

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN II)
Northern and Central California, Nevada, and Utah
Contract No. N62474-94-D-7609
Contract Task Order No. 022

Prepared For

DEPARTMENT OF THE NAVY
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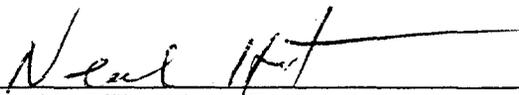
SITE 16 REMOVAL ACTION OVERSIGHT WORK PLAN
ALAMEDA POINT
ALAMEDA, CALIFORNIA

FINAL

September 1997

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ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
CLEAN	Comprehensive Long-term Environmental Action Navy
CLP	EPA Contract Laboratory Program
cm	centimeter
E&E	Ecology and Environment, Inc.
EE/CA	engineering evaluation/cost analysis
EPA	U. S. Environmental Protection Agency
FTL	field team leader
ft ²	square feet
HSP	health and safety plan
IAS	initial assessment study
mg/kg	milligrams per kilogram
NAS	Naval Air Station
PCB	polychlorinated biphenyl
QA/QC	quality assurance/quality control
QAPP	quality assurance project plan
ROICC	Navy Resident Officer In Charge of Construction
RPM	Navy Remedial Project Manager
SHSO	Site Health and Safety Officer

1.0 INTRODUCTION

Under the Comprehensive Long-term Environmental Action Navy (CLEAN II) Contract No. N62474-94-D-7609, Contract Task Order 022, the Navy is conducting a removal action at Installation Restoration Site 16 (Site 16) at Alameda Point (formerly Naval Air Station Alameda), Alameda California. The removal action, to be conducted in September 1997, is being performed by the Navy to address surface soils contaminated with polychlorinated biphenyls (PCB) and lead at Site 16. The Navy prepared this removal action oversight work plan as a guide to (1) perform engineering oversight during the performance of the removal action, and (2) conduct confirmation sampling at the site after excavation is complete.

This work plan presents the Navy's technical approach to performing engineering oversight, conduct confirmation sampling and analyses, and providing other technical support as needed during the removal action. This work plan details the project organization, tasks to be performed, and performance protocols (health and safety, sampling and analysis, and quality assurance/quality control [QA/QC]) for work performed by the Navy during this removal action. Performance protocols for QA/QC are included in the quality assurance project plan (QAPP), which is presented in Appendix A. Performance protocols for health and safety are presented in the existing base-wide health and safety plan (HSP) for Alameda Point (PRC Environmental Management, Inc. [PRC] 1997).

This work plan does not describe site preparation, removal of temporary runway plates and asphalt, or soil excavation and disposal. These activities are discussed in the Navy's Site 16 Removal Action Work Plan (International Technology Corporation 1997).

1.1 PURPOSE OF THE REMOVAL ACTION

Based on data collected during the remedial investigations at Alameda Point, the Navy identified Site 16 as a site that required "early action" and determined that a removal action would be conducted at the former storage yard to remove surface soils contaminated with high concentrations of PCBs and lead (PRC 1994a). To facilitate closure of Site 16, the Navy proposed performing a limited soil excavation based on results of an engineering evaluation/cost analysis (EE/CA) (PRC 1994a). The EE/CA for this removal action was prepared by the Navy in June 1997 (Moju 1997). Based on the

EE/CA, the Navy will perform a removal action at Site 16 that includes excavating the contaminated surface soil, disposing of the contaminated soil at an appropriate classified landfill, and backfilling the excavation area with clean fill.

Based on the EE/CA, the extent of the excavation for soils containing elevated concentrations of PCB and lead includes four locations with approximate areas of 180 feet by 150 feet, 60 feet by 90 feet, 90 feet by 105 feet, and 70 feet by 105 feet, respectively, to a depth of 1 foot below ground surface (bgs). Based on these measurements, the total volume of soil to be excavated is approximately 1825 cubic yards (Moju 1997). The areas of excavation and the resulting volume of excavated soil are based on the interim clean-up goals of 1 milligram per kilogram (mg/kg) for PCBs and 300 mg/kg for lead. Although the recommended removal action level for lead is 300 mg/kg, as a result of the distribution of lead remaining in soils after excavation, the EE/CA projects that the average residual level of lead will be less than 130 mg/kg (Moju 1997), which is the California-Modified preliminary remediation goal for lead (Department of Toxic Substances Control 1994).

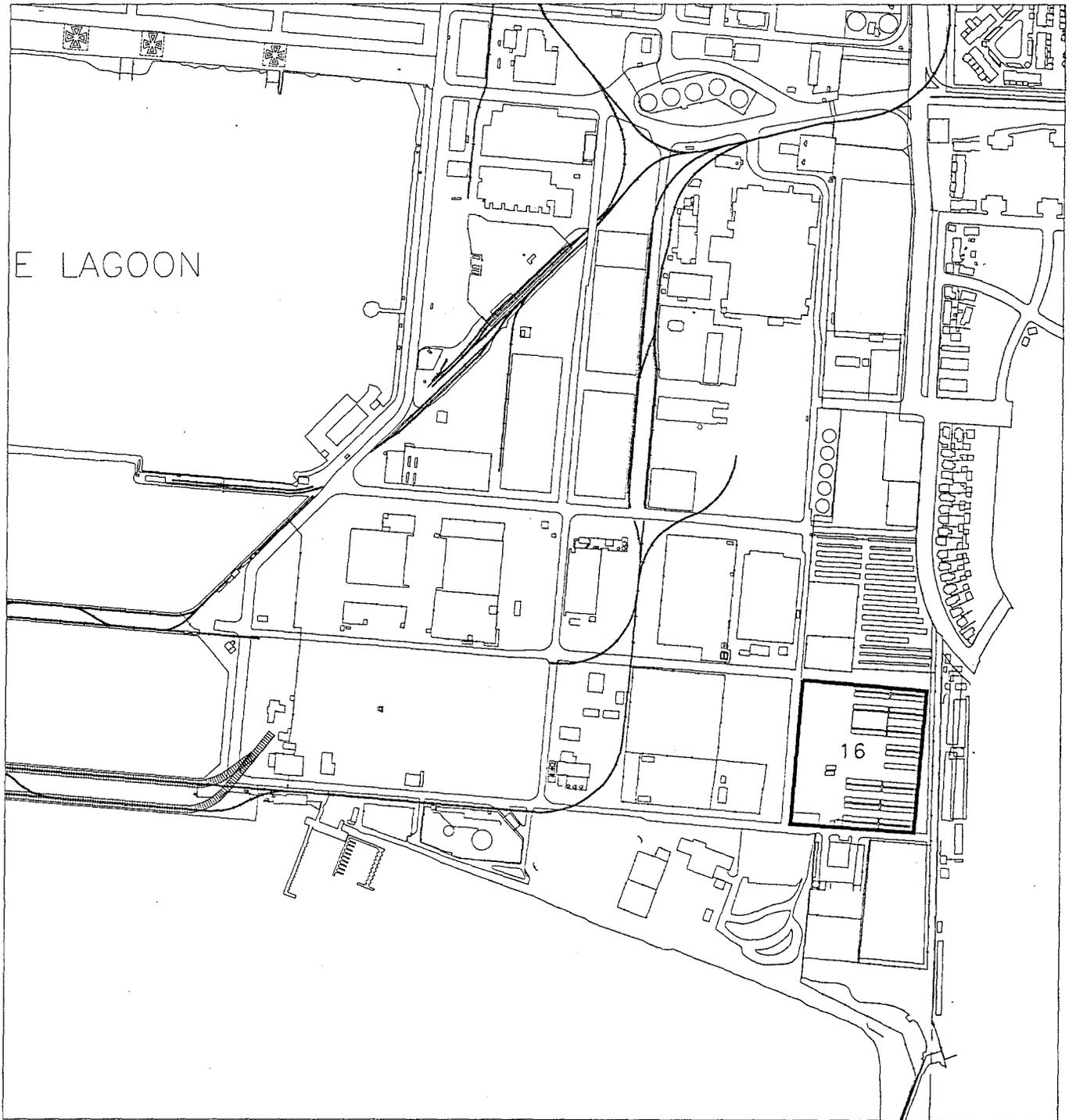
During the performance of this removal action, the Navy will prepare the site; remove temporary runway plates and asphalt (rip-rap); transport and dispose of rip-rap to an off-site disposal facility; excavate contaminated soil; transport and dispose of contaminated soil to an off-site disposal facility; backfill the excavation with clean fill; perform engineering oversight; and perform sampling and analyses of confirmation samples. Based on the engineering oversight and confirmation sampling, the Navy will also prepare a removal action implementation report detailing the final outcome of the removal action.

1.2 SITE LOCATION, DESCRIPTION, AND HISTORY

Alameda Point is located at the western end of Alameda Island in Alameda County, California.

Alameda Point is bounded on the north by the Oakland Inner Harbor, on the west and south by San Francisco Bay, and on the east by the City of Alameda. Site 16 is located at the southeast corner of Alameda Point, between Avenues M and N, east of Eleventh Street (see Figure 1).

Site 16 consists of the C-2 CANS Area and occupies 6.5 acres; 3 acres were used as a storage yard and 3.5 acres contain CANS, large shipping containers that have been converted into storage buildings.



0 600 1200

Approximate Scale
1" = 600'

FIGURE 1

SITE LOCATION MAP
SITE 16
ALAMEDA POINT

The CANS are structurally connected to concrete foundations and are not readily movable. The area around the CANS is paved with asphalt and concrete. Surface runoff is collected by catch basins located within the paved areas. The storage yard is primarily unpaved; however, the ground surface is covered with temporary runway plates made of perforated steel (see Figure 2).

Site 16 area has been used for over 50 years as a storage area during different operational missions. The estimated 1,825 cubic yards of contaminated soils at Site 16 are mostly associated with (1) surface soil in the storage yard area where equipment were stored and (2) from application of PCB-contaminated oil as a weed killer. Waste oils (some containing PCBs) were reportedly used for weed control in the storage yard area until 1963. The storage yard was reportedly used to store aircraft parts, warehouse equipment, paints, solvents, and acidic and alkaline liquids in storage containers and drums (Canonie Environmental 1990). Some of the storage containers and drums became corroded, resulting in leaks. Electrical transformers containing PCBs were also stored in the yard. Since 1982, the storage yard has been used to store various obsolete equipment and miscellaneous parts such as paint stripping baths, electrical equipment, and aircraft parts. The storage yard is currently clear and is not in use.

In 1983, Ecology and Environment, Inc. (E&E), performed an initial assessment study (IAS) of Site 16 (then identified as Site 6) (E&E 1983). The purpose of the IAS was to identify and assess the site for potential threats to human health or the environment due to contamination from past hazardous materials operations. No sampling or analysis was performed as part of this IAS. It was reported in the IAS that an electrical transformer located in the northwest corner of the storage yard leaked PCB oil onto the ground. In response to the spill, the IAS reported "Base environmental personnel stated that 10 cubic yards of the PCB-contaminated soil from the transformer spill were removed in August 1982 by the Naval Air Rework Facility at NAS Alameda. Tests indicate that the soil remaining at the spill site contained less than 1 ppm PCBs" (E&E 1983). The IAS concluded that "chemicals have leaked into the ground and PCBs were used as weed killers" (E&E 1983).

Since the 1983 IAS, three subsequent investigations have been performed at the site between 1985 and 1994. These investigations reported additional areas of PCBs with concentrations above 1 mg/kg, as well as concentrations of lead that exceeded 10 times the soluble threshold limit concentration specified in Title 22 of the California Code of Regulations (Wahler Associates 1985, PRC and James M. Montgomery Consulting Engineers, Inc., 1992, and PRC and Montgomery Watson 1996).

The Navy compiled and interpreted all of the historical data collected for Site 16 as part of the Site 16 EE/CA. The highest concentrations reported for PCBs and lead at Site 16 are 23 mg/kg for Aroclor 1254, 7.3 mg/kg for Aroclor 1260, 4.6 mg/kg for Aroclor 1248, and 500 mg/kg for lead. The highest concentrations of PCBs and lead were found in the soil at approximately 0.5 foot bgs. The data are summarized and presented in Appendix A of the Site 16 EE/CA report (Moju 1997).

1.3 PROJECT MANAGEMENT

The project will be staffed by a team with the experience and training to maintain consistent quality throughout the project. The following are the responsibilities of each team member:

Project Manager

The project manager is responsible for overseeing all project activities and is ultimately responsible for the timely completion of the project. The responsibilities of the project manager include the following:

- Assigning technical staff
- Developing work plans that define the scope of activities and the level of documentation and QC required
- Ensuring that project staff complete all QC requirements described in the work plan
- Working with QC coordinators to implement quality improvements identified during audit and review of ongoing work
- Approving all deliverables and associated documents prior to transmittal
- Procuring subcontractors and preparing statements of work for subcontractors
- Establishing and maintaining communication among technical staff, QA officer, and regulatory agencies
- Implementing all programs and protocols related to the project

Project Quality Assurance Officer

The responsibilities of the project QA officer include the following:

- Preparing the QAPP (see Appendix A) in accordance with U.S. Environmental Protection Agency (EPA) guidance documents
- Ensuring that all protocols described in the QAPP are met

- Verifying that the specified data collection methods comply with all EPA, Navy, and subcontractor QA/QC requirements and will yield data of desired quality and integrity
- Reviewing, evaluating, and approving quality-related changes to the work plan and QAPP
- Ensuring that all field and laboratory non-conformances are identified and appropriate corrective actions are taken; providing assistance to the project manager with regard to corrective action; and, if necessary, soliciting involvement by the QA program manager
- Communicating regularly with the project manager and project chemist to ensure adherence to all QA tasks
- Serving as the main contact for all project QA matters, and providing guidance on appropriate procedures to the project manager and support personnel
- Conducting laboratory evaluations and audits to ensure that analyses are performed in accordance with the QAPP

Project Chemist

The project chemist is responsible for the following:

- Ensuring that the laboratory implements the analytical requirements of the QAPP and work plan
- Ensuring that the laboratory adheres to the Navy CLEAN II Laboratory Services Statement of Work (PRC 1995a)
- Coordinating with the laboratory on QAPP requirements, delivery schedules, and all QA/QC matters
- Reviewing laboratory data prior to release to the data users and the Navy
- Coordinating data validation activities
- Ensuring accuracy of the database entries for sample tracking, laboratory chemical data, and data validation qualifiers
- Providing updates on the project to the QA officer and project manager with regard to QC data

Field Team Leader

The FTL is responsible for all oversight field activities including the following:

- Directing all on-site activities performed by contractors

- Ensuring that all procedures described in the work plan are adhered to in the field
- Ordering all necessary supplies, equipment, and personal protective clothing
- Ensuring that field equipment is properly calibrated and maintained
- Ensuring that individual samples are properly handled and documented to allow tracing the possession and handling of samples from collection to laboratory receipt
- Acting as the liaison between contractors and on-base Navy personnel during the course of the field work
- Communicating with the project chemist on any problems encountered with the collection of samples or the sampling schedule
- Communicating any problems to the project manager in a timely manner

Site Health and Safety Officer

The SHSO is responsible for field implementation of the HSP. In addition, the SHSO has the following responsibilities:

- Correcting and changing site control measures and the required health and safety protection, as required
- Maintaining primary on-site enforcement authority, as delegated by the project manager, for the policies and provisions of the health and safety program and the HSP
- Conducting initial and daily safety meetings prior to initiation of field work
- Verifying that all workers on the site are properly trained for health and safety and handling hazardous materials
- Ensuring that everyone at the site knows the route to emergency first aid care or the local hospital
- Ensuring that all workers are wearing proper personal protective equipment at the site

2.0 REMOVAL ACTION OVERSIGHT

This section describes the oversight tasks that will be performed during the Site 16 removal action. These tasks include engineering oversight and oversight documentation. Also included in this section is field personnel training requirements.

2.1 ENGINEERING OVERSIGHT

The Navy will perform engineering oversight throughout the duration of the removal action. Prior to the start of the removal action, a field oversight manager will be assigned to the project. The field oversight manager will observe the activities of the contractors and prepare daily oversight reports on the contractor's performance and the progress of the removal action. These oversight reports will be forwarded at the end of each day by facsimile machine to the Navy Resident Officer In Charge of Construction (ROICC) and the EFA West RPM. Specific information on the oversight reports is presented in Section 2.2.2.

Upon completion of the excavation by the contractors, the Navy will conduct confirmation sampling and analysis to determine the residual levels of lead and PCBs in the remaining soil. Further excavation will be performed by the Navy in areas found to contain PCBs or lead above the interim clean-up goals. The Navy will collect additional confirmation samples to determine if the interim clean-up goals were met. Section 3.0 describes the confirmation sampling and analysis procedures.

2.2 OVERSIGHT DOCUMENTATION

Field oversight will include the use of logbooks and daily oversight reports as described in the following sections.

2.2.1 Logbooks

Logbooks are hardbound notebooks in which all activities associated with the field investigation will be thoroughly described. Logbooks are intended to provide sufficient data to reconstruct events occurring during the field project. A site logbook will be kept by the FTL. General information regarding removal action activities will be recorded within the site logbook and will include, at a minimum, the following:

- Summary of daily activities, including information presented at the daily safety meeting
- Equipment present on site
- Descriptions of deviations from the Navy's work plan

- Personnel and visitors on site
- Weather Conditions

Other appropriate observations may be included when necessary.

2.2.2 Daily Oversight Reports

Daily field oversight reports will be submitted to the ROICC and the EFA West RPM after each day of field activities. The report will include the following information:

- Date
- Weather, including temperature and approximate wind speed and direction
- Personnel performing site activities
- Visitors to the site
- Work performed
- Sampling performed
- Problems encountered and corrective actions taken
- Next day's anticipated work schedule
- Signature of individual completing the report

Other appropriate observations may be included when necessary.

2.3 FIELD PERSONNEL TRAINING REQUIREMENTS

All field personnel scheduled for work at Site 16 will be trained in compliance with the Occupational Safety and Health Administration (OSHA) requirements found in 29 Federal Regulations 1910.120, the CLEAN II Health and Safety Plan (PRC 1995b), and the Alameda Point Base-wide Health and Safety Plan (PRC 1997) and will be experienced in hazardous waste site work, use of personal protective equipment, and emergency response procedures. The FTL will have received the 8-hour health and safety training for supervisors. The FTL will be current in cardiopulmonary resuscitation and first aid training.

All field personnel assigned to the project will receive the work plan/QAPP and the HSPs prior to commencement of field activities. A field staff orientation and briefing will be held prior to the initiation of field activities as specified in the Alameda base-wide HSP (PRC 1997).

3.0 CONFIRMATION SAMPLING

This section presents sampling objectives and design, sampling procedures, and sampling equipment decontamination procedures. QA/QC for sampling and analysis is presented in the QAPP in Appendix A.

3.1 SAMPLING OBJECTIVES AND DESIGN

The overall objective of the project is to complete the remediation of surface soils containing PCB concentrations exceeding 1 mg/kg and lead concentrations exceeding 300 mg/kg, while minimizing the removal of soil containing concentrations of the contaminants that are below the action levels. The objective of the sampling program is to collect adequate data that will support the decision-making process used to determine if the remediation of the site is complete. Due to the limitation in detection limits for PCB field test kits (and the fact that metals test kits are still unavailable), only definitive data (certified laboratory data) will be collected to support the sampling objectives discussed in this section.

A non-probabilistic (judgmental) sampling design was developed for final confirmation sampling of the Site 16 excavation area. Non-probabilistic sampling involves selecting sampling locations based on experience and knowledge of the site (EPA 1993). Judgmental samples can be used subjectively to provide data about specific areas of the site, which is useful during site closure, since information is available on the contamination sources, history, and dispersion of contaminants as described in the EE/CA (Moju 1997).

The estimated volume of 1825 cubic yards of soil for the Site 16 removal action is derived from the excavation of four discrete areas covering a total area of approximately 49,275 square feet (ft²). Based on EPA guidance documents (EPA 1985, 1986) and the previous removal action at Site 15 (PRC 1994b, 1995c), a sampling frequency of one sample for every 350 ft² was considered adequate to properly characterize the site after excavation. This sampling frequency results in an estimated 135 discrete confirmatory samples being collected and analyzed at a cost of approximately \$17,125.

3.2 SAMPLING PROCEDURES.

Upon completion of the excavation, the Navy will conduct confirmation sampling and analysis to determine the residual levels of lead and PCBs in the remaining soil and to assess whether additional excavation is required. Samples will be collected for PCB and lead analyses at a density of one sample per 350 ft² of surface area. Based on the estimated extent of excavation, 135 confirmation samples will be collected. Based on the analytical results from these samples, additional excavation may be required. The total number of confirmation samples required for verification will depend on the final extent of the excavation.

The field sampling technician will collect samples in accordance with procedures found in the EPA guidance documents (EPA 1985, 1986). In using the recommended sampling configuration, a hexagonal grid will be established over each excavation area using surveying stakes. The proposed sampling locations are shown on Figure 3. Surface scrape samples will be collected at each sampling location. Using a 10 centimeter (cm) by 10 cm template to mark the area to be sampled, the surface will be scraped to a depth of 2 cm with a stainless steel trowel or similar implement. This procedure should yield a soil sample of at least 200 grams. The soil will be scraped directly into a precleaned, 8-ounce glass sampling jar. The sampling jar will be sealed using a Teflon lined cap. Each sample will be labeled in the field with a unique identification number as described in Table A-3 of the QAPP (see Appendix A).

Confirmation samples will be placed in coolers packed with "blue ice" (or bagged ice) with appropriate chain-of-custody forms and shipped to the laboratory for PCB and lead analyses. Confirmation samples will be shipped to a Navy-approved laboratory for analysis of PCBs and lead using EPA Contract Laboratory Program (CLP) methods (see Appendix A). The laboratory shall provide the Navy with preliminary analytical results (CLP Form 1's) within 5 working days after receipt of the samples.

Documentation of sampling activities, data reporting, and data validation and management are discussed in the QAPP (see Appendix A).

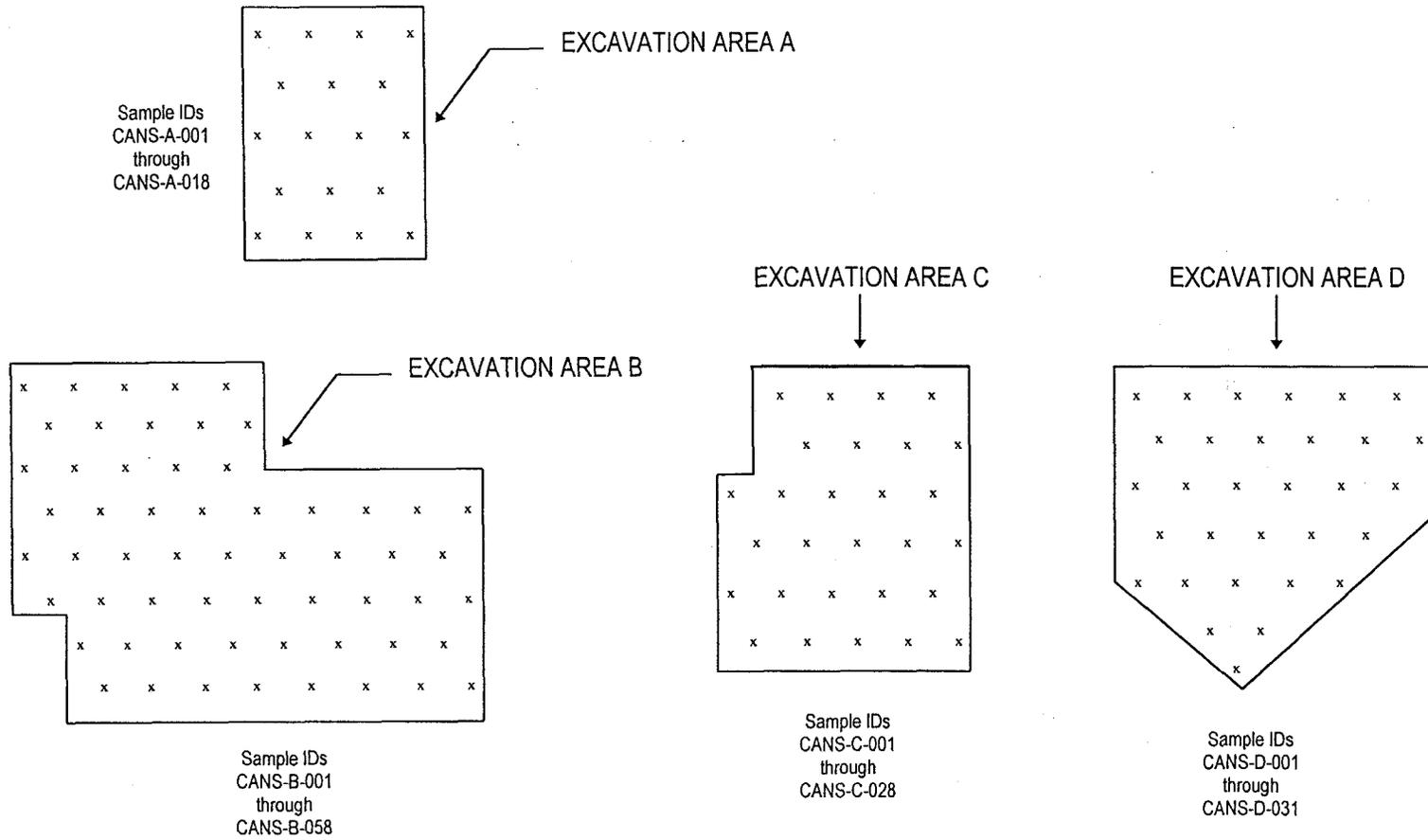


FIGURE 3
CONFIRMATION SAMPLE LOCATIONS
SITE 16
ALAMEDA POINT

Note: Figure not to scale

3.3

DECONTAMINATION OF SAMPLING EQUIPMENT

The purpose of decontaminating sampling equipment during sampling tasks is to prevent cross-contamination of samples between sample locations. Before use, sampling equipment will be cleaned by washing with a non-phosphate detergent such as Liquinox or its equivalent. The detergent will be removed with a tap water rinse followed by two purified water rinses. Cleaned equipment will be allowed to air-dry away from the excavation area to reduce the potential for cross-contamination. Decontamination liquids will be stored in a 55-gallon barrel. At the end of the project, the contents of the barrel will be sampled, analyzed, and disposed of at an appropriate hazardous waste disposal facility.

4.0 HEALTH AND SAFETY

Work will be performed on this project in accordance with the Alameda Point Draft Base-wide Health and Safety Plan (PRC 1997) and the Navy CLEAN II Health and Safety Plan (PRC 1995b). A copy of both documents are on file in the field office at Alameda Point.

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APPENDIX A
QUALITY ASSURANCE PROJECT PLAN

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN II)
Northern and Central California, Nevada, and Utah
Contract No. N62474-94-D-7609
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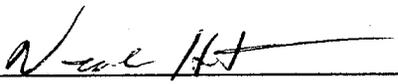
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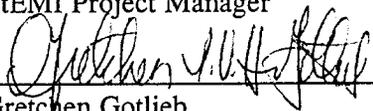
REVIEWS AND APPROVALS

Prepared by:



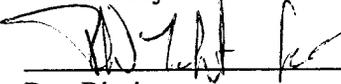
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TtEMI Project Manager



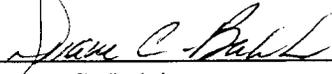
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Gretchen Gotlieb
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Date: 9/16/97

Ron Riesing
TtEMI Quality Assurance Program Manager



Date: 9/16/97

Duane C. Balch
TtEMI CLEAN Installation Coordinator

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ABBREVIATIONS AND ACRONYMS

CLEAN	Comprehensive Long-term Environmental Action Navy
CLP	Contract Laboratory Program
CRDL	contract-required detection limit
CRQL	contract-required quantitation limit
COC	chain-of-custody
CTO	contract task order
DOT	Department of Transportation
DQO	data quality objectives
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
FTL	field team leader
LCS	laboratory control sample
MS/MSD	matrix spike/matrix spike duplicate
NAS	Naval Air Station
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyl
QA/QC	quality assurance/quality control
QAPP	quality assurance project plan
QCSR	quality control summary report
RPD	relative percent difference
SDG	sample delivery group
SOW	statement of work

1.0 INTRODUCTION

This quality assurance project plan (QAPP) specifies the procedures, and quality assurance/quality control (QA/QC) requirements necessary to collect environmental data of sufficient quantity and quality to meet the project objectives identified for the Site 16 removal action. The QAPP specifies how QA/QC activities will be planned, implemented, and assessed for the duration of the project.

This QAPP has been prepared in accordance with the U.S. Environmental Protection Agency's (EPA) guidance document "Requirements for Quality Assurance Project Plans for Environmental Data Operations," EPA QA/R-5 (EPA 1994a). EPA QA/R-5 states that the requirements for a QAPP are that (1) data quality objectives (DQO) are identified, (2) the intended measurements and data acquisitions are appropriate, (3) the QA/QC is sufficient for confirming the quality of data, and (4) limitations on the use of the data can be identified. These QAPP requirements have been presented as four components: (1) quality objectives and criteria for measurement data, (2) documentation and records, (3) measurement and data acquisition, and (4) assessment and oversight.

2.0 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

Data quality objectives (DQO) are qualitative and quantitative statements developed by data users to specify the quality of data needed from a particular data collection activity to support specific decisions or regulatory actions. The DQOs developed for the Site 16 removal action determine whether analytical data will be one of two data categories: screening or definitive. Each of these categories is defined by specific QA/QC procedures using a wide range of analytical methods. Following selection of the data category, the appropriate analytical method is selected and measurement objectives are defined.

Measurement objectives are described as the critical indicator parameters of data quality, and are precision, accuracy, representativeness, completeness, and comparability (PARCC). The following subsections discuss and provide definitions for the data categories, PARCC parameters, and quantitation limits.

2.1 SITE BACKGROUND AND DATA QUALITY OBJECTIVES

The history of Site 16 at Naval Air Station (NAS) Alameda and all previous investigations are explained in the Site 16 engineering evaluation and cost analysis (Moju Environmental Technologies, Inc. 1997) and are not repeated in this QAPP. The overall objective of the sampling activities is to collect adequate chemical data necessary to support the decision-making process used to determine if the remediation of the site is complete. Sampling objectives and design are presented in Section 3.1 of the Site 16 removal action work plan. Based on the sampling objectives and design, only definitive data will be collected to support the Site 16 removal action.

2.2 DEFINITIVE DATA

The following definition for definitive data is from "Data Quality Objectives Process for Superfund Interim Final Guidance" (EPA 1993).

Definitive data are data generated using rigorous analytical methods, such as approved EPA reference methods. Definitive data provide defensible data useable for characterization and assessment purposes. Data are analyte-specific, with confirmation of analyte identity and concentration. Methods produce tangible raw data in the form of paper printouts or computer-generated electronic files. Data may be generated at the site or at an off-site location, as long as the QA/QC requirements are satisfied. For the data to be definitive, either analytical or total measurement error must be determined. QA/QC elements required for definitive data include the following:

- Sample documentation (location, date and time collected, batch, etc.)
- Chain-of-custody (when appropriate)
- Sampling design approach (systematic, simple or stratified random, judgmental)
- Initial and continuing calibration
- Determination and documentation of detection limits
- Analyte identification
- Analyte quantitation

- QC blanks (trip, method, rinsate)
- Matrix spike recoveries
- Performance evaluation samples (when specified)
- Matrix duplicate. For two or more aliquots this is also referred to as the analytical error determination (measures precision of analytical method): an appropriate number of replicate aliquots, as specified in the QAPP, are taken from at least one thoroughly homogenized sample, the replicate aliquots are analyzed, and standard laboratory QC parameters are calculated and compared to method-specific performance requirements defined in the QAPP.
- Field duplicates or total measurement error determination (measures overall precision of measurement system, from sample acquisition through analysis): an appropriate number of co-located samples are independently collected from the same location and analyzed following standard operating procedures. The variance, mean, coefficient of variation, or relative percent difference are calculated for each matrix under investigation.

The analytical methods are described in Section 4.0 of this QAPP.

2.3 PARCC CRITERIA

PARCC are critical indicators of project data quality (EPA 1987a). Measurement objectives for these indicator parameters were developed based on past experience of the project, limitations of the analytical methods, and on the project DQOs. The following sections describe the PARCC parameters.

2.3.1 Precision

Precision is the degree of mutual agreement between individual measurements of the same property under prescribed similar conditions. For duplicate measurements, precision is expressed as the relative percent difference (RPD) of the pair and is calculated using the following:

$$RPD = \frac{|D_1 - D_2|}{\frac{1}{2}(D_1 + D_2)} \times 100\%$$

where: D_1 = Concentration of analyte in original sample
 D_2 = Concentration of analyte in duplicate sample

The precision of chemical analyses or analytical methods will be assessed through the analysis of matrix spike/matrix spike duplicate (MS/MSD) samples and matrix duplicate samples. Each QC sample type will provide unique information regarding the precision of the laboratory programs, as described below:

- MS/MSD samples: Laboratory analytical precision for organic analyses
- Matrix duplicate samples: Laboratory analytical precision for inorganic/physical parameters

Precision acceptance criteria for duplicate and MS/MSD samples for all analytical methods are presented in Table A-1. Due to the non-homogeneous nature of soil and sediment samples, collection of field duplicate samples is not planned for the Site 16 removal action.

When analytes are present in samples either near the method detection limit or substantially above the detection limit, the precision objectives for MS/MSD analyses may not be appropriate. If precision objectives are not met, other QC data will be evaluated to determine the validity of the data.

2.3.2 Accuracy

Accuracy refers to the degree to which a measurement agrees with its true value. The accuracy of an analytical measurement is impacted by errors introduced through the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analytical techniques. Sampling accuracy will be evaluated based on the analytical results of the field blanks, trip blanks, and equipment rinsate blanks. To evaluate laboratory accuracy, a program of sample spiking will be conducted by the analytical laboratory. This program includes the analysis of MS/MSD samples, laboratory control samples (LCS) or blank spikes, and surrogate standards. MS/MSD samples are analyzed at a frequency of 5 percent; LCS or blank spike at a frequency of 5 percent; and surrogate standards, where applicable, are added to every sample analyzed for organic constituents. The results of spiked samples will be expressed as percent recovery and will provide information on positive and negative bias.

Accuracy is expressed in terms of percent recovery and is calculated by the following equation:

$$\text{Percent Recovery} = \frac{(\text{Measured Spike Value} - \text{Unspiked Value})}{(\text{Known Spiked Value})} \times 100\%$$

Accuracy acceptance criteria for MS samples and surrogate standards, expressed in percent recovery, are presented in Table A-1.

**TABLE A-1
PCBs AND LEAD - CLP METHOD
ACCURACY AND PRECISION LIMITS
ALAMEDA POINT**

Matrix Spike Compound	Soil	
	% Recovery	RPD
Aroclor 1260	60-150	50
Lead	75-125	35
PCB Method Surrogate Spike Compound	Soil	
	% Recovery	
Tetrachloro-m-xylene	60-150	
Decachlorobiphenyl	60-150	

Note:
RPD Relative Percent Difference

2.3.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent the characteristics of a population, parameter variations at a sampling point, or an environmental condition they are intended to represent. Representativeness is a qualitative parameter; hence, no specific criteria must be met. For this project, representative data will be obtained through the careful selection of sampling locations and analytical parameters, the proper collection and handling of samples to avoid interferences and minimize sample contamination and loss of analytes, and the use of standardized field and laboratory procedures and their consistent application. To aid in the evaluation of the

representativeness of each sample, field- and laboratory-required blank samples are evaluated for the presence of contaminants. Method blank samples will be considered in evaluating the validity of the data when there are problems with contamination in any samples.

2.3.4 Completeness

Completeness is defined as the percentage of measurements that are judged valid. The project completeness value will be determined at the conclusion of the data validation phase and will be calculated by dividing the number of complete, valid sample results by the total number of sample analyses planned for the project. The data validation process will determine whether a particular data point is a valid result that is acceptable for all uses, an estimated result that is acceptable for limited uses, or a rejected result that is unacceptable for any use. Complete results are defined as results that are considered valid and include estimated results. Sample results that are considered rejected, unacceptable, and unusable when compared to QC criteria are listed as incomplete. The completeness objective for the Site 16 removal action is 95 percent for definitive data.

2.3.5 Comparability

Comparability is a qualitative parameter that expresses the confidence with which one data set may be compared to another. This goal is achieved through the use of standardized techniques to collect samples, the use of standardized analytical methods, and the use of appropriate units to report analytical results. All analytical laboratories performing work for the Navy must comply with the Comprehensive Long-term Environmental Action Navy (CLEAN) II laboratory services statement of work (CLEAN II laboratory services SOW) (PRC 1995), which specifies analytical protocols, QC criteria, and standard deliverables, promoting comparable data.

2.4 DETECTION AND QUANTITATION LIMITS

The instrument detection limit is the minimum concentration of an analyte that can be distinguished from the normal electronic "noise" of an analytical instrument, and is statistically determined. The quantitation limit is the lowest concentration at which an analyte can be accurately and reproducibly quantified. Quantitation limits vary depending on instrument sensitivity and sample matrix effects.

Contract-required detection limits (CRDL) and contract-required quantitation limits (CRQL) are the minimum quantitation limits that are contractually required for analyses performed under EPA CLP protocols. Lead analyzed using the CLP method is required to be reported to the CRDL. PCBs analyzed by the CLP method are required to be reported to the CRQL. All CRQLs, CRDLs, and quantitation limits are reported based on the dry weight of the sample. In other words, quantitation limits are adjusted based on moisture content of the soil. The detection limits and quantitation limits for the Site 16 removal action are listed in Table A-2.

**TABLE A-2
PCBs AND LEAD - CLP METHOD
REPORTING LIMITS
ALAMEDA POINT**

Compound	Soil	
	CRDL	CRQL
Aroclor 1016	----	16 ug/kg
Aroclor 1221	----	33 ug/kg
Aroclor 1232	----	16 ug/kg
Aroclor 1242	----	16 ug/kg
Aroclor 1248	----	16 ug/kg
Aroclor 1254	----	16 ug/kg
Aroclor 1260	----	16 ug/kg
Lead	1 mg/kg	----

Notes:
 CRDL - Contract required detection limit
 CRQL - Contract required quantitation limit
 ug/kg - microgram per kilogram
 mg/kg - milligram per kilogram

3.0 DOCUMENTATION AND RECORDS

This section describes the field documentation requirements for the proposed field activities for the Site 16 removal action, and includes the overall sample handling process and how the samples will be containerized and shipped to the laboratory.

3.1 SAMPLE IDENTIFICATION

Samples will be identified to provide a means of tracking each sample from collection through analysis, data reduction, reporting, and validation. A field identification system and a laboratory identification system have been established for Alameda Point to efficiently manage sample tracking and referencing and to provide a means of submitting blind samples to the laboratory. The following subsections describe sample identification procedures in detail.

3.1.1 Field Identification System

All samples will be assigned a field number on the basis of an alphanumeric code that will be unique and easily transcribed. These samples will be identified with a three-part identification code consisting of a sampling area code, a sample location number, and a sample type code as follows:

<u>Sampling Area</u>	<u>Excavation Area</u>	<u>Sample Number</u>
CANS	A	001

The sampling area consists of the letters CANS, which describes the C-2 CANS area. The excavation area code is a single-character code that identifies one of the four excavation areas (A through D) as shown on Figure 3 in the work plan. Each sample will also be assigned a unique sequential number for each sampling point location within a specified excavation area.

3.1.2 Laboratory Identification System

Each sample will be assigned a unique identifier, apart from the field identification number, to provide a means of submitting the samples blind to the laboratory. The number will be based on a three-part alphanumeric code, as follows:

<u>CTO Number</u>	<u>Site Code</u>	<u>Sample Number</u>
022	S16	001

The "022" represents CLEAN II contract task order (CTO) number 022, under which the field work

and sample analyses will be performed. The "S16" references the site from which the samples are collected. The last set of numbers represent an arbitrary sample number, sequentially assigned to each sample, including any field QC samples. This number will be used to cross-reference the field identification number. Table A-3 identifies the field and laboratory identification numbers, with the corresponding field identification numbers, and the analytical methods to be performed for each sample.

TABLE A-3
FIELD AND LABORATORY IDENTIFICATION NUMBERS
FOR SOIL AND QUALITY CONTROL SAMPLES
ALAMEDA POINT

Laboratory Identification	Field Identification	Matrix	Lead	PCBs
022-S16-001	CANS-A-001	Soil	x	x
022-S16-002	CANS-A-002	Soil	x	x
022-S16-003	CANS-A-003	Soil	x	x
022-S16-004	CANS-A-004	Soil	x	x
022-S16-005	CANS-A-005	Soil	x	x
022-S16-006	CANS-A-006	Soil	x	x
022-S16-007	CANS-A-007	Soil	x	x
022-S16-008	CANS-A-008	Soil	x	x
022-S16-009	CANS-A-009	Soil	x	x
022-S16-010	CANS-A-010	Soil	x	x
022-S16-011	CANS-A-011	Soil	x	x
022-S16-012	CANS-A-012	Soil	x	x
022-S16-013	CANS-A-013	Soil	x	x
022-S16-014	CANS-A-014	Soil	x	x
022-S16-015	CANS-A-015	Soil	x	x
022-S16-016	CANS-A-016	Soil	x	x
022-S16-017	CANS-A-017	Soil	x	x
022-S16-018	CANS-A-018	Soil	x	x
022-S16-019	CANS-B-001	Soil	x	x
022-S16-020	CANS-B-002	Soil	x	x
022-S16-021	CANS-B-003	Soil	x	x
022-S16-022	CANS-B-004	Soil	x	x
022-S16-023	CANS-B-005	Soil	x	x

TABLE A-3 (continued)
FIELD AND LABORATORY IDENTIFICATION NUMBERS
FOR SOIL AND QUALITY CONTROL SAMPLES
ALAMEDA POINT

Laboratory Identification	Field Identification	Matrix	Lead	PCBs
022-S16-024	CANS-B-006	Soil	x	x
022-S16-025	CANS-B-007	Soil	x	x
022-S16-026	CANS-B-008	Soil	x	x
022-S16-027	CANS-B-009	Soil	x	x
022-S16-028	CANS-B-010	Soil	x	x
022-S16-029	CANS-B-011	Soil	x	x
022-S16-030	CANS-B-012	Soil	x	x
022-S16-031	CANS-B-013	Soil	x	x
022-S16-032	CANS-B-014	Soil	x	x
022-S16-033	CANS-B-015	Soil	x	x
022-S16-034	CANS-B-016	Soil	x	x
022-S16-035	CANS-B-017	Soil	x	x
022-S16-036	CANS-B-018	Soil	x	x
022-S16-037	CANS-B-019	Soil	x	x
022-S16-038	CANS-B-020	Soil	x	x
022-S16-039	CANS-B-021	Soil	x	x
022-S16-040	CANS-B-022	Soil	x	x
022-S16-041	CANS-B-023	Soil	x	x
022-S16-042	CANS-B-024	Soil	x	x
022-S16-043	CANS-B-025	Soil	x	x
022-S16-044	CANS-B-026	Soil	x	x
022-S16-045	CANS-B-027	Soil	x	x
022-S16-046	CANS-B-028	Soil	x	x
022-S16-047	CANS-B-029	Soil	x	x
022-S16-048	CANS-B-030	Soil	x	x
022-S16-049	CANS-B-031	Soil	x	x
022-S16-050	CANS-B-032	Soil	x	x
022-S16-051	CANS-B-033	Soil	x	x
022-S16-052	CANS-B-034	Soil	x	x
022-S16-053	CANS-B-035	Soil	x	x
022-S16-054	CANS-B-036	Soil	x	x

TABLE A-3 (continued)

FIELD AND LABORATORY IDENTIFICATION NUMBERS
FOR SOIL AND QUALITY CONTROL SAMPLES
ALAMEDA POINT

Laboratory Identification	Field Identification	Matrix	Lead	PCBs
022-S16-055	CANS-B-037	Soil	x	x
022-S16-056	CANS-B-038	Soil	x	x
022-S16-057	CANS-B-039	Soil	x	x
022-S16-058	CANS-B-040	Soil	x	x
022-S16-059	CANS-B-041	Soil	x	x
022-S16-060	CANS-B-042	Soil	x	x
022-S16-061	CANS-B-043	Soil	x	x
022-S16-062	CANS-B-044	Soil	x	x
022-S16-063	CANS-B-045	Soil	x	x
022-S16-064	CANS-B-046	Soil	x	x
022-S16-065	CANS-B-047	Soil	x	x
022-S16-066	CANS-B-048	Soil	x	x
022-S16-067	CANS-B-049	Soil	x	x
022-S16-068	CANS-B-050	Soil	x	x
022-S16-069	CANS-B-051	Soil	x	x
022-S16-070	CANS-B-052	Soil	x	x
022-S16-071	CANS-B-053	Soil	x	x
022-S16-072	CANS-B-054	Soil	x	x
022-S16-073	CANS-B-055	Soil	x	x
022-S16-074	CANS-B-056	Soil	x	x
022-S16-075	CANS-B-057	Soil	x	x
022-S16-076	CANS-B-058	Soil	x	x
022-S16-077	CANS-C-001	Soil	x	x
022-S16-078	CANS-C-002	Soil	x	x
022-S16-079	CANS-C-003	Soil	x	x
022-S16-080	CANS-C-004	Soil	x	x
022-S16-081	CANS-C-005	Soil	x	x
022-S16-082	CANS-C-006	Soil	x	x
022-S16-083	CANS-C-007	Soil	x	x
022-S16-084	CANS-C-008	Soil	x	x
022-S16-085	CANS-C-009	Soil	x	x

TABLE A-3 (continued)

FIELD AND LABORATORY IDENTIFICATION NUMBERS
FOR SOIL AND QUALITY CONTROL SAMPLES
ALAMEDA POINT

Laboratory Identification	Field Identification	Matrix	Lead	PCBs
022-S16-086	CANS-C-010	Soil	x	x
022-S16-087	CANS-C-011	Soil	x	x
022-S16-088	CANS-C-012	Soil	x	x
022-S16-089	CANS-C-013	Soil	x	x
022-S16-090	CANS-C-014	Soil	x	x
022-S16-091	CANS-C-015	Soil	x	x
022-S16-092	CANS-C-016	Soil	x	x
022-S16-093	CANS-C-017	Soil	x	x
022-S16-094	CANS-C-018	Soil	x	x
022-S16-095	CANS-C-019	Soil	x	x
022-S16-096	CANS-C-020	Soil	x	x
022-S16-097	CANS-C-021	Soil	x	x
022-S16-098	CANS-C-022	Soil	x	x
022-S16-099	CANS-C-023	Soil	x	x
022-S16-100	CANS-C-024	Soil	x	x
022-S16-101	CANS-C-025	Soil	x	x
022-S16-102	CANS-C-026	Soil	x	x
022-S16-103	CANS-C-027	Soil	x	x
022-S16-104	CANS-C-028	Soil	x	x
022-S16-105	CANS-D-001	Soil	x	x
022-S16-106	CANS-D-002	Soil	x	x
022-S16-107	CANS-D-003	Soil	x	x
022-S16-108	CANS-D-004	Soil	x	x
022-S16-109	CANS-D-005	Soil	x	x
022-S16-110	CANS-D-006	Soil	x	x
022-S16-111	CANS-D-007	Soil	x	x
022-S16-112	CANS-D-008	Soil	x	x
022-S16-113	CANS-D-009	Soil	x	x
022-S16-114	CANS-D-010	Soil	x	x
022-S16-115	CANS-D-011	Soil	x	x
022-S16-116	CANS-D-012	Soil	x	x

TABLE A-3 (continued)

FIELD AND LABORATORY IDENTIFICATION NUMBERS
FOR SOIL AND QUALITY CONTROL SAMPLES
ALAMEDA POINT

Laboratory Identification	Field Identification	Matrix	Lead	PCBs
022-S16-117	CANS-D-013	Soil	x	x
022-S16-118	CANS-D-014	Soil	x	x
022-S16-119	CANS-D-015	Soil	x	x
022-S16-120	CANS-D-016	Soil	x	x
022-S16-121	CANS-D-017	Soil	x	x
022-S16-122	CANS-D-018	Soil	x	x
022-S16-123	CANS-D-019	Soil	x	x
022-S16-124	CANS-D-020	Soil	x	x
022-S16-125	CANS-D-021	Soil	x	x
022-S16-126	CANS-D-022	Soil	x	x
022-S16-127	CANS-D-023	Soil	x	x
022-S16-128	CANS-D-024	Soil	x	x
022-S16-129	CANS-D-025	Soil	x	x
022-S16-130	CANS-D-026	Soil	x	x
022-S16-131	CANS-D-027	Soil	x	x
022-S16-132	CANS-D-028	Soil	x	x
022-S16-133	CANS-D-029	Soil	x	x
022-S16-134	CANS-D-030	Soil	x	x
022-S16-135	CANS-D-031	Soil	x	x
022-S16-136	Rinsate Blank-001	Water	x	x
022-S16-137	Rinsate Blank-002	Water	x	x
022-S16-138	Rinsate Blank-003	Water	x	x
022-S16-129	Rinsate Blank-004	Water	x	x
022-S16-130	Rinsate Blank-005	Water	x	x
022-S16-131	Rinsate Blank-006	Water	x	x
022-S16-132	Rinsate Blank-007	Water	x	x
022-S16-133	Rinsate Blank-008	Water	x	x
022-S16-134	Rinsate Blank-009	Water	x	x
022-S16-135	Rinsate Blank-010	Water	x	x
022-S16-137	Field Blank-001	Water	x	x

3.2 SAMPLE HANDLING

Sample collection methods are described in the Site 16 oversight work plan. Sample handling procedures are described in the following sections.

3.2.1 Sample Containers and Labels

As described in the work plan, soil samples will be scraped into 8-ounce wide-mouth glass jars and sealed with Teflon lined caps. Approximately 200 grams of soil will be collected for analyses of PCBs and lead. The contracted laboratory will provide clean containers with caps, which meet EPA CLP container guidelines for CLP methods.

A sample label will be affixed to each sample container sent to the laboratory. The sample label will be completed in indelible ink and include the following information:

- Project name and location: **Alameda Point**
- Site name: **S16**
- Laboratory identification number: **022-S16-XXX**
- Date of sample collection: **8/XX/97**
- Preservative used: **N/A**
- Sampler's initials: **XXX**
- Sample type: **Soil**
- Analyses requested: **PCBs and Lead by CLP**

After the label has been affixed to the sample container, the label will be covered with a wide strip of clear strapping tape to protect it from moisture damage during shipment and storage.

3.2.2 Custody Seals

To ensure that no tampering occurs, custody seals will be placed on each cooler used to ship samples. Custody seals used during the course of the project will consist of security tape with the date and initials of the sampler. Two seals will be placed on each cooler so that they must be broken to gain

access to the contents. Clear tape will be placed over the custody seals to protect them from accidental breakage.

3.2.3 Chain-of-Custody

Chain-of-custody (COC) procedures provide an accurate written record that traces the possession of individual samples from the time of field collection through laboratory analysis. A sample is considered in custody if it meets one of the following criteria:

- In a person's possession
- In view after having been in physical custody
- In a secure area after having been in physical custody
- In a designated secure area to which access is restricted to authorized personnel

A COC record will be used to document the samples collected and the analyses requested. Information that field personnel will record on the COC record includes the following:

- Project name and number
- Name and signature of sampler(s)
- Destination of samples (name of laboratory)
- Laboratory identification number
- Date and time of collection
- Sample designation (grab or composite)
- Sampling location
- Signatures of personnel involved in custody transfer
- Date and time of all transfers
- Air bill number, if applicable
- Number and size of containers
- Preservatives used, if any
- Sample matrix
- Analyses required
- Contract number (in upper left corner)

Unused lines on the COC record will be crossed out. COC records initiated in the field will be signed, placed in a plastic resealable bag, and taped to the inside of the shipping container used for sample transport. Signed air bills will serve as evidence of custody transfer between the field sampler and courier, and between the courier and the laboratory. Copies of the COC record and the air bill will be retained and filed by the sampler prior to shipment.

Upon receipt of an ice chest or shipping container, laboratory personnel will review the contents and will sign and retain the COC record and the air bill. Information that will be recorded on the COC record in the remarks column, or on another appropriate document, at the time of sample receipt will include the following, as appropriate:

- Status of custody seals
- Temperature of ice chest upon receipt
- Identification number of broken sample containers, if any
- Description of discrepancies between the COC record, sample labels, and requested analyses
- Observations of visible headspace in sample bottles, indicating inadequate sample collection

Laboratory personnel will contact the project chemist regarding discrepancies in paperwork and sample preservation, and will document non-conformances and corrective actions in accordance with laboratory standard operating procedures.

After samples have been accepted by the laboratory, checked, and logged in, they will be maintained in a manner consistent with custody and security requirements specified in the EPA CLP SOW.

3.2.4 Sample Preservation and Holding Times

Methods of sample preservation are relatively limited and are generally intended to (1) retard biological degradation, (2) retard chemical degradation, and (3) reduce container adsorption effects. The proposed soil samples will be preserved by refrigeration to 4 °C, in accordance with EPA CLP protocols for CLP methods.

Upon receipt of the samples from the shipping company, the laboratory will make every effort to analyze all samples within the specified holding times for each analytical method. The field team will coordinate all sample shipments with the laboratory to reduce the possibility of these analyses exceeding the specified holding times. At a minimum, the laboratory will be required to extract samples for PCB analysis within 14 days of sampling, and will analyze the resulting extract within 40 days of extraction. For lead, the laboratory will be required to digest and analyze the samples within 6 months of sampling.

3.2.5 Sample Packaging and Shipping

All soil samples collected at Site 16 will be identified as environmental samples for the purpose of shipment. Environmental samples are defined as soil, water, or sediment that is not saturated with product material. All Department of Transportation (DOT) regulations will be followed for packaging and shipment. The following procedures, which are taken from EPA guidance on field operations methods (EPA 1987b), meet these DOT requirements.

- An ice chest will be lined with a large plastic bag. After the bag is in place, the ice chest will be filled with sample bottles that have been wrapped in bubble-wrap plastic. Any additional space between bottles will be filled with styrofoam, starch peanuts, or shredded paper. Sufficient packing material will be used to prevent sample containers from making contact during shipment. Sufficient bagged ice or blue ice will be added to the samples to maintain the ice chest at a temperature of 4°C during shipping. The large plastic bag will be securely taped shut to prevent leakage.
- COC records will be sealed in plastic bags and taped to the inside of the ice chest lid.
- The ice chest will be closed and taped shut with filament-type strapping tape on both ends. If the ice chest contains a drain, the drain will be taped closed both inside and outside.
- The ice chest will be custody-sealed by placing a short length of custody tape across the opening of the ice chest lid at two places—one on the front and one on the side of the ice chest. The custody tape will then be signed and dated.
- An air bill will be prepared and affixed to the lid of the ice chest. The ice chest may then be handed over to the specified overnight carrier, such as Federal Express or United Parcel Service, for shipment.

No samples will be held on site for more than 24 hours, except when weekend sampling occurs. Samples collected on weekends will be refrigerated and shipped on the next available working day.

3.3 FIELD DOCUMENTATION

Sampling activities during the field work require several forms of documentation to maintain sample identification, COC, and to record significant events or observations. Required documentation will include the use of logbooks and field change request forms. Daily oversight reports including information on field sampling is described in Section 2.2.2 of the work plan.

3.3.1 Logbooks

Logbooks are hardbound notebooks in which all activities associated with the field investigation will be thoroughly described. Logbooks are intended to provide sufficient data to reconstruct events occurring during the field project. A field sampling logbook will be kept by the field team leader (FTL).

Information regarding sampling activities will be recorded within the field sampling logbook and will include, at a minimum, the following:

- Personnel on site
- Weather Conditions
- Sampling and shipping summary
 - Air bill number
 - COC number
 - Sample destination
 - Time of pickup
- Stop and start times for sampling activities at each location
- Description of any problems encountered during sampling at each location
- Description of deviations from the work plan

Other appropriate observations may be included.

3.3.2 Field Change Request Forms

Field change request forms provide a written record documenting proposed changes to project plans including the work plan, the health and safety plan, and the QAPP. Any request will include the rationale for the proposed changes and the anticipated impacts of the deviation. The form will be signed by appropriate project personnel, including the FTL, the health and safety program officer, and the project manager. Approval of the change by the Navy may be required before any change to the field program is implemented.

3.4 LABORATORY DOCUMENTATION

The laboratory shall provide the Navy full data packages and electronic data deliverables (EDD) in accordance with the CLEAN II laboratory services SOW (PRC 1995). Data packages and EDD must be received by the Navy within 35 days after receipt of the samples; however, as specified in the work plan, the laboratory shall provide preliminary results (CLP Form 1's) to the project manager within 5 working days after receipt of the samples.

The data package will include two copies of a summary data package containing the following:

- Case narrative
- Copies of non-conformance/corrective action forms
- Chain-of-custody forms
- Tracking documents
- Sample results
- QA/QC summaries

The data package will also include requirements for a full data package that includes the following:

- Sample raw data
- QC raw data
- Standard raw data
- Instrument raw data
- Other raw data

3.5 DATA VALIDATION AND QUALITY CONTROL SUMMARY REPORTS

Data validation is the process by which the laboratory data package, or sample delivery group (SDG), is technically evaluated by a party independent of the laboratory.

The laboratory will analyze samples in SDGs that consist of no more than 20 samples each. The validation reviewer will prepare a validation narrative for each SDG. Each validation narrative will contain a list of the samples in the SDG, the analyses performed, the identity of the samples receiving full validation, and the results of validation for each methodology.

During data validation, the validation reviewer will complete worksheets that document the criteria reviewed. These worksheets will be used to generate the validation narrative. The worksheets are part of the complete data validation report that will be kept on file.

Once the analytical data have been received from the laboratory and the data validation has been performed, a quality control summary report (QCSR) will be prepared. The QCSR summarizes the data validation reports, the project goals, the PARCC criteria, and evaluates the ability of the analytical data to support the project DQOs. The QCSR will include the following information:

- Tabulated, validated data tables
- Data validation narratives
- Evaluation of PARCC criteria

The QCSR is intended to provide a general overview of data quality and the data validation reports. Specific details may be found in the data validation narratives which are included in the appendix of the QCSR.

4.0 MEASUREMENT AND DATA ACQUISITION

The following sections describe the field and laboratory methods and QA/QC requirements associated with sampling and analyses of confirmation soil samples collected during the Site 16 removal action. Laboratory procedures will include the analysis of soil samples for PCBs and lead using EPA CLP

methods. For PCB analyses, soil samples will be quantified according to the CLP SOW OLM03.1 protocol (EPA 1994b). For lead analyses, soil samples will be quantified according to the CLP SOW ILM04.0 protocol (EPA 1995). See Tables A-1 and A-2 for appropriate QA requirements.

4.1 QUALITY CONTROL REQUIREMENTS AND FREQUENCY

QC checks are instituted to obtain accurate and precise data and to document the quality of the data. These checks cover the field sampling effort and the laboratory analytical work. This section discusses the required QC checks and their frequency.

4.1.1 Field Quality Control Samples

Field QC samples will be collected for laboratory analysis to check sampling and analytical accuracy and precision. These samples are consistent with guidelines presented in the Navy QA requirements (Naval Energy and Environmental Support Activity 1988). Table A-4 summarizes all field and laboratory QC samples.

**TABLE A-4
FIELD AND LABORATORY QC SAMPLES
ALAMEDA POINT**

Sample Type	Frequency of Analysis
Matrix Spike/Matrix Spike Duplicate Pair (organics)	5 percent ^a
Matrix Spike (inorganics)	5 percent ^b
Matrix Duplicate (inorganics)	5 percent ^c
Field Blank Sample	One sample analyzed per event
Equipment Rinsates	One rinsate analyzed per day per equipment

Notes:

- ^a At least one MS/MSD pair will be included with each analytical batch. The sample selected for the MS/MSD pair will be chosen by the field personnel and submitted to the laboratory in triplicate.
- ^b At least one MS will be included with each analytical batch. The sample selected for the MS will be chosen by the field personnel and submitted to the laboratory in duplicate.
- ^c At least one matrix duplicate (MD) will be analyzed with each analytical batch. The sample selected for the MD will be chosen by the laboratory.

4.1.1.1 Field Blank Samples

Field blank samples consist of the source water used for the final rinsing of sampling equipment during decontamination. The water used will be deionized or distilled and will be obtained in 5-gallon plastic carboys from a reliable vendor. The field blank samples will be analyzed for all analyses in which a decontamination procedure was used. The results of the field blank samples will provide information on the potential for contamination of field samples and will be used to qualify data on the basis of blank contamination. One field blank sample will be collected during the soil sampling.

4.1.1.2 Equipment Rinsate Samples

Equipment rinsate samples are used to evaluate the decontamination procedures and the resulting cleanliness of the sampling equipment. The rinsate samples will be collected after a sample collection device is subjected to standard decontamination procedures. Deionized or distilled source water will be poured over or through the sampling device after decontamination and will be collected in the appropriate containers for analysis. The equipment rinsate samples will be packaged with the field samples and shipped blind to the laboratory for the specified analyses. One equipment rinsate sample per sampling device per day will be sampled and submitted for the appropriate analyses.

4.1.2 Laboratory Quality Control Parameters

Laboratory QC samples and procedures will be performed at the frequency specified in the referenced method, and as required by the laboratory's specific QA/QC program. These QC samples and procedures may include the following:

- Method blanks
- MS/MSDs
- Matrix duplicates
- Laboratory control samples
- Interference check samples
- Post-digestion spike samples
- Instrument performance check samples

- Internal standards
- Surrogate standards

4.2 INSTRUMENT AND EQUIPMENT TESTING, INSPECTIONS, AND MAINTENANCE REQUIREMENTS

The contracted laboratory will perform instrument and equipment testing, inspections, and maintenance at the frequency specified in the referenced method, and as required by the laboratory's specific QA/QC program.

4.2.1 Instrument Calibration and Frequency

For all analytical laboratory procedures, the analytical instruments must be calibrated within the analytical method requirements specified in the laboratory's standard operating procedures and, in addition, the CLEAN II laboratory services SOW (PRC 1995). All calibration information, including date and time, will be logged on the appropriate form, logbook, document, and electronic format. The analytical laboratories will perform and retain documentation of calibration and maintenance of all instruments used for the analysis of samples.

4.2.2 Inspection and Acceptance Requirements for Supplies and Consumables

Supplies and consumables to be used in the field will be ordered from Hazco, Inc., a field equipment supplier, or the contracted laboratory. Prior to use in the field, the items will be inspected and tested. Any defective material will be replaced prior to the onset of the sampling event.

All sample containers with the appropriate preservation are prepared by the analytical laboratory following laboratory procedures, and meet EPA specifications for certified clean containers. All containers and coolers are inspected prior to use for packing and shipping samples. Prior to use in the field, containers will be inspected. Any defective material will be replaced prior to the onset of the sampling event.

Appropriate materials (such as bubble-wrap, plastic bags, and tape) will be available for packing samples to avoid breakage during transportation.

4.3 DATA ACQUISITION REQUIREMENTS

Data acquired through the analyses of samples will be reported following formats established by the CLP method and the CLEAN II laboratory services SOW, and will be reported within the required deliverable schedule. All data from analytical laboratories will be presented in a CLP hardcopy or equivalent data package and in the electronic data deliverable format detailed in the CLEAN II laboratory services SOW (PRC 1995).

The EDD is an ASCII file of the results and sample identification information downloaded into a specific file structure from the laboratory information management system. The EDD is imported into the Alameda Point database. All data and QC information in the file must be within the limits established by the CLEAN II laboratory services SOW for correct transfer of the data from the laboratory. If an EDD is incorrectly structured, the laboratory is required to resubmit the data file.

All field data will be recorded on the appropriate field forms for data entry into the Alameda Point database. All data entered into the database, either from field forms or imported from an EDD, will be reviewed for accuracy.

4.4 DATA MANAGEMENT

The following sections outline the project data management scheme.

4.4.1 Field Data Management

The project manager will be responsible for the review, transfer, and storage of all data collected in the field for the Site 16 removal action. Field activities will be documented by the FTL as described in Section 4.0: All field change request forms and daily field sampling reports will be filed by the project manager and copies will be included as an appendix to the final QCSR.

4.4.2 Laboratory Data Management

Upon the receipt of the samples by the laboratory, the laboratory sample custodian will reconcile the information on the COC forms with the sample bottles received. The sample custodian will document any anomalies and report these to the laboratory project manager. Anomalies will be resolved with the project chemist. The information on the COC forms will then be entered into the laboratory's information management system along with the analyses being requested. The proper sample container labels will be generated and attached to the containers.

Data acquired through the sample preparation, analysis, and reporting processes are tracked using the laboratory's information management system. Data are either transferred from the instrumentation electronically to the laboratory's information management system or qualified personnel enter the data through terminals. The laboratory is responsible for tracking all QC measurements along with the specific sample results on a batch basis. Any QC measurements that exceed the specified QC limits for the project are documented. QC problems which directly impact data quality are immediately communicated to the project chemist. The laboratory will implement necessary corrective action which also will be appropriately documented. After all data are collected, reviewed, and approved, the laboratory will generate an EDD and a CLP data package from the laboratory's information management system and deliver them to the project chemist.

The laboratory project manager is responsible for proper sample handling and documentation that will allow for the tracking of individual samples from the time of receipt to the submittal of the final data package and electronic deliverable to the project chemist. Laboratory sample receipt deficiency reports and non-conformance memos will be used by the laboratory to document and disseminate non-conformance information to the project chemist.

The laboratory is required to maintain the analytical records for a period of 10 years. Data can be stored in a number of ways, usually including a combination of hard copy and computer tape backups.

4.4.3 Data Management

The laboratory is responsible for sending a hard copy of the CLP data package and an EDD on computer diskette to the project chemist. Upon the receipt of the data package, the EDD is imported into the database. The importing program checks the format and content of the EDD for compliance with Navy specifications. Any errors reported by the importing program are thoroughly investigated. If necessary, the laboratory is requested to regenerate the deliverable. The EDD, as well as the hard copy data package, are also checked for completeness. Any missing information in either the EDD or the hard copy is immediately requested from the laboratory.

Data tables are printed from the database and copies of both the data tables and the hard copy data package are sent to an outside party for data validation as described in Section 5.4. The validator then applies qualifiers or comment codes, as appropriate, to data and marks the data tables for input into the database. The validator prepares a data validation report and returns the data package, marked tables, and data validation report to the project chemist.

The project chemist performs a technical review of the data validation report as described in Section 5.1.3. The data tables are submitted to a data entry person for input into the database. The final version of the data validation report is generated complete with the analytical tables containing the appropriate qualifiers and comment codes. This complete data validation package is stored with the raw analytical data. Copies of all validation report narratives are submitted with the QCSR.

The project chemist is responsible for the proper handling of the data. At the conclusion of the project, the project chemist will prepare a QCSR in support of the report which summarizes the overall quality of the data and also determines whether the DQOs were achieved. All hard copy data packages are stored in an off-site storage facility and the final versions of the electronic data tables are archived onto electronic data diskettes for permanent storage.

5.0 ASSESSMENT AND OVERSIGHT

An assessment evaluates the capability and performance of a measurement system or its components and identifies problems warranting correction. This section presents the activities for assessing the effectiveness of the implementation of the QAPP.

5.1 ASSESSMENT

Assessments planned for the confirmatory sampling at Site 16 include the following: (1) performance evaluations, (2) technical systems audits, (3) technical reviews, and (4) field audits.

5.1.1 Performance Evaluations

A performance evaluation includes a review of the existing project and QC data to determine the accuracy of a total measurement system or a component of the system. Laboratory performance evaluations are conducted routinely by the Navy. Internal performance evaluations or audits for the laboratory are described in the laboratory QA plan.

5.1.2 Technical Systems Audit

A technical systems audit is used to verify adherence to QA policies and standard operating procedures. This type of audit may consist of an on-site review of measurement systems, including facilities, equipment, and personnel. Additionally, procedures for measurement, QC, and documentation may be evaluated. Technical systems audits are conducted on a regularly scheduled basis, with the first audit conducted shortly after a system becomes operational.

5.1.3 Technical Reviews

Technical reviews are performed on all reports and deliverables, including data validation reports and the QCSR. All data validation reports are reviewed for technical accuracy by a chemist independent from the data validator. The data validation reports are reviewed for consistency within the project as well as the overall remedial investigation.

5.1.4 Field Audits

A field audit involves an on-site visit by the auditor or auditing team. Items to be examined include the availability and implementation of approved work procedures; calibration and operation of equipment; packaging, storage, and shipping of samples; documentation of procedures and instructions; and non-conformance documentation.

5.2 RESPONSE ACTION

An effective QA program requires prompt and thorough correction of non-conformances affecting quality. Rapid and effective corrective action minimizes the possibility of questionable data or documentation. All QA problems and corrective actions will be documented to provide a complete record of QA activities.

5.2.1 Field Corrective Action Procedures

Corrective action procedures will depend on the severity of the non-conformance. In cases where immediate and complete corrective action may be implemented by field personnel, corrective actions will be recorded in the field logbook and summarized in the daily field progress report and site logbook.

Non-conformances identified during an audit that have a substantial impact on data quality require the completion of a corrective action memorandum. This memorandum may be completed by an auditor or any individual who suspects that any aspect of data integrity is being affected by a field non-conformance. The memorandum will include the description of the problem and the required corrective action.

Copies of the corrective action memo will be distributed to the project manager, FTL, the project QA officer, and the project file. The project QA officer will forward the memorandum to the CLEAN II program manager and the QA program manager as appropriate. Key personnel will meet to discuss the following:

- Determine when and how the problem developed
- Assign responsibility for problem investigation and documentation
- Determine the corrective action needed to eliminate the problem
- Design a schedule for completion of the corrective action
- Assign responsibility for implementing the corrective action
- Document and verify that the corrective action has eliminated the problem

The person identified as responsible for implementing the corrective action will also be responsible for completing a follow-up memorandum documenting the completion of the corrective action. The follow-up memorandum will be submitted to the project QA officer to evaluate that the solution has adequately and permanently corrected the problem. The QA program manager can require data acquisition to be limited or discontinued until the corrective action is complete and the non-conformance eliminated. The QA program manager can also request the reanalysis of any or all data acquired since the system was last in control.

5.2.2 Laboratory Corrective Action Procedures

The internal laboratory corrective action procedures and a description of out-of-control situations requiring corrective action are contained in the laboratory QA plan. At a minimum, corrective action will be implemented when control chart warning or control limits are exceeded, method QC requirements are not met, or sample holding times are exceeded. Out-of-control situations will be reported to the project chemist within 2 working days of identification. In addition, a corrective action report, signed by the laboratory director or project managers and the laboratory QC coordinator, will be provided to the project chemist. The corrective action report will include the description of the problem, the identification of affected samples, and the required corrective action.

The corrective action procedures require that the laboratory identify all out-of-control situations that would result in significant amounts of qualified data and perform a corrective action designed to reduce the amount of qualified data. This corrective action is often the reanalysis of samples once the cause of the out-of-control situation has been identified and corrected.

5.3 REPORTS TO MANAGEMENT

A summary progress report will be prepared on a monthly basis by the project manager and submitted to the Navy. The report may include the following:

- Audit results, if any audit conducted during the reporting period
- Status of the project
- Problems affecting QA and recommended solutions

- Objectives from the previous report that were achieved
- Objectives from the previous report that were not achieved
- Work and objectives planned for the next month

This information will also be required from any subcontractors and will be included in the monthly status report.

5.4 DATA VALIDATION AND USABILITY

This section provides an overview of the data validation process and how data useability is documented. The data validation process ultimately enables the reconciliation with the project objectives.

5.4.1 Data Review, Validation, and Verification Requirements

Through the data validation process, the data will be evaluated for acceptable quality and quantity, based on the critical indicator parameters of PARCC (EPA 1987a). These parameters are discussed in detail in Section 2.3.

All analytical methods for each SDG will be validated on the basis of the criteria listed in the following:

- “U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review” (EPA 1994c)
- “USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review” (EPA 1994d)

All samples in each SDG will receive a cursory validation review, and, initially, 10 percent of the samples for each of the analyses performed will receive a full validation review. Table A-5 lists the cursory validation criteria and the full validation criteria.

**TABLE A-5
DATA VALIDATION EVALUATION CRITERIA
ALAMEDA POINT**

<u>CLP Inorganics (EPA 1994d)</u>	<u>CLP Organics (EPA 1994c)</u>
<ul style="list-style-type: none"> *Holding times *Calibration (initial and continuing) *Blanks (method, instrument, and preparation blanks) Inductively coupled plasma (ICP) interference check sample *Laboratory control sample *Duplicate sample analysis *MS sample analysis Graphite furnace atomic absorption QC ICP serial dilution Sample result verification *Field duplicates *Overall assessment of data for an SDG 	<ul style="list-style-type: none"> *Holding times Gas chromatograph/mass spectrometer tuning *Calibration (initial and continuing) *Blanks (method, instrument, and preparation blanks) *Surrogate recovery *MS/MSD *Field duplicates *Internal standard performance Target compound identification Tentatively identified compounds System performance *Overall assessment of data for an SDG

Note: All items listed are evaluated during a full validation review. Cursory review items are indicated by a single asterisk (*).

After the data have been reviewed, data validation qualifiers will be applied to the analytical results. Data validation qualifiers are alphabetical characters that are placed next to each reported value that corresponds to definitions specified by the functional guidelines. Table A-6 lists data validation qualifiers and their definitions based on functional guidelines (EPA 1994c).

**TABLE A-6
DATA VALIDATION
QUALIFIERS
ALAMEDA POINT**

Data Qualifiers ^a	Definition
U	Compound was analyzed for, but was not detected above the concentration listed; the value listed is the sample quantitation limit.
J	Estimated concentration value; the result is considered qualitatively acceptable but quantitatively unreliable.
UJ	Estimated quantitation limit; the compound was analyzed for but was considered nondetected.
JN	An analyte has been tentatively identified; the associated numerical value represents its approximate concentration.
R	The data are unusable (compound may or may not be present). Resampling and reanalysis are necessary for verification.
No qualifier	The data are acceptable qualitatively and quantitatively.

A QCSR will be generated to summarize the project goals stated in the DQOs and the PARCC criteria. The QCSR will summarize how well the analytical data support the DQOs. The QCSR will include the following items:

- Reconciliation with DQOs
- Laboratory data validation summary
- Field screen data summary
- Limitations on the applicability of the data
- Any quality assurance plan modifications from the work plan
- Field audit report
- Any corrective actions performed

The data validation summary includes a brief description of the results of the data validation process for each analytical method; this description consists of the assessment of data quality in terms of the PARCC criteria. The details of the data validation process for each SDG, along with the validated analytical results, are included as data validation narratives in an appendix of the QCSR.

The laboratory will submit analytical reports in hard copy and electronic formats. Both hard copy reports and the electronic database reports will be submitted with laboratory qualifiers that are defined by either the EPA CLP SOW or the laboratory's standard operating procedures. Data submitted with CLP or laboratory-defined qualifiers identify items such as (1) nondetected values, (2) values below the CRQL (considered estimated values), and (3) values with problems during the analysis. Through data validation, these CLP or laboratory-defined data qualifiers are evaluated for appropriateness and replaced, as necessary, by the functional guidelines data validation qualifiers to notify the data user of the validity of the data. A database program created for the Navy will be used to transfer data from the laboratory by an ASCII-formatted diskette. This database allows (1) the data validation qualifiers to be substituted as necessary for the original laboratory qualifiers, (2) corrections of detected data errors, (3) other software to be interfaced, and (4) tables to be printed with the validated results in various formats.

In addition to the analytical results with the associated qualifiers, the printed tables will also include a comment column. The comment column is used to provide an explanation for any assigned qualifiers.

The alphabetical letters "a" through "h" are used to reference different QC issues that may have affected the analytical results. Table A-7 lists the associated definitions for these comment codes. The comment codes on the analytical tables will provide the reader with an immediate explanation for the qualifier attached to the result. The comment code will also enable the reader to locate a detailed discussion of the QC issue in the appropriate data validation narrative.

**TABLE A-7
DATA VALIDATION
COMMENT CODES
ALAMEDA POINT**

Comment Codes	Definition
a	Surrogate spike recovery problems
b	Blank contamination problems
c	MS recovery problems
d	Duplicate (precision) problems
e	Internal standard problems
f	Calibration problems
g	Quantification below the reporting limit
h	Other problems; refer to data validation narrative

Note: ^a EPA 1994c

5.4.2 Reconciliation with Data Quality Objectives

The project chemist is responsible for data quality. All data quality issues concerning field sampling efforts, laboratory analysis, data validation, database management, and data reporting will be referred to the project chemist. In addition, the project chemist will be responsible for the following data handling procedures:

- Sorting, binding, and tracking of analytical raw data delivered from the laboratory
- Input of EDD into the database and printing of initial result tables
- Reconciliation of sample numbers, field identification numbers, and requested analyses, based on the work plan, COC, and data package

- Preparation and shipment of SDGs to data validation services
- Technical review of data validation reports
- Input of data validation qualifiers into the database
- Preparation of final data validation report, including text, supporting documentation, and final result tables
- Preparation of EDD for input into geographical information system

At the conclusion of the project, the project chemist will prepare a QCSR in support of the characterization report, which summarizes the overall quality of the data and also determines whether the DQOs of the project were met. In addition, any tabular results required for the characterization report will be printed and be reviewed for accuracy by the project chemist.

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