachlorobiphenyl (PCB 167)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	9005	2,3,4,4',5-Pentachlorobiphenyl (PCB 114)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	8995	2,3',4,4',5-Pentachlorobiphenyl (PCB 118)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	9000	2,3',4,4',5'-Pentachlorobiphenyl (PCB 123)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	8936	2,4,4'-Trichlorobiphenyl (PCB 28)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	9060	3,3',4,4',5,5'-Hexachlorobiphenyl (PCB 169)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	9015	3,3',4,4',5-Pentachlorobiphenyl (PCB 126)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	8965	3,3',4,4'-Tetrachlorobiphenyl (PCB 77)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	8970	3,4,4',5-Tetrachlorobiphenyl (PCB 81)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	9025	PCB (129)+(138)+(163)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	9040	PCB (153)+(168)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	9046	PCB (156)+(157)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	9070	PCB (180)+(193)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	8936	PCB (20)+(28)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	8980	PCB (90)+(101)+(113)	EPA 1668	**Approved**
PCB Congeners in Soil	SPE-068	8870	PCBs, total	EPA 1668	**Approved**
RCRA Anions	55141	1540	Bromide	EPA 300.0	**Approved**
RCRA Anions	55141	1575	Chloride	EPA 300.0	**Approved**
RCRA Anions	55141	1730	Fluoride	EPA 300.0	**Approved**
RCRA Anions	55141	1810	Nitrate as N	EPA 300.0	**Approved**
RCRA Anions	55141	1870	Phosphate as P	EPA 300.0	**Approved**
RCRA Anions	55141	2000	Sulfate	EPA 300.0	**Approved**
RCRA Hexavalent Chromium	55104	1045	Chromium IV	EPA 3060A	**Approved**
Hexavalent Chromium in Soil	4120	1045	Chromium, Hexavalent	EPA 3060A	**Approved**
RCRA Perchlorate	38151	1885	Perchlorate	EPA 314.0	**Approved**
RCRA Nutrients	55142	1515	Ammonia as N	EPA 350.1	**Approved**
Nutrients in Soil	4170	1515	Ammonia Nitrogen as N	EPA 350.1	**Approved**
Nutrients in Soil	4170	1795	Total Kjeldahl Nitrogen	EPA 351.2	**Approved**
RCRA Nutrients	55142	1795	Total Kjeldhal Nitrogen	EPA 351.2	**Approved**
RCRA Metals In Soil #2	55103	1000	Aluminuim	EPA 6010B	**Approved**
TCLP Metals	PT-TCLPMET-SOIL	1005	Antimony	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1005	Antimony	EPA 6010B	**Approved**
TCLP Metals in Soil	4180	1005	Antimony, Sb	EPA 6010B	**Approved**
TCLP Metals in Soil - CA WET	SPE-006	1005	Antimony, Sb	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1010	Arsenic	EPA 6010B	**Approved**
TCLP Metals in Soil	4180	1010	Arsenic, As	EPA 6010B	**Approved**
TCLP Metals	PT-TCLPMET-SOIL	1015	Barium	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1015	Barium	EPA 6010B	**Approved**
TCLP Metals in Soil	4180	1015	Barium, Ba	EPA 6010B	**Approved**
TCLP Metals	PT-TCLPMET-SOIL	1020	Beryllium	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1020	Beryllium	EPA 6010B	**Approved**
TCLP Metals in Soil - CA WET	SPE-006	1020	Beryllium, Be	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1025	Boron	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1030	Cadmium	EPA 6010B	**Approved**
TCLP Metals in Soil	4180	1030	Cadmium, Cd	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1030	Cadmiun	EPA 6010B	**Approved**
RCRA Metals in Soil #2	55103	1035	Calciium	EPA 6010B	**Approved**
RCRA Metals In Soil #2	55103	1035	Calcium	EPA 6010B	**Approved**
TCLP Metals	PT-TCLPMET-SOIL	1040	Chromium	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1040	Chromium	EPA 6010B	**Approved**
TCLP Metals in Soil	4180	1040	Chromium, Cr (total)	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1050	Cobalt	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1055	Copper	EPA 6010B	**Approved**
TCLP Metals in Soil - CA WET	SPE-006	1055	Copper, Cu	EPA 6010B	**Approved**
RCRA Metals In Soil #2	55103	1070	Iron	EPA 6010B	**Approved**
TCLP Metals	PT-TCLPMET-SOIL	1075	Lead	EPA 6010B	**Approved**

RCRA Metals in Soil #1	55102	1075	Lead	EPA 6010B	**Approved**
TCLP Metals in Soil	4180	1075	Lead, Pb	EPA 6010B	**Approved**
RCRA Metals In Soil #2	55103	1085	Magnesium	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1090	Manganese	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1100	Molybdenum	EPA 6010B	**Approved**
TCLP Metals in Soil - CA WET	SPE-006	1100	Molybdenum, Mo	EPA 6010B	**Approved**
TCLP Metals	PT-TCLPMET-SOIL	1105	Nickel	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1105	Nickel	EPA 6010B	**Approved**
TCLP Metals in Soil	4180	1105	Nickel, Ni	EPA 6010B	**Approved**
RCRA Metals In Soil #2	55103	1125	Potassium	EPA 6010B	**Approved**
TCLP Metals	PT-TCLPMET-SOIL	1140	Selenium	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1140	Selenium	EPA 6010B	**Approved**
TCLP Metals in Soil	4180	1140	Selenium, Se	EPA 6010B	**Approved**
TCLP Metals	PT-TCLPMET-SOIL	1150	Silver	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1150	Silver	EPA 6010B	**Approved**
TCLP Metals in Soil	4180	1150	Silver, Ag	EPA 6010B	**Approved**
RCRA Metals In Soil #2	55103	1155	Sodium	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1160	Strontium	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1165	Thallium	EPA 6010B	**Approved**
TCLP Metals in Soil - CA WET	SPE-006	1165	Thallium, Tl	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1175	Tin	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1180	Titanium	EPA 6010B	**Approved**
RCRA Nutrients	55142	1910	Total Phosphorus	EPA 6010B	**Approved**
Nutrients in Soil	4170	1910	Total Phosphorus as P	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1185	Vanadium	EPA 6010B	**Approved**
TCLP Metals in Soil - CA WET	SPE-006	1185	Vanadium, V	EPA 6010B	**Approved**
TCLP Metals	PT-TCLPMET-SOIL	1190	Zinc	EPA 6010B	**Approved**
RCRA Metals in Soil #1	55102	1190	Zinc	EPA 6010B	**Approved**
TCLP Metals in Soil	4180	1190	Zinc, Zn	EPA 6010B	**Approved**
RCRA Metals in Soil #2	55103	1000	Aluminum	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1005	Antimony	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1015	Barium	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1020	Beryllium	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1025	Boron	EPA 6020	**Approved**
RCRA Metals in Soil #2	55103	1035	Calcium	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1040	Chromium	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1050	Cobalt	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1055	Copper	EPA 6020	**Approved**
RCRA Metals in Soil #2	55103	1070	Iron	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1075	Lead	EPA 6020	**Approved**
RCRA Metals in Soil #2	55103	1085	Magnesium	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1090	Manganese	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1100	Molybdenum	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1105	Nickel	EPA 6020	**Approved**
RCRA Metals in Soil #2	55103	1125	Potassium	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1140	Selenium	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1150	Silver	EPA 6020	**Approved**
RCRA Metals in Soil #2	55103	1155	Sodium	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1160	Strontium	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1165	Thallium	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1175	Tin	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1180	Titanium	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1185	Vanadium	EPA 6020	**Approved**
RCRA Metals in Soil #1	55102	1190	Zinc	EPA 6020	**Approved**
RCRA Perchlorate	55143	1895	Perchlorate	EPA 6850	**Approved**
RCRA Hexavalent Chromium	55104	1045	Chromium VI	EPA 7196A	**Approved**
Hexavalent Chromium in Soil	4120	1045	Chromium, Hexavalent	EPA 7196A	**Approved**
RCRA Hexavalent Chromium	55104	1045	Chromium VI	EPA 7199	**Approved**
Hexavalent Chromium in Soil	4120	1045	Chromium, Hexavalent	EPA 7199	**Approved**
TCLP Metals	PT-TCLPMET-SOIL	1095	Mercury	EPA 7470A	**Approved**
TCLP Metals in Soil	4180	1095	Mercury	EPA 7470A	**Approved**
RCRA Metals in Soil #1	55102	1095	Mercury	EPA 7471A	**Approved**
RCRA Metals in Soil #1	55102	1095	Mercury	EPA 7471B	**Approved**
Diesel Fuel #2 in Soil	38115	9369	#2 Fuel Oil (Diesel)	EPA 8015B	**Approved**
PT Diesel Fuel #2 in Water	38114	9369	#2 Fuel Oil (Diesel)	EPA 8015B	**Approved**
93 Octane Gasoline in Soil	38117	9408	93 Octane Gasoline in Soil	EPA 8015B	**Approved**
PT Unleaded Gasoline in Water	38116	9408	Unleaded Gasoline 93 Octane	EPA 8015B	**Approved**
RCRA BTEX & MTBE	38161	4375	Benzene	EPA 8021B	**Approved**
RCRA BTEX & MTBE	38161	4765	Ethyl benzene	EPA 8021B	**Approved**
RCRA BTEX & MTBE	38161	5000	Methyl tert-butyl ether (MTBE)	EPA 8021B	**Approved**
RCRA BTEX & MTBE	38161	5140	Toluene	EPA 8021B	**Approved**
RCRA BTEX & MTBE	38161	5260	Total Xylenes	EPA 8021B	**Approved**
Chlorinated Pesticides in Soil	38101	7355	4,4'-DDD	EPA 8081A	**Approved**

Chlorinated Pesticides in Soil	38101	7360	4,4'-DDE	EPA 8081A	**Approved**
Pesticides in Soil	14221	7360	4,4'-DDE	EPA 8081A	**Approved**
Chlorinated Pesticides in Soil	38101	7365	4,4'-DDT	EPA 8081A	**Approved**
Pesticides in Soil	14222	7365	4,4'-DDT	EPA 8081A	**Approved**
Pesticides in Soil	14220	7355	4.4'-DDD	EPA 8081A	**Approved**
Chlorinated Pesticides in Soil	38101	7110	a-BHC	EPA 8081A	**Approved**
Chlorinated Pesticides in Soil	38101	7240	a-Chlordane	EPA 8081A	**Approved**
Chlorinated Pesticides in Soil	38101	7025	Aldrin	EPA 8081A	**Approved**
Pesticides in Soil	14223	7025	Aldrin	EPA 8081A	**Approved**
Pesticides in Soil	14224	7110	alpha-BHC	EPA 8081A	**Approved**
Pesticides in Soil	14225	7240	alpha-Chlordane	EPA 8081A	**Approved**
Chlorinated Pesticides in Soil	38101	7115	b-BHC	EPA 8081A	**Approved**
Pesticides in Soil	14226	7115	beta-BHC	EPA 8081A	**Approved**
Chlordane in Soil	38141	7250	Chlordane	EPA 8081A	**Approved**
Chlorinated Pesticides in Soil	38101	7105	d-BHC	EPA 8081A	**Approved**
Pesticides in Soil	14227	7105	delat-BHC	EPA 8081A	**Approved**
Chlorinated Pesticides in Soil	38101	7470	Dieldrin	EPA 8081A	**Approved**
Pesticides in Soil	14228	7470	Dieldrin	EPA 8081A	**Approved**
Pesticides in Soil	14229	7510	Endosulfan I	EPA 8081A	**Approved**
Chlorinated Pesticides in Soil	38101	7515	Endosulfan II	EPA 8081A	**Approved**
Pesticides in Soil	14230	7515	Endosulfan II	EPA 8081A	**Approved**
Chlorinated Pesticides in Soil	38101	7520	Endosulfan sulfate	EPA 8081A	**Approved**
Pesticides in Soil	14231	7520	Endosulfan sulfate	EPA 8081A	**Approved**
Chlorinated Pesticides in Soil	38101	7540	Endrin	EPA 8081A	**Approved**
Pesticides in Soil	14232	7540	Endrin	EPA 8081A	**Approved**
Chlorinated Pesticides in Soil	38101	7530	Endrin aldehyde	EPA 8081A	**Approved**
Pesticides in Soil	14233	7530	Endrin aldehyde	EPA 8081A	**Approved**
Chlorinated Pesticides in Soil	38101	7535	Endrin ketone	EPA 8081A	**Approved**
Pesticides in Soil	14234	7535	Endrin Ketone	EPA 8081A	**Approved**
Pesticides in Soil	14235	7120	gamma-BHC (Lindane)	EPA 8081A	**Approved**
Pesticides in Soil	14236	7245	gamma-Chlordane	EPA 8081A	**Approved**
Chlorinated Pesticides in Soil	38101	7120	g-BHC (Lindane)	EPA 8081A	**Approved**
Chlorinated Pesticides in Soil	38101	7685	Heptachlor	EPA 8081A	**Approved**
Pesticides in Soil	14237	7685	Heptachlor	EPA 8081A	**Approved**
Chlorinated Pesticides in Soil	38101	7690	Heptachlor epoxide	EPA 8081A	**Approved**
Pesticides in Soil	14238	7690	Heptachlor epoxide	EPA 8081A	**Approved**
Chlorinated Pesticides in Soil	38101	7810	Methoxychlor	EPA 8081A	**Approved**
Pesticides in Soil	14239	7810	Methoxychlor	EPA 8081A	**Approved**
Total Chlordane in Soil	4240	7250	Total Chlordane	EPA 8081A	**Approved**
Toxaphene in Soil	38066	8250	Toxaphene	EPA 8081A	**Approved**
Toxaphene in Soil	4230	8250	Toxaphene	EPA 8081A	**Approved**
Aroclor in Soil	38142	8880	Aroclor 1016	EPA 8082	**Approved**
WP PCBs in Water	38091	8880	Aroclor 1016	EPA 8082	**Approved**
WP PCBs in Water	38094	8880	Aroclor 1016	EPA 8082	**Approved**
Aroclor in Soil	38142	8885	Aroclor 1221	EPA 8082	**Approved**
WP PCBs in Water	38091	8885	Aroclor 1221	EPA 8082	**Approved**
WP PCBs in Water	38094	8885	Aroclor 1221	EPA 8082	**Approved**
Aroclor in Soil	38142	8890	Aroclor 1232	EPA 8082	**Approved**
WP PCBs in Water	38091	8890	Aroclor 1232	EPA 8082	**Approved**
WP PCBs in Water	38094	8890	Aroclor 1232	EPA 8082	**Approved**
Aroclor in Soil	38142	8895	Aroclor 1242	EPA 8082	**Approved**
WP PCBs in Water	38091	8895	Aroclor 1242	EPA 8082	**Approved**
WP PCBs in Water	38094	8895	Aroclor 1242	EPA 8082	**Approved**
Aroclor in Soil	38142	8900	Aroclor 1248	EPA 8082	**Approved**
WP PCBs in Water	38091	8900	Aroclor 1248	EPA 8082	**Approved**
WP PCBs in Water	38094	8900	Aroclor 1248	EPA 8082	**Approved**
Aroclor in Soil	38142	8905	Aroclor 1254	EPA 8082	**Approved**
WP PCBs in Water	38091	8905	Aroclor 1254	EPA 8082	**Approved**
WP PCBs in Water	38094	8905	Aroclor 1254	EPA 8082	**Approved**
Aroclor in Soil	38142	8910	Aroclor 1260	EPA 8082	**Approved**
WP PCBs in Water	38091	8910	Aroclor 1260	EPA 8082	**Approved**
WP PCBs in Water	38094	8910	Aroclor 1260	EPA 8082	**Approved**
PCB in Soil	SPE-010	8912	Aroclor 1016/1242	EPA 8082	**Approved**
PCB in Soil	SPE-010	8880	Aroclor-1016 (PCB-1016)	EPA 8082	**Approved**
PCB in Soil	SPE-010	8885	Aroclor-1221 (PCB-1221)	EPA 8082	**Approved**
PCB in Soil	SPE-010	8890	Aroclor-1232 (PCB-1232)	EPA 8082	**Approved**
PCB in Soil	SPE-010	8895	Aroclor-1242 (PCB-1242)	EPA 8082	**Approved**
PCB in Soil	SPE-010	8900	Aroclor-1248 (PCB-1248)	EPA 8082	**Approved**
PCB in Soil	SPE-010	8905	Aroclor-1254 (PCB-1254)	EPA 8082	**Approved**
PCB in Soil	SPE-010	8910	Aroclor-1260 (PCB-1260)	EPA 8082	**Approved**
OrganoPhosphorus Pesticides	38151	7075	Azinphosmethyl	EPA 8141A	**Approved**
OP/NP Pesticides in Soil	4280	7075	Azinphos-methyl	EPA 8141A	**Approved**
OP/NP Pesticides in Soil	4280	7300	Chloropyrifos	EPA 8141A	**Approved**

OP/NP Pesticides in Soil	4280	7390	Demeton O&S	EPA 8141A	**Approved**
OrganoPhosphorus Pesticides	38151	7390	Demeton, (Mix of Isomers O:S)	EPA 8141A	**Approved**
OP/NP Pesticides in Soil	4280	7410	Diazinon	EPA 8141A	**Approved**
OrganoPhosphorus Pesticides	38151	7410	Diazinon	EPA 8141A	**Approved**
OP/NP Pesticides in Soil	4280	8610	Dichlorvos (DDVP)	EPA 8141A	**Approved**
OP/NP Pesticides in Soil	4280	8625	Disulfoton	EPA 8141A	**Approved**
OrganoPhosphorus Pesticides	38151	8625	Disulfoton	EPA 8141A	**Approved**
OrganoPhosphorus Pesticides	38151	8110	Fenchlorphos (Ronnel)	EPA 8141A	**Approved**
OP/NP Pesticides in Soil	4280	7770	Malathion	EPA 8141A	**Approved**
OrganoPhosphorus Pesticides	38151	7770	Malathion	EPA 8141A	**Approved**
OrganoPhosphorus Pesticides	38151	7825	Parathion methyl	EPA 8141A	**Approved**
OP/NP Pesticides in Soil	4280	7955	Parathion, ethyl	EPA 8141A	**Approved**
OP/NP Pesticides in Soil	4280	7825	Parathion, methyl	EPA 8141A	**Approved**
OrganoPhosphorus Pesticides	38151	7985	Phorate	EPA 8141A	**Approved**
OP/NP Pesticides in Soil	4280	8110	Ronnel	EPA 8141A	**Approved**
OP/NP Pesticides in Soil	4280	8200	Stirophos (Tetrachlorvinphos)	EPA 8141A	**Approved**
OrganoPhosphorus Pesticides	38151	8200	Tetrachlorvinphos (Stirophos)	EPA 8141A	**Approved**
Herbicide Acids in Soil	38146	8655	2,4,5-T	EPA 8151A	**Approved**
Herbicide Acids in Soil	38146	8650	2,4,5-TP	EPA 8151A	**Approved**
Herbicide Acids in Soil	38146	8545	2,4-D	EPA 8151A	**Approved**
Herbicide Acids in Soil	38146	8560	2,4-DB	EPA 8151A	**Approved**
Herbicides in Soil	4250	8600	3,5-Dichlorobenzoic acid	EPA 8151A	**Approved**
Herbicides in Soil	4250	8505	Acifluorfen	EPA 8151A	**Approved**
Herbicides in Soil	4250	8530	Bentazon	EPA 8151A	**Approved**
Herbicides in Soil	4250	8540	Chloramben	EPA 8151A	**Approved**
Herbicides in Soil	4250	8550	Dacthal diacid (DCPA)	EPA 8151A	**Approved**
Herbicide Acids in Soil	38146	8555	Dalapon	EPA 8151A	**Approved**
Herbicide Acids in Soil	38146	8595	Dicamba	EPA 8151A	**Approved**
Herbicide Acids in Soil	38146	8620	Dinoseb	EPA 8151A	**Approved**
Herbicide Acids in Soil	38146	6605	Pentachlorophenol	EPA 8151A	**Approved**
Herbicides in Soil	4250	6605	Pentachlorophenol	EPA 8151A	**Approved**
Herbicides in Soil	4250	8645	Picloram	EPA 8151A	**Approved**
RCRA Medium Level Volatiles in Soil	38199	5105	1,1,1,2-Tetrachloroethane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5105	1,1,1,2-Tetrachloroethane	EPA 8260B	**Approved**
Volatiles in Soil	38084	5105	1,1,1,2-Tetrachloroethane	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	5160	1,1,1-Trichloroethane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5160	1,1,1-Trichloroethane	EPA 8260B	**Approved**
Volatiles in Soil	38084	5160	1,1,1-Trichloroethane	EPA 8260B	**Approved**
Volatiles in Soil	4200	5160	1,1,1-Trichloroethane	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	5110	1,1,2,2-Tetrachloroethane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5110	1,1,2,2-Tetrachloroethane	EPA 8260B	**Approved**
Volatiles in Soil	38084	5110	1,1,2,2-Tetrachloroethane	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	5165	1,1,2-Trichloroethane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5165	1,1,2-Trichloroethane	EPA 8260B	**Approved**
Volatiles in Soil	38084	5165	1,1,2-Trichloroethane	EPA 8260B	**Approved**
Volatiles in Soil	4200	5165	1,1,2-Trichloroethane	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4630	1,1-Dichloroethane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4630	1,1-Dichloroethane	EPA 8260B	**Approved**
Volatiles in Soil	38084	4630	1,1-Dichloroethane	EPA 8260B	**Approved**
Volatiles in Soil	4200	4630	1,1-Dichloroethane	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4640	1,1-Dichloroethene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4640	1,1-Dichloroethene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4640	1,1-Dichloroethylene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4670	1,1-Dichloropropene	EPA 8260B	**Approved**
Volatiles in Soil	38084	5150	1,2,3-Trichlorobenzene	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	5180	1,2,3-Trichloropropane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5180	1,2,3-Trichloropropane	EPA 8260B	**Approved**
Volatiles in Soil	38084	5180	1,2,3-Trichloropropane	EPA 8260B	**Approved**
Volatiles in Soil	4200	5180	1,2,3-Trichloropropane	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	5155	1,2,4-Trichlorobenzene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5155	1,2,4-Trichlorobenzene	EPA 8260B	**Approved**
Volatiles in Soil	4200	5155	1,2,4-Trichlorobenzene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5210	1,2,4-Trimethylbenzene	EPA 8260B	**Approved**
Volatiles in Soil	38084	5210	1,2,4-Trimethylbenzene	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4570	1,2-Dibromo-3-chloropropane	EPA 8260B	**Approved**
Volatiles in Soil	38084	4570	1,2-Dibromo-3-chloropropane	EPA 8260B	**Approved**
Volatiles in Soil	4200	4570	1,2-Dibromo-3-chloropropane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4570	1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4585	1,2-Dibromoethane	EPA 8260B	**Approved**
Volatiles in Soil	38084	4585	1,2-Dibromoethane	EPA 8260B	**Approved**
Volatiles in Soil	4200	4585	1,2-Dibromoethane (EDB)	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4585	1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260B	**Approved**
Volatiles in Soil	4200	4655	1,2-Dicahloropropane	EPA 8260B	**Approved**

RCRA Medium Level Volatiles in Soil	38199	4610	1,2-Dichlorobenzene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4610	1,2-Dichlorobenzene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4610	1,2-Dichlorobenzene	EPA 8260B	**Approved**
Volatiles in Soil	4200	4610	1,2-Dichlorobenzene	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4635	1,2-Dichloroethane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4635	1,2-Dichloroethane	EPA 8260B	**Approved**
Volatiles in Soil	38084	4635	1,2-Dichloroethane	EPA 8260B	**Approved**
Volatiles in Soil	4200	4635	1,2-Dichloroethane	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4655	1,2-Dichloropropane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4655	1,2-Dichloropropane	EPA 8260B	**Approved**
Volatiles in Soil	38084	4655	1,2-Dichloropropane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5215	1,3,5-Trimethylbenzene	EPA 8260B	**Approved**
Volatiles in Soil	38084	5215	1,3,5-Trimethylbenzene	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4615	1,3-Dichlorobenzene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4615	1,3-Dichlorobenzene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4615	1,3-Dichlorobenzene	EPA 8260B	**Approved**
Volatiles in Soil	4200	4615	1,3-Dichlorobenzene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4660	1,3-Dichloropropane	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4620	1,4-Dichlorobenzene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4620	1,4-Dichlorobenzene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4620	1,4-Dichlorobenzene	EPA 8260B	**Approved**
Volatiles in Soil	4200	4620	1,4-Dichlorobenzene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4665	2,2-Dichloropropane	EPA 8260B	**Approved**
RCRA Ketones in Soil	38167	4410	2-Butanone (Methyl ethyl ketone)	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4410	2-Butanone (Methyl ethyl ketone)	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4410	2-Butanone (Methyl ethyl ketone, MEK)	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4500	2-Chloroethyl vinyl ether	EPA 8260B	**Approved**
Volatiles in Soil	4200	4500	2-Chloroethylvinylether	EPA 8260B	**Approved**
Volatiles in Soil	38084	4535	2-Chlorotoluene	EPA 8260B	**Approved**
RCRA Ketones in Soil	38167	4860	2-Hexanone	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4860	2-Hexanone	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4860	2-Hexanone	EPA 8260B	**Approved**
Volatiles in Soil	4200	4860	2-Hexanone	EPA 8260B	**Approved**
Volatiles in Soil	38084	4540	4-Chlorotoluene	EPA 8260B	**Approved**
RCRA Ketones in Soil	38167	4995	4-Methyl-2-pentanone	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4995	4-Methyl-2-pentanone	EPA 8260B	**Approved**
Volatiles in Soil	38084	4995	4-Methyl-2-pentanone	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4995	4-Methyl-2-pentanone (MIBK)	EPA 8260B	**Approved**
Volatiles in Soil	4200	4995	4-Methyl-2-pentanone (MIBK)	EPA 8260B	**Approved**
RCRA Ketones in Soil	38167	4315	Acetone	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4315	Acetone	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4315	Acetone	EPA 8260B	**Approved**
Volatiles in Soil	4200	4320	Acetonitrile	EPA 8260B	**Approved**
Volatiles in Soil	4200	4325	Acrolein	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4325	Acrolein (Propenal)	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4375	Benzene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4375	Benzene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4375	Benzene	EPA 8260B	**Approved**
Volatiles in Soil	4200	4375	Benzene	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4385	Bromobenzene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4385	Bromobenzene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4385	Bromobenzene	EPA 8260B	**Approved**
Volatiles in Soil	4200	4385	Bromobenzene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4390	Bromochloromethane	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4395	Bromodichloromethane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4395	Bromodichloromethane	EPA 8260B	**Approved**
Volatiles in Soil	38084	4395	Bromodichloromethane	EPA 8260B	**Approved**
Volatiles in Soil	4200	4395	Bromodichloromethane	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4400	Bromoform	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4400	Bromoform	EPA 8260B	**Approved**
Volatiles in Soil	38084	4400	Bromoform	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	49504	Bromomethane	EPA 8260B	**Approved**
Volatiles in Soil	38084	4950	Bromomethane	EPA 8260B	**Approved**
Volatiles in Soil	4200	4950	Bromomethane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4450	Carbon disulfide	EPA 8260B	**Approved**
Volatiles in Soil	4200	4450	Carbon disulfide	EPA 8260B	**Approved**
Volatiles in Soil	38084	4450	Carbon disulphide	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4455	Carbon tetrachloride	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4455	Carbon tetrachloride	EPA 8260B	**Approved**
Volatiles in Soil	38084	4455	Carbon tetrachloride	EPA 8260B	**Approved**
Volatiles in Soil	4200	4455	Carbon tetrachloride	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4475	Chlorobenzene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4475	Chlorobenzene	EPA 8260B	**Approved**

Volatiles in Soil	38084	4475	Chlorobenzene	EPA 8260B	**Approved**
Volatiles in Soil	4200	4475	Chlorobenzene	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4485	Chloroethane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4485	Chloroethane	EPA 8260B	**Approved**
Volatiles in Soil	38084	4485	Chloroethane	EPA 8260B	**Approved**
Volatiles in Soil	4200	4485	Chloroethane	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4505	Chloroform	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4505	Chloroform	EPA 8260B	**Approved**
Volatiles in Soil	38084	4505	Chloroform	EPA 8260B	**Approved**
Volatiles in Soil	4200	4505	Chloroform	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4960	Chloromethane	EPA 8260B	**Approved**
Volatiles in Soil	38084	4960	Chloromethane	EPA 8260B	**Approved**
Volatiles in Soil	4200	4960	Chloromethane	EPA 8260B	**Approved**
Volatiles in Soil	4200	4645	cis-1,2-Dichloroethane	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4645	cis-1,2-Dichloroethene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4645	cis-1,2-Dichloroethene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4645	cis-1,2-Dichloroethylene	EPA 8260B	**Approved**
Volatiles in Soil	4200	4680	cis-1,2-Dichloropropene	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4680	cis-1,3-Dichloropropene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4680	cis-1,3-Dichloropropene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4680	cis-1,3-Dichloropropene	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4575	Dibromochloromethane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4575	Dibromochloromethane	EPA 8260B	**Approved**
Volatiles in Soil	38084	4575	Dibromochloromethane	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4595	Dibromomethane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4595	Dibromomethane	EPA 8260B	**Approved**
Volatiles in Soil	38084	4595	Dibromomethane	EPA 8260B	**Approved**
Volatiles in Soil	4200	4595	Dibromomethane	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4625	Dichlorodifluoromethane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4625	Dichlorodifluoromethane	EPA 8260B	**Approved**
Volatiles in Soil	38084	4625	Dichlorodifluoromethane	EPA 8260B	**Approved**
Volatiles in Soil	4200	4625	Dichlorodifluoromethane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	9375	Di-isopropylether (DIPE)	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4765	Ethyl benzene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4765	Ethyl benzene	EPA 8260B	**Approved**
RCRA Oxygenates	38169	4770	Ethyl tert-butyl ether	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4765	Ethylbenzene	EPA 8260B	**Approved**
Volatiles in Soil	4200	4765	Ethylbenzene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4835	Hexachlorobutadiene	EPA 8260B	**Approved**
Volatiles in Soil	4200	4835	Hexachlorobutadiene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4840	Hexachloroethane	EPA 8260B	**Approved**
Volatiles in Soil	38084	4840	Hexachloroethane	EPA 8260B	**Approved**
RCRA Oxygenates	38169	9375	Isopropyl ether	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4900	Isopropylbenzene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4900	Isopropylbenzene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4900	Isopropylbenzene	EPA 8260B	**Approved**
Volatiles in Soil	4200	4900	Isopropylbenzene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5240	m+p-Xylene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4950	Methyl bromide (Bromomethane)	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4960	Methyl chloride (Chloromethane)	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	5000	Methyl tert-butyl ether (MTBE)	EPA 8260B	**Approved**
RCRA Oxygenates	38169	5000	Methyl tert-butyl ether (MTBE)	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5000	Methyl tert-butyl ether (MTBE)	EPA 8260B	**Approved**
Volatiles in Soil	38084	5000	Methyl tert-butyl ether (MTBE)	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4975	Methylene chloride	EPA 8260B	**Approved**
Volatiles in Soil	38084	4975	Methylene chloride	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4975	Methylene chloride (Dichloromethane)	EPA 8260B	**Approved**
Volatiles in Soil	4200	4975	Methylene chloride (Dichloromethane)	EPA 8260B	**Approved**
Volatiles in Soil	4200	5000	Methyl-t-butylether (MTBE)	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	5005	Naphthalene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5005	Naphthalene	EPA 8260B	**Approved**
Volatiles in Soil	38084	5005	Naphthalene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4435	n-Butyl benzene	EPA 8260B	**Approved**
RCRA Oxygenates	38169	5090	n-Propylbenzene	EPA 8260B	**Approved**
Volatiles in Soil	38084	5090	n-Propylbenzene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5250	o-Xylene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4910	p-Isopropyl toluene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4440	sec-Butyl benzene	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	5100	Styrene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5100	Styrene	EPA 8260B	**Approved**
Volatiles in Soil	38084	5100	Styrene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4370	T-amylmethylether (TAME)	EPA 8260B	**Approved**
RCRA Oxygenates	38169	4370	tert-Amyl methyl ether	EPA 8260B	**Approved**

RCRA Oxygenates	38169	4420	tert-Butyl alcohol (t-Butanol)	EPA 8260B	**Approved**
Volatiles in Soil	38084	4445	tert-Butyl benzene	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	5115	Tetrachloroethene	EPA 8260B	**Approved**
Volatiles in Soil	38084	5115	Tetrachloroethene	EPA 8260B	**Approved**
Volatiles in Soil	4200	5115	Tetrachloroethene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5115	Tetrachloroethylene (Perchloroethylene)	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	5140	Toluene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5140	Toluene	EPA 8260B	**Approved**
Volatiles in Soil	38084	5140	Toluene	EPA 8260B	**Approved**
Volatiles in Soil	4200	5140	Toluene	EPA 8260B	**Approved**
Volatiles in Soil	4200	4260	Total Xylenes	EPA 8260B	**Approved**
Volatiles in Soil	38084	5260	Total Xylenes	EPA 8260B	**Approved**
Volatiles in Soil	4200	5260	Total Xylenes	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4700	trans-1,2-Dichloroethene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4700	trans-1,2-Dichloroethene	EPA 8260B	**Approved**
Volatiles in Soil	4200	4700	trans-1,2-Dichloroethene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4700	trans-1,2-Dichloroethylene	EPA 8260B	**Approved**
Volatiles in Soil	4200	4685	trans-1,3,-Dichloropropene	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	4685	trans-1,3-Dichloropropene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	4685	trans-1,3-Dichloropropene	EPA 8260B	**Approved**
Volatiles in Soil	38084	4685	trans-1,3-Dichloropropene	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	5170	Trichloroethene	EPA 8260B	**Approved**
Volatiles in Soil	38084	5170	Trichloroethene	EPA 8260B	**Approved**
Volatiles in Soil	4200	5170	Trichloroethene	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5170	Trichloroethene (Trichloroethylene)	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	5175	Trichlorofluoromethane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5175	Trichlorofluoromethane	EPA 8260B	**Approved**
Volatiles in Soil	38084	5175	Trichlorofluoromethane	EPA 8260B	**Approved**
Volatiles in Soil	4200	5175	Trichlorofluoromethane	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5225	Vinyl acetate	EPA 8260B	**Approved**
Volatiles in Soil	4200	5225	Vinyl acetate	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	5235	Vinyl chloride	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5235	Vinyl chloride	EPA 8260B	**Approved**
Volatiles in Soil	38084	5235	Vinyl chloride	EPA 8260B	**Approved**
Volatiles in Soil	4200	5235	Vinyl Chloride	EPA 8260B	**Approved**
VOAs in Soil - Medium Level	SPE-002-H	5260	Xylene, total	EPA 8260B	**Approved**
RCRA Medium Level Volatiles in Soil	38199	5260	Xylenes, total	EPA 8260B	**Approved**
RCRA Semi-Volatiles in Soil	38068	5155	1,2,4-Trichlorobenzene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	4610	1,2-Dichlorobenzene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	4610	1,2-Dichlorobenzene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	4615	1,3-Dichlorobenzene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	4615	1,3-Dichlorobenzene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	4620	1,4-Dichlorobenzene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	4620	1,4-Dichlorobenzene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6735	2,3,4,6-Tetrachlorophenol	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6835	2,4,5-Trichlorophenol	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6835	2,4,5-Trichlorophenol	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6840	2,4,6-Trichlorophenol	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6840	2,4,6-Trichlorophenol	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6000	2,4-Dichlorophenol	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6000	2,4-Dichlorophenol	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6130	2,4-Dimethylphenol	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6130	2,4-Dimethylphenol	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6175	2,4-Dinitrophenol	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6175	2,4-Dinitrophenol	EPA 8270C	**Approved**
RCRA PAH's	38171	6185	2,4-Dinitrotoluene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6185	2,4-Dinitrotoluene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6185	2,4-Dinitrotoluene (2,4-DNT)	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6005	2,6-Dichlorophenol	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6005	2,6-Dichlorophenol	EPA 8270C	**Approved**
RCRA PAH's	38171	6190	2,6-Dinitrotoluene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6190	2,6-Dinitrotoluene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5795	2-Chloronaphthalene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5800	2-Chlorophenol	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5800	2-Chlorophenol	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6360	2-Methyl-4,6-Dinitrophenol	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6385	2-Methylnaphthalene	EPA 8270C	**Approved**
RCRA PAH's	38171	6385	2-Methylnaphthalene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6385	2-Methylnaphthalene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6400	2-Methylphenol	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6460	2-Nitroaniline	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6490	2-Nitrophenol	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6490	2-Nitrophenol	EPA 8270C	**Approved**

Base Neutrals and Acids in Soil	4260	5945	3,3'-Dichlorobenzidine	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5945	3,3'-Dichlorobenzidine	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6405	3-Methylphenol	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6465	3-Nitroaniline	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6465	3-Nitroaniline	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6360	4,6-Dinitro-2-methylphenol	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5660	4-Bromophenyl phenyl ether	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5660	4-Bromophenyl phenyl ether	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5700	4-Chloro-3-methylphenol	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5700	4-Chloro-3-methylphenol	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5745	4-Chloroaniline	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5745	4-Chloroaniline	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5825	4-Chlorophenyl phenyl ether	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5825	4-Chlorophenyl-phenylether	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6410	4-Methylphenol	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6470	4-Nitroaniline	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6470	4-Nitroaniline	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6500	4-Nitrophenol	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6500	4-Nitrophenol	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5500	Acenaphthene	EPA 8270C	**Approved**
RCRA PAH's	38171	5500	Acenaphthene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5500	Acenaphthene	EPA 8270C	**Approved**
Acenaphthylene in Soils	SPE-003	5505	Acenaphthylene	EPA 8270C	**Approved**
RCRA PAH's	38171	5505	Acenaphthylene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5505	Acenaphthylene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5545	Aniline	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5555	Anthracene	EPA 8270C	**Approved**
RCRA PAH's	38171	5555	Anthracene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5555	Anthracene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5575	Benzo(a)anthracene	EPA 8270C	**Approved**
RCRA PAH's	38171	5575	Benzo(a)anthracene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5575	Benzo(a)anthracene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5580	Benzo(a)pyrene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5585	Benzo(b)fluoranthene	EPA 8270C	**Approved**
RCRA PAH's	38171	5585	Benzo(b)fluoranthene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5585	Benzo(b)fluoranthene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5590	Benzo(g,h,I)perylene	EPA 8270C	**Approved**
RCRA PAH's	38171	5590	Benzo(g,h,i)perylene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5590	Benzo(g,h,i)perylene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5600	Benzo(k)fluoranthene	EPA 8270C	**Approved**
RCRA PAH's	38171	5600	Benzo(k)fluoranthene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5600	Benzo(k)fluoranthene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5610	Benzoic Acid	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5630	Benzyl alcohol	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5630	Benzyl alcohol	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5670	Benzyl butyl phthalate	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5670	Benzyl butyl phthalate	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5760	bis(2-Chloroethoxy) methane	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5760	bis(2-Chloroethoxy) methane	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5765	bis(2-Chloroethyl) ether	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5765	bis(2-Chloroethyl) ether	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5780	bis(2-Chloroisopropyl) ether	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5780	bis(2-Chloroisopropyl) ether	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6255	bis(2-Ethylhexyl) phthalate	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6065	bis(2-Ethylhexyl) phthalate	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	14260	5680	Carbazole	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5680	Carbazole	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5855	Chrysene	EPA 8270C	**Approved**
RCRA PAH's	38171	5855	Chrysene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5855	Chrysene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5895	Dibenz(a,h) anthracene	EPA 8270C	**Approved**
RCRA PAH's	38171	5895	Dibenzo(a,h)anthracene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5895	Dibenzo(a,h)anthracene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5905	Dibenzofuran	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5905	Dibenzofuran	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6070	Diethyl phthalate	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6070	Diethyl phthalate	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6135	Dimethyl phthalate	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6135	Dimethyl phthalate	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5925	Di-n-butyl phthalate	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5925	Di-n-butylphthalate	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6200	Di-n-octyl phthalate	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6200	Di-n-octylphthalate	EPA 8270C	**Approved**

Base Neutrals and Acids in Soil	4260	6265	Fluoranthene	EPA 8270C	**Approved**
RCRA PAH's	38171	6265	Fluoranthene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6265	Fluoranthene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6270	Fluorene	EPA 8270C	**Approved**
RCRA PAH's	38171	6270	Fluorene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6270	Fluorene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6275	Hexachlorobenzene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	4835	Hexachlorobutadiene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	4835	Hexachlorobutadiene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6285	Hexachlorocyclopentadiene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6285	Hexachlorocyclopentadiene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	4840	Hexachloroethane	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	4840	Hexachloroethane	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6315	Indeno (1,2,3-cd) pyrene	EPA 8270C	**Approved**
RCRA PAH's	38171	6315	Indeno(1,2,3-cd)pyrene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6315	Indeno(1,2,3-cd)pyrene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6320	Isophorone	EPA 8270C	**Approved**
RCRA PAH's	38171	6320	Isophorone	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6320	Isophorone	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6410	m/p-Cresol	EPA 8270C	**Approved**
RCRA PAH's	38171	5005	Naphthalene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5005	Naphthalene	EPA 8270C	**Approved**
RCRA PAH's	38171	5015	Nitrobenzene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5015	Nitrobenzene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	5015	Nitrobenzene (NB)	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6530	N-nitrosodimethylamine	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6530	N-Nitrosodimethylamine	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6545	N-nitrosodi-n-propylamine	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6545	N-Nitrosodi-n-propylamine	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6535	N-nitrosodiphenylamine	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6535	N-Nitrosodiphenylamine	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6400	o-Cresol	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6605	Pentachlorophenol	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6615	Phenanthrene	EPA 8270C	**Approved**
RCRA PAH's	38171	6615	Phenanthrene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6615	Phenanthrene	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6625	Phenol	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6625	Phenol	EPA 8270C	**Approved**
Base Neutrals and Acids in Soil	4260	6665	Pyrene	EPA 8270C	**Approved**
RCRA PAH's	38171	6665	Pyrene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	6665	Pyrene	EPA 8270C	**Approved**
RCRA Semi-Volatiles in Soil	38068	5095	Pyridine	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5155	1,2,4-Trichlorobenzene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	4610	1,2-Dichlorobenzene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	4615	1,3-Dichlorobenzene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	4620	1,4-Dichlorobenzene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6835	2,4,5-Trichlorophenol	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6840	2,4,6-Trichlorophenol	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6000	2,4-Dichlorophenol	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6130	2,4-Dimethylphenol	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6175	2,4-Dinitrophenol	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6185	2,4-Dinitrotoluene (2,4-DNT)	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6005	2,6-Dichlorophenol	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6190	2,6-Dinitrotoluene (2,6-DNT)	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5795	2-Chloronaphthalene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5800	2-Chlorophenol	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6360	2-Methyl-4,6-dinitrophenol	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6385	2-Methylnaphthalene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6400	2-Methylphenol (o-Cresol)	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6460	2-Nitroaniline	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6490	2-Nitrophenol	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5945	3,3'-Dichlorobenzidine	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6410	3+4-Methylphenol (m+p-Cresol)	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6405	3-Methylphenol (m-Cresol)	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6465	3-Nitroaniline	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5660	4-Bromophenyl phenyl ether	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5700	4-Chloro-3-methylphenol	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5745	4-Chloroaniline	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5825	4-Chlorophenyl phenylether	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6410	4-Methylphenol (p-Cresol)	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6470	4-Nitroaniline	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6500	4-Nitrophenol	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5500	Acenaphthene	EPA 8270C	**Approved**

BNAs in Soil	SPE-003	5505	Acenaphthylene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5545	Aniline	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5555	Anthracene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5595	Benzidine	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5575	Benzo(a)anthracene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5580	Benzo(a)pyrene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5585	Benzo(b)fluoranthene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5590	Benzo(g,h,i)perylene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5600	Benzo(k)fluoranthene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5610	Benzoic acid	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5630	Benzyl alcohol	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5760	bis(2-Chloroethoxy)methane	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5765	bis(2-Chloroethyl) ether	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5780	bis(2-Chloroisopropyl) ether	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6255	bis(2-Ethylhexyl) phthalate (DEHP)	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5670	Butyl benzyl phthalate	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5680	Carbazole	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5855	Chrysene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5895	Dibenz(a,h) anthracene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5905	Dibenzofuran	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6070	Diethyl phthalate	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6135	Dimethyl phthalate	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5925	Di-n-butyl phthalate	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6200	Di-n-octyl phthalate	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6265	Fluoranthene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6270	Fluorene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6275	Hexachlorobenzene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	4835	Hexachlorobutadiene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6285	Hexachlorocyclopentadiene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	4840	Hexachloroethane	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6315	Indeno(1,2,3-cd) pyrene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6320	Isophorone	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5005	Naphthalene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5015	Nitrobenzene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6530	n-Nitrosodimethylamine	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6545	n-Nitroso-di-n-propylamine	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6535	n-Nitrosodiphenylamine	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6605	Pentachlorophenol	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6615	Phenanthrene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6625	Phenol	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	6665	Pyrene	EPA 8270C	**Approved**
BNAs in Soil	SPE-003	5095	Pyridine	EPA 8270C	**Approved**
Base/Neutrals and Acids in Soil	727	5155	1,2,4-Trichlorobenzene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	4610	1,2-Dichlorobenzene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	4615	1,3-Dichlorobenzene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	4620	1,4-Dichlorobenzene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6835	2,4,5-Trichlorophenol	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6840	2,4,6-Trichlorophenol	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6000	2,4-Dichlorophenol	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6130	2,4-Dimethylphenol	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6175	2,4-Dinitrophenol	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6185	2,4-Dinitrotoluene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6005	2,6-Dichlorophenol	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6190	2,6-Dinitrotoluene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5795	2-Chloronaphthalene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5800	2-Chlorophenol	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6385	2-Methylnaphthalene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6400	2-Methylphenol	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6460	2-Nitroaniline	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6490	2-Nitrophenol	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6410	3&4-Methylphenol	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5945	3,3'-Dichlorobenzidine	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6465	3-Nitroaniline	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6360	4,6-Dinitro-2-methylphenol	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5660	4-Bromophenyl-phenylether	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5700	4-Chloro-3-methylphenol	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5745	4-Chloroaniline	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5825	4-Chlorophenyl-phenylether	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6470	4-Nitroaniline	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6500	4-Nitrophenol	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5500	Acenaphthene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5505	Acenaphthylene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5545	Aniline	EPA 8270D	**Approved**

Base/Neutrals and Acids in Soil	727	5555	Anthracene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5575	Benzo(a)anthracene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5580	Benzo(a)pyrene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5585	Benzo(b)fluoranthene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5590	Benzo(g,h,i)perylene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5600	Benzo(k)fluoranthene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5610	Benzoic acid	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5630	Benzyl alcohol	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5760	bis(2-Chloroethoxy)methane	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5765	bis(2-Chloroethyl)ether	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5780	bis(2-Chloroisopropyl)ether	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6255	bis(2-Ethylhexyl)phthalate	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5670	Butylbenzylphthalate	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5855	Chrysene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5895	Dibenz(a,h)anthracene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5905	Dibenzofuran	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6070	Diethylphthalate	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6135	Dimethylphthalate	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5925	Di-n-butylphthalate	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6200	Di-n-octylphthalate	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6265	Fluoranthene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6270	Fluorene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6275	Hexachlorobenzene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	4835	Hexachlorobutadiene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6285	Hexachlorocyclopentadiene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	4840	Hexachloroethane	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6315	Indeno(1,2,3-cd)pyrene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6320	Isophorone	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5005	Naphthalene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5015	Nitrobenzene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6530	N-Nitrosodimethylamine	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6545	N-Nitroso-di-n-propylamine	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6535	N-Nitrosodiphenylamine	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6605	Pentachlorophenol	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6615	Phenanthrene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6625	Phenol	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	6665	Pyrene	EPA 8270D	**Approved**
Base/Neutrals and Acids in Soil	727	5095	Pyridine	EPA 8270D	**Approved**
Low-Level PAHs in Soil	722	5500	Acenaphthene	EPA 8270DSIM	**Approved**
Low-Level PAHs in Soil	722	5505	Acenaphthylene	EPA 8270DSIM	**Approved**
Low-Level PAHs in Soil	722	5555	Anthracene	EPA 8270DSIM	**Approved**
Low-Level PAHs in Soil	722	5575	Benzo(a)anthracene	EPA 8270DSIM	**Approved**
Low-Level PAHs in Soil	722	5580	Benzo(a)pyrene	EPA 8270DSIM	**Approved**
Low-Level PAHs in Soil	722	5585	Benzo(b)fluoranthene	EPA 8270DSIM	**Approved**
Low-Level PAHs in Soil	722	5590	Benzo(g,h,i)perylene	EPA 8270DSIM	**Approved**
Low-Level PAHs in Soil	722	5600	Benzo(k)fluoranthene	EPA 8270DSIM	**Approved**
Low-Level PAHs in Soil	722	5855	Chrysene	EPA 8270DSIM	**Approved**
Low-Level PAHs in Soil	722	5895	Dibenz(a,h)anthracene	EPA 8270DSIM	**Approved**
Low-Level PAHs in Soil	722	6265	Fluoranthene	EPA 8270DSIM	**Approved**
Low-Level PAHs in Soil	722	6270	Fluorene	EPA 8270DSIM	**Approved**
Low-Level PAHs in Soil	722	6315	Indeno(1,2,3-cd)pyrene	EPA 8270DSIM	**Approved**
Low-Level PAHs in Soil	722	5005	Naphthalene	EPA 8270DSIM	**Approved**
Low-Level PAHs in Soil	722	6615	Phenanthrene	EPA 8270DSIM	**Approved**
Low-Level PAHs in Soil	722	6665	Pyrene	EPA 8270DSIM	**Approved**
Dioxin	SPE-016	9519	1,2,3,4,6,7,8,9-OCDD	EPA 8290	**Approved**
Dioxin	SPE-016	9516	1,2,3,4,6,7,8,9-OCDF	EPA 8290	**Approved**
Dioxin	SPE-016	9426	1,2,3,4,6,7,8-Hpcdd	EPA 8290	**Approved**
Dioxin	SPE-016	9420	1,2,3,4,6,7,8-Hpcdf	EPA 8290	**Approved**
Dioxin	SPE-016	9423	1,2,3,4,7,8,9-Hpcdf	EPA 8290	**Approved**
Dioxin	SPE-016	9453	1,2,3,4,7,8-Hxcdd	EPA 8290	**Approved**
Dioxin	SPE-016	9471	1,2,3,4,7,8-Hxcdf	EPA 8290	**Approved**
Dioxin	SPE-016	9456	1,2,3,6,7,8-Hxcdd	EPA 8290	**Approved**
Dioxin	SPE-016	9474	1,2,3,6,7,8-Hxcdf	EPA 8290	**Approved**
Dioxin	SPE-016	9459	1,2,3,7,8,9-Hxcdd	EPA 8290	**Approved**
Dioxin	SPE-016	9477	1,2,3,7,8,9-Hxcdf	EPA 8290	**Approved**
Dioxin	SPE-016	9549	2,3,4,7,8-Pecdf	EPA 8290	**Approved**
Dioxin	SPE-016	9606	2,3,7,8-TCDD	EPA 8290	**Approved**
Dioxin	SPE-016	9612	2,3,7,8-TCDF	EPA 8290	**Approved**
Dioxin	SPE-016	9444	Hpcdf, total	EPA 8290	**Approved**
Dioxin	SPE-016	9483	Hxcdf, total	EPA 8290	**Approved**
Dioxin	SPE-016	9606	PCDD + PCDF, total	EPA 8290	**Approved**
Dioxin	SPE-016	9993	PCDF, total	EPA 8290	**Approved**
Dioxin	SPE-016	9555	Pecdd, total	EPA 8290	**Approved**

Dioxin	SPE-016	9552	Pecdf, total	EPA 8290	**Approved**
Dioxin	SPE-016	9615	TCDD, total	EPA 8290	**Approved**
Dioxins and Furans in Soil	SPE-016	9540	1,2,3,7,8-Pecdd	EPA 8290	**Approved**
Dioxins and Furans in Soil	SPE-016	9543	1,2,3,7,8-Pecdf	EPA 8290	**Approved**
Dioxins and Furans in Soil	SPE-016	9480	2,3,4,6,7,8-Hxcdf	EPA 8290	**Approved**
Dioxins and Furans in Soil	SPE-016	9438	Hpcdd, total	EPA 8290	**Approved**
Dioxins and Furans in Soil	SPE-016	9444	Hpcdf, total	EPA 8290	**Approved**
Dioxins and Furans in Soil	SPE-016	9468	Hxcdd, total	EPA 8290	**Approved**
Dioxins and Furans in Soil	SPE-016	9483	Hxcdf, total	EPA 8290	**Approved**
Dioxins and Furans in Soil	SPE-016	9992	PCDD + PCDF, total	EPA 8290	**Approved**
Dioxins and Furans in Soil	SPE-016	9991	PCDD, total	EPA 8290	**Approved**
Dioxins and Furans in Soil	SPE-016	9993	PCDF, total	EPA 8290	**Approved**
Dioxins and Furans in Soil	SPE-016	9555	Pecdd, total	EPA 8290	**Approved**
Dioxins and Furans in Soil	SPE-016	9552	Pecdf, total	EPA 8290	**Approved**
Dioxins and Furans in Soil	SPE-016	9989	TCDD, total	EPA 8290	**Approved**
Dioxins and Furans in Soil	SPE-016	9615	TCDF, total	EPA 8290	**Approved**
Herbicides in Soil	4250	8655	2,4,5-T	EPA 8321A	**Approved**
Herbicides in Soil	4250	8650	2,4,5-TP (silvex)	EPA 8321A	**Approved**
Herbicides in Soil	4250	8545	2,4-D	EPA 8321A	**Approved**
Herbicides in Soil	4250	8560	2,4-DB	EPA 8321A	**Approved**
RCRA Carbamates	38158	7710	3-Hydroxycarbofuran	EPA 8321A	**Approved**
RCRA Carbamates	38158	7015	Aldicarb sulfone	EPA 8321A	**Approved**
RCRA Carbamates	38158	7020	Aldicarb sulfoxide	EPA 8321A	**Approved**
RCRA Carbamates	38158	8080	Baygon (Propoxur)	EPA 8321A	**Approved**
RCRA Carbamates	38158	7195	Carbaryl	EPA 8321A	**Approved**
RCRA Carbamates	38158	7205	Carbofuran	EPA 8321A	**Approved**
Herbicides in Soil	4250	8555	Dalapon	EPA 8321A	**Approved**
Herbicides in Soil	4250	8595	Dicamba	EPA 8321A	**Approved**
Herbicides in Soil	4250	8605	Dichloroprop	EPA 8321A	**Approved**
Herbicides in Soil	4250	8620	Dinoseb	EPA 8321A	**Approved**
RCRA Carbamates	38158	9384	Dioxacarb	EPA 8321A	**Approved**
RCRA Carbamates	38158	7505	Diuron	EPA 8321A	**Approved**
Herbicides in Soil	4250	7775	MCPA	EPA 8321A	**Approved**
Herbicides in Soil	4250	7780	MCPP	EPA 8321A	**Approved**
RCRA Carbamates	38158	7800	Methiocarb	EPA 8321A	**Approved**
RCRA Carbamates	38158	8025	Promecarb	EPA 8321A	**Approved**
Nitroaromatics/Nitroamines in Soil	4420	6885	1,3,5-Trinitrotoulene	EPA 8330	**Approved**
Nitroaromatics/Nitroamines in Soil	4420	9651	2,4,6-Trinitrotoulene	EPA 8330	**Approved**
Nitroaromatics/Nitroamines in Soil	4420	6185	2,4-Dinitrotoulene	EPA 8330	**Approved**
Nitroaromatics/Nitroamines in Soil	4420	6190	2,6-Dinitrotoulene	EPA 8330	**Approved**
Nitroaromatics/Nitroamines in Soil	4420	9306	4-Amino-2,6-dinitrotoulene	EPA 8330	**Approved**
Nitroaromatics/Nitroamines in Soil	4420	9513	4-Nitrotoulene	EPA 8330	**Approved**
Nitroaromatics/Nitroamines in Soil	4420	3740	HMX	EPA 8330	**Approved**
Nitroaromatics/Nitroamines in Soil	4420	6900	Nitrobenzene	EPA 8330	**Approved**
Nitroaromatics/Nitroamines in Soil	4420	3630	RDX	EPA 8330	**Approved**
Nitroaromatics/Nitroamines in Soil	4420	6415	Tetryl	EPA 8330	**Approved**
RCRA Nitroaromatics in Soil	38155	6885	1,3,5-Trinitrobenzene	EPA 8330A	**Approved**
RCRA Nitroaromatics in Soil	38155	6160	1,3-Dinitrobenzene	EPA 8330A	**Approved**
RCRA Nitroaromatics in Soil	38155	9651	2,4,6-Trinitrotoluene	EPA 8330A	**Approved**
RCRA Nitroaromatics in Soil	38155	6185	2,4-Dinitrotoluene	EPA 8330A	**Approved**
RCRA Nitroaromatics in Soil	38155	6190	2,6-Dinitrotoluene	EPA 8330A	**Approved**
RCRA Nitroaromatics in Soil	38155	9303	2-Amino-4,6-dinitrotoluene	EPA 8330A	**Approved**
RCRA Nitroaromatics in Soil	38155	9507	2-Nitrotoluene	EPA 8330A	**Approved**
RCRA Nitroaromatics in Soil	38155	9510	3-Nitrotoluene	EPA 8330A	**Approved**
RCRA Nitroaromatics in Soil	38155	9306	4-Amino-2,6-dinitrotoluene	EPA 8330A	**Approved**
RCRA Nitroaromatics in Soil	38155	9513	4-Nitrotoluene	EPA 8330A	**Approved**
RCRA Nitroaromatics in Soil	38155	9522	HMX	EPA 8330A	**Approved**
RCRA Nitroaromatics in Soil	38155	5015	Nitrobenzene	EPA 8330A	**Approved**
RCRA Nitroaromatics in Soil	38155	9432	RDX	EPA 8330A	**Approved**
RCRA Nitroaromatics in Soil	38155	6415	Tetryl	EPA 8330A	**Approved**
Nitroaromatics in Soil	38155	6885	1,3,5-Trinitrobenzene	EPA 8330B	**Approved**
Nitroaromatics in Soil	38155	6160	1,3-Dinitrobenzene	EPA 8330B	**Approved**
Nitroaromatics in Soil	38155	9651	2,4,6-Trinitrotoluene	EPA 8330B	**Approved**
Nitroaromatics in Soil	38155	9185	2,4-Dinitrotoluene	EPA 8330B	**Approved**
Nitroaromatics in Soil	38155	6190	2,6-Dinitrotoluene	EPA 8330B	**Approved**
Nitroaromatics in Soil	38155	9303	2-Amino-4,6-dinitrotoluene	EPA 8330B	**Approved**
Nitroaromatics in Soil	38155	9507	2-Nitrotoluene	EPA 8330B	**Approved**
Nitroaromatics in Soil	38155	9510	3-Nitrotoluene	EPA 8330B	**Approved**
Nitroaromatics in Soil	38155	9306	4-Amino-2,6-dinitrotoluene	EPA 8330B	**Approved**
Nitroaromatics in Soil	38155	9513	4-Nitrotoluene	EPA 8330B	**Approved**
Nitroaromatics in Soil	38155	9522	HMX	EPA 8330B	**Approved**
Nitroaromatics in Soil	38155	5015	Nitrobenzene	EPA 8330B	**Approved**
Nitroaromatics in Soil	38155	9432	RDX	EPA 8330B	**Approved**

Nitroaromatics in Soil	38155	6415	Tetryl	EPA 8330B	**Approved**
RCRA Cyanide	55105	1645	Cyanide	EPA 9010B	**Approved**
Cyanide in Soil	4130	1645	Total Cyanide	EPA 9010B	**Approved**
RCRA Cyanide	55105	1645	Cyanide	EPA 9014	**Approved**
Cyanide in Soil	4130	1645	Total Cyanide	EPA 9014	**Approved**
RCRA Corrosivity - pH Determination	55127	1625	Corrosivity	EPA 9045C	**Approved**
pH/Corrosivity in Soil	4140	1625	Corrosivity (pH)	EPA 9045C	**Approved**
RCRA Corrosivity - pH Determination	55127	1625	Corrosivity	EPA 9045D	**Approved**
Anions in Soil	4160	1540	Bromide	EPA 9056	**Approved**
RCRA Anions	55141	1540	Bromide (Br)	EPA 9056	**Approved**
Anions in Soil	4160	1575	Chloride	EPA 9056	**Approved**
RCRA Anions	55141	1575	Chloride (Cl)	EPA 9056	**Approved**
Anions in Soil	4160	1730	Fluoride	EPA 9056	**Approved**
RCRA Anions	55141	1730	Fluoride (F)	EPA 9056	**Approved**
RCRA Anions	55141	1810	Nitrate as N (NO3- as N)	EPA 9056	**Approved**
Anions in Soil	4160	1810	Nitrate Nitrogen as N	EPA 9056	**Approved**
Anions in Soil	4160	1870	Orthophosphate as P	EPA 9056	**Approved**
RCRA Anions	55141	1870	Phosphate as P (PO43- as P)	EPA 9056	**Approved**
Anions in Soil	4160	2000	Sulfate	EPA 9056	**Approved**
RCRA Anions	55141	2000	Sulfate (SO42-)	EPA 9056	**Approved**
Anions in Soil	SPE-013	1540	Bromide	EPA 9056A	**Approved**
Anions in Soil	SPE-013	1575	Chloride	EPA 9056A	**Approved**
Anions in Soil	SPE-013	1730	Fluoride	EPA 9056A	**Approved**
Anions in Soil	SPE-013	1810	Nitrate as N	EPA 9056A	**Approved**
Anions in Soil	SPE-013	1820	Nitrate+nitrite as N	EPA 9056A	**Approved**
Anions in Soil	SPE-013	1840	Nitrite as N	EPA 9056A	**Approved**
Anions in Soil	SPE-013	1870	Orthophosphate as P	EPA 9056A	**Approved**
Anions in Soil	SPE-013	2000	Sulfate	EPA 9056A	**Approved**
			TOC	Walkley-Black	**Approved**

APPL QUALITY CONTROL CRITERIA

ADEPT	AREF	DollarCode	Analyte	LOQ	LOD	DL	Unit	LCS_CL	LCSD_RPD	MS_CL	MSD_RPD
GC	8270D-LL	$SIMDDODSM	2-Methylnaphthalene	0.005	0.0018	0.0009	mg/kg	45-105	30	45-105	30
GC	8270D-LL	$SIMDDODSM	Acenaphthene	0.005	0.002	0.001	mg/kg	45-110	30	45-110	30
GC	8270D-LL	$SIMDDODSM	Acenaphthylene	0.005	0.0018	0.0009	mg/kg	45-105	30	45-105	30
GC	8270D-LL	$SIMDDODSM	Anthracene	0.005	0.0016	0.0008	mg/kg	55-105	30	55-105	30
GC	8270D-LL	$SIMDDODSM	Benz (a) anthracene	0.005	0.0018	0.0009	mg/kg	50-110	30	50-110	30
GC	8270D-LL	$SIMDDODSM	Benzo (a) pyrene	0.005	0.0018	0.0009	mg/kg	50-110	30	50-110	30
GC	8270D-LL	$SIMDDODSM	Benzo (b) fluoranthene	0.005	0.0022	0.0011	mg/kg	45-115	30	45-115	30
GC	8270D-LL	$SIMDDODSM	Benzo (g,h,i) perylene	0.005	0.0026	0.0013	mg/kg	40-125	30	40-125	30
GC	8270D-LL	$SIMDDODSM	Benzo (k) fluoranthene	0.005	0.002	0.001	mg/kg	45-125	30	45-125	30
GC	8270D-LL	$SIMDDODSM	Chrysene	0.005	0.0018	0.0009	mg/kg	55-110	30	55-110	30
GC	8270D-LL	$SIMDDODSM	Dibenz (a,h) anthracene	0.005	0.0018	0.0009	mg/kg	40-125	30	40-125	30
GC	8270D-LL	$SIMDDODSM	Fluoranthene	0.005	0.0024	0.0012	mg/kg	55-115	30	55-115	30
GC	8270D-LL	$SIMDDODSM	Fluorene	0.005	0.002	0.001	mg/kg	50-110	30	50-110	30
GC	8270D-LL	$SIMDDODSM	Indeno (1,2,3-cd) pyrene	0.005	0.0018	0.0009	mg/kg	40-120	30	40-120	30
GC	8270D-LL	$SIMDDODSM	Naphthalene	0.005	0.0018	0.0009	mg/kg	40-105	30	40-105	30
GC	8270D-LL	$SIMDDODSM	Phenanthrene	0.005	0.0022	0.0011	mg/kg	50-110	30	50-110	30
GC	8270D-LL	$SIMDDODSM	Pyrene	0.005	0.0024	0.0012	mg/kg	45-125	30	45-125	30
GC	8270D-LL	$SIMDDODSM	Surrogate: 2-Fluorbiphenyl (S)	45-105			mg/kg	45-105		45-105	
GC	8270D-LL	$SIMDDODSM	Surrogate: Terphenyl-d14 (S)	30-125			mg/kg	30-125		30-125	
GC	8270D-LL	$SIMDDODSM	Surrogate: Nitrobenzene-D5 (S)	35-100			mg/kg	35-100		35-100	
METALS	6020A	$62ASDOD	Antimony (Sb)	0.1	0.06	0.03	mg/Kg	80-120	20	80-120	20
METALS	6020A	$62ASDOD	Arsenic (As)	0.5	0.16	0.08	mg/Kg	80-120	20	80-120	20
METALS	6020A	$62ASDOD	Copper (Cu)	0.1	0.08	0.04	mg/Kg	80-120	20	80-120	20
METALS	6020A	$62ASDOD	Lead (Pb)	0.1	0.04	0.02	mg/Kg	80-120	20	80-120	20
METALS	6020A	$62ASDOD	Tin (Sn)	0.2	0.16	0.08	mg/Kg	80-120	20	80-120	20
METALS	6020A	$62ASDOD	Zinc (Zn)	2.0	0.26	0.13	mg/Kg	80-120	20	80-120	20
LCMS	EPA 8330	$83DODS	Nitroglycerin	0.5	0.18	0.09	mg/kg	70-135	30	70-135	30
LCMS	EPA 8330	$83DODS	Surrogate: 1,2-Dinitrobenzene (S)	70-130			mg/kg	70-130		70-130	
GC	8270D-LL	$SIMDDODW	2-Methylnaphthalene	0.2	0.12	0.06	ug/L	45-105	30	45-105	30
GC	8270D-LL	$SIMDDODW	Acenaphthene	0.2	0.12	0.06	ug/L	45-110	30	45-110	30
GC	8270D-LL	$SIMDDODW	Acenaphthylene	0.2	0.12	0.06	ug/L	50-105	30	50-105	30
GC	8270D-LL	$SIMDDODW	Anthracene	0.2	0.1	0.05	ug/L	55-110	30	55-110	30
GC	8270D-LL	$SIMDDODW	Benz (a) anthracene	0.2	0.14	0.07	ug/L	55-110	30	55-110	30
GC	8270D-LL	$SIMDDODW	Benzo (a) pyrene	0.2	0.14	0.07	ug/L	55-110	30	55-110	30
GC	8270D-LL	$SIMDDODW	Benzo (b) fluoranthene	0.2	0.12	0.06	ug/L	45-120	30	45-120	30
GC	8270D-LL	$SIMDDODW	Benzo (g,h,i) perylene	0.2	0.16	0.08	ug/L	40-125	30	40-125	30
GC	8270D-LL	$SIMDDODW	Benzo (k) fluoranthene	0.2	0.14	0.07	ug/L	45-125	30	45-125	30
GC	8270D-LL	$SIMDDODW	Chrysene	0.2	0.1	0.05	ug/L	55-110	30	55-110	30
GC	8270D-LL	$SIMDDODW	Dibenz (a,h) anthracene	0.2	0.1	0.05	ug/L	40-125	30	40-125	30
GC	8270D-LL	$SIMDDODW	Fluoranthene	0.2	0.16	0.08	ug/L	55-115	30	55-115	30
GC	8270D-LL	$SIMDDODW	Fluorene	0.2	0.12	0.06	ug/L	50-110	30	50-110	30

APPL QUALITY CONTROL CRITERIA

ADEPT	AREF	DollarCode	Analyte	LOQ	LOD	DL	Unit	LCS_CL	LCSD_RPD	MS_CL	MSD_RPD
GC	8270D-LL	$SIMDDODW	Indeno (1,2,3-cd) pyrene	0.2	0.14	0.07	ug/L	45-125	30	45-125	30
GC	8270D-LL	$SIMDDODW	Naphthalene	0.2	0.1	0.05	ug/L	40-100	30	40-100	30
GC	8270D-LL	$SIMDDODW	Phenanthrene	0.2	0.14	0.07	ug/L	50-115	30	50-115	30
GC	8270D-LL	$SIMDDODW	Pyrene	0.2	0.16	0.08	ug/L	50-130	30	50-130	30
GC	8270D-LL	$SIMDDODW	Surrogate: 2-Fluorbiphenyl (S)	50-110			ug/L	50-110		50-110	
GC	8270D-LL	$SIMDDODW	Surrogate: Terphenyl-d14 (S)	50-135			ug/L	50-135		50-135	
GC	8270D-LL	$SIMDDODW	Surrogate: Nitrobenzene-D5 (S)	40-110			ug/L	40-110		40-110	
LCMS	EPA 8330	$833BW	NITROGLYCERIN	0.50	0.26	0.130	ug/L	70-130	20	70-130	20
LCMS	EPA 8330	$833BW	SURROGATE: 1,2-DINITROBENZENE (S)	70-130			ug/L	70-130		70-130	
METALS	6020A	$62ADODW	ANTIMONY (SB)	0.20	0.02	0.01	ug/L	80-120	20	80-120	20
METALS	6020A	$62ADODW	ARSENIC (AS)	0.20	0.18	0.09	ug/L	80-120	20	80-120	20
METALS	6020A	$62ADODW	COPPER (CU)	0.50	0.26	0.13	ug/L	80-120	20	80-120	20
METALS	6020A	$62ADODW	LEAD (PB)	0.50	0.22	0.11	ug/L	80-120	20	80-120	20
METALS	6020A		Tin (Sn)	1	0.2	0.1	ug/L	80-120	20	80-120	20
METALS	6020A	$62ADODW	ZINC (ZN)	50.0	4.6	2.3	ug/L	80-120	20	80-120	20

APPENDIX C

DQO MEETING MINUTES

Indian Head Small Arms/Skeet Ranges

Internal DQO Scoping Session

Date: March 4, 2011

Place: Teleconference

Participants: Barb Becker, Mark Traxler, Tom Johnston, Ralph Basinski

Objective: Introduce the five small arms/skeet ranges to the internal project team by providing a preliminary conceptual site model (verbal) for each. Step through the USEPA Data Quality Objective (DQO) process for each site to develop project DQOs and establish the basis for developing a UFP-SAP.

Summary: Draft DQOs developed during the meeting are presented for each site on following pages.

Indianhead DQOs – Five Sites

- Barb Becker
- Mark Traxler
- Ralph Basinski
- Tom Johnston

Marine Rifle Range

Step 1. Problem

Soil and sediment have been investigated and human health risks for exposure of representative human receptors to select metals in these media have been eval'd but GW has not been evaluated nor have associated risks been evaluated. Therefore, GW must be investigated to determine whether risks from exposure of human receptors to the select metals in GW could be unacceptable so an appropriate course of action can be taken to investigate the site in more detail as necessary.

The select metals are:
Mark-Will write of As as being part of BKG in soil so leaching to GW is not a problem.

Vert. and horiz. Extent of so contam. Is known.

Barb: Check with risk assessor receptors:

- Hypothetical future resident
- Occupational worker
- Construction worker

Eco not a concern 'cause no exposure to GW.

Ste 2. Decisions

If screening value is exceeded for GW, plan additional investigation; otherwise recommend NFA for GW.

Step 3. Inputs

- Select total [M] in GW obtain using micro wells for comparison to criteria.
- If turbidity > 10 NTU then collect dissolved metals.
- GW qual. parameters

- Criteria – Lowest of MD cleanup stds, MCLs, and RSL. Check with R.A.
- Horizontal GPS of locations (submeter accuracy?).
- Depths to GW measured using water level meter I field and top riser with tape measure. Can get more detailed data I subsequent rounds

Note: Lead is most critical metal

Step 4. Boundaries

Go to most likely contaminated point in surficial aquifer. Surficial aquifer is most likely to be contaminated. If it isn't a drinking water aquifer, this would be considered in next phase of investigation.

Barb: Low tide fluctuations matter most near river. Check effect tidal fluctuations on GW sampling timing.

Step 5. Decision Rules

If any measured metal concentration in any sample exceeds the screening value plan additional investigation; otherwise recommend NFA for GW and add the GW data with soil data for completion of the risk assessment.

Step 6. Performance Criteria

Use standard text. Selected biased locations

Step 7. Design and Rationale

Need Fred R. to help select well locations.

Indianhead DQOs – Five Sites

- Barb Becker
- Mark Traxler
- Ralph Basinski
- Tom Johnston

Old Trap and Skeet Range

PAH contamination near firing point further away.

Step 1. Problem

Soil and sediment have been investigated and human health risks for exposure of representative human receptors to select metals and PAHs in these media have been eval'd but GW has not been evaluated nor have associated risks been evaluated. Therefore, GW must be investigated to determine whether risks from exposure of human receptors to the select metals and PAHs in GW could be unacceptable so an appropriate course of action can be taken to investigate the site in more detail as necessary.

The select metals are:
Five select metals for this type of range and 16 PAHs are the parameters of interest (no methylated PAHs???) Mark to confirm methylated.

Vert. and horiz. Extent of so contam. Is known in soil.

Barb: Check with risk assessor receptors – same as MRR

- Hypothetical future resident
- Occupational worker
- Construction worker

Ecorisk not a concern 'cause no exposure to GW.

Ste 2. Decisions

If screening value is exceeded for GW, plan additional investigation; otherwise recommend NFA for GW.

Step 3. Inputs

- Select total [M] in GW for five metals obtained using micro wells for comparison to criteria. Plus the PAH concentrations.
- If turbidity > 10 NTU then collect dissolved metals.

- GW qual. parameters
- Criteria – Lowest of MD cleanup stds, MCLs, and RSL.s Check with R.A.
- Horizontal GPS of locations (submeter accuracy?).
- Depths to GW measured using water level meter I field and top riser with tape measure. Can get more detailed data I subsequent rounds

Note: Lead is most critical metal.

Step 4. Boundaries

Go to most likely contaminated point in surficial aquifer. Surficial aquifer is most likely to be contaminated. If it isn't a drinking water aquifer, this would be considered in next phase of investigation.

Barb: Low tide fluctuations matter most in wells near shore. Check effect tidal fluctuations on GW sampling timing.

Different areas have different contaminants:

- 100' x 150' rectangle of PAH contamination in soil is located around two firing points about 150' from shoreline.
- This is where we need PAH concentration in GW.

- Two areas (one bisected by road) NW and NE, respectively, of M contamination. This is where we want to monitor for metals.

Step 5. Decision Rules

If any measured metal or PAH concentration in any GW sample exceeds the screening value, plan additional investigation to delineate contamination and evaluate risk for exposure to GW; otherwise recommend NFA for GW and add the GW data with soil data for completion of the risk assessment.

Step 6. Performance Criteria

Use standard text. Selected biased locations

Step 7. Design and Rationale

Need Fred R. to help select well locations.

Indianhead DQOs – Five Sites

- Barb Becker
- Mark Traxler
- Ralph Basinski
- Tom Johnston

Rum point Skeet Range

One little area > 400 ppm lead. One area with PAH exceedances.

Step 1. Problem

Soil and sediment have been investigated and human health risks for exposure of representative human receptors to select metals in these media have been eval'd but GW has not been evaluated nor have associated risks been evaluated. Therefore, GW must be investigated to determine whether soil contaminants have migrated to GW and whether risks from exposure of human receptors to the select metals in GW could be unacceptable so an appropriate course of action can be taken to investigate the site in more detail as necessary.

The select metals are:
Pb and Sb plus all normal PAHs. Mark to check whether to include methylated PAHs.

Vert. and horiz. Extent of so contam. is known in soil.

Barb: Check with risk assessor receptors – same as MRR

- Hypothetical future resident
- Occupational worker
- Construction worker

Ecorisk not a concern 'cause no exposure to GW.

Ste 2. Decisions

If screening value is exceeded for GW, plan additional investigation; otherwise recommend NFA for GW.

Step 3. Inputs

- [Sb], [Pb] iplus [PAH] GW obtained using micro wells for comparison to criteria.
- If turbidity > 10 NTU then collect dissolved metals.
- GW qual. parameters

- Criteria – Lowest of MD cleanup stds, MCLs, and RSL.s Check with R.A.
- Horizontal GPS of locations (submeter accuracy?).
- Depths to GW measured using water level meter I field and top riser with tape measure. Can get more detailed data I subsequent rounds

Note: Lead is most critical metal.

Step 4. Boundaries

Go to most likely contaminated point in surficial aquifer. Surficial aquifer is most likely to be contaminated. If it isn't a drinking water aquifer, this would be considered in next phase of investigation.

Need to focus on two areas contaminated with M of PAH.

Step 5. Decision Rules

If any measured metal or PAH concentration in any GW sample exceeds the screening value, plan additional investigation to delineate contamination and evaluate risk for exposure to GW; otherwise recommend NFA for GW and add the GW data with soil data for completion of the risk assessment.

Step 6. Performance Criteria

Use standard text. Selected biased locations

Step 7. Design and Rationale

Need Fred R. to help select well locations.

Indianhead DQOs – Five Sites

- Barb Becker
- Mark Traxler
- Ralph Basinski
- Tom Johnston

Small Arms Range

Three firing lines aiming at single hillside target. Metals contamination in hillside and target. Also found NG in soil.

Sb,, Cu, Pb; As was within BKG concentrations. Nitroglycerine (NG) was also detected at unacceptable levels in soil.

Step 1. Problem

Soil and sediment have been investigated and human health risks for exposure of representative human receptors to select metals in these media have been eval'd but GW has not been evaluated nor have associated risks been evaluated. Therefore, GW must be investigated to determine whether soil contaminants have migrated to GW and whether risks from exposure of human receptors to the select metals in GW could be unacceptable so an appropriate course of action can be taken to investigate the site in more detail as necessary.

The select metals are:
Pb, Cu, and Sb.

Vert. and horiz. Extent of so contam. is known in soil.

Barb: Check with risk assessor receptors – same as MRR

- Hypothetical future resident
- Occupational worker
- Construction worker

Ecorisk not a concern 'cause no exposure to GW.

Ste 2. Decisions

If screening value is exceeded for GW, plan additional investigation; otherwise recommend NFA for GW.

Step 3. Inputs

- [Sb], [Cu], [Pb] plus [NG] GW obtained using micro wells (if possible) for comparison to criteria.
- If turbidity > 10 NTU then collect dissolved metals.
- GW qual. parameters
- Criteria – Lowest of MD cleanup stds, MCLs, and RSL.s Check with R.A.
- Horizontal GPS of locations (submeter accuracy?).
- Depths to GW measured using water level meter I field and top riser with tape measure. Can get more detailed data I subsequent rounds

Note: Lead is most critical metal.

Step 4. Boundaries

Go to most likely contaminated point in surficial aquifer. Surficial aquifer is most likely to be contaminated. If it isn't a drinking water aquifer, this would be considered in next phase of investigation.

Fred to check on whether we can access GW with DPT (for microwells).

Step 5. Decision Rules

If any measured metal or NG concentration in any GW sample exceeds the screening value, plan additional investigation to delineate contamination and evaluate risk for exposure to GW; otherwise recommend NFA for GW and add the GW data with soil data for completion of the risk assessment.

Step 6. Performance Criteria

Use standard text. Selected biased locations

Step 7. Design and Rationale

Need Fred R. to help select well locations.

Indianhead DQOs – Five Sites

- Barb Becker
- Mark Traxler
- Ralph Basinski
- Tom Johnston

Roach Road

Small site, 8 firing positions near sheer cliff. Contaminated dirt may have slumped over the cliff. Base of cliff received bullet impact. Because there had been some slumping of dirt down hillside.

No tidal influence of GW levels.

Step 1. Problem

Soil and sediment have been investigated and human health risks for exposure of representative human receptors to select metals in these media have been eval'd but GW has not been evaluated nor have associated risks been evaluated. Therefore, GW must be investigated to determine whether soil contaminants have migrated to GW and whether risks from exposure of human receptors to the select metals in GW could be unacceptable so an appropriate course of action can be taken to investigate the site in more detail as necessary.

The select metals are:
Pb, Sb, Cu, Zn are the metals of interest because they exceeded criteria and are potentially associated with this type of range. The SI report indicated that As concentration were indicative of background.

Vert. and horiz. Extent of so contam. is known in soil.

Barb: Check with risk assessor receptors – same as MRR

- Hypothetical future resident
- Occupational worker
- Construction worker

Ecorisk not a concern 'cause no exposure to GW.

Ste 2. Decisions

If screening value is exceeded for GW, plan additional investigation; otherwise recommend NFA for GW.

Step 3. Inputs

- [Sb], [Cu], [Zn], [Pb] in GW obtained using micro wells for comparison to criteria.
- If turbidity > 10 NTU then collect dissolved metals.
- GW qual. parameters
- Criteria – Lowest of MD cleanup stds, MCLs, and RSL.s Check with R.A.
- Horizontal GPS of locations (submeter accuracy?).
- Depths to GW measured using water level meter I field and top riser with tape measure. Can get more detailed data I subsequent rounds

Note: Lead is most critical metal.

Step 4. Boundaries

Go to most likely contaminated point in surficial aquifer. Surficial aquifer is most likely to be contaminated. If it isn't a drinking water aquifer, this would be considered in next phase of investigation.

Need to focus on target area (a single area) at base of the cliff.

Step 5. Decision Rules

If any measured metal concentration in any GW sample exceeds the screening value, plan additional investigation to delineate contamination and evaluate risk for exposure to GW; otherwise recommend NFA for GW and add the GW data with soil data for completion of the risk assessment.

Step 6. Performance Criteria

Use standard text. Selected biased locations

Step 7. Design and Rationale

Need Fred R. to help select well locations.

NAVAL SUPPORT FACILITY – INDIAN HEAD STUMP NECK ANNEX

FIVE SMALL ARMS RANGES

PHASE 2 SITE INSPECTION GROUNDWATER INVESTIGATION

Installation Restoration Team Meeting

Gettysburg, PA

March 23, 2011

STUMP NECK ANNEX FIVE SMALL ARMS RANGES

SITE INSPECTION (SI)

- SI fieldwork conducted May-June 2009
- Investigation scope: collection and analysis of 451 soil and sediment samples
- All samples analyzed onsite for lead by X-ray fluorescence (XRF)
- Select samples shipped to off-site laboratory for analytical testing of: metals, PAHs, explosives, soil properties (CEC, pH, TOC, TS)
- Risk screening evaluation conducted by comparing results to Project Action Limits (PALs)
- SI Report approved/finalized September 2010

SCOPE OF PHASE 1 SITE INSPECTION

- Site Descriptions
- Sampling/Analysis

MARINE RIFLE RANGE (UXO 14)

- Used for rifle (.30-cal) training from 1911 to 1918
- Multiple firing lines, two target berms, hillside impact area

MARINE RIFLE RANGE (UXO 14)

- Sampling: 148 soil samples
  - 9 composite (10 aliquot) surface soil from firing lines
  - 35 initial surface soil from Berm #1
  - 35 initial surface soil from Berm #2
  - 54 initial surface soil from Hillside
  - 14 step-out soil (10 surface, 4 subsurface)
  - 1 duplicate
- Analysis (off-site):

MEDIUM	METALS	PAHs	EXPLOSIVES (NG)
SOIL	32	9	9

OLD SKEET AND TRAP RANGE (UXO 15)

- Used for small arms recreation from ~1967 to 1991
- Flat, fan-shaped area with accumulations of lead shot and clay target fragments on ground surface

OLD SKEET AND TRAP RANGE (UXO 15)

- Sampling: 83 soil and 34 sediment samples
  - 4 composite (10 aliquot) surface soil from firing lines
  - 56 initial surface soil
  - 23 step-out (17 surface, 6 subsurface)
  - 1 duplicate soil
  - 9 shoreline sediment
  - 25 underwater sediment
- Analysis (off-site):

MEDIUM	METALS	PAHs	EXPLOSIVES (NG)
SOIL	18	2	2
SEDIMENT	5	3	0

RUM POINT SKEET RANGE (UXO 16)

- Used for shotgun recreation from 1991 to 2001
- Flat fan-shaped area with accumulations of lead shot and clay target fragments on ground surface

RUM POINT SKEET RANGE (UXO 16)

- Sampling: 96 soil samples
  - 2 composite (10 aliquot) surface soil from firing lines
  - 77 initial surface soil
  - 15 step-out surface soil
  - 2 duplicates
- Analysis (off-site):

MEDIUM	METALS	PAHs	EXPLOSIVES (NG)
SOIL	25	21	2

SMALL ARMS (PISTOL) RANGE (UXO 17)

- Used for small arms (.22-, .45-, .50-cal; 9-mm) training from mid-1980s to 1991
- Three firing lines, target/hillside impact area

SMALL ARMS (PISTOL) RANGE (UXO 17)

- Sampling: 53 soil samples
  - 3 composite (10 aliquot) surface soil from firing lines
  - 17 initial surface soil
  - 6 step-out soil (3 surface, 3 subsurface)
  - 27 DPT samples
  - 1 duplicate
- Analysis (off-site):

MEDIUM	METALS	EXPLOSIVES (NG)
SOIL	25	3

ROACH ROAD RIFLE RANGE (UXO 25)

- Used for small arms (rifle and pistol) training from 1967 to 1986
- Two firing lines, target/hillside impact area

ROACH ROAD RIFLE RANGE (UXO 25)

- Sampling: 36 soil samples
  - 1 composite (10 aliquot) surface soil from firing lines
  - 33 initial surface soil
  - 0 step-out soil
  - 2 duplicates
- Analysis (off-site):

MEDIUM	METALS	EXPLOSIVES (NG)
SOIL	23	1

GENERAL HUMAN HEALTH RISK SCREENING RESULTS

- Metals (primarily Pb, also Sb, As, Cu, Sn, Zn), NG, and PAHs are present in surface media at concentrations that may pose unacceptable human health and/or ecological risk
- Removal of shallow soils in areas with elevated metals and PAHs is recommended
- NG in soil is reactive and expected to degrade over time – no remediation necessary

SITE-SPECIFIC FINDINGS HUMAN HEALTH PAL EXCEEDANCES

SITE	DIRECT SOIL CONTACT	SOIL-TO-GROUNDWATER*
MRR	Sb, Cu, Pb, Sn, Zn	Sb, Cu, Pb, NG
OSTR	As, Sb, Pb, Zn, PAHs	Sb, Pb, NG, PAHs
RPSR	Sb, Pb, PAHs	Sb, Pb, PAHs
SAPR	Sb, As, Cu, Pb, NG	Sb, Pb, NG
RRRR	Sb, Cu, Pb, Zn	Sb, Cu, Pb

*Risk screening was based on "soil-to-groundwater" pathway criteria, as applied to soil concentrations. No groundwater data were obtained.

PHASE 2 SITE INSPECTION

DATA QUALITY OBJECTIVE (DQO) PLANNING PROCESS

PROBLEM STATEMENT

Analysis of soil and sediment samples collected during the Phase I SI indicate exceedances of soil-to-groundwater pathway PALs at each site, suggesting that contaminant migration from surface soil/sediment to shallow groundwater may be of concern. To evaluate whether this migration has occurred and, if so, whether surface contaminants now present in the groundwater pose an unacceptable risk, groundwater data should be obtained from locations most likely to be impacted by contamination in the overlying soil/sediment.

RECEPTORS

There are no receptors currently exposed to groundwater under the existing land use.

Hypothetical future receptors with potential exposure to groundwater include:

- Residents – ingestion and dermal contact
- Construction Workers – incidental ingestion and dermal contact

INFORMATION INPUTS

Chemical Data: Concentration of soil contaminants exceeding both soil-to-groundwater PALs and background that are present in groundwater (metals, PAHs)

Physical Data: Sampling locations; groundwater quality parameters (pH, ORP, DO, temp, spec. conductivity, turbidity)

Screening Levels: Project Action Limits (PALs) based on RSLs, MCLs, MDE DW standards

STUDY BOUNDARIES

Groundwater of interest is the surficial aquifer.

- Although not currently used as a drinking water, this is the groundwater most likely to have been impacted by releases from soil contaminants deposited during range operations.
- Samples will be collected from locations of highest soil concentrations to represent worst-case site conditions.

DECISION RULES

If measured concentrations of groundwater contaminants exceed PALs, then plan for remedial investigation to evaluate groundwater flow direction and rate, and delineate vertical and horizontal extent.

If measured concentrations of groundwater contaminants do not exceed PALs, then recommend no further action (NFA) for groundwater, and perform Interim Removal Action for soils under EE/CA and AM.

CONCEPTUAL SAMPLING DESIGN

- Install a temporary monitoring well in each source area near location of highest lead or PAH concentration in the soil

- Conduct one sampling event for site-specific contaminants that exceeded PALs in Phase 1 for soil-to-groundwater pathway

SITE-SPECIFIC SAMPLING DESIGN

MARINE RIFLE RANGE (UXO 14)

- 3 wells – 1 each at Berm #1, Berm #2, and Hillside
- Sample for antimony, copper, lead

OLD SKEET AND TRAP RANGE (UXO 15)

- 3 wells – 1 each at firing point, NW target , NE target
- Sample firing point for PAHs; targets for antimony, lead

RUM POINT SKEET RANGE (UXO 16)

- 2 wells – 1 each at firing point and NW target area
- Sample firing point for PAHs; target for antimony, lead

SMALL ARMS (PISTOL) RANGE (UXO 17)

- 1 well – at hillside target area
- Sample for antimony, lead

ROACH ROAD RIFLE RANGE (UXO 25)

- 1 well – at hillside target area
- Sample for antimony, copper, lead

PHASE 2 SITE INSPECTION NEXT STEPS

- UFP-SAP submittal and on-board review
- Fieldwork implementation and data evaluation
- If risk due to groundwater is unacceptable, expand GW investigation at that site (RI/FS)
- If risk due to groundwater is within acceptable limits, recommend NFA for GW; perform Interim Removal Action for soils under EE/CA and AM

NAVAL SUPPORT FACILITY – INDIAN HEAD
STUMP NECK ANNEX

UFP-SAP
FOR
FIVE SMALL ARMS RANGES

PHASE 2 SITE INSPECTION
GROUNDWATER INVESTIGATION

May 2011

WORKSHEET 10

CONCEPTUAL SITE MODELS

FIG. 1 - FACILITY LOCATION MAP
MAIN INSTALLATION AND STUMP NECK ANNEX

FIG. 2 - FACILITY LOCATION MAP
VALLEY FIRING FAN

FIG. 3 – SMALL ARMS RANGES LOCATION MAP

MARINE RIFLE RANGE (UXO 14)

FIG. 4 - MARINE RIFLE RANGE (UXO 14)

- Used for rifle (.30-cal) training from 1911 to 1918
- Multiple firing lines, two target berms, hillside impact area

FIG. 9 – TARGET BERM AREA CSM

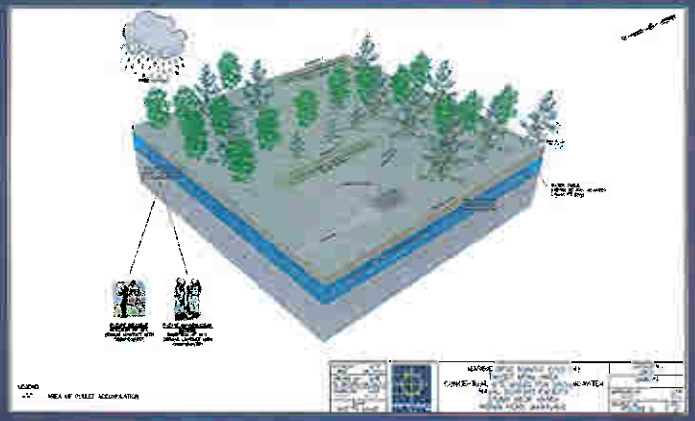


FIG. 10 – HILLSIDE IMPACT AREA CSM

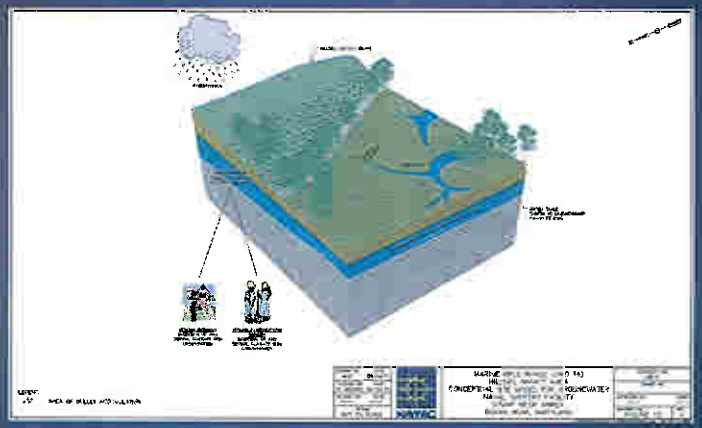
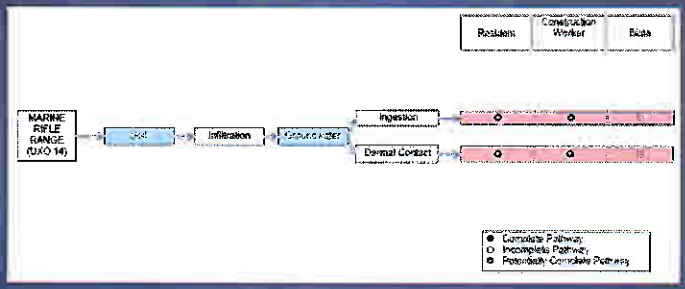


FIG. 11 – EXPOSURE PATHWAY ANALYSIS



- Receptors: future resident; future construction worker
- Exposure Pathways: ingestion; dermal contact

OLD SKEET AND TRAP RANGE (UXO 15)

FIG. 5 - OLD SKEET AND TRAP RANGE (UXO 15)

- Used for small arms recreation from ~1967 to 1991
- Surface accumulations of lead shot / clay target fragments

FIG. 12 – OLD SKEET AND TRAP RANGE CSM

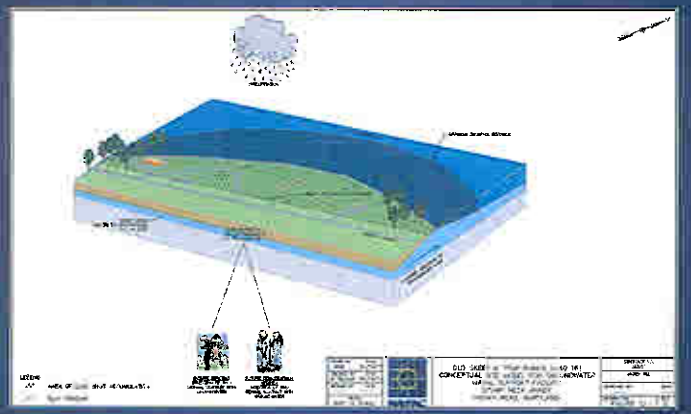
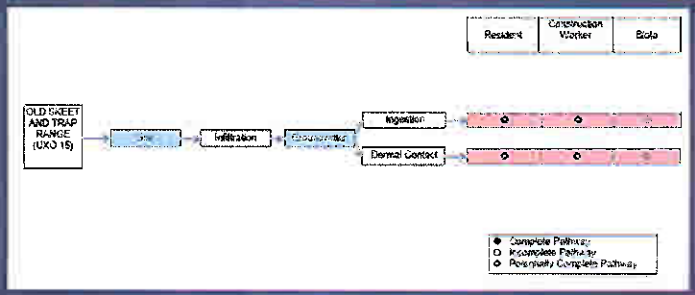


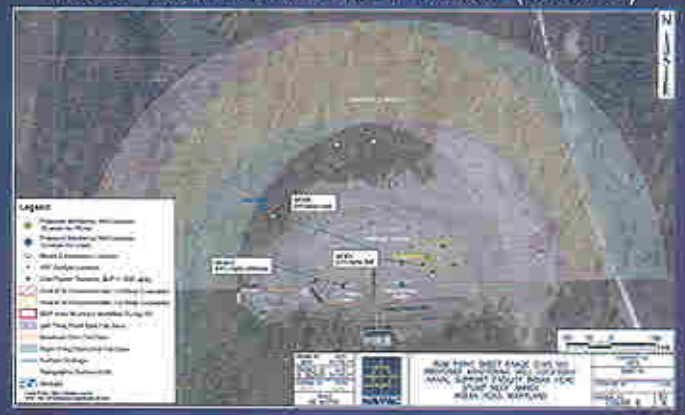
FIG. 13 – EXPOSURE PATHWAY ANALYSIS



- Receptors: future resident; future construction worker
- Exposure Pathways: ingestion; dermal contact

RUM POINT SKEET RANGE (UXO 16)

FIG. 6 - RUM POINT SKEET RANGE (UXO 16)



- Used for shotgun recreation from 1991 to 2001
- Surface accumulations of lead shot / clay target fragments

FIG. 14 – RUM POINT SKEET RANGE CSM

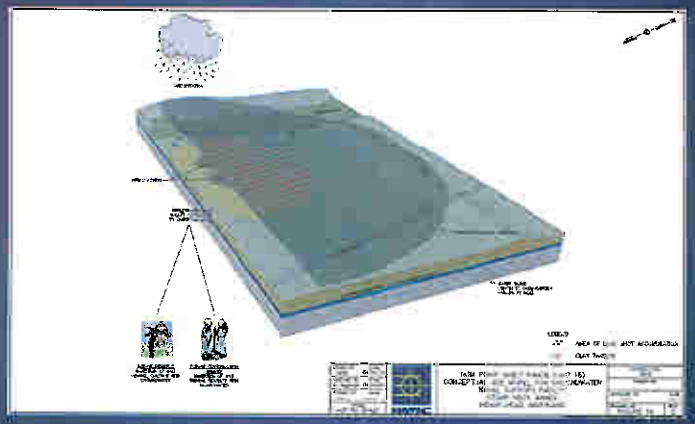
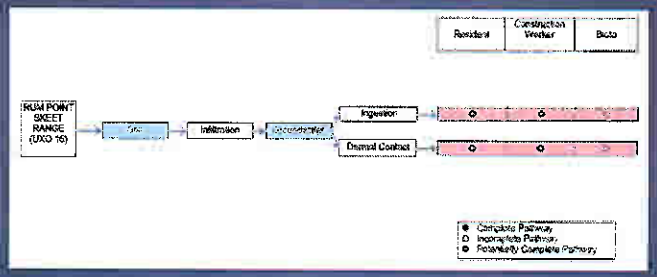


FIG. 15 – EXPOSURE PATHWAY ANALYSIS



- Receptors: future resident; future construction worker
- Exposure Pathways: ingestion; dermal contact

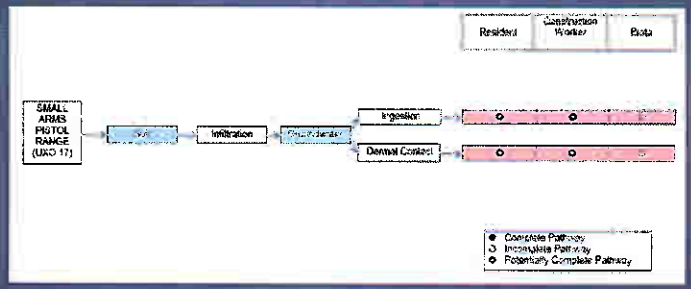
SMALL ARMS (PISTOL) RANGE (UXO 17)

FIG. 7 - SMALL ARMS (PISTOL) RANGE (UXO 17)

- Used for small arms training from mid-1980s to 1991
- Three firing lines, target/hillside impact area

FIG. 16 – SMALL ARMS (PISTOL) RANGE CSM

FIG. 17 – EXPOSURE PATHWAY ANALYSIS



- Receptors: future resident; future construction worker
- Exposure Pathways: ingestion; dermal contact

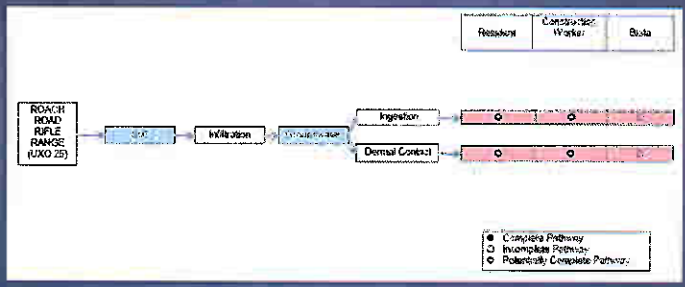
ROACH ROAD RIFLE RANGE (UXO 25)

FIG. 8 - ROACH ROAD RIFLE RANGE (UXO 25)

- Used for small arms training from 1967 to 1986
- Two firing lines, target/hillside impact area

FIG. 18 – ROACH ROAD RIFLE RANGE CSM

FIG. 19 – EXPOSURE PATHWAY ANALYSIS



- Receptors: future resident; future construction worker
- Exposure Pathways: ingestion; dermal contact

WORKSHEET 11

PROJECT QUALITY OBJECTIVES

PROBLEM STATEMENT

Analyses of soil and sediment samples collected during the Phase 1 SI have identified the presence of site-related contaminants at concentrations that... exceed risk-based criteria... and are, thus, considered COPCs. Soil and sediment have been investigated, and the extent of... contamination is well-defined in those media.

The problem is that underlying groundwater has not yet been investigated, nor has it been adequately considered in the risk evaluation.

To determine whether exposure of human receptors to groundwater at these sites may pose an unacceptable risk, a groundwater investigation must be conducted and the data generated must be considered in the human health risk screening evaluation.

INFORMATION INPUTS

Chemical Data: Concentrations of COPCs

GW Quality Data: pH, ORP, DO, temp, spec. conductivity, turbidity

GW Level Measurements: depth to water

Dissolved Metals Data: Collect if turb. > 10 ntu

Sample Location Data: hor./vert. coordinates

Project Action Limits (PALs): based on lowest of RSLs or MCLs, as appropriate

STUDY AREA BOUNDARIES

Vertical - Groundwater of interest is top 5 ft of surficial aquifer. This groundwater is:

- Not currently used for drinking water
- Most likely groundwater to have been impacted by migration from soil contaminants deposited during range operations

Horizontal - Groundwater samples should be collected from locations of greatest soil concentrations to ensure that data represent worst-case site conditions

DECISION RULE #1

If all measured groundwater concentrations at each monitoring location are less than the respective groundwater PALs, then conclude that there is no unacceptable risk associated with groundwater at that site and recommend No Further Action (NFA) with respect to groundwater.

Otherwise, convene the Partnering Team to assess whether enough data have been collected to complete the risk screening, and proceed to Decision Rule #2.

DECISION RULE #2

If the Partnering Team determines, based on Phase 2 SI data, that the presence or absence of groundwater contamination has been adequately documented, then proceed with completing the groundwater human health risk screening evaluation.

Otherwise, convene the Partnering Team to assess whether additional data collection to characterize the nature and extent of groundwater contamination is warranted.

PERFORMANCE CRITERIA

- Collect groundwater data at locations most likely to be impacted by contamination in overlying soil
- Investigation to be considered satisfactory if all data are collected as planned and no data point are missing/rejected
- Data adequacy will be assessed by the Partnering Team

WORKSHEET 17

SAMPLING DESIGN AND RATIONALE

FIG. 4 - MARINE RIFLE RANGE (UXO 14)

- 4 wells – Firing Line, Berm #1, Berm #2, Hillside Impact Area
- Sample Firing Line for NG, Sb, Cu; others for Cu, Pb

FIG. 5 - OLD SKEET AND TRAP RANGE (UXO 15)

- 3 wells – Firing Point, NW Shot Fall Area, NE Shot Fall Area
- Sample Firing Point for PAHs, NG, Sb; Shot Fall Areas for Sb, Pb

FIG. 6 - RUM POINT SKEET RANGE (UXO 16)

- 2 wells – Firing Point/Target Area; NW Shot Fall Area
- Sample Firing Point for PAHs, Sb; Shot Fall Area for Sb, Pb

FIG. 7 - SMALL ARMS (PISTOL) RANGE (UXO 17)

- 1 well – Firing Line/Target Area
- Sample for NG, As, Sb, Pb

FIG. 8 - ROACH ROAD RIFLE RANGE (UXO 25)

- 1 well – Target Area
- Sample for Sb, Cu, Pb

PHASE 2 SITE INSPECTION NEXT STEPS

- Receipt/incorporation of Navy Chemist comments
- UFP-SAP submittal to EPA/MDE (end of May)
- On-board review/comment resolution (June 29)
- Finalization of UFP-SAP (July)
- Fieldwork (early August) and data evaluation

If risk due to groundwater appears to be unacceptable, expand GW investigation at that site and move toward RI/FS.

Otherwise, recommend NFA for GW and plan for interim soils removal action under EE/CA and AM.