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FINAL TIER II SAMPLING AND ANALYSIS PLAN EXPANDED SITE INSPECTION FOR MACHINE GUN BORESIGHT RANGES UNEXPLODED ORDNANCE SITE 5 (UXO 5) AND SITE 10 (UXO 10) NAS OCEANA VA

11/1/2013

CH2M HILL

1 Title and Approval Page

(UFP-QAPP Manual Section 2.1 – Worksheet #1)

Final

Tier II Sampling and Analysis Plan
Expanded Site Inspection
Machine Gun Boresight Ranges (UXO-5 and UXO-10)

Naval Air Station Oceana and Naval Auxiliary Landing Field Fentress
Virginia Beach and Chesapeake, Virginia

Contract Task Order WE03

November 2013

Prepared for:

Department of the Navy
Naval Facilities Engineering Command
Mid-Atlantic

Under the:

NAVFAC CLEAN 1000 Program
Contract N62470-08-D-1000

Prepared by:

CH2MHILL

Virginia Beach, Virginia

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Signature Page

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Executive Summary

This document presents the Uniform Federal Policy (UFP) Sampling and Analysis Plan (SAP) for the Expanded Site Inspection (SI) of the Unexploded Ordnance (UXO)-5 Machine Gun Boresight Range (MGBR) located at Naval Air Station (NAS) Oceana in Virginia Beach, Virginia, and the UXO-10 MGBR located at Naval Auxiliary Landing Field (NALF) Fentress in Chesapeake, Virginia.

The MGBRs at NAS Oceana and NALF Fentress were used as small arms firing ranges in the 1940s and 1950s. The presence of metals, likely due to the use of small arms ammunition, at concentrations exceeding human health and/or ecological screening values in surface or subsurface soil was confirmed based on the analytical results associated with soil samples collected during a SI performed at the former MGBRs in June 2010.

CH2M HILL prepared this document under the Department of the Navy (Navy), Naval Facilities Engineering Command (NAVFAC), Mid-Atlantic, Comprehensive Long-Term Environmental Action – Navy (CLEAN) 1000 Contract N62470-08-D-1000, Contract Task Order (CTO) WE03, for submittal to NAVFAC Mid-Atlantic and the Virginia Department of Environmental Quality (VDEQ).

The primary objective of the Expanded SI outlined in this SAP is to further delineate the lateral and vertical extent of soil contamination for the constituents of potential concern (COPCs) identified at each MGBR during the SI based on human health and ecological risk screening criteria in support of an Engineering Evaluation/Cost Analysis (EE/CA) that is currently in progress.

The proposed Expanded SI field activities consist of collecting surface and subsurface soil samples from the soil berm and toe of the berm at each MGBR. Surface and subsurface soil samples will be collected from approximately 30 locations at the NALF Fentress MGBR and 32 locations at the NAS Oceana MGBR. Background samples will also be collected for surface and subsurface soil at each site to support the establishment of appropriate cleanup goals for the EE/CA.

This UFP-SAP was prepared in accordance with the Navy's UFP-SAP policy guidance to ensure that environmental data collected are scientifically sound, of known and documented quality, and suitable for intended uses. The laboratory information cited in this UFP-SAP is specific to EMAX Laboratories, Inc. (EMAX), in Torrence, California. EMAX was selected based on a competitive selection process and will provide all analytical laboratory support for this project. If analytical changes are required, a technical memorandum, including revised UFP-SAP worksheets as appropriate, will be prepared as documentation.

This UFP-SAP contains the required elements outlined in the Navy's UFP-SAP Tier II guidance. Tables are embedded within the document and figures are provided following the text. The laboratory Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) accreditation is provided as **Appendix A**. Relevant Field Standard Operating Procedures (SOPs) are included in **Appendix B.** The laboratory chain-of-custody document is included in **Appendix C.**

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Appendices

Figures

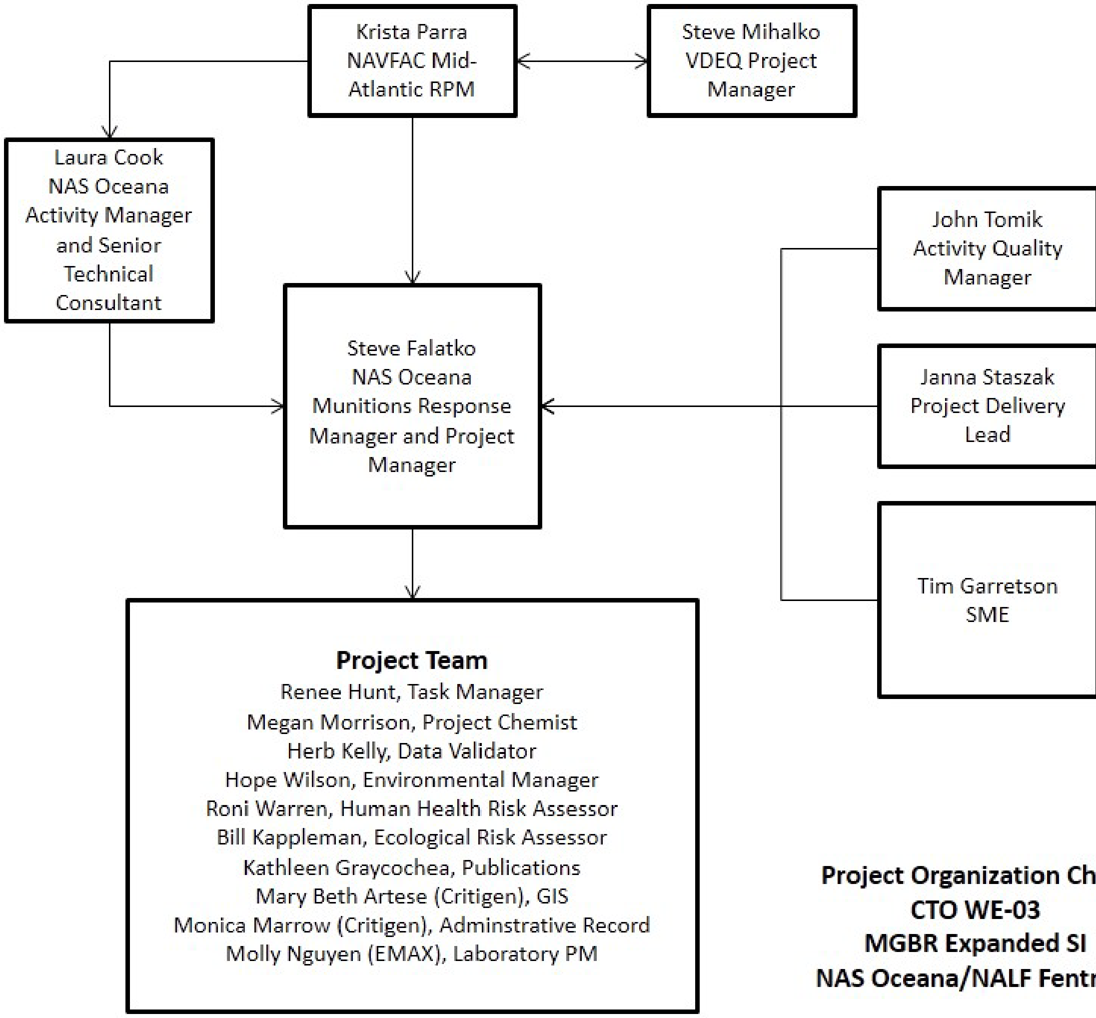
Acronyms and Abbreviations

°C	degree Celsius
AM	Activity Manager
AQM	Activity Quality Manager
bgs	below ground surface
CA	corrective action
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action – Navy
COPC	constituent of potential concern
CSM	Conceptual Site Model
CTO	Contract Task Order
DL	Detection Limit
DoD	Department of Defense
DQE	data quality evaluation
DQI	data quality indicator
DQOs	Data Quality Objectives
Eco-SSL	Ecological Soil Screening Level
EE/CA	Engineering Evaluation/Cost Analysis
ELAP	Environmental Laboratory Accreditation Program
EMAX	EMAX Laboratories, Inc.
EPA	United States Environmental Protection Agency
ERA	Ecological Risk Assessor
ft	feet
FTL	Field Team Leader
GIS	Geographic Information System
GPS	global positioning system
HASP	Health and Safety Plan
HHRA	Human Health Risk Assessor
ICP	inductively coupled plasma
ICS	interference check solutions
IS	internal standard
LCL	Lower Control Limit
LCS	Laboratory Control Sample
LOD	limit of detection
LOQ	limit of quantitation
MEC	munitions and explosives of concern
mg/kg	milligram per kilogram
MGBR	Machine Gun Boresight Range
mL	milliliter
mm	millimeter
MS	matrix spike
MSD	matrix spike duplicate

NALF	Naval Auxiliary Landing Field
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
Navy	Department of the Navy
NIRIS	Naval Installation Restoration Information Solution
NTR	Navy Technical Representative
PA	Preliminary Assessment
PM	Project Manager
PPE	personal protective equipment
PQO	Project Quality Objective
QA	quality assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	quality control
QL	quantitation limit
QSM	Quality Systems Manual
RPD	Relative Percent Difference
RPM	Remedial Project Manager
RSL	regional screening level
SAP	Sampling and Analysis Plan
SI	Site Inspection
SME	Subject Matter Expert
SOP	standard operating procedure
SSC	Site Safety Coordinator
TBD	to be determined
UCL	upper confidence limit
UFP	Uniform Federal Policy
UTL	upper tolerance limit
VDEQ	Virginia Department of Environmental Quality

2 Project Organizational Chart

(UFP-QAPP Manual Section 2.4.1 – Worksheet #5)



Project Organization Chart
CTO WE-03
MGBR Expanded SI
NAS Oceana/NALF Fentress

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3 Communication Pathways

(UFP-QAPP Manual Section 2.4.2 – Worksheet #6)

The communication pathways for the SAP are shown below.

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or e-mail	Procedure, Pathway, etc.
Communication with the Department of the United States Navy (Navy) (lead agency)	Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic Navy Technical Representative (NTR)	Krista Parra	krista.parra@navy.mil	Primary contact for Naval Air Station (NAS) Oceana; can delegate communication to other internal or external points of contact. Will notify Virginia Department of Environmental Quality (VDEQ) via email within 24 hours for field changes affecting the scope.
Communication with Navy	NAVFAC Atlantic Navy Chemist	To be determined (TBD)	TBD	Reviews Uniform Federal Policy (UFP)-SAP and provides input for NAVFAC Atlantic.
Communication with VDEQ (regulatory agency)	VDEQ Remedial Project Manager (RPM)	Steve Mihalko	stephen.mihalko@deq.virginia.gov	Primary contact for VDEQ; can delegate communication to other internal or external points of contact. Upon notification of field changes, VDEQ will have 24 hours to approve or comment on the field changes.
Communication regarding overall project status and implementation and primary point of contact with Navy RPM and VDEQ	CH2M HILL Activity Manager (AM)	Laura Cook	laura.cook@ch2m.com	Primary contact at CH2M HILL with NTR for all NAS Oceana activities; delegate's communication within CH2M HILL. Coordinates, reviews, and approves all critical technical deliverables and related correspondence within one week. Oversees project and will be informed of project status by the Project Manager (PM).

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or e-mail	Procedure, Pathway, etc.
All activities associated with NAS Oceana	CH2M HILL Activity Quality Manager (AQM)	John Tomik	john.tomik@ch2m.com	Field and analytical issues requiring corrective action (CA) will be identified by the Field Team Leader (FTL) and brought to the attention of the PM, who in turn will notify the AQM before any decisions are made or action occurs. Communications and decisions should be made on a daily basis and before conducting any actions that may be affected by them. Communications with the Navy Chemist will be in person or by phone, followed up with e-mail to document decisions and actions.
Communication regarding overall project status and implementation, as well as primary point of contact with the AM	CH2M HILL PM	Stephen Falatko	stephen.falatko@ch2m.com	Primary contact at CH2M HILL for Navy NTR for NAS Oceana and NALF Fentress Expanded SI (SI) activities; can delegate communication to other points of contact within CH2M HILL. Oversees the overall project status and execution. Will be informed of project status by CH2M HILL project staff. Manages subcontractors. If field changes occur, works with AM/AQM within 24 hours of the activity. Communicates field results to team during team meetings.
Field staff discussion and inquiry regarding ecological risk assessment	CH2M HILL Senior Ecological Risk Assessor (ERA)	Bill Kappleman	william.kappleman@ch2m.com	Primary point of contact for field team before, during, and after investigation for ecological risk assessment concerns. Communicates back to PM and AQM as needed.
Field staff discussion and inquiry regarding human health risk assessment	CH2M HILL Senior Human Health Risk Assessor (HHRA)	Roni Warren	roni.warren@ch2m.com	Primary point of contact for field team before, during, and after investigation for human health risk assessment concerns. Communicates back to PM and AQM as needed.

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or e-mail	Procedure, Pathway, etc.
SAP field changes and field progress reports, communications with PM during sampling activities	CH2M HILL FTL	TBD	TBD	Documents field activities and work plan deviations (made with the approval of AM, PM, and/or AQM) in field logbooks. Communicates deviations to PM on a daily basis and before conducting any actions that may be affected by such communications. Any field issues or SAP deviations that could negatively impact project schedule or render project data quality objectives (DQOs) unattainable will be communicated to the Navy NTR by the AM or PM.
Stop Work Order	CH2M HILL, and NAVFAC Mid-Atlantic	TBD	TBD	Any field member can immediately stop work if an unsafe condition, which is immediately threatening to human health, is observed. Ultimately, the FTL, PM, and AM can stop work for a period of time. NAVFAC Mid-Atlantic can stop work at any time.
Communication regarding overall quality of the UFP-SAP	CH2M HILL Comprehensive Long-Term Environmental Action – Navy (CLEAN) Program UFP-SAP Reviewer	Janna Staszak	janna.stazak@ch2m.com	Performs program-level technical and quality review of UFP-SAP prior to submittal.
Communication regarding overall quality of the chemistry worksheets	CH2M HILL Navy CLEAN Program Chemist	Anita Dodson	anita.dodson@ch2m.com	Performs program-level chemist review of the UFP-SAP prior to submittal.
Health and safety expectations and procedures	CH2M HILL Health and Safety Officer	Mark Orman	mark.orman@ch2m.com	Reviews the Health and Safety Plan (HASP) prior to submittal Directs communication to/from CH2M HILL project team to ensure implementation of appropriate health and safety procedures.
Field CAs	CH2M HILL FTL and PM	TBD Stephen Falatko	TBD stephen.falatko@ch2m.com	Summary of field CAs taken will be provided to the Navy within 2 days of incident that requires field CA.

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or e-mail	Procedure, Pathway, etc.
Overseeing staff health and safety in the field	CH2M HILL Site Safety Coordinator (SSC)	TBD	TBD	Responsible for daily safety tailgates, weekly observations, and real-time discussions of observations and changes to be implemented with field staff.
Management of analytical laboratory and data validation subs. Analytical CAs, release of analytical data, and reporting lab data quality issues	CH2M HILL Project Chemist	Megan Morrison	megan.morrison@ch2m.com	Primary contact with the laboratory Quality Assurance Officer (QAO). Analytical CAs will be identified by or brought to the attention of the project chemist on a daily basis. The project chemist will facilitate resolution on a same-day basis after consulting with the PM and AQM and the Navy Chemist (if changes in the UFP-SAP are warranted) to ensure UFP-SAP requirements are met by the laboratory. No analytical data can be released until validation is completed and approved by the project chemist. Communications with subcontractors will be by phone, followed up with an e-mail to document decisions and actions. Informs PM, NTR, and Navy QAO of any laboratory issues that would cause negative impacts to project delivery or would cause the project DQOs to not be met.
Reporting laboratory data quality issues	Laboratory PM	Molly Nguyen	MNguyen@emaxlabs.com	Responsible for audits, CAs, checks of quality assurance (QA) performance within the laboratory.
Validation of analytical lab data	CH2M HILL Data Validator	Herb Kelly	herb.kelly@ch2m.com	Performs data validation of analytical laboratory data within 2 weeks of receiving the analytical data packages.

4 Project Planning Session Participants Sheets

(UFP-QAPP Manual Section 2.5.1 – Worksheet #9)

Project Name: NAS Oceana and NALF Fentress Machine Gun Boresight Range Expanded SI
Projected Date(s) of Sampling: Fall 2013
Project Manager: Stephen Falatko/CH2M HILL

Site Name: Machine Gun Boresight Ranges (UXO-5 and UXO-10)
Site Location: NAS Oceana and NALF Fentress

Date of Session: June 14, 2013
Scoping Session Purpose: Gain Team concurrence with the Expanded SI approach.

Name	Title/Project Role	Affiliation	Phone #	E-mail Address
Krista Parra	RPM	NAVFAC-Mid Atlantic	(757) 341-0395	krista.parra@navy.mil
Steve Mihalko	RPM	VDEQ	(804) 698-4202	stephen.mihalko@deq.virginia.gov
Stephen Falatko	PM	CH2M HILL	(703) 376-5099	stephen.falatko@ch2m.com

Comments:

Stephen Falatko presented information about the proposed Expanded SI for the MGBRs located at NAS Oceana and NALF Fentress. The objective of the presentation was to review the historical site information and refine and gain team agreement on the investigation objectives and approach. Based on historical information and previous investigation results, small arms ammunition is a source of metals contamination at these sites. Antimony, copper, lead, and zinc have been identified as constituents of potential concern (COPCs) at the NAS Oceana MGBR, and copper, lead, and zinc have been identified as COPCs at the NALF Fentress MGBR. The Expanded SI is being performed to better define the horizontal and vertical extent of metals contamination exceeding human health and ecological screening levels at each site to support the Engineering Evaluation/Cost Analysis that is currently in progress.

The following sampling approach was agreed upon by the Partnering Team for the NAS Oceana and NALF Fentress MGBRs:

- Within the soil berm, subsurface soil samples will be collected at the previous SI sample locations at depths of 2-3 feet below ground surface (ft bgs) and 3-4 ft bgs, as the 2010 SI samples that were collected at 0-1 ft bgs and 1-2 ft bgs exceeded human health and ecological screening values at both depth intervals. The purpose of the 2-3 ft bgs and 3-4 ft bgs samples is to better determine the vertical extent of contamination exceeding human health and ecological screening levels.
- Additional surface and subsurface soil samples will be collected near the soil berm at depths of 0-1 ft bgs and 1-2 ft bgs. The area near the soil berm has not been sampled during previous investigation activities, and it is not known whether metals impacts are present in this area. Due to this uncertainty, the 1-2 foot sample interval will be held pending analysis of the surface soil samples. If COPCs exceed screening levels in the corresponding shallow sample, then the subsurface soil samples will be analyzed.
- Approximately 64 samples will be collected at the NAS Oceana MGBR from 32 sample locations, and approximately 60 samples will be collected at NALF Fentress from 30 sample locations. The total sample count may be modified during the investigation effort depending upon observed site conditions. The collection of additional soil samples may be warranted based on the results of the planned sampling described above.
- The NAS Oceana MGBR samples will be analyzed for antimony, copper, lead, and zinc as they were identified as COPCs during the SI.
- The NALF Fentress MGBR samples will be analyzed for copper, lead, and zinc as they were identified as COPCs during the SI.

Action Items:
CH2M HILL: Proceed with the preparation of the UFP-SAP.

Consensus Decisions:
The Team agreed to move forward with the proposed sampling approach

Project Name: NAS Oceana and NALF Fentress Machine Gun Boresight Range Expanded SI **Projected Date(s) of Sampling**: Fall 2013 **Project Manager**: Stephen Falatko/CH2M HILL	**Site Name**: Machine Gun Boresight Ranges (UXO-5 and UXO-10) **Site Location**: NAS Oceana and NALF Fentress

Date of Session: September 20, 2013
Scoping Session Purpose: Discussion of background soil sampling approach

Name	Title/Project Role	Affiliation	Phone #	E-mail Address
Krista Parra	RPM	NAVFAC-Mid Atlantic	(757) 341-0395	krista.parra@navy.mil
Steve Mihalko	RPM	VDEQ	(804) 698-4202	stephen.mihalko@deq.virginia.gov
Stephen Falatko	PM	CH2M HILL	(703) 376-5099	stephen.falatko@ch2m.com
Laura Cook	STC	CH2M HILL	(757) 671-6214	laura.cook@ch2m.com
Renee Hunt	Task Manager	CH2M HILL	(414) 847-0349	renee.hunt@ch2m.com

Comments:

Renee Hunt and Laura Cook presented the rationale for the background soil sampling to be conducted during the proposed Expanded SI for the MGBRs located at NAS Oceana and NALF Fentress. Due to the lack of site-wide background data, the Partnering Team agreed that background samples were needed at these site to aid in the delineation of metals contamination in soil during future removal action activities.

The following background data evaluation approach was agreed upon by the Partnering Team for the NAS Oceana and NALF Fentress MGBRs:

- Five background samples for surface and subsurface soils will be collected at each site. Surface soil samples will be collected at 0-1 ft bgs, and subsurface soil samples will be collected at 1-2 ft bgs to correspond with the other samples collected at each site.
- Because background soil sample locations from both NAS Oceana and NALF Fentress are located in the same soil type, it is likely that analytical results from both sets of background samples will be appropriate to combine in order to calculate background upper tolerance limits (UTLs). The total sample set of ten samples would be appropriate for statistical calculations. The background samples at both sites will be analyzed for antimony, copper, lead, and zinc to allow for combination of the data sets if comparable.
- The background data sets will be evaluated graphically to determine if the two data sets are comparable. If results of the two background data sets are comparable, site sample concentrations will be compared to background UTLs to determine which areas should be included in any future removal actions.
- If the two background data sets are not comparable, then background maximum values from each data set will be used in place of UTLs.
- If soil sample concentrations exceed human health and/or ecological screening values and site-specific background data, the sampled area will be evaluated for action as part of the removal action to be proposed in the EE/CA.
- If soil sample concentrations do not exceed screening values and site-specific background data, these sample areas will not be addressed as part of the EE/CA.

Action Items:
CH2M HILL: Continue with the preparation of the UFP-SAP.

Consensus Decisions:
The Team agreed to move forward with the proposed sampling approach

5 Conceptual Site Model

The conceptual site models (CSMs) for the NAS Oceana MGBR (UXO-5) and the NALF Fentress MGBR (UXO-10) are based on information collected during the Preliminary Assessment (PA) (Malcolm Pirnie, 2008) and Site Inspection (CH2M HILL, 2012). The CSMs present the site description and history, site geology, previous investigations, distribution of contamination, release history, potential migration pathways, and the potential exposure and receptor pathways.

5.1 Site Description and History

NAS Oceana is located near the Atlantic Ocean, within the southeastern portion of the city of Virginia Beach, Virginia (**Figure 1)**. The installation encompasses just over 5,300 acres, as well as approximately 3,600 acres in restrictive easements. In addition, NAS Oceana maintains control over several annex properties and outlying fields in the surrounding Virginia and North Carolina area. The mission of the facility is to support the Navy's Atlantic and Pacific fleet forces of strike-fighter aircraft and joint and interagency operations.

The former MGBR at NAS Oceana covers approximately 1.7 acres and is north of Dorr Place and west of Runway 14 (**Figure2)**. The eastern half of the site is generally flat and consists of maintained grass because it borders an active aircraft runway. The western portion is predominantly overgrown with brush and trees because it is not actively used by the installation. According to an archival map from 1943, the site was initially used as a maintenance and testing range for aircraft-mounted machine guns and was later converted to a small arms firing range (Malcolm Pirnie, 2008). A concrete backstop is still in place on the western portion of the site, which suggests that the direction of fire was toward the west. The concrete backstop is overgrown with trees and brush and is deteriorating. The former firing point is approximately 900 feet east of the backstop (Malcolm Pirnie, 2008), as shown on **Figure 2**. There are no wetlands or water bodies on the site. Based on the range boundaries and period of use, probable munitions used were likely limited to .50 and .30 caliber rounds for aircraft guns, as well as 9-millimeter (mm) rounds for small arms.

NALF Fentress (**Figure 1**) is located in Chesapeake, Virginia, approximately 7 miles southwest of NAS Oceana. Established in 1940, the installation encompasses just over 2,500 acres and approximately 8,700 acres in restrictive easements. The facility is used primarily by squadrons stationed at NAS Oceana or Naval Station Norfolk Chambers Field for field carrier landing practice operations (Malcolm Pirnie, 2008).

The former MGBR at NALF Fentress encompasses about 1 acre and lies southwest of runway 1-19, on the northern portion of the facility. The former MGBR is oriented northeast-southwest, with the former firing point at the northernmost end, as indicated on a 1955 archival map (**Figure 3**). The southwestern half of the site is overgrown with brush and trees, while the northeastern half is generally flat and consists of maintained grass along the border of an active aircraft runway. The site was initially used as a maintenance and testing range for aircraft-mounted machine guns, but was later converted to a pistol range, as shown on a 1974 archival map (Malcolm Pirnie, 2008). A concrete backstop is still in place on the southwestern portion and is showing signs of deterioration. Although there are no water bodies on the site, shrub wetlands are located in portions of the site between the historical firing position and the soil berm. The range backstop and the northeastern half of the site, consisting of maintained grass, are not located in a wetland area. Based on the range boundaries and period of use, probable munitions used were likely limited to .50 and .30 caliber rounds for aircraft-mounted machineguns. Additionally, expended 7-mm, 9-mm, .38 and .30 caliber, and shotgun rounds were observed at the site during a site reconnaissance by Malcolm Pirnie in 2007 (Malcolm Pirnie, 2008) and by CH2M HILL in 2009; however, the additional rounds appeared to be from more-recent, recreational use.

5.2 Site Geology

The NAS Oceana and NALF Fentress MGBRs are located within the Atlantic Coastal Plain physiographic province, which is underlain with unconsolidated sediments generally of Quaternary ages. These surficial deposits include undivided sand, clay, gravel, and peat, which were deposited in marine, fluvial, aeolian, and lacustrine environments (Malcolm Pirnie, 2008).

5.3 Previous Investigations

A PA was conducted for the NAS Oceana and NALF Fentress MGBRs to identify possible munitions and explosives of concern and any sources of metals-related contamination at the sites. Consistent with expected results for a small-caliber munitions site, the PA did not identify any munitions and explosives of concern (MEC). However, the PA identified potential metals-related contamination from lead (projectiles), antimony (added to increase projectile hardness), arsenic (small amount present in lead during production), and copper, nickel and zinc (jacket alloy metals (Malcolm Pirnie, 2008).

An SI was conducted by CH2M HILL in 2010 to evaluate the potential presence or absence of elevated metals concentrations in surface and subsurface soil at each MGBR. A visual survey of the berm associated with the backstop of each MGBR was performed to confirm the findings of the PA and document visible evidence of past site use related to military munitions. The surveys included inspecting the ground surface for spent shell casings and other range-related debris that may serve as continuing sources of contamination at each site. Numerous .223 caliber small arms projectiles and jackets were found on the ground surface of the berm at each MGBR during the visual survey activities. In addition, .45-caliber cartridges, .30 caliber machine gun rounds, 9-mm pistol, and spent shotgun shells were found on the ground surface of the berm located at NALF Fentress.

Following the visual inspection, surface and subsurface soil samples were collected at eight locations on the berm at each MGBR. All samples were analyzed for lead, antimony, arsenic, copper, nickel, and zinc. At the NAS Oceana MGBR, antimony, copper, lead, and zinc were identified as COPCs exceeding either human health risk screening criteria or the ecological screening values. At the NALF Fentress MGBR, copper, lead, and zinc were identified as COPCs exceeding either human health risk screening criteria or the ecological screening values (CH2M HILL, 2012).

5.4 Distribution of Contaminants

During the 2010 SI, select metals were detected in surface and subsurface soil samples at concentrations exceeding human health and ecological screening levels. The results of the risk screening conducted during the SI indicated that select metals in soil may pose an unacceptable risk to human and ecological receptors. Antimony, copper, lead, and zinc have been identified as COPCs at the NAS Oceana MGBR, and copper, lead, and zinc have been identified as COPCs at the NALF Fentress MGBR. The 2010 SI samples were collected from 0-1 ft bgs and 1-2 ft bgs intervals within the soil berms. Select metals were detected in all of the surface and subsurface soil sample locations at concentrations exceeding human health or ecological screening criteria. The SI exceedances for the NAS Oceana and NALF Fentress MGBRs are provided in **Figure 4** and **Figure 5**, respectively. The horizontal and vertical extents of the metals concentrations exceeding screening levels have not yet been determined. Additionally, background concentrations of the identified COPCs are not known at NAS Oceana and NALF Fentress. The purpose of the ESI sampling effort is to better define the extent of contamination exceeding human health and ecological screening levels and also to evaluate background metals concentrations present at these sites to develop cleanup levels.

5.5 Potential Migration Pathways

The principal contaminant release and transport mechanisms from source areas include:

- Weathering and breakdown of metals from small arms ammunition present at the ground surface and imbedded within the soil berm to soil.

- Overland transport of contaminants via surface runoff or dust generation from the source areas (surface soil contaminated from site use) to downgradient surface soil and possibly to adjacent areas.

Due to the vegetated nature of these sites, surface runoff is expected to be restricted to area immediately surrounding the soil berm and concrete backstop. The CSM figures for the NAS Oceana and NALF Fentress MGBRs are provided in **Figure 6** and **Figure 7**, respectively.

5.6 Potential Exposure and Receptor Pathways

Access to the MGBRs is not restricted, and humans could be exposed to contaminated soil at the MGBRs. Current receptors could be exposed to surface soil. Potential current receptors include adult and adolescent trespassers and visitors exposed to surface soil through incidental ingestion, dermal contact, and inhalation of particulate emissions from surface soil.

The sites are not currently in use, nor is future use of the sites planned. Future receptors include visitors and trespassers, and, although unlikely, if the site is re-developed for future uses, future residents, industrial workers, and construction workers. Future receptors could be exposed to the surface and subsurface soil if future development activities occur at the site (for example, future construction of residential housing or industrial buildings) or if utility or excavation work results in exposing subsurface soil.

Based on the habitats and biota present at the MGBRs, complete exposure pathways exist to lower trophic level terrestrial receptors (plants and soil invertebrates) at each site. Due to the small size of the area at each MGBR that contains spent ammunition (the backstop [source] area, about 25 feet by 100 feet), exposures to upper trophic level receptors (birds and mammals) are not considered significant for lower-trophic-level receptors (terrestrial plants and invertebrates), these exposure routes primarily consist of direct exposure to contaminated surface soil. For terrestrial plants, additional exposure can occur through roots during water and nutrient uptake.

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6 Data Quality Objectives/Systematic Planning Process Statements

(UFP-QAPP Manual Section 2.6.1 – Worksheet #11)

6.1 Project Statement and Objectives

The NALF Fentress and NAS Oceana MGBRs were used as small arms firing ranges in the 1940s and 1950s. The presence of metals in surface and subsurface soil in the area of the backstop at each MGBR was confirmed based on the analytical data associated with the surface and subsurface soil samples collected during the June 2010 SI activities. It was also confirmed that metals exist at concentrations that present unacceptable human health and/or ecological risks.

The confirmed presence of hazardous substances associated with previous site use is regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Therefore, an Expanded SI is warranted to further delineate the lateral and vertical extent of the elevated concentrations of COPCs at each MGBR and to establish site background concentrations to support the establishment of appropriate cleanup goals. These data will be used during development of an EE/CA to determine the quantity of soils exceeding the project screening levels and background concentrations at each site.

List the project quality objectives (PQOs) in the form of if/then qualitative and quantitative statements.

The results of the Oceana and Fentress background data sets will be evaluated graphically to determine if the two data sets are comparable. If results of the two background data sets are comparable, as expected[1], site sample concentrations will be compared to background UTLs to determine which areas should be included in any future removal actions.

If the two background data sets are not comparable, then background maximum values from each data set will be used in place of UTLs.

If a soil sample concentration exceeds human health and/or ecological screening values and site-specific background data, that sample location will be considered for inclusion in the removal action to be proposed in the EE/CA. Decisions regarding which areas should be included will be agreed to by the Navy and DEQ, and will consider background and screening value exceedances as well as other applicable lines of evidence.

If soil sample concentrations do not exceed screening values and site-specific background data, then these sample areas will not be addressed as part of the EE/CA.

If the Partnering Team determines that the lateral and vertical extent of soils exceeding human health and/or ecological screening values has been sufficiently delineated by the Expanded SI effort, then no additional sampling will be proposed and the EE/CA will be prepared based on the findings of the Expanded SI.

If the Partnering Team determines that the lateral and vertical extent of soils exceeding human health and/or ecological screening values has not been sufficiently delineated, then additional sampling locations will be proposed and samples will be collected prior to preparation of the EE/CA.

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[1] Background soil sample locations from both NAS Oceana and NALF Fentress are located in the Acredale silt loam soil type. Therefore, it is likely that analytical results from both sets of background samples will be appropriate to combine in order to calculate background upper tolerance limits (UTLs). The total sample set of ten samples is appropriate for statistical calculations.

6.2 Project Action Levels

The project action levels are based on the more conservative of the human health and ecologically based criteria summarized as follows:

- **Human Health** - The concentrations of COPCs identified in soil at each MGBR will be compared to human health screening values. The human health screening values for antimony and copper are based on a hazard quotient of 1, while the screening value for lead is based on the RSL.
- **Ecological Risk** - For lower-trophic-level receptors, concentrations of constituents detected in surface soil will be compared to EPA Ecological Soil Screening Levels (Eco-SSLs) for plants and invertebrates, where available, and surface soil screening values from the available literature for constituents without Eco-SSLs.
- Soil data also will be screened against the background data collected during this investigation to help distinguish site-related contaminants from background constituent concentrations. Further, the determination of presence of contamination (versus background) will take into consideration professional judgment evaluations such as nature of the constituents versus those likely released, presence of other constituents in the dataset, and magnitude and frequency of exceedances. All background samples will be analyzed for antimony, copper, lead, and zinc.

6.3 Systematic Planning Process Statements

6.3.1 Who will use the data?

CH2M HILL, in conjunction with the Team (Navy and VDEQ), will use the data collected during the Expanded SI.

6.3.2 How will the data be used?

The data will be used to establish background concentrations and to define the lateral and vertical extent of COPC concentrations that exceed human health and/or ecological risk screening criteria and background, which will be used during development of an EE/CA to establish removal action areas.

6.3.3 What types of data are needed (matrix, target analytes, analytical groups, field screening, onsite analytical or offsite laboratory techniques, or sampling techniques)?

This UFP-SAP provides details for collection and analysis of soil samples at the NALF Fentress and NAS Oceana MGBRs.

Soil samples will be collected and analyzed as described in Section 9.1.2.

Surface and subsurface soil samples will be collected at the NAS Oceana and NALF Fentress MGBRs at the locations shown on **Figures 8 and 9**, respectively.

6.3.4 How "good" must the data be to support the environmental decision?

- The data quality must be adequate to evaluate potential risks (ecological and human health) and support risk-reducing remedial actions that may occur in the future. Ensuring data are adequate for this purpose will be accomplished by employing appropriate sampling methods, sample handling and shipping procedures, analytical protocols, identifying project screening levels, validating the resulting data, including QA/quality control (QC) samples to assess proper sampling and analysis protocol, and performing a data quality evaluation (DQE) on the availability and usability of the data for the intended purpose. Each of these is further discussed as follows.
- **Data Validation** – Validation of data increases the level of confidence in a data set for a particular data use. The particular type and level of validation necessary to achieve acceptable confidence is subjective, and the appropriate type and level of data validation is not an absolute. Rather, the level of validation is specific to the data use and data user. For this Expanded SI data set, analyses for potential contaminants will be validated by

CH2M HILL using guidance from the validation criteria outlined by EPA. The validation criteria and guidance documents are listed in the Data Verification and Validation (Steps I and IIa/IIb) Process Table in Section 13. These documents will help the validator create a thorough and systematic approach to the validation process. The data validator will also recalculate 10 percent of the results from the raw laboratory data, which may identify laboratory errors in identification or quantification, if present.

- **QA/QC Samples** – During the Expanded SI, QA/QC samples will be collected in the field along with the various soil samples as a check on sampling and analytical protocol. Like data validation, the appropriate type and quantity of QA/QC samples is not an absolute. For this Expanded SI, field duplicates will be collected at a frequency of 1 per 10 field samples. Field duplicates help assess sample collection techniques and laboratory precision. Matrix spikes (MSs)/matrix spike duplicates (MSDs) will be collected at a frequency of 1 pair per 20 field samples. The frequency is such that there is one MS/MSD pair per laboratory analytical batch. MS/MSD samples are often required by the analytical method and/or data validation guidance. Equipment blanks are collected at a frequency of one per day per type of decontaminated equipment. Equipment blanks help assess equipment decontamination techniques and identify when contamination may have been carried over from one sample location to another. It is important to maintain this equipment blank frequency in order to avoid associating too many sample locations with a potentially contaminated equipment blank.
- **DQE** – All data sets will undergo a DQE before the data are used to make site-specific evaluations.

6.3.5 How much data should be collected (number of samples for each analytical group, environmental media)?

Detailed information on matrices to be sampled, number of samples to collect, and analyses for each sample are provided in Section 8. The quantities and types of QA/QC samples are detailed in Section 12. General information is presented as follows:

<u>NAS Oceana</u>

In order to evaluate site conditions and delineate the extent of contamination, surface and subsurface soil samples will be collected from the 32 locations shown on **Figure 8** which are within the NAS Oceana MGBR boundary. Subsurface soil samples will be collected from 2-3 ft bgs and 3-4 ft bgs at 8 locations on the existing berm (blue sampling locations shown on **Figure 8**). The subsurface samples collected on the existing berm will be collected at deeper intervals at the 2010 SI locations which were collected at 0-1 ft bgs and 1-2 ft bgs. In addition, co-located surface (0-1 ft bgs) and subsurface (1-2 ft bgs) soil samples will be collected from approximately 24 locations adjacent to the toe of the existing berm (red locations shown on **Figure 8**). The sample locations adjacent to the toe of the berm were selected based on the area that may have been directly impacted by machine gun fire during boresight range operations, as not all rounds would have been fired into the soil berm. Although the scoping session presented in Worksheet 4 indicated that the 1-2 ft interval samples would be held pending analysis of the surface soil sample, during further discussion with the Navy the decision was made to analyze all samples after collection without holding to gather additional site data.

In order to evaluate site-specific background locations for the MGBR at NAS Oceana, surface and subsurface soil background samples will be co-located at five sample locations, as shown on **Figure 8**. Five background samples for surface and subsurface soils are believed to be adequate to characterize the naturally variable metals concentrations in site soils. Surface soil samples will be collected at 0-1 ft bgs, and subsurface soil samples will be collected at 1-2 ft bgs. These background sample depth intervals correspond with the other samples collected at the site.

<u>NALF Fentress</u>

In order to evaluate site conditions and delineate the extent of contamination within surface and subsurface soil samples will be collected from the 30 locations shown on **Figure 9** which are within the NALF Fentress MGBR boundary. Subsurface soil samples will be collected from 2-3 ft bgs and 3-4 ft bgs at 8 locations on the existing berm (blue sampling locations shown on **Figure 9**). The subsurface samples collected on the existing berm will be collected at deeper intervals at the 2010 SI locations which were collected at 0-1 ft bgs and 1-2 ft bgs. In addition, co-located surface (0-1 ft bgs) and subsurface (1-2 ft bgs) soil samples will be collected from approximately 22 locations adjacent to the toe of the existing berm (red locations shown on **Figure 9**). The sample locations adjacent to the toe of the berm were selected based on the area that may have been directly impacted by machine gun fire during boresight range operations, as not all rounds would have been fired into the soil berm. Although the scoping session presented in Worksheet 4 indicated that the 1-2 ft interval samples would be held pending analysis of the surface soil sample, during further discussion with the Navy the decision was made to analyze all samples after collection without holding to gather additional site data.

In order to evaluate site-specific background conditions for the MGBR at NALF Fentress, surface and subsurface soil background samples will be co-located at five sample locations, as shown on **Figure 9**. Five background samples for surface and subsurface soils are believed to be adequate to characterize the naturally variable metals concentrations in site soils. Surface soil samples will be collected at 0-1 ft bgs, and subsurface soil samples will be collected at 1-2 ft bgs. These background sample depth intervals correspond with the other samples collected at the site.

Section 10 presents the constituents to be analyzed for and the associated reference limits for the NAS Oceana and NALF Fentress MGBRs.

6.3.6 Where, when, and how should the data be collected or generated?

- Sampling will be performed during the NALF Fentress and NAS Oceana MGBRs Expanded SI field sampling event, tentatively scheduled for October 2013.
- All sampling will be performed in general accordance with procedures described in the SOPs listed in the Field SOPs Reference Table (Section 9.2) and included in **Appendix B**.

6.3.7 Who will collect and generate the data? How will the data be reported?

- A CH2M HILL field team will collect the soil samples.
- Samples will be shipped for analysis via overnight courier to an offsite Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP)-approved laboratory under subcontract to CH2M HILL.
- All analytical data will be submitted to, reviewed by, and validated by CH2M HILL.
- Field data such as field observations will also be generated during the sampling event and recorded in a field notebook.
- All analytical data will be documented in the NAS Oceana and NALF Fentress MGBRs Expanded SI Technical Memorandum to be prepared and submitted to the Navy as a preliminary draft for review before distribution to VDEQ for regulatory review and approval. The final approved report will be placed in the Administrative Record and will be publicly available.

6.3.8 How will the data be archived?

Data will be archived according to procedures dictated via the program contract. Data will be uploaded to the Naval Installation Restoration Information Solution (NIRIS) system for use and archiving by the Navy. At the end of the project, paper copies of archived laboratory data and validation reports will be returned to the Navy.

7 Field Quality Control Samples

(UFP-QAPP Manual Section 2.6.2 – Worksheet #12)

7.1 Measurement Performance Criteria Table – Field QC Samples

TABLE 1

Matrix: Surface and Subsurface Soil

Analytical Group: Metals

QC Sample	Analytical Group	Frequency	DQIs	Measurement Performance Criteria
Field Duplicate	Select Metals	1 per 10 field samples	Precision	RPD ≤ 35%
Equipment Blank		1 per day of sampling	Bias/Contamination	Target analytes ≤ 1/2 LOQ
Cooler Temperature Indicator		1 per cooler to the laboratory	Representativeness	Temperature ≤ 6 °C

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8 Sampling Design and Rationale

(UFP-QAPP Manual Section 3.1.1 - Worksheet #17)

The Oceana Partnering Team met to scope the investigation outlined in Section 4. During this meeting, the Team discussed and agreed to the sampling rationale for the Oceana and Fentress MGBRs. **Figures 8 and 9** present the proposed soil sampling locations to delineate the extent of site contaminants and to determine background concentrations at each site. Exact sample locations will ultimately be field-determined based on accessibility of each sample location during the field effort, but will be in proximity to the proposed sample locations.

The data will be used to evaluate the lateral and vertical extent of COPC concentrations in surface and subsurface soil at each MGBR for preparation of an EE/CA and to develop a proposed path forward if further characterization of the contamination extent is determined to be necessary. The detailed rationale for the soil sampling to be performed at the Oceana and Fentress MGBRs are described in the following table.

Field QC samples will be collected as described in Section 7.

Analytical methods to be employed by the laboratory for each analyte and their respective project screening levels are listed in Section 10.

Section 9 provides a detailed outline of the field methods to be utilized during the ESI.

Matrix	Depth of Samples	Analysis	Method	Approximate Number of Samples	Rationale	Sampling Strategy
NALF Oceana MGBR Surface Soil	Surface to 12 inches	Select metals-antimony, lead, copper, and zinc only)	SW-846 6020	29 (24 locations adjacent to the toe of the berm and 5 background locations)	Samples will be collected to delineate the lateral and vertical extent of metals contamination associated with small arms ammunition use within the boundary of the site. Based on historical information, small arms ammunition debris is present at the site and previous sampling results indicate that the metals concentrations in surface soil of the backstop pose potential unacceptable human health and ecological risks. The surface soil samples adjacent to the toe of the berm were selected based on the area that may have also been directly impacted by machine gun fire during boresight range operations. The background sample locations were selected to evaluate COPC concentrations in site soils that have not been impacted by site-related contamination in order to establish reasonable clean up goals. Background sample locations were selected from an upgradient area in close proximity to the site that has not been previously developed and would not have been impacted by historical MGBR activities. These upgradient background samples are of the same soil type as observed at the site.	Surface soil samples will be collected using a trowel or shovel and will be inspected for debris; any debris will be removed and noted. Samples will be collected from the locations shown on **Figure 8**. If the lateral and vertical extent of the soil impacts has not be sufficiently delineated, additional sample locations may be proposed for analysis in locations where additional delineation is needed.

Matrix	Depth of Samples	Analysis	Method	Approximate Number of Samples	Rationale	Sampling Strategy
NALF Oceana MGBR Subsurface Soil	2-3 and 3-4 ft bgs at locations in the berm. 1-2 ft bgs at locations adjacent to the front toe of the berm and at background locations.	Select metals (antimony, lead, copper, and zinc only)	SW-846 6020	45 (8 locations with two sampling depths on the berm, 24 locations adjacent to the toe of the berm, and 5 background locations)	Samples will be collected to delineate the lateral and vertical extent of metals contamination associated with small arms ammunition use within the boundary of the site. Based on historical information, small arms ammunition debris is present at the site and previous sampling results indicate that the metals concentrations in subsurface soil of the backstop pose potential unacceptable human health and ecological risks. The subsurface soil samples on the berm will be collected at deeper intervals at the 2010 SI sample locations. The subsurface soil samples adjacent to the toe of the berm were selected based on the area that may have also been directly impacted by machine gun fire during boresight range operations. The background sample locations were selected to evaluate COPC concentrations in site soils that have not been impacted by site-related contamination in order to establish reasonable clean up goals. Background sample locations were selected from an upgradient area in close proximity to the site that has not been previously developed and would not have been impacted by historical MGBR activities. These upgradient background samples are of the same soil type as observed at the site.	Subsurface soil samples will be collected using a stainless steel hand auger and will be inspected for debris; any debris will be removed and noted. Samples will be collected from the locations shown on **Figure 8**. If the lateral and vertical extent of the soil impacts has not be sufficiently delineated, additional sample locations may be proposed for analysis in locations where additional delineation is needed.

<table>
<tr><th>Matrix</th><th>Depth of Samples</th><th>Analysis</th><th>Method</th><th>Approximate Number of Samples</th><th>Rationale</th><th>Sampling Strategy</th></tr>
<tr><td>NALF Fentress MGBR Surface Soil</td><td>Surface to 12 inches</td><td>Select metals (lead, copper, and zinc only)</td><td>SW-846 6020</td><td>22 locations adjacent to the toe of the berm</td><td>Samples will be collected to delineate the lateral and vertical extent of metals contamination associated with small arms ammunition use within the boundary of the site.
Based on historical information, small arms ammunition debris is present at the site and previous sampling results indicate that the metals concentrations in surface soil of the backstop pose potential unacceptable human health and ecological risks.
The surface soil samples adjacent to the toe of the berm were selected based on the area that may have also been directly impacted by machine gun fire during boresight range operations.</td><td rowspan="2">Surface soil samples will be collected using a trowel or shovel and will be inspected for debris; any debris will be removed and noted.
Samples will be collected from the locations shown on Figure 9.
If the lateral and vertical extent of the soil impacts has not be sufficiently delineated, additional sample locations may be proposed for analysis in locations where additional delineation is needed.</td></tr>
<tr><td>NALF Fentress MGBR Surface Soil</td><td>Surface to 12 inches</td><td>Select metals (antimony, lead, copper, and zinc only)</td><td>SW-846 6020</td><td>5 background locations</td><td>The background sample locations were selected to evaluate COPC concentrations in site soils that have not been impacted by site-related contamination in order to establish reasonable clean up goals. Background sample locations were selected from an upgradient area in close proximity to the site that has not been previously developed and would not have been impacted by historical MGBR activities. These upgradient background samples are of the same soil type as observed at the site.</td></tr>
</table>

Matrix	Depth of Samples	Analysis	Method	Approximate Number of Samples	Rationale	Sampling Strategy
NALF Fentress MGBR Subsurface Soil	2-3 and 3-4 ft bgs at locations in the berm. 1-2 ft bgs at locations adjacent to the front toe of the berm.	Select metals (lead, copper, and zinc only)	SW-846 6020	38 (8 locations with two sampling depths on the berm 22 locations adjacent to the toe of the berm)	Samples will be collected to delineate the lateral and vertical extent of metals contamination associated with small arms ammunition use within the boundary of the site. Based on historical information, small arms ammunition debris is present at the site and previous sampling results indicate that the metals concentrations in subsurface soil of the backstop pose potential unacceptable human health and ecological risks. The subsurface soil samples on the berm will be collected at deeper intervals at the 2010 SI sample locations. The subsurface soil samples adjacent to the toe of the berm were selected based on the area that may have also been directly impacted by machine gun fire during boresight range operations.	Subsurface soil samples will be collected using a stainless steel hand auger and will be inspected for debris; any debris will be removed and noted. Samples will be collected from the locations shown on **Figure 9**. If the lateral and vertical extent of the soil impacts has not be sufficiently delineated, additional sample locations may be proposed for analysis in locations where additional delineation is needed.
NALF Fentress MGBR Subsurface Soil	1-2 ft bgs at background locations.	Select metals (antimony, lead, copper, and zinc only)	SW-846 6020	5 background locations	The background sample locations were selected to evaluate COPC concentrations in site soils that have not been impacted by site-related contamination in order to establish reasonable clean up goals. Background sample locations were selected from an upgradient area in close proximity to the site that has not been previously developed and would not have been impacted by historical MGBR activities. These upgradient background samples are of the same soil type as observed at the site.	Subsurface soil samples will be collected using a stainless steel hand auger and will be inspected for debris; any debris will be removed and noted. Samples will be collected from the locations shown on **Figure 9**. If the lateral and vertical extent of the soil impacts has not be sufficiently delineated, additional sample locations may be proposed for analysis in locations where additional delineation is needed.

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9 Field Project Implementation

(Field Project Instructions)

9.1 Field Project Tasks

Pre-Sampling Tasks

- Before fieldwork begins, the FTL, SSC, and other field team members will be identified to complete the field sampling event at the NALF Fentress and NAS Oceana MGBRs. All field team members will review this UFP-SAP and the project-specific HASP.

9.1.1 Sampling Tasks

- Applicable SOPS for project tasks outlined in this section are listed on the Field SOPs Reference Table (Section 9.2) and included in **Appendix B**.

Mobilization

Following approval of this UFP-SAP, CH2M HILL will begin mobilization activities. A field team kickoff meeting will be held to ensure that personnel are familiar with the scope of field activities and safety issues. Mobilization activities will include coordination with Base personnel and the preparation of field equipment.

Sample Collection

In general, work will be performed in Level D personal protective equipment (PPE), which includes safety glasses, safety-toed boots, and impermeable gloves. Upgrades to higher levels of PPE will be presented in the HASP that will be prepared as a part of mobilization efforts.

Surface soil samples will be collected using a trowel, shovel, or corer and subsurface soil samples will be collected using a stainless steel hand auger. The surface and subsurface soil sampling locations at NALF Fentress and NAS Oceana MGBRs are shown on **Figures 8 and 9**, respectively. All surface and subsurface soil sampling will be performed in accordance with the SOPs. Surface soil samples will be collected from 0 to 12 inches. Subsurface soil samples will be collected from 2-3 ft bgs and 3-4 ft bgs at locations at the previous SI sampling locations on the soil berm and from 1-2 ft bgs at locations adjacent to the toe of the backstop at each MGBR. All samples will be inspected for debris prior to filling the sampling containers. All samples will be collected and analyzed as outlined in Section 9.3. All relevant site-specific observations, onsite conditions, and sampling activities will be recorded in the field logbook, as described in the SOPs. All samples will be collected in laboratory-prepared sampling containers, packed on ice, and shipped overnight to an offsite laboratory every evening. The field team will relinquish custody of the samples prior to shipping using the EMAX Chain of Custody, see Appendix C. All soil sample locations will be surveyed using a global positioning system (GPS) unit.

Equipment Decontamination

All non-disposable sampling equipment will be decontaminated before use and immediately after each use as described in the SOPs. Equipment will be decontaminated with alternating rinses of deionized water, phosphate-free laboratory detergent, and methanol, and allowed to dry between each use. Disposable equipment will be disposed of immediately following use.

9.2 Field SOPs Reference Table

(UFP-QAPP Manual Section 3.1.2 – Worksheet #21)

TABLE 2
Field SOPs Reference Table

Reference Number	Title, Revision Date and/or Number	Originating Organization of SOP	Equipment Type	Modified for Project Work?	Comments
SOP B.01	Equipment Blank and Field Blank Preparation, reviewed 5/2013	CH2M HILL	Sample bottles, gloves, blank liquid, preservatives	No	Included in Appendix B
SOP B.02	Chain-of-Custody, reviewed 5/2013	CH2M HILL	Chain-of-custody	No	Included in Appendix B
SOP B.03	Decontamination of Personnel and Equipment, reviewed and revised 5/2013	CH2M HILL	Deionized water, distilled water, potable water, Liquinox, plastic pails or tubs, 55-gallon drum, gloves, decon pad	No	Included in Appendix B
SOP B.04	Preparing Field Log Books, reviewed 5/2013	CH2M HILL	Logbook, indelible pen	No	Included in Appendix B
SOP B.05	Shallow Soil Sampling, reviewed and revised 5/2013	CH2M HILL	Stainless steel trowel, shovel, scoop; stainless steel pan or bowl, sample containers	No	Included in Appendix B
SOP B.06	Soil Sampling, reviewed and revised 5/2013	CH2M HILL	Stainless steel hand auger	No	Included in Appendix B

9.3 Field Project Implementation

TABLE 3
Sample Details Table

(UFP-QAPP Manual Sections 3.1.1 and 3.5.2.3 – Worksheets #18, 19, 20 and 30)

Soil samples collected as part of this ESI will be analyzed as outlined in the following table.

CTO-WE03 Oceana and Fentress Machine Gun Boresight Ranges Fall 2013 EMAX 1835 W. 205th St. Torrance, CA 90501 Molly Nguyen 310-618-8889 NAS Oceana MGBR Analytes (Antimony, Copper, Lead, and Zinc) NALF Fentress MGBR Analytes (Copper, Lead, and Zinc)					**Analysis Group**	**Select Metals (Aqueous Blanks)**	**Select Metals (Soil)**
					Preparation and Analytical Method	SW-846 6020A	SW-846 3050B/6020A
					Analytical Laboratory/ Analytical SOP Reference[2]	EMAX/EMAX-6020	EMAX/EMAX-6020
					Data Package Turnaround Time	28 calendar days	
					Container Type/ Volume required (if different than container volume)	250mL plastic / 50mL	4 oz. glass jar / 2g
					Preservative	HNO3	None
					Holding Time[3] (Preparation/ Analysis)	180 days	180 days
Site	**Matrix**	**Station ID**	**Sample ID**	**Info**	**Depth/ Sampling Interval**		
NAS Oceana MGBR	Surface Soil	OCMGBR-SO09	OCMGBR-SS09-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO10	OCMGBR-SS10-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO11	OCMGBR-SS11-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO12	OCMGBR-SS12-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO13	OCMGBR-SS13-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO14	OCMGBR-SS14-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO15	OCMGBR-SS15-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO16	OCMGBR-SS16-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO17	OCMGBR-SS17-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO18	OCMGBR-SS18-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO19	OCMGBR-SS19-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO20	OCMGBR-SS20-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO21	OCMGBR-SS21-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO22	OCMGBR-SS22-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO23	OCMGBR-SS23-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO24	OCMGBR-SS24-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO25	OCMGBR-SS25-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO26	OCMGBR-SS26-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO27	OCMGBR-SS27-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO28	OCMGBR-SS28-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO29	OCMGBR-SS29-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO30	OCMGBR-SS30-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO31	OCMGBR-SS31-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO32	OCMGBR-SS32-0001-MMYY	Toe of Berm	0-1'		X
		OCMGBR-SO33	OCMGBR-SS33-0001-MMYY	Background Location	0-1'		X
		OCMGBR-SO34	OCMGBR-SS34-0001-MMYY	Background Location	0-1'		X
		OCMGBR-SO35	OCMGBR-SS35-0001-MMYY	Background Location	0-1'		X
		OCMGBR-SO36	OCMGBR-SS36-0001-MMYY	Background Location	0-1'		X
		OCMGBR-SO37	OCMGBR-SS37-0001-MMYY	Background Location	0-1'		X

CTO-WE03 Oceana and Fentress Machine Gun Boresight Ranges
Fall 2013

EMAX
1835 W. 205th St.
Torrance, CA 90501
Molly Nguyen
310-618-8889

NAS Oceana MGBR Analytes (Antimony, Copper, Lead, and Zinc)
NALF Fentress MGBR Analytes (Copper, Lead, and Zinc) with the exception of the Fentress Background Samples (Antimony, Copper, Lead, and Zinc)

Analysis Group	**Select Metals (Aqueous Blanks)**	**Select Metals (Soil)**
Preparation and Analytical Method	SW-846 6020A	SW-846 3050B/ 6020A
Analytical Laboratory/ Analytical SOP Reference[2]	EMAX/EMAX-6020	EMAX/EMAX-6020
Data Package Turnaround Time	28 calendar days	
Container Type/ Volume required (if different than container volume)	250mL plastic / 50mL	4 oz. glass jar / 2g
Preservative	HNO3	None
Holding Time[3] (Preparation/ Analysis)	180 days	180 days

Site	**Matrix**	**Station ID**	**Sample ID**	**Info**	**Depth/ Sampling Interval**		
NAS Oceana MGBR	Subsurface Soil	OCMGBR-SO01	OCMGBR-SB01-0203-MMYY	Berm	2-3'		X
		OCMGBR-SO01	OCMGBR-SB01-0304-MMYY	Berm	3-4'		X
		OCMGBR-SO02	OCMGBR-SB02-0203-MMYY	Berm	2-3'		X
		OCMGBR-SO02	OCMGBR-SB02-0304-MMYY	Berm	3-4'		X
		OCMGBR-SO03	OCMGBR-SB03-0203-MMYY	Berm	2-3'		X
		OCMGBR-SO03	OCMGBR-SB03-0304-MMYY	Berm	3-4'		X
		OCMGBR-SO04	OCMGBR-SB04-0203-MMYY	Berm	2-3'		X
		OCMGBR-SO04	OCMGBR-SB04-0304-MMYY	Berm	3-4'		X
		OCMGBR-SO05	OCMGBR-SB05-0203-MMYY	Berm	2-3'		X
		OCMGBR-SO05	OCMGBR-SB05-0304-MMYY	Berm	3-4'		X
		OCMGBR-SO06	OCMGBR-SB06-0203-MMYY	Berm	2-3'		X
		OCMGBR-SO06	OCMGBR-SB06-0304-MMYY	Berm	3-4'		X
		OCMGBR-SO07	OCMGBR-SB07-0203-MMYY	Berm	2-3'		X
		OCMGBR-SO07	OCMGBR-SB07-0304-MMYY	Berm	3-4'		X
		OCMGBR-SO08	OCMGBR-SB08-0203-MMYY	Berm	2-3'		X
		OCMGBR-SO08	OCMGBR-SB08-0304-MMYY	Berm	3-4'		X
		OCMGBR-SO09	OCMGBR-SB09-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO10	OCMGBR-SB10-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO11	OCMGBR-SB11-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO12	OCMGBR-SB12-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO13	OCMGBR-SB13-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO14	OCMGBR-SB14-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO15	OCMGBR-SB15-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO16	OCMGBR-SB16-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO17	OCMGBR-SB17-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO18	OCMGBR-SB18-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO19	OCMGBR-SB19-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO20	OCMGBR-SB20-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO21	OCMGBR-SB21-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO22	OCMGBR-SB22-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO23	OCMGBR-SB23-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO24	OCMGBR-SB24-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO25	OCMGBR-SB25-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO26	OCMGBR-SB26-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO27	OCMGBR-SB27-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO28	OCMGBR-SB28-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO29	OCMGBR-SB29-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO30	OCMGBR-SB30-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO31	OCMGBR-SB31-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO32	OCMGBR-SB32-0102-MMYY	Toe of Berm	1-2'		X
		OCMGBR-SO33	OCMGBR-SB33-0102-MMYY	Background Location	1-2'		X
		OCMGBR-SO34	OCMGBR-SB34-0102-MMYY	Background Location	1-2'		X
		OCMGBR-SO35	OCMGBR-SB35-0102-MMYY	Background Location	1-2'		X
		OCMGBR-SO36	OCMGBR-SB36-0102-MMYY	Background Location	1-2'		X
		OCMGBR-SO37	OCMGBR-SB37-0102-MMYY	Background Location	1-2'		X

CTO-WE03 Oceana and Fentress Machine Gun Boresight Ranges
Fall 2013

EMAX
1835 W. 205th St.
Torrance, CA 90501
Molly Nguyen
310-618-8889

NAS Oceana MGBR Analytes (Antimony, Copper, Lead, and Zinc)
NALF Fentress MGBR Analytes (Copper, Lead, and Zinc) with the exception of the Fentress Background Samples (Antimony, Copper, Lead, and Zinc)

					Analysis Group	**Select Metals (Aqueous Blanks)**	**Select Metals (Soil)**
					Preparation and Analytical Method	SW-846 6020A	SW-846 3050B/ 6020A
					Analytical Laboratory/ Analytical SOP Reference[2]	EMAX/ EMAX-6020	EMAX/ EMAX-6020
					Data Package Turnaround Time	28 calendar days	
					Container Type/ Volume required (if different than container volume)	250mL plastic / 50mL	4 oz. glass jar / 2g
					Preservative	HNO3	none
					Holding Time[3] (Preparation/ Analysis)	180 days	180 days
Site	**Matrix**	**Station ID**	**Sample ID**	**Info**	**Depth/ Sampling Interval**		
NALF Fentress MGBR	Surface Soil	OFMGBR-SO09	OFMGBR-SS09-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO10	OFMGBR-SS10-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO11	OFMGBR-SS11-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO12	OFMGBR-SS12-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO13	OFMGBR-SS13-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO14	OFMGBR-SS14-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO15	OFMGBR-SS15-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO16	OFMGBR-SS16-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO17	OFMGBR-SS17-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO18	OFMGBR-SS18-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO19	OFMGBR-SS19-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO20	OFMGBR-SS20-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO21	OFMGBR-SS21-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO22	OFMGBR-SS22-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO23	OFMGBR-SS23-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO24	OFMGBR-SS24-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO25	OFMGBR-SS25-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO26	OFMGBR-SS26-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO27	OFMGBR-SS27-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO28	OFMGBR-SS28-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO29	OFMGBR-SS29-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO30	OFMGBR-SS30-0001-MMYY	Toe of Berm	0-1'		X
		OFMGBR-SO31	OFMGBR-SS31-0001-MMYY	Background Location	0-1'		X
		OFMGBR-SO32	OFMGBR-SS32-0001-MMYY	Background Location	0-1'		X
		OFMGBR-SO33	OFMGBR-SS33-0001-MMYY	Background Location	0-1'		X
		OFMGBR-SO34	OFMGBR-SS34-0001-MMYY	Background Location	0-1'		X
		OFMGBR-SO35	OFMGBR-SS35-0001-MMYY	Background Location	0-1'		X

CTO-WE03 Oceana and Fentress Machine Gun Boresight Ranges **Fall 2013**					**Analysis Group**	**Select Metals (Aqueous Blanks)**	**Select Metals (Soil)**
					Preparation and Analytical Method	SW-846 6020A	SW-846 3050B/ 6020A
EMAX 1835 W. 205th St. Torrance, CA 90501 Molly Nguyen 310-618-8889					**Analytical Laboratory/ Analytical SOP Reference[2]**	EMAX/ EMAX-6020	EMAX/ EMAX-6020
					Data Package Turnaround Time	28 calendar days	
					Container Type/ Volume required (if different than container volume)	250mL plastic / 50mL	4 oz. glass jar / 2g
					Preservative	HNO3	none
NAS Oceana MGBR Analytes (Antimony, Copper, Lead, and Zinc) **NALF Fentress MGBR Analytes (Copper, Lead, and Zinc) with the exception of the Fentress Background Samples (Antimony, Copper, Lead, and Zinc)**					**Holding Time[3] (Preparation/ Analysis)**	180 days	180 days
Site	**Matrix**	**Station ID**	**Sample ID**	**Info**	**Depth/ Sampling Interval**		
		OFMGBR-SO01	OFMGBR-SB01-0203-MMYY	Berm	2-3'		X
		OFMGBR-SO01	OFMGBR-SB01-0304-MMYY	Berm	3-4'		X
		OFMGBR-SO02	OFMGBR-SB02-0203-MMYY	Berm	2-3'		X
		OFMGBR-SO02	OFMGBR-SB02-0304-MMYY	Berm	3-4'		X
		OFMGBR-SO03	OFMGBR-SB03-0203-MMYY	Berm	2-3'		X
		OFMGBR-SO03	OFMGBR-SB03-0304-MMYY	Berm	3-4'		X
		OFMGBR-SO04	OFMGBR-SB04-0203-MMYY	Berm	2-3'		X
		OFMGBR-SO04	OFMGBR-SB04-0304-MMYY	Berm	3-4'		X
		OFMGBR-SO05	OFMGBR-SB05-0203-MMYY	Berm	2-3'		X
		OFMGBR-SO05	OFMGBR-SB05-0304-MMYY	Berm	3-4'		X
		OFMGBR-SO06	OFMGBR-SB06-0203-MMYY	Berm	2-3'		X
		OFMGBR-SO06	OFMGBR-SB06-0304-MMYY	Berm	3-4'		X
		OFMGBR-SO07	OFMGBR-SB07-0203-MMYY	Berm	2-3'		X
		OFMGBR-SO07	OFMGBR-SB07-0304-MMYY	Berm	3-4'		X
		OFMGBR-SO08	OFMGBR-SB08-0203-MMYY	Berm	2-3'		X
		OFMGBR-SO08	OFMGBR-SB08-0304-MMYY	Berm	3-4'		X
		OFMGBR-SO09	OFMGBR-SB09-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO10	OFMGBR-SB10-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO11	OFMGBR-SB11-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO12	OFMGBR-SB12-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO13	OFMGBR-SB13-0102-MMYY	Toe of Berm	1-2'		X
NALF Fentress MGBR	Subsurface Soil	OFMGBR-SO14	OFMGBR-SB14-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO15	OFMGBR-SB15-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO16	OFMGBR-SB16-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO17	OFMGBR-SB17-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO18	OFMGBR-SB18-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO19	OFMGBR-SB19-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO20	OFMGBR-SB20-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO21	OFMGBR-SB21-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO22	OFMGBR-SB22-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO23	OFMGBR-SB23-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO24	OFMGBR-SB24-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO25	OFMGBR-SB25-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO26	OFMGBR-SB26-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO27	OFMGBR-SB27-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO28	OFMGBR-SB28-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO29	OFMGBR-SB29-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO30	OFMGBR-SB30-0102-MMYY	Toe of Berm	1-2'		X
		OFMGBR-SO31	OFMGBR-SB31-0102-MMYY	Background Location	1-2'		X
		OFMGBR-SO32	OFMGBR-SB32-0102-MMYY	Background Location	1-2'		X
		OFMGBR-SO33	OFMGBR-SB33-0102-MMYY	Background Location	1-2'		X
		OFMGBR-SO34	OFMGBR-SB34-0102-MMYY	Background Location	1-2'		X
		OFMGBR-SO35	OFMGBR-SB35-0102-MMYY	Background Location	1-2'		X

CTO-WE03 Oceana and Fentress Machine Gun Boresight Ranges
Summer 2013

EMAX
1835 W. 205th St.
Torrance, CA 90501
Molly Nguyen
310-618-8889

NAS Oceana MGBR Analytes (Antimony, Copper, Lead, and Zinc)
NALF Fentress MGBR Analytes (Copper, Lead, and Zinc) with the exception of the Fentress Background Samples (Antimony, Copper, Lead, and Zinc)

					Analysis Group	**Select Metals (Aqueous Blanks)**	**Select Metals (Soil)**
					Preparation and Analytical Method	SW-846 6020A	SW-846 3050B/ 6020A
					Analytical Laboratory/ Analytical SOP Reference[2]	EMAX/ EMAX-6020	EMAX/ EMAX-6020
					Data Package Turnaround Time	28 calendar days	
					Container Type/ Volume required (if different than container volume)	250mL plastic / 50mL	4 oz. glass jar / 2g
					Preservative	HNO3	none
					Holding Time[3] (Preparation/ Analysis)	180 days	180 days
Site	**Matrix**	**Station ID**	**Sample ID**	**Info**	**Depth/ Sampling Interval**		
Field QC Samples							
NAS Oceana MGBR	SS Field Duplicate	OCMGBR-SOXX	OCMGBR-SSXXP-TDBD-MMYY	1/10 samples	TBD		4
	SB Field Duplicate	OCMGBR-SOXX	OCMGBR-SBXXP-TDBD-MMYY	1/10 samples	TBD		4
	SS Matrix Spike (MS)	OCMGBR-SOXX	OCMGBR-SSXX-TDBD-MMYY	1/20 samples	TBD		2
	SS Matrix Spike Duplicate (MSD)	OCMGBR-SOXX	OCMGBR-SSXX-TDBD-MMYY	1/20 samples	TBD		2
	SB MS	OCMGBR-SOXX	OFMGBR-SBXX-TDBD-MMYY	1/20 samples	TBD		3
	SB MSD	OCMGBR-SOXX	OFMGBR-SBXX-TDBD-MMYY	1/20 samples	TBD		3
	Equipment Blank (EB)	NA	OCMGBR-EBMMDDYY	1/ day	NA	5	
NALF Fentress MGBR	SS Field Duplicate	OFMGBR-SOXX	OFMGBR-SSXXP--TDBD-MMYY	1/10 samples	TBD		3
	SB Field Duplicate	OFMGBR-SOXX	OFMGBR-SBXXP-TDBD-MMYY	1/20 samples	TBD		4
	SS MS	OFMGBR-SOXX	OFMGBR-SSXX--TDBD-MMYY	1/20 samples	TBD		2
	SS MSD	OFMGBR-SOXX	OFMGBR-SSXX--TDBD-MMYY	1/20 samples	TBD		2
	SB MS	OFMGBR-SOXX	OFMGBR-SBXX-TDBD-MMYY	1/20 samples	TBD		3
	SB MSD	OFMGBR-SOXX	OFMGBR-SBXX-TDBD-MMYY	1/20 samples	TBD		3
	Equipment Blank (EB)	NA	OFMGBR-EBMMDDYY	1/ day	NA	5	
					Total Number of Samples to the Laboratory	**10**	**179**

[1] Field QC counts may change depending upon duration of field event.

Frequency of QA/QC sample collection:

Field Duplicate- One per 10 field samples

MS/MSD- One pair per 20 field samples (including field QC samples)

Equipment Blank- One per day of sampling

[2] The field team will ship sample directly to the laboratory indicated in this row.

[3] Maximum holding time is calculated from the time the sample is collected to the time the sample is prepared/extracted.

TDBD = Top Depth, Bottom Depth (in feet)

MMYY - Month & Year of Sampling

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10 Reference Limits and Evaluation Tables

(UFP-QAPP Manual Section 2.8.1 – Worksheet # 15)

Matrix: Surface Soil, Subsurface Soil

Analytical Group: Select Metals

Site	Analyte	CAS No.	Recommended Human Health Screening Level (mg/kg)	Recommended Ecological Screening Level (SS only) (mg/kg)	Project QL Goal (mg/kg)	Laboratory Specific Limits			LCS and MS/MSD Recovery Limits		
						LOQ (mg/kg)	LOD (mg/kg)	DL (mg/kg)	LCL (%)	UCL (%)	RPD (%)
NAS Oceana MBGR, NALF Fentress MGBR	Antimony	7440-36-0	26	NC	8.67	0.5	0.2	0.1	80	120	20
NAS Oceana MGBR, NALF Fentress MGBR	Copper	7440-50-8	3,040	70	23.33	0.5	0.2	0.1	80	120	20
NAS Oceana MGBR, NALF Fentress MGBR	Lead	7439-92-1	400	120	40	0.5	0.1	0.05	80	120	20
NAS Oceana MGBR, NALF Fentress MGBR	Zinc	7440-66-6	NC	120	40	2	1.0	0.68	80	120	20

Refer to **Section 6.2** for a discussion on development of the human health and ecological project screening levels.

Project QL goals were established on a case-by-case basis and are at least 3 times less than the project screening levels and greater than the laboratory LOD.

Project screening levels and Project QL Goals assume dry weight basis.

NC = No Criteria (Human health and ecological screening levels are presented only for compounds identified as posing a risk to human health or ecological receptors.)

Recommended Human Health screening levels are human health screening values which have been calculated based on various literature and model-based values.

Recommended Ecological screening levels are the EPA Ecological Soil Screening Levels (Eco-SSLs) for plants and invertebrates, where available, and surface soil screening values from the available literature for chemicals without Eco-SSLs

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11 Analytical SOP References Table

Laboratory Name and Address: EMAX Laboratory, Inc., 1835 W. 205th St. Torrance, CA 90501

Point of Contact: Molly Nguyen

Phone Number: 310-618-8889 ext. 119

Lab SOP Number	Title, Revision Date, and Number	Date reviewed if not revised	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Variance to QSM	Modified for Project Work? (Y/N)
EMAX-6020	Trace Metals By ICP-Ms, Rev. 7	November 14, 2012	Definitive	Soil and Aqueous Blanks / Metals	ICP-MS	No	N
EMAX-MCD	Percent Moisture Determination, Rev. 3	December 28, 2012	NA	Soil/ Moisture Content	NA	NA	N
EMAX-SM01	Sample Management, Rev. 6	May 28, 2013	NA	NA	NA	NA	N
EMAX-SM02	Sample Receiving, Rev. 7	June 14, 2012	NA	NA	NA	NA	N
EMAX-SM03	Waste Disposal, Rev. 5	January 28, 2013	NA	NA	NA	NA	N

Required Laboratory Accreditation: DoD ELAP

Expiration Date: 01/10/2014

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12 Laboratory QC Samples Table

(UFP-QAPP Manual Section 3.4 – Worksheet #28)

Matrix: Surface Soil, Subsurface Soil

Analytical Group: Select Metals

Analytical Method/ SOP Reference: SW-846 6020 /EMAX-6020

QC Sample:	Frequency & Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Method Blank	One per preparatory batch	No analytes detected > ½ LOQ. Blank result must not otherwise affect sample results.	Determine cause of contamination and re-prep and reanalyze method blank and all samples processed with the non-conforming method blank.	Analyst/ Supervisor	Contamination/ Bias	Same as Method / SOP QC Acceptance Limits
Laboratory Control Sample (LCS)		See control limits in Section 10	Re-prep and reanalyze LCS and all samples processed with the non-conforming LCS.		Accuracy/ Bias	
MS/ MSD			If result is indicative of matrix interference, discuss in case narrative. Otherwise check for possible source of error, and extract / reanalyze the sample.		Accuracy/Bias/Precision	
Dilution Test		Five-fold dilution must agree within ± 10% of the original measurement	Perform post-digestion spike addition.		Accuracy/ Bias	
Post-digestion spike addition		Recovery within 75-125%	Run all associated samples in the preparatory batch by the method of standard additions.		Accuracy/Bias/Precision	
Method of Standard Additions	When matrix interference is confirmed	NA	NA		NA	
Internal Standards (IS)	All samples	IS intensity within 30-120% of intensity of the IS in the ICAL.	Reanalyze sample at 5-fold dilution with addition of appropriate amounts of IS.		Accuracy/ Bias	
Interference Check Solutions (ICS)	At the beginning of an analytical run and every 12 hours.	ICS-A: Absolute value of concentration for all non-spiked analytes < LOD (unless they are verified trace impurity from one of the spiked analytes); ICS-B: Within ± 20% of true value	Terminate analysis; locate and correct problem; reanalyze ICS, reanalyze all samples.		Accuracy/ Bias	

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13 Data Verification and Validation (Steps I and IIa/IIb) Process Table

(UFP-QAPP Manual Section 5.2.1, UFP-QAPP Manual Section 5.2.2, Figure 37 UFP-QAPP Manual, Table 9 UFP-QAPP Manual – Worksheets #34, 35, 36)

Data Review Input	Description[1]	Responsible for Verification/Validation	Internal / External[2]
Field Notebooks	Field notebooks will be reviewed internally and placed into the project file for archival at project closeout.	FTL (TBD)/CH2M HILL	Internal
Chain-of-Custody and Shipping Forms	Chain-of-custody forms and shipping documentation will be reviewed internally upon their completion and verified against the packed sample coolers they represent. The shipper's signature on the chain-of-custody will be initialed by the reviewer, a copy of the chain-of-custody retained in the site file, and the original and remaining copies taped inside the cooler for shipment.	FTL (TBD)/CH2M HILL Project Chemist: Megan Morrison/CH2M HILL	Internal / External
Sample Condition upon Receipt	Any discrepancies or missing or broken containers will be communicated to the chemist in the form of laboratory logins.	Project Chemist: Megan Morrison/CH2M HILL	External
Documentation of Laboratory Method Deviations	Laboratory Method Deviations will be discussed and approved by the project chemist. Documentation will be incorporated into the case narrative, which becomes part of the final hardcopy data package.	Project Chemist: Megan Morrison/CH2M HILL	Internal
Electronic Data Deliverables	Electronic Data Deliverables will be compared against hardcopy laboratory results (10 percent check).	Project Chemist: Megan Morrison/CH2M HILL	External
Case Narrative	Case narratives will be reviewed by the data validator during the data validation process. This is verification that they were generated and applicable to the data packages.	Data Validator: Herb Kelly/CH2M HILL	External
Laboratory Data	All laboratory data packages will be verified internally by the laboratory performing the work for completeness and technical accuracy prior to submittal.	EMAX	Internal
Laboratory Data	The data will be verified for completeness by the chemist. In order to ensure completeness, EDDs will be compared to the SAP and Sample Details Table. This is verification that all samples were included in the laboratory data and that correct analyte lists were included.	Project Chemist: Megan Morrison/CH2M HILL	External
Audit Reports	Upon report completion, a copy of all audit reports will be placed in the site file. If CAs are required, a copy of the documented CA taken will be attached to the appropriate audit report in the QA site file. Periodically, and at the completion of site work, site file audit reports and CA forms will be reviewed internally to ensure that all appropriate CAs have been taken and that CA reports are attached. If CAs have not been taken, the site manager will be notified to ensure action is taken.	PM: Steve Falatko/CH2M HILL Project Chemist: Megan Morrison/CH2M HILL	Internal / External

Data Review Input	Description[1]	Responsible for Verification/Validation	Internal / External[2]
CA Reports	CA reports will be reviewed by the project chemist or PM and placed into the project file for archival at project closeout.	PM: Steve Falatko/CH2M HILL Project Chemist: Megan Morrison/CH2M HILL	External
Laboratory Methods	Ensure the laboratory analyzed samples using the correct methods by comparing the EDDs to the SAP.	Project Chemist: Megan Morrison/CH2M HILL	External
Analyte lists	Ensure the laboratory reported all analytes per Section 10.	Project Chemist: Megan Morrison/CH2M HILL	External
Reporting Limits	Ensure the laboratory met the project-designated QLs as per Section 10. If QLs were not met, the reason will be determined and documented.	Project Chemist: Megan Morrison/CH2M HILL	External
Laboratory SOPs	Ensure that approved analytical laboratory SOPs were followed (Section 11).	Data Validator: Herb Kelly/CH2M HILL	External
Sample Chronology	Holding times from collection to extraction or analysis and from extraction to analysis will be considered by the data validator during the data validation process.	Data Validator: Herb Kelly/CH2M HILL	External
Raw Data	10 percent review of raw data to confirm laboratory calculations.	Data Validator: Herb Kelly/CH2M HILL	External
Onsite Screening	All non-analytical field data will be reviewed against SAP requirements for completeness and accuracy based on the field calibration records.	FTL (TBD)/CH2M HILL	Internal
Documentation of Method QC Results	Establish that all required QC samples were run and met limits.	Data Validator: Herb Kelly/CH2M HILL	External
Documentation of field QC Sample Results	Establish that all required QC samples were run and met limits.	Project Chemist: Megan Morrison/CH2M HILL Data Validator: Herb Kelly/CH2M HILL	External
Analytical Data Validation (Select Metals)	Analytical methods and laboratory SOPs, as presented in this UFP-SAP, will be used to evaluate compliance against QA/QC criteria. QA/QC criteria for field QC samples are presented in Section 9.3. LOQs, LODs, and DLs are presented in Section 10. QA/QC criteria for calibrations are presented in Lab SOPs (referenced in Section 11). QA/QC criteria for laboratory QC samples are presented in Section 12. Data may be qualified if QA/QC exceedances have occurred. Data qualifiers will be those presented in Region 3 Modifications to the National Functional Guidelines for Evaluating Inorganic Analyses (EPA, 1993). 100 percent of the data generated will undergo analytical data validation. Of the 100 percent validated, 10 percent of results will be re-calculated from the raw data to verify calculations.	Data Validator: Herb Kelly/CH2M HILL	External

[1] Should CH2M HILL find discrepancies during the verification or validation procedures above, an email documenting the issue will be circulated to the internal project team, and a Corrections to File Memo will be prepared identifying the issues and the corrective action needed. This Memo will be sent to the laboratory, or applicable party, and maintained in the project file

[2] Internal/External are with respect to the data generator.

14 References

CH2M HILL. 2012. *Final Revised Site Inspection Report, Former Small Arms Firing Ranges, Naval Air Station Oceana, Fleet Combat Training Center Dam Neck Annex, and Naval Auxiliary Landing Field Fentress, Virginia Beach, Virginia.* January

Geo-Marine. 2001. *Integrated Natural Resources Management Plan, Naval Air Station Oceana and Naval Auxiliary Landing Field Fentress*. November.

Geo-Marine, Inc. 2006. *Integrated Natural Resources Management Plan (Final), Naval Air Station Oceana, Dam Neck Annex and Naval Air Station Oceana, South Virginia Beach Annex (Camp Pendleton).* November.

Malcolm Pirnie. 2008. *Final Preliminary Assessment*, Naval Air Station Oceana, Virginia. October.

United States Environmental Protection Agency. 1993. *Region III Modifications to the Laboratory Data Validation Function Guidelines for Evaluating Inorganics Analyses*. April.

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Figures

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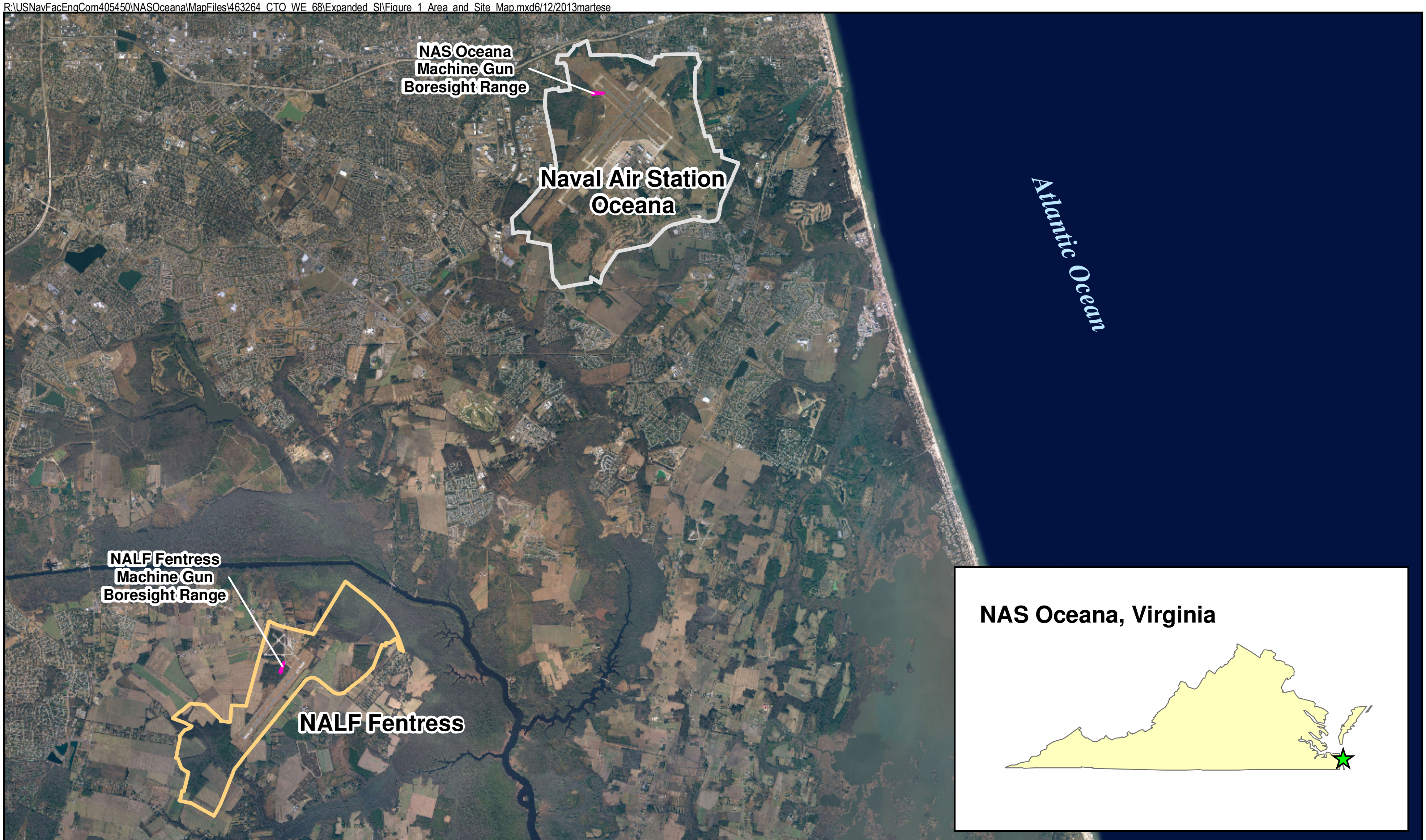

Legend

- NAS Oceana Boundary
- NALF Fentress Boundary
- MRP Sites

N W E S

0 1.1 2.2 Miles

Figure 1
Area and Site Location Map
Machine Gun Boresight Range Expanded SI
NAS Oceana and NALF Fentress
Virginia Beach, Virginia

CH2MHILL

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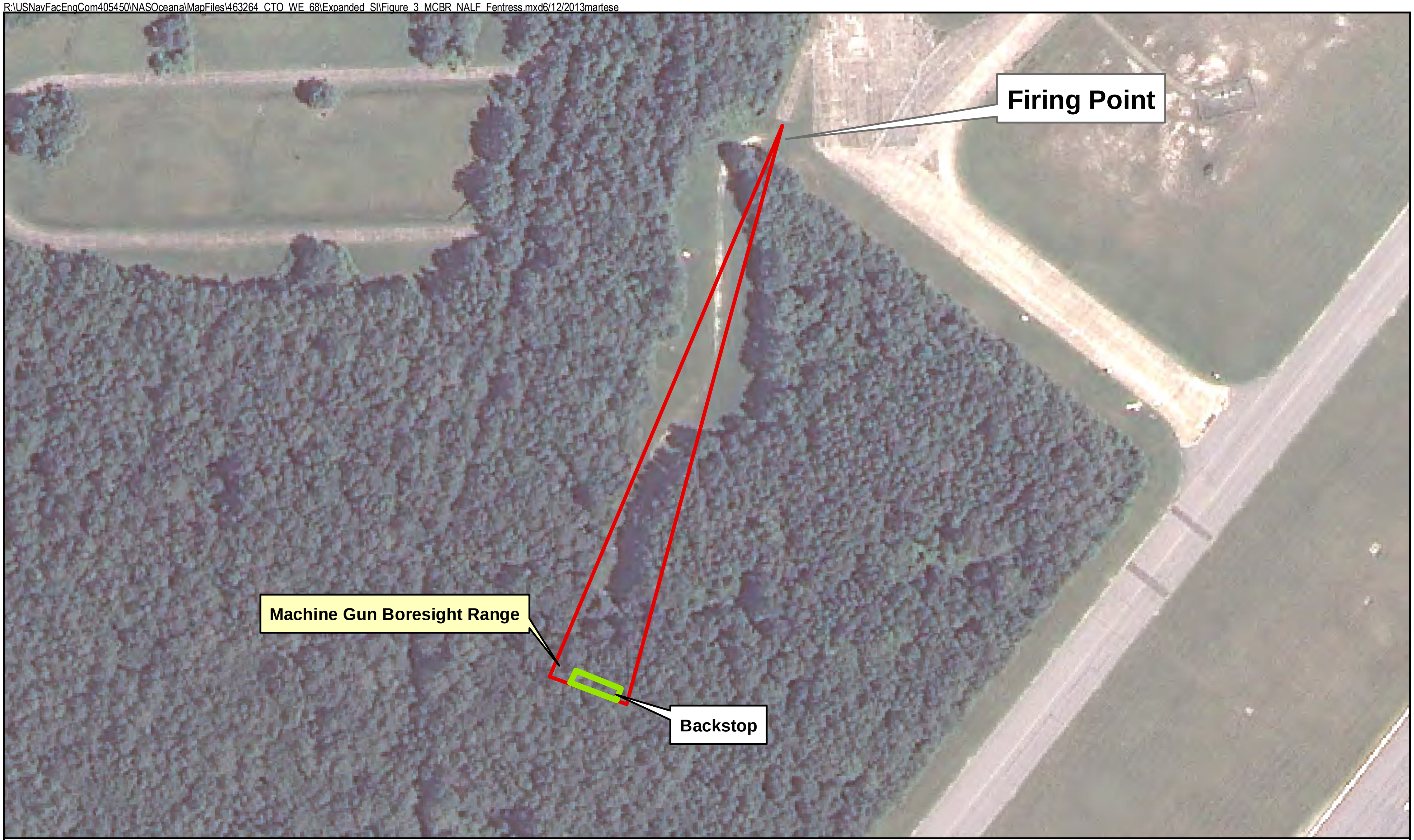
Legend

- MRP Site
- Backstop

N
W E
S
0 100 200
Feet

Figure 2
NAS Oceana MGBR Site Map
Machine Gun Boresight Range Expanded SI
AS Oceana and NALF Fentress
Virginia Beach, Virginia

CH2MHILL



Legend
- MRP Site
- Backstop

N
W E
S

0 100 200
Feet

Figure 3
NALF Fentress MGBR Site Map
Machine Gun Boresight Range Expanded SI
NAS Oceana and NALF Fentress
Chesapeake, Virginia

CH2MHILL

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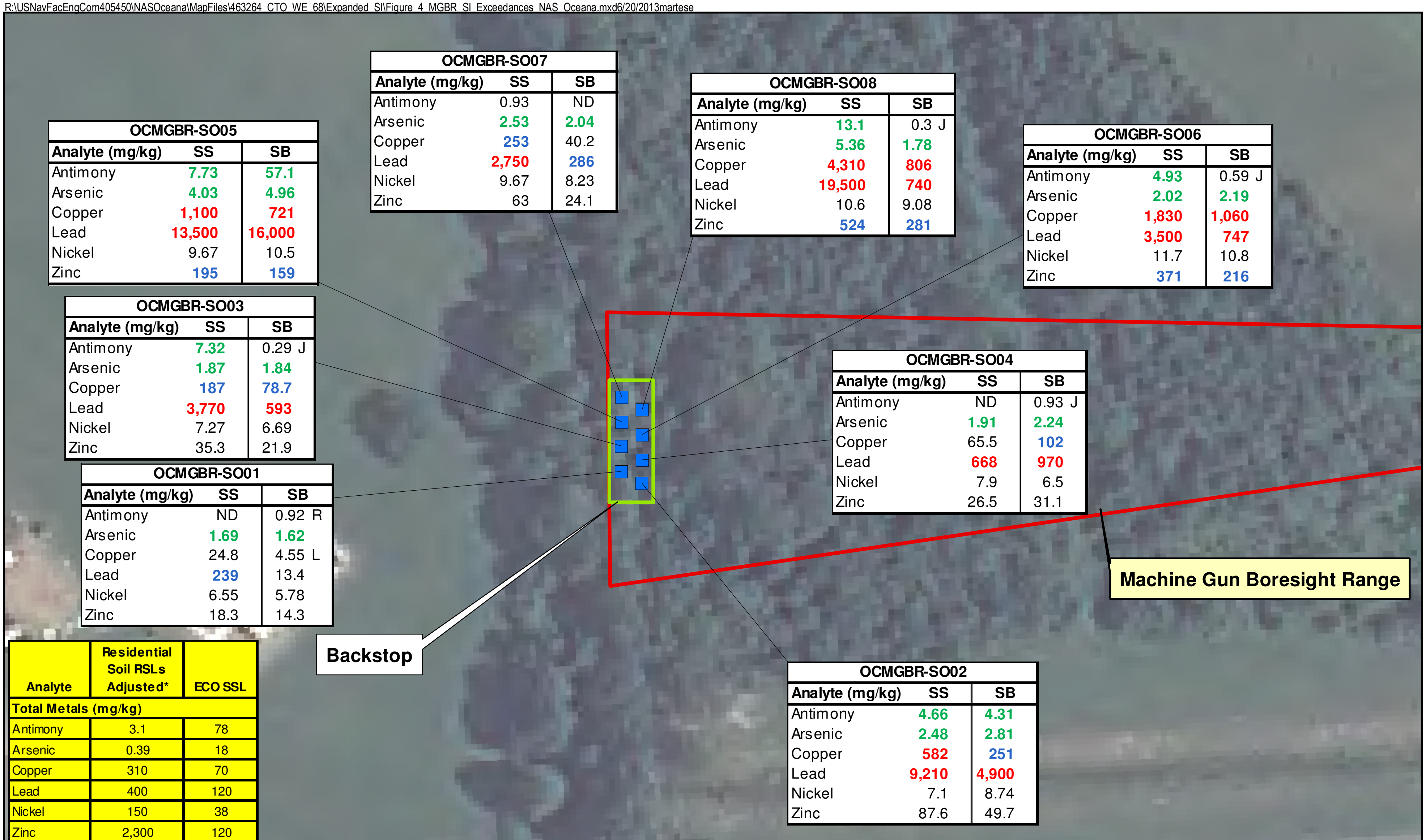

OCMGBR-SO07		
Analyte (mg/kg)	SS	SB
Antimony	0.93	ND
Arsenic	2.53	2.04
Copper	253	40.2
Lead	2,750	286
Nickel	9.67	8.23
Zinc	63	24.1

OCMGBR-SO08		
Analyte (mg/kg)	SS	SB
Antimony	13.1	0.3 J
Arsenic	5.36	1.78
Copper	4,310	806
Lead	19,500	740
Nickel	10.6	9.08
Zinc	524	281

OCMGBR-SO05		
Analyte (mg/kg)	SS	SB
Antimony	7.73	57.1
Arsenic	4.03	4.96
Copper	1,100	721
Lead	13,500	16,000
Nickel	9.67	10.5
Zinc	195	159

OCMGBR-SO06		
Analyte (mg/kg)	SS	SB
Antimony	4.93	0.59 J
Arsenic	2.02	2.19
Copper	1,830	1,060
Lead	3,500	747
Nickel	11.7	10.8
Zinc	371	216

OCMGBR-SO03		
Analyte (mg/kg)	SS	SB
Antimony	7.32	0.29 J
Arsenic	1.87	1.84
Copper	187	78.7
Lead	3,770	593
Nickel	7.27	6.69
Zinc	35.3	21.9

OCMGBR-SO04		
Analyte (mg/kg)	SS	SB
Antimony	ND	0.93 J
Arsenic	1.91	2.24
Copper	65.5	102
Lead	668	970
Nickel	7.9	6.5
Zinc	26.5	31.1

OCMGBR-SO01		
Analyte (mg/kg)	SS	SB
Antimony	ND	0.92 R
Arsenic	1.69	1.62
Copper	24.8	4.55 L
Lead	239	13.4
Nickel	6.55	5.78
Zinc	18.3	14.3

OCMGBR-SO02		
Analyte (mg/kg)	SS	SB
Antimony	4.66	4.31
Arsenic	2.48	2.81
Copper	582	251
Lead	9,210	4,900
Nickel	7.1	8.74
Zinc	87.6	49.7

Analyte	Residential Soil RSLs Adjusted*	ECO SSL
Total Metals (mg/kg)		
Antimony	3.1	78
Arsenic	0.39	18
Copper	310	70
Lead	400	120
Nickel	150	38
Zinc	2,300	120

Legend

- Soil Sample Location
- MRP Site
- Backstop

NOTES:
Concentrations shown in green exceed the USEPA residential soil regional screening levels
Concentrations shown in blue exceed the ecological soil screening levels
Concentrations shown in red exceed both the ecological and residential screening levels
J - Analyte present, value may or may not be accurate or precise
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
ND - Analyte not detected
mg/kg - milligrams per kilogram
SS - Surface soil
SB - Subsurface soil

N W E S
0 40 80 Feet

Figure 4
NAS Oceana MGBR SI Exceedances
Machine Gun Boresight Range Expanded SI
NAS Oceana and NALF Fentress
Virginia Beach, Virginia

CH2MHILL

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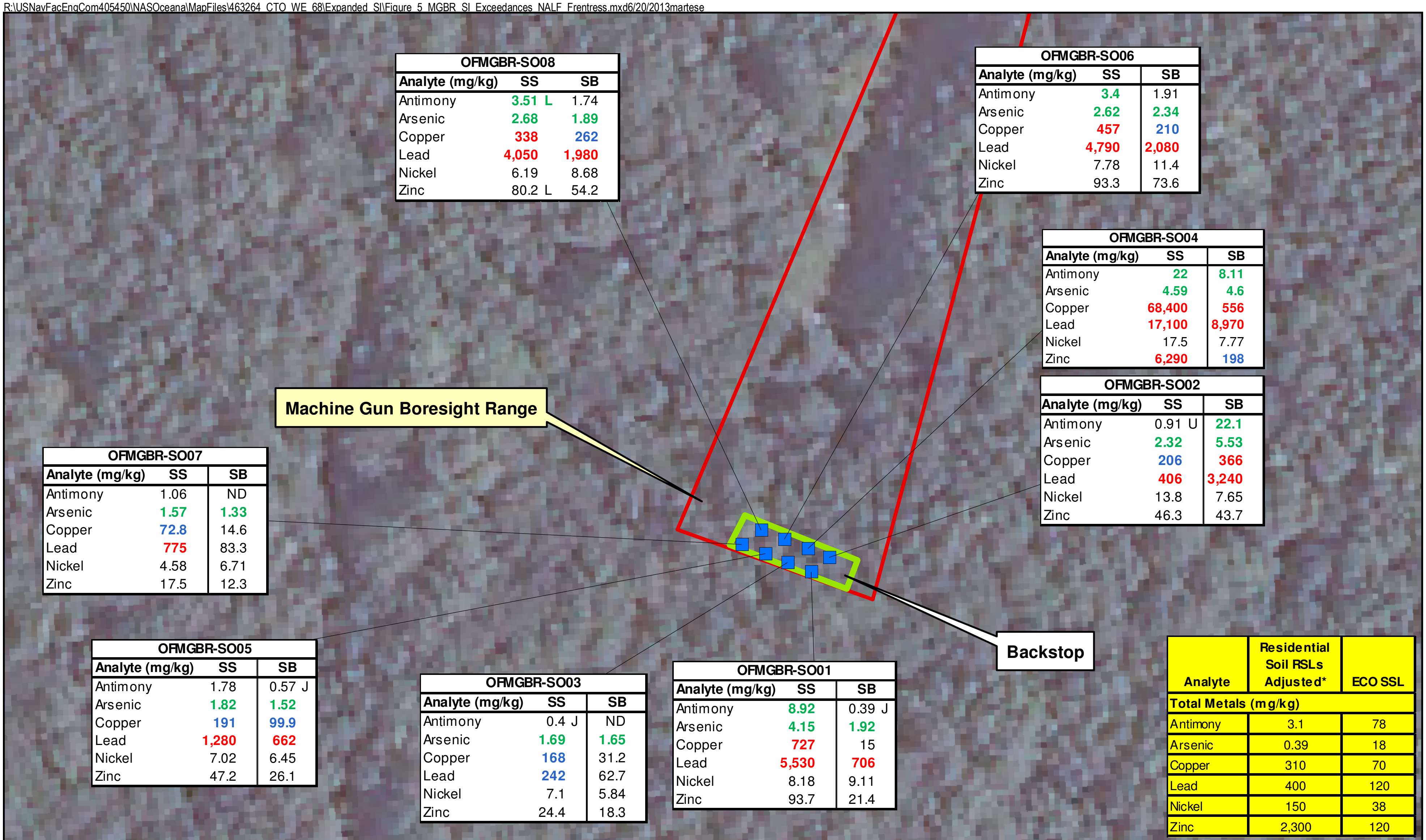

OFMGBR-SO08		
Analyte (mg/kg)	SS	SB
Antimony	3.51 L	1.74
Arsenic	2.68	1.89
Copper	338	262
Lead	4,050	1,980
Nickel	6.19	8.68
Zinc	80.2 L	54.2

OFMGBR-SO06		
Analyte (mg/kg)	SS	SB
Antimony	3.4	1.91
Arsenic	2.62	2.34
Copper	457	210
Lead	4,790	2,080
Nickel	7.78	11.4
Zinc	93.3	73.6

OFMGBR-SO04		
Analyte (mg/kg)	SS	SB
Antimony	22	8.11
Arsenic	4.59	4.6
Copper	68,400	556
Lead	17,100	8,970
Nickel	17.5	7.77
Zinc	6,290	198

OFMGBR-SO02		
Analyte (mg/kg)	SS	SB
Antimony	0.91 U	22.1
Arsenic	2.32	5.53
Copper	206	366
Lead	406	3,240
Nickel	13.8	7.65
Zinc	46.3	43.7

OFMGBR-SO07		
Analyte (mg/kg)	SS	SB
Antimony	1.06	ND
Arsenic	1.57	1.33
Copper	72.8	14.6
Lead	775	83.3
Nickel	4.58	6.71
Zinc	17.5	12.3

OFMGBR-SO05		
Analyte (mg/kg)	SS	SB
Antimony	1.78	0.57 J
Arsenic	1.82	1.52
Copper	191	99.9
Lead	1,280	662
Nickel	7.02	6.45
Zinc	47.2	26.1

OFMGBR-SO03		
Analyte (mg/kg)	SS	SB
Antimony	0.4 J	ND
Arsenic	1.69	1.65
Copper	168	31.2
Lead	242	62.7
Nickel	7.1	5.84
Zinc	24.4	18.3

OFMGBR-SO01		
Analyte (mg/kg)	SS	SB
Antimony	8.92	0.39 J
Arsenic	4.15	1.92
Copper	727	15
Lead	5,530	706
Nickel	8.18	9.11
Zinc	93.7	21.4

Analyte	Residential Soil RSLs Adjusted*	ECO SSL
Total Metals (mg/kg)		
Antimony	3.1	78
Arsenic	0.39	18
Copper	310	70
Lead	400	120
Nickel	150	38
Zinc	2,300	120

Legend

- Soil Sample Location
- MRP Site
- Backstop

NOTES:
Concentrations shown in green exceed the USEPA residential soil regional screening levels
Concentrations shown in blue exceed the ecological soil screening levels
Concentrations shown in red exceed both the ecological and residential screening levels
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
ND - Analyte not detected
mg/kg - milligrams per kilogram
SS - Surface soil
SB - Subsurface soil

N W E S
0 40 80 Feet

Figure 5
NALF Fentress MGBR SI Exceedances
Machine Gun Boresight Range Expanded SI
NAS Oceana and NALF Fentress
Chesapeake, Virginia

CH2MHILL

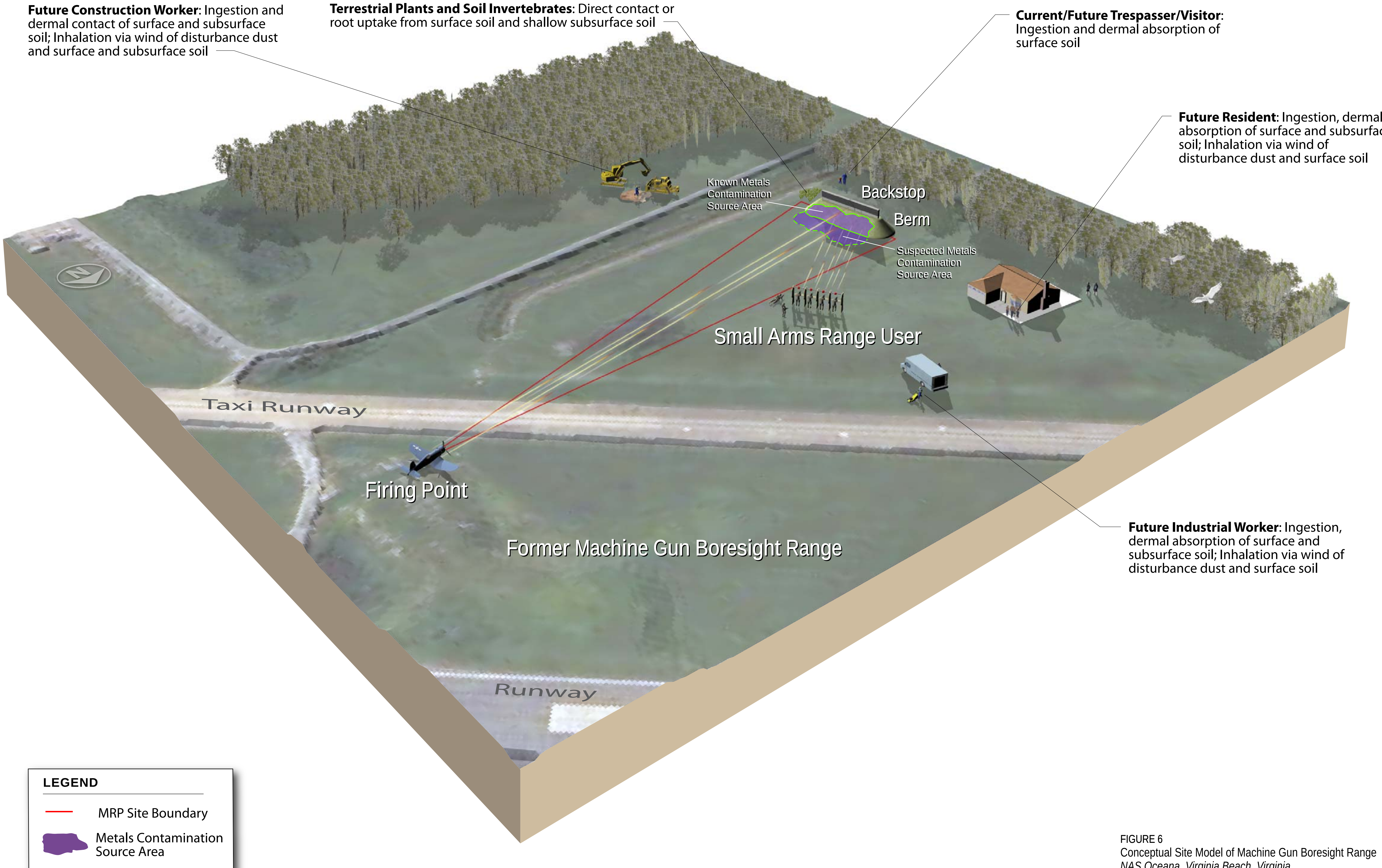

FIGURE 6
Conceptual Site Model of Machine Gun Boresight Range
NAS Oceana, Virginia Beach, Virginia

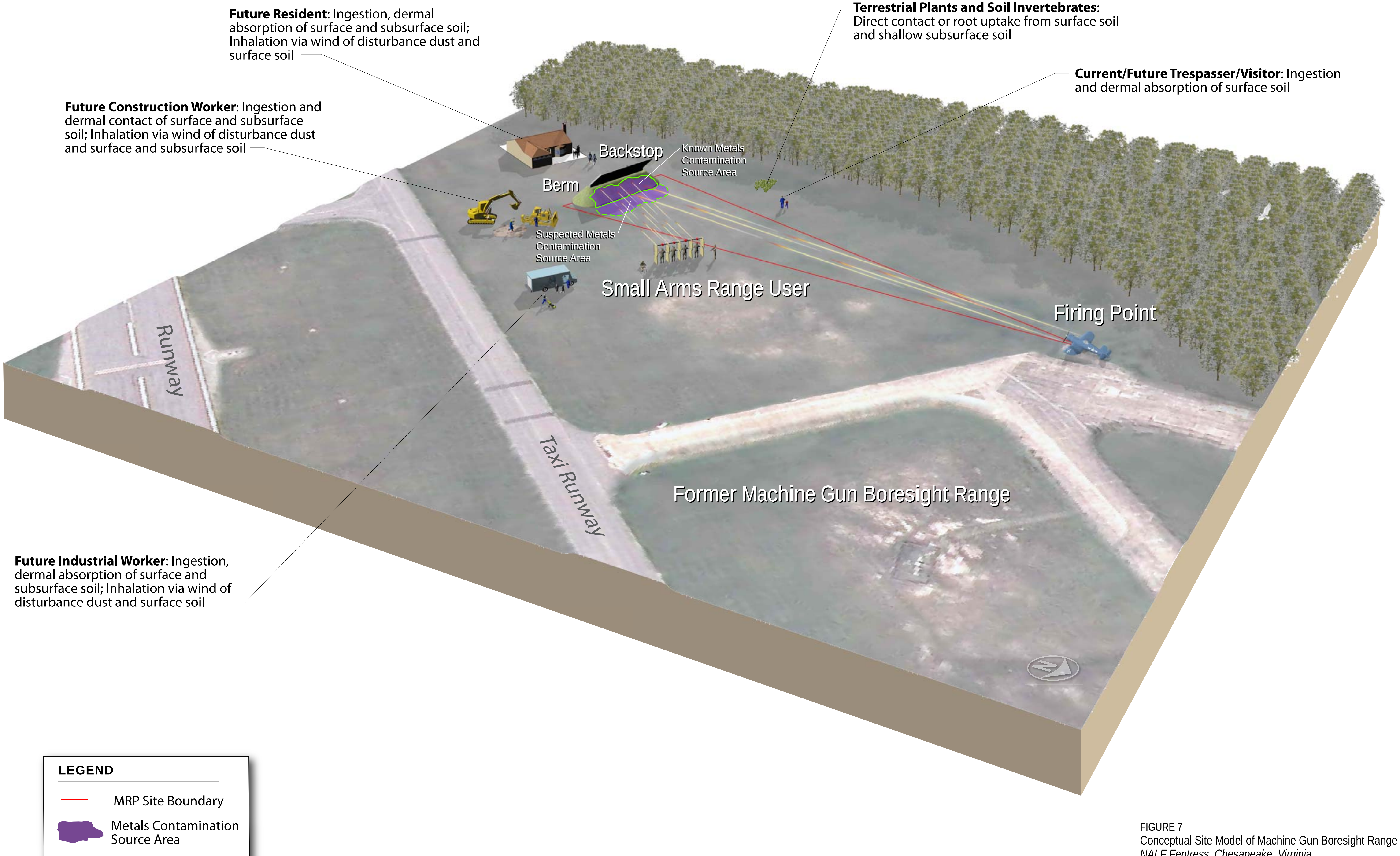

FIGURE 7
Conceptual Site Model of Machine Gun Boresight Range
NALF Fentress, Chesapeake, Virginia

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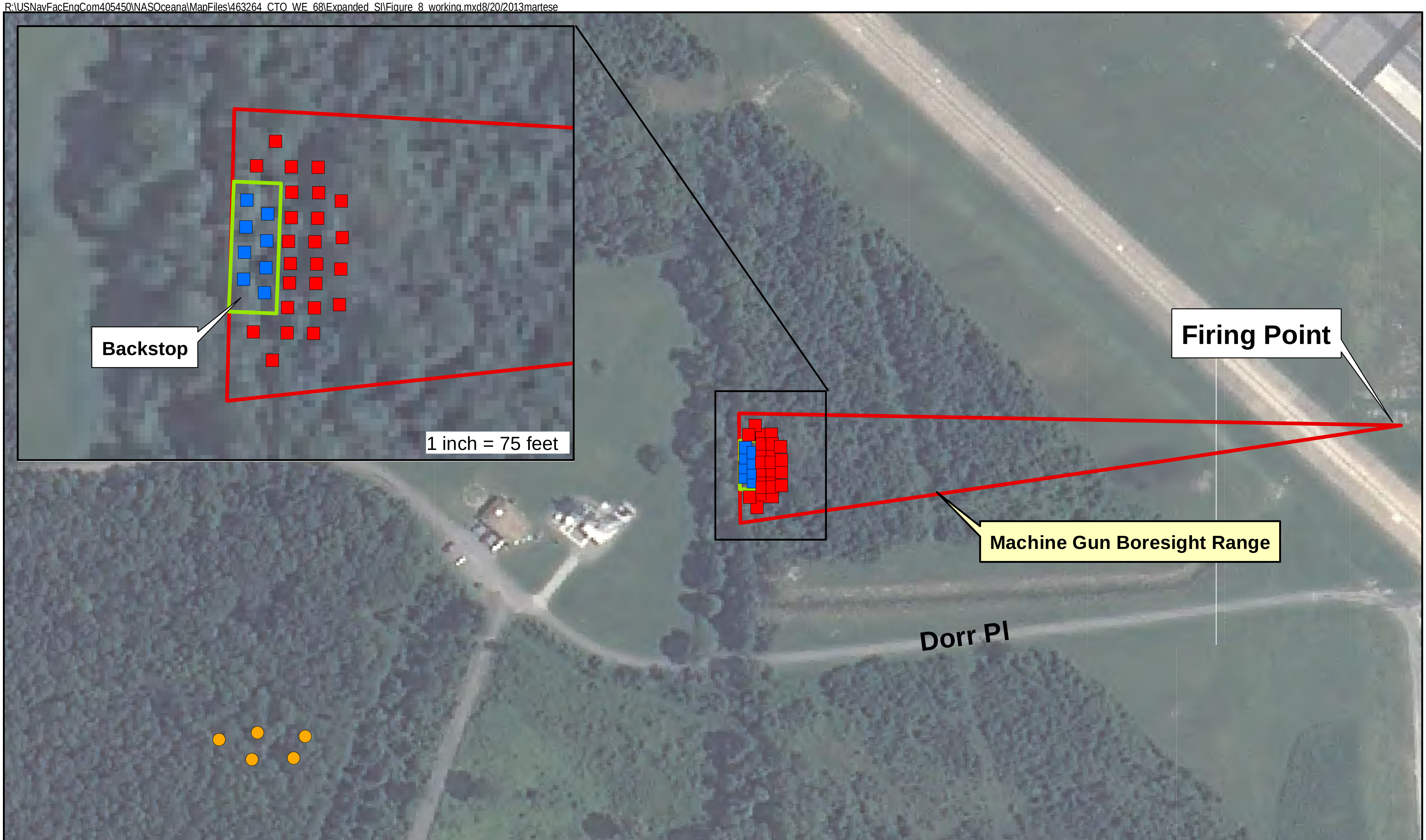

Legend

- Subsurface Soil Sampling Location (2-3 and 3-4 ft bgs)
- Surface (0-1 ft bgs) and Subsurface (1-2 ft bgs) Soil Sampling Location
- Surface (0-1 ft bgs) and Subsurface (1-2 ft bgs) Background Sampling Location
- MRP Site
- Backstop

N W E S

0 200 Feet

Figure 8
NAS Oceana MGBR Sampling Locations
Machine Gun Boresight Range Expanded SI
NAS Oceana and NALF Fentress
Virginia Beach, Virginia

CH2MHILL

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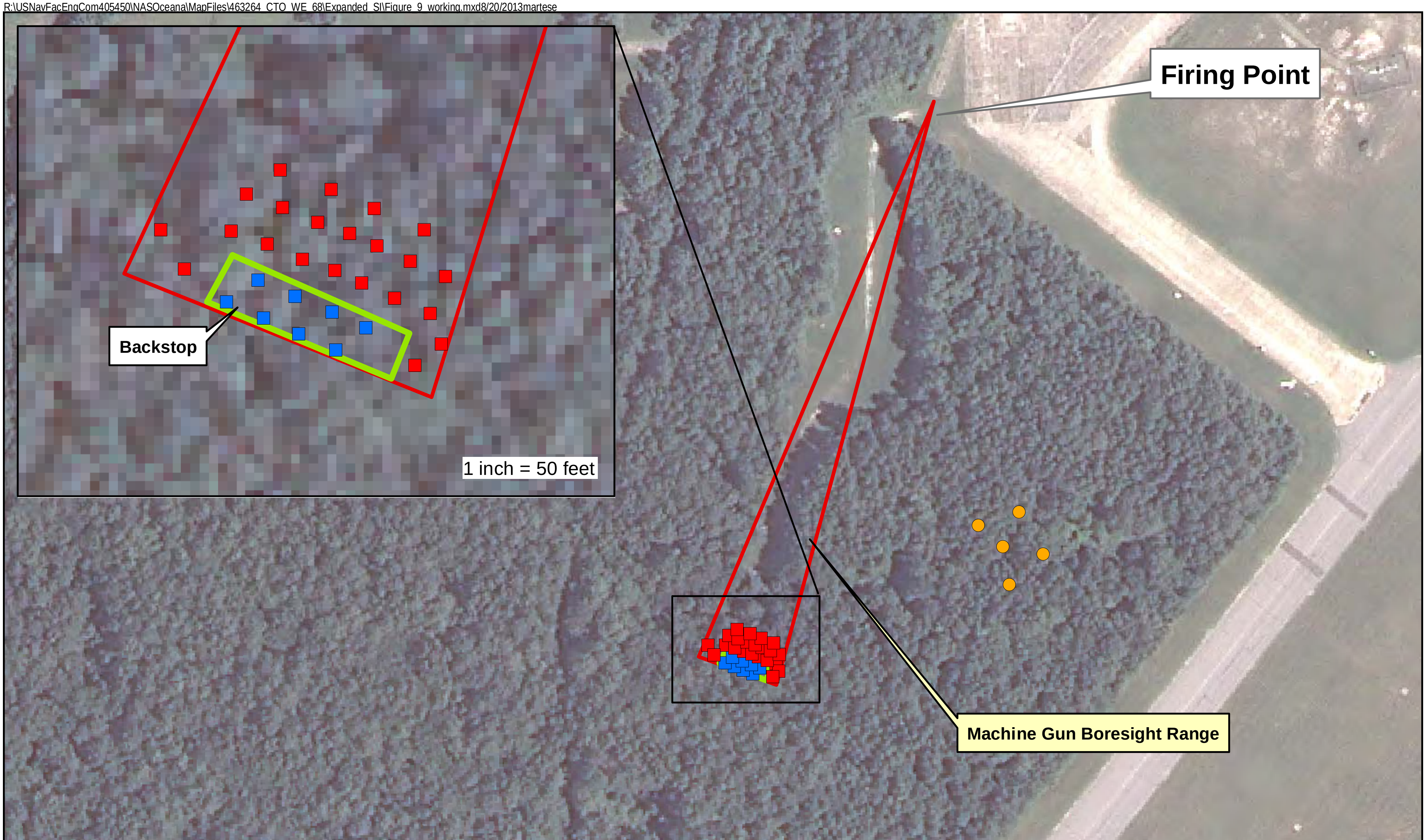

Legend

- Subsurface Soil Sampling Location (2-3 and 3-4 ft bgs)
- Surface (0-1 ft bgs) and Subsurface (1-2 ft bgs) Soil Sampling Location
- Surface (0-1 ft bgs) and Subsurface (1-2 ft bgs) Background Sampling Location
- MRP Site
- Backstop

N W E S

0 100 200 Feet

Figure 9
NALF Fentress MGBR Sampling Locations
Machine Gun Boresight Range Expanded SI
NAS Oceana and NALF Fentress
Chesapeake, Virginia

CH2MHILL

Appendix A
Laboratory DoD ELAP Accreditation Letter

LABORATORY ACCREDITATION BUREAU

Certificate # L2278

Scope of Accreditation
For
EMAX Laboratories, Inc.

1835 W 205th Street
Torrance, CA 90501
Kenette Pimentel
310-618-8889

In recognition of a successful assessment to ISO/IEC 17025:2005 and the requirements of the DoD Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in the DoD Quality Systems Manual for Environmental Laboratories (DoD QSM v4.2) based on the National Environmental Laboratory Accreditation Conference Chapter 5 Quality Systems Standard (NELAC Voted Revision June 5, 2003), accreditation is granted to **EMAX Laboratories, Inc.** to perform the following tests:

Accreditation granted through: **January 10, 2014**

Testing - Environmental

Non-Potable Water		
Technology	**Method**	**Analyte**
GC	AK101	GRO
GC	AK102	DRO
GC	AK103	RRO
GFAA	CA 939M	Organo Lead
Platinum Electrode	EPA 120.1	Specific Conductance
Titrimetric	EPA 130.2	Hardness
Electrode	EPA 150.1	pH
Gravimetric	EPA 160.1	TDS
Gravimetric	EPA 160.2	TSS
Gravimetric	EPA 160.3	Total Residue
Turbidimetric	EPA 180.1	Turbidity
ICP	EPA 200.7	Aluminum
ICP	EPA 200.7	Antimony
ICP	EPA 200.7	Arsenic
ICP	EPA 200.7	Barium
ICP	EPA 200.7	Beryllium
ICP	EPA 200.7	Boron
ICP	EPA 200.7	Cadmium
ICP	EPA 200.7	Calcium
ICP	EPA 200.7	Chromium
ICP	EPA 200.7	Cobalt
ICP	EPA 200.7	Copper
ICP	EPA 200.7	Iron

Non-Potable Water

Technology	Method	Analyte
ICP	EPA 200.7	Lead
ICP	EPA 200.7	Magnesium
ICP	EPA 200.7	Manganese
ICP	EPA 200.7	Molybdenum
ICP	EPA 200.7	Nickel
ICP	EPA 200.7	Potassium
ICP	EPA 200.7	Selenium
ICP	EPA 200.7	Silver
ICP	EPA 200.7	Sodium
ICP	EPA 200.7	Strontium
ICP	EPA 200.7	Thallium
ICP	EPA 200.7	Tin
ICP	EPA 200.7	Titanium
ICP	EPA 200.7	Vanadium
ICP	EPA 200.7	Zinc
ICP-MS	EPA 200.8	Aluminum
ICP-MS	EPA 200.8	Antimony
ICP-MS	EPA 200.8	Arsenic
ICP-MS	EPA 200.8	Barium
ICP-MS	EPA 200.8	Beryllium
ICP-MS	EPA 200.8	Boron
ICP-MS	EPA 200.8	Cadmium
ICP-MS	EPA 200.8	Calcium
ICP-MS	EPA 200.8	Chromium
ICP-MS	EPA 200.8	Cobalt
ICP-MS	EPA 200.8	Copper
ICP-MS	EPA 200.8	Iron
ICP-MS	EPA 200.8	Lead
ICP-MS	EPA 200.8	Lithium
ICP-MS	EPA 200.8	Magnesium
ICP-MS	EPA 200.8	Manganese
ICP-MS	EPA 200.8	Molybdenum
ICP-MS	EPA 200.8	Nickel
ICP-MS	EPA 200.8	Potassium
ICP-MS	EPA 200.8	Selenium
ICP-MS	EPA 200.8	Silver
ICP-MS	EPA 200.8	Sodium
ICP-MS	EPA 200.8	Strontium
ICP-MS	EPA 200.8	Thallium
ICP-MS	EPA 200.8	Tin
ICP-MS	EPA 200.8	Titanium
ICP-MS	EPA 200.8	Uranium
ICP-MS	EPA 200.8	Vanadium

LABORATORY ACCREDITATION BUREAU

Certificate # L2278

Non-Potable Water

Technology	Method	Analyte
ICP-MS	EPA 200.8	Zinc
IC	EPA 218.6	Hexavalent Chromium
COLD VAPOR	EPA 245.1	Mercury
IC	EPA 300.0	Fluoride
IC	EPA 300.0	Chloride
IC	EPA 300.0	Nitrite
IC	EPA 300.0	Bromide
IC	EPA 300.0	Nitrate
IC	EPA 300.0	Phosphate
IC	EPA 300.0	Sulfate
IC	EPA 300.0	Bromate
IC	EPA 300M	Lactate
IC	EPA 300M	Acetate
IC	EPA 300M	Propionate
IC	EPA 300M	Butyrate
IC	EPA 300M	Pyruvate
IC	EPA 310.1	Alkalinity
IC	EPA 314.0	Perchlorate
Titrimetric	EPA 330.3	Total Residual Chlorine
Spectrometric	EPA 352.1	Nitrate-N
Spectrometric	EPA 353.3	Nitrate-N
Spectrometric	EPA 354.1	Nitrite-N
Spectrometric	EPA 365.2	Ortho-phosphate
Spectrometric	EPA 335.2	Cyanide
Spectrometric	EPA 350.2	Ammonia
Spectrometric	EPA 351.3	TKN
Spectrometric	EPA 365.2	Phosphorus
Spectrometric	EPA 370.1	Silica
Titrimetric	EPA 376.1	Sulfide
Spectrometric	EPA 376.2	Sulfide
Electrode	EPA 405.1	BOD
Spectrometric	EPA 410.4	COD
Combustion-IR	EPA 415.1	TOC
Spectrometric	EPA 420.1	Phenols
Spectrometric	EPA 425.1	MBAS
GC	EPA 504.1	DBCP
GC	EPA 504.1	EDB
GC	EPA 608	Aldrin
GC	EPA 608	alpha-BHC
GC	EPA 608	beta-BHC
GC	EPA 608	delta-BHC
GC	EPA 608	gamma-BHC (Lindane)
GC	EPA 608	DDD (4,4)

LABORATORY ACCREDITATION BUREAU

Certificate # L2278

Non-Potable Water		
Technology	**Method**	**Analyte**
GC	EPA 608	DDE (4,4)
GC	EPA 608	DDT (4,4)
GC	EPA 608	Dieldrin
GC	EPA 608	Endosulfan I
GC	EPA 608	Endosulfan II
GC	EPA 608	Endosulfan sulfate
GC	EPA 608	Endrin
GC	EPA 608	Endrin Aldehyde
GC	EPA 608	Heptachlor
GC	EPA 608	Heptachlor epoxide
GC	EPA 608	Methoxychlor
GC	EPA 608	alpha-Chlordane
GC	EPA 608	gamma-Chlordane
GC	EPA 608	Endrin Ketone
GC	EPA 608	Toxaphene
GC	EPA 608	Technical Chlordane
GC	EPA 608	cis-Nonachlor
GC	EPA 608	DDD (2,4)
GC	EPA 608	DDE (2,4)
GC	EPA 608	DDT (2,4)
GC	EPA 608	Mirex
GC	EPA 608	Oxychlordane
GC	EPA 608	trans-Nonachlor
GC	EPA 608	PCB1016
GC	EPA 608	PCB1221
GC	EPA 608	PCB1232
GC	EPA 608	PCB1242
GC	EPA 608	PCB1248
GC	EPA 608	PCB1254
GC	EPA 608	PCB1260
GC	EPA 608	PCB1262
GC	EPA 608	PCB1268
GC-MS	EPA 624	Acrolein
GC-MS	EPA 624	Acrylonitrile
GC-MS	EPA 624	Benzene
GC-MS	EPA 624	Bromodichloromethane
GC-MS	EPA 624	Bromoform
GC-MS	EPA 624	Bromomethane
GC-MS	EPA 624	Carbon tetrachloride
GC-MS	EPA 624	Chlorobenzene
GC-MS	EPA 624	2-Chloroethyl vinyl ether
GC-MS	EPA 624	Chloroethane
GC-MS	EPA 624	Chloroform

Certificate # L2278

Non-Potable Water

Technology	Method	Analyte
GC-MS	EPA 624	Chloromethane
GC-MS	EPA 624	Dibromochloromethane
GC-MS	EPA 624	1,1-Dichloroethane
GC-MS	EPA 624	1,2-Dichloroethane
GC-MS	EPA 624	1,2-Dichlorobenzene
GC-MS	EPA 624	1,3-Dichlorobenzene
GC-MS	EPA 624	1,4-Dichlorobenzene
GC-MS	EPA 624	Dichlorodifluoromethane
GC-MS	EPA 624	1,1-Dichloroethene
GC-MS	EPA 624	cis-1,2-Dichloroethene
GC-MS	EPA 624	trans-1,2-Dichloroethene
GC-MS	EPA 624	1,2-Dichloropropane
GC-MS	EPA 624	cis-1,3-Dichloropropene
GC-MS	EPA 624	trans-1,3-Dichloropropene
GC-MS	EPA 624	Ethylbenzene
GC-MS	EPA 624	Methylene Chloride
GC-MS	EPA 624	tert-Butyl methyl ether
GC-MS	EPA 624	Styrene
GC-MS	EPA 624	1,1,2,2-Tetrachloroethane
GC-MS	EPA 624	Tetrachloroethene
GC-MS	EPA 624	Toluene
GC-MS	EPA 624	1,1,1-Trichloroethane
GC-MS	EPA 624	1,1,2-Trichloroethane
GC-MS	EPA 624	1,2,4-Trichlorobenzene
GC-MS	EPA 624	Trichloroethene
GC-MS	EPA 624	Trichlorofluoromethane
GC-MS	EPA 624	1,1,2-Trichloro1,2,2-trifluoroethane
GC-MS	EPA 624	Vinyl Chloride
GC-MS	EPA 624	m-Xylene & p-xylene
GC-MS	EPA 624	o-Xylene
GC-MS	EPA 625	Acenaphthene
GC-MS	EPA 625	Acenaphthylene
GC-MS	EPA 625	Aniline
GC-MS	EPA 625	Anthracene
GC-MS	EPA 625	Azobenzene
GC-MS	EPA 625	Benzidine
GC-MS	EPA 625	Benzo(a)anthracene
GC-MS	EPA 625	benzo(a)pyrene
GC-MS	EPA 625	Benzo(b)fluoranthene
GC-MS	EPA 625	Benzo(e)pyrene
GC-MS	EPA 625	Benzo(g,h,i)perylene
GC-MS	EPA 625	Benzo(k)fluoranthene
GC-MS	EPA 625	Benzoic Acid

Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 625	Benzyl Alcohol
GC-MS	EPA 625	Biphenyl
GC-MS	EPA 625	bis(2-chloroethoxy)methane
GC-MS	EPA 625	bis(2-chloroethyl)ether
GC-MS	EPA 625	bis(2-chloroisopropyl)ether
GC-MS	EPA 625	bis(2-Ethylhexyl)adipate
GC-MS	EPA 625	bis(2-Ethylhexyl)phthalate
GC-MS	EPA 625	4-Bromophenyl-phenylether
GC-MS	EPA 625	Butylbenzylphthalate
GC-MS	EPA 625	Carbazole
GC-MS	EPA 625	4-Chloro-3-methylphenol
GC-MS	EPA 625	4-Chloroaniline
GC-MS	EPA 625	2-Chloronaphthalene
GC-MS	EPA 625	2-Chlorophenol
GC-MS	EPA 625	4-Chlorophenyl-phenylether
GC-MS	EPA 625	Chrysene
GC-MS	EPA 625	Dibenzo(a,h)anthracene
GC-MS	EPA 625	Dibenzofuran
GC-MS	EPA 625	1,2-Dichlorobenzene
GC-MS	EPA 625	1,3-Dichlorobenzene
GC-MS	EPA 625	1,4-Dichlorobenzene
GC-MS	EPA 625	3,3'-Dichlorobenzidine
GC-MS	EPA 625	2,4-Dichlorophenol
GC-MS	EPA 625	Diethylphthalate
GC-MS	EPA 625	2,6-Dimethylnaphthalene
GC-MS	EPA 625	2,4-Dimethylphenol
GC-MS	EPA 625	Dimethylphthalate
GC-MS	EPA 625	Di-n-butylphthalate
GC-MS	EPA 625	4,6-Dinitro-2-methylphenol
GC-MS	EPA 625	2,4-Dinitrophenol
GC-MS	EPA 625	2,4-Dinitrotoluene
GC-MS	EPA 625	2-6-Dinitrotoluene
GC-MS	EPA 625	Di-n-octylphthalate
GC-MS	EPA 625	1,2-Diphenylhydrazine
GC-MS	EPA 625	Fluoranthene
GC-MS	EPA 625	Fluorene
GC-MS	EPA 625	Hexachlorobenzene
GC-MS	EPA 625	Hexachlorobutadiene
GC-MS	EPA 625	Hexachlorocyclopentadiene
GC-MS	EPA 625	Hexachloroethane
GC-MS	EPA 625	Indeno(1,2,3-cd)pyrene
GC-MS	EPA 625	Isophorone
GC-MS	EPA 625	1-Methylnaphthalene

Non-Potable Water

Technology	Method	Analyte
GC-MS	EPA 625	2-Methylnaphthalene
GC-MS	EPA 625	1-Methylphenanthrene
GC-MS	EPA 625	2-Methylphenol
GC-MS	EPA 625	4-Methylphenol
GC-MS	EPA 625	Naphthalene
GC-MS	EPA 625	2-Nitroaniline
GC-MS	EPA 625	3-Nitroaniline
GC-MS	EPA 625	4-Nitroaniline
GC-MS	EPA 625	Nitrobenzene
GC-MS	EPA 625	2-Nitrophenol
GC-MS	EPA 625	4-Nitrophenol
GC-MS	EPA 625	n-Nitrosodimethylamine
GC-MS	EPA 625	n-Nitroso-di-n-propylamine
GC-MS	EPA 625	n-Nitrosodiphenylamine
GC-MS	EPA 625	Pentachlorophenol
GC-MS	EPA 625	Perylene
GC-MS	EPA 625	Phenanthrene
GC-MS	EPA 625	Phenol
GC-MS	EPA 625	Pyrene
GC-MS	EPA 625	Pyridine
GC-MS	EPA 625	2,3,4,6-Tetrachlorophenol
GC-MS	EPA 625	1,2,4-Trichlorobenzene
GC-MS	EPA 625	2,3,4-Trichlorophenol
GC-MS	EPA 625	2,3,5-Trichlorophenol
GC-MS	EPA 625	2,4,5-Trichlorophenol
GC-MS	EPA 625	2,4,6-Trichlorophenol
GC-MS	EPA 625	2,3,5-Trimethylnaphthalene
Gravimetric	EPA 1664A	Oil & Grease
Pensky-Martens	EPA 1010	Ignitability
ICP	EPA 6010B / 6010C	Aluminum
ICP	EPA 6010B / 6010C	Antimony
ICP	EPA 6010B / 6010C	Arsenic
ICP	EPA 6010B / 6010C	Barium
ICP	EPA 6010B / 6010C	Beryllium
ICP	EPA 6010B / 6010C	Boron
ICP	EPA 6010B / 6010C	Cadmium
ICP	EPA 6010B / 6010C	Calcium
ICP	EPA 6010B / 6010C	Chromium
ICP	EPA 6010B / 6010C	Cobalt
ICP	EPA 6010B / 6010C	Copper
ICP	EPA 6010B / 6010C	Iron
ICP	EPA 6010B / 6010C	Lead
ICP	EPA 6010B / 6010C	Magnesium

Non-Potable Water		
Technology	**Method**	**Analyte**
ICP	EPA 6010B / 6010C	Manganese
ICP	EPA 6010B / 6010C	Molybdenum
ICP	EPA 6010B / 6010C	Nickel
ICP	EPA 6010B / 6010C	Potassium
ICP	EPA 6010B / 6010C	Selenium
ICP	EPA 6010B / 6010C	Silver
ICP	EPA 6010B / 6010C	Sodium
ICP	EPA 6010B / 6010C	Strontium
ICP	EPA 6010B / 6010C	Thallium
ICP	EPA 6010B / 6010C	Tin
ICP	EPA 6010B / 6010C	Titanium
ICP	EPA 6010B / 6010C	Vanadium
ICP	EPA 6010B / 6010C	Zinc
ICP-MS	EPA 6020A	Aluminum
ICP-MS	EPA 6020A	Antimony
ICP-MS	EPA 6020A	Arsenic
ICP-MS	EPA 6020A	Barium
ICP-MS	EPA 6020A	Beryllium
ICP-MS	EPA 6020A	Boron
ICP-MS	EPA 6020A	Cadmium
ICP-MS	EPA 6020A	Calcium
ICP-MS	EPA 6020A	Chromium
ICP-MS	EPA 6020A	Cobalt
ICP-MS	EPA 6020A	Copper
ICP-MS	EPA 6020A	Iron
ICP-MS	EPA 6020A	Lead
ICP-MS	EPA 6020A	Magnesium
ICP-MS	EPA 6020A	Manganese
ICP-MS	EPA 6020A	Molybdenum
ICP-MS	EPA 6020A	Nickel
ICP-MS	EPA 6020A	Potassium
ICP-MS	EPA 6020A	Selenium
ICP-MS	EPA 6020A	Silver
ICP-MS	EPA 6020A	Sodium
ICP-MS	EPA 6020A	Strontium
ICP-MS	EPA 6020A	Thallium
ICP-MS	EPA 6020A	Tin
ICP-MS	EPA 6020A	Titanium
ICP-MS	EPA 6020A	Uranium
ICP-MS	EPA 6020A	Vanadium
ICP-MS	EPA 6020A	Zinc
HPLC-MS	EPA 6850	Perchlorate
Spectrometric	EPA 7196A	Hex. Chromium

Non-Potable Water		
Technology	**Method**	**Analyte**
IC	EPA 7199	Hex. Chromium
Cold-Vapor	EPA 7470A / 7471A /7471B	Mercury
GC	EPA 8015B / 8015C	Gasoline
GC	EPA 8015B / 8015C	Diesel
GC	EPA 8015B / 8015C	Motor Oil
GC	EPA 8015B / 8015C	Diethylene Glycol
GC	EPA 8015B / 8015C	Ethanol
GC	EPA 8015B / 8015C	Ethylene Glycol
GC	EPA 8015B / 8015C	Isopropanol
GC	EPA 8015B / 8015C	JP4
GC	EPA 8015B / 8015C	Methanol
GC	EPA 8015B / 8015C	Propylene Glycol
GC	EPA 8015B / 8015C	JP5
GC	EPA 8081A / 8081B	Aldrin
GC	EPA 8081A / 8081B	alpha-BHC
GC	EPA 8081A / 8081B	beta-BHC
GC	EPA 8081A / 8081B	delta-BHC
GC	EPA 8081A / 8081B	gamma-BHC (Lindane)
GC	EPA 8081A / 8081B	DDD (4,4)
GC	EPA 8081A / 8081B	DDE (4,4)
GC	EPA 8081A / 8081B	DDT (4,4)
GC	EPA 8081A / 8081B	Dieldrin
GC	EPA 8081A / 8081B	Endosulfan I
GC	EPA 8081A / 8081B	Endosulfan II
GC	EPA 8081A / 8081B	Endosulfan sulfate
GC	EPA 8081A / 8081B	Endrin
GC	EPA 8081A / 8081B	Endrin Aldehyde
GC	EPA 8081A / 8081B	Heptachlor
GC	EPA 8081A / 8081B	Heptachlor epoxide
GC	EPA 8081A / 8081B	Methoxychlor
GC	EPA 8081A / 8081B	alpha-Chlordane
GC	EPA 8081A / 8081B	gamma-Chlordane
GC	EPA 8081A / 8081B	Endrin Ketone
GC	EPA 8081A / 8081B	Toxaphene
GC	EPA 8081A / 8081B	Technical Chlordane
GC	EPA 8081A / 8081B	cis-Nonachlor
GC	EPA 8081A / 8081B	DDD (2,4)
GC	EPA 8081A / 8081B	DDE (2,4)
GC	EPA 8081A / 8081B	DDT (2,4)
GC	EPA 8081A / 8081B	Mirex
GC	EPA 8081A / 8081B	Oxychlordane
GC	EPA 8081A / 8081B	trans-Nonachlor
GC	EPA 8082 / 8082A	PCB1016

Non-Potable Water

Technology	Method	Analyte
GC	EPA 8082 / 8082A	PCB1221
GC	EPA 8082 / 8082A	PCB1232
GC	EPA 8082 / 8082A	PCB1242
GC	EPA 8082 / 8082A	PCB1248
GC	EPA 8082 / 8082A	PCB1254
GC	EPA 8082 / 8082A	PCB1260
GC	EPA 8082 / 8082A	PCB1262
GC	EPA 8082 / 8082A	PCB1268
GC	EPA 8082 / 8082A	PCB 8
GC	EPA 8082 / 8082A	PCB 18
GC	EPA 8082 / 8082A	PCB 28
GC	EPA 8082 / 8082A	PCB 44
GC	EPA 8082 / 8082A	PCB 52
GC	EPA 8082 / 8082A	PCB 66
GC	EPA 8082 / 8082A	PCB 77
GC	EPA 8082 / 8082A	PCB 81
GC	EPA 8082 / 8082A	PCB 101
GC	EPA 8082 / 8082A	PCB 105
GC	EPA 8082 / 8082A	PCB 114
GC	EPA 8082 / 8082A	PCB 118
GC	EPA 8082 / 8082A	PCB 123
GC	EPA 8082 / 8082A	PCB 126
GC	EPA 8082 / 8082A	PCB 128
GC	EPA 8082 / 8082A	PCB 138
GC	EPA 8082 / 8082A	PCB 153
GC	EPA 8082 / 8082A	PCB 156
GC	EPA 8082 / 8082A	PCB 157
GC	EPA 8082 / 8082A	PCB 167
GC	EPA 8082 / 8082A	PCB 169
GC	EPA 8082 / 8082A	PCB 170
GC	EPA 8082 / 8082A	PCB 180
GC	EPA 8082 / 8082A	PCB 187
GC	EPA 8082 / 8082A	PCB 189
GC	EPA 8082 / 8082A	PCB 195
GC	EPA 8082 / 8082A	PCB 206
GC	EPA 8082 / 8082A	PCB 209
GC	EPA 8082 / 8082A	PCB 110
GC	EPA 8141A / 8141B	Azinphos-methyl
GC	EPA 8141A / 8141B	Bolstar
GC	EPA 8141A / 8141B	Chlorpyrifos
GC	EPA 8141A / 8141B	Coumaphos
GC	EPA 8141A / 8141B	Demeton
GC	EPA 8141A / 8141B	Diazinon

Non-Potable Water		
Technology	**Method**	**Analyte**
GC	EPA 8141A / 8141B	Dichlorvos
GC	EPA 8141A / 8141B	Disulfoton
GC	EPA 8141A / 8141B	Ethoprop
GC	EPA 8141A / 8141B	Fensulfothion
GC	EPA 8141A / 8141B	Fenthion
GC	EPA 8141A / 8141B	Merphos
GC	EPA 8141A / 8141B	Mevinphos
GC	EPA 8141A / 8141B	Naled
GC	EPA 8141A / 8141B	Methyl Parathion
GC	EPA 8141A / 8141B	Phorate
GC	EPA 8141A / 8141B	Ronnel
GC	EPA 8141A / 8141B	Stirophos
GC	EPA 8141A / 8141B	Tokuthion
GC	EPA 8141A / 8141B	Trichloronate
GC	EPA 8141A / 8141B	Dimethoate
GC	EPA 8141A / 8141B	EPN
GC	EPA 8141A / 8141B	Famphur
GC	EPA 8141A / 8141B	Malathion
GC	EPA 8141A / 8141B	Ethyl Parathion
GC	EPA 8141A / 8141B	O,O,O-Triethylphosphorothioate
GC	EPA 8141A / 8141B	Sulfotepp
GC	EPA 8141A / 8141B	Thionazin
GC	EPA 8141A / 8141B	Tributyl Phosphate
GC	EPA 8151A	Acifluorfen
GC	EPA 8151A	Bentazon
GC	EPA 8151A	Chloramben
GC	EPA 8151A	2,4-D
GC	EPA 8151A	2,4-DB
GC	EPA 8151A	Dacthal
GC	EPA 8151A	Dalapon
GC	EPA 8151A	Dicamba
GC	EPA 8151A	3,5 Dichlorobenzoic
GC	EPA 8151A	Dichlorprop
GC	EPA 8151A	Dinoseb
GC	EPA 8151A	MCPA
GC	EPA 8151A	MCPP
GC	EPA 8151A	4-Nitrophenol
GC	EPA 8151A	Pentachlorophenol
GC	EPA 8151A	Picloram
GC	EPA 8151A	Silvex
GC	EPA 8151A	2,4,5-T
GC-MS	EPA 8260B / 8260C	Acetone
GC-MS	EPA 8260B / 8260C	Acrolein

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Non-Potable Water

Technology	Method	Analyte
GC-MS	EPA 8260B / 8260C	Acrylonitrile
GC-MS	EPA 8260B / 8260C	Benzene
GC-MS	EPA 8260B / 8260C	Bromobenzene
GC-MS	EPA 8260B / 8260C	Bromochloromethane
GC-MS	EPA 8260B / 8260C	Bromodichloromethane
GC-MS	EPA 8260B / 8260C	Bromoform
GC-MS	EPA 8260B / 8260C	Bromomethane
GC-MS	EPA 8260B / 8260C	tert-Butyl alcohol
GC-MS	EPA 8260B / 8260C	2-Butanone (MEK)
GC-MS	EPA 8260B / 8260C	n-Butylbenzene
GC-MS	EPA 8260B / 8260C	sec-Butylbenzene
GC-MS	EPA 8260B / 8260C	tert-Butylbenzene
GC-MS	EPA 8260B / 8260C	Carbon disulfide
GC-MS	EPA 8260B / 8260C	Carbon tetrachloride
GC-MS	EPA 8260B / 8260C	Chlorobenzene
GC-MS	EPA 8260B / 8260C	2-Chloroethyl vinyl ether
GC-MS	EPA 8260B / 8260C	Chloroethane
GC-MS	EPA 8260B / 8260C	Chloroform
GC-MS	EPA 8260B / 8260C	1-Chlorohexane
GC-MS	EPA 8260B / 8260C	Chloromethane
GC-MS	EPA 8260B / 8260C	2-Chlorotoluene
GC-MS	EPA 8260B / 8260C	4-Chlorotoluene
GC-MS	EPA 8260B / 8260C	Isopropyl ether (DIPE)
GC-MS	EPA 8260B / 8260C	Dibromochloromethane
GC-MS	EPA 8260B / 8260C	1,2-Dibromo-3-chloropropane
GC-MS	EPA 8260B / 8260C	1,2-Dibromoethane
GC-MS	EPA 8260B / 8260C	Dibromomethane
GC-MS	EPA 8260B / 8260C	1,1-Dichloroethane
GC-MS	EPA 8260B / 8260C	1,2-Dichloroethane
GC-MS	EPA 8260B / 8260C	1,2-Dichlorobenzene
GC-MS	EPA 8260B / 8260C	1,3-Dichlorobenzene
GC-MS	EPA 8260B / 8260C	trans-1,4-Dichloro-2-Butene
GC-MS	EPA 8260B / 8260C	1,4-Dichlorobenzene
GC-MS	EPA 8260B / 8260C	Dichlorodifluoromethane
GC-MS	EPA 8260B / 8260C	1,1-Dichloroethene
GC-MS	EPA 8260B / 8260C	cis-1,2-Dichloroethene
GC-MS	EPA 8260B / 8260C	trans-1,2-Dichloroethene
GC-MS	EPA 8260B / 8260C	Dichlorofluoromethane
GC-MS	EPA 8260B / 8260C	1,1-Dichloropropene
GC-MS	EPA 8260B / 8260C	1,2-Dichloropropane
GC-MS	EPA 8260B / 8260C	1,3-Dichloropropane
GC-MS	EPA 8260B / 8260C	2,2-Dichloropropane
GC-MS	EPA 8260B / 8260C	cis-1,3-Dichloropropene

Non-Potable Water

Technology	Method	Analyte
GC-MS	EPA 8260B / 8260C	trans-1,3-Dichloropropene
GC-MS	EPA 8260B / 8260C	tert-Butyl ethyl ether (ETBE)
GC-MS	EPA 8260B / 8260C	Ethyl Methacrylate
GC-MS	EPA 8260B / 8260C	Ethylbenzene
GC-MS	EPA 8260B / 8260C	2-Hexanone (MBK)
GC-MS	EPA 8260B / 8260C	Hexachlorobutadiene
GC-MS	EPA 8260B / 8260C	Iodomethane
GC-MS	EPA 8260B / 8260C	Isopropylbenzene
GC-MS	EPA 8260B / 8260C	p-Isopropyltoluene
GC-MS	EPA 8260B / 8260C	Methylene Chloride
GC-MS	EPA 8260B / 8260C	4-Methyl-2-pentanone (MIBK)
GC-MS	EPA 8260B / 8260C	tert-Butyl methyl ether
GC-MS	EPA 8260B / 8260C	Naphthalene
GC-MS	EPA 8260B / 8260C	n-Propylbenzene
GC-MS	EPA 8260B / 8260C	Styrene
GC-MS	EPA 8260B / 8260C	tert-Amyl methyl ether (TAME)
GC-MS	EPA 8260B / 8260C	1,1,1,2-Tetrachloroethane
GC-MS	EPA 8260B / 8260C	1,1,2,2-Tetrachloroethane
GC-MS	EPA 8260B / 8260C	Tetrachloroethene
GC-MS	EPA 8260B / 8260C	Toluene
GC-MS	EPA 8260B / 8260C	1,1,1-Trichloroethane
GC-MS	EPA 8260B / 8260C	1,1,2-Trichloroethane
GC-MS	EPA 8260B / 8260C	1,2,3-Trichlorobenzene
GC-MS	EPA 8260B / 8260C	1,2,4-Trichlorobenzene
GC-MS	EPA 8260B / 8260C	Trichloroethene
GC-MS	EPA 8260B / 8260C	Trichlorofluoromethane
GC-MS	EPA 8260B / 8260C	1,2,3-Trichloropropane
GC-MS	EPA 8260B / 8260C	1,1,2-Trichloro1,2,2-trifluoroethane
GC-MS	EPA 8260B / 8260C	1,2,4-Trimethylbenzene
GC-MS	EPA 8260B / 8260C	1,3,5-Trimethylbenzene
GC-MS	EPA 8260B / 8260C	Vinyl Acetate
GC-MS	EPA 8260B / 8260C	Vinyl Chloride
GC-MS	EPA 8260B / 8260C	m-Xylene & p-xylene
GC-MS	EPA 8260B / 8260C	o-Xylene
GC-MS	EPA 8260B / 8260C	2-Butanol
GC-MS	EPA 8260B / 8260C	Cyclohexane
GC-MS	EPA 8260B / 8260C	1,4-Dioxane
GC-MS	EPA 8260B / 8260C	2-Chloro-1,1,1-trifluoroethane
GC-MS	EPA 8260B / 8260C	Chlorotrifluoroethylene
GC-MS	EPA 8260B / 8260C	cis-1,4-Dichloro-2-butene
GC-MS	EPA 8260B / 8260C	Ethanol
GC-MS	EPA 8260B / 8260C	Ethyl Methacrylate
GC-MS	EPA 8260B / 8260C	Isobutyl Alcohol

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8260B / 8260C	Methacrylonitrile
GC-MS	EPA 8260B / 8260C	Methyl Methacrylate
GC-MS	EPA 8260B / 8260C	Pentachloroethane
GC-MS	EPA 8260B / 8260C	Propionitrile
GC-MS	EPA 8260B / 8260C	Sec-Propyl alcohol
GC-MS	EPA 8260B / 8260C	Tetrahydrofuran
GC-MS	EPA 8260B / 8260C	trans-1,4-Dichloro-2-butene
GC-MS	EPA 8260B / 8260C SIM	Benzene
GC-MS	EPA 8260B / 8260C SIM	Carbon tetrachloride
GC-MS	EPA 8260B / 8260C SIM	Chloroform
GC-MS	EPA 8260B / 8260C SIM	Chloromethane
GC-MS	EPA 8260B / 8260C SIM	1,2-Dibromo-3-chloropropane
GC-MS	EPA 8260B / 8260C SIM	1,2-Dibromoethane
GC-MS	EPA 8260B / 8260C SIM	1,2-Dichloroethane
GC-MS	EPA 8260B / 8260C SIM	1,1-Dichloroethene
GC-MS	EPA 8260B / 8260C SIM	cis-1,2-Dichloroethene
GC-MS	EPA 8260B / 8260C SIM	trans-1,2-Dichloroethene
GC-MS	EPA 8260B / 8260C SIM	1,1,2,2-Tetrachloroethane
GC-MS	EPA 8260B / 8260C SIM	Tetrachloroethene
GC-MS	EPA 8260B / 8260C SIM	1,1,1-Trichloroethane
GC-MS	EPA 8260B / 8260C SIM	1,1,2-Trichloroethane
GC-MS	EPA 8260B / 8260C SIM	Trichloroethene
GC-MS	EPA 8260B / 8260C SIM	1,2,3-Trichloropropane
GC-MS	EPA 8260B / 8260C SIM	Vinyl Chloride
GC-MS	EPA 8260B / 8260C SIM	1,4-Dioxane
GC-MS	EPA 8270C / 8270D	Acenaphthene
GC-MS	EPA 8270C / 8270D	Acenaphthylene
GC-MS	EPA 8270C / 8270D	Aniline
GC-MS	EPA 8270C / 8270D	Anthracene
GC-MS	EPA 8270C / 8270D	Azobenzene
GC-MS	EPA 8270C / 8270D	Benzidine
GC-MS	EPA 8270C / 8270D	Benzo(a)anthracene
GC-MS	EPA 8270C / 8270D	benzo(a)pyrene
GC-MS	EPA 8270C / 8270D	Benzo(b)fluoranthene
GC-MS	EPA 8270C / 8270D	Benzo(e)pyrene
GC-MS	EPA 8270C / 8270D	Benzo(g,h,i)perylene
GC-MS	EPA 8270C / 8270D	Benzo(k)fluoranthene
GC-MS	EPA 8270C / 8270D	Benzoic Acid
GC-MS	EPA 8270C / 8270D	Benzyl Alcohol
GC-MS	EPA 8270C / 8270D	Biphenyl
GC-MS	EPA 8270C / 8270D	bis(2-chloroethoxy)methane
GC-MS	EPA 8270C / 8270D	bis(2-chloroethyl)ether
GC-MS	EPA 8270C / 8270D	bis(2-chloroisopropyl)ether

Non-Potable Water

Technology	Method	Analyte
GC-MS	EPA 8270C / 8270D	bis(2-Ethylhexyl)adipate
GC-MS	EPA 8270C / 8270D	bis(2-Ethylhexyl)phthalate
GC-MS	EPA 8270C / 8270D	4-Bromophenyl-phenylether
GC-MS	EPA 8270C / 8270D	Butylbenzylphthalate
GC-MS	EPA 8270C / 8270D	Carbazole
GC-MS	EPA 8270C / 8270D	4-Chloro-3-methylphenol
GC-MS	EPA 8270C / 8270D	4-Chloroaniline
GC-MS	EPA 8270C / 8270D	2-Chloronaphthalene
GC-MS	EPA 8270C / 8270D	2-Chlorophenol
GC-MS	EPA 8270C / 8270D	4-Chlorophenyl-phenylether
GC-MS	EPA 8270C / 8270D	Chrysene
GC-MS	EPA 8270C / 8270D	Dibenzo(a,h)anthracene
GC-MS	EPA 8270C / 8270D	Dibenzofuran
GC-MS	EPA 8270C / 8270D	1,2-Dichlorobenzene
GC-MS	EPA 8270C / 8270D	1,3-Dichlorobenzene
GC-MS	EPA 8270C / 8270D	1,4-Dichlorobenzene
GC-MS	EPA 8270C / 8270D	3,3'-Dichlorobenzidine
GC-MS	EPA 8270C / 8270D	2,4-Dichlorophenol
GC-MS	EPA 8270C / 8270D	Diethylphthalate
GC-MS	EPA 8270C / 8270D	2,6-Dimethylnaphthalene
GC-MS	EPA 8270C / 8270D	2,4-Dimethylphenol
GC-MS	EPA 8270C / 8270D	Dimethylphthalate
GC-MS	EPA 8270C / 8270D	Di-n-butylphthalate
GC-MS	EPA 8270C / 8270D	4,6-Dinitro-2-methylphenol
GC-MS	EPA 8270C / 8270D	2,4-Dinitrophenol
GC-MS	EPA 8270C / 8270D	2,4-Dinitrotoluene
GC-MS	EPA 8270C / 8270D	2-6-Dinitrotoluene
GC-MS	EPA 8270C / 8270D	Di-n-octylphthalate
GC-MS	EPA 8270C / 8270D	Fluoranthene
GC-MS	EPA 8270C / 8270D	Fluorene
GC-MS	EPA 8270C / 8270D	Hexachlorobenzene
GC-MS	EPA 8270C / 8270D	Hexachlorobutadiene
GC-MS	EPA 8270C / 8270D	Hexachlorocyclopentadiene
GC-MS	EPA 8270C / 8270D	Hexachloroethane
GC-MS	EPA 8270C / 8270D	Indeno(1,2,3-cd)pyrene
GC-MS	EPA 8270C / 8270D	Isophorone
GC-MS	EPA 8270C / 8270D	1-Methylnaphthalene
GC-MS	EPA 8270C / 8270D	2-Methylnaphthalene
GC-MS	EPA 8270C / 8270D	1-Methylphenanthrene
GC-MS	EPA 8270C / 8270D	2-Methylphenol
GC-MS	EPA 8270C / 8270D	4-Methylphenol
GC-MS	EPA 8270C / 8270D	Naphthalene
GC-MS	EPA 8270C / 8270D	2-Nitroaniline

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Non-Potable Water		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C / 8270D	3-Nitroaniline
GC-MS	EPA 8270C / 8270D	4-Nitroaniline
GC-MS	EPA 8270C / 8270D	Nitrobenzene
GC-MS	EPA 8270C / 8270D	2-Nitrophenol
GC-MS	EPA 8270C / 8270D	4-Nitrophenol
GC-MS	EPA 8270C / 8270D	n-Nitrosodimethylamine
GC-MS	EPA 8270C / 8270D	n-Nitroso-di-n-propylamine
GC-MS	EPA 8270C / 8270D	n-Nitrosodiphenylamine
GC-MS	EPA 8270C / 8270D	Pentachlorophenol
GC-MS	EPA 8270C / 8270D	Perylene
GC-MS	EPA 8270C / 8270D	Phenanthrene
GC-MS	EPA 8270C / 8270D	Phenol
GC-MS	EPA 8270C / 8270D	Pyrene
GC-MS	EPA 8270C / 8270D	Pyridine
GC-MS	EPA 8270C / 8270D	2,3,4,6-Tetrachlorophenol
GC-MS	EPA 8270C / 8270D	1,2,4-Trichlorobenzene
GC-MS	EPA 8270C / 8270D	2,3,4-Trichlorophenol
GC-MS	EPA 8270C / 8270D	2,3,5-Trichlorophenol
GC-MS	EPA 8270C / 8270D	2,4,5-Trichlorophenol
GC-MS	EPA 8270C / 8270D	2,4,6-Trichlorophenol
GC-MS	EPA 8270C / 8270D	2,3,5-Trimethylnaphthalene
GC-MS	EPA 8270C / 8270D	1,2,4,5-Tetrachlorobenzene
GC-MS	EPA 8270C / 8270D	1,3,5-Trinitrobenzene
GC-MS	EPA 8270C / 8270D	1,3-Dinitrobenzene
GC-MS	EPA 8270C / 8270D	1,4-Dioxane
GC-MS	EPA 8270C / 8270D	1,4-Naphthoquinone
GC-MS	EPA 8270C / 8270D	1-Chloronaphthalene
GC-MS	EPA 8270C / 8270D	1-Naphthylamine
GC-MS	EPA 8270C / 8270D	2,6-Dichlorophenol
GC-MS	EPA 8270C / 8270D	2-acetylaminofluorene
GC-MS	EPA 8270C / 8270D	2-Naphthylamine
GC-MS	EPA 8270C / 8270D	2-Picoline
GC-MS	EPA 8270C / 8270D	3,3-Dimethylbenzidine
GC-MS	EPA 8270C / 8270D	3,4-Dimethylphenol
GC-MS	EPA 8270C / 8270D	3,5-Dimethylphenol
GC-MS	EPA 8270C / 8270D	3,5-Dimethylphenol
GC-MS	EPA 8270C / 8270D	3-Methylchlolanthrene
GC-MS	EPA 8270C / 8270D	4-Aminobiphenyl
GC-MS	EPA 8270C / 8270D	4-Nitroquinoline-N-oxide
GC-MS	EPA 8270C / 8270D	5-Nitro-o-toluidine
GC-MS	EPA 8270C / 8270D	7,12-Dimethylben(a)anthracene
GC-MS	EPA 8270C / 8270D	a,a-dimethylphenethylamine
GC-MS	EPA 8270C / 8270D	Acetophenone

Non-Potable Water

Technology	Method	Analyte
GC-MS	EPA 8270C / 8270D	Aramite
GC-MS	EPA 8270C / 8270D	Atrazine
GC-MS	EPA 8270C / 8270D	Biphenyl
GC-MS	EPA 8270C / 8270D	Chlorobenzilate
GC-MS	EPA 8270C / 8270D	Diallate
GC-MS	EPA 8270C / 8270D	Dibenzo(a,j)acridine
GC-MS	EPA 8270C / 8270D	Dimethoate
GC-MS	EPA 8270C / 8270D	Dinoseb
GC-MS	EPA 8270C / 8270D	Diphenyl ether
GC-MS	EPA 8270C / 8270D	Disulfoton
GC-MS	EPA 8270C / 8270D	Ethyl methacrylate
GC-MS	EPA 8270C / 8270D	Ethyl methanesulfonate
GC-MS	EPA 8270C / 8270D	Ethyl parathion
GC-MS	EPA 8270C / 8270D	Famphur
GC-MS	EPA 8270C / 8270D	Hexachlorophene
GC-MS	EPA 8270C / 8270D	Hexachloropropene
GC-MS	EPA 8270C / 8270D	Isodrin
GC-MS	EPA 8270C / 8270D	Isosafrole
GC-MS	EPA 8270C / 8270D	kepone
GC-MS	EPA 8270C / 8270D	Methapyrilene
GC-MS	EPA 8270C / 8270D	Methyl methanesulfonate
GC-MS	EPA 8270C / 8270D	Methyl parathion
GC-MS	EPA 8270C / 8270D	N-nitrosodiethylamine
GC-MS	EPA 8270C / 8270D	N-Nitrosodi-n-butylamine
GC-MS	EPA 8270C / 8270D	N-Nitrosomethylethylamine
GC-MS	EPA 8270C / 8270D	N-Nitrosomorpholine
GC-MS	EPA 8270C / 8270D	N-Nitrosopiperdine
GC-MS	EPA 8270C / 8270D	N-Nitrosopyrrolidine
GC-MS	EPA 8270C / 8270D	O,O,O-triethyl phosphorothi
GC-MS	EPA 8270C / 8270D	o-toluidine
GC-MS	EPA 8270C / 8270D	p-Dimethylaminoazobenze
GC-MS	EPA 8270C / 8270D	Pentachlorobenzene
GC-MS	EPA 8270C / 8270D	Pentachloroethane
GC-MS	EPA 8270C / 8270D	Pentachloronitrobenzene
GC-MS	EPA 8270C / 8270D	Phenacetin
GC-MS	EPA 8270C / 8270D	Phorate
GC-MS	EPA 8270C / 8270D	p-phenylenediamine
GC-MS	EPA 8270C / 8270D	Pronamide
GC-MS	EPA 8270C / 8270D	Safrole
GC-MS	EPA 8270C / 8270D	Sulfotepp
GC-MS	EPA 8270C / 8270D	Thionazin
GC-MS	EPA 8270C / 8270D SIM	Acenaphthene
GC-MS	EPA 8270C / 8270D SIM	Acenaphthylene

Non-Potable Water

Technology	Method	Analyte
GC-MS	EPA 8270C / 8270D SIM	Anthracene
GC-MS	EPA 8270C / 8270D SIM	Azobenzene
GC-MS	EPA 8270C / 8270D SIM	Benzo(a)anthracene
GC-MS	EPA 8270C / 8270D SIM	benzo(a)pyrene
GC-MS	EPA 8270C / 8270D SIM	Benzo(b)fluoranthene
GC-MS	EPA 8270C / 8270D SIM	Benzo(e)pyrene
GC-MS	EPA 8270C / 8270D SIM	Benzo(g,h,i)perylene
GC-MS	EPA 8270C / 8270D SIM	Benzo(k)fluoranthene
GC-MS	EPA 8270C / 8270D SIM	Biphenyl
GC-MS	EPA 8270C / 8270D SIM	bis(2-chloroethyl)ether
GC-MS	EPA 8270C / 8270D SIM	bis(2-Ethylhexyl)phthalate
GC-MS	EPA 8270C / 8270D SIM	Carbazole
GC-MS	EPA 8270C / 8270D SIM	4-Chloro-3-methylphenol
GC-MS	EPA 8270C / 8270D SIM	2-Chlorophenol
GC-MS	EPA 8270C / 8270D SIM	Chrysene
GC-MS	EPA 8270C / 8270D SIM	Dibenzo(a,h)anthracene
GC-MS	EPA 8270C / 8270D SIM	2,4-Dichlorophenol
GC-MS	EPA 8270C / 8270D SIM	2,6-Dimethylnaphthalene
GC-MS	EPA 8270C / 8270D SIM	2,4-Dimethylphenol
GC-MS	EPA 8270C / 8270D SIM	Fluoranthene
GC-MS	EPA 8270C / 8270D SIM	Fluorene
GC-MS	EPA 8270C / 8270D SIM	Hexachlorobenzene
GC-MS	EPA 8270C / 8270D SIM	Indeno(1,2,3-cd)pyrene
GC-MS	EPA 8270C / 8270D SIM	1-Methylnaphthalene
GC-MS	EPA 8270C / 8270D SIM	2-Methylnaphthalene
GC-MS	EPA 8270C / 8270D SIM	1-Methylphenanthrene
GC-MS	EPA 8270C / 8270D SIM	Naphthalene
GC-MS	EPA 8270C / 8270D SIM	n-Nitrosodimethylamine
GC-MS	EPA 8270C / 8270D SIM	n-Nitroso-di-n-propylamine
GC-MS	EPA 8270C / 8270D SIM	Pentachlorophenol
GC-MS	EPA 8270C / 8270D SIM	Perylene
GC-MS	EPA 8270C / 8270D SIM	Phenanthrene
GC-MS	EPA 8270C / 8270D SIM	Phenol
GC-MS	EPA 8270C / 8270D SIM	Pyrene
GC-MS	EPA 8270C / 8270D SIM	2,4,5-Trichlorophenol
GC-MS	EPA 8270C / 8270D SIM	2,4,6-Trichlorophenol
GC-MS	EPA 8270C / 8270D SIM	2,3,5-Trimethylnaphthalene
GC-MS	EPA 8270C / 8270D SIM	1,4-Dioxane
GC-MS	EPA 8270C / 8270D SIM	Butylbenzylphthalate
GC-MS	EPA 8270C / 8270D SIM	Diethylphthalate
GC-MS	EPA 8270C / 8270D SIM	Dimethylphthalate
GC-MS	EPA 8270C / 8270D SIM	Di-n-butylphthalate
GC-MS	EPA 8270C / 8270D SIM	Di-n-octylphthalate

Non-Potable Water		
Technology	**Method**	**Analyte**
HPLC	EPA 8310	Acenaphthene
HPLC	EPA 8310	Acenaphthylene
HPLC	EPA 8310	Anthracene
HPLC	EPA 8310	Benzo(a)anthracene
HPLC	EPA 8310	Benzo(a)pyrene
HPLC	EPA 8310	Benzo(b)fluoranthene
HPLC	EPA 8310	Benzo(g,h,i)perylene
HPLC	EPA 8310	Benzo(k)fluoranthene
HPLC	EPA 8310	Chrysene
HPLC	EPA 8310	Dibenzo(a,h)anthracene
HPLC	EPA 8310	Fluoranthene
HPLC	EPA 8310	Fluorene
HPLC	EPA 8310	Indeno(1,2,3-cd)pyrene
HPLC	EPA 8310	1-Methylnaphthalene
HPLC	EPA 8310	2-Methylnaphthalene
HPLC	EPA 8310	Naphthalene
HPLC	EPA 8310	Phenanthrene
HPLC	EPA 8310	Pyrene
HPLC	EPA 8330A	HMX
HPLC	EPA 8330A	RDX
HPLC	EPA 8330A	1,3,5-TNB
HPLC	EPA 8330A	1,3-DNB
HPLC	EPA 8330A	Tetryl
HPLC	EPA 8330A	Nitrobenzene
HPLC	EPA 8330A	2,4,6-TNT
HPLC	EPA 8330A	4-AM-2,6-DNT
HPLC	EPA 8330A	2-AM-4,6-DNT
HPLC	EPA 8330A	2,6-DNT
HPLC	EPA 8330A	2,4-DNT
HPLC	EPA 8330A	2-Nitrotoluene
HPLC	EPA 8330A	4-Nitrotoluene
HPLC	EPA 8330A	3-Nitrotoluene
HPLC	EPA 8330A	3,5-Dinitroaniline
HPLC	EPA 8330A	2,4-Diamino-6-nitrotoluene
HPLC	EPA 8330A	2,6-Diamino-4-nitrotoluene
HPLC	EPA 8330A	3,5-Dinitroaniline
HPLC	EPA 8330A	Picric Acid
HPLC	EPA 8332	Nitroglycerine
HPLC	EPA 8332	PETN
Spectrometric	EPA 9014	Cyanide
Electrode	EPA 9040C	pH
Electrode	EPA 9045D	pH
IC	EPA 9056 / 9056A	Bromate

Non-Potable Water		
Technology	**Method**	**Analyte**
IC	EPA 9056 / 9056A	Bromide
IC	EPA 9056 / 9056A	Chloride
IC	EPA 9056 / 9056A	Fluoride
IC	EPA 9056 / 9056A	Nitrate
IC	EPA 9056 / 9056A	Nitrite
IC	EPA 9056 / 9056A	Phosphate
IC	EPA 9056 / 9056A	Sulfate
Combustion-IR	EPA 9060	TOC
Spectrometric	EPA 9065	Phenols
Gravimetric	EPA 9070	Oil & Grease
Gravimetric	EPA 9071B	Oil & Grease
GC	RSK175	Methane
GC	RSK175	Acetylene
GC	RSK175	Ethylene
GC	RSK175	Ethane
GC	RSK175	Propane
GC	RSK175	Carbon dioxide
Spectrometric	SM4500-NH3C	Ammonia
Spectrometric	SM4500-NH3F	Ammonia
Spectrometric	SM4500-NOrgC	TKN
Spectrometric	SM4500-PE	Phosphorus
Turbidimetric	SM 2130B	Turbidity
Titrimetric	SM 2320B	Alkalinity
Titrimetric	SM 2340C	Hardness
Platinum Electrode	SM 2510B	Specific Conductance
Gravimetric	SM 2540C	TDS
Gravimetric	SM 2540D	TSS
Gravimetric	SM 2540B	Total Residue
Combustion-IR	SM5310	TOC
Spectrometric	SM3500-FeD	Ferrous iron
Titrimetric	SM4500-Cl B	Total Residual Chlorine
Spectrometric	SM4500CNE	Cyanide
Spectrometric	SM4500-NO2B	Nitrite-N
Spectrometric	SM4500-NO3E	Nitrate-N
Spectrometric	SM4500PE	Ortho-phosphate
Spectrometric	SM4500-PE(PB5)	Phosphorus
Spectrometric	SM4500-S2D	Sulfide
Titrimetric	SM4500-S2F	Sulfide
Spectrometric	SM4500-SiO2C	Silica
Electrode	SM5210B	BOD
Spectrometric	SM5220B	COD
Combustion-IR	SM 5310B	TOC
Spectrometric	SM5540C	Surfactants (MBAS)

Non-Potable Water		
Technology	**Method**	**Analyte**
Distillation	EPA 9010C	Cyanide
MicroDistillation	QuickChem 10-204-00-1-X	Cyanide
ICP/ICP-MS	SM2340B	Hardness
Preparation	**Method**	**Type**
Purge & Trap	EPA 5030B	Volatiles Prep
Acid Digestion	EPA 3005A / EPA 3010A / EPA 200.8	Metals Prep
Continuous Liquid-Liquid	EPA 3520C	Organic Extraction
Separatory Funnel	EPA 3510B	Organic Extraction
Waste Dilution	EPA 3580A	Organic Extraction
TCLP	EPA 1311	Leaching
SPLP	EPA 1312	Leaching

Drinking Water		
Technology	**Method**	**Analyte**
Platinum Electrode	EPA 120.1	Specific Conductance
Electrode	EPA 150.1	pH
Gravimetric	EPA 160.1	TDS
Gravimetric	EPA 160.2	TSS
Gravimetric	EPA 160.3	Total Residue
ICP-MS	EPA 200.8	Aluminum
ICP-MS	EPA 200.8	Antimony
ICP-MS	EPA 200.8	Arsenic
ICP-MS	EPA 200.8	Barium
ICP-MS	EPA 200.8	Beryllium
ICP-MS	EPA 200.8	Boron
ICP-MS	EPA 200.8	Cadmium
ICP-MS	EPA 200.8	Calcium
ICP-MS	EPA 200.8	Chromium
ICP-MS	EPA 200.8	Cobalt
ICP-MS	EPA 200.8	Copper
ICP-MS	EPA 200.8	Iron
ICP-MS	EPA 200.8	Lithium
ICP-MS	EPA 200.8	Lead
ICP-MS	EPA 200.8	Magnesium
ICP-MS	EPA 200.8	Manganese
ICP-MS	EPA 200.8	Molybdenum
ICP-MS	EPA 200.8	Nickel
ICP-MS	EPA 200.8	Potassium
ICP-MS	EPA 200.8	Selenium

Drinking Water		
Technology	**Method**	**Analyte**
ICP-MS	EPA 200.8	Silver
ICP-MS	EPA 200.8	Sodium
ICP-MS	EPA 200.8	Strontium
ICP-MS	EPA 200.8	Thallium
ICP-MS	EPA 200.8	Tin
ICP-MS	EPA 200.8	Titanium
ICP-MS	EPA 200.8	Uranium
ICP-MS	EPA 200.8	Vanadium
ICP-MS	EPA 200.8	Zinc
IC	EPA 218.6	Hexavalent Chromium
Cold Vapor	EPA 245.1	Mercury
IC	EPA 300.0	Bromate
IC	EPA 300.0	Bromide
IC	EPA 300.0	Chloride
IC	EPA 300.0	Fluoride
IC	EPA 300.0	Nitrate
IC	EPA 300.0	Nitrite
IC	EPA 300.0	Phosphate
IC	EPA 300.0	Sulfate
IC	EPA 300M	Acetate
IC	EPA 300M	Butyrate
IC	EPA 300M	Lactate
IC	EPA 300M	Propionate
IC	EPA 300M	Pyruvate
IC	EPA314.0	Perchlorate
Spectrometric	EPA 335.2	Cyanide
Spectrometric	EPA 350.2	Ammonia
Spectrometric	EPA 351.3	TKN
Spectrometric	EPA 352.1	Nitrate-N
Spectrometric	EPA 353.3	Nitrate-N
Spectrometric	EPA 354.1	Nitrite-N
Spectrometric	EPA 365.2	Ortho-phosphate
Spectrometric	EPA 365.2	Phosphorus
Spectrometric	EPA 370.1	Silica
Titrimetric	EPA 376.2	Sulfide
Spectrometric	EPA 410.4	COD
Combustion-IR	EPA 415.1	TOC
Spectrometric	EPA 420.1	Phenols
GC	EPA 504.1	DBCP
GC	EPA 504.1	EDB
GC-MS	EPA 524.2	Acetone

Drinking Water

Technology	Method	Analyte
GC-MS	EPA 524.2	Benzene
GC-MS	EPA 524.2	Bromobenzene
GC-MS	EPA 524.2	Bromochloromethane
GC-MS	EPA 524.2	Bromodichloromethane
GC-MS	EPA 524.2	Bromoform
GC-MS	EPA 524.2	Bromomethane
GC-MS	EPA 524.2	tert-Butyl alcohol
GC-MS	EPA 524.2	2-Butanone (MEK)
GC-MS	EPA 524.2	n-Butylbenzene
GC-MS	EPA 524.2	sec-Butylbenzene
GC-MS	EPA 524.2	tert-Butylbenzene
GC-MS	EPA 524.2	Carbon disulfide
GC-MS	EPA 524.2	Carbon tetrachloride
GC-MS	EPA 524.2	Chlorobenzene
GC-MS	EPA 524.2	Chloroethane
GC-MS	EPA 524.2	Chloroform
GC-MS	EPA 524.2	Chloromethane
GC-MS	EPA 524.2	2-Chlorotoluene
GC-MS	EPA 524.2	4-Chlorotoluene
GC-MS	EPA 524.2	Dibromochloromethane
GC-MS	EPA 524.2	1,2-Dibromo-3-chloropropane
GC-MS	EPA 524.2	1,2-Dibromoethane
GC-MS	EPA 524.2	Dibromomethane
GC-MS	EPA 524.2	1,1-Dichloroethane
GC-MS	EPA 524.2	1,2-Dichloroethane
GC-MS	EPA 524.2	1,2-Dichlorobenzene
GC-MS	EPA 524.2	1,3-Dichlorobenzene
GC-MS	EPA 524.2	1,4-Dichlorobenzene
GC-MS	EPA 524.2	Dichlorodifluoromethane
GC-MS	EPA 524.2	1,1-Dichloroethene
GC-MS	EPA 524.2	cis-1,2-Dichloroethene
GC-MS	EPA 524.2	trans-1,2-Dichloroethene
GC-MS	EPA 524.2	1,1-Dichloropropene
GC-MS	EPA 524.2	1,2-Dichloropropane
GC-MS	EPA 524.2	1,3-Dichloropropane
GC-MS	EPA 524.2	2,2-Dichloropropane
GC-MS	EPA 524.2	cis-1,3-Dichloropropene
GC-MS	EPA 524.2	trans-1,3-Dichloropropene
GC-MS	EPA 524.2	tert-Butyl ethyl ether (ETBE)
GC-MS	EPA 524.2	Ethylbenzene
GC-MS	EPA 524.2	2-Hexanone (MBK)

Drinking Water

Technology	Method	Analyte
GC-MS	EPA 524.2	Hexachlorobutadiene
GC-MS	EPA 524.2	Isopropyl ether (DIPE)
GC-MS	EPA 524.2	Isopropylbenzene
GC-MS	EPA 524.2	p-Isopropyltoluene
GC-MS	EPA 524.2	Methylene Chloride
GC-MS	EPA 524.2	4-Methyl-2-pentanone (MIBK)
GC-MS	EPA 524.2	tert-Butyl methyl ether
GC-MS	EPA 524.2	Naphthalene
GC-MS	EPA 524.2	n-Propylbenzene
GC-MS	EPA 524.2	Styrene
GC-MS	EPA 524.2	tert-Amyl methyl ether (TAME)
GC-MS	EPA 524.2	1,1,1,2-Tetrachloroethane
GC-MS	EPA 524.2	1,1,2,2-Tetrachloroethane
GC-MS	EPA 524.2	Tetrachloroethene
GC-MS	EPA 524.2	Toluene
GC-MS	EPA 524.2	1,1,1-Trichloroethane
GC-MS	EPA 524.2	1,1,2-Trichloroethane
GC-MS	EPA 524.2	1,2,3-Trichlorobenzene
GC-MS	EPA 524.2	1,2,4-Trichlorobenzene
GC-MS	EPA 524.2	Trichloroethene
GC-MS	EPA 524.2	Trichlorofluoromethane
GC-MS	EPA 524.2	1,2,3-Trichloropropane
GC-MS	EPA 524.2	1,1,2-Trichloro1,2,2-trifluoroethane
GC-MS	EPA 524.2	1,2,4-Trimethylbenzene
GC-MS	EPA 524.2	1,3,5-Trimethylbenzene
GC-MS	EPA 524.2	Vinyl Chloride
GC-MS	EPA 524.2	m-Xylene & p-xylene
GC-MS	EPA 524.2	o-Xylene
HPLC-MS	EPA 6850	Perchlorate
ICP/ICP-MS by Calculation	SM 2340B	Hardness
Titrimetric	SM 2340C	Hardness
Platinum Electrode	SM 2510B	Specific Conductance
Gravimetric	SM 2540B	Total Residue
Gravimetric	SM 2540C	TDS
Gravimetric	SM 2540D	TSS
Spectrometric	SM 3500-FeD	Ferrous Iron
Spectrometric	SM 4500-CNE	Cyanide
Spectrometric	SM 4500-NH3C	Ammonia
Spectrometric	SM 4500-NH3F	Ammonia
Spectrometric	SM 4500-NO2B	Nitrite-N
Spectrometric	SM 4500-NO3E	Nitrate-N

Drinking Water

Technology	Method	Analyte
Spectrometric	SM 4500-NOrgC	TKN
Spectrometric	SM 4500-PE	Ortho-phosphate
Spectrometric	SM 4500-PE(PB5)	Phosphorus
Titrimetric	SM 4500-S2D	Sulfide
Spectrometric	SM 4500-SiO2C	Silica
Spectrometric	SM 5220B	COD
Combustion-IR	SM 5310B	TOC
Spectrometric	SM 5540C	Surfactants
MicroDistillation	QuickChem 10-204-00-1-X	Cyanide

Solid and Chemical Materials

Technology	Method	Analyte
GC	AK101	GRO
GC	AK102	DRO
GC	AK103	RRO
GC	AZ8015	DRO (C10-C22)
GC	AZ8015	ORO (C22-C32)
GC	RSK175	Methane
GC	RSK175	Acetylene
GC	RSK175	Ethylene
GC	RSK175	Ethane
GC	RSK175	Propane
GC	RSK175	Carbon dioxide
Spectrometric	SM4500-NH3C	Ammonia
Spectrometric	SM4500-NH3F	Ammonia
Spectrometric	SM4500-NOrgC	TKN
Spectrometric	SM4500-PE(PB5)	Phosphorus
Titrimetric	Walkley Black	TOC
Electrode	EPA 9040C	pH
Electrode	EPA 9045D	pH
Spectrometric	EPA 9065	Phenols
Penskey-Martens	EPA 1010	Ignitability
ICP	EPA 6010B / 6010C	Aluminum
ICP	EPA 6010B / 6010C	Antimony
ICP	EPA 6010B / 6010C	Arsenic
ICP	EPA 6010B / 6010C	Barium
ICP	EPA 6010B / 6010C	Beryllium
ICP	EPA 6010B / 6010C	Boron
ICP	EPA 6010B / 6010C	Cadmium
ICP	EPA 6010B / 6010C	Calcium
ICP	EPA 6010B / 6010C	Chromium

Solid and Chemical Materials

Technology	Method	Analyte
ICP	EPA 6010B / 6010C	Cobalt
ICP	EPA 6010B / 6010C	Copper
ICP	EPA 6010B / 6010C	Iron
ICP	EPA 6010B / 6010C	Lead
ICP	EPA 6010B / 6010C	Magnesium
ICP	EPA 6010B / 6010C	Manganese
ICP	EPA 6010B / 6010C	Molybdenum
ICP	EPA 6010B / 6010C	Nickel
ICP	EPA 6010B / 6010C	Potassium
ICP	EPA 6010B / 6010C	Selenium
ICP	EPA 6010B / 6010C	Silver
ICP	EPA 6010B / 6010C	Sodium
ICP	EPA 6010B / 6010C	Strontium
ICP	EPA 6010B / 6010C	Thallium
ICP	EPA 6010B / 6010C	Tin
ICP	EPA 6010B / 6010C	Titanium
ICP	EPA 6010B / 6010C	Vanadium
ICP	EPA 6010B / 6010C	Zinc
IPC-MS	EPA 6020A	Aluminum
IPC-MS	EPA 6020A	Antimony
IPC-MS	EPA 6020A	Arsenic
IPC-MS	EPA 6020A	Barium
IPC-MS	EPA 6020A	Beryllium
IPC-MS	EPA 6020A	Boron
IPC-MS	EPA 6020A	Cadmium
IPC-MS	EPA 6020A	Calcium
IPC-MS	EPA 6020A	Chromium
IPC-MS	EPA 6020A	Cobalt
IPC-MS	EPA 6020A	Copper
ICP-MS	EPA 6020A	Iron
ICP-MS	EPA 6020A	Lead
ICP-MS	EPA 6020A	Magnesium
ICP-MS	EPA 6020A	Manganese
ICP-MS	EPA 6020A	Molybdenum
ICP-MS	EPA 6020A	Nickel
ICP-MS	EPA 6020A	Potassium
ICP-MS	EPA 6020A	Selenium
ICP-MS	EPA 6020A	Silver
ICP-MS	EPA 6020A	Sodium
ICP-MS	EPA 6020A	Strontium
ICP-MS	EPA 6020A	Thallium
ICP-MS	EPA 6020A	Tin
ICP-MS	EPA 6020A	Titanium

Solid and Chemical Materials

Technology	Method	Analyte
ICP-MS	EPA 6020A	Uranium
ICP-MS	EPA 6020A	Vanadium
ICP-MS	EPA 6020A	Zinc
HPLC-MS	EPA 6850	Perchlorate
Spectrometric	EPA 7196A	Hex. Chromium
IC	EPA 7199	Hex. Chromium
Cold-Vapor	EPA 7470A / 7471A / 7471B	Mercury
GC	EPA 8011	DBCP
GC	EPA 8011	EDB
GC	EPA 8015B / 8015C	Gasoline
GC	EPA 8015B / 8015C	Diesel
GC	EPA 8015B / 8015C	Motor Oil
GC	EPA 8015B / 8015C	JP5
GC	EPA 8015B / 8015C	Ethanol
GC	EPA 8015B / 8015C	Isopropanol
GC	EPA 8015B / 8015C	Diethylene Glycol
GC	EPA 8015B / 8015C	Ethylene Glycol
GC	EPA 8015B / 8015C	JP4
GC	EPA 8015B / 8015C	Methanol
GC	EPA 8015B / 8015C	Propylene Glycol
GC	EPA 8081A / 8081B	Aldrin
GC	EPA 8081A / 8081B	alpha-BHC
GC	EPA 8081A / 8081B	beta-BHC
GC	EPA 8081A / 8081B	delta-BHC
GC	EPA 8081A / 8081B	gamma-BHC (Lindane)
GC	EPA 8081A / 8081B	DDD (4,4)
GC	EPA 8081A / 8081B	DDE (4,4)
GC	EPA 8081A / 8081B	DDT (4,4)
GC	EPA 8081A / 8081B	Dieldrin
GC	EPA 8081A / 8081B	Endosulfan I
GC	EPA 8081A / 8081B	Endosulfan II
GC	EPA 8081A / 8081B	Endosulfan sulfate
GC	EPA 8081A / 8081B	Endrin
GC	EPA 8081A / 8081B	Endrin Aldehyde
GC	EPA 8081A / 8081B	Heptachlor
GC	EPA 8081A / 8081B	Heptachlor epoxide
GC	EPA 8081A / 8081B	Methoxychlor
GC	EPA 8081A / 8081B	alpha-Chlordane
GC	EPA 8081A / 8081B	gamma-Chlordane
GC	EPA 8081A / 8081B	Endrin Ketone
GC	EPA 8081A / 8081B	Toxaphene
GC	EPA 8081A / 8081B	Technical Chlordane

Solid and Chemical Materials

Technology	Method	Analyte
GC	EPA 8081A / 8081B	cis-Nonachlor
GC	EPA 8081A / 8081B	DDD (2,4)
GC	EPA 8081A / 8081B	DDE (2,4)
GC	EPA 8081A / 8081B	DDT (2,4)
GC	EPA 8081A / 8081B	Mirex
GC	EPA 8081A / 8081B	Oxychlordane
GC	EPA 8081A / 8081B	trans-Nonachlor
GC	EPA 8082 / 8082A	PCB1016
GC	EPA 8082 / 8082A	PCB1221
GC	EPA 8082 / 8082A	PCB1232
GC	EPA 8082 / 8082A	PCB1242
GC	EPA 8082 / 8082A	PCB1248
GC	EPA 8082 / 8082A	PCB1254
GC	EPA 8082 / 8082A	PCB1260
GC	EPA 8082 / 8082A	PCB1262
GC	EPA 8082 / 8082A	PCB1268
GC	EPA 8082 / 8082A	PCB 8
GC	EPA 8082 / 8082A	PCB 18
GC	EPA 8082 / 8082A	PCB 28
GC	EPA 8082 / 8082A	PCB 44
GC	EPA 8082 / 8082A	PCB 52
GC	EPA 8082 / 8082A	PCB 66
GC	EPA 8082 / 8082A	PCB 77
GC	EPA 8082 / 8082A	PCB 81
GC	EPA 8082 / 8082A	PCB 101
GC	EPA 8082 / 8082A	PCB 105
GC	EPA 8082 / 8082A	PCB 110
GC	EPA 8082 / 8082A	PCB 114
GC	EPA 8082 / 8082A	PCB 118
GC	EPA 8082 / 8082A	PCB 123
GC	EPA 8082 / 8082A	PCB 126
GC	EPA 8082 / 8082A	PCB 128
GC	EPA 8082 / 8082A	PCB 138
GC	EPA 8082 / 8082A	PCB 153
GC	EPA 8082 / 8082A	PCB 156
GC	EPA 8082 / 8082A	PCB 157
GC	EPA 8082 / 8082A	PCB 167
GC	EPA 8082 / 8082A	PCB 169
GC	EPA 8082 / 8082A	PCB 170
GC	EPA 8082 / 8082A	PCB 180
GC	EPA 8082 / 8082A	PCB 187
GC	EPA 8082 / 8082A	PCB 189
GC	EPA 8082 / 8082A	PCB 195

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC	EPA 8082 / 8082A	PCB 206
GC	EPA 8082 / 8082A	PCB 209
GC	EPA 8141A / 8141B	Azinphos-methyl
GC	EPA 8141A / 8141B	Bolstar
GC	EPA 8141A / 8141B	Chlorpyrifos
GC	EPA 8141A / 8141B	Coumaphos
GC	EPA 8141A / 8141B	Demeton
GC	EPA 8141A / 8141B	Diazinon
GC	EPA 8141A / 8141B	Dichlorvos
GC	EPA 8141A / 8141B	Disulfoton
GC	EPA 8141A / 8141B	Ethoprop
GC	EPA 8141A / 8141B	Fensulfothion
GC	EPA 8141A / 8141B	Fenthion
GC	EPA 8141A / 8141B	Merphos
GC	EPA 8141A / 8141B	Mevinphos
GC	EPA 8141A / 8141B	Naled
GC	EPA 8141A / 8141B	Methyl Parathion
GC	EPA 8141A / 8141B	Phorate
GC	EPA 8141A / 8141B	Ronnel
GC	EPA 8141A / 8141B	Stirophos
GC	EPA 8141A / 8141B	Tokuthion
GC	EPA 8141A / 8141B	Trichloronate
GC	EPA 8141A / 8141B	Dimethoate
GC	EPA 8141A / 8141B	EPN
GC	EPA 8141A / 8141B	Famphur
GC	EPA 8141A / 8141B	Malathion
GC	EPA 8141A / 8141B	Ethyl Parathion
GC	EPA 8141A / 8141B	O,O,O-Triethylphosphorothioate
GC	EPA 8141A / 8141B	Sulfotepp
GC	EPA 8141A / 8141B	Thionazin
GC	EPA 8141A / 8141B	Tributyl Phosphate
GC-MS	EPA 8260B / 8260C	Acetone
GC-MS	EPA 8260B / 8260C	Acrolein
GC-MS	EPA 8260B / 8260C	Acrylonitrile
GC-MS	EPA 8260B / 8260C	Benzene
GC-MS	EPA 8260B / 8260C	Bromobenzene
GC-MS	EPA 8260B / 8260C	Bromochloromethane
GC-MS	EPA 8260B / 8260C	Bromodichloromethane
GC-MS	EPA 8260B / 8260C	Bromoform
GC-MS	EPA 8260B / 8260C	Bromomethane
GC-MS	EPA 8260B / 8260C	tert-Butyl alcohol
GC-MS	EPA 8260B / 8260C	2-Butanone (MEK)
GC-MS	EPA 8260B / 8260C	n-Butylbenzene

Solid and Chemical Materials

Technology	Method	Analyte
GC-MS	EPA 8260B / 8260C	sec-Butylbenzene
GC-MS	EPA 8260B / 8260C	tert-Butylbenzene
GC-MS	EPA 8260B / 8260C	Carbon disulfide
GC-MS	EPA 8260B / 8260C	Carbon tetrachloride
GC-MS	EPA 8260B / 8260C	Chlorobenzene
GC-MS	EPA 8260B / 8260C	2-Chloroethyl vinyl ether
GC-MS	EPA 8260B / 8260C	Chloroethane
GC-MS	EPA 8260B / 8260C	Chloroform
GC-MS	EPA 8260B / 8260C	1-Chlorohexane
GC-MS	EPA 8260B / 8260C	Chloromethane
GC-MS	EPA 8260B / 8260C	2-Chlorotoluene
GC-MS	EPA 8260B / 8260C	4-Chlorotoluene
GC-MS	EPA 8260B / 8260C	Isopropyl ether (DIPE)
GC-MS	EPA 8260B / 8260C	Dibromochloromethane
GC-MS	EPA 8260B / 8260C	1,2-Dibromo-3-chloropropane
GC-MS	EPA 8260B / 8260C	1,2-Dibromoethane
GC-MS	EPA 8260B / 8260C	Dibromomethane
GC-MS	EPA 8260B / 8260C	1,1-Dichloroethane
GC-MS	EPA 8260B / 8260C	1,2-Dichloroethane
GC-MS	EPA 8260B / 8260C	1,2-Dichlorobenzene
GC-MS	EPA 8260B / 8260C	1,3-Dichlorobenzene
GC-MS	EPA 8260B / 8260C	trans-1,4-Dichloro-2-Butene
GC-MS	EPA 8260B / 8260C	1,4-Dichlorobenzene
GC-MS	EPA 8260B / 8260C	Dichlorodifluoromethane
GC-MS	EPA 8260B / 8260C	1,1-Dichloroethene
GC-MS	EPA 8260B / 8260C	cis-1,2-Dichloroethene
GC-MS	EPA 8260B / 8260C	trans-1,2-Dichloroethene
GC-MS	EPA 8260B / 8260C	Dichlorofluoromethane
GC-MS	EPA 8260B / 8260C	1,1-Dichloropropene
GC-MS	EPA 8260B / 8260C	1,2-Dichloropropane
GC-MS	EPA 8260B / 8260C	1,3-Dichloropropane
GC-MS	EPA 8260B / 8260C	2,2-Dichloropropane
GC-MS	EPA 8260B / 8260C	cis-1,3-Dichloropropene
GC-MS	EPA 8260B / 8260C	trans-1,3-Dichloropropene
GC-MS	EPA 8260B / 8260C	tert-Butyl ethyl ether (ETBE)
GC-MS	EPA 8260B / 8260C	Ethyl Methacrylate
GC-MS	EPA 8260B / 8260C	Ethylbenzene
GC-MS	EPA 8260B / 8260C	2-Hexanone (MBK)
GC-MS	EPA 8260B / 8260C	Hexachlorobutadiene
GC-MS	EPA 8260B / 8260C	Iodomethane
GC-MS	EPA 8260B / 8260C	Isopropylbenzene
GC-MS	EPA 8260B / 8260C	p-Isopropyltoluene
GC-MS	EPA 8260B / 8260C	Methylene Chloride

Solid and Chemical Materials

Technology	Method	Analyte
GC-MS	EPA 8260B / 8260C	4-Methyl-2-pentanone (MIBK)
GC-MS	EPA 8260B / 8260C	tert-Butyl methyl ether
GC-MS	EPA 8260B / 8260C	Naphthalene
GC-MS	EPA 8260B / 8260C	n-Propylbenzene
GC-MS	EPA 8260B / 8260C	Styrene
GC-MS	EPA 8260B / 8260C	tert-Amyl methyl ether (TAME)
GC-MS	EPA 8260B / 8260C	1,1,1,2-Tetrachloroethane
GC-MS	EPA 8260B / 8260C	1,1,2,2-Tetrachloroethane
GC-MS	EPA 8260B / 8260C	Tetrachloroethene
GC-MS	EPA 8260B / 8260C	Toluene
GC-MS	EPA 8260B / 8260C	1,1,1-Trichloroethane
GC-MS	EPA 8260B / 8260C	1,1,2-Trichloroethane
GC-MS	EPA 8260B / 8260C	1,2,3-Trichlorobenzene
GC-MS	EPA 8260B / 8260C	1,2,4-Trichlorobenzene
GC-MS	EPA 8260B / 8260C	Trichloroethene
GC-MS	EPA 8260B / 8260C	Trichlorofluoromethane
GC-MS	EPA 8260B / 8260C	1,2,3-Trichloropropane
GC-MS	EPA 8260B / 8260C	1,1,2-Trichloro1,2,2-trifluoroethane
GC-MS	EPA 8260B / 8260C	1,2,4-Trimethylbenzene
GC-MS	EPA 8260B / 8260C	1,3,5-Trimethylbenzene
GC-MS	EPA 8260B / 8260C	Vinyl Acetate
GC-MS	EPA 8260B / 8260C	Vinyl Chloride
GC-MS	EPA 8260B / 8260C	m-Xylene & p-xylene
GC-MS	EPA 8260B / 8260C	o-Xylene
GC-MS	EPA 8260B / 8260C	2-Butanol
GC-MS	EPA 8260B / 8260C	Cyclohexane
GC-MS	EPA 8260B / 8260C	1,4-Dioxane
GC-MS	EPA 8260B / 8260C	2-Chloro-1,1,1-trifluoroethane
GC-MS	EPA 8260B / 8260C	2-Chloro-1,1,1-trifluoroethane
GC-MS	EPA 8260B / 8260C	Chlorotrifluoroethylene
GC-MS	EPA 8260B / 8260C	cis-1,4-Dichloro-2-butene
GC-MS	EPA 8260B / 8260C	Ethanol
GC-MS	EPA 8260B / 8260C	Ethyl Methacrylate
GC-MS	EPA 8260B / 8260C	Isobutyl Alcohol
GC-MS	EPA 8260B / 8260C	Methacrylonitrile
GC-MS	EPA 8260B / 8260C	Methyl Methacrylate
GC-MS	EPA 8260B / 8260C	Pentachloroethane
GC-MS	EPA 8260B / 8260C	Propionitrile
GC-MS	EPA 8260B / 8260C	Sec-Propyl alcohol
GC-MS	EPA 8260B / 8260C	Tetrahydrofuran
GC-MS	EPA 8260B / 8260C	trans-1,4-Dichloro-2-butene
GC-MS	EPA 8260B / 8260C SIM	Benzene
GC-MS	EPA 8260B / 8260C SIM	Carbon tetrachloride

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Solid and Chemical Materials

Technology	Method	Analyte
GC-MS	EPA 8260B / 8260C SIM	Chloroform
GC-MS	EPA 8260B / 8260C SIM	Chloromethane
GC-MS	EPA 8260B / 8260C SIM	1,2-Dibromo-3-chloropropane
GC-MS	EPA 8260B / 8260C SIM	1,2-Dibromoethane
GC-MS	EPA 8260B / 8260C SIM	1,2-Dichloroethane
GC-MS	EPA 8260B / 8260C SIM	1,1-Dichloroethene
GC-MS	EPA 8260B / 8260C SIM	cis-1,2-Dichloroethene
GC-MS	EPA 8260B / 8260C SIM	trans-1,2-Dichloroethene
GC-MS	EPA 8260B / 8260C SIM	1,1,2,2-Tetrachloroethane
GC-MS	EPA 8260B / 8260C SIM	Tetrachloroethene
GC-MS	EPA 8260B / 8260C SIM	1,1,1-Trichloroethane
GC-MS	EPA 8260B / 8260C SIM	1,1,2-Trichloroethane
GC-MS	EPA 8260B / 8260C SIM	Trichloroethene
GC-MS	EPA 8260B / 8260C SIM	1,2,3-Trichloropropane
GC-MS	EPA 8260B / 8260C SIM	Vinyl Chloride
GC-MS	EPA 8260B / 8260C SIM	1,4-Dioxane
GC-MS	EPA 8270C / 8270D	Acenaphthene
GC-MS	EPA 8270C / 8270D	Acenaphthylene
GC-MS	EPA 8270C / 8270D	Aniline
GC-MS	EPA 8270C / 8270D	Anthracene
GC-MS	EPA 8270C / 8270D	Azobenzene
GC-MS	EPA 8270C / 8270D	Benzidine
GC-MS	EPA 8270C / 8270D	Benzo(a)anthracene
GC-MS	EPA 8270C / 8270D	benzo(a)pyrene
GC-MS	EPA 8270C / 8270D	Benzo(b)fluoranthene
GC-MS	EPA 8270C / 8270D	Benzo(e)pyrene
GC-MS	EPA 8270C / 8270D	Benzo(g,h,i)perylene
GC-MS	EPA 8270C / 8270D	Benzo(k)fluoranthene
GC-MS	EPA 8270C / 8270D	Benzoic Acid
GC-MS	EPA 8270C / 8270D	Benzyl Alcohol
GC-MS	EPA 8270C / 8270D	Biphenyl
GC-MS	EPA 8270C / 8270D	bis(2-chloroethoxy)methane
GC-MS	EPA 8270C / 8270D	bis(2-chloroethyl)ether
GC-MS	EPA 8270C / 8270D	bis(2-chloroisopropyl)ether
GC-MS	EPA 8270C / 8270D	bis(2-Ethylhexyl)adipate
GC-MS	EPA 8270C / 8270D	bis(2-Ethylhexyl)phthalate
GC-MS	EPA 8270C / 8270D	4-Bromophenyl-phenylether
GC-MS	EPA 8270C / 8270D	Butylbenzylphthalate
GC-MS	EPA 8270C / 8270D	Carbazole
GC-MS	EPA 8270C / 8270D	4-Chloro-3-methylphenol
GC-MS	EPA 8270C / 8270D	4-Chloroaniline
GC-MS	EPA 8270C / 8270D	2-Chloronaphthalene
GC-MS	EPA 8270C / 8270D	2-Chlorophenol

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C / 8270D	4-Chlorophenyl-phenylether
GC-MS	EPA 8270C / 8270D	Chrysene
GC-MS	EPA 8270C / 8270D	Dibenzo(a,h)anthracene
GC-MS	EPA 8270C / 8270D	Dibenzofuran
GC-MS	EPA 8270C / 8270D	1,2-Dichlorobenzene
GC-MS	EPA 8270C / 8270D	1,3-Dichlorobenzene
GC-MS	EPA 8270C / 8270D	1,4-Dichlorobenzene
GC-MS	EPA 8270C / 8270D	3,3'-Dichlorobenzidine
GC-MS	EPA 8270C / 8270D	2,4-Dichlorophenol
GC-MS	EPA 8270C / 8270D	Diethylphthalate
GC-MS	EPA 8270C / 8270D	2,6-Dimethylnaphthalene
GC-MS	EPA 8270C / 8270D	2,4-Dimethylphenol
GC-MS	EPA 8270C / 8270D	Dimethylphthalate
GC-MS	EPA 8270C / 8270D	Di-n-butylphthalate
GC-MS	EPA 8270C / 8270D	4,6-Dinitro-2-methylphenol
GC-MS	EPA 8270C / 8270D	2,4-Dinitrophenol
GC-MS	EPA 8270C / 8270D	2,4-Dinitrotoluene
GC-MS	EPA 8270C / 8270D	2-6-Dinitrotoluene
GC-MS	EPA 8270C / 8270D	Di-n-octylphthalate
GC-MS	EPA 8270C / 8270D	Fluoranthene
GC-MS	EPA 8270C / 8270D	Fluorene
GC-MS	EPA 8270C / 8270D	Hexachlorobenzene
GC-MS	EPA 8270C / 8270D	Hexachlorobutadiene
GC-MS	EPA 8270C / 8270D	Hexachlorocyclopentadiene
GC-MS	EPA 8270C / 8270D	Hexachloroethane
GC-MS	EPA 8270C / 8270D	Indeno(1,2,3-cd)pyrene
GC-MS	EPA 8270C / 8270D	Isophorone
GC-MS	EPA 8270C / 8270D	1-Methylnaphthalene
GC-MS	EPA 8270C / 8270D	2-Methylnaphthalene
GC-MS	EPA 8270C / 8270D	1-Methylphenanthrene
GC-MS	EPA 8270C / 8270D	2-Methylphenol
GC-MS	EPA 8270C / 8270D	4-Methylphenol
GC-MS	EPA 8270C / 8270D	Naphthalene
GC-MS	EPA 8270C / 8270D	2-Nitroaniline
GC-MS	EPA 8270C / 8270D	3-Nitroaniline
GC-MS	EPA 8270C / 8270D	4-Nitroaniline
GC-MS	EPA 8270C / 8270D	Nitrobenzene
GC-MS	EPA 8270C / 8270D	2-Nitrophenol
GC-MS	EPA 8270C / 8270D	4-Nitrophenol
GC-MS	EPA 8270C / 8270D	n-Nitrosodimethylamine
GC-MS	EPA 8270C / 8270D	n-Nitroso-di-n-propylamine
GC-MS	EPA 8270C / 8270D	n-Nitrosodiphenylamine
GC-MS	EPA 8270C / 8270D	Pentachlorophenol

Solid and Chemical Materials

Technology	Method	Analyte
GC-MS	EPA 8270C / 8270D	Perylene
GC-MS	EPA 8270C / 8270D	Phenanthrene
GC-MS	EPA 8270C / 8270D	Phenol
GC-MS	EPA 8270C / 8270D	Pyrene
GC-MS	EPA 8270C / 8270D	Pyridine
GC-MS	EPA 8270C / 8270D	2,3,4,6-Tetrachlorophenol
GC-MS	EPA 8270C / 8270D	1,2,4-Trichlorobenzene
GC-MS	EPA 8270C / 8270D	2,3,4-Trichlorophenol
GC-MS	EPA 8270C / 8270D	2,3,5-Trichlorophenol
GC-MS	EPA 8270C / 8270D	2,4,5-Trichlorophenol
GC-MS	EPA 8270C / 8270D	2,4,6-Trichlorophenol
GC-MS	EPA 8270C / 8270D	2,3,5-Trimethylnaphthalene
GC-MS	EPA 8270C / 8270D	1,2,4,5-Tetrachlorobenzene
GC-MS	EPA 8270C / 8270D	1,3,5-Trinitrobenzene
GC-MS	EPA 8270C / 8270D	1,3-Dinitrobenzene
GC-MS	EPA 8270C / 8270D	1,4-Dioxane
GC-MS	EPA 8270C / 8270D	1,4-Naphthoquinone
GC-MS	EPA 8270C / 8270D	1-Chloronaphthalene
GC-MS	EPA 8270C / 8270D	1-Naphthylamine
GC-MS	EPA 8270C / 8270D	2,6-Dichlorophenol
GC-MS	EPA 8270C / 8270D	2-acetylaminofluorene
GC-MS	EPA 8270C / 8270D	2-Naphthylamine
GC-MS	EPA 8270C / 8270D	2-Picoline
GC-MS	EPA 8270C / 8270D	3,3-Dimethylbenzidine
GC-MS	EPA 8270C / 8270D	3,4-Dimethylphenol
GC-MS	EPA 8270C / 8270D	3,5-Dimethylphenol
GC-MS	EPA 8270C / 8270D	3,5-Dimethylphenol
GC-MS	EPA 8270C / 8270D	3-Methylchlolanthrene
GC-MS	EPA 8270C / 8270D	4-Aminobiphenyl
GC-MS	EPA 8270C / 8270D	4-Nitroquinoline-N-oxide
GC-MS	EPA 8270C / 8270D	5-Nitro-o-toluidine
GC-MS	EPA 8270C / 8270D	7,12-Dimethylben(a)anthracene
GC-MS	EPA 8270C / 8270D	Acetophenone
GC-MS	EPA 8270C / 8270D	Aramite
GC-MS	EPA 8270C / 8270D	Atrazine
GC-MS	EPA 8270C / 8270D	Biphenyl
GC-MS	EPA 8270C / 8270D	Chlorobenzilate
GC-MS	EPA 8270C / 8270D	Diallate
GC-MS	EPA 8270C / 8270D	Dibenzo(a,j)acridine
GC-MS	EPA 8270C / 8270D	Dimethoate
GC-MS	EPA 8270C / 8270D	Dinoseb
GC-MS	EPA 8270C / 8270D	Diphenyl ether
GC-MS	EPA 8270C / 8270D	Disulfoton

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Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC-MS	EPA 8270C / 8270D	Ethyl methacrylate
GC-MS	EPA 8270C / 8270D	Ethyl methanesulfonate
GC-MS	EPA 8270C / 8270D	Ethyl parathion
GC-MS	EPA 8270C / 8270D	Famphur
GC-MS	EPA 8270C / 8270D	Hexachlorophene
GC-MS	EPA 8270C / 8270D	Hexachloropropene
GC-MS	EPA 8270C / 8270D	Isodrin
GC-MS	EPA 8270C / 8270D	Isosafrole
GC-MS	EPA 8270C / 8270D	kepone
GC-MS	EPA 8270C / 8270D	Methapyrilene
GC-MS	EPA 8270C / 8270D	Methyl methanesulfonate
GC-MS	EPA 8270C / 8270D	Methyl parathion
GC-MS	EPA 8270C / 8270D	N-nitrosodiethylamine
GC-MS	EPA 8270C / 8270D	N-Nitrosodi-n-butylamine
GC-MS	EPA 8270C / 8270D	N-Nitrosomethylethylamine
GC-MS	EPA 8270C / 8270D	N-Nitrosomorpholine
GC-MS	EPA 8270C / 8270D	N-Nitrosopiperdine
GC-MS	EPA 8270C / 8270D	N-Nitrosopyrrolidine
GC-MS	EPA 8270C / 8270D	O,O,O-triethyl phosphorothi
GC-MS	EPA 8270C / 8270D	o-toluidine
GC-MS	EPA 8270C / 8270D	p-Dimethylaminoazobenze
GC-MS	EPA 8270C / 8270D	Pentachlorobenzene
GC-MS	EPA 8270C / 8270D	Pentachloroethane
GC-MS	EPA 8270C / 8270D	Pentachloronitrobenzene
GC-MS	EPA 8270C / 8270D	Phenacetin
GC-MS	EPA 8270C / 8270D	Phorate
GC-MS	EPA 8270C / 8270D	p-phenylenediamine
GC-MS	EPA 8270C / 8270D	Pronamide
GC-MS	EPA 8270C / 8270D	Safrole
GC-MS	EPA 8270C / 8270D	Sulfotepp
GC-MS	EPA 8270C / 8270D	Thionazin
GC-MS	EPA 8270C / 8270D SIM	Acenaphthene
GC-MS	EPA 8270C / 8270D SIM	Acenaphthylene
GC-MS	EPA 8270C / 8270D SIM	Anthracene
GC-MS	EPA 8270C / 8270D SIM	Azobenzene
GC-MS	EPA 8270C / 8270D SIM	Benzo(a)anthracene
GC-MS	EPA 8270C / 8270D SIM	benzo(a)pyrene
GC-MS	EPA 8270C / 8270D SIM	Benzo(b)fluoranthene
GC-MS	EPA 8270C / 8270D SIM	Benzo(e)pyrene
GC-MS	EPA 8270C / 8270D SIM	Benzo(g,h,i)perylene
GC-MS	EPA 8270C / 8270D SIM	Benzo(k)fluoranthene
GC-MS	EPA 8270C / 8270D SIM	Biphenyl
GC-MS	EPA 8270C / 8270D SIM	bis(2-chloroethyl)ether

Solid and Chemical Materials

Technology	Method	Analyte
GC-MS	EPA 8270C / 8270D SIM	bis(2-Ethylhexyl)phthalate
GC-MS	EPA 8270C / 8270D SIM	Carbazole
GC-MS	EPA 8270C / 8270D SIM	4-Chloro-3-methylphenol
GC-MS	EPA 8270C / 8270D SIM	2-Chlorophenol
GC-MS	EPA 8270C / 8270D SIM	Chrysene
GC-MS	EPA 8270C / 8270D SIM	Dibenzo(a,h)anthracene
GC-MS	EPA 8270C / 8270D SIM	2,4-Dichlorophenol
GC-MS	EPA 8270C / 8270D SIM	2,6-Dimethylnaphthalene
GC-MS	EPA 8270C / 8270D SIM	2,4-Dimethylphenol
GC-MS	EPA 8270C / 8270D SIM	Fluoranthene
GC-MS	EPA 8270C / 8270D SIM	Fluorene
GC-MS	EPA 8270C / 8270D SIM	Hexachlorobenzene
GC-MS	EPA 8270C / 8270D SIM	Indeno(1,2,3-cd)pyrene
GC-MS	EPA 8270C / 8270D SIM	1-Methylnaphthalene
GC-MS	EPA 8270C / 8270D SIM	2-Methylnaphthalene
GC-MS	EPA 8270C / 8270D SIM	1-Methylphenanthrene
GC-MS	EPA 8270C / 8270D SIM	Naphthalene
GC-MS	EPA 8270C / 8270D SIM	n-Nitrosodimethylamine
GC-MS	EPA 8270C / 8270D SIM	n-Nitroso-di-n-propylamine
GC-MS	EPA 8270C / 8270D SIM	Pentachlorophenol
GC-MS	EPA 8270C / 8270D SIM	Perylene
GC-MS	EPA 8270C / 8270D SIM	Phenanthrene
GC-MS	EPA 8270C / 8270D SIM	Phenol
GC-MS	EPA 8270C / 8270D SIM	Pyrene
GC-MS	EPA 8270C / 8270D SIM	2,4,5-Trichlorophenol
GC-MS	EPA 8270C / 8270D SIM	2,4,6-Trichlorophenol
GC-MS	EPA 8270C / 8270D SIM	2,3,5-Trimethylnaphthalene
GC-MS	EPA 8270C / 8270D SIM	1,4-Dioxane
GC-MS	EPA 8270C / 8270D SIM	Butylbenzylphthalate
GC-MS	EPA 8270C / 8270D SIM	Diethylphthalate
GC-MS	EPA 8270C / 8270D SIM	Dimethylphthalate
GC-MS	EPA 8270C / 8270D SIM	Di-n-butylphthalate
GC-MS	EPA 8270C / 8270D SIM	Di-n-octylphthalate
HPLC	EPA 8310	Acenaphthene
HPLC	EPA 8310	Acenaphthylene
HPLC	EPA 8310	Anthracene
HPLC	EPA 8310	Benzo(a)anthracene
HPLC	EPA 8310	Benzo(a)pyrene
HPLC	EPA 8310	Benzo(b)fluoranthene
HPLC	EPA 8310	Benzo(g,h,i)perylene
HPLC	EPA 8310	Benzo(k)fluoranthene
HPLC	EPA 8310	Chrysene

Solid and Chemical Materials

Technology	Method	Analyte
HPLC	EPA 8310	Dibenzo(a,h)anthracene
HPLC	EPA 8310	Fluoranthene
HPLC	EPA 8310	Fluorene
HPLC	EPA 8310	Indeno(1,2,3-cd)pyrene
HPLC	EPA 8310	1-Methylnaphthalene
HPLC	EPA 8310	2-Methylnaphthalene
HPLC	EPA 8310	Naphthalene
HPLC	EPA 8310	Phenanthrene
HPLC	EPA 8310	Pyrene
HPLC	EPA 8330A	HMX
HPLC	EPA 8330A	RDX
HPLC	EPA 8330A	1,3,5-TNB
HPLC	EPA 8330A	1,3-DNB
HPLC	EPA 8330A	Tetryl
HPLC	EPA 8330A	Nitrobenzene
HPLC	EPA 8330A	2,4,6-TNT
HPLC	EPA 8330A	4-AM-2,6-DNT
HPLC	EPA 8330A	2-AM-4,6-DNT
HPLC	EPA 8330A	2,6-DNT
HPLC	EPA 8330A	2,4-DNT
HPLC	EPA 8330A	2-Nitrotoluene
HPLC	EPA 8330A	4-Nitrotoluene
HPLC	EPA 8330A	3-Nitrotoluene
HPLC	EPA 8330A	3,5-Dinitroaniline
HPLC	EPA 8330A	2,4-Diamino-6-nitrotoluene
HPLC	EPA 8330A	2,6-Diamino-4-nitrotoluene
HPLC	EPA 8330A	3,5-Dinitroaniline
HPLC	EPA 8330A	Picric Acid
HPLC	EPA 8332	Nitroglycerine
HPLC	EPA 8332	PETN
Combustion-IR	EPA 9060	TOC
IC	EPA9056/9056A	Bromate
IC	EPA9056/9056A	Bromide
IC	EPA9056/9056A	Chloride
IC	EPA9056/9056A	Fluoride
IC	EPA9056/9056A	Nitrate
IC	EPA9056/9056A	Nitrite
IC	EPA9056/9056A	Phosphate
IC	EPA9056/9056A	Sulfate
GC	EPA 8151A	Acifluorfen
GC	EPA 8151A	Bentazon

LABORATORY ACCREDITATION BUREAU

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Solid and Chemical Materials

Technology	Method	Analyte
GC	EPA 8151A	Chloramben
GC	EPA 8151A	2,4-D
GC	EPA 8151A	2,4-DB
GC	EPA 8151A	Dacthal
GC	EPA 8151A	Dalapon
GC	EPA 8151A	Dicamba
GC	EPA 8151A	3,5 Dichlorobenzoic
GC	EPA 8151A	Dichlorprop
GC	EPA 8151A	Dinoseb
GC	EPA 8151A	MCPA
GC	EPA 8151A	MCPP
GC	EPA 8151A	Pentachlorophenol
GC	EPA 8151A	Picloram
GC	EPA 8151A	Silvex
GC	EPA 8151A	2,4,5-T
Spectrometric	EPA 9014	Cyanide
GFAA	CA 939M	Organo Lead
Preparation	**Method**	**Type**
Purge &Trap	EPA 5030B / EPA 5035	Volatiles Prep
Acid Digestion	EPA 3010 / EPA 3050B	Metals Prep
Alkaline Digestion	EPA 3060A	Hexavalent Chrom
Soxhlet	EPA 3540C	Organic Extraction
Sonication	EPA 3520C / EPA 3550C	Organic Extraction
Waste Dilution	EPA 3580A	Organic Extraction
TCLP	EPA 1311	Leaching
SPLP	EPA 1312	Leaching
Floricil Clean-up	EPA 3520B	Extract Clean-Up
GPC Clean-up	EPA 3640A	Extract Clean-Up
Sulfur Clean-up	EPA 3660B	Extract Clean-Up
Acid/Permanganate Clean-up	EPA 3665A	Extract Clean-Up

Air and Emissions

Technology	Method	Analyte
GC-MS	TO-15	1,1,1-trichloroethane
GC-MS	TO-15	1,1,2,2-tetrachloroethane
GC-MS	TO-15	1,1,2-Trichloro1,2,2-trifluoroethane
GC-MS	TO-15	1,1,2-trichloroethane
GC-MS	TO-15	1,1-dichloroethane

Air and Emissions

Technology	Method	Analyte
GC-MS	TO-15	1,1-Dichloroethene
GC-MS	TO-15	1,2,4-trichlorobenzene
GC-MS	TO-15	1,2,4-trimethylbenzene
GC-MS	TO-15	1,2-dibromoethane
GC-MS	TO-15	1,2-dichlorobenzene
GC-MS	TO-15	1,2-dichloroethane
GC-MS	TO-15	1,2-dichloroethene
GC-MS	TO-15	1,2-dichloropropane
GC-MS	TO-15	1,3,5-trimethylbenzene
GC-MS	TO-15	1,3-Butadiene
GC-MS	TO-15	1,3-Butadiene, 1,1,2,3,4,Hexachloro
GC-MS	TO-15	1,3-dichlorobenzene
GC-MS	TO-15	1,4-dichlorobenzene
GC-MS	TO-15	1,4-Dioxane
GC-MS	TO-15	2,2,4-Trimethylpentane
GC-MS	TO-15	4-Ethyltoluene
GC-MS	TO-15	Acetone
GC-MS	TO-15	Acrylonitrile
GC-MS	TO-15	Allyl Chloride
GC-MS	TO-15	Benzene
GC-MS	TO-15	Benzyl Chloride
GC-MS	TO-15	Bromodichloromethane
GC-MS	TO-15	Bromoform
GC-MS	TO-15	Bromomethane
GC-MS	TO-15	Carbon Disulfide
GC-MS	TO-15	Carbon Tetrachloride
GC-MS	TO-15	Chlorobenzene
GC-MS	TO-15	Chloroethane
GC-MS	TO-15	Chloroethene
GC-MS	TO-15	Chloroform
GC-MS	TO-15	Chloromethane
GC-MS	TO-15	cis-1,3-Dichloropropene
GC-MS	TO-15	Cyclohexane
GC-MS	TO-15	Dibromochloromethane
GC-MS	TO-15	Dichlorodifluoromethane
GC-MS	TO-15	Dichlorotetrafluoroethane
GC-MS	TO-15	Ethyl Acetate

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Air and Emissions		
Technology	**Method**	**Analyte**
GC-MS	TO-15	Ethylbenzene
GC-MS	TO-15	Isopropyl Alcohol
GC-MS	TO-15	m+p-Xylene
GC-MS	TO-15	Methyl butyl Ketone
GC-MS	TO-15	Methyl Ethyl Ketone
GC-MS	TO-15	Methyl Isobutyl Ketone
GC-MS	TO-15	Methyl Tert-Butyl Ether
GC-MS	TO-15	Methylene Chloride
GC-MS	TO-15	n-Heptane
GC-MS	TO-15	n-Hexane
GC-MS	TO-15	o-Xylene
GC-MS	TO-15	Styrene
GC-MS	TO-15	Tetrachloroethylene
GC-MS	TO-15	Tetrahydrofuran
GC-MS	TO-15	Toluene
GC-MS	TO-15	Trans-1,2-Dichloroethene
GC-MS	TO-15	trans-1,3-Dichloropropene
GC-MS	TO-15	Trichloroethylene
GC-MS	TO-15	Trichloromonofluoromethan
GC-MS	TO-15	Vinyl Acetate
GC-MS	TO-15	Vinyl Bromide

Notes:

1) This laboratory offers commercial testing service.

Approved by: ______________________________ Date: XXXXXXXXX

R. Douglas Leonard
Chief Technical Officer

Issued: 1/10/11 Revised: 1/18/11 Revised: 3/21/11 Revised: 3/24/11 Revised: 8/25/11
Revised: 1/31/12 Revised: 1/3/13 Revised:

Appendix B
Standard Operating Procedures

STANDARD OPERATING PROCEDURE-B.01

Equipment Blank and Field Blank Preparation

I. Purpose

To prepare blanks to determine whether decontamination procedures are adequate and whether any cross-contamination is occurring during sampling due to contaminated air and dust.

II. Scope

The general protocols for preparing the blanks are outlined. The actual equipment to be rinsed will depend on the requirements of the specific sampling procedure.

III. Equipment and Materials

- Blank liquid (use ASTM Type II or lab grade water)
- Millipore™ deionized water
- Sample bottles as appropriate
- Gloves
- Preservatives as appropriate

IV. Procedures and Guidelines

A. Decontaminate all sampling equipment that has come in contact with sample according to SOP *Decontamination of Personnel and Equipment.*

B. To collect an equipment blank for volatile analysis from the surfaces of sampling equipment other than pumps, pour blank water over one piece of equipment and into two 40-ml vials until there is a positive meniscus, then seal the vials. Note the sample number and associated piece of equipment in the field notebook as well as the type and lot number of the water used.

For non-volatiles analyses, one aliquot is to be used for equipment. For example, if a pan and trowel are used, place trowel in pan and pour blank fluid in pan such that pan and trowel surfaces which contacted the sample are contacted by the blank fluid. Pour blank fluid from pan into appropriate sample bottles.

Do not let the blank fluid come in contact with any equipment that has not been decontaminated.

C. When collecting an equipment blank from a pump, run an extra gallon of deionized water through the pump while collecting the pump outflow into appropriate containers. Make sure the flow rate is low when sampling VOCs. If a Grundfos Redi-Flo2 pump with disposable tubing is used, remove the disposable tubing after sampling but before decon. When decon is complete, put a 3- to 5-foot segment of new tubing onto the pump to collect the equipment blank.

D. To collect a field blank, slowly pour ASTM Type II or lab grade water directly into sample containers.

E. Document and ship samples in accordance with the procedures for other samples.

F. Collect next field sample.

V. Attachments

None.

VI. Key Checks and Items

- Wear gloves.
- Do not use any non-decontaminated equipment to prepare blank.
- Use ASTM-Type II or lab grade water.

STANDARD OPERATING PROCEDURE-B.02

Chain-of-Custody

I Purpose

The purpose of this SOP is to provide information on chain-of-custody procedures to be used under the CLEAN Program.

II Scope

This procedure describes the steps necessary for transferring samples through the use of Chain-of-Custody Records. A Chain-of-Custody Record is required, without exception, for the tracking and recording of samples collected for on-site or off-site analysis (chemical or geotechnical) during program activities (except wellhead samples taken for measurement of field parameters). Use of the Chain-of-Custody Record Form creates an accurate written record that can be used to trace the possession and handling of the sample from the moment of its collection through analysis. This procedure identifies the necessary custody records and describes their completion. This procedure does not take precedence over region specific or site-specific requirements for chain-of-custody.

III Definitions

Chain-of-Custody Record Form - A Chain-of-Custody Record Form is a printed two-part form that accompanies a sample or group of samples as custody of the sample(s) is transferred from one custodian to another custodian. One copy of the form must be retained in the project file.

Custodian - The person responsible for the custody of samples at a particular time, until custody is transferred to another person (and so documented), who then becomes custodian. A sample is under one's custody if:

- It is in one's actual possession.
- It is in one's view, after being in one's physical possession.
- It was in one's physical possession and then he/she locked it up to prevent tampering.
- It is in a designated and identified secure area.

Sample - A sample is physical evidence collected from a facility or the environment, which is representative of conditions at the point and time that it was collected.

IV Responsibilities

Project Manager - The Project Manager is responsible for ensuring that project-specific plans are in accordance with these procedures, where applicable, or that other, approved procedures are developed. The Project Manager is responsible for development of documentation of procedures which deviate from those presented herein. The Project Manager is responsible for ensuring that chain-of-custody procedures are implemented. The Project Manager also is responsible for determining that custody procedures have been met by the analytical laboratory.

Field Team Leader - The Field Team Leader is responsible for determining that chain-of-custody procedures are implemented up to and including release to the shipper or laboratory. It is the responsibility of the Field Team Leader to ensure that these procedures are implemented in the field and to ensure that personnel performing sampling activities have been briefed and trained to execute these procedures.

Sample Personnel - It is the responsibility of the field sampling personnel to initiate chain-of-custody procedures, and maintain custody of samples until they are relinquished to another custodian, the sample shipper, or to a common carrier.

V Procedures

The term "chain-of-custody" refers to procedures which ensure that evidence presented in a court of law is valid. The chain-of-custody procedures track the evidence from the time and place it is first obtained to the courtroom, as well as providing security for the evidence as it is moved and/or passed from the custody of one individual to another.

Chain-of-custody procedures, recordkeeping, and documentation are an important part of the management control of samples. Regulatory agencies must be able to provide the chain-of-possession and custody of any samples that are offered for evidence, or that form the basis of analytical test results introduced as evidence. Written procedures must be available and followed whenever evidence samples are collected, transferred, stored, analyzed, or destroyed.

V.1 Sample Identification

The method of identification of a sample depends on the type of measurement or analysis performed. When *in situ* measurements are made, the data are recorded directly in bound logbooks or other field data records with identifying information.

Information which shall be recorded in the field logbook, when in-situ measurements or samples for laboratory analysis are collected, includes:

- Field Sampler(s),
- Contract Task Order (CTO) Number,
- Project Sample Number,
- Sample location or sampling station number,
- Date and time of sample collection and/or measurement,

- Field observations,
- Equipment used to collect samples and measurements, and
- Calibration data for equipment used

Measurements and observations shall be recorded using waterproof ink.

V.1.1 Sample Label

Samples, other than for *in situ* measurements, are removed and transported from the sample location to a laboratory or other location for analysis. Before removal, however, a sample is often divided into portions, depending upon the analyses to be performed. Each portion is preserved in accordance with the Sampling and Analysis Plan. Each sample container is identified by a sample label (see Attachment A). Sample labels are provided, along with sample containers, by the analytical laboratory. The information recorded on the sample label includes:

- Project - CTO Number.
- Station Location - The unique sample number identifying this sample.
- Date - A six-digit number indicating the day, month, and year of sample collection (e.g., 01/21/08).
- Time - A four-digit number indicating the 24-hour time of collection (for example: 0954 is 9:54 a.m., and 1629 is 4:29 p.m.).
- Medium - Water, soil, sediment, sludge, waste, etc.
- Sample Type - Grab or composite.
- Preservation - Type and quantity of preservation added.
- Analysis - VOA, BNAs, PCBs, pesticides, metals, cyanide, other.
- Sampled By - Printed name of the sampler.
- Remarks - Any pertinent additional information.

Using only the work assignment number of the sample label maintains the anonymity of sites. This may be necessary, even to the extent of preventing the laboratory performing the analysis from knowing the identity of the site (e.g., if the laboratory is part of an organization that has performed previous work on the site). The field team should always follow the sample ID system prepared by the project EIS and reviewed by the Project Manager.

V.2 Chain-of-Custody Procedures

After collection, separation, identification, and preservation, the sample is maintained under chain-of-custody procedures until it is in the custody of the analytical laboratory and has been stored or disposed of.

V.2.1 Field Custody Procedures

- Samples are collected as described in the site Sampling and Analysis Plan. Care must be taken to record precisely the sample location and to ensure that the sample number on the label matches the Chain-of-Custody Record exactly.

- The person undertaking the actual sampling in the field is responsible for the care and custody of the samples collected until they are properly transferred or dispatched.

- When photographs are taken of the sampling as part of the documentation procedure, the name of the photographer, date, time, site location, and site description are entered sequentially in the site logbook as photos are taken. Once downloaded to the server or developed, the electronic files or photographic prints shall be serially numbered, corresponding to the logbook descriptions; photographic prints will be stored in the project files. To identify sample locations in photographs, an easily read sign with the appropriate sample/ location number should be included.

- Sample labels shall be completed for each sample, using waterproof ink unless prohibited by weather conditions (e.g., a logbook notation would explain that a pencil was used to fill out the sample label if the pen would not function in freezing weather.)

V.2.2 Transfer of Custody and Shipment

Samples are accompanied by a Chain-of-Custody Record Form. A Chain-of-Custody Record Form example is shown in Attachment B. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the Record. This Record documents sample custody transfer from the sampler, often through another person, to the analyst in the laboratory. The Chain-of-Custody Record is filled out as given below:

- Enter header information (CTO number, samplers, and project name).

- Enter sample specific information (sample number, media, sample analysis required and analytical method grab or composite, number and type of sample containers, and date/time sample was collected).

- Sign, date, and enter the time under "Relinquished by" entry.

- Have the person receiving the sample sign the "Received by" entry. If shipping samples by a common carrier, print the carrier to be used in this space (i.e., Federal Express).

- If a carrier is used, enter the airbill number under "Remarks," in the bottom right corner;

- Place the original (top, signed copy) of the Chain-of-Custody Record Form in a plastic zipper-type bag or other appropriate sample-shipping package. Retain the copy with field records.
- Sign and date the custody seal, a 1-inch by 3-inch white paper label with black lettering and an adhesive backing. Attachment C is an example of a custody seal. The custody seal is part of the chain-of-custody process and is used to prevent tampering with samples after they have been collected in the field. Custody seals shall be provided by the analytical laboratory.
- Place the seal across the shipping container opening (front and back) so that it would be broken if the container were to be opened.
- Complete other carrier-required shipping papers.

The custody record is completed using waterproof ink. Any corrections are made by drawing a line through and initialing and dating the change, then entering the correct information. Erasures are not permitted.

Common carriers will usually not accept responsibility for handling Chain-of-Custody Record Forms; this necessitates packing the record in the shipping container (enclosed with other documentation in a plastic zipper-type bag). As long as custody forms are sealed inside the shipping container and the custody seals are intact, commercial carriers are not required to sign the custody form.

The laboratory representative who accepts the incoming sample shipment signs and dates the Chain-of-Custody Record, completing the sample transfer process. It is then the laboratory's responsibility to maintain internal logbooks and custody records throughout sample preparation and analysis.

VI Quality Assurance Records

Once samples have been packaged and shipped, the Chain-of-Custody copy and airbill receipt become part of the quality assurance record.

VII Attachments

A. Sample Label
B. Chain of Custody Form
C. Custody Seal

VIII References

USEPA. *User's Guide to the Contract Laboratory Program*. Office of Emergency and Remedial Response, Washington, D.C. (EPA/540/P-91/002), January 1991.

STANDARD OPERATING PROCEDURE-B.03

Decontamination of Personnel and Equipment

I. Purpose

To provide general guidelines for the decontamination of personnel, sampling equipment, and monitoring equipment used in potentially contaminated environments.

II. Scope

This is a general description of decontamination procedures.

III. Equipment and Materials

- Demonstrated analyte-free, deionized ("DI") water (specifically, ASTM Type II water or lab-grade DI water)
- Distilled water
- Potable water; must be from a municipal water supplier, otherwise an analysis must be run for appropriate volatile and semivolatile organic compounds and inorganic chemicals (e.g., Target Compound List and Target Analyte List chemicals)
- 2.5% (W/W) Liquinox® (or Alconox®)and water solution
- Concentrated (V/V) pesticide grade methanol (DO NOT USE ACETONE)
- Large plastic pails or tubs for Liquinox® and water, scrub brushes, squirt bottles for Liquinox® solution, methanol and water, plastic bags and sheets
- DOT approved 55-gallon drum for disposal of waste
- Phthalate-free gloves such as Nitrile
- Decontamination pad and steam cleaner/high pressure cleaner for large equipment

IV. Procedures and Guidelines

A. PERSONNEL DECONTAMINATION

To be performed after completion of tasks whenever potential for contamination exists, and upon leaving the exclusion zone.

1. Wash boots in Liquinox® solution, then rinse with water. If disposable latex booties are worn over boots in the work area, rinse with Liquinox® solution, remove, and discard into DOT-approved 55-gallon drum.

2. Wash outer gloves in Liquinox® solution, rinse, remove, and discard into DOT-approved 55-gallon drum.

3. Remove disposable coveralls (“Tyveks”) and discard into DOT-approved 55-gallon drum.

4. Remove respirator (if worn).

5. Remove inner gloves and discard.

6. At the end of the work day, shower entire body, including hair, either at the work site or at home.

7. Sanitize respirator if worn.

B. SAMPLING EQUIPMENT DECONTAMINATION—GROUNDWATER SAMPLING PUMPS

Sampling pumps are decontaminated after each use as follows.

1. Don phthalate-free gloves.

2. Spread plastic on the ground to keep equipment from touching the ground

3. Turn off pump after sampling. Remove pump from well and remove and dispose of tubing. Place pump in decontamination tube.

4. Turn pump back on and pump 1 gallon of Liquinox® solution through the sampling pump.

5. Rinse with 1 gallon of 10% methanol solution pumped through the pump. (DO NOT USE ACETONE).

6. Rinse with 1 gallon of tap water.

7. Rinse with 1 gallon of deionized water.

8. Keep decontaminated pump in decontamination tube or remove and wrap in aluminum foil or clean plastic sheeting.

9. Collect all rinsate and dispose of in a DOT-approved 55-gallon drum.

10. Decontamination materials (e.g., plastic sheeting, tubing, etc.) that have come in contact with used decontamination fluids or sampling equipment will be disposed of in DOT-approved 55-gallon drums.

C. SAMPLING EQUIPMENT DECONTAMINATION—OTHER EQUIPMENT

Reusable sampling equipment is decontaminated after each use as follows.

1. Don phthalate-free gloves.

2. Before entering the potentially contaminated zone, wrap soil contact points in aluminum foil (shiny side out).

3. Rinse and scrub with potable water.

4. Wash all equipment surfaces that contacted the potentially contaminated soil/water with Liquinox® solution.

5. Rinse with potable water.

6. Rinse with distilled or potable water and methanol solution (DO NOT USE ACETONE).

7. Air dry.

8. Rinse with deionized water.

9. Completely air dry and wrap exposed areas with aluminum foil (shiny side out) for transport and handling if equipment will not be used immediately.

10. Collect all rinsate and dispose of in a DOT-approved 55-gallon drum.

11. Decontamination materials (e.g., plastic sheeting, tubing, etc.) that have come in contact with used decontamination fluids or sampling equipment will be disposed of in DOT-approved 55-gallon drums.

D. HEALTH AND SAFETY MONITORING EQUIPMENT DECONTAMINATION

1. Before use, wrap soil contact points in plastic to reduce need for subsequent cleaning.

2. Wipe all surfaces that had possible contact with contaminated materials with a paper towel wet with Liquinox® solution, then a towel wet with methanol solution, and finally three times with a towel wet with distilled water. Dispose of all used paper towels in a DOT-approved 55-gallon drum.

E. SAMPLE CONTAINER DECONTAMINATION

The outsides of sample bottles or containers filled in the field may need to be decontaminated before being packed for shipment or handled by personnel without hand protection. The procedure is:

1. Wipe container with a paper towel dampened with Liquinox® solution or immerse in the solution AFTER THE CONTAINERS HAVE BEEN SEALED. Repeat the above steps using potable water.

2. Dispose of all used paper towels in a DOT-approved 55-gallon drum.

F. HEAVY EQUIPMENT AND TOOLS

Heavy equipment such as drilling rigs, drilling rods/tools, and the backhoe will be decontaminated upon arrival at the site and between locations as follows:

1. Set up a decontamination pad in area designated by the Facility

2. Steam clean heavy equipment until no visible signs of dirt are observed. This may require wire or stiff brushes to dislodge dirt from some areas.

V. Attachments

None.

VI. Key Checks and Items

- Clean with solutions of Liquinox®, methanol, and distilled water.
- Do not use acetone for decontamination.
- Drum all contaminated rinsate and materials.
- Decontaminate filled sample bottles before relinquishing them to anyone.

STANDARD OPERATING PROCEDURE-B.04

Preparing Field Log Books

I. Purpose

To provide general guidelines for entering field data into log books during site investigation and remediation field activities.

II. Scope

This is a general description of data requirements and format for field log books. Log books are needed to properly document all field activities in support of data evaluation and possible legal activities.

III. Equipment and Materials

- Log book
- Indelible pen

IV. Procedures and Guidelines

Properly completed field log books are a requirement of much of the work we perform under the Navy CLEAN contract. Log books are legal documents and, as such, must be prepared following specific procedures and must contain required information to ensure their integrity and legitimacy. This SOP describes the basic requirements for field log book entries.

A. PROCEDURES FOR COMPLETING FIELD LOG BOOKS

1. Field notes commonly are kept in bound, orange-covered logbooks used by surveyors and produced, for example, by Peninsular Publishing Company and Sesco, Inc. Pages should be water-resistant and notes should be taken only with water-proof, non-erasable permanent ink, such as that provided in Sanford Sharpie® permanent markers.

2. On the inside cover of the log book the following information should be included:

    - Company name and address
    - Log-holders name if log book was assigned specifically to that person
    - Activity or location
    - Project name
    - Project manager's name
    - Phone numbers of the company, supervisors, emergency response, etc.

3. All lines of all pages should be used to prevent later additions of text, which could later be questioned. Any line not used should be marked through with a line and initialed and dated. Any pages not used should be marked through with a line, the author's initials, the date, and the note "Intentionally Left Blank."

4. If errors are made in the log book, cross a single line through the error and enter the correct information. All corrections shall be initialed and dated by the personnel performing the correction. If possible, all corrections should be made by the individual who made the error.

5. Daily entries will be made chronologically.

6. Information will be recorded directly in the field log book during the work activity. Information will not be written on a separate sheet and then later transcribed into the log book.

7. Each page of the log book will have the date of the work and the note takers initials.

8. The final page of each day's notes will include the note-takers signature as well as the date.

9. Only information relevant to the subject project will be added to the log book.

10. The field notes will be copied and the copies sent to the Project Manager or designee in a timely manner (at least by the end of each week of work being performed).

B. INFORMATION TO BE INCLUDED IN FIELD LOG BOOKS

1. Entries into the log book should be as detailed and descriptive as possible so that a particular situation can be recalled without reliance on the collector's memory. Entries must be legible and complete.

2. General project information will be recorded at the beginning of each field project. This will include the project title, the project number, and project staff.

3. Scope: Describe the general scope of work to be performed each day.

4. Weather: Record the weather conditions and any significant changes in the weather during the day.

5. Tail Gate Safety Meetings: Record time and location of meeting, who was present, topics discussed, issues/problems/concerns identified, and corrective actions or adjustments made to address concerns/ problems, and other pertinent information.

6. Standard Health and Safety Procedures: Record level of personal protection being used (e.g., level D PPE), record air monitoring data on a regular basis and note where data were recording (e.g., reading in borehole, reading in breathing zone, etc). Also record other required health and safety procedures as specified in the project specific health and safety plan.

7. Instrument Calibration; Record calibration information for each piece of health and safety and field equipment.

8. Personnel: Record names of all personnel present during field activities and list their roles and their affiliation. Record when personnel and visitors enter and leave a project site and their level of personal protection.

9. Communications: Record communications with project manager, subcontractors, regulators, facility personnel, and others that impact performance of the project.

10. Time: Keep a running time log explaining field activities as they occur chronologically throughout the day.

11. Deviations from the Work Plan: Record any deviations from the work plan and document why these were required and any communications authorizing these deviations.

12. Heath and Safety Incidents: Record any health and safety incidents and immediately report any incidents to the Project Manager.

13. Subcontractor Information: Record name of company, record names and roles of subcontractor personnel, list type of equipment being used and general scope of work. List times of starting and stopping work and quantities of consumable equipment used if it is to be billed to the project.

14. Problems and Corrective Actions: Clearly describe any problems encountered during the field work and the corrective actions taken to address these problems.

15. Technical and Project Information: Describe the details of the work being performed. The technical information recorded will vary significantly between projects. The project work plan will describe the specific activities to be performed and may also list requirements for note taking. Discuss note-taking expectations with the Project Manager prior to beginning the field work.

16. Any conditions that might adversely affect the work or any data obtained (e.g., nearby construction that might have introduced excessive amounts of dust into the air).

17. Sampling Information; Specific information that will be relevant to most sampling jobs includes the following:

    - Description of the general sampling area – site name, buildings and streets in the area, etc.
    - Station/Location identifier
    - Description of the sample location – estimate location in comparison to two fixed points – draw a diagram in the field log book indicating sample location relative to these fixed points – include distances in feet.
    - Sample matrix and type
    - Sample date and time
    - Sample identifier

- Draw a box around the sample ID so that it stands out in the field notes
- Information on how the sample was collected – distinguish between “grab,” “composite,” and “discrete” samples
- Number and type of sample containers collected
- Record of any field measurements taken (i.e. pH, turbidity, dissolved oxygen, and temperature, and conductivity)
- Parameters to be analyzed for, if appropriate
- Descriptions of soil samples and drilling cuttings can be entered in depth sequence, along with PID readings and other observations. Include any unusual appearances of the samples.

C. SUGGESTED FORMAT FOR RECORDING FIELD DATA

1. Use the left side border to record times and the remainder of the page to record information (see attached example).
2. Use tables to record sampling information and field data from multiple samples.
3. Sketch sampling locations and other pertinent information.
4. Sketch well construction diagrams.

V. Attachments

Example field notes.

Shallow Soil Sampling

I. Purpose

To provide general guidelines for the collection and handling of surface soil samples during field operations.

II. Scope

The method described for surface soil sampling is applicable for loosely packed earth and is used to collect disturbed-soil samples.

III. Equipment and Materials

- Sample jars.
- A hand auger or other device that can be used to remove the soil from the ground. Only stainless steel, Teflon, or glass materials should be used. The only exception is split spoons, which are most commonly available in carbon steel; these are acceptable for use only if they are not rusty.
- A stainless steel spatula should be used to remove material from the sampling device.
- Unpainted wooden stakes or pin flags
- Fiberglass measuring tape (at least 200 feet in length)
- GPS Unit (if available)

IV. Procedures and Guidelines

A. Wear protective gear, as specified in the Health and Safety Plan.

B. To locate samples, identify the correct location using the pin flags or stakes. Proceed to collect a sample from the undisturbed soil adjacent to the marker following steps C and D. If markers are not present, the following procedures will be used.

1. For samples on a grid:

    a. Use measuring tape to locate each sampling point on the first grid line as prescribed in the sampling plan. As each point is located, drive a numbered stake in the ground and record its location on the site map and in the logbook.

    b. Proceed to sample the points on the grid line.

c. Measure to location where next grid line is to start and stake first sample. For subsequent samples on the line take two orthogonal measurements: one to the previous grid line, and one to the previous sample on the same grid line.

d. Proceed to sample the points on the grid line as described in Section C below.

e. Repeat 1c and 1d above until all samples are collected from the area.

f. Or, a GPS unit can be used to identify each location based on map coordinated, if available.

2. For non-grid samples:

a. Use steel measuring tape to position sampling point at location described in the sampling plan by taking two measurements from fixed landmarks (e.g., corner of house and fence post).

b. Note measurements, landmarks, and sampling point on a sketch in the field notebook, and on a site location map.

c. Proceed to sample as described in Section C below.

d. Repeat 2a through 2c above until all samples are collected from the area.

e. Or, a GPS unit can be used to identify each location based on map coordinated, if available.

C. To the extent possible, differentiate between fill and natural soil. If both are encountered at a boring location, sample both as prescribed in the field sampling plan. Do not locate samples in debris, tree roots, or standing water. In residential areas, do not sample in areas where residents' activities may impact the sample (e.g., barbecue areas, beneath eaves of roofs, driveways, garbage areas). If an obstacle prevents sampling at a measured grid point, move as close as possible, but up to a distance of one half the grid spacing in any direction to locate an appropriate sample. If an appropriate location cannot be found, consult with the Field Team Leader (FTL). If the FTL concurs, the sampling point will be deleted from the program. The FTL will contact the CH2M HILL project manager (PM) immediately. The PM and Navy Technical Representative (NTR) will discuss whether the point should be deleted from the program. If it is deleted, the PM will follow-up with the NTR in writing.

D. To collect samples:

1. Use a decontaminated stainless steel scoop/trowel to scrape away surficial organic material (grass, leaves, etc.) adjacent to the stake. New disposable scoops or trowels may also be used to reduce the need for equipment blanks.

2. If sampling:

a. Surface soil: Obtain soil sample by scooping soil using the augering scoop/trowel, starting from the surface and digging down to a depth of about 6 inches, or the depth specified in the workplan.

b. Subsurface soil: Obtain the subsurface soil sample using an auger down to the depths prescribed in the field sampling plan.

3. Take a photoionizaton detector (PID) reading of the sampled soil if organics are anticipated to be present and record the response in the field notebook. Also record lithologic description and any pertinent observations (such as discoloration) in the logbook.

4. Empty the contents of the scoop/trowel into a decontaminated stainless steel pan.

5. Repeat this procedure until sufficient soil is collected to meet volume requirements.

6. For TCL VOC and field GC aliquots, fill sample jars directly with the trowel/ scoop and cap immediately upon filling. DO NOT HOMOGENIZE.

7. For TCL pesticides/PCBs and SVOCs, TAL metals, and field XRF aliquots, homogenize cuttings in the pan using a decontaminated stainless steel utensil in accordance with SOP *Decontamination of Drilling Rigs and Equipment*.

8. Transfer sample for analysis into appropriate containers with a decon-taminated utensil.

9. Backfill the hole with soil removed from the borehole. To the extent possible, replace topsoil and grass and attempt to return appearance of sampling area to its pre-sampled condition. For samples in non-residential, unmowed areas, mark the sample number on the stake and leave stake in place. In mowed areas, remove stake.

V. Attachments

None.

VI. Key Checks and Items

- Use phthalate-free latex or surgical gloves and other personal protective equipment.
- Transfer volatiles first, avoid mixing.
- Decontaminate utensils before reuse, or use dedicated, disposable utensils.

STANDARD OPERATING PROCEDURE-B.06

Soil Sampling

I. Purpose and Scope

The purpose of this procedure is to provide guidelines for obtaining samples of surface and subsurface soils using hand and drilling-rig mounted equipment.

II. Equipment and Materials

- Stainless-steel trowel, shovel, scoop, coring device, hand auger, or other appropriate hand tool
- Stainless-steel, split-spoon samplers
- Thin-walled sampling tubes
- Drilling rig or soil-coring rig
- Stainless-steel pan/bowl or disposable sealable bags
- Sample bottles

III. Procedures and Guidelines

Before sampling begins, equipment will be decontaminated using the procedures described in SOP *Decontamination of Drilling Rigs and Equipment*. The sampling point is located and recorded in the field logbook. Debris should be cleared from the sampling location.

A. Surface and Shallow Subsurface Sampling

A shovel, post-hole digger, or other tool can be used to remove soil to a point just above the interval to be sampled. A decontaminated sampling tool will be used to collect the sample when the desired sampling depth has been reached. Soil for semivolatile organic and inorganic analyses is placed in the bowl and mixed; soil for volatile organic analysis is not mixed or composited but is placed directly into the appropriate sample bottles. A stainless-steel or dedicated wooden tongue depressor is used to transfer the sample from the bowl to the container.

The soils removed from the borehole should be visually described in the field log book, including approximated depths.

When sampling is completed, photo-ionization device (PID) readings should be taken directly above the hole, and the hole is then backfilled.

More details are provided in the SOP *Shallow Soil Sampling.*

B. Split-Spoon Sampling

Using a drilling rig, a hole is advanced to the desired depth. For split-spoon sampling, the samples are then collected following the ASTM D 1586 standard (attached). The sampler is lowered into the hole and driven to a depth equal to the total length of the sampler; typically this is 24 inches. The sampler is driven in 6-inch increments using a 140-pound weight ("hammer") dropped from a height of 30 inches. The number of hammer blows for each 6-inch interval is counted and recorded. To obtain enough volume of sample for subsequent laboratory analysis, use of a 3-inch ID sampler may be required. Blow counts obtained with a 3-inch ID spoon would not conform to ASTM D 1586 and would therefore not be used for geotechnical evaluations.

Once retrieved from the hole, the sampler is carefully split open. Care should be taken not to allow material in the sampler to fall out of the open end of the sampler. To collect the sample, the surface of the sample should be removed with a clean tool and disposed of. Samples collected for volatiles analysis should be placed directly into the sample containers from the desired depth in the split spoon. Material for samples for all other parameters should be removed to a decontaminated stainless steel tray or disposable sealable bag. The sample for semivolatile organic and inorganic analyses should be homogenized in the field by breaking the sample into small pieces and removing gravel. The homogenized sample should be placed in the sample containers. If sample volume requirements are not met by a single sample collection, additional sample volume may be obtained by collecting a sample from below the sample and compositing the sample for non-volatile parameters only.

Split-spoon samples also will be collected using a tripod rig. When using a tripod rig the soil samples are collected using an assembly similar to that used by the drilling rig.

C. Thin-Walled Tube Sampling

Undisturbed fine grained samples may be collected for analysis for geotechnical parameters such as vertical hydraulic conductivity. These samples will be collected using thin-walled sampling tubes (sometimes called Shelby tubes) according to ASTM D 1587 (attached). Tubes will be 24- to 36 inches long and 3- to 4-inches in diameter, depending upon the quantity of sample required. Undisturbed samples will be obtained by smoothly pressing the sampling tube through the interval to be sampled using the weight of the drilling rig. Jerking the sample should be avoided. Once the sample is brought to the surface, the ends will be sealed with bees wax and then sealed with end caps and heavy tape. The sample designation, data and time of sampling, and the up direction will be noted on the sampling tube. The tube shall be kept upright as much as possible and will be protected from freezing, which could disrupt the undisturbed nature of the sample. Samples for geochemical analysis normally are not collected from thin-walled tube samples.

IV. Attachments

ASTM D 1586 *Standard Penetration Test Method for Penetration Test and Split-Barrel Sampling of Soils* (ASTM D1586.pdf)

ASTM D 1587 *Standard Practice for Thin-Walled Tube Sampling of Soils* (ASTM D1587.pdf)

V. Key Checks and Preventative Maintenance

- Check that decontamination of equipment is thorough.
- Check that sample collection is swift to avoid loss of volatile organics during sampling.

Appendix C
Chain-of-Custody

CHAIN OF CUSTODY

EMAX Laboratories, Inc.
1835 W. 205th Street, Torrance, CA 90501
Tel # : 310-618-8889 FAX#: 310-618-0818
Email: info@emaxlabs.com

PO NUMBER:

SAMPLE STORAGE

EMAX CONTROL NO.

PROJECT CODE:

	MATRIX CODE	PRESERVATIVE CODE	ANALYSIS REQUIRED	TAT
CLIENT				
PROJECT	DW=Drinking Water	IC = Ice		☐ Rush __24__hrs.
COORDINATOR	GW=Ground Water	HC = HCl		☐ Rush __48_hrs
TEL FAX EMAIL	WW=Waste Water	HN=HNO3		☐ Rush_72_hrs
SEND REPORT TO	SD=Solid Waste SL=Sludge	SH=NaO3		☐ 7 days
COMPANY	SS=Soil/ Sediment	ST=Na2S2O3		☐ 14 days
ADDRESS	WP=Wipes PP=Pure Products	ZA=Zinc Acetate		☐ 21 days
	AR=Air	HS=H2SO4		
EMAX PM	O=			

SAMPLE ID		SAMPLING			CONTAINER			MATRIX CODE	QC	PRESERVATIVE CODE										COMMENTS
LAB	CLIENT	LOCATION	DATE	TIME	NO.	SIZE	TYPE													
* 1																				
* 2																				
* 3																				
* 4																				
* 5																				
* 6																				
* 7																				
* 8																				
* 9																				
10																				

Instructions	Cooler #	Temp. (^{o}C)	Sample #s

SAMPLER

COURIER/AIRBILL

RELINQUISHED BY	Date	Time	RECEIVED BY

NOTICE: Turn-around-time (TAT) for samples shall not begin untill all discrepancies have been resolved. For samples received and discrepacies resolved after 1500 hrs, TAT shall start at 0800 hrs the next business day. The client is responsible for all cost associted with sample disposal. Samples shall be disposed of as soon as pra (but not prior to fifteen (15) calendar days) after issuance of analytical report unless a different sample disposal schedule is pre-arranged with EMAX. Disposal fee for samples defined by CA Title 22 as non-hazardous shall be $5.00 per sample. EMAX will return hazardous samples to the client at the client's expense unless directed in writing otherwise.