N00236.001715
ALAMEDA POINT
SSIC NO. 5090.3

AECRU Contract Number N68711-00-D-0005
Delivery Order 0021

FINAL
SAMPLING AND ANALYSIS PLAN
(FIELD SAMPLING PLAN/QUALITY ASSURANCE PROJECT PLAN)

SITE 07 SUPPLEMENTAL SAMPLING AND ANALYSIS PLAN

Alameda Point
Alameda, California

October 7, 2003

Prepared for

DEPARTMENT OF THE NAVY
Greg Lorton, Remedial Project Manager
Southwest Division
Naval Facilities Engineering Command
San Diego, California

Prepared by

TETRA TECH EM INC.
1230 Columbia Street, Suite 1000
San Diego, California 92101
(619) 525-7188

Craig Hunter, Project Manager

DS.A021.10800

TETRA TECH EM INC.

TRANSMITTAL/DELIVERABLE RECEIPT

Contract No. N68711-00-D-0005 Document Control No. DS . A021 . 10800

TO: Mr. Ron Fuller, Code 02R1.RF
Contracting Officer
Naval Facilities Engineering Command
Southwest Division
1230 Columbia Street, Suite 1100
San Diego, CA 92101-8517

DATE: 10/09/03
DO: 021
LOCATION: Alameda Point, Alameda, California

FROM: [signature]
Michael Wanta, Contract Manager

DOCUMENT TITLE AND DATE:
Final Site Supplemental Sampling and Analysis Plan
October 7, 2003

TYPE: ☐ Contractual Deliverable ☒ Technical Deliverable (DS) ☐ Other (TC)

VERSION: Final (e.g., Draft, Draft Final, Final) REVISION #: NA

ADMIN RECORD: Yes ☒ No ☐ CATEGORY: Confidential ☐

SCHEDULED DELIVERY DATE: 10/09/03 ACTUAL DELIVERY DATE: 10/09/03

NUMBER OF COPIES SUBMITTED TO NAVY: O/7C/6E

O = original transmittal form
C = copy of transmittal form
E = enclosure

COPIES TO: (Include Name, Navy Mail Code, and Number of Copies)

NAVY:	TETRA TECH:	OTHER:
Mike McClelland (06CA.MM)	File/Doc Control	See Navy Cover Letter
O/2C/3E	1C/1E (w/QC)	
Joyce Howell-Payne (06CA.JH)		
1C + letter only		
Terry Martin (5DEN.TM)		
1C + letter only		**Date/Time Received**
Diane Silva *		
(05G.DS)		
3C/3E		

*Admin Record Recipient

rev 07/20/03

Final

Sampling and Analysis Plan
Field Sampling Plan/Quality Assurance Project Plan

Site 07 Supplemental Site Investigation
Alameda Point
Alameda, California

Contract Number N68711-00-D-0005
Delivery Order 0021

Prepared for:

DEPARTMENT OF THE NAVY

REVIEW AND APPROVAL

Tetra Tech Program QA Manager:	*For* Greg Swanson, Tetra Tech	Date: *01 Oct 03*
Navy QA Officer:	Narciso A. Ancog	Date: *10/2/03*

DISTRIBUTION LIST

Name	Responsibility	Affiliation
Glenna Clark	Remedial Project Manager	Naval Facilities Engineering Command, Southwest Division (SWDIV)
Narciso A. Ancog	Quality Assurance (QA) Officer	SWDIV
Mike McClelland	BRAC Environmental Coordinator	SWDIV
Mark Ripperda	Project Manager	United States Environmental Protection Agency, Region IX
Marcia Liao	Project Manager	California Environmental Protection Agency Department of Toxic Substances Control
Judy Huang	Project Manager	California Regional Water Quality Control Board, Central Valley Region
Greg Swanson	Program QA Manager	Tetra Tech EM Inc. (Tetra Tech)
Ron Ohta	Project QA Officer	Tetra Tech
Craig Hunter	Project Manager	Tetra Tech
John Swanson	Project Chemist	Tetra Tech
Brad Shelton	Field Team Leader	Tetra Tech

TABLE 1: ELEMENTS OF EPA QA/R-5 IN RELATION TO THIS SAP

Site 07 Supplemental Sampling and Analysis Plan, Alameda Point

	EPA QA/R-5 QAPP ELEMENT[a]		Tetra Tech SAP
A1	Title and Approval Sheet		Title and Approval Sheet
A2	Table of Contents		Table of Contents
A3	Distribution List		Distribution List
A4	Project/Task Organization	1.4	Project Organization
A5	Problem Definition/Background	1.1	Problem Definition and Background
A6	Project/Task Description	1.2	Project Description
A7	Quality Objectives and Criteria	1.3	Quality Objectives and Criteria
A8	Special Training/Certification	1.5	Special Training and Certification
A9	Documents and Records	1.6	Documents and Records
B1	Sampling Process Design	2.1	Sampling Process Design
B2	Sampling Methods	2.2	Sampling Methods
B3	Sample Handling and Custody	2.3	Sample Handling and Custody
B4	Analytical Methods	2.4	Analytical Methods
B5	Quality Control	2.5	Quality Control
B6	Instrument/Equipment Testing, Inspection, and Maintenance	2.6	Equipment Testing, Inspection, and Maintenance
B7	Instrument/Equipment Calibration and Frequency	2.7	Instrument Calibration and Frequency
B8	Inspection/Acceptance of Supplies and Consumables	2.8	Inspection and Acceptance of Supplies and Consumables
B9	Non-direct Measurements	2.9	Nondirect Measurements
B10	Data Management	2.10	Data Management
C1	Assessment and Response Actions	3.1	Assessment and Response Actions
C2	Reports to Management	3.2	Reports to Management
D1	Data Review, Verification, and Validation	4.1	Data Review, Verification, and Validation
D2	Validation and Verification Methods		
D3	Reconciliation with User Requirements	4.2	Reconciliation with User Requirements

Notes:

a EPA. 2001. "EPA Requirements for QAPPs, EPA QA/R-5." Office of Environmental Information. Washington, DC. EPA/240/B-01/003. March.

EPA U.S. Environmental Protection Agency
QAPP Quality assurance project plan
SAP Sampling and analysis plan
Tetra Tech Tetra Tech EM Inc.

CONTENTS

CONTENTS (Continued)

Appendix

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

±	Plus or minus
29 CFR	Title 29 Code of Federal Regulations
AECRU	Architect-Engineer CERCLA/RCRA/UST Contract
bgs	Below ground surface
BSU	Bay sediment unit
BTEX	Benzene Toluene, ethylbenzene, and xylenes
°C	Degrees Celsius
CAA	Corrective action area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLP	Contract laboratory program
COC	Chain of custody
CPR	Cardiopulmonary resuscitation
CPT	Cone penetrometer testing
%D	Percent difference
DCN	Document control number
DGS	Data gap sampling
DHS	Department of Health Services
DI	Deionized water
DO	Delivery Order
DQA	Data quality assessment
DQO	Data quality objective
DTSC	Department of Toxic Substances Control
DVE	Direct Vapor Extraction
EBS	Environmental baseline survey
EDD	Electronic data deliverable
ELAP	Environmental Laboratory Accreditation Program
EPA	U.S. Environmental Protection Agency
Ft/ft	Feet per foot
Ft/min	Feet per minute
Ft/yr	feet per year
FS	Feasibility Study
FTL	Field team leader

FWBZ	First water bearing zone
GAP	Generation accumulation point
GC/MS	Gas chromatography/mass spectrometry
GIS	Geographic information system
HASP	Health and safety plan
ICP	Inductively coupled plasma
ID	Identification
IDW	Investigation-derived waste
IT	International Technology Corporation
IR	Installation restoration
JMM	James M. Montgomery
LCS	Laboratory control sample
LIMS	Laboratory information management system
MDL	Method detection limit
MTBE	Methyl-tert-butyl-ether
MQO	Measurement quality objective
MS	Matrix spike
MSD	Matrix spike duplicate
MSR	Monthly status report
NA	Not available/applicable
NACIP	Navy assessment and control of installation pollutants
NAS	Naval Air Station
Navy	Department of Navy
NEDTS	Navy Environmental Data Transfer Standards
NFA	No further action
NFESC	Naval Facilities Engineering Service Center
OEI	Office of Environmental Information
OERR	Office of Emergency and Remedial Response
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
OWS	Oil-water separator

Oz	Ounce
PAH	Polycyclic aromatic hydrocarbons
PARCC	Precision, accuracy, representativeness, completeness, and comparability
PCB	Polychlorinated biphenyls
PE	Performance evaluation
PID	Photoionization detector
PPE	Personal protective equipment
PRC	PRC Environmental Management, Inc.
PRG	Preliminary remediation goals
PRRL	Project-required reporting limit
PWC	Navy Public Works Center
QA	Quality assurance
QAPP	Quality assurance project plan
QC	Quality control
QCSR	Quality control summary report
%R	Percent recovery
RAC	Response Action Contract
RI	Remedial investigation
RPD	Relative percent difference
RPM	Remedial project manager
RWQCB	Regional water quality control board
SDG	Sample delivery group
Shaw	Shaw Environmental and Infrastructure, Inc.
SOP	Standard operating procedure
SOW	Statement of work
SQL	Sample quantitation limit
SSI	Supplemental site investigation
SVOC	Semivolatile organic compound
SWBZ	Second water bearing zone
TIC	Totally inorganic carbon
TTPH	Total Total petroleum hydrocarbons
TPH	Total petroleum hydrocarbons
TPH-P	Total petroleum hydrocarbons purgeable
TSA	Technical systems audit

Tetra Tech	Tetra Tech EM Inc.
UST	Underground storage tank
VOC	Volatile organic compound
VSP	Visual sampling plan

1.0 PROJECT DESCRIPTION AND MANAGEMENT

The Department of Navy (Navy) is conducting a remedial investigation (RI) and feasibility study (FS) in conformance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for 32 sites at Alameda Point, Alameda, California (see Figure 1). As a result of cleanup efforts for total petroleum hydrocarbons (TPH) and lead-contaminated soils at CERCLA Site 07, a blue, crystalline, metallic debris layer was identified in shallow soils in the parking area south of Building 459. This debris layer was identified during excavation activities conducted by Shaw Environmental and Infrastructure, Inc. (Shaw) in October 2002, in accordance with the Final Work Plan Addendum, Evaluation of Alternative Remedial Technology, Former Exchange Service Station, Building 530 and Area 37 International Technology Corporation (IT), 2002. The debris layer ranges in depth from about 18 to 24 inches below ground surface (bgs), and is about 8 to 12 inches thick. The nature and extent of the debris layer is unknown at this time and is considered to be a data gap for completion of the RI/FS process for Site 07.

This sampling and analysis plan (SAP), which describes the supplemental site investigation (SSI) activities that will address the data gap for CERCLA Site 07, is augmented with the elements of a quality assurance project plan (QAPP). Table 1, which follows the approval page at the beginning of this SAP, demonstrates how this SAP addresses the elements of a QAPP, as specified in the U.S. Environmental Protection Agency (EPA) QA/R-5 QAPP guidance document (2001). The figures and remainder of the tables in this report follow the pages where each is first referenced in the text. Appendix A presents precision and accuracy goals for each method, Appendix B presents standard operating procedures (SOP), Appendix C presents specified field forms, Appendix D presents project-required reporting limits (PRRL), and Appendix E presents the laboratories that Tetra Tech EM Inc. (Tetra Tech) has contracted to analyze samples collected under its Navy contracts.

1.1 Problem Definition and Background

This section describes the following:

- Purpose of the Investigation (Section 1.1.1)
- Problem to be Solved (Section 1.1.2)
- Facility Background (Section 1.1.3)
- Site Description (Section 1.1.4)
- Physical Setting (Section 1.1.5)
- Summary of Previous Investigations (Section 1.1.6)

- Principal Decision-makers (Section 1.1.7)
- Technical or Regulatory Standards (Section 1.1.8)

1.1.1 Purpose of the Investigation

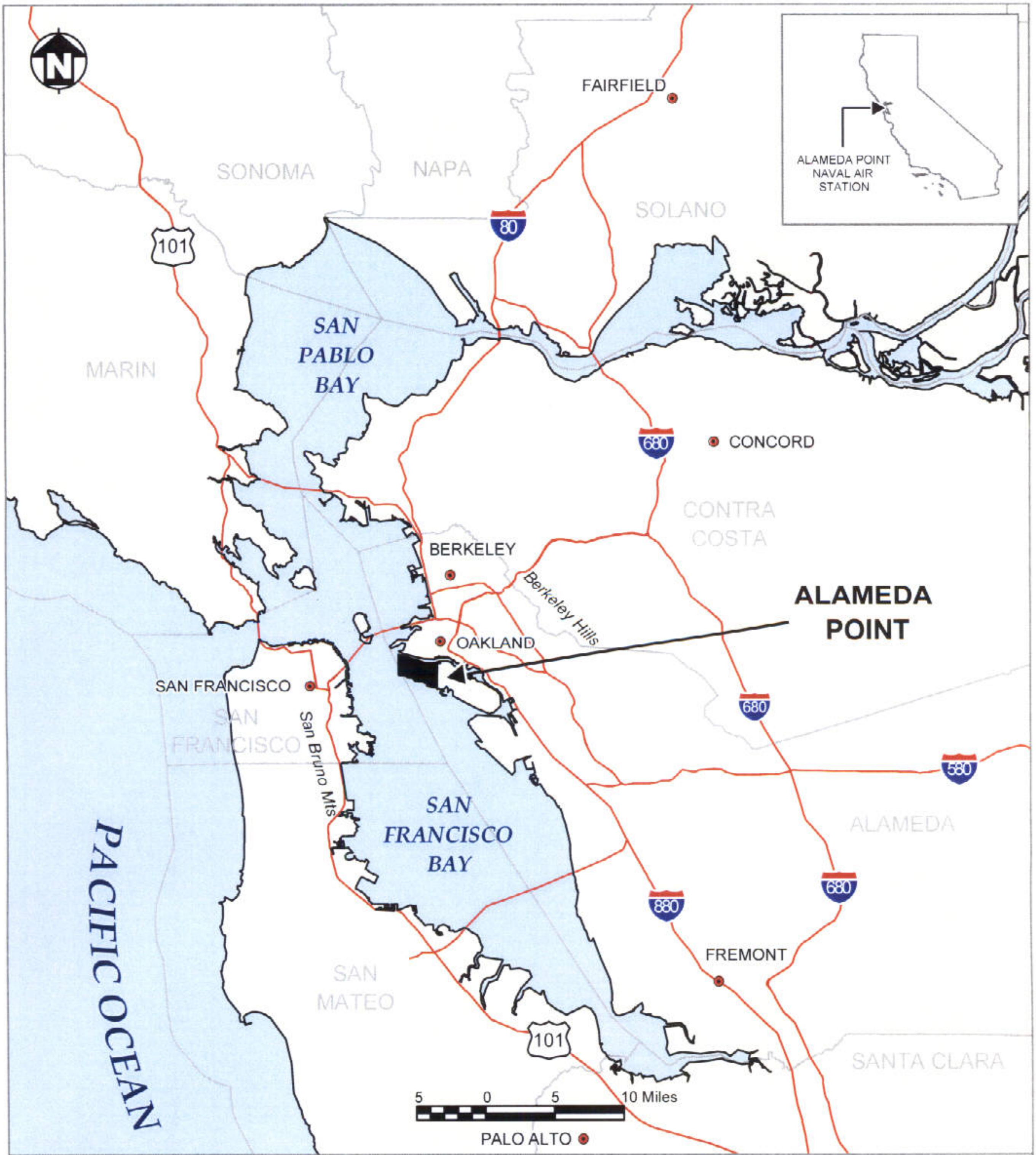
The purpose of this investigation is to determine the nature and extent of the debris layer in the southern parking area of Building 459. The data collected also will be used to determine if the contaminants in the debris layer pose a risk to human health and the environment. The evaluation of the data resulting from this SSI will be used to complete the RI/FS process for CERCLA Site 07.

1.1.2 Problem to be Solved

Former Building 68, located in Environmental baseline survey (EBS) Parcel 113 (CERCLA Site 7), originally housed an incinerator and smoke stack base that was used for reduction of wastes generated by base activities Figure 2. During the supplemental RI data gap sampling (DGS) investigation (Tetra Tech 2002) at Operable Unit (OU) - 1 and - 2, a soil samples were collected at three locations around the former location of Building 68 (see Figure 3). These samples were collected to evaluate the presence of metals, dioxins, and furans in the soil, which are known to be related to incineration wastes. However, target contaminants were not detected in these samples at concentrations indicative of incinerator wastes.

During excavation to remove TPH and lead-impacted soil related to an oil-water separator (OWS) near the base fuel station, Shaw discovered a light blue, crystalline, solid and scrap metal debris layer in shallow soils in the parking area south of Building 459 (Shaw 2003). The parking area next to Building 459 is near the footprint of former Building 68. Shaw Group sampled the debris layer to identify the chemicals present. Analytical data for these samples are presented in Appendix F. Shaw attempted to remove the debris layer in the parking area by excavating two small areas of surface soil; however, excavation activities were halted so that additional evaluation of the nature and extent of the debris layer could be performed. About 1,320 cubic feet of soil were removed and disposed of off site.

To determine the nature and extent of the debris layer in the southern parking area of Building 459 and to determine if contaminants in the debris layer pose a risk to human health and the environment, soil samples will be collected and analyzed for constituents that are known to be related to incineration wastes. Step-out criteria will be specified that will allow for horizontal and vertical delineation of the debris layer, within practical limits. To determine if the extent of the contamination has been fully delineated, data will be compared against EPA Region 9 Preliminary Remediation Goals (PRG). The analytical data also will be used in human health and ecological risk assessments to determine if contaminants in the debris layer pose risks.



- CITY
- HIGHWAY
- COUNTY BORDER

Tetra Tech EM Inc.

Alameda Point
U.S. Navy Southwest Division, NAVFAC, San Diego

FIGURE 1
REGIONAL LOCATION MAP
FOR ALAMEDA POINT

Site 7 Supplemental Sampling and Analysis Plan

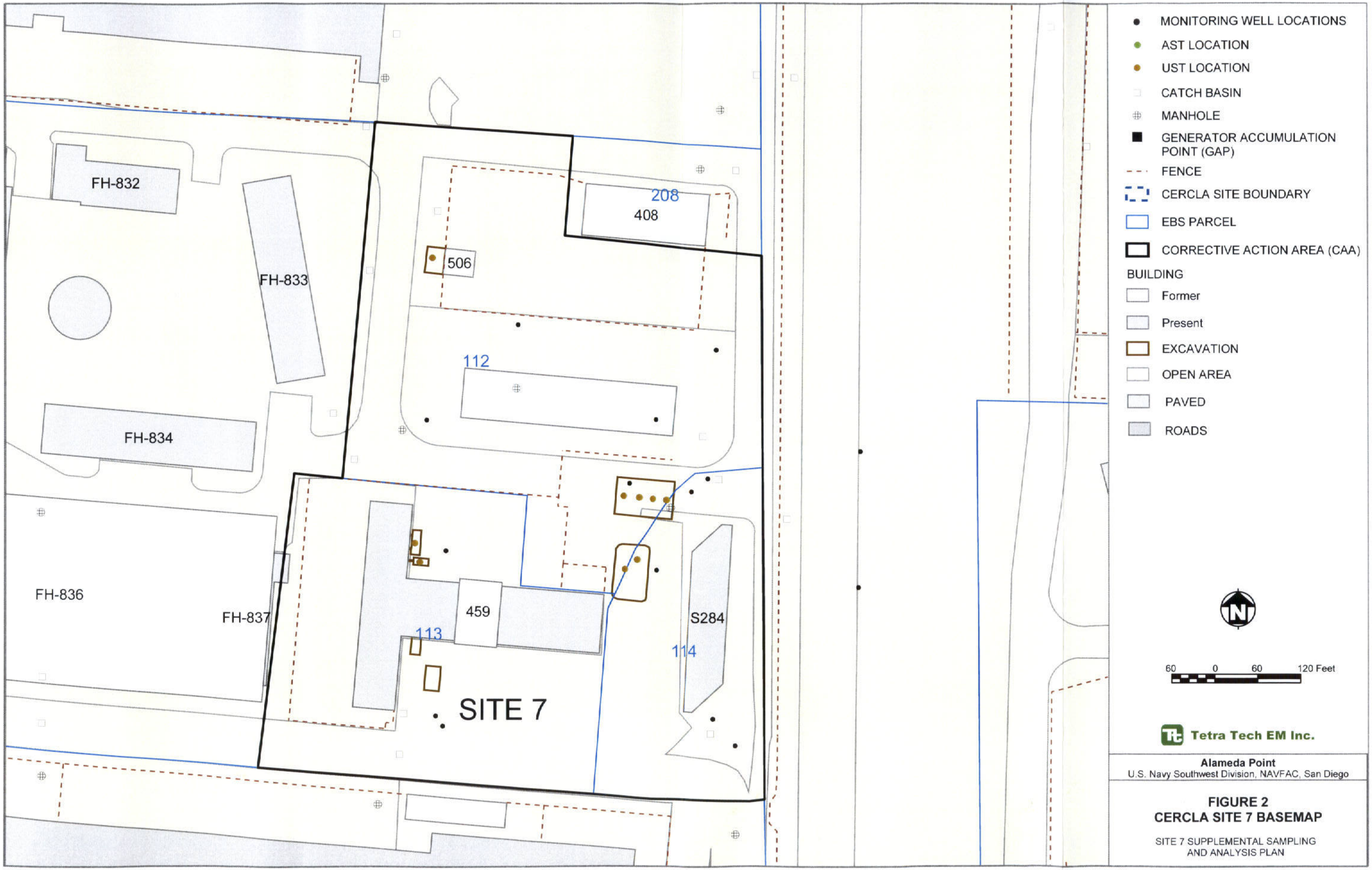


FIGURE 2
CERCLA SITE 7 BASEMAP

SITE 7 SUPPLEMENTAL SAMPLING AND ANALYSIS PLAN

YYYY-MM-DD S:\path\my.mxd TtEMI-SA My Initials

1.1.3 Facility Background

Alameda Point, formerly Naval Air Station Alameda, is located on the western end of Alameda Island, which lies in the eastern side of the San Francisco Bay, adjacent to the City of Alameda. Alameda Point is rectangular, about 2 miles long from east to west and 1 mile wide from north to south, and occupies 1,734 acres of land. In 1936, the Navy acquired title to the land from the U.S. Army and began building the air station in response to the military buildup in Europe before World War II. Construction of the base included several iterations of filling the existing tidelands, marshlands, and sloughs with dredge materials from the San Francisco Bay (Tetra Tech EM 1998a).

The Navy began site investigations at Alameda Point under the Navy Assessment and Control of Installation Pollutants (NACIP) program in 1982. On June 6, 1988, the Navy received a Remedial Action Order from the California Department of Health Services (now referred to as "DTSC") that identified a total of 20 sites as needing an RI/FS in conformance with the requirements of CERCLA. In 1988, the Navy converted its NACIP Program into the Installation Restoration (IR) Program, to be more consistent with CERCLA. Alameda Point was identified for closure in September 1993, and all naval operations ceased in April 1997. In July 1999, Alameda Point was identified as a National Priority List site (EPA 1999a). Between 1998 and 2002, and additional 12 CERCLA sites were identified as requiring RI/FS activities. The Navy is currently conducting an investigation in accordance with CERCLA (EPA 1988) at 32 CERCLA sites.

The three environmental investigations: EBS parcel investigations, Corrective Action Areas (CAA) investigations, and CERCLA site investigations are delineated in Figure 4.

1.1.4 Site Description

CERCLA Site 07 consists of a former Alameda Point fuel station and the surrounding area, including an unpaved, vacant lot to the north (see Figure 2). The former fuel station, located at the corner of Main Street and West Tower Avenue, operated from 1966 to 1997. An automobile repair shop and a small convenience store were also part of station facilities (Building 459) and were closed with the fuel station in 1997. Base housing and light industrial naval facilities were adjacent to CERCLA Site 07.

Two structures formerly occupied the EBS parcel that includes CERCLA Site 7. Former Building 158 was a craft/hobby shop and laundry facility, built in 1945. Former Building 68, built in 1942 and demolished in 1961, originally was constructed to house an incinerator and smoke stack base and to store firefighting equipment. This building and activities involved with its operation are the focus of this SSI at CERCLA Site 7. The building is referred to as "former" to avoid confusion with the current Building 68, located adjacent to Seaplane Lagoon on Parcel 139.

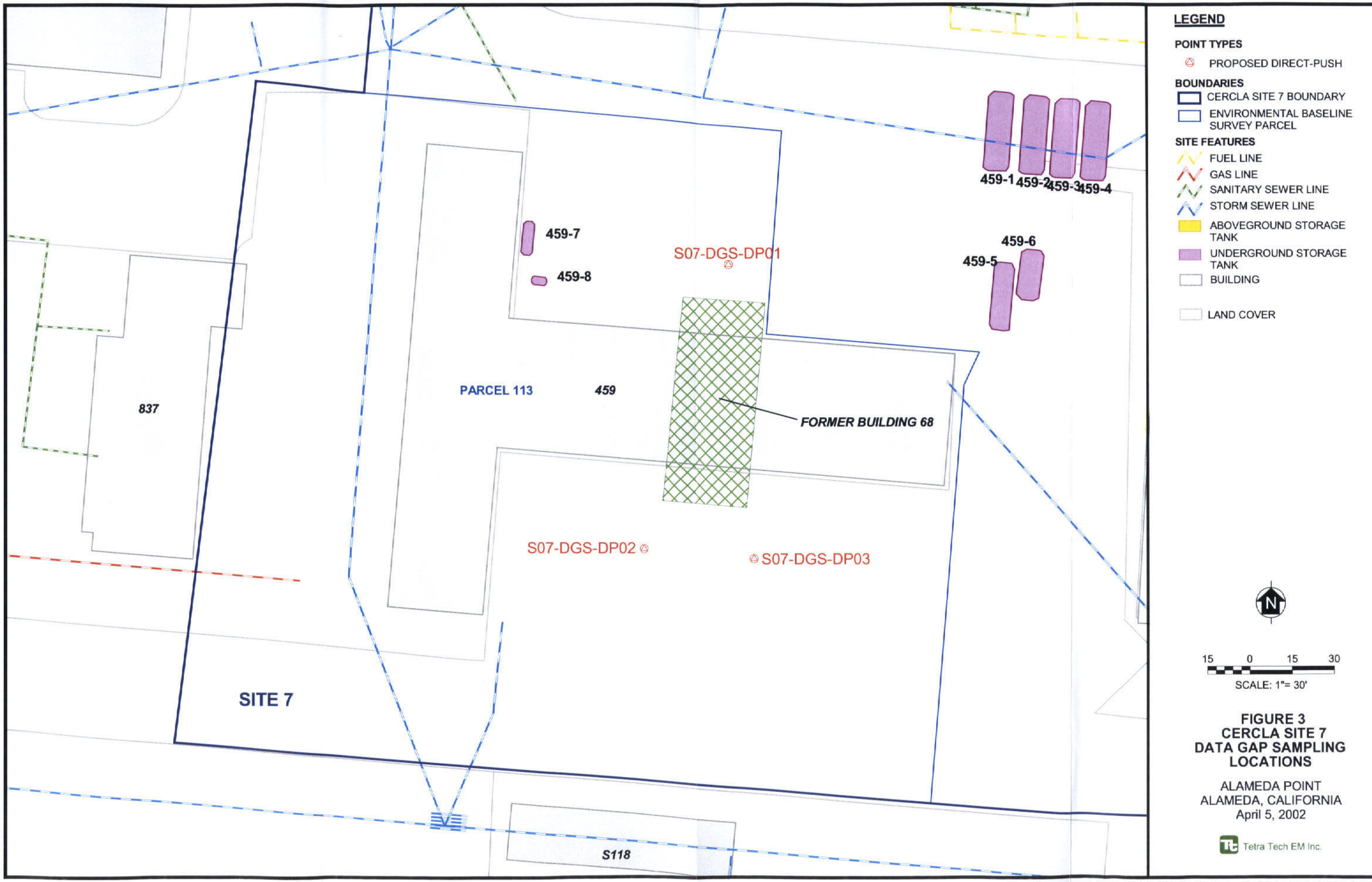
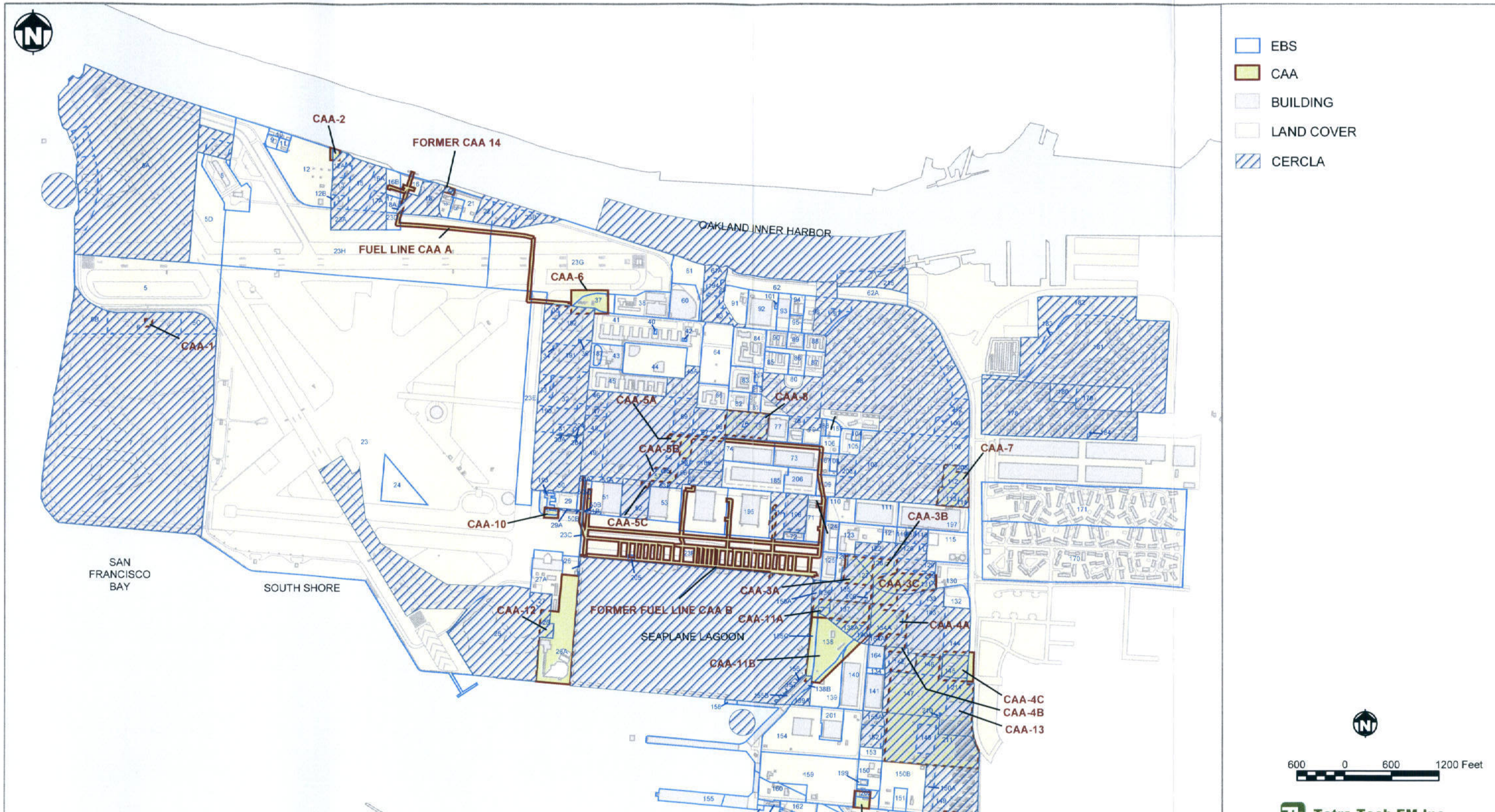


FIGURE 3
CERCLA SITE 7
DATA GAP SAMPLING LOCATIONS

ALAMEDA POINT
ALAMEDA, CALIFORNIA
April 5, 2002

Tetra Tech EM Inc.

S:\AECRU\Alameda\OU 1 - Sites 6,7,8,16 (DO 031)\Site 7 Supplemental site investigation Figure 2 TPM 04/05/03



Tetra Tech EM Inc.

Alameda Point
U.S. Navy Southwest Division, NAVFAC, San Diego

FIGURE 4
CAA, EBS, AND CERCLA SITE BOUNDARY MAP

SITE 7 SUPPLEMENTAL SITE INVESTIGATION

2003-01-30 U:\almda_sa\DO021\exit_strategy\mxd\basewide_caa.mxd TtEMI-SA K. Johnson

1.1.5 Physical, Geological, and Hydrogeological Setting

This section describes the physical, geological, and hydrogeological settings, based on investigations conducted during the OU-1 RI for CERCLA Site 07.

Four geologic units have been identified from soil borings and Cone penetrometer testing (CPT) logs at the site: fill material, the Bay Sediments unit (BSU), the Merritt Sand Formation, and the Upper San Antonio Formation.

The first geologic unit encountered at the site was fill material. Fill material is a silty to clayey sand that ranges from ground surface to a depth of 6 feet. A 1- to 2-foot layer of gravelly sand (SW) was present in most borings across the site. About 2 to 6 feet of sandy fill material, classified as poorly graded sand (SP) to silty sand (SM), was encountered across the site. Sandy material, similar in composition to the shallow fill material present throughout the site and believed to be backfill material for waste oil and solvent tanks, was present to a depth of 10 feet bgs at Boring M07A-01.

The second geologic unit encountered was the BSU. The BSU is composed of soft, moist, silty clay to clay (CL) and clayey sand (SC) and clayey silt (ML) material containing abundant plant remains. The plant material was found in varying states of decay and was often associated with a strong hydrogen sulfide odor. The BSU ranged from 30 to 50 feet in thickness, with the thickest portions south and east of Building 459.

The third geologic unit encountered was the Merritt Sand Formation. Deep borings indicate the presence of the Merritt Sand Formation beneath the BSU as far east as the eastern edge of Building 459 (refer to Boring D07A-01). The Merritt Sand Formation, classified as poorly graded sand (SP) to silty sand (SM), was encountered at depths ranging from 35 to 45 feet bgs.

The fourth geologic unit encountered was the Upper San Antonio Formation. The Upper San Antonio Formation beneath CERCLA Site 07 is composed of grayish olive silty sand (SM), with 40 percent fine sand, 20 percent very fine sand, 10 to 20 percent medium sand, and 20 to 30 percent silt. The soil was moist to very moist and had layers of organic matter at some depth intervals. Clay and clayey sand was encountered at Soil Boring D07A-01 at a depth of 69 feet bgs, indicating the top of the Yerba Buena Mud unit.

Three hydrogeologic units were identified at CERCLA Site 07: the First water bearing zone (FWBZ), the bay sediment unit (BSU), and the second water bearing zone (SWBZ). The fill material comprises the FWBZ. The FWBZ at CERCLA Site 07 is thin, because the fill material at the site is thin. Hydraulic conductivity values determined for the fill material ranged from 3.7 x 10^{-4} to 7.9 x 10^{-4} feet per minute (ft/min). The Merritt Sand and Upper San Antonio Formations comprise the SWBZ. The Merritt Sand Formation disappears in the eastern portion of the site before reaching the pump islands, so that the Upper San Antonio Formation alone comprises the SWBZ on the eastern portion of the site. The BSU separates the two water bearing zones. Hydraulic conductivity values determined for the BSU ranged from 2.0×10^{-7} to 7.5×10^{-8} ft/min. Underlying the SWBZ is the Yerba Buena Mud Aquitard.

Six monitoring wells at CERCLA Site 07 are screened in the FWBZ (although part of the screened interval is within the BSU), and six of the monitoring wells are fully screened in the BSU. Three monitoring wells are screened in the SWBZ, either in the Merritt Sand or the Upper San Antonio Formation. None of the CERCLA Site 07 monitoring wells was determined to be tidally influenced. During monitoring well installation, groundwater was encountered between 0.2 and 5.6 feet bgs within a clayey unit of the FWBZ.

Groundwater flow characteristics at CERCLA Site 07, based on April 1998 data, are summarized below.

Hydraulic Parameter	FWBZ (fill material)	BSU (bay sediments)
Flow Direction	East	Northeast
Horizontal Hydraulic Gradient	0.0089 ft/ft	0.0039 ft/ft
Estimated Horizontal Flow Velocity	3.1 ft/yr	0.045 ft/yr
Average Vertical Hydraulic Gradient	0.004 ft/ft (downward)	

Notes: ft/ft feet per foot
Ft/yr feet per year
FWBZ First water bearing zone
BSU Bay sediment unit

Horizontal flow velocity was estimated based on an effective porosity of 0.35 for silty sands in the fill material, an effective porosity of 0.3 for medium sands in the BSU, and an average hydraulic conductivity value derived from slug tests. Groundwater flow direction in the FWBZ likely is influenced by preferential flow paths caused by storm and sanitary sewer lines, as well as leaks in these sewer lines. The drainage ditch that runs north-south east of CERCLA Site 07, along Main Street, also influences the shallow, groundwater flow direction. Although the drainage ditch is predominantly dry for most of the year, a local gradient towards the ditch results in local eastward flow, rather than the westward regional flow. The drainage ditch leads north to a pump station, which discharges to the San Francisco Bay. Vertical gradients were calculated between three clusters of wells, screened between the upper portion of the BSU and the SWBZ. Individual, vertical gradients, based on April 1998 data, were 0.0013 Feet per foot (ft/ft) downward between Wells M07A-02 and D07A-03, 0.003 ft/ft downward between Wells M07A-03 and D07A-02, and 0.0077 ft/ft downward between Wells W-1 and D07A-01.

The BSU, because of its low hydraulic conductivity (low [2.0×10^{-7} Feet per minute (ft/min) to 7.5×10^{-8} ft/min]), may act as a flow barrier between the FWBZ and the SWBZ by limiting the vertical groundwater flux. However, interconnected "fingers" of clayey sand lenses still may provide vertical pathways to the SWBZ. Aquifer tests conducted at other locations within Alameda Point (CERCLA Site 5) showed no response from the SWBZ, while the FWBZ was being pumped (refer to Section 2.3.3). In these test areas, the BSU also was thinner than at CERCLA Site 07. However, continuous (preferential) flow paths of relatively higher-conductivity clayey sands, interbedded within the clays of the BSU, may allow transport of compounds to deeper units.

1.1.6 Summary of Previous Investigations

This section describes each of the environmental investigations conducted at Site 07 under the IR Program. The investigations are grouped according to the three types of investigations conducted, those conducted; during the RI, during the EBS, or as a part of the TPH Program.

RIs

Investigations conducted at Site 07 under the RI included the Phases 2B and 3 investigation, follow-on investigations conducted in 1994 and 1998, DGS conducted in 1998, a TPH free-phase floating product investigation in 2000, a supplemental DGS conducted in 2001, and a basewide monitoring program in 2002.

Phases 2B and 3 Investigation, 1991. This investigation included a soil gas survey, soil sampling, installation of groundwater monitoring wells, and groundwater sampling PRC Environmental Management, Inc. and James M. Montgomery (PRC and JMM 1992). A soil gas survey was conducted around Building 459 to delineate the extent of petroleum hydrocarbon vapors in the soil and to aid in selecting monitoring well locations. A total of 72 points was sampled; nine of these were added in the field in an attempt to delineate the downgradient extent of hydrocarbons detected in soil vapors.

Seven soil borings were drilled and four soil samples were analyzed from each of seven soil borings. Groundwater monitoring wells (M07A-01 through M07A-04) were constructed from five of the seven soil borings. The rationale for placement of the soil borings and monitoring wells as to identify chemicals of concern from the tanks and place monitoring wells along the perimeter of Site 07 to verify that constituents were not migrating off site (Canonie Environmental 1990). Four groundwater samples were collected from Wells M07A-01 through M07A-04 (PRC and JMM 1992). In addition, three groundwater samples were collected from Wells W-1 through W-3, which were installed in 1987 Environmental Resource Management, West (ERM 1987).

Follow-on investigation, 1994. The follow-on field investigation was conducted to provide additional lithologic, chemical, and hydrogeologic information, with the goal of assessing the nature and extent of soil and groundwater contamination for the RI/FS (PRC and JMM 1996).

Analytical results from previous soil investigations indicated the presence of gasoline constituents, TPH, semi volatile organic compounds (SVOC), pesticides, and elevated lead and benzene concentrations. The follow-on field investigation included soil sampling, non-point source sampling, CPT, direct-push groundwater sampling, monitoring well installation, and one out of the four planned quarters of groundwater monitoring (PRC and JMM 1996).

Twenty subsurface soil samples were collected from three soil borings (B07A-10 through B07A-12) and two monitoring well locations (M07A-08 and M07A-09).

The objective of the CPT and direct-push groundwater sampling program was to evaluate the lithology and hydrogeologic characteristics below a depth of 15 feet, to assess the thickness of the SWBZ and the lithology for direct-push groundwater sampling at locations adjacent to Site 07. Four deep, direct-push groundwater samples (DHP-S07A-01 through DHP-S07A-04) were collected from the SWBZ, and seven direct-push groundwater samples (SHP-S07A-05 through SHP-S07A-11) were collected from the fill layer in the northern and eastern portions of Site 07 to assist in the evaluation of TPH gas in groundwater. Four direct-push groundwater samples (DHP-S07A-05, DHP-S07A-07, DHP-S07A-09, and DHP-S07A-11) were collected from the Holocene Bay Mud Unit (PRC and JMM 1996).

Two shallow monitoring wells (M07A-08 and M07A-09) were installed in the FWBZ, and three deep monitoring wells (D07A-01, D07A-02, and D07A-03) were installed in the SWBZ. Groundwater samples were collected from each monitoring well, and soil samples were collected from Wells M07A-08 and M07A-09. Deep monitoring well locations were selected based on direct-push groundwater sampling results and were located to provide horizontal groundwater flow direction information for the SWBZ. Groundwater samples also were collected from 10 additional monitoring wells.

Three shallow monitoring wells (M07A-5, M07A-06, and M07A-07) were installed in the FWBZ. Soil and groundwater samples were collected. In addition, two soil borings (B07A-08 and B07A-09) were advanced.

Follow-on Investigation, 1998. This investigation was conducted to obtain analytical data in order to characterize the distribution and concentration of chemicals in groundwater at Site 07. During prior sampling of Site 07 wells, releases were detected of petroleum hydrocarbons (including volatile organic compounds) associated with Underground storage tank (UST) 459-5 and -6 and a waste oil tank located north of Building 459. (Tetra Tech and Uribe & Associates 1998). Five monitoring wells were originally selected for quarterly sampling (D07A-02, M07A-03, M07A-04, M07A-09, and W-1) and were sampled for Quarters 1 and 2. During Quarters 3 and 4, four additional wells (D07A-01, M07A-01, M07A-05, and M07A-08) were added to the quarterly monitoring program.

Well W-1 was chosen for quarterly monitoring because of its location in the center of the petroleum hydrocarbon plume, originating at Site 07. Adjacent wells were chosen to monitor the plume, and wells along the perimeter of Site 07 were sampled to determine if constituents originating from Site 07 were migrating off site or if constituents not originating from Site 07 were migrating on site.

Quarterly groundwater samples were analyzed for VOCs, SVOCs, pesticides/ polychlorinated biphenyls (PCB), TPH, metals, and general chemicals.

Supplemental RI DGS for OUS-1 and OU-2, 2001. The objective of this investigation at Site 07 was to identify possible contaminants in soil in the area of former Building 68. It was unknown at the time whether wastes from the former incinerator located in Building 68 had contaminated the site (Tetra Tech 2001b). Soil samples were collected at three locations around the former location of Building 68, from depths of 3 and 6 feet bgs (Tetra Tech 2002).

Basewide Groundwater Monitoring, 2002. The specific objectives of this investigation were to: (1) definition of contaminant plumes in groundwater, (2) identify general types and number of plumes, and (3) identify the main chemicals of concern (COC). Nine monitoring wells (D07A-02, D07A-03, M07A-02, M07A-03, M07A-04, M07A-05, M07A-06B, M07A-07, and M07A-08) were identified for quarterly sampling.

Polycyclic Aromatic Hydrocarbons (PAH) Background Investigation, 2003. The purpose of the background PAH investigation was to determine the ambient level of PAHs, so that cleanup levels are not set below that number.

EBS

Site 07 lies within Zone 20 and is composed of Parcels 112, 113, and 114. Soil and groundwater sampling was conducted during June 1995 at these parcels as part of the EBS. No parcel-specific sampling was conducted at Parcel 114, and soil samples were collected only in the northern area of Parcel 112 (IT 2001a).

Phase 2A, 1994. A previous investigation detected PCBs in soil samples collected near the former concrete transformer pad. A total of 15 soil samples was collected (6 surface and 9 subsurface). Surface soil samples were analyzed for TPH. Subsurface soil samples were analyzed for these constituents, as well as VOCs, SVOCs, TPH, and metals. Additionally, two subsurface soil samples were collected from the industrial sewer line. Two samples were collected adjacent to the industrial waste sewer line and analyzed for TPH, VOCs, and SVOCs (IT 2001a).

Phase 2B, 1994. A Phase 2B sampling event was recommended as a result of the detection of TPH (motor-oil-range) compounds in a surface and subsurface soil sample (located southeast of Building 506), VOC detections in a soil sample (south of Building 506), and lead detections between the southern side of Building 459 and OWS-459. During the Phase 2B sampling event a total of eight soil samples was collected (four surface and four subsurface). Soil samples were analyzed for VOCs, TPH, SVOCs (specifically, PAHs), and metals. One direct-push groundwater sample was collected and analyzed for VOCs (IT 2001a).

Phase 2C, 2001. A Phase 2C sampling event was recommended as a result of the detection of PAHs (in the same vicinity as the TPH detection) in surface soil, and VOCs in groundwater, and SVOCs in sediment samples during the Phase 2B sampling event. During the Phase 2C sampling event, at Parcel 112, four groundwater samples were collected and analyzed for VOCs, MTBE, metals, and TPH (IT 2001a).

TPH Program and UST Removal Program

Investigation activities conducted at Site 07 under the TPH Program included UST removals, Methyl-tert-butyl-ether (MTBE) sampling, floating product investigations, and a corrective action to remove soil vapor and dissolved-phase fuel constituents from groundwater.

UST removals, 1997. In February 1995, UST 506-1 was removed. UST 506-1 was a 1,400-gallon lubricating oil tank located on the western side of Building 506. Soil contamination was observed during removal of the tank and associated piping. Overexcavation of contaminated soil continued until contaminants appeared to be removed, based on readings from a photoionization detector (PID) and visual inspections (Navy Public Works Center [PWC] 1997a).

A request of no further action (NFA) for UST 506-1 was submitted in February 2000 (Tetra Tech 2000b). The Regional Water Quality Control Board (RWQCB) approved closure of UST 506-1 in June 2000. According to the Draft Supplemental EBS (Tetra Tech 2002a), UST 506-1 requires NFA.

USTs 459-1 through -4 were removed on November 13, 1998. Fuel lines connecting USTs 459-1 through -4 and the fuel pumps also were removed. Although the USTs showed no evidence of leaks, a strong hydrocarbon odor was present during excavation and contamination was observed in soil and groundwater within the excavation. The UST removal report was not available at the time of this report.

In April 1995 USTs 459-5 and -6 were removed. UST 459-5 was a 10,000-gallon tank, and UST 459-6 was an 8,000-gallon steel tank. Both USTs contained gasoline and were located northwest of the fuel islands. The excavation had a petroleum hydrocarbon odor, and intermittent visible contamination appeared around the perimeter of the excavation. Soil and groundwater samples were collected from the excavation (PWC 1997b).

In January 1995, USTs 459-7 and -8 were removed. Upon removal, water was pumped from the excavation pit of Tank 459-7 to remove floating product. Soil and groundwater samples were collected immediately after the removal of Tank 459-7. Soil and groundwater samples were collected after overexcavation of soil and removal of Tank 459-8 (PWC 1997b).

MTBE, 1998. In 1998, an investigation was conducted to determine the presence of MTBE in groundwater. Seven groundwater samples were collected from existing wells and analyzed for MTBE (Tetra Tech 2001a).

Free-Phase Floating Product, 1998. In 1998, during the RI DGS event, the presence of floating product near former USTs 459-1 through -4 was assessed. A soil boring was driven, and a piezometer was installed. One groundwater sample was collected from the piezometer; however, no floating product was present. The section of storm sewer between Catch Basin 6G-11 and Manhole 6G-15, running in an east-west direction through the location of former USTs 459-1 through -4, was investigated for total total petroleum hydrocarbons (TTPH) and TPH-associated compound concentrations in groundwater samples collected near storm drains exceeding PRG. The storm drain reach was grouted with concrete; therefore, a groundwater sample was not collected (Tetra Tech 2001a).

In 2000, another floating product investigation was conducted to evaluate whether free phase floating product is present beneath USTs at Site 07 and to confirm findings of previous IR investigations. A previous investigation conducted in 1995 detected free product in the storm drain catch basin at Site 07 (does not specify which catch basin). Air monitoring surveys were performed to assess VOC vapors and explosive gas emissions from monitoring wells (Tetra Tech 2000a).

All of the wells at Site 07 were examined using an oil-water interface probe. None of the wells or the storm drain catch basin was found to contain free product.

Corrective Action, 2001. Previous investigations at Site 07 have focused on the contamination near the former USTs and south of Buildings 459 and 506. DGS, conducted under the TPH Program in April 2000, indicated the presence of MTBE in groundwater samples. Additionally, benzene, toluene, ethylbenzene, and xylenes (BTEX), TPH, gasoline, and motor oil have been detected in soil from borings or excavations. This investigation further assessed the extent of TPH contamination, to support the design, building, and operation of a removal system for MTBE and dissolved-phase TPH constituents from groundwater at Site 07 (IT 2001b). The extraction system was an expansion of a direct vapor extraction (DVE) free-product recovery system that was designed, but had not been implemented (IT 2001c).

The investigation was conducted in three phases. In the first phase, soil borings were drilled and sampled to further assess the extent of petroleum hydrocarbon contamination. The free product boundary was based on free-product plume delineation activities performed under IT's Fuel

Remediation Measures (IT 2001c). Soil and groundwater samples were collected from each soil boring. The second phase involved installing piezometers in soil borings to confirm the direction of groundwater flow and to measure water table fluctuations. In the third phase, all soil borings, piezometers, and extraction wells were surveyed.

Shaw excavated soil from the southern parking area of Building 459 in two locations to remove the debris layer identified during the TPH/lead removal action associated with OWS-459.

1.1.7 Principal Decision-makers

Principal decision-makers include the Navy and the regulatory agencies (EPA, DTSC, and RWQCB). These decision-makers will use the data collected from this investigation, in addition to data collected during previous investigations, to support decisions for completing the RI/FS at Site 07.

1.1.8 Technical or Regulatory Standards

This SSI will be conducted in accordance with CERCLA guidance for determining nature and extent and for performing risk assessments (EPA 1988, 1992b). EPA Region IX PRGs for residential soil (2002) will be used as screening levels for this site. EPA Region IX PRGs are presented in Appendix D. Results of this investigation and data evaluation will be presented in the OU-1 RI report for Sites 6, 7, 8, and 16.

1.2 Project Description

The following sections discuss the objectives and measurements for this project. Table 2 presents the implementation schedule for sampling, analysis, and reporting for this project.

1.2.1 Project Objectives

As stated in Section 1.1, the primary objective of the Site 07 SSI is to determine the nature and extent of the debris layer related to the former incinerator (Building 68) in the southern parking area of Building 459. This data will be used to prepare human health and ecological risk assessments and to complete the RI/FS process for this site. These objectives will be accomplished by conducting the following activities:

- Collecting subsurface soil samples from about 23 locations in the southern parking area outside of Building 459 where the debris layer was previously identified

TABLE 2: IMPLEMENTATION SCHEDULE FOR SAMPLING, ANALYSIS, AND REPORTING

Site 07 Supplemental Sampling and Analysis Plan, Alameda Point

Milestone	Due Date	Anticipated Date
Internal Draft SAP to Navy	30 calendar days after notification to proceed	July 15, 2003
Draft SAP to Agencies	7 calendar days after Navy comments are received	July 15, 2003
Internal Final SAP to Navy	30 calendar days after all regulatory agency comments are received	August 18, 2003
Final SAP to Regulatory Agencies	14 calendar days after Navy comments are received	September 17, 2003
HASP to Navy	30 calendar days before field investigation begins	September 17, 2003
Field Investigation	Immediately following finalization of SAP	September 29, 2003

Notes:

HASP Health and safety plan
SAP Sampling and analysis plan
NAVY United States Navy

- Using visual inspection to identify the debris layer at each sampling location and choosing samples for submittal to a laboratory for chemical analysis
- Analyzing samples for specific target analytes related to incinerator wastes
- Evaluating the resulting chemical data against PRGs to determine if the extent of the debris layer has been fully delineated
- Conducting step-out sampling if additional horizontal or vertical delineation is required
- Evaluating the risk from contaminants detected in the samples where the debris layer was identified
- Presenting the chemical data and the results of the risk assessment in an RI report
- Evaluating the chemical data and the results of the risk assessment to determine the need for further action at the site

1.2.2 Project Measurements

Soil samples collected during this project will be analyzed for total metals. In addition, selected samples will be analyzed for PCBs, dioxins/furans, and chromium speciation. Details on specific analyses that will be performed on field samples and QC samples are presented in Sections 2.4 and 2.5.

1.3 Quality Objectives and Criteria

The following sections present the data quality objectives (DQO) and measurement quality objectives (MQO) identified for this project.

1.3.1 Data Quality Objectives

DQOs are qualitative and quantitative statements developed through a seven-step DQO process (EPA 2000b, 2000d). DQOs clarify the study objective, define the most appropriate data to collect and the conditions under which to collect the data, and specify tolerable limits on decision errors that will be used as the basis for establishing the quantity and quality of data needed to support decision-making. DQOs are used to develop a scientific and resource-effective design for data collection. The seven steps of the DQO process for this project are presented in Table 3.

1.3.2 Measurement Quality Objectives

Analytical results will be evaluated in accordance with precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters to document the quality of the data and to ensure that the data are of sufficient quality to meet project objectives. Of these PARCC parameters, precision and accuracy will be evaluated quantitatively by collecting the quality control (QC) samples listed in Table 4. Descriptions of these QC samples are presented in Section 2.5. Specific precision and accuracy goals for QC samples for this project are listed in Appendix A. The following subsections describe each of the PARCC parameters and how they will be assessed for this project.

1.3.2.1 Precision

Precision is the degree of mutual agreement between individual measurements of the same property under similar conditions. Laboratory analytical precision will be evaluated by analyzing laboratory duplicates or matrix spike (MS) and matrix spike duplicate (MSD) samples. For this project, MS/MSD samples will be generated for all analytes. The results of the analysis of each MS/MSD pair will be used to calculate a relative percent difference (RPD) for evaluating precision.

$$RPD = \frac{|A-B|}{(A+B)/2} \; x \; 100\%$$

Where:

A = First duplicate concentration
B = Second duplicate concentration

Field sampling precision is evaluated by analyzing field duplicate samples. Collocated field duplicates will be collected for this project to evaluate variability of concentrations in the debris layer. The results will not be used for data validation but will help in the evaluation of the data set.

TABLE 3: DQOs

Site 07 Supplemental Sampling and Analysis Plan, Alameda Point

STEP 1: State the Problem

Former Building 68 was located within the current boundary of RI Site 07 at Alameda Point. The former building housed an incinerator and smoke stack base. Past activities related to the operation of the incinerator are believed to have resulted in a land-spread of fly ash south of former Building 68, in the current southern parking area of Building 459. A foot-thick debris layer containing high concentrations of heavy metals was identified in the area described, at a depth of about 18 to 24 inches bgs. Two areas of the debris layer, 9 by 16 ft and 15 by 20 ft were excavated and disposed of under the Navy's response action contract (RAC) in 2002; however, the nature and extent of the debris layer is still unknown. In addition, not enough data exist to determine the potential risks to human health and the environment from contaminants in the debris layer.

STEP 2: Identify the Decisions

- What is the lateral and vertical extent of the debris layer?
- Do contaminants in the debris layer pose a risk to human health and/or the environment?

STEP 3: Identify Inputs to the Decisions

- Analytical results from the excavation of the debris layer performed by the Navy's RAC.
- Aerial Photographs
- Collection of 17 subsurface samples from the area of suspected debris piles associated with the former incinerator, and six additional soil samples for visual inspection and chemical testing
- Soil boring logs generated during sampling
- Field observations
- Step-out decision criteria

STEP 4: Define Study Boundaries

- The south parking area for Building 459 and the perimeter of Building 459. Building 459 defines the southern parking area to the north and west, West Tower Street to the south, and about 125 feet east of the west boundary.
- The vertical extent of the study area extends from the soil surface down to about 4 feet bgs.
- The total temporal boundary for the project will be within the period of performance.

STEP 5: Develop Decision Rules

1a. If the concentrations of chemicals in the outermost and deepest subsurface samples from the suspected area of the debris piles are below the PRGs and/or they are significantly lower than the areas of highest concentrations, then the extent of the debris layer has been adequately characterized.

1b. If the concentrations of chemicals in the outermost and deepest subsurface samples from the suspected area of the debris piles are greater the PRGs for constituents of concern, and/or they are significantly higher than concentrations measured in the areas of highest concentrations, then the extent of the debris layer has not been adequately characterized and the need for additional sampling will be evaluated.

2a. If results for soil samples show that contaminants in the debris layer pose a risk to human health and/or the environment, then a Feasibility Study (FS) will be performed.

2b. If results for soil samples show that contaminants in the debris layer do not pose a risk to human health or the environment, the site will be considered for no further action.

STEP 6: Specify Tolerable Limits on Decision Errors

Selection of the analytical suite of analyses is based on historical data. Measurement quality objectives specify the performance criteria for laboratory analysis of samples and are summarized in Appendix A of the work plan.

A sampling goal of "hot spot location" was evaluated for site characterization using VSP 2.0 (Battelle Memorial Institute 2002). The assumptions used to determine sample spacing include:

- The target hot spot is circular or elliptical in shape (based on aerial photographs).
- Samples are taken on a triangular grid.
- The sample is much smaller than the hot spot of interest.
- The level of contamination that defines a hot spot is well defined.
- There are no misclassification errors.

Parameter inputs used to define the sampling grid include:

- Probability of hot spot detection = 95%
- Hot spot area is 0.016 acre (30-foot diameter)
- Hot spot is a circular shape
- Total sampling area is 11,284 square feet

VSP determined that a sampling grid with 16 samples would be sufficient to characterize the site. Figure 6 shows the gridded sampling locations. Gridded samples are located in the area where historical evidence shows that incinerator debris was possibly deposited. Note that an additional sample (17 total) was added to the grid to account for edge effects.

STEP 7: Optimize the Sampling Design

Aerial photography of the site taken in the 1950s shows several areas where the incinerator debris may have been deposited, graded, and covered with soil.

Hand augering will be performed at each location to a depth of about 4 feet bgs. Based on visual observations, samples will be collected from each boring at the depth at which the debris layer looks the most concentrated. In the outerlying sampling locations, if no debris layer is identified in the top four feet of the boring, the sample will be collected from the bottom of the boring. At five locations where the debris layer was identified, an additional sample will be collected from the bottom of the boring, at 4 feet bgs. These samples will be used to confirm the vertical extent of the debris layer.

In addition to gridded samples, six step-out samples will be collected: two samples located along the northern perimeter of Building 459, two samples located along the western perimeter of Building 459, and two samples on the southern side of West Tower Street. At these sampling locations, if no debris layer is identified in the top 4 feet of the boring, the sample will be collected from the bottom of the boring. This will ensure that the extent of contamination will be adequately defined. If the debris layer is identified in these step-out samples, up to 10 additional step-out locations may be identified for sampling.

All samples will be analyzed for total metals. In the three samples where the debris layer is observed to be the most concentrated, dioxin/furan, PCB, and chromium speciation analyses will be performed. Dioxins and PCBs are frequently detected in incinerator ash and low concentrations of these compounds can influence risk assessment results. Chromium speciation will be performed because of the substantial difference in toxicity values for chromium III versus hexavalent chromium. If analytical results for these additional sample analyses exceed PRGs, analysis of additional grid samples may be considered. Risk assessment and regulatory agency representatives will be consulted for future steps in this determination.

Notes:

bgs	Below ground surface	PRG	Preliminary Remediation Goal
DQO	Data quality objectives	RAC	Response Action Contract
NAVY	United States Navy	VSP	Visual sampling plan
PCB	Polychlorinated biphenyls		

TABLE 4: QC SAMPLES FOR PRECISION AND ACCURACY

Site 07 Supplemental Sampling and Analysis Plan, Alameda Point

QC Type	Precision	Accuracy	Frequency
Field QC	**Collocated field duplicates** (%D)	**Equipment Rinsate** **Source water blank**	**Field duplicate** = 1/10 samples (soil) **Equipment rinsate** = 1/day/piece of equipment used for sampling **Source water blank** = 1/sampling event/source of water used for the final decontamination rinse
Laboratory QC	**MS/MSD** (RPD)	**MS/MSD** (%R) **Method blanks** **LCS or blank spikes surrogate standards** (%R) **Internal standards** (%R)	**MS/MSD** = 1/20 samples (soil) **Method blank** = 1/20 samples **LCS or blank spikes** = 1/20 samples **Surrogate standards** = Every sample for organic analysis by GC **Internal standards** = Every sample for organic analysis by GC

Notes:

%D	Percent Difference
%R	Percent recovery
GC	Gas chromatography
LCS	Laboratory control sample
MS/MSD	Matrix spike/matrix spike duplicate
QC	Quality control
RPD	Relative percent difference

1.3.2.2 Accuracy

A program of sample spiking will be conducted to evaluate laboratory accuracy. This program includes analysis of MS/MSD samples, laboratory control samples (LCS) or blank spikes, surrogate standards, and method blanks. MS/MSD samples will be prepared and analyzed at a frequency of 5 percent for soil samples. LCSs or blank spikes also are analyzed at a frequency of 5 percent. Surrogate standards, where available, are added to every sample analyzed for organic constituents. Results of the spiked samples are used to calculate the percent recovery (%R) for evaluating accuracy.

$$\%R = \frac{S - C}{T} \; x \; 100$$

where:

S = Measured spike sample concentration
C = Sample concentration
T = True or actual concentration of the spike

Appendix A presents accuracy goals for the investigation based on the %R of matrix and surrogate spikes. Results that fall outside of the accuracy goals will be further evaluated on the basis of the results of other QC samples.

1.3.2.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter at a sampling point, or an environmental condition that they are intended to represent. For this project, representative data will be obtained through careful selection of sampling locations and analytical parameters. Representative data also will be obtained through proper collection and handling of samples to avoid interference and minimize contamination.

Representativeness of data also will be ensured through the consistent application of established field and laboratory procedures. Field blanks (if appropriate) and laboratory blank samples will be evaluated for the presence of contaminants to aid in evaluating the representativeness of sample results. Collocated field duplicates will also aid assessment of data representativeness allowing an evaluation of matrix variability. Data determined to be non-representative, by comparison with existing data, will be used only if accompanied by appropriate qualifiers and limits of uncertainty.

1.3.2.4 Completeness

Completeness is a measure of the percentage of project-specific data that are valid. Valid data are obtained when samples are collected and analyzed in accordance with QC procedures outlined in this SAP and when none of the QC criteria that affect data usability are exceeded. When all data validation is completed, the percent completeness value will be calculated by dividing the number of useable sample results by the total number of sample results planned for this investigation.

As discussed further in Section 4.2, completeness also will be evaluated as part of the data quality assessment process (EPA 2000c). This evaluation will help determine whether any limitations are associated with the decisions to be made based on the data collected.

1.3.2.5 Comparability

Comparability expresses the confidence with which one data set can be compared with another. Comparability of data will be achieved by consistently following standard field and laboratory procedures and using standard measurement units in reporting analytical data.

1.3.2.6 Detection and Quantitation Limits

The method detection limit (MDL) is the minimum concentration of an analyte that can be reliably distinguished from background noise for a specific analytical method. The quantitation limit represents the lowest concentration of an analyte that can be accurately and reproducibly quantified in a sample matrix. PRRL are contractually specified maximum quantitation limits for specific analytical methods and sample matrices, such as soil or water, and are typically several times the MDL to allow for matrix effects. PRRLs, which are established by Tetra Tech in the scope of work for subcontract laboratories, are set to establish minimum criteria for laboratory performance; actual laboratory quantitation limits may be substantially lower.

For this project, analytical methods have been selected so that the PRRL for each target analyte is below the applicable regulatory screening criteria, the PRGs, wherever practical. Appendix D compares PRRLs for selected analytical methods with residential PRG because it has not been formally established which of these land uses will apply to this site.

1.4 Project Organization

Table 5 presents the responsibilities and contact information for key personnel involved in soil sampling activities at Site 07 at Alameda Point. In some cases, more than one responsibility has been assigned to one person. Figure 5 presents the organization of the project team.

1.5 Special Training and Certification

This section outlines the training and certification required to complete the activities described in this SAP. The following sections describe the requirements for Tetra Tech and subcontractor personnel working on site.

TABLE 5: KEY PERSONNEL

Site 07 Supplemental Sampling and Analysis Plan, Alameda Point

Name	Organization	Role	Responsibilities	Contact Information
Glenna Clark	Navy	Remedial project manager	Responsible for overall project execution and coordination with base representatives, regulatory agencies, and Navy management Actively participates in Data quality objectives (DQO) process Provides management and technical oversight during data collection	Naval Facilities Engineering Command, SWDIV, San Diego, CA AndersonSD@efdsw.navfac.navy.mil (619) 532-0938
Narciso A. Ancog	Navy	QA officer	Responsible for QA issues for all Southwest divisions (SWDIV) environmental work Provides government oversight of Tetra Tech's QA program Reviews and approves SAP and any significant modifications Has authority to suspend project activities if Navy quality requirements are not met	Naval Facilities Engineering Command, SWDIV, San Diego, CA ancogna@efdsw.navfac.navy.mil (619) 532-2540
Beth Kelly	Tetra Tech	Installation coordinator	Responsible for ensuring that all Tetra Tech activities at this installation are carried out in accordance with current Navy requirements and Tetra Tech Architect-Engineer CERCLA/RCRA/UST Contract (AECRU) program guidance	Tetra Tech, Sacramento, CA Beth.Kelly@ttemi.com (916) 853-4525
Craig Hunter	Tetra Tech	Project manager	Responsible for implementing all activities called out in Delivery order (DO) Prepares or supervises preparation of SAP Monitors and directs field activities to ensure compliance with SAP requirements	Tetra Tech, Sacramento, CA Craig.Hunter@ttemi.com (916) 853-4507
Greg Swanson	Tetra Tech	Program QA manager	Responsible for regular discussion and resolution of QA issues with Navy QA officer Provides program-level QA guidance to installation coordinator, project manager, and project teams Reviews and approves SAPs Identifies nonconformances through audits and other QA review activities and recommends corrective action	Tetra Tech, San Diego, CA Greg.Swanson@TtEMI.com 619-525-7188
Ron Ohta	Tetra Tech	Project QA officer	Responsible for providing guidance to project teams that are preparing SAPs Verifies that data collection methods specified in SAP comply with Navy and Tetra Tech requirements May conduct laboratory evaluations and audits	Tetra Tech, Sacramento, CA Ron.Ohta@TtEMI.com (916) 853-4506

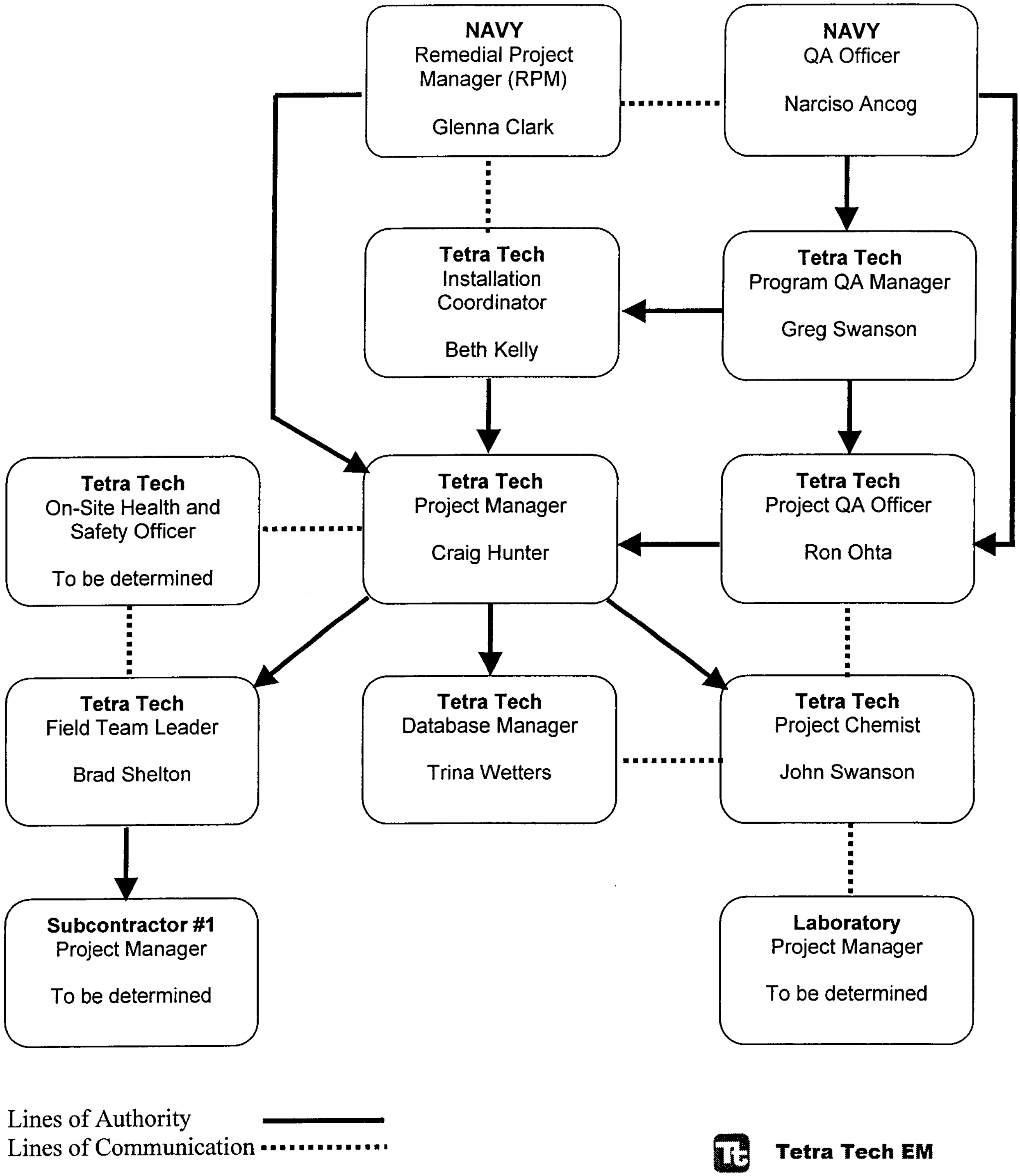
TABLE 5: KEY PERSONNEL (Continued)

Site 07 Supplemental Sampling and Analysis Plan, Alameda Point

Name	Organization	Role	Responsibilities	Contact Information
Brad Shelton	Tetra Tech	Field team leader	Responsible for directing day-to-day field activities conducted by Tetra Tech and subcontractor personnel Verifies that field sampling and measurement procedures follow SAP Provides project manager with regular reports on status of field activities	Tetra Tech, Sacramento, CA Brad.Shleton@ttemi.com (916) 853-4559
To be determined	Tetra Tech	On-site safety officer	Responsible for implementing health and safety plan and determining appropriate site control measures and personal protection levels Conducts safety briefings for Tetra Tech and subcontractor personnel and site visitors Can suspend operations that threaten health and safety	To be determined
John Swanson	Tetra Tech	Project chemist	Responsible for working with project team to define analytical requirements Assists in selecting a prequalified laboratory to complete required analyses (see Section 2.4 of SAP) Coordinates with laboratory project manager on analytical requirements, delivery schedules, and logistics Reviews laboratory data before they are released to project team	Tetra Tech, Sacramento, CA John.Swanson@ttemi.com (916) 853-4582
Trina Wetters	Tetra Tech	Database manager	Responsible for developing, monitoring, and maintaining project database under guidance of project manager Works with project chemist during preparation of SAP to resolve sample identification issues	Tetra Tech, Sacramento, CA Trina.Wetters@ttemi.com (916) 853-4534
To be determined	Laboratory	Project manager	Responsible for delivering analytical services that meet requirements of SAP Reviews SAP to understand analytical requirements Works with Tetra Tech project chemist to confirm sample delivery schedules Reviews laboratory data package before it is delivered to Tetra Tech	To be determined
To be determined	Subcontractor	Project manager	Responsible for ensuring that subcontractor activities are conducted in accordance with requirements of SAP Coordinates subcontractor activities with Tetra Tech project manager or field team leader	To be determined

Notes:

NAVY	United States Navy
QA	Quality assurance
SAP	Sampling analysis plan
Tetra Tech	Tetra Tech EM Inc.



Tetra Tech EM

NAVY	United States Navy
QA	Quality assurance
Tetra Tech	Tetra Tech EM Inc.

ALAMEDA POINT

U.S. Navy Southwest Division, NAVFAC, San Diego

FIGURE 5

PROJECT TEAM ORGANIZATION CHART

Site 07 Supplemental Sampling and Analysis Plan

1.5.1 Health and Safety Training

Tetra Tech personnel who work at hazardous waste project sites are required to meet the Occupational Safety and Health Administration (OSHA) training requirements defined in Title 29 Code of Federal Regulations (29 CFR) Part 1910.120(e). These requirements include: (1) 40 hours of formal, off-site instruction; (2) a minimum of 3 days of actual on-site field experience under the supervision of a trained and experienced field supervisor; and (3) 8 hours of annual refresher training. Field personnel who directly supervise employees engaged in hazardous waste operations also receive at least 8 additional hours of specialized supervisor training. The supervisor training covers Architect-Engineer CERCLA/RCRA/UST Contract (AECRU) health and safety program requirements, training requirements, personal protective equipment (PPE) requirements, the spill containment program, and health-hazard monitoring procedures and techniques. At least one member of every Tetra Tech field team will maintain current certification in the American Red Cross Multimedia First Aid and Cardiopulmonary Resuscitation (CPR) Modular, or equivalent. Personnel performing the sampling beneath the building will have confined-space entry training.

Copies of Tetra Tech's health and safety training records, including course completion certifications for the initial and refresher health and safety training, specialized supervisor training, and first aid and CPR training are maintained in project files.

Before work begins at a specific hazardous waste project site, Tetra Tech personnel are required to undergo site-specific training that thoroughly covers the following areas:

- Names of personnel and alternates responsible for health and safety at a hazardous waste project site
- Health and safety hazards present on site
- Selection of appropriate personal protection levels
- Correct use of PPE
- Work practices to minimize risks from hazards
- Safe use of engineering controls and equipment on site
- Medical surveillance requirements, including recognition of symptoms and signs that might indicate overexposure to hazardous substances
- Contents of the basewide health and safety plan (HASP) (Tetra Tech 1998)

1.5.2 Subcontractor Training

Subcontractors who work on site will certify that their employees have been trained for work on hazardous waste project sites. Training will meet OSHA requirements defined in 29 CFR 1910.120(e). Before work begins at the project site, subcontractors will submit copies of the training certification for each employee to Tetra Tech.

All employees of associate and professional services firms and technical services subcontractors will attend a safety briefing and complete the Safety Meeting Sign-off Sheet before they conduct on-site work. The briefing will cover the topics described in Section 1.5.1 and is conducted by the Tetra Tech on-site health and safety officer or other qualified person.

Subcontractors are responsible for conducting their own safety briefings. Tetra Tech personnel may audit these briefings.

1.5.3 Specialized Training and Certification Requirements

Because of the unknown nature of the debris layer, preliminary screening for personnel was determined by evaluation of the Shaw Group's analytical data. The extent of the contamination did not exceed the 2002 EPA PRGs for soil. No specialized training or certifications will be needed.

1.6 Documents and Records

Documentation is critical for evaluating the success of any environmental data collection activity. The following sections discuss the requirements for documenting field activities and for preparing laboratory data packages. This section also describes reports that will be generated as a result of this project.

1.6.1 Field Documentation

Complete and accurate documentation is essential to demonstrate that field measurement and sampling procedures are carried out as described in the SAP. Field personnel will use permanently bound field logbooks with sequentially numbered pages to record and document field activities. The logbook will list the contract name and number, the Delivery order (DO) number, the site name, and the names of subcontractors, the service client, and the project manager. At a minimum, the following information will be recorded in the field logbook:

- Name and affiliation of all on-site personnel or visitors
- Weather conditions during the field activity
- Summary of daily activities and significant events

- Notes of conversations with coordinating officials
- References to other field logbooks or forms that contain specific information
- Discussions of problems encountered and their resolution
- Discussions of deviations from the SAP or other governing documents
- Description of all photographs taken

The field team also will use the various field forms included in Appendix C to record field activities.

1.6.2 Summary Data Package

The subcontracted laboratory will prepare summary data packages in accordance with the instructions provided in the EPA Contract Laboratory Program (CLP) statements of work (SOW) (EPA 1999a, 2000a). The summary data package will consist of a case narrative, copies of all associated chain-of-custody forms, sample results, and quality assurance (QA) QC summaries. The case narrative will include the following information:

- Subcontractor name, project name, DO number, project order number, sample delivery group (SDG) number, and a table that cross-references client and laboratory sample identification (ID) numbers
- Detailed documentation of all sample shipping and receiving, preparation, analytical, and quality deficiencies
- Thorough explanation of all instances of manual integration
- Copies of all associated non-conformance and corrective action forms that will describe the nature of the deficiency and the corrective action taken
- Copies of all associated sample receipt notices

Additional requirements for the summary data package are outlined in Table 6. The subcontracting laboratory will provide Tetra Tech with two copies of the summary data package within 28 days after it receives the last sample in the SDG.

1.6.3 Full Data Package

When a full data package is required, the laboratory will prepare data packages in accordance with instructions provided in the EPA CLP SOWs (EPA 1999a, 2000a). Full data packages will contain all of the information from the summary data package and all associated raw data. Full data package requirements are outlined in Table 6. Full data packages are due to Tetra Tech within 35 days after the last sample in the SDG is received. Unless otherwise requested, the subcontractor will deliver one copy of the full data package.

1.6.4 Data Package Format

The subcontracted laboratory will provide EDDs for all analytical results. An automated laboratory information management system (LIMS) must be used to produce EDDs. Manual creation of the deliverable (data entry by hand) is unacceptable. The laboratory will verify EDDs internally before they are issued. EDDs will correspond exactly to the hard-copy data. No duplicate data will be submitted. EDDs will be delivered in a format compatible with Navy Environmental Data Transfer Standards (NEDTS). Results that should be included in all EDDs are as follows:

- Target analyte results for each sample and associated analytical methods requested on the chain-of-custody form
- Method and instrument blanks and preparation and calibration blank results reported for the SDG
- % Rs for spike compounds in the MS, MSDs, blank spikes, or LCSs
- Matrix duplicate results reported for the SDG
- All re-analysis, re-extractions, or dilutions reported for the SDG, including those associated with samples and the specified laboratory QC samples

Electronic and hard-copy data must be retained for a minimum of 3 and 10 years, respectively, after final data have been submitted. The subcontractor will use an electronic storage device capable of recording data for long-term, off-line storage. Raw data will be retained on an electronic data archival system.

1.6.5 Reports Generated

A report for the Site 07 investigation will not be prepared at the conclusion of the field work. The findings will be incorporated in the OU1-RI report, along with the results of previous related investigations, field and sampling procedures for the soil investigation, soil target analyte concentration and associated QC data, conclusions, and recommendations for the site.

TABLE 6: REQUIREMENTS FOR SUMMARY AND FULL DATA PACKAGES

Site 07 Supplemental Sampling and Analysis Plan, Alameda Point

Requirements for Summary Data Packages – Organic Analysis		Requirements for Summary Data Packages – Inorganic Analysis	
Section I	**Case Narrative**	**Section I**	**Case Narrative**
1.	Case narrative	1.	Case narrative
2.	Copies of non-conformance and corrective action forms	2.	Copies of non-conformance and corrective action forms
3.	COC forms	3.	COC forms
4.	Copies of sample receipt notices	4.	Copies of sample receipt notices
5.	Internal tracking documents, as applicable	5.	Internal tracking documents, as applicable
Section II	**Sample Results - Form I for the following:**	**Section II**	**Sample Results - Form I for the following:**
1.	Environmental samples, including dilutions and re-analysis	1.	Environmental sample including dilutions and re-analysis
2.	TIC volatile organic compounds (VOC) and semi-volatile organic compounds (SVOC only)		
Section III	**QA/QC Summaries - Forms II through XI for the following:**	**Section III**	**QA/QC Summaries - Forms II through XIV for the following:**
1.	System monitoring compound and surrogate recoveries (Form II)	1.	Initial and continuing calibration verifications (Form II)
2.	MS/MSD recoveries and RPDs (Forms I and III)	2.	Project-required reporting limit PRRL standard (Form II)
3.	Blank spike or LCS recoveries (Forms I and III-Z)	3.	Detection limit standard (Form II-Z)
4.	Method blanks (Forms I and IV)	4.	Method blanks, continuing calibration blanks, and preparation blanks (Form III)
5.	Performance check (Form V)	5.	ICP interference check samples (Form IV)
6.	Initial calibrations with retention time information (Form VI)	6.	Matrix spike and post-digestion spikes (Forms V and V-Z)
7.	Continuing calibrations with retention time information (Form VII)	7.	Sample duplicates (Form VI)
8.	Quantitation limit standard (Form VII-Z)	8.	LCSs (Form VII)
9.	Internal standard areas and retention times (Form VIII)	9.	Method of standard additions (Form VIII)
10.	Analytical sequence (Forms VIII-D and VIII-Z)	10.	ICP serial dilution (Form IX)
11.	Gel permeation chromatography (GPC) calibration (Form IX)	11.	IDL (Form X)
12.	Single component analyte identification (Form X)	12.	ICP interelement correction factors (Form XI)
13.	Multicomponent analyte identification (Form X-Z)	13.	ICP linear working range (Form XII)
14.	Matrix-specific method detection limit (Form XI-Z)		

TABLE 6: REQUIREMENTS FOR SUMMARY AND FULL DATA PACKAGES (Continued)

Site 07 Supplemental Sampling and Analysis Plan, Alameda Point

Requirements for Full Data Packages -- Organic Analysis	**Requirements for Full Data Packages -- Inorganic Analysis**
Sections I, II, and III Summary Package	**Sections I, II, III** Summary Package
Section IV Sample Raw Data - indicated form, plus all raw data	**Section IV** Instrument Raw Data - Sequential measurement readout records for ICP, graphite furnace atomic absorption (GFAA), flame atomic absorption (AA), cold vapor mercury, cyanide, and other inorganic analyses, which will contain the following information:
1. Analytical results, including dilutions and re-analysis (Forms I and X)	1. Environmental samples, including dilutions and re-analysis
2. TICs (Form I — volatile organic amendments and semi-volatile organic amendments only)	2. Initial calibration
	3. Initial and continuing calibration verifications
Section V QC Raw Data - indicated form, plus all raw data	4. Detection limit standards
1. Method blanks (Form I)	5. Method blanks, continuing calibration blanks, and preparation blanks
2. MS and MSD samples (Form I)	6. ICP interference check samples
3. Blank spikes or LCSs (Form I)	7. Matrix Spikes and post-digestion spikes
	8. Sample duplicates
Section VI Standard Raw Data - indicated form, plus all raw data	9. LCSs
1. Performance check (Form V)	10. Method of standard additions
2. Initial calibrations, with retention-time information (Form VI)	11. ICP serial dilution
3. Continuing calibrations, with retention-time information (Form VII)	
4. Quantitation-limit standard (Form VII-Z)	**Section V** Other Raw Data
5. GPC calibration (Form IX)	1. Percent moisture for soil samples
	2. Sample digestion, distillation, and preparation logs, as necessary
Section VII Other Raw Data	3. Instrument analysis log for each instrument used
1. Percent moisture for soil samples	4. Standard preparation logs, including initial and final concentrations for each standard used
2. Sample extraction and cleanup logs	5. Formula and a sample calculation for the initial calibration
3. Instrument analysis log for each instrument used (Form VIII-Z)	6. Formula and a sample calculation for soil sample results
4. Standard preparation logs, including initial and final concentrations for each standard used	
5. Formula and a sample calculation for the initial calibration	
6. Formula and a sample calculation for soil sample results	

TABLE 6: REQUIREMENTS FOR SUMMARY AND FULL DATA PACKAGES (Continued)

Site 07 Supplemental Sampling and Analysis Plan, Alameda Point

Notes:	COC	Chain of Custody	GPC	Gel permeation chromatography
	ICP	Inductively coupled plasma	LCS	Laboratory control sample
	MS	Matrix spikes	MSD	Matrix spike duplicates
	QA	Quality assurance	QC	Quality control
	TIC	Tentatively identified compounds		

2.0 DATA GENERATION AND ACQUISITION

This section describes the requirements for the following:

- Sampling Process Design (Section 2.1)
- Sampling Methods (Section 2.2)
- Sample Handling and Custody (Section 2.3)
- Analytical Methods (Section 2.4)
- Quality Control (Section 2.5)
- Equipment Testing, Inspection, and Maintenance (Section 2.6)
- Instrument Calibration and Frequency (Section 2.7)
- Inspection and Acceptance of Supplies and Consumables (Section 2.8)
- Non-direct Measurements (Section 2.9)
- Data Management (Section 2.10)

2.1 Sampling Process Design

This section presents the proposed sampling locations, planned chemical analyses, and information on land surveying sampling locations.

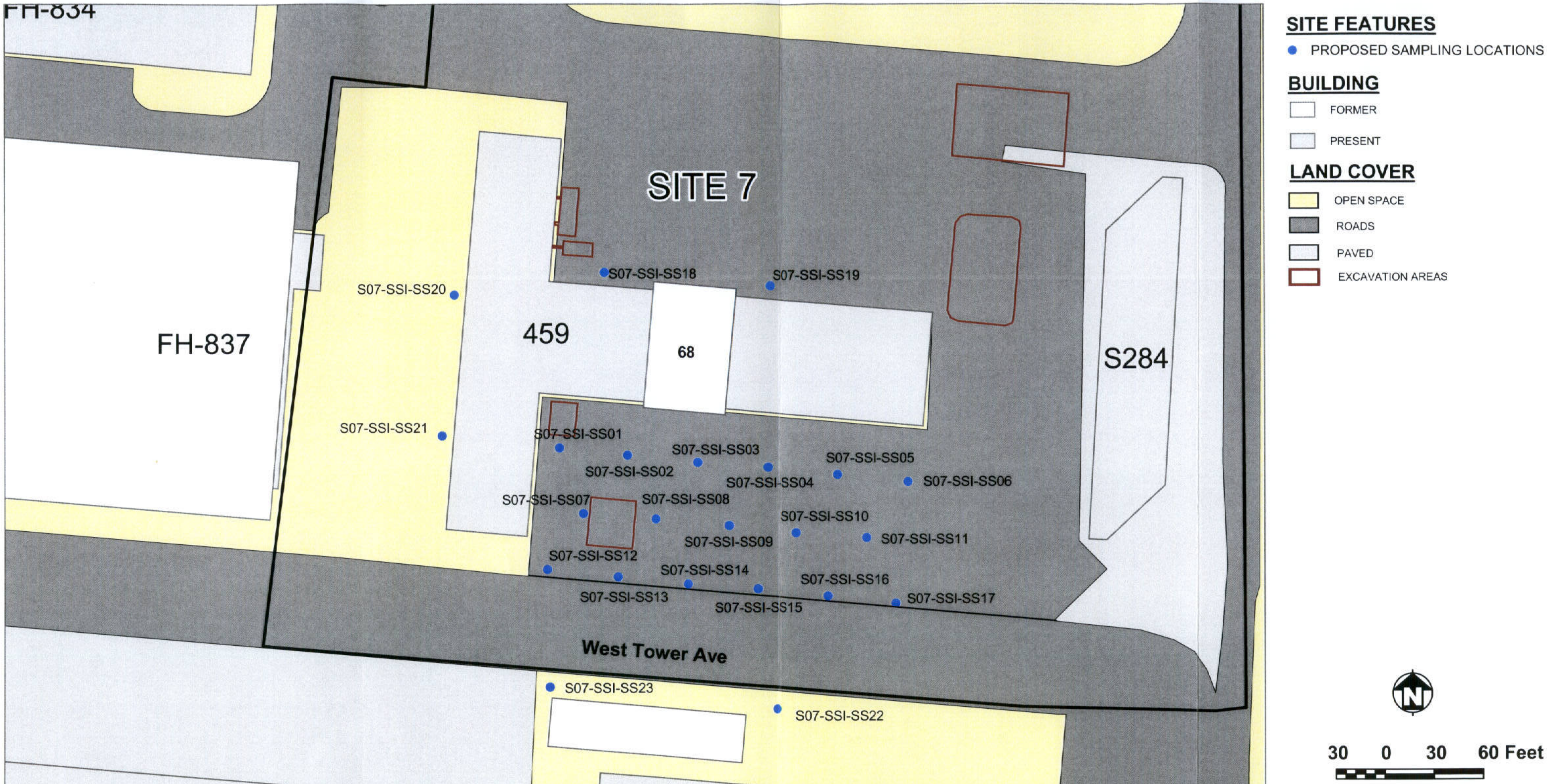
2.1.1 Investigation of Surface Soil

Surface soils will not be collected for analysis. Spoils produced from removal of concrete, asphalt, and road base material will be disposed of as construction waste in an on-base dumpster.

2.1.2 Investigation of Subsurface Soil

Visual sampling plan was used to determine that a sampling grid with 16 samples would be sufficient to characterize the horizontal extent of the debris layer at the site. Figure 6 shows the gridded sampling locations. Gridded samples are located in the area where historical evidence shows incinerator debris was possibly deposited. An additional sample (17 total) was added to the grid to account for edge effects.

Hand augering will be performed at each location to a depth of about 4 feet bgs. Based on visual observations, samples will be collected from each boring at the depth at which the debris layer looks the most concentrated. In the outlying sampling locations, if no debris layer is identified in



Tetra Tech EM Inc.

Alameda Point
U.S. Navy Southwest Division, NAVFAC, San Diego

FIGURE 6

GRID LAYOUT AND PROPOSED SAMPLING LOCATIONS

2003-04-22 S:\AECRU\Alameda\OU 1 - Sites 6,7,8,16 (DO 031)\Site 7 Supplemental site investigation\site 7.mxd TtEMI-SA TPM the top 4 feet of the boring, the sample will be collected from the bottom of the boring. At five locations where the debris layer was identified, an additional sample will be collected from the bottom of the boring at 4 feet bgs. These samples will be used to confirm the vertical extent of the debris layer.

In addition to the gridded samples, six initial step-out samples will be collected: 2 samples located along the northern perimeter of Building 459, two samples located along the western perimeter of Building 459, and two samples on the southside of West Tower Street. At these sampling locations, if no debris layer is identified in the top 4 feet of the boring, the sample will be collected from the bottom of the boring. This will ensure that the extent of contamination is adequately defined. If the debris layer is identified at these step-out sampling locations, up to 10 additional step-out locations may be identified for sampling. The step-out distance will be 50 feet out from the sampling location where the debris layer was last defined. For example, if the debris layer was identified at Sampling Location 21-07-SS021, then an additional step-out location 50 feet west of 21-07-SS021 will be identified and sampled.

All samples will be analyzed for total metals. In the three samples where the debris layer is observed to be the most concentrated, dioxin/furan, PCB, and chromium speciation analyses will be performed. Dioxins and PCBs are frequently detected in incinerator ash, and results for these compounds can influence risk assessments. Chromium speciation will be performed because of the differences in toxicity values for chromium III versus hexavalent chromium.

Samples for chemical analysis will be submitted to a California state-certified laboratory that has been approved by the Navy. Table 7 presents the proposed ID numbers for soil samples, depth of samples, and the rationale for each sample location. Table 8 summarizes the proposed analytical suite for field, Investigation-derived waste (IDW), and QC samples for this project.

2.1.3 Rationale for Selecting Analytical Parameters

Analytical parameters were selected based on results of previous investigations and professional judgment. The particular analytical parameters specified for each location were selected based on the available historical information regarding material use and the characteristics of wastes potentially disposed of at the site.

2.1.4 Surveying

After the boreholes have been backfilled, sampling locations will be surveyed using a hand-held global positioning system (GPS) unit. The locations will be recorded in the field logbooks and will be used to geo-reference the sampling locations for further use in geographic information system (GIS) and analysis.

2.1.5 Underground Utilities Survey

No utilities survey will be necessary for collection of subsurface soil samples using hand augers.

TABLE 7: PROPOSED SOIL SAMPLES, RATIONALE, AND ANALYSES

Site 07 Supplemental Sampling and Analysis Plan, Alameda Point

Laboratory ID	Point Name	Field ID[1]	Sample Interval[2] (feet bgs)	Sample Type[3]	Analyses[4]	Rationale
21-S07-001	S07-SSI-SS01	S07-SSI-SS01-2.5	2.0-3.0	Field	Total Metals	Sample collected on a 15-foot grid to determine horizontal extent of debris layer
21-S07-002	S07-SSI-SS01-D	S07-SSI-SS01-2.5-D	2.0-3.0	Field QC	Total Metals	Same as above
21-S07-003	S07-SSI-SS02	S07-SSI-SS02-2.5	2.0-3.0	Field	Total Metals	Same as above
21-S07-004	S07-SSI-SS03	S07-SSI-SS03-2.5	2.0-3.0	Field	Total Metals	Same as above
21-S07-005	S07-SSI-SS03	S07-SSI-SS03-4.5	4.0-5.0	Field	Total Metals	Sample collected below the debris layer to determine vertical extent[5]
21-S07-006	S07-SSI-SS03	S07-SSI-SS03-8.0	7.5-8.5	Field	Total Metals	Sample collected below the debris layer to determine vertical extent[7]
21-S07-007	S07-SSI-SS04	S07-SSI-SS04-2.5	2.0-3.0	Field	Total Metals	Sample collected on a 15-foot grid to determine horizontal extent of debris layer
21-S07-008	S07-SSI-SS05	S07-SSI-SS05-2.5	2.0-3.0	Field	Total Metals	Same as above
21-S07-009	S07-SSI-SS06	S07-SSI-SS06-2.5	2.0-3.0	Field	Total Metals	Same as above
21-S07-010	S07-SSI-SS06	S07-SSI-SS06-4.5	4.0-5.0	Field	Total Metals	Sample collected below the debris layer to determine vertical extent[5]
21-S07-011	S07-SSI-SS07	S07-SSI-SS07-2.5	2.0-3.0	Field	Total Metals	Sample collected on a 15-foot grid to determine horizontal extent of debris layer
21-S07-012	S07-SSI-SS08	S07-SSI-SS08-2.5	2.0-3.0	Field	Total Metals	Same as above
21-S07-013	S07-SSI-SS09	S07-SSI-SS09-2.5	2.0-3.0	Field	Total Metals	Same as above
21-S07-014	S07-SSI-SS09	S07-SSI-SS09-4.5	4.0-5.0	Field	Total Metals	Sample collected below the debris layer to determine vertical extent[5]
21-S07-015	S07-SSI-SS09	S07-SSI-SS09-8.0	7.5-8.5	Field	Total Metals	Sample collected below the debris layer to determine vertical extent[7]
21-S07-016	S07-SSI-SS10	S07-SSI-SS10-2.5	2.0-3.0	Field	Total Metals	Sample collected on a 15-foot grid to determine horizontal extent of debris layer
21-S07-017	S07-SSI-SS10-D	S07-SSI-SS10-2.5-D	2.0-3.0	Field QC	Total Metals	Same as above
21-S07-018	S07-SSI-SS11	S07-SSI-SS11-2.5	2.0-3.0	Field	Total Metals	Same as above
21-S07-019	S07-SSI-SS12	S07-SSI-SS12-2.5	2.0-3.0	Field	Total Metals	Same as above
21-S07-020	S07-SSI-SS13	S07-SSI-SS13-2.5	2.0-3.0	Field	Total Metals	Same as above
21-S07-021	S07-SSI-SS13	S07-SSI-SS13-4.5	4.0-5.0	Field	Total Metals	Sample collected below the debris layer to determine vertical extent[5]
21-S07-022	S07-SSI-SS14	S07-SSI-SS14-2.5	2.0-3.0	Field	Total Metals	Sample collected on a 15-foot grid to determine horizontal extent of debris layer
21-S07-023	S07-SSI-SS15	S07-SSI-SS15-2.5	2.0-3.0	Field	Total Metals	Same as above
21-S07-024	S07-SSI-SS16	S07-SSI-SS16-2.5	2.0-3.0	Field	Total Metals	Same as above
21-S07-025	S07-SSI-SS17	S07-SSI-SS17-2.5	2.0-3.0	Field	Total Metals	Same as above
21-S07-026	S07-SSI-SS17	S07-SSI-SS17-4.5	4.0-5.0	Field	Total Metals	Sample collected below the debris layer to determine vertical extent[5]
21-S07-027	S07-SSI-SS17	S07-SSI-SS17-8.0	7.5-8.5	Field	Total Metals	Sample collected below the debris layer to determine vertical extent[7]
21-S07-028	S07-SSI-SS18	S07-SSI-SS18-2.5	2.0-3.0	Field	Total Metals	Initial step-out location to ensure that the horizontal extent of contamination is adequately defined
21-S07-029	S07-SSI-SS19	S07-SSI-SS19-2.5	2.0-3.0	Field	Total Metals	Same as above
21-S07-030	S07-SSI-SS20	S07-SSI-SS20-2.5	2.0-3.0	Field	Total Metals	Same as above
21-S07-031	S07-SSI-SS20-D	S07-SSI-SS20-2.5-D	2.0-3.0	Field QC	Total Metals	Same as above
21-S07-032	S07-SSI-SS21	S07-SSI-SS21-2.5	2.0-3.0	Field	Total Metals	Same as above
21-S07-033	S07-SSI-SS22	S07-SSI-SS22-2.5	2.0-3.0	Field	Total Metals	Same as above
21-S07-034	S07-SSI-SS23	S07-SSI-SS23-2.5	2.0-3.0	Field	Total Metals	Same as above
21-S07-035	S07-SSI-SS24	S07-SSI-SS24-2.5-C[6]	2.0-3.0	Field	Total Metals	Additional step-out location if debris layer is identified in outlying sampling locations

TABLE 7: PROPOSED SOIL SAMPLES, RATIONALE, AND ANALYSES (Continued)

Site 07 Supplemental Sampling and Analysis Plan, Alameda Point

Laboratory ID	Point Name	Field ID[1]	Sample Interval[2] (feet bgs)	Sample Type[3]	Analyses[4]	Rationale
21-S07-036	S07-SSI-SS25	S07-SSI-SS25-2.5-C	2.0-3.0	Field	Total Metals	Same as above
21-S07-037	S07-SSI-SS26	S07-SSI-SS26-2.5-C	2.0-3.0	Field	Total Metals	Same as above
21-S07-038	S07-SSI-SS27	S07-SSI-SS27-2.5-C	2.0-3.0	Field	Total Metals	Same as above
21-S07-039	S07-SSI-SS28	S07-SSI-SS28-2.5-C	2.0-3.0	Field	Total Metals	Same as above
21-S07-040	S07-SSI-SS29	S07-SSI-SS29-2.5-C	2.0-3.0	Field	Total Metals	Same as above
21-S07-041	S07-SSI-SS30	S07-SSI-SS30-2.5-C	2.0-3.0	Field	Total Metals	Same as above
21-S07-042	S07-SSI-SS31	S07-SSI-SS31-2.5-C	2.0-3.0	Field	Total Metals	Same as above
21-S07-043	S07-SSI-SS32	S07-SSI-SS32-2.5-C	2.0-3.0	Field	Total Metals	Same as above
21-S07-044	S07-SSI-SS33	S07-SSI-SS33-2.5-C	2.0-3.0	Field	Total Metals	Same as above

Notes:

1 The Field ID includes an approximate sample depth.

2 Actual sampling depths will be determined based on visual inspection. Samples will be collected from the depth where the debris layer looks the most concentrated. At locations where the debris layer is not identified, the sample will be collected from the bottom of the boring.

3 Collocated duplicate samples (specified as "Field QC") will be collected and analyzed in an attempt to determine the variability of contaminant concentrations in the debris layer

4 All samples will be analyzed for total metals. In the three samples where the debris layer is observed to be the most concentrated, dioxin/furan, PCB, and chromium speciation analyses will be performed. Dioxins and PCBs are frequently detected in incinerator ash, and low concentrations of these compounds can influence risk assessment results. Chromium speciation will be performed because of the substantial difference in toxicity values for chromium III versus hexavalent chromium. If analytical results for these additional sample analyses exceed preliminary remediation goals (PRG), analysis of additional grid samples may be considered. Risk assessment and regulatory agency representatives will be consulted for future steps in this determination.

5 At five locations where the debris layer is identified, an additional sample will be collected from the bottom of the boring, at 4.5 feet bgs. These samples will be used to confirm the vertical extent of the debris layer.

6 Contingency samples will be collected if the lateral extent of the debris layer is not defined.

7. Samples will be collected and held until 4.5 foot samples have positive results for analytes of concern above residential PRG.

bgs Below ground surface
ID Identification
PCB Polychlorinated biphenyls
QC Quality control

TABLE 8: SUMMARY OF SUPPLEMENTAL SITE INVESTIGATION AND INVESTIGATION-DERIVED WASTE ANALYSES

Site 07 Supplemental Sampling and Analysis Plan, Alameda Point

Analytical Methods	Matrix	Field Samples	Collocated Field Samples/ Duplicate Samples	Equipment Rinsate	Source Water Blank	Total Number of Samples	MS/MSD (at 5%)[2]
Metals[1]	Soil	31	5/2	NA	NA	41	2
	Water	0	0	2	1	3	NA
Chromium Speciation	Soil	3	0	0	0	3	1
	Water	0	0	0	0	0	NA
Polychlorinated biphenyls	Soil	3	0	NA	NA	3	1
	Water	0	0	NA	NA	0	NA
Dioxins	Soil	3	0	NA	NA	3	1
	Water	0	0	NA	NA	0	NA

Notes: Analyses for field samples and field Quality control samples will be used for investigation-derived waste characterization.

MS Matrix spike
MSD Matrix spike duplicate
NA Not applicable

2.2 Sampling Methods

This section describes the procedures for sample collection, including sampling methods and equipment, sample preservation requirements, decontamination procedures, and management of IDW.

2.2.1 Sampling Methods and Equipment

Prior to sampling, a diamond-impregnated hole saw bit will be used to cut 6-inch cores in the asphalt or concrete at each sampling location. After the asphalt or concrete cores have been removed, a hand auger will be used to bore through any road base material to expose the native fill layer below. As hand augering continues, the debris layer in the boring will be identified visually. A sample will be collected from the auger cuttings where the debris layer looks the most concentrated. The length of the auger handle above the ground surface will be measured to determine the sampling depth. Sample containers will be filled by digging the debris-laden soil from the auger head using a stainless-steel scoopula and placing the soil into a 12-ounce (oz) glass jar. Each sample jar will be sealed with Teflon®-lined lid and then be labeled and packed for shipment to the laboratory.

2.2.2 Decontamination

Sampling equipment, including extension rods, auger head, and scoopulas, will be cleaned after sampling each boring. Decontamination of the equipment will follow general practices listed in Tetra Tech SOP 002 (see Appendix B). A three-bucket decontamination train will be used. Each piece of equipment will be scrubbed with and Alconox soap solution, rinsed in tap water, then triple rinsed with deionized or distilled water. Decontaminated sampling heads and scoopulas will be wrapped in foil for extended storage. An on-site source of potable water will be used for decontamination, and all water derived from decontamination will be collected and temporarily stored on site. Distilled water will be purchased in 5-gallon carboy containers from a reputable supplier, such as Culligan Water Systems.

2.2.3 Management of Investigation-derived Waste

Minimal quantities of IDW will be generated during this investigation. IDW will include concrete/asphalt cores, soil cuttings, and wastewater from decontamination procedures. Concrete and asphalt cores will be disposed of as sanitary waste in an on-site dumpster. Soil cuttings and the wastewater will be containerized in drums and stored at the Tetra Tech field office. It is expected that one drum of solid waste and one drum of rinsate will be generated from this work. Analytical results from the field samples will be used to characterize the wastes for disposal. IDW will be disposed of at an offsite facility with 90 days of generation.

2.2.4 Sample Containers and Holding Times

For this project and specified analyses, one 12-oz glass jar with a Teflon® lid will be collected for each sample. The type of sample containers to be used for each analysis, sample volumes required, preservation requirements, and maximum holding times for samples prior to extraction and analysis are presented in Table 9.

2.3 Sample Handling and Custody

The sections below describe sample handling procedures, including sample ID and labeling, documentation, chain of custody, and shipping.

2.3.1 Sample Identification

Unique sample ID numbers will be assigned to each sample collected during this project. The sample ID numbering system is designed to be compatible with a computerized data management system that includes previous results for samples collected at this installation. The sample numbering system allows each sample to be uniquely identified and provides a means of tracking the sample from collection through analysis.

The sample numbering system includes a blind laboratory ID number, point name, and a field ID number. The blind laboratory ID number format is as follows: 021-S07-XXX, where "021" represents the DO number, "S07" represents the site name, and "XXX" represents a sequential number based on sampling order. The point name identifies the sampling location and is used for cross-referencing the laboratory ID and also for presentation on figures. The point name format is as follows: S07-SSI-SS06, where "S07" represents the site name, "SSI" represents the investigation code, and "SS06" represents Soil Sampling location 06. The field ID includes the point name appended with the sampling depth in feet below ground surface (bgs) in the following format: S07-SSI-SS06-4.5.

2.3.2 Sample Labels

A sample label will be affixed to all sample containers. The label will be completed with the following information written in indelible ink:

- Project name and location
- Sample ID number
- Date and time of sample collection

TABLE 9: SAMPLE CONTAINER, HOLDING TIME, AND PRESERVATIVE REQUIREMENTS

Site 07 Supplemental Sampling and Analysis Plan, Alameda Point

Parameter	Method Number	Sample Volume	Sample Container[a]	Preservative	Holding Time
Soil					
Dioxins/furans	EPA 8290, SW-846	12-oz	Clear glass with Teflon®-lined lid	Cool, 4 ± 2 °C	30 days to extract 45 days to analysis
PCBs	EPA 8082, SW-846	12-oz	Clear glass with Teflon®-lined lid	Cool, 4 ± 2 °C	14 days to extraction/40 days to analysis
Total Metals, Mercury and Chromium Speciation	EPA 6010B, 7471, SW-846	12-oz	Clear glass with Teflon®-lined lid	Cool, 4 ± 2 °C	Mercury (28 holding days) Hexavalent chromium (1 month until extraction, four days until analysis) Total Chromium (6 months)

Notes: More than one analysis can be performed from the same sample container. The sample quantities listed in the table are the quantities necessary if only the specific analysis is requested. The laboratory will indicate which of the analyses can be performed from the same container, so that a smaller quantity of sample can be collected at each depth.

Analyses for characterization of investigation derived waste samples are included in the table.

± Plus or minus
°C Degree Celsius
a All analysis can be performed from 1 12-oz jar.
EPA U.S. Environmental Protection Agency
Oz ounce
PCB Polychlorinated biphenyl

- Preservative used
- Sample collector's initials
- Analysis required

After labeling, each soil sample will be refrigerated or placed in a cooler that contains ice to maintain the sample temperature at 4 plus or minus (±) 2 degree Celsius °C.

2.3.3 Sample Documentation

Documentation during sampling is essential to ensure proper sample ID. Tetra Tech personnel will adhere to the following general guidelines for maintaining field documentation:

- Documentation will be completed in permanent black ink.
- All entries will be legible.
- Errors will be corrected by crossing out with a single line and then dating and initialing the lineout.
- Any serialized documents will be maintained at Tetra Tech and referenced in the site logbook
- Unused portions of pages will be crossed out, and each page will be signed and dated.

Section 1.6.1 includes additional information on how Tetra Tech will use logbooks to document field activities. The Tetra Tech field team leader (FTL) is responsible for ensuring that sampling activities are properly documented.

2.3.4 Chain of Custody

Tetra Tech will use standard sample custody procedures to maintain and document sample integrity during collection, transportation, storage, and analysis. A sample will be considered to be in custody if one of the following statements applies:

- It is in a person's physical possession or view.
- It is in a secure area with restricted access.
- It is placed in a container and secured with an official seal such that the sample cannot be reached without breaking the seal.

Chain-of-custody procedures provide an accurate written record that traces the possession of individual samples from the time of collection in the field to the time of acceptance at the laboratory. The chain-of-custody record (see Appendix C) also will be used to document all samples collected and the analysis requested. Information that the field personnel will record on the chain-of-custody record includes:

- Project name and number
- Sampling location
- Name and signature of sampler
- Destination of samples (laboratory name)
- Sample ID number
- Date and time of collection
- Number and type of containers filled
- Analysis requested
- Preservatives used (if applicable)
- Filtering (if applicable)
- Sample designation (grab or composite)
- Signatures of individuals involved in custody transfer, including the date and time of transfer
- Airbill number (if applicable)
- Project contact and telephone number

Unused lines on the chain-of-custody record will be crossed out. Field personnel will sign chain-of-custody records that are initiated in the field, and the airbill number will be recorded. The record will be placed in a waterproof plastic bag and taped to the inside of the shipping container used to transport the samples. Signed airbills will serve as evidence of custody transfer between field personnel and the courier and between the courier and the laboratory. Copies of the chain-of-custody record and the airbill will be retained and filed by field personnel before the containers are shipped.

Laboratory chain of custody begins when samples are received and continues until samples are discarded. Laboratories analyzing samples under the AECRU contract must follow custody procedures at least as stringent as are required by the EPA CLP SOWs (1999a, 2000a). The laboratory should designate a specific individual as the sample custodian. The custodian will receive all incoming samples, sign the accompanying custody forms, and retain copies of the forms as permanent records. The laboratory sample custodian will record all pertinent information concerning the samples, including the persons delivering the samples, the date and time received, sample condition at the time of receipt (sealed, unsealed, or broken container; temperature; or other relevant remarks), the sample ID numbers, and any unique laboratory ID numbers for the samples. This information should be entered into a computerized LIMS. When the sample transfer process is complete, the custodian is responsible for maintaining internal logbooks, tracking reports, and other records necessary to maintain custody throughout sample preparation and analysis.

The laboratory will provide a secure storage area for all samples. Access to this area will be restricted to authorized personnel. The custodian will ensure that samples requiring special handling, including samples that are heat- or light-sensitive, radioactive, or have other unusual physical characteristics, will be properly stored and maintained prior to analysis.

2.3.5 Sample Shipment

The following procedures (also outlined in SOP No. 19) will be implemented when samples collected during this project are shipped:

- The cooler will be filled with bubblewrap, sample bottles, and packing material. Sufficient packing material will be used to prevent sample containers from breaking during shipment. Enough ice will be added to maintain the sample temperature of below 4 ± 2 °C.

- The chain-of-custody records will be placed inside of a plastic bag. The bag will be sealed and taped to the inside of the cooler lid. The airbill, if required, will be completed before samples are handed over to the carrier. The laboratory will be notified if the sampler suspects that the sample contains any substance that would require laboratory personnel to take safety precautions.

- The cooler will be closed and taped shut with strapping tape around both ends. If the cooler has a drain, it will be taped shut both inside and outside of the cooler.

- Signed and dated custody seals will be placed on the front and side of each cooler. Wide, clear tape will be placed over the seals to prevent accidental breakage.

- The chain-of-custody record will be transported within the taped, sealed cooler. When the cooler is received at the analytical laboratory, laboratory personnel will open the cooler and sign the chain-of-custody record to document transfer of samples.

Multiple coolers may be sent in one shipment to the laboratory. The outside of the coolers will be marked to indicate the number of coolers in the shipment.

2.4 Analytical Methods

Table 9 presents the analytical methods that will be used to analyze samples collected during this project, and Appendix A presents the MQOs and control limits for sample analyses. Tables D-1 through D-3 in Appendix D present the individual target analytes for this investigation and their associated PRRLs. The analytical laboratory(ies) will attempt to achieve the PRRLs for all analytes reported. If problems occur in achieving PRRLs, the laboratory(ies) will contact the Tetra Tech project chemist immediately and other alternatives will be pursued, such as analyzing an undiluted aliquot of sample and allowing non-target compound peaks to go off scale. In addition, results below the reporting limit but above the MDL will be reported with appropriate flags to indicate the greater uncertainty associated with these values.

Analytical methods required for this investigation are all EPA SW-846 methods (1996). Protocols for laboratory selection and ensuring laboratory compliance with project analytical and QA/QC requirements are presented in the following sections.

2.4.1 Selection of Analytical Laboratories

Laboratories for this investigation will be selected from a list of prequalified laboratories developed by Tetra Tech to support Navy contracts. Prequalification streamlines laboratory selection by reducing the need to compile and review detailed bid and qualification packages for each individual investigation. Prequalification also improves flexibility in the program by allowing analyses to be directed to a number of different capable laboratories with available capacity at the time samples are collected.

Tetra Tech's laboratory prequalification and selection process relies on: (1) a standard procedure to evaluate and prequalify laboratories for work under the contract, and (2) the "Tetra Tech EM Inc. Laboratory Analytical SOW" for Navy contracts (Tetra Tech 2002b), a contractual document that specifies standard requirements for analyses that are routinely conducted. Tetra Tech establishes a basic ordering agreement that incorporates and enforces the laboratory SOW with each prequalified laboratory. Individual purchase orders can then be written for specific investigations. These aspects of laboratory selection are further described in the following sections, along with Tetra Tech's procedures for selecting laboratories when the laboratory SOW does not specifically address project-specific analytical methods or QC requirements.

2.4.1.1 Laboratory Evaluation and Prequalification

Laboratories that support the Navy, either directly or through subcontracts, are evaluated and approved for Navy use by the Naval Facilities Engineering Service Center (NFESC). Laboratories that support Tetra Tech under Navy contracts have been selected from the list of laboratories approved by NFESC and evaluated by Tetra Tech to ensure that the laboratory can meet the technical requirements of the laboratory SOW and produce data of acceptable quality. The evaluation of the laboratories is conducted in accordance with the NFESC Installation

Restoration Chemical Data Quality Manual (1999). The laboratory evaluation includes the following elements:

- **Certification and approval.** Laboratories must be currently certified by the California Department of Health Services (DHS) Environmental Laboratory Accreditation Program (ELAP) for analysis of hazardous materials for each method specified. Laboratories also must have or obtain similar approval from NFESC. The California DHS ELAP certification and NFESC approval must be obtained before the laboratory begins work.

- **Performance Evaluation (PE) Samples.** Each laboratory must initially and yearly demonstrate its ability to satisfactorily analyze single-blind PE samples for all analytical services it will provide under Navy contracts. At its discretion, Tetra Tech may submit one or more double-blind PE samples at Tetra Tech's cost. When the results for the PE sample are deficient, the laboratory must correct any problems and analyze (at its own cost) a subsequent round of PE samples for the deficient analysis.

- **Audits.** Laboratories must initially and yearly demonstrate their qualifications by submitting to one or more audits by Tetra Tech. The audits may consist of: (1) an on-site review of laboratory facilities, personnel, documentation, and procedures: or (2) an off-site review of hard-copy and electronic deliverables or magnetic tapes. When deficiencies are identified, the laboratory must correct the problem and provide Tetra Tech with a written summary of the corrective action that was taken.

Appendix E provides a current list of subcontractor laboratories that have passed this evaluation program. Each laboratory was evaluated before it was added to the list, and each is reevaluated annually. If a laboratory fails to meet any of the evaluation criteria, it is removed from the list of approved laboratories.

2.4.1.2 Laboratory Statement of Work

The laboratory SOW establishes standard requirements for analytical methods that are most commonly used under Navy contracts. For each method, the laboratory SOW specifies standard method-specific target analyte lists and PRRLs QC samples and associated control limits; calibration requirements and miscellaneous method performance requirements. The laboratory SOW also specifies standard data package requirements, EDD formats, data qualifiers, and delivery schedules. In addition, the laboratory SOW outlines support services (such as providing sample containers, trip blanks, temperature blanks, sample coolers, and custody forms and seals) that are expected of laboratories. The laboratory SOW incorporates Navy QA policy, as well as applicable EPA and state QA guidelines, as appropriate.

Tetra Tech's laboratory SOW is based on EPA CLP methods for volatile organic compounds, SVOCs, pesticides, PCBs, metals, and cyanide. The laboratory SOW also addresses frequently used non-CLP methods for a variety of organic, inorganic, and physical parameters. Non-CLP methods include the methods published by EPA in SW-846 and in Methods for Chemical

Analysis of Water and Waste, American Society for Testing and Materials methods; and those published by the American Public Health Association, American Water Works Association, and Water Pollution Control Federation in "Standard Methods for the Examination of Water and Waste Water." Laboratories on Tetra Tech's approved laboratory list can elect to provide all or a portion of the analytical services specified in the laboratory SOW.

As noted above, the laboratory SOW is incorporated into all laboratory subcontracts established for analytical services supporting Navy projects. These are prequalified laboratories commit to meeting the requirements in the laboratory SOW during the contracting process before they receive samples. Tetra Tech reviews and revises the laboratory SOW regularly to incorporate new methods and requirements, modifications or updates to existing methods, changes in Navy QA policy or regulatory requirements, and any other necessary corrections or revisions.

2.4.1.3 Laboratory Selection and Oversight

After project-specific analytical and QA/QC requirements have been identified and documented in the SAP, the Tetra Tech project chemist works closely with a Tetra Tech procurement specialist to select a laboratory that can meet these requirements. When project-specific analytical and QC requirements are consistent with Tetra Tech's laboratory SOW, the project chemist identifies one or more prequalified subcontractor laboratories that are capable of carrying out the work. As part of this process, the project chemist typically contacts the laboratories to discuss the analytical requirements and project schedule. The project chemist then forwards the name of the recommended laboratory (or laboratories) to the Tetra Tech procurement specialist, who issues a purchase order for the work. When analytical requirements are consistent with Tetra Tech's laboratory SOW and multiple prequalified laboratories are capable of performing the work, a specific laboratory is typically selected based on laboratory workload and project schedule considerations.

Tetra Tech follows a similar procedure when project-specific analytical and QC requirements are nonstandard and differ from those specified in Tetra Tech's laboratory SOW. The project chemist contacts analytical laboratories, beginning with those on Tetra Tech's prequalified list, to discuss the analytical and QA/QC requirements in the SAP and to assess the laboratories' ability to meet the requirements. In many cases, Tetra Tech works cooperatively with analytical laboratories to develop and refine appropriate QC requirements for nonstandard analyses or matrixes.

If the project chemist is unable to identify one or more prequalified laboratories that can perform the work, additional laboratories are contacted. In general, the additional laboratories must be evaluated as described in Section 2.4.1.1 before they will be allowed to analyze any samples, although some steps in the evaluation may be waived for certain investigations and circumstances (for example, unusual analytes, urgent project needs, experimental methods, mobile laboratories, or on-site screening analyses). After additional laboratories have been identified, the project chemist forwards their names to the procurement specialist. The procurement specialist prepares a solicitation package, including the project-specific analytical and QC requirements, and submits the package to the laboratories. The procurement specialist, in cooperation with the project chemist and project manager, then evaluates the proposals that are received and selects a laboratory that meets the requirements and provides the best value to the Navy and Tetra Tech. Finally, the procurement specialist issues a purchase order to the selected laboratory that incorporates the project-specific analytical and QA/QC requirements.

After a laboratory has been selected, the project chemist holds a kickoff meeting with the laboratory project manager. The kickoff meeting is held regardless of whether project-specific analytical and QA/QC requirements are consistent with Tetra Tech's laboratory SOW or are outside of the SOW. The Tetra Tech project manager, procurement specialist, and other key project and laboratory staff also may be involved in this meeting. The kickoff meeting includes a review of analytical and QC requirements in the SAP, the project schedule, and any other logistical support that the laboratory will be expected to provide.

2.4.2 Project Analytical Requirements

For this investigation, one or more prequalified subcontractor laboratories will analyze samples of soil and water off site. Laboratories will be selected before the field program begins based on their ability to meet the project analytical and QC requirements, as well as their ability to meet the project schedule. Analytical methods selected for the SSI investigation at Alameda point are standard EPA methods that are described in Tetra Tech's laboratory SOW. All methods are listed in Table 9 and are from EPA's SW-846 Test Methods for Evaluating Solid Waste (EPA 1996).

This SAP documents project-specific QC requirements for selected analytical methods. Sample volume, preservation, and holding time requirements are specified in Table 9. Requirements for laboratory QC samples are described in Table 4 and in Section 2.5. Appendix A includes project-specific precision and accuracy goals for the methods. Finally, PRRLs for each method are documented in Appendix D.

2.5 Quality Control

Tetra Tech will assess the quality of field data through regular collection and analysis of field QC samples. Laboratory samples will be used to determine the variability of concentrations in the debris layer. Laboratory QC samples also will be analyzed in accordance with referenced analytical method protocols to ensure that laboratory procedures are conducted properly and that the quality of the data is known.

2.5.1 Field Quality Control Samples

QC samples are collected in the field and analyzed to check sampling and analytical precision, accuracy, and representativeness. The following section discusses the types and purposes of field QC samples that will be collected for this project. Table 10 provides a summary of the types and frequency of collection of field QC samples.

2.5.1.1 Field Duplicates

Field duplicate samples are collected at the same time and from the same source and then submitted as separate samples to the laboratory for analysis. Duplicate samples for this project will be collocated for two reasons. First, adjacent soil samples incorporate spatial variability. These samples are used directly to assess sampling precision. Second, the information on spatial variability that can be obtained from adjacent soil samples may be useful in assessing potential variability of all sampling results and can serve as a major input to uncertainty analyses for risk assessment.

TABLE 10: FIELD QC SAMPLES

Site 07 Supplemental Sampling and Analysis Plan, Alameda Point

Sample Type	Frequency of Analysis	Matrix
MS and MSD	10 percent[a]	Soil
Field Duplicate	10 percent	Soil
Equipment Rinsate	1 per day per team per type of reusable sampling tool used[c]	Water

Notes:

a MS/MSDs for soil samples will be selected by the laboratory. Matrix duplicates replace MSDs for inorganic analyses.

b Tetra Tech anticipates that no field blanks will be required during this investigation.

c Tetra Tech anticipates that 1 day will be sufficient to install all four soil borings; consequently, only one rinsate sample will be collected for this investigation.

2.5.1.2 Equipment Rinsate Samples

Equipment rinsate samples will be collected during soil sampling at a frequency of once per day of sampling per team per type of tool used. An equipment rinsate is a sample collected after a sampling device is subjected to standard decontamination procedures. Water will be poured over or through the sampling equipment into a sample container and sent to the laboratory for analysis. Analytically certified, organic-free water or equivalent will be used for organic parameters; DI or distilled water will be used for inorganic parameters.

During data validation, the results for the equipment rinsate samples will be used to qualify data or to evaluate the levels of analytes in the field samples collected on the same day.

2.5.1.3 Source Water Blank Samples

One source water blank will be collected for each sampling event and for each source of water (distilled, DI, or from an industrial or residential water source). For the SSI at Site 07, only one source water blank will be submitted for analysis of total metals.

2.5.2 Laboratory Quality Control Samples

The types of laboratory QC samples that will be used for this project are discussed in the following sections. Table 4 presents the required frequencies for laboratory QC samples, and Appendix A presents project-specific precision and accuracy goals for these samples.

2.5.2.1 Method Blanks

Method blanks will be prepared at the frequency prescribed in the individual analytical method or at a rate of 5 percent of the total samples if a frequency is not prescribed in the method.

2.5.2.2 Matrix Spike and Matrix Spike Duplicates

MS/MSD samples for water matrices require collection of an additional volume of material for laboratory spiking and analysis; for soil matrices, additional sample volume is generally not required. MS/MSD samples will be collected at a frequency of 5 percent for soil. The %R will be calculated for each of the spiked analytes and used to evaluate analytical accuracy. The RPD between spiked samples will be calculated to evaluate precision. Project-specific precision and accuracy goals are presented in Appendix A.

2.5.2.3 Laboratory Control Samples

LCSs, or blank spikes, will be analyzed at the frequency prescribed in the analytical method or at a rate of 5 percent of the total samples if a frequency is not prescribed in the method. If percent recovery results for the LCS or blank spike are outside of the established goals, laboratory-specific protocols will be followed to gauge the usability of the data.

2.5.2.4 Surrogate Standards

Surrogate standards consist of known concentrations of nontarget organic analytes that are added to each sample, method blank, and MS/MSD before samples are prepared and analyzed. The surrogate standard measures the efficiency the analytical method in recovering the target analytes from an environmental sample matrix. %R for surrogate compounds are evaluated using laboratory control limits. Surrogate standards provide an indication of laboratory accuracy and matrix effects for every field and QC sample that is analyzed by gas chromatography for volatile and extractable organic constituents. Surrogate compounds are used in the analysis of VOCs to monitor purge efficiency and analytical performance, whereas surrogates are used in the analysis of extractable organic compounds to monitor the extraction process and analytical performance.

2.5.2.5 Internal Standards

Internal standards are compounds that are added to every VOC, SVOC, and Dioxin standard, method blank, MS/MSD, and sample or sample extract at a known concentration prior to analysis. Internal standards are used as the basis for quantification of gas chromatography (GC)/mass spectrometry (GC/MS) target compounds and ensure that the GC/MS sensitivity and response are stable during the analytical run. An internal standard is used to evaluate the efficiency of the sample introduction process and monitors the efficiency of the analytical procedure for each sample matrix encountered. Internal standards also may be used in the analysis of organic compounds by GC to monitor retention-time shifts. Validation of internal standards data will be based on EPA protocols presented in guidelines for evaluating organic analyses (1999b).

2.5.3 Additional Laboratory Quality Control Procedures

In addition to the analysis of laboratory QC samples, subcontractor laboratories will conduct the QC procedures discussed in the following sections.

2.5.3.1 Method Detection Limit Studies

The MDL is the minimum concentration of a compound that can be measured and reported. The MDL is a specified limit at which there is 99 percent confidence that the concentration of the analyte is greater than zero. The MDL takes into account sample matrix and preparation. The subcontractor laboratory will demonstrate MDLs for all analyses, except inorganic analyses and physical properties test methods.

MDL studies will be conducted annually for soil matrices or more frequently if any method or instrumentation changes. Each MDL study will consist of seven replicates spiked with all target analytes of interest at concentrations no greater than required quantitation limits. Replicates will be extracted and analyzed in the same manner as routine samples. If multiple instruments are used, each will be included in the MDL study. MDLs reported will be representative of the least sensitive instrument.

2.5.3.2 Sample Quantitation Limits

Sample quantitation limits (SQL), also referred to as practical quantitation limits, are PRRLs adjusted for the characteristics of individual samples. The PRRLs presented in Appendix D are chemical-specific levels that a laboratory should be able to routinely detect and quantitate in a given sample matrix. The PRRL is usually defined in the analytical method or in laboratory method documentation. The SQL takes into account changes in preparation and analytical methodology that may alter the ability to detect an analyte, including changes such as use of a smaller sample aliquot or dilution of the sample extract. Physical characteristics, such as sample matrix and percent moisture that may alter the ability to detect the analyte, also are considered. The laboratory will calculate and report SQLs for all environmental samples.

2.5.3.3 Control Charts

Control charts document data quality in graphic form for specific method parameters such as surrogate standards and blank spike recoveries. A collection of data points for each parameter is used to statistically calculate means and control limits for a given analytical method. This information is useful in determining whether analytical measurement systems are in control. In addition, control charts provide information about trends over time in specific analytical and preparation methodologies. Although they are not required, Tetra Tech recommends that subcontractor laboratories maintain control charts for organic and inorganic analyses. At a minimum, method-blank surrogate recoveries and blank spike recoveries should be charted for all organic methods. Blank spike recoveries should be charted for inorganic methods. Control charts should be updated monthly.

2.6 Equipment Testing, Inspection, and Maintenance

This section outlines the testing, inspection, and maintenance procedures that will be used to keep both field and laboratory equipment in good working condition.

2.6.1 Maintenance of Field Equipment

Preventive maintenance for most field equipment is carried out in accordance with procedures and schedules recommended in: (1) the equipment manufacturer's literature or operating manual, or (2) SOPs that describe equipment operation associated with particular applications of the instrument. However, more stringent testing, inspection, and maintenance procedures and schedules may be required when field equipment is used to make critical measurements.

A field instrument that is out of order will be segregated, clearly marked, and not used until it is repaired. The FTL will be notified of equipment malfunctions so that service can be completed quickly or substitute equipment can be obtained. When the condition of equipment is suspect, unscheduled testing, inspection, and maintenance should be conducted. Any significant problems with field equipment will be reported in the daily field QC report.

2.6.2 Maintenance of Laboratory Equipment

Subcontractor laboratories will prepare and follow a maintenance schedule for each instrument used to analyze samples collected for this project. All instruments will be serviced at scheduled intervals necessary to optimize factory specifications. Routine preventive maintenance and major repairs will be documented in a maintenance logbook.

An inventory of items to be kept ready for use in case of instrument failure will be maintained and restocked, as needed. The list will include equipment parts subject to frequent failure, parts that have a limited lifetime of optimum performance, and parts that cannot be obtained in a timely manner.

The laboratory's QA plan and written SOPs will describe specific preventive maintenance procedures for equipment maintained by the laboratory. These documents identify the personnel responsible for major, preventive, and daily maintenance procedures; the frequency and type of maintenance performed; and procedures for documenting maintenance activities.

Laboratory equipment malfunctions will require immediate corrective action. Actions should be documented in laboratory logbooks. No other formal documentation is required, unless data quality is adversely affected or further corrective action is necessary. On-the-spot corrective actions will be taken, as necessary, in accordance with the procedures described in the laboratory QA plan and SOPs.

2.7 Instrument Calibration and Frequency

The following sections discuss calibration procedures that will be followed to ensure the accuracy of measurements made using field and laboratory equipment.

2.7.1 Calibration of Field Equipment

Tetra Tech does not plan to use any field equipment that requires calibration during the SSI at CERCLA Site 07 Alameda Point.

2.7.2 Calibration of Laboratory Equipment

Procedures and frequencies for calibration of laboratory equipment will follow the requirements in the methods referenced in Section 2.4.2 of this SAP. Qualified analysts will calibrate laboratory equipment and document the procedures and results in a logbook.

The laboratory will obtain calibration standards from commercial vendors for both inorganic and organic compounds and analytes. Stock solutions for surrogate standards and other inorganic mixes will be made from reagent-grade chemicals or as specified in the analytical method. Stock standards also will be used to make intermediate standards that will be used to prepare calibration standards. Special attention will be paid to expiration dating, proper labeling, proper refrigeration, and freedom from contamination. Documentation on receipt, mixing, and use of standards will be recorded in the appropriate laboratory logbook. Logbooks must be permanently bound. Additional specific handling and documentation requirements for the use of standards may be provided in subcontractor laboratory QA plans.

2.8 Inspection and Acceptance of Supplies and Consumables

Tetra Tech project managers have primary responsibility for identifying the types and quantities of supplies and consumables needed to complete Navy projects and are responsible for determining acceptance criteria for these items.

Supplies and consumables can be received either at a Tetra Tech office or at a work site. When supplies are received at an office, the project manager or FTL will sort them according to vendor, check packing slips against purchase orders, and inspect the condition of all supplies before they are accepted for use on a project. If an item does not meet the acceptance criteria, deficiencies will be noted on the packing slip and purchase order and the item will then be returned to the vendor for replacement or repair.

Procedures for receiving supplies and consumables in the field are similar. When supplies are received, the Tetra Tech project manager or FTL will inspect all items against the acceptance criteria. Any deficiencies or problems will be noted in the field logbook, and deficient items will be returned for immediate replacement.

Analytical laboratories are required to provide certified clean containers for all analyses. These containers must meet EPA standards described in "Specifications and Guidance for Obtaining Contaminant-free Sampling Containers" (1992a).

2.9 Nondirect Measurements

No data for project implementation or decision-making will be obtained from non-direct measurement sources.

2.10 Data Management

Field and analytical data collected from this project and other environmental investigations at Alameda Point are critical to site characterization efforts, development of the comprehensive conceptual site model, risk assessments, and selection of remedial actions to protect human health and the environment. An information management system is necessary to ensure efficient access so that decisions based on the data can be made in a timely manner.

After the field and laboratory data reports are reviewed and validated, the data will be entered into Tetra Tech's database for Alameda Point. The database contains data for: (1) summarizing observations on contamination and geologic conditions, (2) preparing reports and graphics, (3) using with GIS, and (4) transmitting in an electronic format compatible with NEDTS. The following sections describe Tetra Tech's data tracking procedures, data pathways, and overall data management strategy for Alameda Point.

2.10.1 Data Tracking Procedures

All data that are generated in support of the Navy program at Alameda Point are tracked through a database created by Tetra Tech. Information related to the receipt and delivery of samples, project order fulfillment, and invoicing for laboratory and validation tasks is stored in the Tetra Tech program, SAMTRAK. All data are filed according to the document control number (DCN).

2.10.2 Data Pathways

Data are generated from three primary pathways at Alameda Point—data derived from field activities, laboratory analytical data, and validated data. Data from all three pathways must be entered into the Alameda point database. Data pathways must be established and well documented to evaluate whether the data have been accurately loaded into the database in a timely manner.

Data generated during field activities are recorded using field forms (see Appendix C). The project chemist or FTL reviews these forms for completeness and accuracy. Data from the field forms, including the chain-of-custody form, are entered into SAMTRAK according to the DCN.

Data generated during laboratory analysis are recorded in hard copy and in EDDs after samples have been analyzed. The laboratory will send the hard copy and EDD records to the project chemist. The project chemist reviews the data deliverable for completeness, accuracy, and format. After the format has been approved, the electronic data are manipulated and downloaded into the Alameda Point database. Tetra Tech data entry personnel will then update SAMTRAK with the total number of samples received and number of days required to receive the data.

After validation, the project chemist reviews the data for accuracy. Tetra Tech will then update the Alameda Point database with the appropriate data qualifiers. SAMTRAK also is updated to record associated laboratory and data validation costs.

2.10.3 Data Management Strategy

Tetra Tech's short- and mid-term data management strategies require that the database for Alameda Point be updated monthly. The data consist of chemical and field data from Navy contractors, entered into an Oracle (Version 7.3) database. The database can be used to generate reports using available computer-aided drafting and design and contouring software. All electronic data from this database will be stored and maintained in a format compatible with NEDTS.

To satisfy long-term data management goals, the data will be loaded into the database at Tetra Tech for storage, further manipulation, and retrieval after laboratory and field reports are reviewed and validated. The database will be used to provide data for chemical and geologic analysis and for preparing reports and graphic representations of the data. Additional data acquired from field activities are recorded on field forms (see Appendix C) that are reviewed for completeness and accuracy by the project chemist or FTL. Hard copies of forms, data, and chain-of-custody forms are filed in a secure storage area according to project and DCN. Laboratory data packages and reports will be archived at Tetra Tech or Navy offices. Laboratories that generated the data will archive hard-copy data for a minimum of 10 years.

3.0 ASSESSMENT AND OVERSIGHT

This section describes the field and laboratory assessments that may be conducted during this project, the individuals responsible for conducting assessments, corrective actions that may be implemented in response to assessment results, and how quality-related issues will be reported to Tetra Tech and Navy management.

3.1 Assessment and Response Actions

Tetra Tech and the Navy will oversee collection of environmental data using the assessment and audit activities described below. Any problems encountered during an assessment of field investigation or laboratory activities will require appropriate corrective action to ensure that the problems are resolved. This section describes the types of assessments that may be completed, Tetra Tech and Navy responsibilities for conducting the assessments, and corrective action procedures to address problems identified during an assessment.

3.1.1 Field Assessments

Tetra Tech conducts field technical systems audits (TSA) on selected Navy projects to support data quality and encourage continuous improvement in the field systems that involve environmental data collection. The Tetra Tech QA program manager selects projects for field TSAs quarterly based on available resources and the relative significance of the field sampling effort. During the field TSA, the assessor will use personnel interviews, direct observations, and reviews of project-specific documentation to evaluate and document whether procedures specified in the approved SAP are being implemented. Specific items that may be observed during the TSA include:

- Availability of approved project plans such as the SAP and HASP
- Documentation of personnel qualifications and training
- Sample collection, ID, preservation, handling, and shipping procedures
- Sampling equipment decontamination
- Equipment calibration and maintenance
- Completeness of logbooks and other field records (including non-conformance documentation)

During the TSA, the Tetra Tech assessor will verbally communicate any significant deficiencies to the FTL for immediate correction. These and all other observations and comments also will be documented in a TSA report. The TSA report will be issued to the Tetra Tech project manager, FTL, program QA manager, and project QA officer in electronic (e-mail) format within 7 days after the TSA is completed.

The Tetra Tech program QA manager determines the timing and duration of TSAs. Generally, TSAs are conducted early in the project so that any quality issues can be resolved before large amounts of data are collected.

The Navy QA officer also may independently conduct a field assessment of any Tetra Tech project. Items reviewed by the Navy QA officer during a field assessment may be similar to those described above.

3.1.2 Laboratory Assessments

As described in Section 2.4.1, NFESC assesses all laboratories before they are allowed to analyze samples under Navy contracts. Tetra Tech also conducts a pre-award assessment of each laboratory before they are placed on the approved list for performing work under the AECRU contract (see Appendix E). These assessments include: (1) reviews of laboratory certifications, (2) initial and annual demonstrations of the laboratory's ability to satisfactorily analyze single-blind PE samples, and (3) laboratory audits. Laboratory audits may consist of an on-site review of laboratory facilities, personnel, documentation, and procedures, or an off-site evaluation of the ability of the laboratory's data management system to meet contract requirements. Tetra Tech also conducts an assessment when an approved laboratory has been selected for non-routine analyses or when a laboratory that is not on the approved list must be used.

Tetra Tech will conduct a TSA of the selected laboratory for this project after the laboratory receives and begins processing samples. The purpose of this TSA will be to review the project-specific implementation of the methods specified in this SAP and to ensure that appropriate QC procedures are being implemented in association with these methods.

The Navy may audit any laboratory that will analyze samples on this project. The Navy QA officer will determine the need for these audits and typically will conduct the audits before samples are submitted to the laboratory for analysis.

3.1.3 Assessment Responsibilities

Tetra Tech personnel who conduct assessments will be independent of the activity evaluated. The Tetra Tech program QA manager will select the appropriate personnel to conduct each assessment and will assign them responsibilities and deadlines for completing the assessment. These personnel may include the program QA manager, project QA officer, or senior technical staff with relevant expertise and experience in assessment.

When an assessment is planned, the Tetra Tech program QA manager selects a lead assessor who is responsible for:

- Selecting and preparing the assessment team
- Preparing an assessment plan

- Coordinating and scheduling the assessment with the project team, subcontractor, or other organization being evaluated

- Participating in the assessment

- Coordinating preparation and issuance of assessment reports and corrective action request forms

- Evaluating responses and resulting corrective actions

After a TSA is completed, the lead assessor will submit an audit report to the Tetra Tech program QA manger, project manager, and project QA officer; other personnel may be included in the distribution as appropriate. Assessment findings also will be included in the quality control summary report (QCSR) for the project (see Section 3.2.3).

The Navy QA officer is responsible for coordinating all audits that may be conducted by Navy personnel under this project. Audit preparation, completion, and reporting responsibilities for Navy auditors would be similar to those described above.

3.1.4 Field Corrective Action Procedures

Field corrective action procedures will depend on the type and severity of the finding. Tetra Tech classifies assessment findings as either deficiencies or observations. Deficiencies are findings that may have a significant impact on data quality and that will require corrective action. Observations are findings that do not directly affect data quality, but are suggestions for consideration and review.

As described in Section 3.1.1, project teams are required to respond to deficiencies identified in TSA reports. The project manager, FTL, and project QA officer will discuss the deficiencies and the appropriate steps to resolve each deficiency by:

- Determining when and how the problem developed

- Assigning responsibility for problem investigation and documentation

- Selecting the corrective action to eliminate the problem

- Developing a schedule for completing the corrective action

- Assigning responsibility for implementing the corrective action

- Documenting and verifying that the corrective action has eliminated the problem

- Notifying the Navy of the problem and the corrective action taken

In responding to the TSA report, the project team will include a brief description of each deficiency, the proposed corrective action, the individual responsible for determining and implementing the corrective action, and completion dates for each corrective action. The project QA officer will use a status report to monitor all corrective actions.

The Tetra Tech program QA manager is responsible for reviewing proposed corrective actions and verifying that they have been effectively implemented. The program QA manager can require data acquisition to be limited or discontinued until the corrective action is complete and a deficiency is eliminated. The program QA manager also can request the reanalysis of any or all samples and a review of all data acquired since the system was last in control.

3.1.5 Laboratory Corrective Action Procedures

Internal laboratory procedures for corrective action and descriptions of out-of-control situations that require corrective action are contained in laboratory QA plans. At a minimum, corrective action will be implemented when any of the following three conditions occurs: control limits are exceeded, method QC requirements are not met, or sample holding times are exceeded. The laboratory will report out-of-control situations to the Tetra Tech project chemist within 2 working days after they are identified. In addition, the laboratory project manager will prepare and submit a corrective action report to the Tetra Tech project chemist. This report will identify the out-of-control situation and the steps that the laboratory has taken to rectify it.

3.2 Reports to Management

Effective management of environmental data collection requires: (1) timely assessment and review of all activities, and (2) open communication, interaction, and feedback among all project participants. Tetra Tech will use the reports described below to address any project-specific quality issues and to facilitate timely communication of these issues.

3.2.1 Daily Progress Reports

Tetra Tech will prepare a daily progress report to summarize activities throughout the field investigation. This report will describe sampling and field measurements, equipment used, Tetra Tech and subcontractor personnel on site, QA/QC and health and safety activities, problems encountered, corrective actions taken, deviations from the SAP, and explanations for the deviations. The daily progress report is prepared by the field team leader and submitted to the project manager and to the Navy Regional program manager (RPM), if requested. The content of the daily reports will be summarized and included in the final report submitted for the field investigation. The daily progress report will be recorded in the hardbound field notebook.

3.2.2 Project Monthly Status Report

The Tetra Tech project manager will prepare a monthly status report (MSR) to be submitted to the Tetra Tech's program manager and the Navy RPM. MSRs address project-specific quality issues and facilitate their timely communication. The MSR will include the following quality-related information:

- Project status
- Instrument, equipment, or procedural problems that affect quality and recommended solutions
- Objectives from the previous report that were achieved
- Objectives from the previous report that were not achieved
- Work planned for the next month

If appropriate, Tetra Tech will obtain similar information from subcontractors who are participating in the project and will incorporate the information into the MSR.

3.2.3 Quality Control Summary Report

Tetra Tech will prepare a QCSR that will be submitted to the Navy RPM with the final report for the field investigation. The QCSR will include a summary and evaluation of QA/QC activities, including any field or laboratory assessments, completed during the investigation. The QCSR also will indicate the location and duration of storage for the complete data packages. Particular emphasis will be placed on determining whether project DQOs were met and whether data are of adequate quality to support required decisions.

4.0 DATA VALIDATION AND USABILITY

This section describes the procedures that are planned to review, verify, and validate field and laboratory data. This section also discusses procedures for verifying that the data are sufficient to meet DQOs and MQOs for the project.

4.1 Data Review, Verification, and Validation

Validation and verification of the data generated during field and laboratory activities are essential to obtaining defensible data of acceptable quality. Verification and validation methods for field and laboratory activities are presented below.

4.1.1 Field Data Verification

Project team personnel will verify field data through reviews of data sets to identify inconsistencies or anomalous values. Any inconsistencies discovered will be resolved as soon as possible by seeking clarification from field personnel responsible for data collection. All field personnel will be responsible for following the sampling and documentation procedures described in this SAP so that defensible and justifiable data are obtained.

Data values that are significantly different from the population are called "outliers." A systematic effort will be made to identify any outliers or errors before field personnel report the data. Outliers can result from improper sampling or measurement methodology, data transcription errors, calculation errors, or natural causes. Outliers that result from errors found during data verification will be identified and corrected; outliers that cannot be attributed to errors in sampling, measurement, transcription, or calculation will be clearly identified in project reports.

4.1.2 Laboratory Data Verification

Laboratory personnel will verify analytical data at the time of analysis and reporting and through subsequent reviews of the raw data for any non-conformances to the requirements of the analytical method. Laboratory personnel will make a systematic effort to identify any outliers or errors before they report the data. Outliers that result from errors found during data verification will be identified and corrected; outliers that cannot be attributed to errors in analysis, transcription, or calculation will be clearly identified in the case narrative section of the analytical data package.

4.1.3 Laboratory Data Validation

An independent third party contractor will validate all laboratory data in accordance with current EPA national functional guidelines (EPA 1994, 1999b). The data validation strategy will be consistent with Navy guidelines. For this project, 80 percent of the data for COCs will undergo cursory validation and 20 percent of the data for COCs will undergo full validation. Requirements for cursory and full validation are listed below.

4.1.3.1 Cursory Data Validation

Cursory validation will be completed on 80 percent of the summary data packages for analysis of COCs. The data reviewer is required to notify Tetra Tech and request any missing information needed from the laboratory. Elimination of the data from the review process is not allowed. All data will be qualified as necessary in accordance with established criteria. Data summary packages will consist of sample results and QC summaries, including calibration and internal standard data.

4.1.3.2 Full Data Validation

Full validation will be completed on 20 percent of the full data packages for analysis of COCs. The data reviewer is required to notify Tetra Tech and request any missing information needed from the laboratory. Elimination of data from the review process is not allowed. All data will continue through the validation process and will be qualified in accordance with established criteria. Data summary packages will consist of sample results, QC summaries, and all raw data associated with the sample results and QC summaries.

4.1.3.3 Data Validation Criteria

Table 11 lists the QC criteria that will be reviewed for both cursory and full data validation. The data validation criteria selected from Table 11 will be consistent with the project-specific analytical methods referenced in Section 2.4 of the SAP.

4.2 Reconciliation with User Requirements

After environmental data have been reviewed, verified, and validated in accordance with the procedures described in Section 4.1, the data must be further evaluated to determine whether DQOs have been met.

TABLE 11: DATA VALIDATION CRITERIA

Site 07 Supplemental Sampling and Analysis Plan, Alameda Point

Analytical Parameter Group	Cursory Data Validation Criteria	Full Data Validation Criteria
Non-CLP Organic Analyses	Method compliance Holding times Calibration Blanks Surrogate recovery MS/MSD recovery LCS or blank spike Internal standard performance Field duplicate sample analysis Other laboratory QC specified by the method Overall assessment of data for an SDG	Method compliance Holding times Calibration Blanks Surrogate recovery MS/MSD recovery LCS or blank spike Internal standard performance Compound identification Detection limits Compound quantitation Sample results verification Other laboratory QC specified by the method Overall assessment of data for an SDG
Non-CLP Inorganic Analyses	Method compliance Holding times Calibration Blanks MS/MSD recovery LCS or blank spike Field duplicate sample analysis Other laboratory QC specified by the method Overall assessment of data for an SDG	Method compliance Holding times Calibration Blanks MS/MSD recovery LCS Field duplicate sample analysis Other laboratory QC specified by the method Detection limits Analyte identification Analyte quantitation Sample results verification Overall assessment of data for an SDG

Notes:

CLP Contract Laboratory Program
QC Quality control
SDG Sample delivery group

To the extent possible, Tetra Tech will follow EPA's data quality assessment (DQA) process to verify that the type, quality, and quantity of data collected are appropriate for their intended use. DQA methods and procedures are outlined in EPA's "Guidance for DQA, Practical Methods for Data Analysis" (EPA 2000c). The DQA process includes five steps: (1) review the DQOs and sampling design; (2) conduct a preliminary data review; (3) select a statistical test; (4) verify the assumptions of the statistical test; and (5) draw conclusions from the data.

When the five-step DQA process is not followed completely, Tetra Tech will systematically assess data quality and data usability. This assessment will include:

- A review of the sampling design and sampling methods to verify that these were implemented as planned and are adequate to support project objectives

- A review of project-specific data quality indicators for PARCC parameters, and quantitation limits (defined in Section 1.3.2) to determine whether acceptance criteria have been met

- A review of project-specific DQOs to determine whether they have been achieved by the data collected

- An evaluation of any limitations associated with decisions to be made based on the data collected. For example, if data completeness is only 90 percent compared to a project-specific completeness objective of 95 percent, the data may still be usable to support a decision, but at a lower level of confidence.

The final report for the project will discuss any potential impacts of these reviews on data usability and will clearly define any limitations associated with the data.

REFERENCES

Canonie Environmental. 1990. "Sampling Plan, Remedial Investigation (RI)/Feasibility Study [RI/FS] Naval Air Station [NAS] Alameda, Alameda, California, Volume 1." February 12.

Environmental Resource Management, West, 1987. "Site Investigation, NAS Naval Exchange Gas Station, Alameda California." March 31.

International Technology Corporation (IT). 2000. "*Standard Quality Procedures and Standard Operating Procedures Manual, Revision 2, Concord, California.*" August.

IT. 2001a. "Environmental Baseline Survey Data Evaluation Summaries." Alameda Point, Alameda, California. January.

IT. 2001b. "Final Corrective Action Work Plan. Hydrocarbon Plume Delineation, Remediation, and Site Closure Measures. Corrective Action Areas 7, 11, and 13, Alameda Point, Alameda, California." July 20.

IT. 2001c. "Fuel Remediation Measures. Site 07 and Parcel 37, Alameda Point, Alameda, California." March 28.

Naval Facilities Engineering Service Center (NFESC). 1999. "*Navy Installation Restoration Chemical Data Quality Manual* (IRCDQM)." Special Report SP-2056-ENV. September.

Navy Public Works (PWC). 1997a. "Final Summary Report. UST Removal, Site No. 506 – Tank No. 506-1, Naval Air Station Alameda (NAS), Alameda, California." January 8.

Pacific Northwest National Laboratory. 2002. Visual Sample Plan, Version 2.0, User's Guide. September.

PRC Environmental Management, Inc. and James M. Montgomery. 1992. "Data Summary Report RI/FS Phases 2B and 3." Volume 1. October 27.

PRC and Montgomery Watson 1996a. "RI/FS, Data Transmittal Memorandum. Sites 1, 2, 3, Runway Area, 6, 7A, 7B, 7C, 9, 10B, 11, 13, 15, 16, and 19."

PWC. 1997b. "Final Summary Report. UST Removal, Site No. 459 – Tank Nos. 459-5 through 459-8, NAS Alameda, Alameda, California." January 6.

Shaw Group Inc. 2003. "Site 07 Excavation at Building 459 Alameda Point, Alameda, California" March 26.

Tetra Tech and Uribe & Associates. 1998. "Data Summary Report for Quarterly Groundwater Monitoring." November 1997 – August 1998.

Tetra Tech EM Inc. (Tetra Tech). 1998. "Final Base-wide Health and Safety Plan, NAVSTA TI, California." July 7.

Tetra Tech. 2000a. "Free Phase Floating Product Investigation, Alameda Point, Alameda." March 6.

Tetra Tech. 2000b. "UST No Further Action Report, Request for No Further Action UST 506-1, Alameda Point, Alameda, California." February 9.

Tetra Tech. 2001a. "Data Gap Investigation at Corrective Action Areas and Other Locations at Alameda Point, Alameda, California. Summary Report." March 2.

Tetra Tech. 2001b. "Final Field Sampling Plan, Supplemental RI DGS for OU 1 and 2." Alameda Point, Alameda, California. June 14.

Tetra Tech. 2002. "Data Summary Report Supplemental Remedial Investigation DGS for Operable Units 1 and 2." Alameda Point, Alameda, California. July 25.

Tetra Tech. 2002a. "Draft Supplemental Environmental Baseline Survey, Alameda Point, Alameda, California." August 16.

Tetra Tech. 2002b. "Tetra Tech EM Inc. Laboratory Analytical SOW." January.

Tetra Tech EM Inc. (Tetra Tech). 2002. "Data Summary Report Supplemental Investigation Data Gap Sampling for OU 1 and 2." July 25.

U.S. Environmental Protection Agency (EPA). EPA. 1988a. "Guidance for Conducting RI/FS Under CERCLA, Interim Final". EPA/540/G-89/004. October.

EPA 1992a. "Specifications and Guidance for Obtaining Contaminant-Free Sampling Containers." Office of Solid Waste and Emergency Response (OSWER) Directive No. 9240.0-05A. April.

EPA. 1992. "Guidance on Risk Characterization for Risk Managers and Risk Assessors. Memorandum from F. Henry Habicht II, Deputy Administrator". Office of the Administrator. Washington, DC. February.

EPA. 1994. "National Functional Guidelines for Inorganic Data Review." Office of Emergency and Remedial Response (OERR). Washington, DC. EPA-540/R-94/013. February.

EPA. 1996. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846), Update III." Office of Solid Waste and Emergency Response. Washington, DC. December.

EPA. 1999a. "U.S. EPA Contract Laboratory Program (CLP) SOW for Organics Analysis, Multi-Media, Multi-Concentration." Document Number OLM04.2. May.

EPA. 1999b. "National Functional Guidelines for Organic Data Review." Office of Emergency and Remedial Response (OERR). Washington, DC. EPA-540/R-99-008. October.

EPA. 2000a. "U.S. EPA CLP SOW for Inorganic Analysis, Multi-media, Multi-concentration." Document Number ILM04.1. January.

EPA. 2000b. "DQO Process for Hazardous Waste Site Investigations (EPA QA/ G-4HW)." Office of Environmental Information (OEI). Washington, D.C. EPA/600/R-00/007. January.

EPA. 2000c. "Guidance for Data Quality Assessment, Practical Methods for Data Analysis, EPA QA/ G-9, QA00 Update." OEI. Washington, DC. EPA/600/ R-96-084. July.

EPA. 2000d. "Guidance for the DQO Process, EPA QA/G-4." OEI. Washington, DC. EPA/600/R-96/055. August.

EPA. 2002. Region IX Preliminary Remediation Goals. November 1. On-line address: http://www.epa.gov/region09/waste/sfund/prg/index.html

EPA. 2001. "EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5." OEI. Washington, DC. EPA/240/B-01/003. March.

Shaw Group, Inc (Shaw). 2003 "Site 07 Excavation at Building 459 Alameda Point, Alameda California" March 26.

APPENDIX A
METHOD PRECISION AND ACCURACY GOALS

TABLE A-1: METALS, PCBS, AND DIOXINS\FURANS METHOD PRECISION AND ACCURACY GOALS

Site 07 Supplemental Samping and Analysis Plan, Alameda Point

	Water		Soil	
Analyses	**% Recovery**	**RPD**	**% Recovery**	**RPD**
Metals - Method 6010B, SW-846[a]				
All Metals	80-120	20	80-120	20
PCBs – Method 8082, SW-846[a]				
Aroclor 1260	73-116	20	70-118	20
Dioxins\Furans – Method 8290, SW-846[a]				
2,3,7,8-Tetrachlorodibenzofuran	60 to 140	20	60 to 140	20
1,2,3,7,8-Pentachlorodibenzofuran	60 to 140	20	60 to 140	20
2,3,4,7,8-Pentachlorodibenzofuran	60 to 140	20	60 to 140	20
1,2,3,4,7,8-Hexachlorodibenzofuran	60 to 140	20	60 to 140	20
1,2,3,6,7,8-Hexachlorodibenzofuran	60 to 140	20	60 to 140	20
1,2,3,7,8,9-Hexachlorodibenzofuran	60 to 140	20	60 to 140	20
2,3,4,6,7,8-Hexachlorodibenzofuran	60 to 140	20	60 to 140	20
1,2,3,4,6,7,8-Heptachlorodibenzofuran	60 to 140	20	60 to 140	20
1,2,3,4,7,8,9-Heptachlorodibenzofuran	60 to 140	20	60 to 140	20
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	60 to 140	20	60 to 140	20
2,3,7,8-Tetrachlorodibenzo-p-dioxin	60 to 140	20	60 to 140	20
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	60 to 140	20	60 to 140	20
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	60 to 140	20	60 to 140	20
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	60 to 140	20	60 to 140	20
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	60 to 140	20	60 to 140	20
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	60 to 140	20	60 to 140	20
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	60 to 140	20	60 to 140	20
^{13}C-2,3,7,8-Tetrachlorodibenzo-p-dioxin	40 to 135	NA	40 to 135	NA
^{13}C-2,3,7,8-Tetrachlorodibenzofuran	40 to 135	NA	40 to 135	NA
^{13}C-1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40 to 135	NA	40 to 135	NA
^{13}C-1,2,3,7,8-Pentachlorodibenzofuran	40 to 135	NA	40 to 135	NA
^{13}C-1,2,3,6,7,8-Hexaachlorodibenzo-p-dioxin	40 to 135	NA	40 to 135	NA
^{13}C-1,2,3,4,7,8-Hexaachlorodibenzofuran	40 to 135	NA	40 to 135	NA
^{13}C-1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	40 to 135	NA	40 to 135	NA
^{13}C-1,2,3,4,6,7,8-Heptachlorodibenzofuran	40 to 135	NA	40 to 135	NA
^{13}C-1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	40 to 135	NA	40 to 135	NA

Notes:

a	Complete Environmental Protection Agency (EPA) Method references are provided in Section 2.4 of this Sampling Analysis Plan.
NA	Not applicable
PCB	Polychlorinated biphenyl
RPD	Relative percent difference

APPENDIX B
STANDARD OPERATING PROCEDURES

SOP APPROVAL FORM

TETRA TECH EM INC.

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

GENERAL EQUIPMENT DECONTAMINATION

SOP NO. 002

REVISION NO. 2

Last Reviewed: December 1999

KRiesing

Quality Assurance Approved

February 2, 1993

Date

1.0 BACKGROUND

All nondisposable field equipment must be decontaminated before and after each use at each sampling location to obtain representative samples and to reduce the possibility of cross-contamination.

1.1 PURPOSE

This standard operating procedure (SOP) establishes the requirements and procedures for decontaminating equipment in the field.

1.2 SCOPE

This SOP applies to decontaminating general nondisposable field equipment. To prevent contamination of samples, all sampling equipment must be thoroughly cleaned prior to each use.

1.3 DEFINITIONS

Alconox: Nonphosphate soap

1.4 REFERENCES

U.S. Environmental Protection Agency (EPA). 1992. "RCRA Ground-Water Monitoring: Draft Technical Guidance. Office of Solid Waste. Washington, DC. EPA/530-R-93-001. November.

EPA. 1994. "Sampling Equipment Decontamination." Environmental Response Team SOP #2006 (Rev. #0.0, 08/11/94). On-Line Address: http://204.46.140.12/media_resrcs/media_resrcs.asp?Child1=

1.5 REQUIREMENTS AND RESOURCES

The equipment required to conduct decontamination is as follows:

- Scrub brushes
- Large wash tubs or buckets
- Squirt bottles

- Alconox
- Tap water
- Distilled water
- Plastic sheeting
- Aluminum foil
- Methanol or hexane
- Dilute (0.1 N) nitric acid

2.0 PROCEDURE

The procedures below discuss decontamination of personal protective equipment (PPE), drilling and monitoring well installation equipment, borehole soil sampling equipment, water level measurement equipment, and general sampling equipment.

2.1 PERSONAL PROTECTIVE EQUIPMENT DECONTAMINATION

Personnel working in the field are required to follow specific procedures for decontamination prior to leaving the work area so that contamination is not spread off-site or to clean areas. All used disposable protective clothing, such as Tyvek coveralls, gloves, and booties, will be containerized for later disposal. Decontamination water will be containerized in 55-gallon drums.

Personnel decontamination procedures will be as follows:

1. Wash neoprene boots (or neoprene boots with disposable booties) with Liquinox or Alconox solution and rinse with clean water. Remove booties and retain boots for subsequent reuse.

2. Wash outer gloves in Liquinox or Alconox solution and rinse in clean water. Remove outer gloves and place into plastic bag for disposal.

3. Remove Tyvek or coveralls. Containerize Tyvek for disposal and place coveralls in plastic bag for reuse.

4. Remove air purifying respirator (APR), if used, and place the spent filters into a plastic bag for disposal. Filters should be changed daily or sooner depending on use and application. Place respirator into a separate plastic bag after cleaning and disinfecting.

5. Remove disposable gloves and place them in plastic bag for disposal.

6. Thoroughly wash hands and face in clean water and soap.

2.2 DRILLING AND MONITORING WELL INSTALLATION EQUIPMENT DECONTAMINATION

All drilling equipment should be decontaminated at a designated location on-site before drilling operations begin, between borings, and at completion of the project.

Monitoring well casing, screens, and fittings are assumed to be delivered to the site in a clean condition. However, they should be steam cleaned on-site prior to placement downhole. The drilling subcontractor will typically furnish the steam cleaner and water.

After cleaning the drilling equipment, field personnel should place the drilling equipment, well casing and screens, and any other equipment that will go into the hole on clean polyethylene sheeting.

The drilling auger, bits, drill pipe, temporary casing, surface casing, and other equipment should be decontaminated by the drilling subcontractor by hosing down with a steam cleaner until thoroughly clean. Drill bits and tools that still exhibit particles of soil after the first washing should be scrubbed with a wire brush and then rinsed again with a high-pressure steam rinse.

All wastewater from decontamination procedures should be containerized.

2.3 BOREHOLE SOIL SAMPLING EQUIPMENT DECONTAMINATION

The soil sampling equipment should be decontaminated after each sample as follows:

1. Prior to sampling, scrub the split-barrel sampler and sampling tools in a bucket using a stiff, long bristle brush and Liquinox or Alconox solution.

2. Steam clean the sampling equipment over the rinsate tub and allow to air dry.

3. Place cleaned equipment in a clean area on plastic sheeting and wrap with aluminum foil.

4. Containerize all water and rinsate.

5. Decontaminate all pipe placed down the hole as described for drilling equipment.

2.4 WATER LEVEL MEASUREMENT EQUIPMENT DECONTAMINATION

Field personnel should decontaminate the well sounder and interface probe before inserting and after removing them from each well. The following decontamination procedures should be used:

1. Wipe the sounding cable with a disposable soap-impregnated cloth or paper towel.
2. Rinse with deionized organic-free water.

2.5 GENERAL SAMPLING EQUIPMENT DECONTAMINATION

All nondisposable sampling equipment should be decontaminated using the following procedures:

1. Select an area removed from sampling locations that is both downwind and downgradient. Decontamination must not cause cross-contamination between sampling points.
2. Maintain the same level of protection as was used for sampling.
3. To decontaminate a piece of equipment, use an Alconox wash; a tap water wash; a solvent (methanol or hexane) rinse, if applicable or dilute (0.1 N) nitric acid rinse, if applicable; a distilled water rinse; and air drying. Use a solvent (methanol or hexane) rinse for grossly contaminated equipment (for example, equipment that is not readily cleaned by the Alconox wash). The dilute nitric acid rinse may be used if metals are the analyte of concern.
4. Place cleaned equipment in a clean area on plastic sheeting and wrap with aluminum foil.
5. Containerize all water and rinsate.

SOP APPROVAL FORM

TETRA TECH EM INC.

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

PACKAGING AND SHIPPING SAMPLES

SOP NO. 019

REVISION NO. 5

Last Reviewed: January 2000

Quality Assurance Approved

January 28, 2000

Date

1.0 BACKGROUND

In any sampling program, the integrity of a sample must be ensured from its point of collection to its final disposition. Procedures for classifying, packaging, and shipping samples are described below. Steps in the procedures should be followed to ensure sample integrity and to protect the welfare of persons involved in shipping and receiving samples. When hazardous substances and dangerous goods are sent by common carrier, their packaging, labeling, and shipping are regulated by the U.S. Department of Transportation (DOT) Hazardous Materials Regulations (HMR, *Code of Federal Regulations*, Title 49 [49 CFR] Parts 106 through 180) and the International Air Transportation Association (IATA) Dangerous Goods Regulations (DGR).

1.1 PURPOSE

This standard operating procedure (SOP) establishes the requirements and procedures for packaging and shipping samples. It has been prepared in accordance with the U.S. Environmental Protection Agency (EPA) "Sampler's Guide to the Contract Laboratory Program (CLP)," the DGR, and the HMR. Sample packaging and shipping procedures described in this SOP should be followed for all sample packaging and shipping. Deviations from the procedures in this SOP must be documented in a field logbook. This SOP assumes that samples are already collected in the appropriate sample jars and that the sample jars are labeled and tagged appropriately.

1.2 SCOPE

This SOP applies to sample classification, packaging, and shipping.

1.3 DEFINITIONS

Custody seal: A custody seal is a tape-like seal. Placement of the custody seal is part of the chain-of-custody process and is used to prevent tampering with samples after they have been packaged for shipping.

Dangerous goods: Dangerous goods are articles or substances that can pose a significant risk to health, safety, or property when transported by air; they are classified as defined in Section 3 of the DGR (IATA 1999).

Environmental samples: Environmental samples include drinking water, most groundwater and ambient surface water, soil, sediment, treated municipal and industrial wastewater effluent, and biological specimens. Environmental samples typically contain low concentrations of contaminants and when handled require only limited precautionary procedures.

Hazardous Materials Regulations: The HMR are DOT regulations for the shipment of hazardous materials by air, water, and land; they are located in 49 CFR 106 through 180.

Hazardous samples: Hazardous samples include dangerous goods and hazardous substances. Hazardous samples shipped by air should be packaged and labeled in accordance with procedures specified by the DGR; ground shipments should be packaged and labeled in accordance with the HMR.

Hazardous substance: A hazardous substance is any material, including its mixtures and solutions, that is listed in Appendix A of 49 CFR 172.101 and its quantity, in one package, equals or exceeds the reportable quantity (RQ) listed in the appendix.

IATA Dangerous Goods Regulations: The DGR are regulations that govern the international transport of dangerous goods by air. The DGR are based on the International Civil Aviation Organization (ICAO) Technical Instructions. The DGR contain all of the requirements of the ICAO Technical Instructions and are more restrictive in some instances.

Nonhazardous samples: Nonhazardous samples are those samples that do not meet the definition of a hazardous sample and **do not** need to be packaged and shipped in accordance with the DGR or HMR.

Overpack: An enclosure used by a single shipper to contain one or more packages and to form one handling unit (IATA 1999). For example, a cardboard box may be used to contain three fiberboard boxes to make handling easier and to save on shipping costs.

1.4 REFERENCES

U.S. Department of Transportation, Transport Canada, and the Secretariat of Communications and Transportation of Mexico (DOT and others). 1996. "1996 North American Emergency Response Guidebook."

International Air Transport Association (IATA). 1997. "Guidelines for Instructors of Dangerous Courses."

IATA. 1999. "Dangerous Goods Regulations." 40th Edition.

U.S. Environmental Protection Agency. 1996. "Sampler's Guide to the Contract Laboratory Program." Office of Solid Waste and Emergency Response. Washington, DC. EPA/540/R-96/032. On-Line Address: http://www.epa.gov/oerrpage/superfund/programs/clp/guidance.htm#sample

1.5 REQUIREMENTS AND RESOURCES

The procedures for packaging and shipping **nonhazardous** samples require the following:

- Coolers
- Ice
- Vermiculite, bubble wrap, or similar cushioning material
- Chain-of-custody forms and seals
- Airbills
- Resealable plastic bags for sample jars and ice
- Tape (strapping and clear)

The procedures for packaging and shipping **hazardous** samples require the following:

- Ice
- Vermiculite or other non-combustible, absorbent packing material
- Chain-of-custody forms and seals
- Appropriate dangerous goods airbills and emergency response information to attach to the airbill

- Resealable plastic bags for sample jars and ice
- Tape (strapping and clear)
- Appropriate shipping containers as specified in the DGR
- Labels that apply to the shipment such as hazard labels, address labels, "Cargo Aircraft Only" labels, and package orientation labels (up arrows)

2.0 PROCEDURES

The following procedures apply to packaging and shipping nonhazardous and hazardous samples.

2.1 SAMPLE CLASSIFICATION

Prior to sample shipment, it must be determined whether the sample is subject to the DGR. Samples subject to these regulations shall be referred to as hazardous samples. If the hazardous sample is to be shipped by air, then the DGR should be followed. Any airline, including FedEx, belonging to IATA must follow the DGR. As a result, FedEx **may not** accept a shipment that is packaged and labeled in accordance with the HMR (although in most cases, the packaging and labeling would be the same for either set of regulations). The HMR states that a hazardous material may be transported by aircraft in accordance with the ICAO Technical Instruction (49 CFR 171.11) upon which the DGR is based. Therefore, the use of the DGR for samples to be shipped by air complies with the HMR, but not vice versa.

Most environmental samples are not hazardous samples and do not need to be packaged in accordance with any regulations. Hazardous samples are those samples that can be classified as specified in Section 3 of the DGR, can be found in the List of Dangerous Goods in the DGR in bold type, are considered a hazardous substance (see definition), or are mentioned in "Section 2 - Limitations" of the DGR for countries of transport or airlines (such as FedEx). The hazard classifications specified in the DGR (and the HMR) are as follows:

Class 1 - Explosives

Division 1.1 - Articles and substances having a mass explosion hazard

Division 1.2 - Articles and substances having a projection hazard but not a mass explosion hazard
Division 1.3 - Articles and substances having a fire hazard, a minor blast hazard and/or a minor projection hazard but not a mass explosion hazard
Division 1.4 - Articles and substances presenting no significant hazard
Division 1.5 - Very sensitive substances mass explosion hazard
Division 1.6 - Extremely insensitive articles which do not have a mass explosion hazard

Class 2 - Gases

Division 2.1 - Flammable gas
Division 2.2 - Non-flammable, non-toxic gas
Division 2.3 - Toxic gas

Class 3 - Flammable Liquids

Class 4 - Flammable Solids; Substances Liable to Spontaneous Combustion; Substances, which, in Contact with Water, Emit Flammable Gases

Division 4.1 - Flammable solids.
Division 4.2 - Substances liable to spontaneous combustion.
Division 4.3 - Substances, which, in contact with water, emit flammable gases.

Class 5 - Oxidizing Substances and Organic Peroxide

Division 5.1 - Oxidizers.
Division 5.2 - Organic peroxides.

Class 6 - Toxic and Infectious Substances

Division 6.1 - Toxic substances.
Division 6.2 - Infectious substances.

Class 7 - Radioactive Material

Class 8 - Corrosives

Class 9 - Miscellaneous Dangerous Goods

The criteria for each of the first eight classes are very specific and are outlined in Section 3 of the DGR and 49 CFR 173 of the HMR. Some classes and divisions are further divided into packing groups based on their level of danger. Packing group I indicates a great danger, packing group II indicates a medium danger, and packing group III indicates a minor danger. Class 2, gases, includes any compressed gas being shipped and any noncompressed gas that is either flammable or toxic. A compressed gas is defined as having a pressure over 40 pounds per square inch (psi) absolute (25 psi gauge). Most air samples and empty cylinders that did not contain a flammable or toxic gas are exempt from the regulations. An empty hydrogen cylinder, as in a flame ionization detector (FID), is considered a dangerous good unless it is properly purged with nitrogen in accordance with the HMR. A landfill gas sample is usually considered a flammable gas because it may contain a high percentage of methane. Class 3, flammable liquids, are based on the boiling point and flash point of a substance. Most class 3 samples include solvents, oil, gas, or paint-related material collected from drums, tanks, or pits. Division 6.1, toxic substances, is based on oral toxicity (LD_{50} [lethal dose that kills 50 percent of the test animals]), dermal toxicity (LD_{50} values), and inhalation toxicity (LC_{50} [lethal concentration that kills 50 percent of the test animals] values). Division 6.1 substances include pesticides and cyanide. Class 7, radioactive material, is defined as any article or substance with a specific activity greater than 70 kiloBecquerels (kBq/kg) (0.002 [microCuries per gram [μCi/g]). If the specific activity exceeds this level, the sample should be shipped in accordance with Section 10 of the DGR. Class 8, corrosives, are based on the rate at which a substance destroys skin tissue or corrodes steel; they are not based on pH. Class 8 materials include the concentrated acids used to preserve water samples. Preserved water samples are not considered class 8 substances and should be packaged as nonhazardous samples. Class 9, miscellaneous dangerous goods, are substances that present a danger but are not covered by any other hazard class. Examples of class 9 substances include asbestos, polychlorinated biphenyls (PCB), and dry ice.

Unlike the DGR, the HMR includes combustible liquids in hazard class 3. The definition of a combustible liquid is specified in 49 CFR 173.120 of the HMR. The HMR has an additional class, ORM-D, that is not specified in the DGR. "ORM-D material" refers to a material such as a consumer commodity, that although otherwise subject to the HMR, presents a limited hazard during transport due to its form, quantity, and packaging. It must be a material for which exceptions are provided in the table of 49 CFR 172.101. The DGR lists consumer commodities as a class 9 material.

In most instances, the hazard of a material sampled is unknown because no laboratory testing has been conducted. A determination as to the suspected hazard of the sample must be made using knowledge of the site, field observations, field tests, and other available information.

According to 40 CFR 261.4(d) and (e), samples transported to a laboratory for testing or treatability studies, including samples of hazardous wastes, are **not** hazardous wastes. FedEx will not accept a shipment of hazardous waste.

2.2 PACKAGING NONHAZARDOUS SAMPLES

Nonhazardous samples, after being appropriately containerized, labeled, and tagged, should be packaged in the following manner. Note that these are general instructions; samplers should be aware of any client-specific requirements concerning the placement of custody seals or other packaging provisions.

1. Place the sample in a resealable plastic bag.
2. Place the bagged sample in a cooler and pack it to prevent breakage.
3. Prevent breakage of bottles during shipment by either wrapping the sample container in bubble wrap, or lining the cooler with a noncombustible material such as vermiculite. Vermiculite is especially recommended because it will absorb any free liquids inside the cooler. It is recommended that the cooler be lined with a large plastic garbage bag before samples, ice, and absorbent packing material are placed in the cooler.
4. Add a sufficient quantity of ice to the cooler to cool samples to 4 °C. Ice should be double bagged in resealable plastic bags to prevent the melted ice from leaking out. As an option, a temperature blank (a sample bottle filled with distilled water) can be included with the cooler.
5. Seal the completed chain-of-custody forms in a plastic bag and tape the plastic bag to the inside of the cooler lid.
6. Tape any instructions for returning the cooler to the inside of the lid.
7. Close the lid of the cooler and tape it shut by wrapping strapping tape around both ends and hinges of the cooler at least once. Tape shut any drain plugs on the cooler.
8. Place two signed custody seals on the cooler, ensuring that each one covers the cooler lid and side of the cooler. Place clear plastic tape over the custody seals.
9. Place address labels on the outside of the cooler.
10. Ship samples overnight by a commercial carrier such as FedEx.

2.3 PACKAGING HAZARDOUS SAMPLES

The procedures for packaging hazardous samples are summarized below. Note that according to the DGR, all spellings must be exactly as they appear in the List of Dangerous Goods, and only approved abbreviations are acceptable. The corresponding HMR regulations are provided in parentheses following any DGR referrals. The HMR must be followed only if shipping hazardous samples by ground transport.

1. Determine the proper shipping name for the material to be shipped. All proper shipping names are listed in column B of the List of Dangerous Goods table in Section 4 of the DGR (or column 2 of the Hazardous Materials Table in 49 CFR 172.101). In most instances, a generic name based on the hazard class of the material is appropriate. For example, a sample of an oily liquid collected from a drum with a high photoionization detector (PID) reading should be packaged as a flammable liquid. The proper shipping name chosen for this sample would be "flammable liquid, n.o.s." The abbreviation "n.o.s." stands for "not otherwise specified" and is used for generic shipping names. Typically, a specific name, such as acetone, should be inserted in parentheses after most n.o.s. descriptions. However, a technical name is not required when shipping a sample for testing purposes and the components are not known. If shipping a hazardous substance (see definition), then the letters "RQ" must appear in front of the proper shipping name.

2. Determine the United Nations (UN) identification number, class or division, subsidiary risk if any, required hazard labels, packing group, and either passenger aircraft or cargo aircraft packing instructions based on the quantity of material being shipped in one package. This information is provided in the List of Dangerous Goods (or Hazardous Materials Table in 49 CFR 172.101) under the appropriate proper shipping name. A "Y" in front of a packing instruction indicates a limited quantity packing instruction. If shipping dry ice or a limited quantity of a material, then UN specification shipping containers do not need to be used.

3. Determine the proper packaging required for shipping the samples. Except for limited quantity shipments and dry ice, these are UN specification packages that have been tested to meet the packing group of the material being shipped. Specific testing requirements of the packages is listed in Section 6 of the DGR (or 49 CFR 178 of the HMR). All UN packages are stamped with the appropriate UN specification marking. Prior planning is required to have the appropriate packages on hand during a sampling event where hazardous samples are anticipated. Most samples can be shipped in either a 4G fiberboard box, a 1A2 steel drum, or a 1H2 plastic drum. Drums can be purchased in 5- and 20-gallon sizes and are ideal for shipping multiple hazardous samples. When FedEx is used to ship samples containing PCBs, the samples must be shipped in an inner metal packaging (paint can) inside a 1A2 outer steel drum. This method of packaging PCB samples is in accordance with FedEx variation FX-06, listed in Section 2 of the DGR.

4. Place each sample jar in a separate resealable plastic bag. Some UN specification packagings contain the sample jar and plastic bag to be used when shipping the sample.

5. Place each sealed bag inside the approved UN specification container (or other appropriate container if a limited quantity or dry ice) and pack with enough noncombustible, absorbent, cushioning material (such as vermiculite) to prevent breakage and to absorp liquid.

6. Place chain-of-custody forms in a resealable plastic bag and either attach it to the inside lid of the container or place it on top inside the container. Place instructions for returning the container to the shipper on the inside lid of the container as appropriate. Close and seal the shipping container in the manner appropriate for the type of container being used.

7. Label and mark each package appropriately. All irrelevant markings and labels need to be removed or obliterated. All outer packagings must be marked with proper shipping name, UN identification number, and name and address of the shipper and the recipient. For carbon dioxide, solid (dry ice), the net weight of the dry ice within the package needs to be marked on the outer package. For limited quantity shipments, the words "limited quantity" or "LTD. QTY." must be marked on the outer package. Affix the appropriate hazard label to the outer package. If the material being shipped contains a subsidiary hazard, then a subsidiary hazard label must also be affixed to the outer package. The subsidiary hazard label is identical to the primary hazard label except that the class or division number is not present. It is acceptable to obliterate the class or division marking on a primary hazard label and use it as the subsidiary hazard label. If using cargo aircraft only packing instructions, then the "Cargo Aircraft Only" label must be used. Package orientation labels (up arrows) must be placed on opposite sides of the outer package. Figure 1 depicts a properly marked and labeled package.

8. If using an overpack (see definition), mark and label the overpack and each outer packaging within the overpack as described in step 7. In addition, the statement "INNER PACKAGES COMPLY WITH PRESCRIBED SPECIFICATIONS" must be marked on the overpack.

9. Attach custody seals, and fill out the appropriate shipping papers as described in Section 2.4.

2.4 SHIPPING PAPERS FOR HAZARDOUS SAMPLES

A "Shippers Declaration for Dangerous Goods" and "Air Waybill" must be completed for each shipment of hazardous samples. FedEx supplies a Dangerous Goods Airbill to its customers; the airbill combines both the declaration and the waybill. An example of a completed Dangerous Goods Airbill is depicted in Figure 2. A shipper's declaration must contain the following:

- Name and address of shipper and recipient
- Air waybill number (not applicable to the HMR)
- Page ___ of ___
- Deletion of either "Passenger and Cargo Aircraft" or "Cargo Aircraft Only," whichever does not apply
- Airport or city of departure
- Airport or city of destination
- Deletion of either "Non-Radioactive" or "Radioactive," which ever does not apply
- The nature and quantity of dangerous goods. This includes the following information in the following order (obtained from the List of Dangerous Goods in the DGR): proper shipping name, class or division number, UN identification number, packing group number, subsidiary risk, quantity in liters or kilograms (kg), type of packaging used, packing instructions, authorizations, and additional handling information. Authorizations include the words "limited quantity" or "LTD. QTY." if shipping a limited quantity, any special provision numbers listed in the List of Dangerous Goods in the DGR, and the variation "USG-14" when a technical name is required after the proper shipping name but not entered because it is unknown.
- Signature for the certification statement
- Name and title of signatory
- Place and date of signing certification
- A 24-hour emergency response telephone number for use in the event of an incident involving the dangerous good
- Emergency response information attached to the shipper's declaration. This information can be in the form of a material safety data sheet or the applicable North American Emergency Response Guidebook (NAERG; DOT 1996) pages. Figure 3 depicts the appropriate NAERG emergency response information for "Flammable liquids, n.o.s." as an example.

Note that dry ice does not require an attached shipper's declaration. However, the air waybill must include the following on it: "Dry ice, 9, UN1845, ____ x ____ kg." The blanks must include the number of packages and the quantity in kg in each package. If using FedEx to ship dry ice, the air waybill includes a box specifically for dry ice. Simply check the appropriate box and enter in the number of packages and quantity in each package.

The HMR requirements for shipping papers are located in 49 CFR 172 Subpart C.

3.0 POTENTIAL PROBLEMS

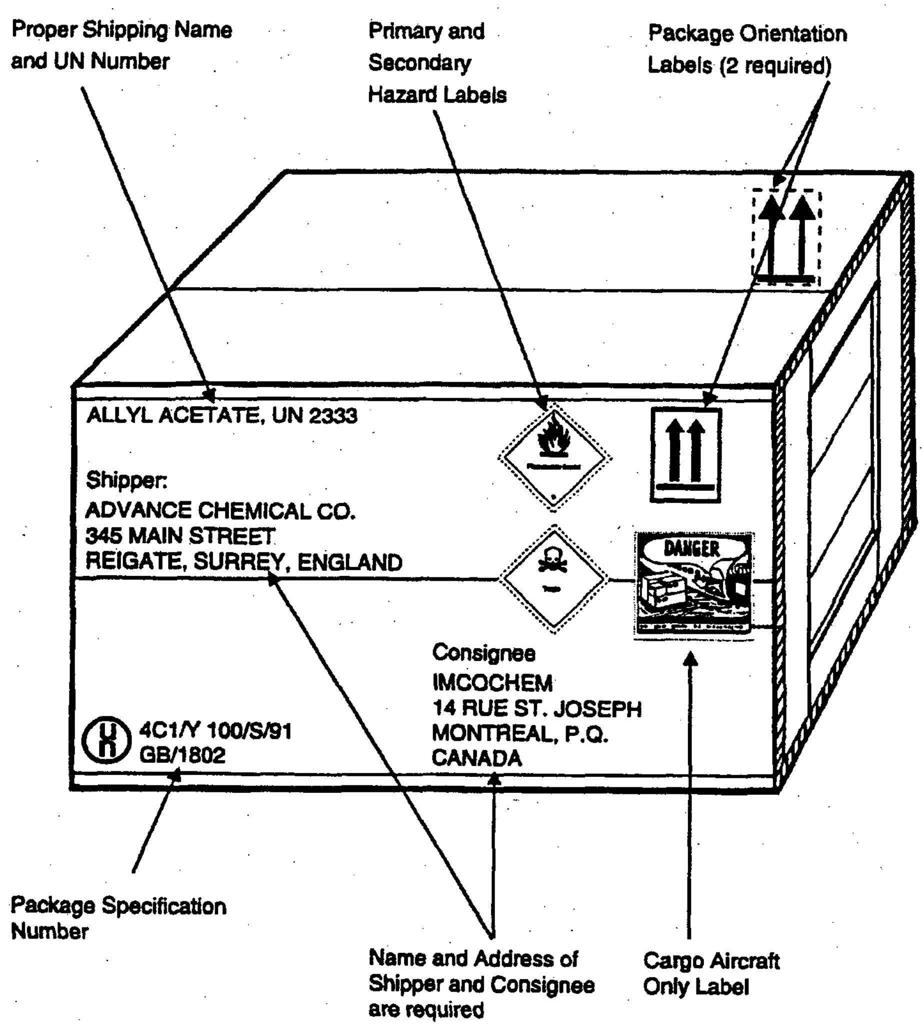
The following potential problems may occur during sample shipment:

- Leaking package. If a package leaks, the carrier may open the package, return the package, and if a dangerous good, inform the Federal Aviation Administration (FAA), which can result in fines.
- Improper labeling and marking of package. If mistakes are made in labeling and marking the package, the carrier will most likely notice the mistakes and return the package to the shipper, thus delaying sample shipment.
- Improper, misspelled, or missing information on the shipper's declaration. The carrier will most likely notice this as well and return the package to the shipper.

Contact FedEx with questions about dangerous goods shipments by calling 1-800-463-3339 and asking for a dangerous goods expert.

FIGURE 1

EXAMPLE OF A CORRECTLY MARKED AND LABELED DANGEROUS GOODS PACKAGE



Source: International Air Transport Association (IATA). 1997.

FIGURE 2

EXAMPLE OF A DANGEROUS GOODS AIRBILL

FedEx *Dangerous Goods Airbill* — Sender's Copy — RETAIN THIS COPY FOR YOUR RECORDS

The World On Time.

11729489

1 From *Please print and press hard.*

Date: FILL IN — Sender's FedEx Account Number: 1788-8014-4

Sender's Name: FILL IN — Phone: (312) 856 6700

Company: TETRA TECH EM INC

Address: 200 E RANDOLPH ST STE 4700 — Dept./Floor/Suite/Room

City: CHICAGO — State: IL — ZIP: 60601

2 Your Internal Billing Reference (First 24 characters will appear on invoice.): FILL IN

3 To

Recipient's Name: ______ Phone: ( )

Company: ______

Address: ______ (To "HOLD" at FedEx location, print FedEx address here. We cannot deliver to P.O. boxes or P.O. ZIP codes.) Dept./Floor/Suite/Room

City: ______ State: ______ ZIP: ______

FILL IN

For HOLD at FedEx Location check here: ☐ Hold Weekday ☐ Hold Saturday (Available for FedEx Priority Overnight and FedEx 2Day to select locations)

For WEEKEND Delivery check here: ☐ Saturday Delivery (Available for FedEx Priority Overnight and FedEx 2Day to select ZIP codes) ☐ Sunday Delivery (Available for FedEx Priority Overnight to select ZIP codes)

4a Express Package Service *Packages up to 150 lbs.* — Delivery commitment may be later in some areas.

☒ FedEx Priority Overnight (Next business morning) ☐ FedEx Standard Overnight (Next business afternoon)

☐ FedEx 2Day (Second business day) ☐ FedEx Express Saver (Third business day)

4b Express Freight Service *Packages over 150 lbs.* — Delivery commitment may be later in some areas.

☐ FedEx 1Day Freight* (Next business day) ☐ FedEx 2Day Freight (Second business day) ☐ FedEx 3Day Freight (Third business day)

* Call for Confirmation: ______

Service Conditions, Declared Value, and Limit of Liability – By using this Airbill, you agree to the service conditions in our current Service Guide or U.S. Government Service Guide. Both are available on request. SEE BACK OF SENDER'S COPY OF THIS AIRBILL FOR INFORMATION AND ADDITIONAL TERMS. See the *FedEx Service Guide* for further details.

Questions? Call 1·800·Go·FedEx® (800-463-3339) or Visit our Web site at www.fedex.com

5 Packaging

☒ Other Packaging

Dangerous Goods cannot be shipped in FedEx packaging.

6 Special Handling

☒ Dangerous Goods as per attached Shipper's Declaration ☐ Cargo Aircraft Only

7 Payment

Bill to: ☒ Sender (Acct. No. in Section 1 will be billed) ☐ Recipient ☐ Third Party ☐ Credit Card ☐ Cash/Check

FedEx Account No. ______

Credit Card No. ______ Exp. Date ______

Total Packages — Total Weight — Total Declared Value* $ .00

Signature Release Unavailable

PART #154827 • Rev. Date 11/98 ©1994-98 FedEx • PRINTED IN U.S.A.

374

FedEx Tracking Number: 813350883058 — Form I.D. No.: 0204

Page 1 of 1 Pages

Two completed and signed copies of this Declaration must be handed to the operator.

WARNING

Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties. This Declaration must not, in any circumstances, be completed and/or signed by a consolidator, a forwarder or an IATA cargo agent.

TRANSPORT DETAILS

This shipment is within the limitations prescribed for: (delete non-applicable) PASSENGER AND CARGO AIRCRAFT ~~CARGO AIRCRAFT ONLY~~

Airport of Departure: Chicago

Airport of Destination: "City sending sample to"

Shipment type: (delete non-applicable) NON-RADIOACTIVE ~~RADIOACTIVE~~

NATURE AND QUANTITY OF DANGEROUS GOODS

Proper Shipping Name	Class or Division	UN or I.D. No.	Packing Group	Subsidiary Risk	Quantity and Type of Packaging	Packing Instr.	Authorization
Flammable liquid, n.o.s.	3	UN 1993	III	—	4 glass jars in a 1A2 steel drum Net Quantity = 4 L	309	A3 USG-14

Additional Handling Information: NAERG # 128 Attached.

Prepared for AIR TRANSPORT according to: (Customer MUST check one) ☐ 49 CFR ☒ ICAO / IATA

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packaged, marked, and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Name/Title of Signatory: Me, Environmental Scientist

Place and Date: 200 E Randolph, Chicago, IL xx/xx/xx

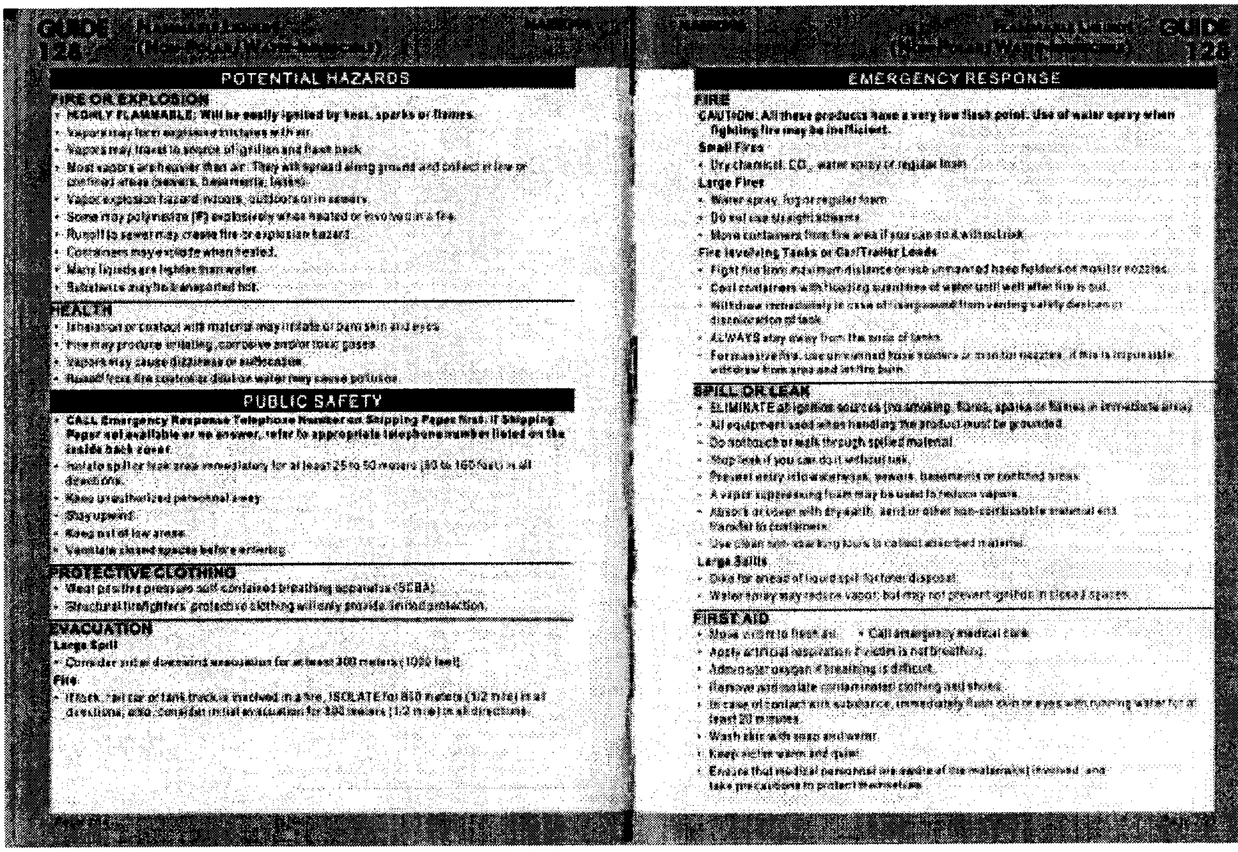
Signature (see warning above): me

Emergency Telephone Number (Required for U.S. Origin or Destination Shipments): FILL IN

IF ACCEPTABLE FOR PASSENGER AIRCRAFT, THIS SHIPMENT CONTAINS RADIOACTIVE MATERIAL INTENDED FOR USE IN, OR INCIDENT TO, RESEARCH, MEDICAL DIAGNOSIS, OR TREATMENT.

FIGURE 3

NAERG EMERGENCY RESPONSE INFORMATION FOR FLAMMABLE LIQUIDS, N.O.S.



GUIDE 128

POTENTIAL HAZARDS

FIRE OR EXPLOSION
- **HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.**
- Vapors may form explosive mixtures with air.
- Vapors may travel to source of ignition and flash back.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Vapor explosion hazard indoors, outdoors or in sewers.
- Some may polymerize (P) explosively when heated or involved in a fire.
- Runoff to sewer may create fire or explosion hazard.
- Containers may explode when heated.
- Many liquids are lighter than water.
- Substance may be transported hot.

HEALTH
- Inhalation or contact with material may irritate or burn skin and eyes.
- Fire may produce irritating, corrosive and/or toxic gases.
- Vapors may cause dizziness or suffocation.
- Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- **CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- Isolate spill or leak area immediately for at least 25 to 50 meters (80 to 160 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING
- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION
Large Spill
- Consider initial downwind evacuation for at least 300 meters (1000 feet).

Fire
- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

GUIDE 128

EMERGENCY RESPONSE

FIRE
CAUTION: All these products have a very low flash point. Use of water spray when fighting fire may be inefficient.

Small Fires
- Dry chemical, CO_2, water spray or regular foam.

Large Fires
- Water spray, fog or regular foam.
- Do not use straight streams.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads
- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- **ALWAYS** stay away from the ends of tanks.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- A vapor suppressing foam may be used to reduce vapors.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- Use clean non-sparking tools to collect absorbed material.

Large Spills
- Dike far ahead of liquid spill for later disposal.
- Water spray may reduce vapor; but may not prevent ignition in closed spaces.

FIRST AID
- Move victim to fresh air. • Call emergency medical care.
- Apply artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Wash skin with soap and water.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

Source: DOT and others. 1996.

APPENDIX C
FIELD FORMS

Tetra Tech EM, Inc.
10670 White Rock Road, #100
Rancho Cordova, CA 95670
916.852.8300
916.853.4550 fax

BORING LOG

BORING NO.: ________

PROJECT NAME: ____________________

PROJECT NUMBER: ____________________

SOIL BORING ☐ MONITORING WELL ☐ ________ ☐

SHEET 1 OF ____

PROJECT LOCATION	START DATE	COMPLETION DATE
	COMPLETED DEPTH (FEET)	GROUNDWATER DEPTH (FEET)

DRILLING CONTRACTOR	DRILLER	WELL CONSTRUCTION
DRILLING EQUIPMENT	BORING DIAMETER	TYPE AND DIAMETER OF WELL CASING
SAMPLING METHOD California Modified ☐ Hand Auger ☐ Geoprobe ☐		SLOT SIZE / FILTER MATERIAL
LOGGED BY	BACKFILL MATERIAL	WELL DEPTH / PERFORATED INTERVAL

TIME	DESCRIPTION	BLOW COUNTS	DEPTH (FEET)	SAMPLE	UCSC SOIL TYPE	LITHOLOGY	WELL	PID/FID READINGS OVA (ppm)	REMARKS
			5						
			10						
			15						
			20						
			25						

E:\forms\BORING LOG_1.dwg

BOREHOLE LOG

Boring ID:	
Monitoring Well ID:	
Project Number:	Project Name:
Client:	
Site:	
Borehole Location (Township, Range, Section):	
Logged By:	
Reviewed By:	Review Date:
Drilling Contractor:	
Drill Rig Type/Method:	
Sampler Type:	
Borehole Diameter (inches):	to: feet bgs
Overdrilled Diameter (inches):	to: feet bgs
Drill Start Date:	Drill Start Time:
Drill Finish Date:	Drill Finish Time:
Total Borehole Depth (feet bgs):	
Soil Boring Backfill Date:	Soil Boring Backfill Time:
Ground Surface Reference Elevation (feet msl):	
Depth to 1st Saturated Zone (feet bgs):	Date: Time:
Depth to Other Water-Bearing Zones (feet bgs):	
Depth to Water After Drilling (feet bgs):	
Well Completion Date:	Well Completion Time:
Screen Interval (feet bgs):	Total Well Depth (feet bgs):
Well Diameter (inches):	Well Casing Material:
Static Water Level After Well Installation (feet bgs):	

BOREHOLE LOCATION MAP

N

NOTES/REMARKS

Tetra Tech EM Inc.

CHAIN OF CUSTODY RECORD
10670 White Rock Road, Suite 100
Rancho Cordova, CA 95670
(916) 852-8300 FAX (916) 852-8307

DATE	CHAIN OF CUSTODY NUMBER № 6144
LABORATORY NUMBER	PAGE ____ OF ____

PROJECT NAME	PROJECT MANAGER
PROJECT NUMBER	TELEPHONE NUMBER
PROJECT LOCATION	DESTINATION LABORATORY
SAMPLER(S)	ADDRESS
SAMPLER SIGNATURE(S)	CITY STATE ZIP
SITE CONTACT/ TELEPHONE NUMBER	LABORATORY TELEPHONE NUMBER

REQUESTED ANALYSES

SAMPLE IDENTIFICATION	DATE	TIME	MATRIX TYPE	NO./TYPE OF CONTAINERS	TURN AROUND TIME											REMARKS (GRAB, COMPOSITE, ETC.)

SHIPPED VIA:

AIRBILL #: ____________

SPECIAL INSTRUCTIONS:

RELINQUISHED BY (SIGNATURE)	PRINT NAME/ COMPANY	DATE	TIME	RECEIVED BY (SIGNATURE)	PRINT NAME/ COMPANY	DATE	TIME
				RECEIVED AT LAB BY (PRINT AND SIGN):			

DISTRIBUTION: WHITE = LABORATORY YELLOW = PROJECT MANAGER PINK = FILE

106?? White Rock Rd. S-100
Rancho Cordova
California 95670
(916) 852-8300
Tetra Tech EM Inc.

EXTENDED CHAIN-OF-CUSTODY #:

(FOR SOIL BORING AND GROUNDWATER SAMPLES)

DATE: Page of

PROJECT NAME	PROJECT #
SAMPLER(S) PRINTED NAME AND SIGNATURE	SAMPLING TEAM #

THIS FORM IS FOR INTERNAL USE ONLY
DO NOT SEND TO LABORATORY
SEND TO PROJECT CHEMIST

LAB I.D.	FIELD I.D.	COLLECTION DATE	SAMPLE TYPE	POINT TYPE	MATRIX	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	SAMPLER'S INITIALS	SAMPLER'S COMPANY

REMARKS:

INSTRUCTIONS: Complete all columns for each row you use. Enter only the codes listed below for columns containing and asterisk (*). Enter the three initials for the field sampler who collected the sample. Draw a vertical arrow down the column if an entry row applies to additional rows in the same column. Consult the project chemist for POINT NAMES prior to beginning field activities.

SAMPLE TYPE
FB = Field Blank
TB = Trip Blank
ER = Equipment Rinsate
DUP = Field Duplicate
Real = Real Sample

POINT TYPE
SO = Soil Sample
GW = Groundwater Sample
CPT = Cone Penetrometer Test
RNS = Ribbon NAPL Sample
SW = Storm Water Sample
QC = QC sample
EXC = Excavation

MATRIX
SOIL
WATER
SEDIMENT
SLUDGE
AIR
SOIL GAS
PRODUCT
TISSUE
PLANTS

COLLECTION METHOD (part of Field ID)
DP = Direct Push
HS = Holloe Stem Auger
SD = Sonic Drilling
HA = Hand Auger
SS = Surface Soil
MW = Monitoring Well
MH = Manhole Grab

APPENDIX D
PROJECT-REQUIRED REPORTING LIMITS

TABLE D-1: COMPARISON OF PROJECT-REQUIRED REPORTING LIMITS AND PRELIMINARY REMEDIATION GOALS, METALS METHOD 6010B, SW-846

Site 07 Supplemental Sampling and Analysis Plan, Alameda Point

Analyte	Residential Soil PRG (mg/kg)	Soil PRRL (mg/kg)	Soil PRRL Below PRG?
Aluminum	76,000	20	Yes
Antimony	31	2.0	Yes
Arsenic	**0.39**	**1.0**	**No**[a]
Barium	5,400	10	Yes
Beryllium	150	0.5	Yes
Cadmium	37	0.5	Yes
Calcium	NA	NA	NA
Chromium	210	1.0	Yes
Cobalt	4,700	1.0	Yes
Copper	2,900	1.0	Yes
Iron	23,000	10	Yes
Lead	400	0.3	Yes
Magnesium	NA	100	NA
Manganese	1,800	1.0	Yes
Mercury	23	0.1	Yes
Molybdenum	390	1.0	Yes
Nickel	1,600	2.0	Yes
Potassium	NA	100	NA
Selenium	390	0.5	Yes
Silver	390	1.0	Yes
Sodium	NA	NA	NA
Thallium	5.2	1.0	Yes
Vanadium	550	1.0	Yes
Zinc	23,000	2.0	Yes
Chromium VI	30	0.05	Yes
Aroclor-1016	3.9	0.016	Yes
Aroclor-1221	0.22	0.016	Yes
Aroclor-1232	0.22	0.016	Yes
Aroclor-1242	0.22	0.016	Yes
Aroclor-1248	0.22	0.016	Yes
Aroclor-1254	0.22	0.016	Yes
Aroclor-1260	0.22	0.016	Yes

Notes:

a	The listed PRRL reflects the maximum sensitivity of current, routinely used analytical methods. The listed PRRL will be used as the project screening criteria, unless reasonable grounds are established for pursuing non-routine methods.-
b	All water samples collected during this project are field or equipment rinsate blanks; therefore, comparisons with regulatory goals, such as PRGs, are not appropriate.

mg/kg	Milligrams per kilogram
EPA	Environmental Protection Agency
NA	Not available
PRG	Preliminary remediation goal (EPA 2000e)
PRRL	Project-required reporting limit

TABLE D-2: COMPARISON OF PROJECT-REQUIRED REPORTING LIMITS (PRRL) AND PRELIMINARY REMEDIATION GOALS, DIOXINS/FURANS, METHOD 8290 SW-846

Site 07 Supplemental Site Investigation, Alameda Point

Analyte	Soil PRRL (µg/kg)	Action Level[a] (µg/kg)	Soil PRRL Below PRG?
Tetrachlorodibenzo-p-dioxin	0.001	0.0039	Yes
Pentachlorodibenzo-p-dioxin	0.005	0.0078	Yes
Hexachlorodibenzo-p-dioxin	0.005	0.039	Yes
Heptachlorodibenzo-p-dioxin	0.005	0.39	Yes
Octachlorodibenzo-p-dioxin	0.01	3.9	Yes
Tetrachlorodibenzofuran	0.001	0.039	Yes
Pentachlorodibenzofuran	0.005	0.0078	Yes
Hexachlorodibenzofuran	0.005	0.039	Yes
Heptachlorodibenzofuran	0.005	0.39	Yes
Octachlorodibenzofuran	0.01	3.9	Yes

Notes:

a The action level is established by using the residential PRG for TCDD and assigning equivalence toxicity factors to other dioxins which are possibly present.

µg/kg micrograms/kilogram
TCDD Tetrachlorodibenzo-p-dioxin

APPENDIX E
APPROVED AECRU LABORATORIES

TABLE E-1: TETRA TECH EM INC.-APPROVED AECRU LABORATORIES UNDER BASIC ORDERING AGREEMENT

Site 07 Supplemental Site Investigation, Alameda Point

Analytica Group	
Lab Address:	12189 Pennsylvania Street
	Thornton, CO 80241
Point of Contact:	Joe Egry / Mary Fealey
Phone:	(800) 873-8707 X103/X135
Fax:	(303) 469-5254
Business Size:	SWO
E-mail	mfealey@analyticagroup.com

Applied Physics and Chemistry Laboratory	
Lab Address:	13760 Magnolia Avenue
	Chino, CA 91710
Point of Contact:	Dan Dischner / Eric Wendland
Phone:	(909) 590-1828 X203/X104
Fax:	(909) 590-1498
Business Size:	SDB
E-mail	marketing@apclab.com

Columbia Analytical Services	
Lab Address:	5090 Caterpillar Road
	Redding, CA 96003
Point of Contact:	Karen Sellers / Howard Boorse
Phone:	(530) 244-5262 / (360) 577-7222
Fax:	(530) 244-4109
Business Size:	LB
E-mail	lkennedy@kelso.caslab.com

Curtis and Tompkins, Ltd	
Lab Address:	2323 Fifth Street
	Berkeley, CA 94710
Point of Contact:	Anna Pajarillo / Mike Pearl
Phone:	(510) 486-0925 X103/ X108
Fax:	(510) 486-0532
Business Size:	SB
E-mail	mikep@ctberk.com

EMAX Laboratories Inc.	
Lab Address:	1835 205th Street
	Torrance, CA 90501
Point of Contact:	Ye Myint / Jim Carter
Phone:	(310) 618-8889 X121/X105
Fax:	(310) 618-0818
Business Size:	SDB/WO
E-mail	ymyint@emaxlabs.com

Laucks Laboratories	
Lab Address:	940 S. Harney Street
	Seattle, WA 98108
Point of Contact:	Mike Owens / Kathy Kreps
Phone:	(206) 767-5060
Fax:	(206) 767-5063
Business Size:	SB
E-mail	KathyK@lauckslabs.com

Sequoia Analytical	
Lab Address:	1455 McDowell Blvd. North, Suite D
	Petaluma, CA 94954
Point of Contact:	Michelle Wiita
Phone:	(707) 792-7517
Fax:	(707) 792-0342
Business Size:	LB
E-mail	

Notes:

DHS California Department of Health Services
LB Large business
SB Small business
SDB Small disabled business
SWO Small woman-owned
WO Woman-owned
AECRU Architect-Engineer CERCLA / RCRA/UST Contract

APPENDIX F
REMEDIAL ACTION CONTRACTORS ANALYTICAL DATA

Table 1: Site 7 Excavations
Estimated Sample Location Coordinates

Well Number	Easting	Northing
Northern Excavation		
37IT-CAA7-N	1482298	472107
37IT-CAA7-N-N	1482302	472123
37IT-CAA7-N-NE	1482306	472117
37IT-CAA7-N-S	1482301	472107
37IT-CAA7-N-SE	1482306	472111
37IT-CAA7-N-W	1482297	472121
Southern Excavation		
37IT-CAA7-S	1482337	472025
37IT-CAA7-S-ENE	1482337	472032
37IT-CAA7-S-ESE	1482336	472023
37IT-CAA7-S-NNE	1482334	472038
37IT-CAA7-S-NNW	1482326	472038
37IT-CAA7-S-SSE	1482333	472018
37IT-CAA7-S-SSW	1482324	472019
37IT-CAA7-S-WNW	1482322	472033
37IT-CAA7-S-WSW	1482321	472024
37IT-CAA7-S-BOT	1482329	472028

Table 2: Site 7 Excavations (;ample Analytical Results

Sample ID		37IT-CAA7-N-A		37IT-CAA7-N-B		37IT-CAA7-N-C		37IT-CAA7-N-D		37IT-CAA7-N-N		37IT-CAA7-N-NE	
Date Collected		10/17/02		10/17/02		10/17/02		10/17/02		10/8/02		10/8/02	
Parameter	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Metals (EPA 6010B/7471A)													
ANTIMONY	MG/KG	2.6	J	3.1	J	0.49	J	1.3	J	61.7		31.5	
ARSENIC	MG/KG	2.8		8.3		12.6		8.6		11.7		6.9	
BARIUM	MG/KG	260		265		79		153		2400		918	
BERYLLIUM	MG/KG	0.058	J	0.15	J	0.3		0.17	J	0.22	J	0.23	U
CADMIUM	MG/KG	7.1		23.9		1		2.5		162		25.9	
CHROMIUM	MG/KG	48.1		103		72.8		127		503		153	
COBALT	MG/KG	9.9		23		27.7		12.9		18.9		11.6	
COPPER	MG/KG	291		425		148		155		3210		1940	
LEAD	MG/KG	283		537		48.6		236		5210		1280	
MERCURY	MG/KG	0.29		0.18	J	0.41		0.5		0.62		0.45	
MOLYBDENUM	MG/KG	0.9		2.2		0.27	U	1.9		19.3		5.1	
NICKEL	MG/KG	57.8		121		121		73.8		344		160	
SELENIUM	MG/KG	0.53	U	0.9	U	0.68	U	0.44	J	0.5	J	1.4	
SILVER	MG/KG	1.3		2.5		0.68	U	0.26	J	20.8		7.5	
THALLIUM	MG/KG	0.53	U	0.9	U	0.68	U	0.61	U	0.67	U	0.58	U
VANADIUM	MG/KG	29.5		49		51.5		48.5		27.6		22.7	
ZINC	MG/KG	407		829		180		268		6910		1570	
Petroleum Hydrocarbons (EPA 8015B)													
GASOLINE RANGE ORGANICS	MG/KG	not analyzed		not analyzed		not analyzed		not analyzed		0.05	J	0.04	J
JP-5	MG/KG	not analyzed		not analyzed		not analyzed		not analyzed		13	U	12	U
MOTOR OIL RANGE ORGANICS	MG/KG	not analyzed		not analyzed		not analyzed		not analyzed		59		30	
DIESEL RANGE ORGANICS	MG/KG	not analyzed		not analyzed		not analyzed		not analyzed		9	J	5	J
Organochlorine Pesticides/PCBs (EPA 8081A/8082)													
4,4'-DDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		2.7	U	not analyzed	
4,4'-DDE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		2.7	U	not analyzed	
4,4'-DDT	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		2.7	U	not analyzed	
ALDRIN	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		1.3	U	not analyzed	
ALPHA-BHC	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		1.3	U	not analyzed	
ALPHA-CHLORDANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		1.3	U	not analyzed	
BETA-BHC	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		1.3	U	not analyzed	
DELTA-BHC	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		1.3	U	not analyzed	
DIELDRIN	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		2.7	U	not analyzed	
ENDOSULFAN I	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		1.3	U	not analyzed	
ENDOSULFAN II	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		2.7	U	not analyzed	
ENDOSULFAN SULFATE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		6.7	U	not analyzed	
ENDRIN	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		2.7	U	not analyzed	
ENDRIN ALDEHYDE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		2.7	U	not analyzed	
ENDRIN KETONE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		2.7	U	not analyzed	
GAMMA-BHC (LINDANE)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		1.3	U	not analyzed	
GAMMA-CHLORDANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		1.3	U	not analyzed	
HEPTACHLOR	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		1.3	U	not analyzed	
HEPTACHLOR EPOXIDE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		1.3	U	not analyzed	
METHOXYCHLOR	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		13	U	not analyzed	
TOXAPHENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		130	U	not analyzed	
AROCLOR-1016	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		67	U	not analyzed	
AROCLOR-1221	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		130	U	not analyzed	

APPENDIX F – REMEDIAL ACTION CONTRACTORS ANALYTICAL DATA

TABLE 2: SITE 7 EXCAVATIONS – SOIL SAMPLE ANALYTICAL RESULTS

PAGE 2 OF 18

FINAL SAMPLING AND ANALYSIS PLAN (FIELD SAMPLING PLAN/QUALITY ASSURANCE PROJECT PLAN), SITE 07 SUPPLEMENTAL SAMPLING AND ANALYSIS PLAN

EXTENSIVE RESEARCH WAS PERFORMED BY SOUTHWEST DIVISION TO LOCATE THIS PAGE. THIS PAGE HAS BEEN INSERTED AS A PLACEHOLDER AND WILL BE REPLACED SHOULD THE MISSING ITEM BE LOCATED.

QUESTIONS MAY BE DIRECTED TO:

DIANE C. SILVA
RECORDS MANAGEMENT SPECIALIST
NAVAL FACILITIES ENGINEERING COMMAND SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 532-3676

Table 2: Site 7 Excavations - Soil Sample Analytical Results

Sample ID		37IT-CAA7-N-A		37IT-CAA7-N-B		37IT-CAA7-N-C		37IT-CAA7-N-D		37IT-CAA7-N-N		37IT-CAA7-N-NE	
Date Collected		10/17/02		10/17/02		10/17/02		10/17/02		10/8/02		10/8/02	
Parameter	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
AROCLOR-1232	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		67	U	not analyzed	
AROCLOR-1242	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		67	U	not analyzed	
AROCLOR-1248	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		67	U	not analyzed	
AROCLOR-1254	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		33	U	not analyzed	
AROCLOR-1260	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		33	U	not analyzed	
Volatile Organic Compounds (EPA 8260B)													
1,1,1,2-TETRACHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,1,1-TRICHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,1,2,2-TETRACHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,1,2-TRICHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,1-DICHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,1-DICHLOROETHENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,1-DICHLOROPROPENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3-TRICHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3-TRICHLOROPROPANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,4-TRICHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,4-TRIMETHYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2-DIBROMO-3-CHLOROPROPAN	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2-DIBROMOETHANE (EDB)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2-DICHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2-DICHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2-DICHLOROPROPANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,3,5-TRIMETHYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,3-DICHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,3-DICHLOROPROPANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,4-DICHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
2,2-DICHLOROPROPANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
2-CHLOROTOLUENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
4-CHLOROTOLUENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
BENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
BROMOBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
BROMOCHLOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
BROMODICHLOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
BROMOFORM	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
BROMOMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
CARBON TETRACHLORIDE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
CHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
CHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
CHLOROFORM	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
CHLOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
CIS-1,2-DICHLOROETHENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
CIS-1,3-DICHLOROPROPENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
DIBROMOCHLOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
DIBROMOMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
DICHLORODIFLUOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
DIISOPROPYL ETHER (DIPE)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
ETHYL-T-BUTYL ETHER (ETBE)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	

Table 2: Site 7 Excavations -Soil Sample Analytical Results

Sample ID		37IT-CAA7-N-A		37IT-CAA7-N-B		37IT-CAA7-N-C		37IT-CAA7-N-D		37IT-CAA7-N-N		37IT-CAA7-N-NE	
Date Collected		10/17/02		10/17/02		10/17/02		10/17/02		10/8/02		10/8/02	
Parameter	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
ETHYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
HEXACHLOROBUTADIENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
ISOPROPYLBENZENE (CUMENE)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
METHYL-T-BYTYL ETHER (MTBE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
METHYLENE CHLORIDE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
N-BUTYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
N-PROPYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
NAPHTHALENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
P-ISOPROPYLTOLUENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
SEC-BUTYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
STYRENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
T-AMYL METHYL ETHER (TAME)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
T-BUTYL ALCOHOL (TBA)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
TERT-BUTYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
TETRACHLOROETHENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
TOLUENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
TRANS-1,2-DICHLOROETHENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
TRANS-1,3-DICHLOROPROPENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
TRICHLOROETHENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
TRICHLOROFLUOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
VINYL CHLORIDE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
XYLENE (TOTAL)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
Dioxins/Furans (EPA 8280)													
1,2,3,4,6,7,8,9-OCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,4,6,7,8,9-OCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,4,6,7,8-HpCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,4,6,7,8-HpCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,4,7,8,9-HpCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,4,7,8-HxCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,4,7,8-HxCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,6,7,8-HxCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,6,7,8-HxCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,7,8,9-HxCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,7,8,9-HxCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,7,8-PeCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,7,8-PeCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
2,3,4,6,7,8-HxCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
2,3,4,7,8-PeCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
2,3,7,8-TCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
2,3,7,8-TCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
Total HpCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
Total HpCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
Total HxCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
Total HxCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
Total PeCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
Total PeCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
Total TCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	

Table 2: Site 7 Excavations -Soil Sample Analytical Results

Sample ID		37IT-CAA7-N-A		37IT-CAA7-N-B		37IT-CAA7-N-C		37IT-CAA7-N-D		37IT-CAA7-N-N		37IT-CAA7-N-NE	
Date Collected		10/17/02		10/17/02		10/17/02		10/17/02		10/8/02		10/8/02	
Parameter	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Total TCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
General Chemistry													
CORROSIVITY (PH)	PH UNIT	not analyzed		not analyzed		not analyzed		not analyzed		8.86		not analyzed	
IGNITABILITY (FLASHPOINT)	DEG C	not analyzed		not analyzed		not analyzed		not analyzed		>100		not analyzed	
REACTIVITY: CYANIDE	MG/KG	not analyzed		not analyzed		not analyzed		not analyzed		250	U	not analyzed	
REACTIVITY: SULFIDE	MG/KG	not analyzed		not analyzed		not analyzed		not analyzed		500	U	not analyzed	

U qualifier indicates that the analyte was not detected at the specified detection limit

J qualifier indicates that the associated numerical value is an estimate.

Table 2: Site 7 Excavations -Soil Sample Analytical Results

Sample ID		37IT-CAA7-N-S		37IT-CAA7-N-SE		37IT-CAA7-N-W		37IT-CAA7-S-A		37IT-CAA7-S-B		37IT-CAA7-S-C		37IT-CAA7-S-D			
Date Collected		10/8/02		10/8/02		10/8/02		10/17/02		10/17/02		10/17/02		10/17/02		10/10/02	
Parameter	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Metals (EPA 6010B/7471A)																	
ANTIMONY	MG/KG	35.6		3	J	7.9		5.2	U	21.5		7	U	7.6	U	1.2	J
ARSENIC	MG/KG	15.7		3.2		5.2		3.2		9		7.6		7.6		10.3	
BARIUM	MG/KG	333		121		214		220		2460		120		111		148	
BERYLLIUM	MG/KG	0.24	U	0.23	U	0.21	U	0.29		0.27	U	0.34		0.29	J	0.098	J
CADMIUM	MG/KG	13.3		4.7		6.8		0.23		33.2		0.2	J	0.11	J	0.36	
CHROMIUM	MG/KG	83.9		59.9		51.2		15.5		179		97.8		95.8		84.8	
COBALT	MG/KG	12.1		8.9		8.8		9.3		11.2		15.1		14.3		15.6	
COPPER	MG/KG	7990		127		350		26.4		3840		68.7		51.6		84.2	
LEAD	MG/KG	1240		259		461		18.5		1840		39.4		40.1		70.9	
MERCURY	MG/KG	0.072	J	0.064	J	0.14	J	0.41		4.2		1.1		0.76		0.55	
MOLYBDENUM	MG/KG	11		1.2		0.83		0.21	U	27.3		0.15	J	0.3	U	0.3	U
NICKEL	MG/KG	131		52.3		66.1		23		151		91.4		90.2		95.9	
SELENIUM	MG/KG	0.61	U	0.4	J	0.73		0.82		0.67	U	0.25	J	0.76	U	0.74	U
SILVER	MG/KG	2.6		0.93		1.3		0.52	U	12.9		0.7	U	0.76	U	0.21	J
THALLIUM	MG/KG	29.2		0.57	U	0.52	U	0.52	U	0.67	U	0.7	U	0.76	U	0.74	U
VANADIUM	MG/KG	3		29.6		24.5		28.9		18.4		64		65.1		62	
ZINC	MG/KG	881		245		422		63.2		5460		128		99.7		174	
Petroleum Hydrocarbons (EPA 8015B)																	
GASOLINE RANGE ORGANICS	MG/KG	0.04	J	0.03	J	0.04	J	not analyzed		not analyzed		not analyzed		not analyzed		0.03	J
JP-5	MG/KG	61	U	11	U	210	U	not analyzed		not analyzed		not analyzed		not analyzed			
MOTOR OIL RANGE ORGANICS	MG/KG	160		37		390		not analyzed		not analyzed		not analyzed		not analyzed		31	
DIESEL RANGE ORGANICS	MG/KG	28	J	6	J	48	J	not analyzed		not analyzed		not analyzed		not analyzed		35	
Organochlorine Pesticides/PCBs (EPA 8081A/8(																	
4,4'-DDD	UG/KG	2.4	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		0.3	J
4,4'-DDE	UG/KG	2.4	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U
4,4'-DDT	UG/KG	2.4	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		0.5	J
ALDRIN	UG/KG	1.2	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		1.5	U
ALPHA-BHC	UG/KG	1.2	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		1.5	U
ALPHA-CHLORDANE	UG/KG	1.2	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		1.5	U
BETA-BHC	UG/KG	1.2	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		1.5	U
DELTA-BHC	UG/KG	1.2	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		1.5	U
DIELDRIN	UG/KG	2.4	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U
ENDOSULFAN I	UG/KG	1.2	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		1.5	U
ENDOSULFAN II	UG/KG	2.4	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U
ENDOSULFAN SULFATE	UG/KG	6.1	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		7.4	U
ENDRIN	UG/KG	2.4	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U
ENDRIN ALDEHYDE	UG/KG	2.4	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U
ENDRIN KETONE	UG/KG	2.4	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U
GAMMA-BHC (LINDANE)	UG/KG	1.2	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		1.5	U
GAMMA-CHLORDANE	UG/KG	1.2	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		1.5	U
HEPTACHLOR	UG/KG	1.2	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		1.5	U
HEPTACHLOR EPOXIDE	UG/KG	1.2	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		1.5	U
METHOXYCHLOR	UG/KG	12	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		15	U
TOXAPHENE	UG/KG	120	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		150	U
AROCLOR-1016	UG/KG	61	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		74	U
AROCLOR-1221	UG/KG	120	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		150	U

Table 2: Site 7 Excavations - Soil Sample Analytical Results

Sample ID		37IT-CAA7-N-S		37IT-CAA7-N-SE		37IT-CAA7-N-W		37IT-CAA7-S-A		37IT-CAA7-S-B		37IT-CAA7-S-C		37IT-CAA7-S-D			
Date Collected		10/8/02		10/8/02		10/8/02		10/17/02		10/17/02		10/17/02		10/17/02		10/10/02	
Parameter	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
AROCLOR-1232	UG/KG	61	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		74	U
AROCLOR-1242	UG/KG	61	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		74	U
AROCLOR-1248	UG/KG	61	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		74	U
AROCLOR-1254	UG/KG	31	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		37	U
AROCLOR-1260	UG/KG	7	J	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		37	U
Volatile Organic Compounds (EPA 8260B)																	
1,1,1,2-TETRACHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,1,1-TRICHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,1,2,2-TETRACHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,1,2-TRICHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,1-DICHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,1-DICHLOROETHENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,1-DICHLOROPROPENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,2,3-TRICHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,2,3-TRICHLOROPROPANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,2,4-TRICHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,2,4-TRIMETHYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,2-DIBROMO-3-CHLOROPROPAN	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,2-DIBROMOETHANE (EDB)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,2-DICHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,2-DICHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,2-DICHLOROPROPANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,3,5-TRIMETHYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,3-DICHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,3-DICHLOROPROPANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
1,4-DICHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
2,2-DICHLOROPROPANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
2-CHLOROTOLUENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
4-CHLOROTOLUENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
BENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
BROMOBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
BROMOCHLOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
BROMODICHLOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
BROMOFORM	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
BROMOMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
CARBON TETRACHLORIDE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
CHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
CHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
CHLOROFORM	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
CHLOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
CIS-1,2-DICHLOROETHENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
CIS-1,3-DICHLOROPROPENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
DIBROMOCHLOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
DIBROMOMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
DICHLORODIFLUOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
DIISOPROPYL ETHER (DIPE)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
ETHYL-T-BUTYL ETHER (ETBE)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U

Table 2: Site 7 Excavations -Soil Sample Analytical Results

Sample ID		37IT-CAA7-N-S		37IT-CAA7-N-SE		37IT-CAA7-N-W		37IT-CAA7-S-A		37IT-CAA7-S-B		37IT-CAA7-S-C		37IT-CAA7-S-D			
Date Collected		10/8/02		10/8/02		10/8/02		10/17/02		10/17/02		10/17/02		10/17/02		10/10/02	
Parameter	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
ETHYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
HEXACHLOROBUTADIENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
ISOPROPYLBENZENE (CUMENE)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
METHYL-T-BYTYL ETHER (MTBE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
METHYLENE CHLORIDE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		9	
N-BUTYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
N-PROPYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
NAPHTHALENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
P-ISOPROPYLTOLUENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
SEC-BUTYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
STYRENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
T-AMYL METHYL ETHER (TAME)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
T-BUTYL ALCOHOL (TBA)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		33	U
TERT-BUTYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
TETRACHLOROETHENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
TOLUENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
TRANS-1,2-DICHLOROETHENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
TRANS-1,3-DICHLOROPROPENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
TRICHLOROETHENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
TRICHLOROFLUOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
VINYL CHLORIDE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		8.3	U
XYLENE (TOTAL)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		25	U
Dioxins/Furans (EPA 8280)																	
1,2,3,4,6,7,8,9-OCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,4,6,7,8,9-OCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,4,6,7,8-HpCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,4,6,7,8-HpCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,4,7,8,9-HpCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,4,7,8-HxCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,4,7,8-HxCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,6,7,8-HxCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,6,7,8-HxCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,7,8,9-HxCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,7,8,9-HxCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,7,8-PeCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3,7,8-PeCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
2,3,4,6,7,8-HxCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
2,3,4,7,8-PeCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
2,3,7,8-TCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
2,3,7,8-TCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
Total HpCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
Total HpCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
Total HxCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
Total HxCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
Total PeCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
Total PeCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
Total TCDD	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	

Table 2: Site 7 Excavations -Soil Sample Analytical Results

Sample ID		37IT-CAA7-N-S		37IT-CAA7-N-SE		37IT-CAA7-N-W		37IT-CAA7-S-A		37IT-CAA7-S-B		37IT-CAA7-S-C		37IT-CAA7-S-D			
Date Collected		10/8/02		10/8/02		10/8/02		10/17/02		10/17/02		10/17/02		10/17/02		10/10/02	
Parameter	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Total TCDF	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
General Chemistry																	
CORROSIVITY (PH)	PH UNIT	8.49		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
IGNITABILITY (FLASHPOINT)	DEG C	>100		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
REACTIVITY: CYANIDE	MG/KG	250	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
REACTIVITY: SULFIDE	MG/KG	500	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	

U qualifier indicates that the analyte was not detected at

J qualifier indicates that the associated numerical value

Table 2: Site 7 Excavations -Soil Sample Analytical Results

Sample ID		37IT-CAA7-S-ENE		37IT-CAA7-S-ESE		37IT-CAA7-S-NNE		37IT-CAA7-S-NNW		37IT-CAA7-S-SSE		37IT-CAA7-S-SSW		37IT-CAA7-S-WNW		37IT-CAA7-S-WSW	
Date Collected		10/8/02		10/8/02		10/8/02		10/8/02		10/8/02		10/8/02		10/8/02		10/8/02	
Parameter	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Metals (EPA 6010B/7471A)																	
ANTIMONY	MG/KG	12.9		55.3		104		52.1		4.1	J	60.5		12.8		199	
ARSENIC	MG/KG	4.8		12.7		13.5		10.2		2.8		19.1		5.9		20.1	
BARIUM	MG/KG	356		2650		2660		1390		393		2660		746		4340	
BERYLLIUM	MG/KG	0.24	U	0.035	J	0.26	U	0.26	U	0.019	J	0.084	J	0.24	U	0.11	J
CADMIUM	MG/KG	7.8		41.5		78.1		39.4		8.8		63.6		14.3		66.2	
CHROMIUM	MG/KG	59.9		650		228		182		48.9		326		80		595	
COBALT	MG/KG	9.2		17.1		20.4		16.5		8.6		35.4		12.2		19.2	
COPPER	MG/KG	499		8920		23000		4540		192		5050		1320		36400	
LEAD	MG/KG	2730		3820		8000		2490		180		4960		1050		9250	
MERCURY	MG/KG	0.67		1.4		15.2		0.32		0.27		0.34		0.5		2.9	
MOLYBDENUM	MG/KG	3.2		16.5		25.1		13.9		0.81		36		3.3		27.9	
NICKEL	MG/KG	58		299		276		241		54.8		347		123		512	
SELENIUM	MG/KG	0.22	J	0.66	U	1.8		0.65	U	0.15	J	1.2		0.51	J	0.65	U
SILVER	MG/KG	4.9		20		30.2		21.5		8.5		80.6		2.9		22	
THALLIUM	MG/KG	0.59	U	1.4		1.6		10.5		0.59	U	1.9		0.6	U	12.7	
VANADIUM	MG/KG	26.7		26.9		30.3		22.9		26.5		24.1		26.9		13.6	
ZINC	MG/KG	425		8030		8260		3250		591		7810		1580		13200	
Petroleum Hydrocarbons (EPA 8015B)																	
GASOLINE RANGE ORGANICS	MG/KG	0.05	J	0.05	J	0.03	J	0.04	J	0.03	J	0.03	J	0.02	J	0.03	J
JP-5	MG/KG	12	U	130	U	13	U	13	U	12	U	260	U	12	U	13	U
MOTOR OIL RANGE ORGANICS	MG/KG	40		270		62		83		57		1400		36		25	
DIESEL RANGE ORGANICS	MG/KG	11	J	55	J	13		13		19		210	J	9	J	8	J
Organochlorine Pesticides/PCBs (EPA 8081A/8(																	
4,4'-DDD	UG/KG	not analyzed		not analyzed		not analyzed		2.6	U	not analyzed		not analyzed		not analyzed		2.6	U
4,4'-DDE	UG/KG	not analyzed		not analyzed		not analyzed		2.6	U	not analyzed		not analyzed		not analyzed		2.6	U
4,4'-DDT	UG/KG	not analyzed		not analyzed		not analyzed		2.6	U	not analyzed		not analyzed		not analyzed		2.6	U
ALDRIN	UG/KG	not analyzed		not analyzed		not analyzed		1.3	U	not analyzed		not analyzed		not analyzed		1.3	U
ALPHA-BHC	UG/KG	not analyzed		not analyzed		not analyzed		1.3	U	not analyzed		not analyzed		not analyzed		1.3	U
ALPHA-CHLORDANE	UG/KG	not analyzed		not analyzed		not analyzed		1.3	U	not analyzed		not analyzed		not analyzed		1.3	U
BETA-BHC	UG/KG	not analyzed		not analyzed		not analyzed		1.3	U	not analyzed		not analyzed		not analyzed		1.3	U
DELTA-BHC	UG/KG	not analyzed		not analyzed		not analyzed		1.3	U	not analyzed		not analyzed		not analyzed		1.3	U
DIELDRIN	UG/KG	not analyzed		not analyzed		not analyzed		2.6	U	not analyzed		not analyzed		not analyzed		2.6	U
ENDOSULFAN I	UG/KG	not analyzed		not analyzed		not analyzed		1.3	U	not analyzed		not analyzed		not analyzed		1.3	U
ENDOSULFAN II	UG/KG	not analyzed		not analyzed		not analyzed		2.6	U	not analyzed		not analyzed		not analyzed		2.6	U
ENDOSULFAN SULFATE	UG/KG	not analyzed		not analyzed		not analyzed		6.5	U	not analyzed		not analyzed		not analyzed		6.5	U
ENDRIN	UG/KG	not analyzed		not analyzed		not analyzed		2.6	U	not analyzed		not analyzed		not analyzed		2.6	U
ENDRIN ALDEHYDE	UG/KG	not analyzed		not analyzed		not analyzed		2.6	U	not analyzed		not analyzed		not analyzed		2.6	U
ENDRIN KETONE	UG/KG	not analyzed		not analyzed		not analyzed		2.6	U	not analyzed		not analyzed		not analyzed		2.6	U
GAMMA-BHC (LINDANE)	UG/KG	not analyzed		not analyzed		not analyzed		1.3	U	not analyzed		not analyzed		not analyzed		1.3	U
GAMMA-CHLORDANE	UG/KG	not analyzed		not analyzed		not analyzed		1.3	U	not analyzed		not analyzed		not analyzed		1.3	U
HEPTACHLOR	UG/KG	not analyzed		not analyzed		not analyzed		1.3	U	not analyzed		not analyzed		not analyzed		1.3	U
HEPTACHLOR EPOXIDE	UG/KG	not analyzed		not analyzed		not analyzed		1.3	U	not analyzed		not analyzed		not analyzed		1.3	U
METHOXYCHLOR	UG/KG	not analyzed		not analyzed		not analyzed		13	U	not analyzed		not analyzed		not analyzed		13	U
TOXAPHENE	UG/KG	not analyzed		not analyzed		not analyzed		130	U	not analyzed		not analyzed		not analyzed		130	U
AROCLOR-1016	UG/KG	not analyzed		not analyzed		not analyzed		65	U	not analyzed		not analyzed		not analyzed		65	U
AROCLOR-1221	UG/KG	not analyzed		not analyzed		not analyzed		130	U	not analyzed		not analyzed		not analyzed		130	U

Table 2: Site 7 Excavations -Soil Sample Analytical Results

Sample ID		37IT-CAA7-S-ENE		37IT-CAA7-S-ESE		37IT-CAA7-S-NNE		37IT-CAA7-S-NNW		37IT-CAA7-S-SSE		37IT-CAA7-S-SSW		37IT-CAA7-S-WNW		37IT-CAA7-S-WSW	
Date Collected		10/8/02		10/8/02		10/8/02		10/8/02		10/8/02		10/8/02		10/8/02		10/8/02	
Parameter	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
AROCLOR-1232	UG/KG	not analyzed		not analyzed		not analyzed		65	U	not analyzed		not analyzed		not analyzed		65	U
AROCLOR-1242	UG/KG	not analyzed		not analyzed		not analyzed		65	U	not analyzed		not analyzed		not analyzed		65	U
AROCLOR-1248	UG/KG	not analyzed		not analyzed		not analyzed		65	U	not analyzed		not analyzed		not analyzed		65	U
AROCLOR-1254	UG/KG	not analyzed		not analyzed		not analyzed		32	U	not analyzed		not analyzed		not analyzed		33	U
AROCLOR-1260	UG/KG	not analyzed		not analyzed		not analyzed		10	J	not analyzed		not analyzed		not analyzed		3	J
Volatile Organic Compounds (EPA 8260B)																	
1,1,1,2-TETRACHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,1,1-TRICHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,1,2,2-TETRACHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,1,2-TRICHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,1-DICHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,1-DICHLOROETHENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,1-DICHLOROPROPENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3-TRICHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,3-TRICHLOROPROPANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,4-TRICHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2,4-TRIMETHYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2-DIBROMO-3-CHLOROPROPAN	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2-DIBROMOETHANE (EDB)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2-DICHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2-DICHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,2-DICHLOROPROPANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,3,5-TRIMETHYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,3-DICHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,3-DICHLOROPROPANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
1,4-DICHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
2,2-DICHLOROPROPANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
2-CHLOROTOLUENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
4-CHLOROTOLUENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
BENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
BROMOBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
BROMOCHLOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
BROMODICHLOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
BROMOFORM	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
BROMOMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
CARBON TETRACHLORIDE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
CHLOROBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
CHLOROETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
CHLOROFORM	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
CHLOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
CIS-1,2-DICHLOROETHENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
CIS-1,3-DICHLOROPROPENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
DIBROMOCHLOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
DIBROMOMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
DICHLORODIFLUOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
DIISOPROPYL ETHER (DIPE)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
ETHYL-T-BUTYL ETHER (ETBE)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	

Table 2: Site 7 Excavations -Soil Sample Analytical Results

Sample ID		37IT-CAA7-S-ENE		37IT-CAA7-S-ESE		37IT-CAA7-S-NNE		37IT-CAA7-S-NNW		37IT-CAA7-S-SSE		37IT-CAA7-S-SSW		37IT-CAA7-S-WNW		37IT-CAA7-S-WSW	
Date Collected		10/8/02		10/8/02		10/8/02		10/8/02		10/8/02		10/8/02		10/8/02		10/8/02	
Parameter	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
ETHYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
HEXACHLOROBUTADIENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
ISOPROPYLBENZENE (CUMENE)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
METHYL-T-BYTYL ETHER (MTBE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
METHYLENE CHLORIDE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
N-BUTYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
N-PROPYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
NAPHTHALENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
P-ISOPROPYLTOLUENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
SEC-BUTYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
STYRENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
T-AMYL METHYL ETHER (TAME)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
T-BUTYL ALCOHOL (TBA)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
TERT-BUTYLBENZENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
TETRACHLOROETHENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
TOLUENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
TRANS-1,2-DICHLOROETHENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
TRANS-1,3-DICHLOROPROPENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
TRICHLOROETHENE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
TRICHLOROFLUOROMETHANE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
VINYL CHLORIDE	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
XYLENE (TOTAL)	UG/KG	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed	
Dioxins/Furans (EPA 8280)																	
1,2,3,4,6,7,8,9-OCDD	UG/KG	5.8	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		6	U	not analyzed	
1,2,3,4,6,7,8,9-OCDF	UG/KG	5.8	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		6	U	not analyzed	
1,2,3,4,6,7,8-HpCDD	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
1,2,3,4,6,7,8-HpCDF	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
1,2,3,4,7,8,9-HpCDF	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
1,2,3,4,7,8-HxCDD	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
1,2,3,4,7,8-HxCDF	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
1,2,3,6,7,8-HxCDD	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
1,2,3,6,7,8-HxCDF	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
1,2,3,7,8,9-HxCDD	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
1,2,3,7,8,9-HxCDF	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
1,2,3,7,8-PeCDD	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
1,2,3,7,8-PeCDF	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
2,3,4,6,7,8-HxCDF	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
2,3,4,7,8-PeCDF	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
2,3,7,8-TCDD	UG/KG	12	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		1.2	U	not analyzed	
2,3,7,8-TCDF	UG/KG	1.2	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		1.2	U	not analyzed	
Total HpCDD	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
Total HpCDF	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
Total HxCDD	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
Total HxCDF	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
Total PeCDD	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
Total PeCDF	UG/KG	2.9	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		3	U	not analyzed	
Total TCDD	UG/KG	2.2		not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		2.3		not analyzed	

Table 2: Site 7 Excavations - Soil Sample Analytical Results

Sample ID		37IT-CAA7-S-ENE		37IT-CAA7-S-ESE		37IT-CAA7-S-NNE		37IT-CAA7-S-NNW		37IT-CAA7-S-SSE		37IT-CAA7-S-SSW		37IT-CAA7-S-WNW		37IT-CAA7-S-WSW	
Date Collected		10/8/02		10/8/02		10/8/02		10/8/02		10/8/02		10/8/02		10/8/02		10/8/02	
Parameter	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Total TCDF	UG/KG	1.2	U	not analyzed		not analyzed		not analyzed		not analyzed		not analyzed		1.2	U	not analyzed	
General Chemistry																	
CORROSIVITY (PH)	PH UNIT	not analyzed		not analyzed		not analyzed		8.03		not analyzed		not analyzed		not analyzed		8.38	
IGNITABILITY (FLASHPOINT)	DEG C	not analyzed		not analyzed		not analyzed		>100		not analyzed		not analyzed		not analyzed		>100	
REACTIVITY: CYANIDE	MG/KG	not analyzed		not analyzed		not analyzed		250	U	not analyzed		not analyzed		not analyzed		250	U
REACTIVITY: SULFIDE	MG/KG	not analyzed		not analyzed		not analyzed		500	U	not analyzed		not analyzed		not analyzed		500	U

U qualifier indicates that the analyte was not detected at

J qualifier indicates that the associated numerical value

Table 3: Site 7 Excavations
Unknown Blue Crystalline Solid Analytical Results

Sample ID		37IT-CAA7-UNK	
Date Collected		10/7/02	
Parameter	Units	Result	Qual
General Chemistry			
PERCENT MOISTURE	Percent	45.3	
PH	Percent	7.24	
Metals (EPA 6010B/7000)			
ANTIMONY	MG/KG	86.6	
ARSENIC	MG/KG	20.6	
BARIUM	MG/KG	1220	
BERYLLIUM	MG/KG	0.37	U
CADMIUM	MG/KG	16.1	
CHROMIUM	MG/KG	140	
COBALT	MG/KG	7.4	
COPPER	MG/KG	18800	
LEAD	MG/KG	2550	
MERCURY	MG/KG	0.21	J
MOLYBDENUM	MG/KG	14.9	
NICKEL	MG/KG	92.8	
SELENIUM	MG/KG	14.5	
SILVER	MG/KG	38.2	
THALLIUM	MG/KG	39.7	
VANADIUM	MG/KG	12.6	
ZINC	MG/KG	12400	

U qualifier indicates that the analyte was not detected at the specified detection limit.
J qualifier indicates that the associated numerical value is an estimate.

Table 4: Site 7 Excavations
Waste Soil Analytical Results

Sample ID		37IT-CAA7-FPE-IDW	
Date Collected		10/18/02	
Parameter	Units	Result	Qual
Petroleum Hydrocarbons (EPA 8015B)			
DIESEL RANGE ORGANICS	MG/KG	23	
GASOLINE RANGE ORGANICS	MG/KG	0.57	U
MOTOR OIL RANGE ORGANICS	MG/KG	83	
Volatile Organic Compounds (EPA 8260B)			
1,1,1,2-TETRACHLOROETHANE	UG/KG	5.7	U
1,1,1-TRICHLOROETHANE	UG/KG	5.7	U
1,1,2,2-TETRACHLOROETHANE	UG/KG	5.7	U
1,1,2-TRICHLOROETHANE	UG/KG	5.7	U
1,1-DICHLOROETHANE	UG/KG	5.7	U
1,1-DICHLOROETHENE	UG/KG	5.7	U
1,1-DICHLOROPROPENE	UG/KG	5.7	U
1,2,3-TRICHLOROBENZENE	UG/KG	5.7	U
1,2,3-TRICHLOROPROPANE	UG/KG	5.7	U
1,2,4-TRICHLOROBENZENE	UG/KG	5.7	U
1,2,4-TRIMETHYLBENZENE	UG/KG	5.7	U
1,2-DIBROMO-3-CHLOROPROPANE	UG/KG	5.7	U
1,2-DIBROMOETHANE (EDB)	UG/KG	5.7	U
1,2-DICHLOROBENZENE	UG/KG	5.7	U
1,2-DICHLOROETHANE	UG/KG	5.7	U
1,2-DICHLOROPROPANE	UG/KG	5.7	U
1,3,5-TRIMETHYLBENZENE	UG/KG	5.7	U
1,3-DICHLOROBENZENE	UG/KG	5.7	U
1,3-DICHLOROPROPANE	UG/KG	5.7	U
1,4-DICHLOROBENZENE	UG/KG	5.7	U
2,2-DICHLOROPROPANE	UG/KG	5.7	U
2-CHLOROTOLUENE	UG/KG	5.7	U
4-CHLOROTOLUENE	UG/KG	5.7	U
BENZENE	UG/KG	5.7	U
BROMOBENZENE	UG/KG	5.7	U
BROMOCHLOROMETHANE	UG/KG	5.7	U
BROMODICHLOROMETHANE	UG/KG	5.7	U
BROMOFORM	UG/KG	5.7	U
BROMOMETHANE	UG/KG	5.7	U
CARBON TETRACHLORIDE	UG/KG	5.7	U
CHLOROBENZENE	UG/KG	5.7	U
CHLOROETHANE	UG/KG	5.7	U
CHLOROFORM	UG/KG	5.7	U
CHLOROMETHANE	UG/KG	5.7	U
CIS-1,2-DICHLOROETHENE	UG/KG	5.7	U
CIS-1,3-DICHLOROPROPENE	UG/KG	5.7	U
DIBROMOCHLOROMETHANE	UG/KG	5.7	U
DIBROMOMETHANE	UG/KG	5.7	U
DICHLORODIFLUOROMETHANE	UG/KG	5.7	U
DIISOPROPYL ETHER (DIPE)	UG/KG	5.7	U
ETHYL-T-BUTYL ETHER (ETBE)	UG/KG	5.7	U
ETHYLBENZENE	UG/KG	5.7	U

Table 4: Site 7 Excavations
Waste Soil Analytical Results

Sample ID		37IT-CAA7-FPE-IDW	
Date Collected		10/18/02	
Parameter	Units	Result	Qual
HEXACHLOROBUTADIENE	UG/KG	5.7	U
ISOPROPYLBENZENE (CUMENE)	UG/KG	5.7	U
METHYL-T-BYTYL ETHER (MTBE)	UG/KG	5.7	U
METHYLENE CHLORIDE	UG/KG	5.7	U
N-BUTYLBENZENE	UG/KG	5.7	U
N-PROPYLBENZENE	UG/KG	5.7	U
NAPHTHALENE	UG/KG	5.7	U
P-ISOPROPYLTOLUENE	UG/KG	5.7	U
SEC-BUTYLBENZENE	UG/KG	5.7	U
STYRENE	UG/KG	5.7	U
T-AMYL METHYL ETHER (TAME)	UG/KG	5.7	U
T-BUTYL ALCOHOL (TBA)	UG/KG	23	U
TERT-BUTYLBENZENE	UG/KG	5.7	U
TETRACHLOROETHENE	UG/KG	5.7	U
TOLUENE	UG/KG	5.7	U
TRANS-1,2-DICHLOROETHENE	UG/KG	5.7	U
TRANS-1,3-DICHLOROPROPENE	UG/KG	5.7	U
TRICHLOROETHENE	UG/KG	5.7	U
TRICHLOROFLUOROMETHANE	UG/KG	5.7	U
VINYL CHLORIDE	UG/KG	5.7	U
XYLENE (TOTAL)	UG/KG	17	U
Semivolatile Organic Compounds (EPA 8270C)			
1,2,4-TRICHLOROBENZENE	UG/KG	1100	U
1,2-DICHLOROBENZENE	UG/KG	1100	U
1,3-DICHLOROBENZENE	UG/KG	1100	U
1,4-DICHLOROBENZENE	UG/KG	1100	U
2,4,5-TRICHLOROPHENOL	UG/KG	1100	U
2,4,6-TRICHLOROPHENOL	UG/KG	1100	U
2,4-DICHLOROPHENOL	UG/KG	1100	U
2,4-DIMETHYLPHENOL	UG/KG	1100	U
2,4-DINITROPHENOL	UG/KG	5700	U
2,4-DINITROTOLUENE	UG/KG	1100	U
2,6-DINITROTOLUENE	UG/KG	1100	U
2-CHLORONAPHTHALENE	UG/KG	1100	U
2-CHLOROPHENOL	UG/KG	1100	U
2-METHYLNAPHTHALENE	UG/KG	1100	U
2-METHYLPHENOL (O-CRESOL)	UG/KG	1100	U
2-NITROANILINE	UG/KG	5700	U
2-NITROPHENOL	UG/KG	1100	U
3,3'-DICHLOROBENZIDINE	UG/KG	2300	U
3-NITROANILINE	UG/KG	5700	U
3/4-METHYLPHENOL (M/P-CRESOL)	UG/KG	1100	U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	5700	U
4-BROMOPHENYL PHENYL ETHER	UG/KG	1100	U
4-CHLORO-3-METHYLPHENOL	UG/KG	2300	U
4-CHLOROANILINE	UG/KG	2300	U
4-CHLOROPHENYL PHENYL ETHER	UG/KG	1100	U

Table 4: Site 7 Excavations
Waste Soil Analytical Results

Sample ID		37IT-CAA7-FPE-IDW	
Date Collected		10/18/02	
Parameter	Units	Result	Qual
4-NITROANILINE	UG/KG	5700	U
4-NITROPHENOL	UG/KG	5700	U
ACENAPHTHENE	UG/KG	1100	U
ACENAPHTHYLENE	UG/KG	1100	U
ANTHRACENE	UG/KG	1100	U
BENZ(A)ANTHRACENE	UG/KG	1100	U
BENZO(A)PYRENE	UG/KG	1100	U
BENZO(B)FLUORANTHENE	UG/KG	1100	U
BENZO(G,H,I)PERYLENE	UG/KG	1100	U
BENZO(K)FLUORANTHENE	UG/KG	1100	U
BIS(2-CHLOROETHOXY) METHANE	UG/KG	1100	U
BIS(2-CHLOROETHYL) ETHER	UG/KG	1100	U
BIS(2-CHLOROISOPROPYL) ETHER	UG/KG	1100	U
BIS(2-ETHYLHEXYL) PHTHALATE	UG/KG	1100	U
BUTYL BENZYL PHTHALATE (BBP)	UG/KG	1100	U
CARBAZOLE	UG/KG	1100	U
CHRYSENE	UG/KG	1100	U
DI-N-BUTYL PHTHALATE (DBP)	UG/KG	1100	U
DI-N-OCTYL PHTHALATE (DOP)	UG/KG	1100	U
DIBENZ(A,H)ANTHRACENE	UG/KG	1100	U
DIBENZOFURAN	UG/KG	1100	U
DIETHYL PHTHALATE (DEP)	UG/KG	1100	U
DIMETHYL PHTHALATE (DMP)	UG/KG	1100	U
FLUORANTHENE	UG/KG	1100	U
FLUORENE	UG/KG	1100	U
HEXACHLOROBENZENE	UG/KG	1100	U
HEXACHLOROBUTADIENE	UG/KG	1100	U
HEXACHLOROCYCLOPENTADIENE	UG/KG	1100	U
HEXACHLOROETHANE	UG/KG	1100	U
INDENO(1,2,3-CD)PYRENE	UG/KG	1100	U
ISOPHORONE	UG/KG	1100	U
N-NITROSO-DI-N-PROPYLAMINE	UG/KG	1100	U
N-NITROSODIPHENYLAMINE	UG/KG	1100	U
NAPHTHALENE	UG/KG	1100	U
NITROBENZENE	UG/KG	1100	U
PENTACHLOROPHENOL (PCP)	UG/KG	5700	U
PHENANTHRENE	UG/KG	1100	U
PHENOL	UG/KG	1100	U
PYRENE	UG/KG	1100	U
Metals (EPA 6010B/7000)			
ANTIMONY	MG/KG	21.7	
ARSENIC	MG/KG	7.4	
BARIUM	MG/KG	860	
BERYLLIUM	MG/KG	0.15	J
CADMIUM	MG/KG	30.3	
CHROMIUM	MG/KG	120	
COBALT	MG/KG	14.5	

Table 4: Site 7 Excavations
Waste Soil Analytical Results

Sample ID		37IT-CAA7-FPE-IDW	
Date Collected		10/18/02	
Parameter	Units	Result	Qual
COPPER	MG/KG	5190	
LEAD	MG/KG	1290	
MERCURY	MG/KG	0.39	
MOLYBDENUM	MG/KG	4.3	
NICKEL	MG/KG	161	
SELENIUM	MG/KG	0.57	U
SILVER	MG/KG	7.6	
TCLP CADMIUM	UG/L	197	
TCLP CHROMIUM	UG/L	11	
TCLP LEAD	UG/L	913	
THALLIUM	MG/KG	0.57	U
VANADIUM	MG/KG	27	
ZINC	MG/KG	2510	
General Chemistry			
PH	PH UNIT	8.69	

APPENDIX G
RESPONSE TO AGENCY COMMENTS

RESPONSES TO COMMENTS ON THE DRAFT SUPPLEMENTAL SAMPLING AND ANALYSIS PLAN FOR SITE 7
ALAMEDA POINT, ALAMEDA, CALIFORNIA

This document presents the Department of the Navy's (Navy) responses to comments from the California Department of Toxic Substances Control (DTSC) on the Draft Supplemental Sampling and Analysis Plan for Site 7, Alameda Point, Alameda, California, dated July 15, 2003. The Navy received the comments addressed below from DTSC on 18 August 2003.

MAJOR COMMENTS

Data Quality Objective (DQO)

1. **Comment:** **A review of the soil analytical data in Appendix F indicates that the blue, crystalline debris layer observed south of Building 459 contains high concentrations of metals including copper, lead, and zinc. It may also contain other hazardous constituents, such as dioxin, at elevated levels.**

Although Appendix F is incomplete (page 1 and pages 14 through 18 of Appendix F are missing), more than half of the samples tested -- or 11 out of 21 -- exceeded the Total Threshold Limit (TTLC) for copper, lead, and zinc qualifying the debris as hazardous waste in California. A comparison of the Appendix F data with the U.S. EPA Preliminary Remediation Goals (PRGs) shows that every sample tested exceeded the residential as well as industrial PRGs for arsenic. For metals other than arsenic, 13 samples out of 21 exceeded the residential PRGs and 11 out of 21 exceeded industrial PRGs.

Given that more than 21 samples have been collected from the debris-laden area and more than half show significant levels of contamination, it is unclear why the Supplemental Sampling and Analysis Plan (SSAP) states, ".... not enough data exist to determine the potential risks to human health and the environment from contaminants in the debris layer" (DQO Step 1) and "If ...contaminants in the debris layer do not pose a risk ... the site will be considered for no further action" (DQO Step 5).

It is our opinion that given the elevated contaminant levels it is prudent to assume that the debris layer poses a risk and some remediation (e.g. excavation) is necessary. To argue otherwise is difficult and probably cannot be supported.

Furthermore, it is our opinion that the objective of this study can be simple and straightforward. Rather than sample the debris extensively to determine if further action is needed (The SSAP proposes 33 soil borings; this is in addition to the 21-plus existing borings for an area estimated to be only 11,284 ft^2 according to DQO Step 6), we recommend the objective of the SSAP simply be to delineate the extent of the debris so the boundary of remediation can be determined. We believe this minimizes the numbers of borings (See the comment below) and streamlines the process.

Response: Site 7 is a CERCLA site. A remedial investigation report, including a risk assessment, is in preparation for the site. The data will be evaluated in accordance with CERCLA guidance and recommendations will be based on the results of that analysis.

It should be noted that many of the samples previously collected were from two small excavations that have been removed. This data no longer represents site conditions and does not adequately represent the extent of potential contamination or risk to human health. The navy feels that the DQO should remain as stated in the sampling plan, because it is premature to suppose that the entire site must be remediated until the risk assessment is completed.

2. **Comment:** **The SSAP uses VSP which is a grid sampling approach aimed to locate "hot spots" in an area suspected of contamination. However, we believe the debris layer, as a whole, is a hot spot and the objective of the study is not to "locate" it but to determine the lateral and vertical extent of the debris. To achieve it, we recommend judgmental sampling using existing site knowledge.**

As stated in DQO Step 7, aerial photographs taken in the 1950s show several areas where the incinerator debris may have been deposited, graded, and covered with soil. We believe these photographs offer an initial understanding of the lateral extent of the debris layer and should be consulted when placing borings. Also considered valuable is a map showing where the 21-plus soil borings reported in Appendix F are located and how deep the sampling had extended. Currently the SSAP provides neither the photographs nor the map.

We consider the historical photographs and the sampling location map critical site information and recommend their use in the initial selection of sampling locations. We believe this judgmental sampling approach helps minimize the numbers of borings.

Response: The Navy agrees that the debris layer is a hot spot. Because of the non-uniform nature of the debris layer, grid spacing was chosen to determine the lateral and vertical extent of the debris and to ensure that smaller hot spots within the debris layer are not missed.

Historical photos were used to obtain an understanding of site history and the activities that occurred. However, the photographs are not a complete record and could not be used to accurately pinpoint potential sample locations. Thus, a judgmental approach would not necessarily minimize the number of samples and still meet the data quality objectives.

3. **Comment:** **Step 5 of the DQO states that the extent of the debris layer will be considered adequately characterized if the concentrations of chemicals in the outermost and deepest subsurface samples are below the PRGs and/or they are significantly lower than the areas of highest concentrations.**

It is our opinion that the term "significant lower" is not defined and therefore not appropriate to be considered as a decision criterion. We recommend the use of residential PRGs as the criterion. For constituents such as arsenic and polyaromatic hydrocarbons (PAHs), the criterion may be the site-specific background as previously determined.

Response: Comment noted. Background and residential PRGs will be used as a criterion for determining the extent of the debris layer.

4. **Comment:** **Please explain the rationale that the vertical extent of the debris layer extends from the soil surface down to about 4 feet bgs (DQO Step 4) and that hand augering will be performed to a depth of 4 ft bgs (DQO Step 7).**

Also, please discuss any contingency plan should the samples collected at 4 ft bgs show contaminants at levels higher the action criterion, i.e. the residential PRGs.

Response: The rationale is based on the previous observation of the debris layer in the excavations, historical aerial photographs, and the analytical results of samples collected from the excavations. Based on the evidence observed to date, it does not appear that the incinerator debris was deposited in an excavation. Rather, it was deposited at the previous land surface, graded, and then covered. This is supported by the observations of the debris layer in the excavation and the analytical data observed to date.

Additional contingency have been provided in the sampling and analysis. In the event the samples collected at 4 feet below ground surface show contaminant concentrations greater than PRGs; an additional three samples will be collected from the same borehole locations at a depth of 8 feet below ground surface. No further contingency will be provided because potential remedial action would address all contamination regardless of depth.

5. **Comment:** **Step 7 of the DQO states that all samples will be analyzed for total metals and that in three samples where the debris layer is observed to be most concentrated, dioxin/furan, PCB, and chromium speciation analyses will be performed. It is unclear 1) why "three" is proposed to be the number of samples subject to more complete analysis and 2) why PAHs and petroleum hydrocarbons are not included (petroleum hydrocarbons have been previously detected in the debris; PAHs has so far not been tested but is a common class of compounds found in burned waste).**

It is our opinion that the analytical regimen should be expanded to include not just total metals, chromium specification, dioxin/furan, and PCB but also PAHs and petroleum hydrocarbons.

It is also our opinion that the full analytical work may not need to be performed on every soil sample collected. Since contaminants are likely to be co-located in this case, the analytical work may be streamlined by picking out a single indicator chemical (e.g. lead) to make preliminary determination of the extent of the debris. For the outermost and deepest samples so determined, full regimen of analyses should be performed to make sure that

all constituents of interests are within the action criterion and the extent of the debris layer is adequately defined.

Response: Three samples for dioxin/furans, PCBs, and chromium speciation analyses were judged sufficient, because contaminants are likely to be co-located. In addition, three samples across the area to be sampled is considered sufficient to demonstrate the risk posed to human health or the environment.

PAHs were not included in this sampling plan because those constituents are already being evaluated by Navy through the petroleum hydrocarbon sampling program. Petroleum hydrocarbons were not included because if the metal contaminants in the debris layer pose sufficient risk to human health or the environment to require cleanup, then petroleum hydrocarbons would be removed along with the debris layer.

Investigation Derived Wastes

6. **Comment:** **Given that the debris materials qualify for hazardous waste, please discuss how investigation derived wastes will be handled in this study.**

Response: As discussed in Section 2.2.3 of the Draft Sampling and Analysis Plan, the analytical results for the proposed sampling will be used to profile the Investigation-derived Wastes. Once these results are available, the decision as to the appropriate method of disposal will be determined.

Source of Contamination

7. **Comment:** **Appendix F data indicate that the debris contains some levels of petroleum hydrocarbons particularly those in the motor oil and diesel ranges. Although this could simply be a result of incomplete burning, it is possible that petroleum hydrocarbons could be attributed to sources other than the historical incineration operation.**

Please discuss the presence of petroleum hydrocarbons in the incinerator debris. Please discuss if Building 459 (an auto repair facility) or other site features (such as the oil water separator mentioned in page 2 of the SSAP) could be the source of the petroleum hydrocarbons.

Response: Site 7 (Building 459) was previously used as a gas station. It is possible that this historical use is responsible for the presence of petroleum hydrocarbons. However, the purpose of this SAP is to delineate the nature and extent of the debris layer.

Additional Data Gap

8. **Comment:** **Groundwater reportedly was encountered between 0.2 and 5.6 feet bgs at the site. Please make sure any potential impact of the incinerator debris to the groundwater is fully addressed by the RI and there is no additional groundwater data gap.**

Response: Comment noted.

9. **Comment:** **Site 7 consists of Environmental Baseline Survey (EBS) parcels 112, 113, and 114. Please review the relevant EBS reports to make sure that there are no additional areas of concerns (AOCs) other than former Building 68 and the associated blue, crystalline debris layer. Please refer to DTSC comment letter dated December 16, 2002 for the definition of an AOC.**

Response: Comment noted.

MINOR COMMENTS

1. **Comment:** **Page 2, Section 1.1.2, second paragraph states: "Analytical data for these samples are presented in Table 2." The reference of Table 2 is incorrect. It should be Appendix F.**

Response: Comment noted. The reference will be corrected.

2. **Comment:** **Page 6, Section 1.1.6 states "No removal actions have been conducted at Site 07". It then continues in the following paragraph, "...investigation conducted at Site 07 .... included an interim removal action in 1994". Please explain the discrepancy.**

Response: Comment noted. The text will be corrected.

3. **Comment:** **Page 11, Section 1.2.1, first bullet states, "Collecting subsurface soil samples from about 23 locations .....". The numbers of sampling locations are consistent with Figure 6 but not with Table 3 (DQO Step 6) and Table 7 where 33 sampling locations are referenced. Please reconcile the discrepancies.**

Response: Twenty-three sample locations were identified in the Sampling and Analysis Plan. Seventeen grid locations identified using VSP (Table 3, DQO Step 6) together with an additional six locations to ensure the extent of contamination is defined. Table 7 references 34 samples, not sampling locations. These additional samples are for field duplicates, depth samples, and quality control samples.

4. **Comment:** **Figure 2: The title "CERCAL Site 7 Proposed Soil Sampling Locations" appears to be in error. Please verify.**

Response: Comment noted. The figure title will be revised to indicate that these samples have already been collected.

5. **Comment:** **Figure 3: Please clarify the boundary of corrective action area 7 (CAA-7). Figure 3 shows CAA-7 and IR Site 7 completely overlapping each other. This is confusing.**

Response: The boundaries for IR Site 7 and CAA-7 are the same.

6. **Comment:** **Appendix D, Table D-1 does not include the project-required reporting limits (PRRL) and PRGs for PCBs. Please make sure all parameters to be analyzed in this study are included in this table.**

Response: Table D-1 will be revised to show the PRRL and PRGs for PCBs.

7. **Comment:** **Appendix F: Pages 1 and 14 through 18 of Appendix F are missing.**

Response: Appendix F will be updated to include the missing pages.