CLEAN

Contract No. N62474-88-D-5086

Contract Task Order 0137
Modification No. 05

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NAVAL AIR STATION, ALAMEDA
ALAMEDA, CALIFORNIA

REMOVAL ACTION
LEAD AND ACID SOILS REMOVAL
INTERMEDIATE MAINTENANCE FACILITY SITE

IMPLEMENTATION WORK PLAN
FINAL

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NAVAL AIR STATION ALAMEDA
IMPLEMENTATION WORK PLAN

CONTENTS

CONTENTS
(Continued)

LIST OF FIGURES

LIST OF TABLES

SECTION 1.0

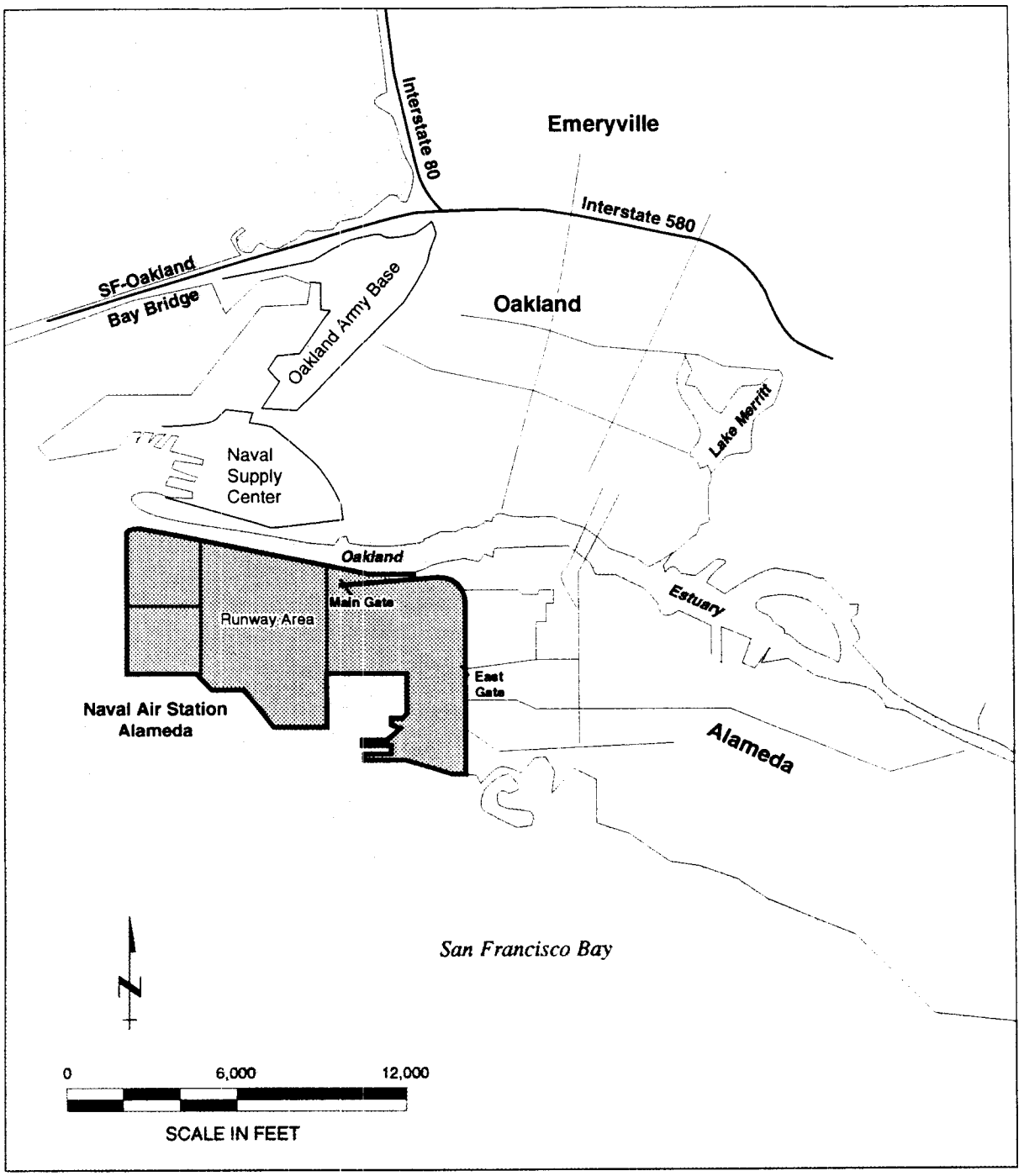
1.0 INTRODUCTION

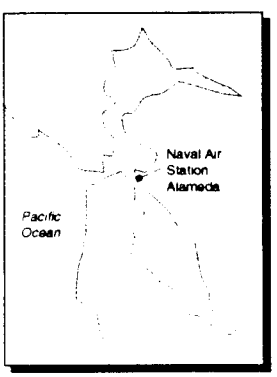
PRC Environmental Management, Inc. (PRC) received Contract Task Order No. (CTO) 0137 Modification No. 05 (Mod 5), from the Department of the Navy, Western Division, Naval Facilities Engineering Command (WESTDIV), under Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract No. N62474-88-D-5086 on May 21, 1993. The Navy statement of work, dated May 21, 1993, calls for PRC to perform four tasks at Naval Air Station (NAS) Alameda in California (Figures 1 and 2). These tasks are part of the removal action (RA) for lead and acid soils at the Intermediate Maintenance Facility (IMF) site and include the following: (1) prepare an action memorandum and implementation work plan; (2) perform engineering oversight and conduct confirmation sampling and analysis and waste profiling; (3) prepare an implementation report; and (4) attend meetings.

PRC and its CLEAN team subcontractor, Montgomery Watson (hereafter referred together as the PRC team), prepared this implementation work plan. This work plan presents the PRC team's technical approach to provide engineering oversight, conduct confirmation sampling and analysis, and provide other technical support as needed by the Navy. This work plan details the project organization, tasks to be performed, and performance protocols (health and safety, sampling and analysis, and quality assurance) required for this work. Soil profile samples have already been submitted for waste profiling prior to writing this work plan. The results of the profiles are discussed in this plan. Excavation, screening-level analysis, transportation, and disposal plans are also described in this work plan, but will be performed by the Navy Public Works Center (PWC).

1.1 BACKGROUND

The IMF site at NAS Alameda is located within Installation Restoration (IR) Site No. 13. High concentrations of lead and low pH were detected in soils at this site in the former Harding Lawson Associates (HLA) soil boring B-7 (Figure 3). Based upon subsequent soil sampling by the PRC team in 1992, the extent of the lead and acid contamination appears to be limited to a localized area in the immediate vicinity of soil boring B-7. The Navy and the California Environmental Protection Agency's (Cal-EPA) Department of Toxic Substances Control (DTSC) agreed that an RA will be conducted to remove soil with high lead concentrations and low pH in the vicinity of soil boring B-7.

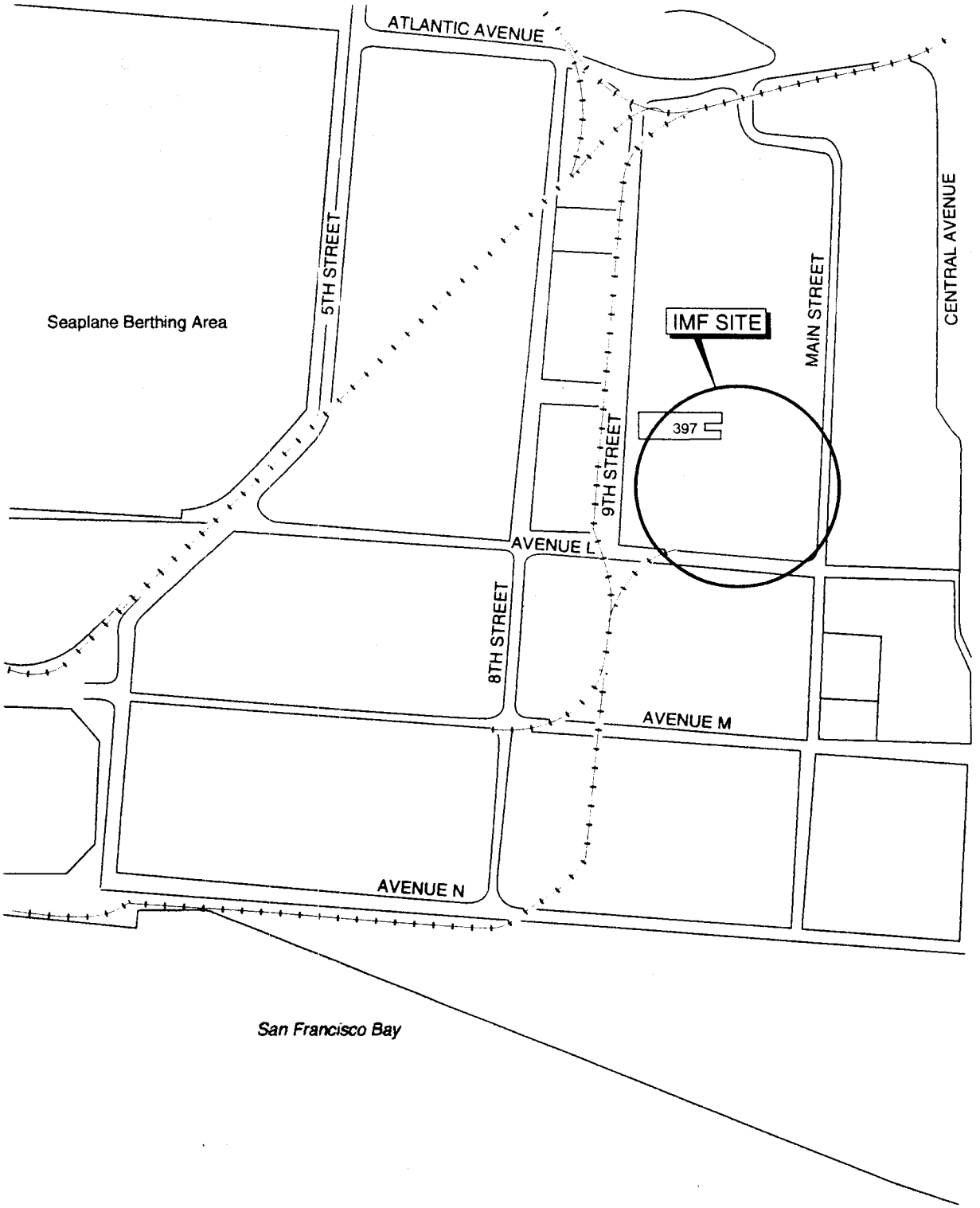




NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

REGIONAL LOCATION MAP

FIGURE 1



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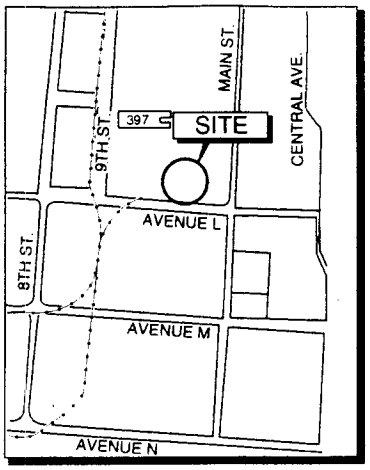
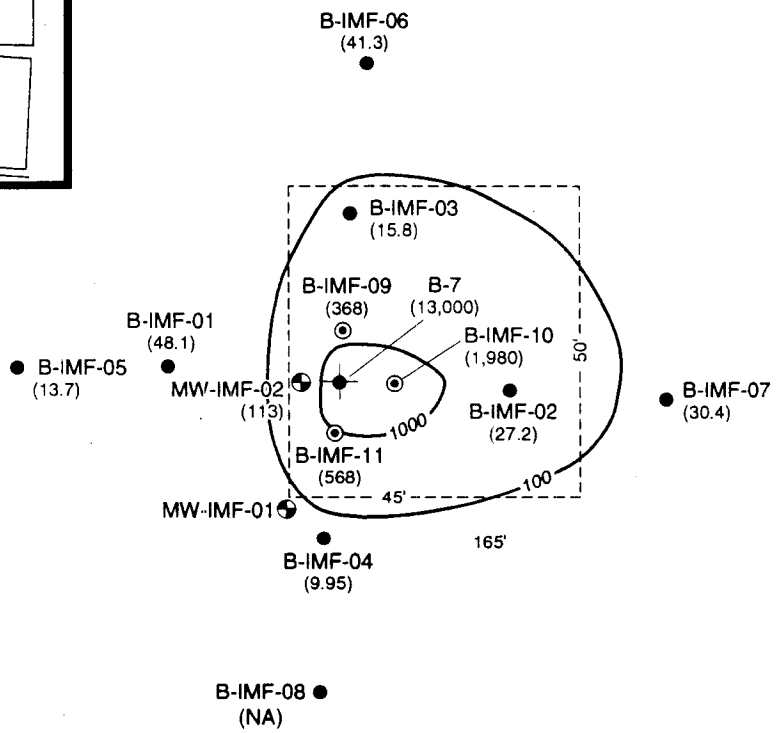
SCALE IN FEET

NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

LOCATION MAP
IMF SITE

FIGURE 2



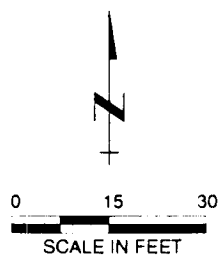


* Assumed Depth to Groundwater = 5.0 ft.

AVENUE L

LEGEND

- Monitoring Well Location
- HLA Soil Boring Location
- Soil Boring Location, Phase I Investigation
- Soil Boring Location, Phase III Investigation
- ----- Excavate to 100 mg/kg (maximum allowable extent of excavation is 45 feet by 50 feet)
- 100 Total Lead Concentration, mg/kg
- (41.3) Maximum Total Lead Concentration Detected Within Soil 5 feet bgs in mg/kg
- NA Not Analyzed



Sources:
Modified from PRC/JMM, 1992;
Modified from HLA, 1989

3/93 137

NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

EXTENT OF EXCAVATION
IMF SITE

FIGURE 3

The Navy, DTSC and the Regional Water Quality Control Board (RWQCB) previously agreed upon a maximum allowable excavation extent of 45 feet by 50 feet by 5 feet below ground surface (bgs).

The engineering evaluation of the RA disposal and treatment alternatives was conducted by the PRC team in April 1993. Based on the IMF site Disposal/Treatment Alternatives Report, excavation of the contaminated soils followed by disposal of the excavated soils at either a recycling facility or a Class I landfill were the recommended alternatives.

In addition, the Navy would like to utilize its Public Works Center (PWC) personnel to perform excavation, screening-level analysis, transportation, and disposal of the contaminated soil. The PRC team will perform engineering oversight, permitting and waste profiling, screening-level and confirmation sampling, and confirmation sample analysis during the RA.

1.2 PURPOSE

This implementation work plan details the PRC team's technical approach to perform RA remedial activities at the IMF site. Items discussed include the estimated extent of excavation; methods of excavation, transportation, and disposal of excavated soil; and verification of sampling and analysis procedures. The work plan is prepared for PWC to perform the removal and subsequent disposal of low pH, lead-contaminated soil at the IMF site and for abandoning well MW-IMF-02. The work plan includes an addendum to the PRC team's existing IMF site health and safety plan, PWC's site health and safety plan and a quality control and quality assurance (QA/QC) plan as appendixes A, B and C, respectively. The work plan also includes a description of engineering controls to address the following contingencies:

- Groundwater seepage into the excavation area during excavation;
- Hydrocarbon floating free-product seepage into the excavation; and
- Elevated concentrations of lead and/or low pH (high acidity) detected in soils below the groundwater table.

1.3 PROJECT ORGANIZATION

A well-organized project team, combined with adequate experience and proper training, has been assembled to ensure consistent quality throughout the IMF RA project. The project team involved with soil remediation oversight at the IMF site consists of the following:

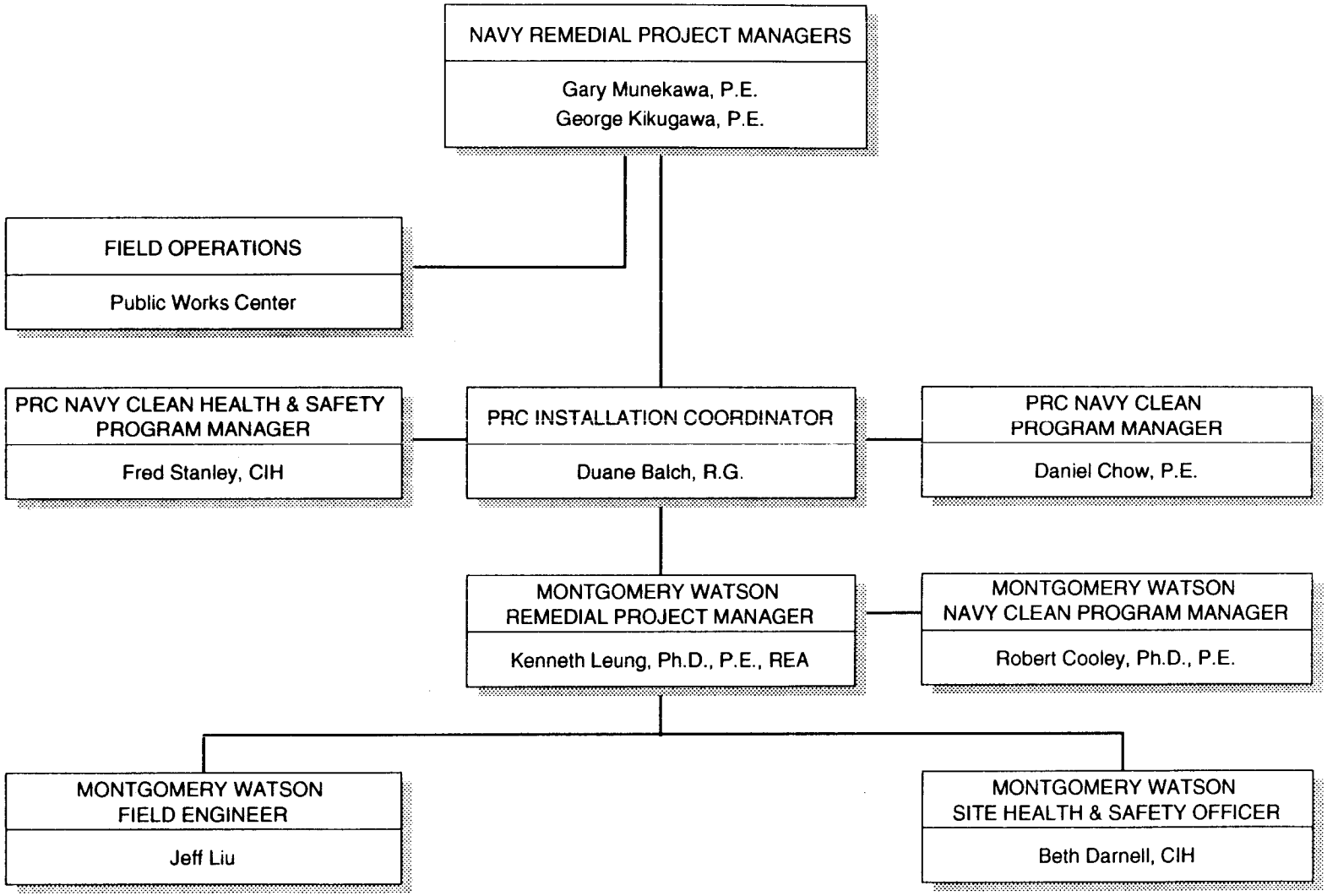
- Program Manager
- Project Manager
- Site Health and Safety Officer
- Field Engineer

Figure 4 presents an organization chart for this project.

1.4 WORK PLAN ORGANIZATION

This work plan contains five sections and three appendices.

- Section 1.0 - Introduction
- Section 2.0 - Operations Plan
- Section 3.0 - Verification Sampling Plan
- Section 4.0 - Transportation Plan
- Section 5.0 - References
- Appendix A - Addendum to the Existing Site Health and Safety Plan
- Appendix B - Navy Public Works Center Site Health and Safety Plan
- Appendix C - Quality Assurance Project Plan



NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

PROJECT ORGANIZATION
IMF SITE

FIGURE 4

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SECTION 2.0

2.0 OPERATIONS PLAN

This operations plan section discusses the site mobilization, site work plan, removal of the excavated soil, demobilization, and final site cleanup activities to be conducted by PWC forces with oversight by the PRC team. Included in Section 2.2 are descriptions of site preparation, well abandonment, excavation, contingencies, waste characterization and disposal, and backfill and compaction.

Daily field progress reports summarizing each field day's activities will be generated by the PRC team field engineer and forwarded at each day's end (7 field days are assumed) via facsimile machine to the Navy at WESTDIV, DTSC, and the RWQCB.

2.1 MOBILIZATION

This section describes the activities that will be performed by PWC to mobilize the NAS Alameda IMF site RA project.

2.1.1 Decontamination Areas

The personnel decontamination trailer will include at three cleaning areas water that will be used for a boot and glove wash, a boot and glove rinse, and a final rinse for both boots and gloves. There will also be a fourth wash and rinse for respirators and other reusable personal protective equipment (PPE). The decontamination trailer will have detergent solution, brushes, sponges, racks for air drying safety equipment, and clean towels. In addition, a large-equipment decontamination station will be installed to include a visqueen-lined bermed area large enough to contain the backhoe, front-end loader, or excavator requiring decontamination.

The specific procedures to be followed for personnel decontamination are listed in the PRC team's health and safety plan (HSP) addendum and in PWC's HSP (Appendices A and B).

2.1.2 Tarping and Decontamination Station

PWC will set up a tarping and decontamination (TD) station for the trucks on a pavement surface north of the excavation area. The TD station will be lined with 10-millimeter (mm) visqueen and bermed to contain runoff. A tarping station will be constructed of scaffolding materials in the center of the TD station.

2.1.3 Sloping/Shoring Design

Because no persons will be entering the excavation area and in accordance with the California Occupational Health and Safety Administration (Cal-OSHA) Title 8, Sub-chapter 4, Construction Safety Orders, Section 1540, sloping, shoring, and/or shielding requirements are not applicable to this project. PWC will slope the excavation floor toward one end in case groundwater seepage into the excavation area is encountered (Section 2.2.4).

2.1.4 Runoff Control

Accumulation of rain in the excavation area will be pumped, collected in a Baker tank, sampled and analyzed by PWC to evaluate the appropriate disposal alternative. At present, the Navy plans to dispose of the rain water to the industrial wastewater pretreatment system at Building 5 of NAS Alameda. However, because excavation activities will be conducted and completed during the summer season, rainfall is not anticipated and therefore runoff control may not be needed.

2.1.5 Underground Utilities

Based on the drawings provided by NAS Alameda, the PRC team anticipates that work in the IMF site will not require relocation or removal of any underground utility lines. However, PWC personnel will survey the area and perform a formal utility clearance for underground electrical/mechanical utilities to include a minimum of 20 feet outside the 50-foot by 45-foot perimeter. Any required relocation and/or removal of underground utility lines will be conducted by PWC.

2.1.6 Soil Waste Profiling

Prior to the start of excavation activities, the PRC team collected soil samples within the proposed excavation area using a spade shovel, and submitted a single composite soil sample each to Chemical Waste Management and Gibson Environmental for analysis and for obtaining soil acceptance approval. Since the excavated soil can be profiled as a single waste stream, only one sample each was required by Chemical Waste Management and Gibson Environmental. NAS Alameda Environmental Office personnel were responsible for signing all profiles.

2.1.7 Permits

The PRC team will prepare a courtesy notification (well abandonment permit) for the Alameda County Flood Control and Water Conservation District, Zone 7 describing the abandonment of well MW-IMF-02. According to Cal-OSHA Title 8, Chapter 3.2, Sub-chapter 2, Article 2, Section 341, a Cal-OSHA excavation permit is not required for excavations which are 5 feet in depth or less and into which no persons are required to descend. No additional permit requirements have been identified.

2.2 IMF SITE WORK PLAN

This section describes the activities that will be performed at the IMF site.

2.2.1 Site Preparation

PWC will establish exclusion and contamination reduction zones using barricades (temporary chain-link fences), caution tape, and signs to restrict access. The exclusion zone will be marked with red caution tape; the contamination reduction zone will be marked with yellow caution tape. Welding, smoking, and general ignition sources will be prohibited in the exclusion zone. The exclusion zone will extend a minimum of 10 feet beyond the perimeter of the site excavation. One fire extinguisher will be installed inside the exclusion zone.

Air monitoring for excavation workers and on-site personnel will be performed by PWC during these site preparation activities in accordance with the PWC's HSP and the PRC team's HSP addendum for

this site. If any of the readings approach the levels established in the PWC or PRC team HSPs, upgrade of health and safety protection will be instituted in accordance with the HSPs.

2.2.2 Well Abandonment

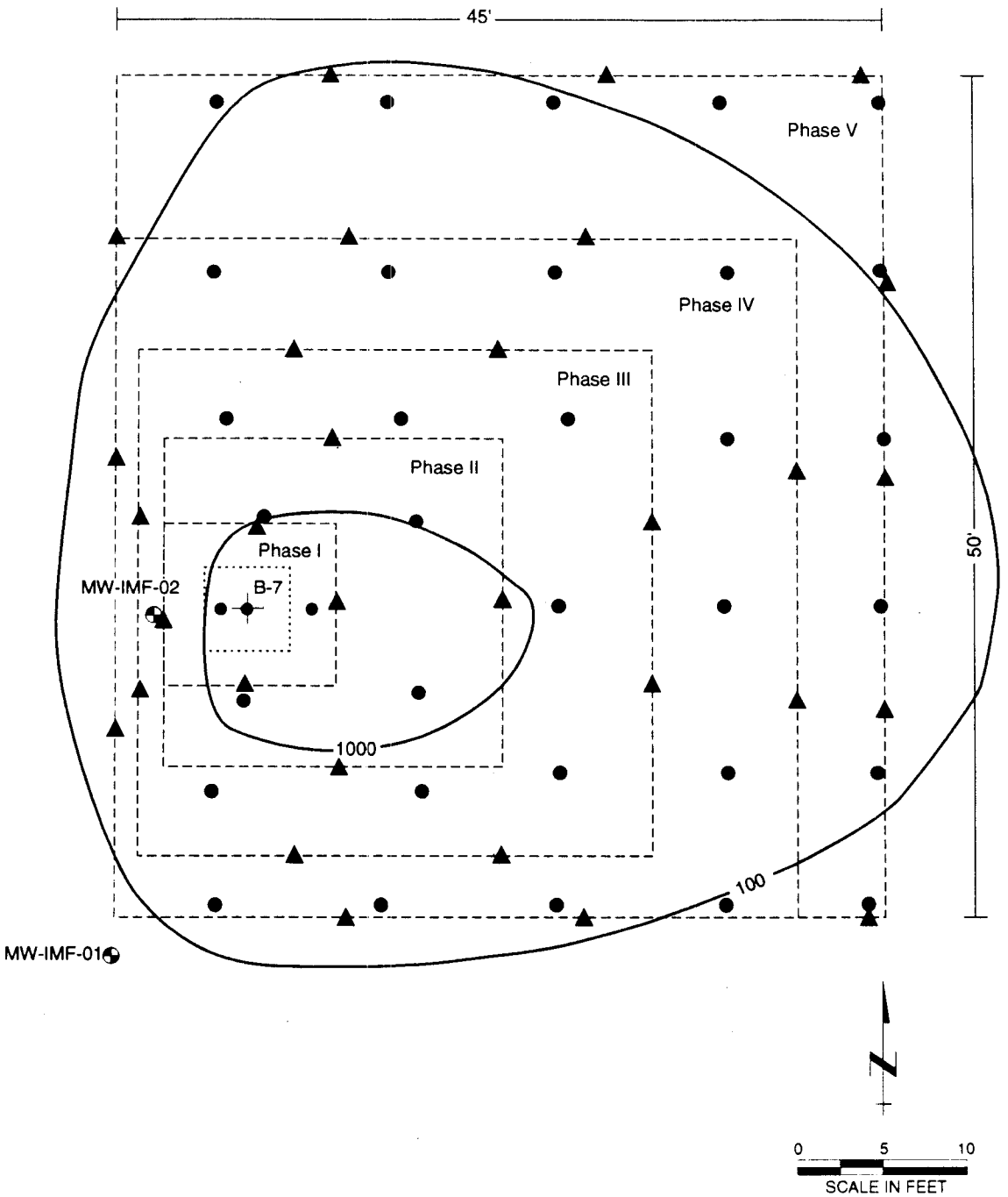
The PRC team will oversee the abandonment of well MW-IMF-02 (Figure 3) by PWC personnel. Well MW-IMF-02 will be abandoned in place by filling the well up to ground surface with cement grout. Well abandonment will be completed prior to commencement of excavation activities.

2.2.3 Excavation

The PRC team will oversee the excavation of low pH, lead-contaminated soils by PWC personnel. The excavation will be conducted using a mechanical excavator (Cat 225 or equivalent) and a phased approach until all soils with lead concentrations exceeding 100 milligrams per kilogram (mg/kg) have been removed or until the maximum allowable extent of the excavation has been attained (45 feet by 50 feet by 5 feet). The maximum agreed upon depth of 5 feet is based upon the assumption that groundwater is 5 feet bgs. The phased excavation limits (10 feet by 10 feet, 20 feet by 20 feet, 30 feet by 30 feet, 40 feet by 40 feet, and 45 feet by 50 feet) will be staked out prior to excavation activities, as shown in Figure 5. Excavation will begin from boring B-7 and move outward during subsequent phases of excavation.

The initial phase of the excavation will begin within a 5 feet by 5 feet area at boring B-7, and then expand to the 10 feet by 10 feet boundary. The excavation depth of the first 5 feet by 5 feet area will be to 5 feet if groundwater is encountered at a depth shallower than 5 feet bgs, or approximately 0.5 feet above the groundwater table if groundwater is encountered at a depth greater than 5 feet bgs. This ensures that the elevated lead concentration detected at 4.5 bgs in boring B-7 will be excavated. The excavation depth of the remaining area within the 10 feet by 10 feet boundary and remaining phased excavation limits will be approximately 0.5 feet above the groundwater table.

The excavated soil will be loaded directly into 20-cubic-yard end bins located in the exclusion zone. Because of the loose nature of the soil at the IMF site, if the end bins sink significantly below the ground surface, the excavated soil will instead be stockpiled on the ground surface next to the



LEGEND

- Monitoring Well Location
- HLA Soil Boring Location
- Verification Floor Sample Location
- Verification Wall Sample Location
- ..... 5 Feet by 5 Feet Excavation Around Boring B-7
- - - - - Lateral Extent for Each Phase of Excavation
- 100 Total Lead Concentration, mg/kg

7/93 AL

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ALAMEDA, CALIFORNIA

PHASED EXCAVATION AND SCREENING-LEVEL SAMPLE LOCATIONS IMF SITE

FIGURE 5

excavation and a front-end loader will transport and load the soil into the bins located on asphalt pavement. The bins will be closed (metal doors) or tarped at the end of the day to prevent release or accumulation of materials.

Upon approaching the estimated phased extent of excavation, PRC team personnel will then collect screening-level samples from the sidewalls and bottom of the excavated area as described in Section 3.3. One of the screening soil samples will be collected at the excavation floor near boring B-7. Screening-level verification analysis for lead will be conducted by PWC's state of California-certified laboratory after each excavation phase to determine if additional excavation is required (lead concentrations exceeding 100 mg/kg) or until the maximum extent of the excavation has been attained. In addition, field pH will be measured on the screening-level soil samples by the PRC team. The protocol for the field pH measurement is described in Section 3.5.1.

Upon receiving the notification of completion of the excavation from PWC personnel, the PRC team will conduct final confirmation sampling and analysis for lead, pH and total petroleum hydrocarbons (TPH) (Section 3.5) to determine the residual levels of lead, pH and TPH in the remaining soil. In addition, a maximum of 3 final confirmation samples, or up to 10% of the total number of final confirmation samples collected, will also be analyzed for volatile organic compounds (VOC), semivolatile organic compounds (SVOC), and a full suite of metals. The final number of confirmation samples required for verification will depend upon the final areal and vertical extent of the excavation (Section 3.2).

2.2.4 Contingencies

Engineering controls may be implemented during excavation activities to address the following contingencies:

- Groundwater seepage into the excavation area.
- Hydrocarbon floating free-product seepage into the excavation.
- Elevated concentrations of lead and/or low pH (high acidity) detected in soils below the groundwater table.

Groundwater Seepage

A Baker tank will be delivered on site by PWC for the groundwater seepage contingency. To prevent sinking of the Baker tank, the tank will be placed near or on asphalt pavement closest to the excavation area as feasible. If groundwater seepage into the excavation area occurs, groundwater will accumulate at one end of the excavation. A submersible sump pump will then be used to pump the groundwater through a flexible hose into the Baker tank.

Hydrocarbon Floating Free Product

If floating free product is observed in the groundwater seepage, a skimmer pump will also be placed in the deep end of the excavation to remove free product into 55-gallon drums. Depending on the rate of groundwater seepage and the amount of free product present, additional Baker tanks and/or drums may be needed. The collected free product will be delivered to the NAS Alameda permitting and storage facility in which standard manifesting and disposal procedures will be followed.

Elevated Concentrations of Lead and/or Low pH

If elevated concentrations of lead and/or low pH are detected in soils below the groundwater table, any further excavation activities below groundwater will require extensive dewatering. Therefore, no additional excavation is proposed at this time. The remaining residual lead and low pH will be addressed in site remedial investigation/feasibility study (RI/FS) work.

2.2.5 Waste Characterization and Disposal

The PRC team will coordinate the disposal of excavated soil generated during the soil removal activities. During the plan preparation, Gibson indicated that the subject soil cannot be accepted to their facility for recycling. Chemical Waste Management has accepted the subject soil for direct landfilling without pretreatment; therefore, the excavated soil will be disposed of to their Class I landfill in Kettleman Hills, California. Because of the elevated level of lead, low pH, and elevated level of benzene found near B-7, the soil will be disposed of as Resource Conservation and Recovery Act (RCRA) D002 (pH), D008 (lead), and D018 (benzene) wastes. According to RCRA regulation, a

land ban treatment standard (5 milligrams per liter [mg/L] of leachable lead using U.S. Environmental Protection Agency [EPA] toxicity characteristic leaching procedure [TCLP]) is established for D008 wastes. Prior to disposal, a soil composite of four discrete soil samples will be collected from each 20-cubic-yard bin for leachable lead analysis using TCLP. If the excavated soil contains leachable lead concentration above 5.0 mg/L using USEPA TCLP, the soil will have to be pretreated at the Class I landfill prior to land disposal.

After receipt of the results of TCLP analysis, the roll-off bin trucks will be loaded, decontaminated, and driven to the weighing station where they will be weighed on the portable scale. Truck decontamination procedures are described in Section 4.15. The PRC team will conduct waste manifesting of the excavated, stock-piled soil prior to transportation and disposal.

If groundwater is collected from the excavation area, the Baker tank(s) and drum(s) will be sampled, analyzed, manifested, and discharged into the industrial wastewater treatment plant at Building 5 or treated and disposed of at a hazardous waste facility by PWC. PWC personnel will also profile, manifest, and dispose of any free product to an off-site recycling facility.

The PRC team will not be responsible for hauling and disposal costs and associated state and federal taxes. NAS Alameda Environmental Office personnel will be responsible for signing all manifests. The signed manifest will accompany with each truck load of soil during transportation to the disposal facility and each drum of free product to the recycling facility.

2.2.6 Site Restoration

PWC will cover the resulting excavation area with high-density polyethylene (HDPE) sheeting to reduce the potential of additional leaching of contaminants from soil to the groundwater. Clean fill material will not be used to restore excavation to the level of the surrounding grade. A temporary chain-link fence with warning signs will be installed around the excavation area by PWC personnel.

2.3 DEMOBILIZATION

This section describes the demobilization activities for the IMF site project.

2.3.1 Tarping and Decontamination Station

The excavator, front end loader, and/or any other earth-moving equipment used on site will be cleaned at the TD station using a hose and brush, or hot water jetted if necessary, and demobilized from the facility. The TD station berm and visqueen will be removed and transported to a nearby sanitary landfill by PWC. The TD station will be demobilized in the same manner by PWC. Protective clothing and items used for equipment or personnel decontamination will either be cleaned mechanically or placed into plastic bags for disposal to a California Class III landfill. The TD station will be cleaned with a mechanical sweeper.

All rinse water will be placed in a Baker tank, sampled, analyzed by PWC to evaluate the appropriate disposal alternative. At present, the Navy plans to dispose of the rinse water to the industrial wastewater pretreatment plant at Building 5 of NAS Alameda.

2.3.2 Site Cleanup

The IMF site will be restored to the condition it was prior to beginning this project with the exception of the remaining excavation depression. The chain-link fence and signs will remain in place until final confirmation sampling analysis results are reviewed to determine if the fence can be removed or should be permanently emplaced. The caution tape surrounding the work zones will be removed.

SECTION 3.0

3.0 VERIFICATION SAMPLING PLAN

This verification sampling plan presents sampling objectives, sample locations at each phased excavation stage, sample collection techniques, sampling equipment decontamination procedures, and sample analyses for the interim soil remedial action at the IMF site at NAS Alameda.

3.1 SAMPLING OBJECTIVES AND APPROACH

As discussed in Section 1.0, the overall objective of the project is to complete the remediation of vadose zone soil having low pH and lead concentrations exceeding 100 mg/kg. The objective of the verification sampling program is to collect adequate data to verify that the remediation of the soils is complete, or if the maximum excavation extent is reached, to characterize the residual levels of lead and pH. It is assumed that all soil sampling will be performed in Level D personal protective equipment (PPE).

Soil sampling will be conducted in a phased excavation approach in which screening-level analysis for lead will be conducted by PWC's laboratory after each excavation phase to assess if additional excavation is required or until the maximum agreed excavation extent has been attained. In addition, soil samples will be collected at each field-screening sample location for field pH testing by the PRC team. The sampling density of one sample per 100 square feet will be used to determine the number of screening-level samples required.

Upon receiving the notification of completion of the excavation from PWC personnel, the PRC team will conduct final confirmation sampling and analysis for lead, pH, and TPH to determine the residual levels of lead, pH, and TPH of the remaining soil. The final number of confirmation samples required for verification will depend upon the final areal and vertical extent of the excavation, using a sampling density of one sample per 100 square feet. Final confirmation samples will be shipped to and analyzed by a laboratory approved by Navy CLEAN and the state of California for total lead, pH and TPH using EPA Methods 6010, 9045, and Modified 8015, respectively.

3.2 SAMPLE LOCATIONS

The lateral extent of lead at the IMF site is presented in Figure 3. The maximum lateral and vertical extent of the excavation is expected to be 2,250 square feet (45 feet by 50 feet) and 5 feet deep. Figures 5 and 6 present the proposed field-screening verification and final confirmation sample locations, respectively, based upon the appropriate sampling density as described below.

3.2.1 Field Screening

The screening-level samples will be collected by the PRC team. The number of samples required will be based on a sampling density of one sample per 100 square feet of surface area, with the exception of a minimum of one sample per wall for an excavation measuring 10 feet by 10 feet. Figure 5 presents the approximate locations of screening-level samples that will be required using the phased approach for soil excavation. The implementation of the phased excavation assumes that additional floor samples will not be collected from previously sampled floor area. Based upon the maximum dimensions of the excavation, 65 samples will be collected from the excavation. Sample identification of the screening soil samples is listed in Table 1.

3.2.2 Final Confirmation

The PRC team will collect final confirmation samples once field-screening measurements are less than 100 mg/kg lead or upon attaining the maximum 45 feet by 50 feet extent. Final confirmation sampling assumes a sampling density of one sample per 100 square feet. Assuming that the maximum extent of excavation of 45 feet by 50 feet by 5 feet is attained, a maximum of 32 final confirmation and 3 duplicate samples (35 total samples) will be collected from a maximum of 32 final confirmation sample locations as shown in Figure 6. Sample identification of the final samples are listed in Table 2. If the final extent of excavation is 10 feet by 10 feet, additional soil samples will be collected at 5 feet away from each side of the excavation. These soil samples will be collected at 2.5 feet and 5.0 feet bgs and one groundwater grab sample will also be collected.

TABLE 1

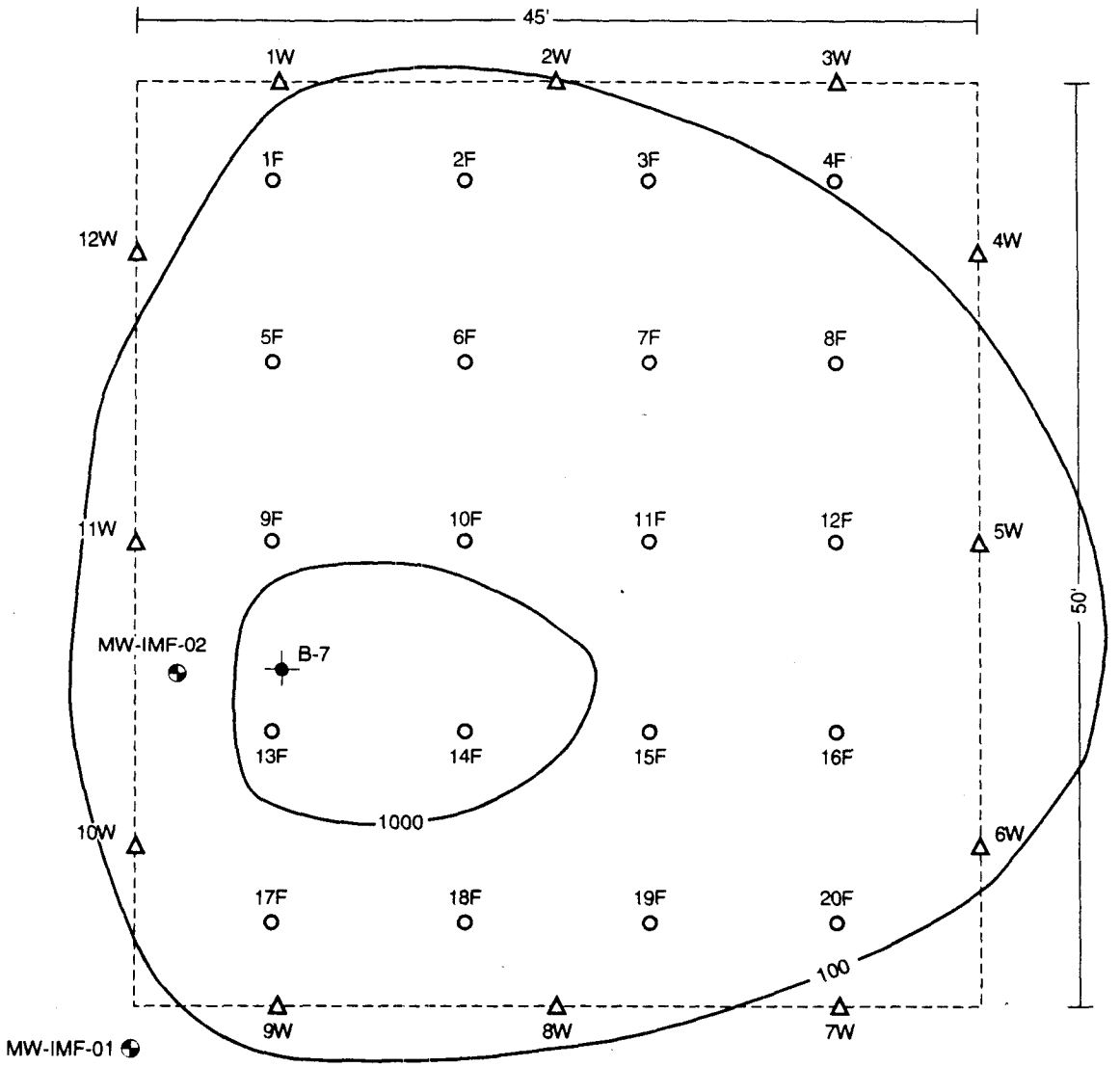
SCREENING SAMPLE IDENTIFICATION
IMF SITE
NAS ALAMEDA
CTO NO. 0137, MOD 5

Excavation Area	Sample I.D.	Lead	pH
5' x 5'	S-1A-F	•	•
PHASE I	S-1-F	•	•
10' x 10'	S-1-W	•	•
	S-2-W	•	•
	S-3-W	•	•
	S-4-W	•	•
PHASE II	S-2-F	•	•
20' x 20'	S-3-F	•	•
	S-4-F	•	•
	S-5-F	•	•
	S-5-W	•	•
	S-6-W	•	•
	S-7-W	•	•
PHASE III	S-6-F	•	•
30' x 30'	S-7-F	•	•
	S-8-F	•	•
	S-9-F	•	•
	S-10-F	•	•
	S-11-F	•	•
	S-12-F	•	•
	S-8-W	•	•
	S-9-W	•	•
	S-10-W	•	•
	S-11-W	•	•
	S-12-W	•	•
	S-13-W	•	•
	S-14-W	•	•
	S-15-W	•	•
PHASE IV	S-13-F	•	•
40' x 40'	S-14-F	•	•
	S-15-F	•	•
	S-16-F	•	•
	S-17-F	•	•
	S-18-F	•	•
	S-19-F	•	•

TABLE 1

SCREENING SAMPLE IDENTIFICATION
IMF SITE
NAS ALAMEDA
CTO NO. 0137, MOD 5

Excavation Area	Sample I.D.	Lead	pH
	S-20-F	•	•
	S-21-F	•	•
	S-22-F	•	•
	S-23-F	•	•
	S-16-W	•	•
	S-17-W	•	•
	S-18-W	•	•
	S-19-W	•	•
	S-20-W	•	•
	S-21-W	•	•
	S-22-W	•	•
	S-23-W	•	•
PHASE V	S-24-F	•	•
45' x 50'	S-25-F	•	•
	S-26-F	•	•
	S-27-F	•	•
	S-28-F	•	•
	S-29-F	•	•
	S-30-F	•	•
	S-31-F	•	•
	S-32-F	•	•
	S-33-F	•	•
	S-24-W	•	•
	S-25-W	•	•
	S-26-W	•	•
	S-27-W	•	•
	S-28-W	•	•
	S-29-W	•	•
	S-30-W	•	•
	S-31-W	•	•



LEGEND

- Monitoring Well Location
- HLA Soil Boring Location
- Final Confirmation Floor Sample Location[1]
- Final Confirmation Wall Sample Location[1]
- Maximum Allowable Extent of Excavation
- 100 Total Lead Concentration, mg/kg
- 1F Floor Sample Location Identification
- 1W Wall Sample Location Identification

Assumptions: [1] Based on maximum allowable extent of excavation. Depth to groundwater is 5 feet below ground surface.

0 5 10
SCALE IN FEET

NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

FINAL CONFIRMATION SAMPLE LOCATIONS
IMF SITE

FIGURE 6

793 AL

TABLE 2

FINAL VERIFICATION LOCATIONS AND SAMPLE IDENTIFICATIONS
IMF SITE
NAS ALAMEDA
CTO NO. 0137, MOD 5

Location I.D.	Sample I.D.	Lead	pH	TPH	VOCs	SVOCs	Metals
1F	C-1	•	•	•			
2F	C-2	•	•	•			
3F	C-3	•	•	•			
4F	C-4	•	•	•			
5F	C-5	•	•	•			
6F	C-6	•	•	•			
7F	C-7	•	•	•			
8F	C-8	•	•	•			
9F	C-9	•	•	•			
10F	C-10	•	•	•			
10F	C-11	•	•	•	•	•	•
11F	C-12	•	•	•			
12F	C-13	•	•	•			
13F	C-14	•	•	•			
14F	C-15	•	•	•			
15F	C-16	•	•	•			
16F	C-17	•	•	•			
17F	C-18	•	•	•			
18F	C-19	•	•	•			
19F	C-20	•	•	•	•	•	•
20F	C-21	•	•	•			
20F	C-22	•	•	•			
1W	C-23	•	•	•			
2W	C-24	•	•	•			
3W	C-25	•	•	•			
4W	C-26	•	•	•			
5W	C-27	•	•	•			
6W	C-28	•	•	•			
7W	C-29	•	•	•			
8W	C-30	•	•	•	•	•	•
9W	C-31	•	•	•			
10W	C-32	•	•	•			
10W	C-33	•	•	•			
11W	C-34	•	•	•			
12W	C-35	•	•	•			
Equipment Rinsate	EQUIP-1	•	•	•			

3.3 SAMPLE COLLECTION AND SHIPMENT

The primary objective of the verification sampling plan is the collection of representative lead and pH samples. This section addresses the collection of field screening and final confirmation samples.

Once the PRC team field person has identified the screening-level or final confirmation sample location, the backhoe operator will collect a bucket of soil from these locations. Samples will attempt to be collected from areas where visible stained soil exist. If the excavation walls exhibit no visible discoloration, samples will be collected from approximately half the depth of the excavation wall. Immediately upon retrieval of a bucket of soil, the PRC team field sampler will collect a sample using a hand-held drive sampler lined with 6-inch-long stainless-steel tube. If the 5-feet by 5-feet excavation immediately surrounding well MW-IMF-02 does not encounter significant groundwater seepage, the soil will be sampled from the edge of the excavation using the hand-held drive sampler on extension rods.

The stainless-steel tubes will be immediately sealed with Teflon sheets and plastic end caps and the end caps will be secured with silicone tape. Each sample will be labeled in the field with a unique identification number. Screening-level samples will be delivered immediately to PWC's laboratory for lead analysis. Final-confirmation samples will be delivered to a CLEAN-approved laboratory for lead, pH, and total petroleum hydrocarbons (TPH) analysis.

3.4 DECONTAMINATION

The purpose of decontamination during sampling tasks is to prevent cross-contamination 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. Pre-cleaned stainless-steel tubes and plastic caps will be used for this project. The backhoe bucket will be steam cleaned prior to excavation. Decontamination of the bucket between collection of samples will consist of the removal of all loose soil in the bucket. Decontamination fluids will be stored in a Baker tank, sampled, analyzed, and disposed of at the industrial treatment plant at Building 5.

3.5 SAMPLE ANALYSIS

This section describes the sample analysis that will be conducted on soil collected from the IMF site.

3.5.1 Field pH Screening

Samples from the backhoe bucket will be screened by the PRC team for field pH using a pH meter with deionized (DI) water. This procedure is outlined in EPA Method 9045 for both calcareous and non-calcareous soils. DI water will be used (as opposed to calcium chloride) because measurements using the calcium chloride were generally less consistent than those using the DI water/soil mixture during the Phase II field investigation (PRC/JMM 1992). The procedure for conducting this field pH screening is described below.

> Mix approximately 20 grams of soil with 20 milliliters (mL) of deionized water. Frequently stir the solution for 30 minutes. Allow the solution to sit for 45 minutes to allow most of the fine material to settle out of suspension. Measure the pH of the supernatant using a calibrated pH probe.

3.5.2 Screening-Level Analysis

PWC personnel will analyze these screening-level samples for total lead using EPA Method 6010 and required detection limit of 1.0 mg/kg (Appendix C), to determine if additional excavation is required.

3.5.3 Final-Confirmation Analysis

Final confirmation samples will be sent to a CLEAN-approved laboratory for total lead, pH, and TPH analysis using EPA Methods 6010, 9045, and Modified 8015, respectively. The soil contract required detection limit for lead is 1.0 mg/kg (Appendix C). A maximum of 3 final confirmation samples, or up to 10% of the total number of final confirmation samples collected, will also be analyzed for VOCs, SVOCs, and a full suite of metals according to the contract laboratory program (CLP). Required reporting and detection limits for the target analytes are presented in Appendix C.

SECTION 4.0

4.0 TRANSPORTATION PLAN

This plan discusses the specific measures that will be taken while transporting hazardous waste from NAS Alameda IMF site to the Class I disposal site. All manifesting, placarding, and transport activities will be performed in conformance with applicable federal, state, and local transportation regulations. Transportation will be provided by PWC under direct contract to the Navy. It will be the responsibility of the Navy and PWC to adhere to and implement this plan.

4.1 MANIFESTING

All manifests will be completed by PWC and checked for accuracy by the NAS Alameda site representative specifically trained in manifest preparation. The manifests will be signed by the authorized NAS Alameda Environmental Office representative.

The drivers will check each manifest to make sure that the generator portion has been filled in accurately and completely before leaving the site. They will also complete all relevant items in the transportation section of the manifest.

4.2 SAFETY

All drivers will carry respirators, proper protective clothing, fire extinguishers, shovels, brooms, and warning markers in their trucks in the event of a spill or other emergency while enroute to the recycling and/or disposal site.

4.3 VEHICLE DESCRIPTION

The trucks used to transport solid hazardous waste from the site will be of the types commonly called roll-off bin trucks. Roll-off bin trucks have a capacity ranging from 10 to 20 tons. Larger or smaller bins may be used depending on specific work requirements and availability. All hazardous waste hauling vehicles will be subject to this transportation plan.

4.4 CERTIFICATION/PERMITTING

All trucks will have current applicable certifications and vehicle container permits confirming that they meet all applicable safety standards for vehicles hauling hazardous wastes. These permits and certifications include an Illness Prevention Plan (Cal-OSHA) pursuant to SB198, a hazardous waste transporter registration and Motor Carrier Safety Rating of at least satisfactory as required by U.S. Department of Transportation (DOT), a carrier license to haul hazardous materials by the California Highway Patrol, a carrier permit to operate dump trucks and other heavy specialized carrier equipment by the California Public Utilities Commission, and a contract carrier permit from the Interstate Commerce Commission.

4.5 INSPECTIONS

Before leaving the site, each vehicle will be inspected by the driver to ensure that mechanical and safety equipment are operational and conform to all safety standards as set forth by the DOT and the Department of Motor Vehicles, as well as all vehicle safety standards pertaining to transporting hazardous material.

4.6 TARPING

All solids-hauling trucks will be completely covered with metal doors (bins), neoprene, or textile tarps prior to leaving the site. The tarps will help reduce escape of odors, fugitive dust, or material which might be released during transportation to the disposal site.

4.7 PLACARDING

Appropriate United Nations/North American (UN/NA) placards in accordance with DOT regulations are required and will be attached to the soil bins. No placards should be required with an ORM-E category.

4.8 PACKAGING

The waste materials will be bulk loaded into the bins by PWC. As discussed above, all loads will be secured or covered to reduce spillage or the release of dust. No other types of packaging are anticipated for this project.

4.9 ACCIDENTS

The drivers involved in the transportation of hazardous wastes will be thoroughly trained in all aspects of the safety plan, use of equipment, completion of the transportation section of the manifests, and all records that they are required to keep. They will carry with them all certificates and licenses required for transportation of hazardous wastes on the highway, including emergency spill response steps to follow in case of an accident or spill.

4.10 ENTRY AND EXIT PROCEDURES

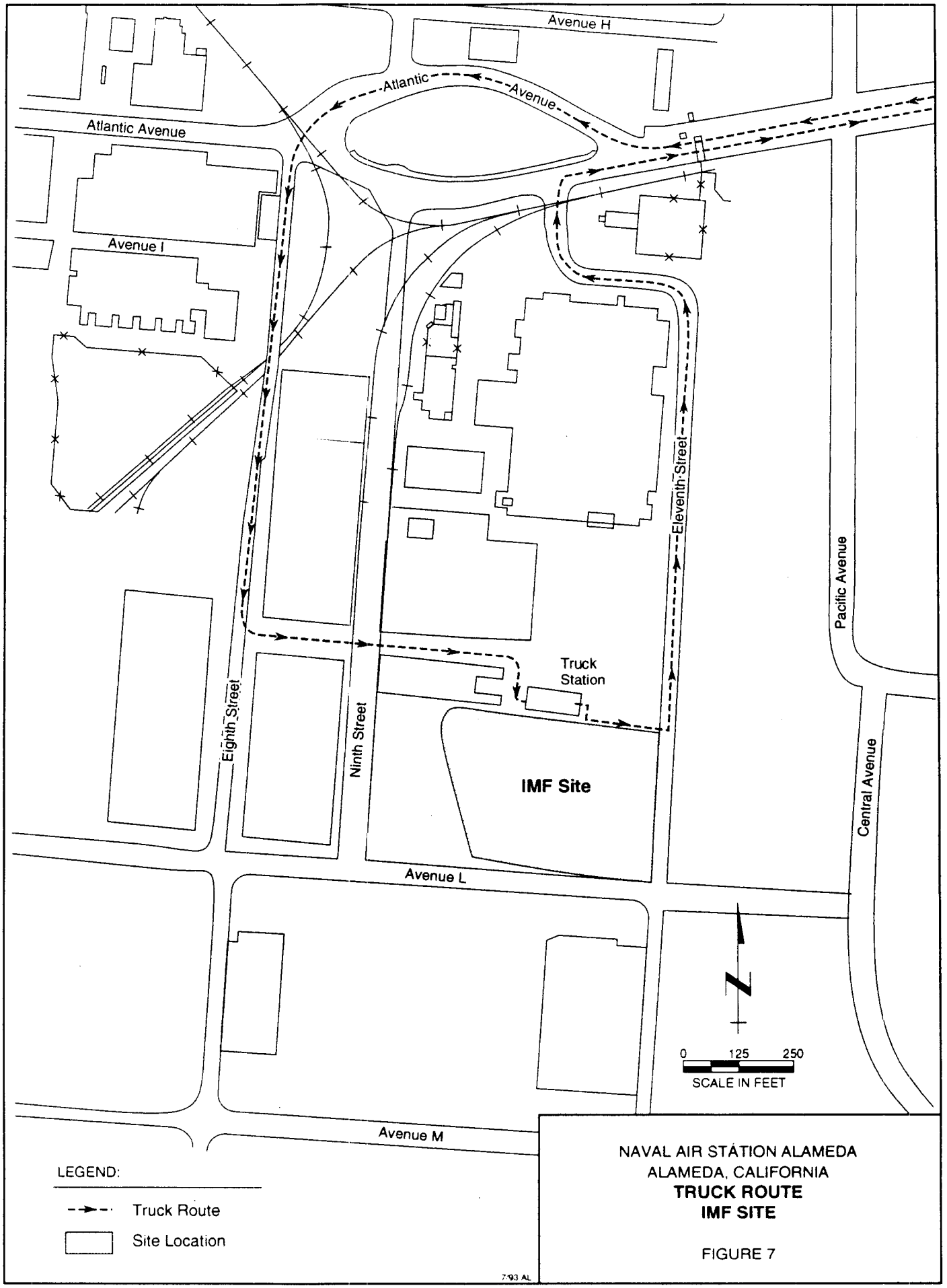
All trucks will follow the prescribed entry and exit routes as shown in Figure 7.

4.11 SCHEDULE

It is anticipated that the soil waste bin(s) will be transported and disposed of in one shipment at the completion of each phased excavation activity.

4.12 MATERIAL IDENTIFICATION

The materials loaded into the bins will be identified as required by both the manifesting procedures on the hazardous waste manifest and placarded according to applicable DOT regulations. No bin will leave the site with improperly identified hazardous waste material.



NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA
TRUCK ROUTE
IMF SITE

FIGURE 7

4.13 TRANSPORTATION ROUTES

The movement of hazardous materials from NAS Alameda to Chemical Waste Management's Kettleman Hills treatment and disposal facility will be described in written form by Chemical Waste Management. A copy of the routes will be provided to each driver, to emergency services personnel, and to other interested parties, as authorized by the Navy. A route will be selected that minimizes disturbance to neighbors of the base. Within Alameda, the waste will be transported by traveling northeast on Atlantic Avenue to Webster Street to I-880.

4.14 VEHICLE MAINTENANCE

The driver of each vehicle used to transport hazardous wastes will have complete service records available for inspection by the Navy project coordinator. Maintenance service is performed at regularly scheduled intervals in conformance with vehicles manufacturer's recommendations and all applicable regulations.

4.15 DECONTAMINATION PLAN FOR EQUIPMENT/VEHICLES

The TD station will be designated for large-equipment and vehicle decontamination. Transportation of equipment to this area will occur following initial wipe-down at the contamination reduction zone (CRZ). A wash solution and brushes will be used at the wash pad area in the CRZ to remove soils that adhere to surfaces and are not removed with brooms and shovels. Upon entering the TD station, the equipment/vehicle will be cleaned using a hose and brush, or hot water jetted, if necessary. A visual inspection will be performed to verify successful decontamination prior to the equipment/vehicle leaving the work site. The CRZ and TD station wash solution will be collected, analyzed, and disposed of to the on-site treatment plant.

4.16 HAULER PROCEDURES

Appropriate and applicable hauler procedures shall be implemented in compliance with all transportation company and regulatory requirements.

4.17 SITE MONITORING

During the entry, loading, tarping, manifesting, and exit operations, health and safety monitoring will be conducted in accordance with PRC team's HSP addendum and PWC's HSP.

SECTION 5.0

5.0 REFERENCES

Remedial Investigation/Feasibility Study Work Plan Addendum (Draft). PRC Environmental Management and Montgomery Watson, September 29, 1993.

IMF Site Interim Removal Action Engineering Evaluation/Cost Estimate Report (Final), for Navy WESTDIV, Naval Air Station Alameda. PRC Environmental Management and Montgomery Watson, September 29, 1993.

Intermediate Maintenance Facility Field Investigation Report. PRC Environmental Management and James M. Montgomery, Consulting Engineers, Inc., June 17, 1992.

Revised Investigation Analytical Results on the Refinery Area (Site 13), Remedial Investigation/Feasibility Study at NAS Alameda. Canonie, December 1990.

Soil and Groundwater Investigation, Intermediate Maintenance Facility, Project P-207, Naval Air Station Alameda. Harding Lawson Associates, December 6, 1989.

APPENDIX A

APPENDIX A

ADDENDUM TO THE EXISTING SITE HEALTH AND SAFETY PLAN

AMENDMENT TO THE FINAL HEALTH AND SAFETY PLAN

FOR

ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

CONTRACT TASK ORDER 0137 Modification 5
CONTRACT NUMBER N62474-88-D-5086

Prepared by:

Montgomery Watson

Beth Darnell, CIH
Program Health and Safety Manager

Beth Darnell

Date: 7/16/93

Reviewed by:

Montgomery Watson

Ken Leung
Project Manager

Kenneth Leung

Date: 8/18/93

PRC Environmental Inc.

Fred L. Stanley, Ph.D, CIH
Navy CLEAN Program
Health and Safety Manager

Fred L. Stanley

Date: 8/11/93

INTRODUCTION

This memorandum is being written as an addendum to the Health and Safety Plan (HSP) written for the Alameda Naval Air Station RI/FS IMF Site Investigation, California. The original HSP along with this addendum will together serve as the site health and safety plan for the field activities associated with the Removal Action (RA) at the Intermediate Maintenance Facility (IMF) at Site 13. The RA involves the removal of soil contaminated with lead and registering a low pH. Where there is a conflict with this addendum and the original HSP, follow the procedures outlined in this addendum. This addendum was developed with the benefit of additional site data and to further characterize the site hazards.

PROJECT ACTIVITIES

The activities covered under this HSP addendum are the removal of soil contaminated with high concentrations of lead and a low pH. Once the soil is removed it will be hauled to a Class I landfill. The PRC team (PRC Environmental Inc. and Montgomery Watson) will oversee the excavation of the identified soil and the abandonment of well MW-IMF-02, in accordance with the Implementation Work Plan. Prior to the start of excavation, the PRC team will collect soil samples within the area to be excavated for disposal profiling and approval from the disposal facility.

The excavation will include an area that is 45 feet by 50 feet by 5 feet deep; this area has been approved by the Navy and DTSC/RWQCB. It is anticipated that this area will remove soil with lead concentrations exceeding 100 mg/kg. The excavation will be conducted in various phases. Screening-level samples will be collected by the PRC team to verify the soil lead concentrations during each phase of the excavation. These samples will be collected from both the walls and floor of the excavation.

PREVIOUS INVESTIGATION INFORMATION

Previous site investigations at the IMF area of Site 13 have revealed that the soil is contaminated with petroleum hydrocarbons [total petroleum hydrocarbons (TPH) as both gasoline and diesel] at 16,000 mg/kg and 76,000 mg/kg respectively. Oil and Grease were detected at 120,000 mg/kg, 2-Methylnaphthalene was detected at 220 mg/kg and lead was detected as high as 13,000 mg/kg. The pH has been reported at 1.6. Benzene, toluene, ethylbenzene, and xylenes were detected at concentrations as high as 7.0, 39, 7.8 and 22 mg/kg, respectively.

Details concerning the relative toxicological properties and allowable exposure limits for these materials is presented in Tables 1-1 and 1-2 of the original HSP.

ACTIVITY HAZARD ANALYSIS

The safety precautions for drilling and sampling are presented in the original HSP. Many of the general safety precautions will apply to the shallow trenching and hand auger sampling that will take place in support of the RA. Activities particular to the RA are excavation of soil, stockpiling of soil, hauling of soil and collection of soil samples.

The excavation will not be made any deeper than 5 feet. This shallow depth is the maximum limit to which an excavation can be made without requiring specific shoring and sloping for personnel entry. It is recommended strongly that personnel do not enter the excavation at depths greater than 4 feet, without it being shored or sloped. The following general safety precautions

shall be adhered to by the field team members during the RA activities. Additional hazards posed by the backhoe equipment or activities of the Navy Public Works Center shall be discussed with the field team at the daily tailgate safety meetings.

- Prior to conducting subsurface activities, the site will be cleared for underground utilities and lines.
- When raising the backhoe bucket, care must be taken such that it does not come within 20 feet of any overhead energized lines.
- The backhoe will only be operated by personnel from the Navy Public Works Center who have been trained in the safe operation of the backhoe. The backhoe will be operated in accordance with the manufacturers suggested guidelines.
- Soil will be stockpiled at least 2 feet away from the edge of the excavation.
- All unnecessary personnel should be kept clear from the back hoe operation and away from the excavation. At no time will personnel watching the operation stand less than 2 feet from the edge of the excavation.
- The excavation will be covered or otherwise secured when not being actively worked on.
- Should personnel enter the excavation at the 4 foot depth there must be a means of egress at least at 20-foot intervals.
- If necessary, stop logs will be used to prevent accidental roll-off of equipment or vehicles into the open excavation.

Soil samples will be collected from a position outside of the excavation whenever possible. At no time will personnel be permitted inside the trench if it is greater than 5 feet in depth, without having the necessary California OSHA trenching and excavation requirements in place.

Attachment 1 to this memorandum is a copy of the OSHA Job Safety and Health Protection Poster. This poster will be on-site at all times and available for review by the field team members.

Attachment 2 to this memorandum is a copy of the Montgomery Watson Injury and Illness Prevention Program (IIPP). All Montgomery Watson personnel are responsible for reading the IIPP and complying with its intent. Personnel from PRC and the Navy will be required to obtain a copy of their employer's IIPP, become familiar with it and have it available at the site.

PERSONAL PROTECTIVE EQUIPMENT

Site activities at the IMF RA are anticipated to begin in Level D protection. The required clothing for a Level D ensemble are presented in Section 5.0 of the original HSP. Due to the low pH of the soil, it is recommended that personnel wear steel toed rubber boots (typically made of butyl rubber) and wear butyl rubber gloves. Other acceptable gloves are neoprene and heavy nitrile. Should level C become necessary, personnel must wear a full-face or half-face dual cartridge respirator with combination filters for organic vapors/acid gas/HEPA (yellow and purple stacked cartridge).

When collecting hand auger soil samples, heavy work gloves should be worn when handling the hand auger to protect against pinch points. Impermeable gloves are required when handling soil and water from the site.

MONITORING EQUIPMENT AND ACTION LEVELS

Section 6 of the original HSP provides information about the air monitoring program, specific monitoring requirements for the IMF RA are presented below.

1. A PID with a 10.2 or 10.6 eV Probe. At 1 ppm, averaged for a fifteen minute period of time, a Dreager tube for Benzene will be taken. If the Dreager tube is negative, site activities may continue in Level D up to 5 ppm. At 5 ppm, sustained for fifteen minutes, Level C will be required. At 25 ppm, sustained for fifteen minutes, site work shall cease pending an evaluation by the project health and safety coordinator and the PRC health and safety manager.

2. Colorimetric tubes will be used for Benzene to supplement PID measurements. Benzene Dreager Tube 0.5/c order number 8101841 will be used. At 1 ppm benzene, Level C will be required. At 10 ppm benzene a full-face respirator will be required, at 25 ppm benzene site work shall cease pending an evaluation by the project health and safety coordinator and the PRC health and safety manager.

3. A combustible gas indicator will be required to test the excavation prior to collection of soil samples and personnel entry. No work shall be permitted when readings exceeding 10% LEL are detected, nor when the oxygen concentration falls below 19.5 % or is detected at greater than 22%.

4. Dust suppression activities will be implemented and dust monitoring will be conducted continuously during excavation and soil stockpiling activities. The action level to upgrade into Level C respiratory protection is 2 mg/m^3, averaged over a five minute period of time. At 10 mg/m^3 work activities will cease pending a method to control dust exposure. Typical dust suppression techniques involve using a water spray to wet the soil. The potential problem with this method at the IMF is the presence of low pH in the soil. The may cause the surface to become more acidic creating a dermal hazard.

5. To accurately assess the worker inhalation exposure to lead-contaminated soil from the excavation activities, personal industrial hygiene air monitoring will be conducted during the first two days of field activities. The air monitoring will be conducted in accordance with NIOSH Analytical Method 7300 *Elements (ICP)* . This sampling will provide backup and confirmation to the total dust monitoring that will be conducted on site with the direct read dust monitor. The sample collection will be at the direction of a certified industrial hygienist and the samples will be analyzed by a laboratory accredited by the American Industrial Hygiene Association.

6. It is recommended that the field team be equipped with pH paper so that quick tests of soil can be made in the field.

7. Noise and heat stress monitoring will be conducted in accordance with the original HSP.

PERSONNEL

The following changes in personnel have been assigned to the Alameda NAS RA project:

Project Manager, Montgomery Watson = Ken Leung

Project Engineer, Montgomery Watson = Jeff Liu

On-site Safety Officer and Field Team Leader = To be determined

Project Safety Health and Safety Coordinator, Montgomery Watson = Beth Darnell, CIH

The emergency assistance information prepared for the original HSP is repeated in this amendment as Attachment 3.

ATTACHMENT 1

OSHA JOB SAFETY AND HEALTH PROTECTION POSTER

JOB SAFETY & HEALTH PROTECTION

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Provisions of the Act include the following:

Employers

All employers must furnish to employees employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to employees. Employers must comply with occupational safety and health standards issued under the Act.

Employees

Employees must comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards, and its Compliance Safety and Health Officers conduct jobsite inspections to help ensure compliance with the Act.

Inspection

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Where there is no authorized employee representative, the OSHA Compliance Officer must consult with a reasonable number of employees concerning safety and health conditions in the workplace.

Complaint

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection if they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with their nearest OSHA office within 30 days of the alleged discriminatory action.

Citation

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period within which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

Proposed Penalty

The Act provides for mandatory civil penalties against employers of up to $7,000 for each serious violation and for optional penalties of up to $7,000 for each nonserious violation. Penalties of up to $7,000 per day may be proposed for failure to correct violations within the proposed time period and for each day the violation continues beyond the prescribed abatement date. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to $70,000 for each such violation. A minimum penalty of $5,000 may be imposed for each willful violation. A violation of posting requirements can bring a penalty of up to $7,000.

There are also provisions for criminal penalties. Any willful violation resulting in the death of any employee, upon conviction, is punishable by a fine of up to $250,000 (or $500,000 if the employer is a corporation), or by imprisonment for up to six months, or both. A second conviction of an employer doubles the possible term of imprisonment. Falsifying records, reports, or applications is punishable by a fine of $10,000 or up to six months in jail or both.

Voluntary Activity

While providing penalties for violations, the Act also encourages efforts by labor and management, before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

OSHA has published Safety and Health Program Management Guidelines to assist employers in establishing or perfecting programs to prevent or control employee exposure to workplace hazards. There are many public and private organizations that can provide information and assistance in this effort, if requested. Also, your local OSHA office can provide considerable help and advice on solving safety and health problems or can refer you to other sources for help such as training.

Consultation

Free assistance in identifying and correcting hazards and in improving safety and health management is available to employers, without citation or penalty, through OSHA-supported programs in each State. These programs are usually administered by the State Labor or Health department or a State university.

Posting Instructions

Employers in States operating OSHA approved State Plans should obtain and post the State's equivalent poster.

Under provisions of Title 29,Code of Federal Regulations, Part 1903.2(a)(1) employers must post this notice (or facsimile) in a conspicuous place where notices to employees are customarily posted.

More Information

Additional information and copies of the Act, specific OSHA safety and health standards, and other applicable regulations may be obtained from your employer or from the nearest OSHA Regional Office in the following locations:

Atlanta, GA	(404) 347-3573
Boston, MA	(617) 565-7164
Chicago, IL	(312) 353-2220
Dallas, TX	(214) 767-4731
Denver, CO	(303) 844-3061
Kansas City, MO	(816) 426-5861
New York, NY	(212) 337-2378
Philadelphia, PA	(215) 596-1201
San Francisco, CA	(415) 744-6670
Seattle,WA	(206) 442-5930

To report suspected fire hazards, imminent danger safety and health hazards in the workplace, or other job safety and health emergencies, such as toxic waste in the workplace, call OSHA's 24-hour hotline: 1-800-321-OSHA.

Lynn Martin

Lynn Martin, Secretary of Labor

U.S. Department of Labor

Occupational Safety and Health Administration

Washington, DC
1991 (Reprinted)
OSHA 2203

ATTACHMENT 2

MONTGOMERY WATSON

INJURY AND ILLNESS PREVENTION PROGRAM

SUBJECT: MONTGOMERY INJURY AND ILLNESS PREVENTION PROGRAM (IIPP)

I. PURPOSE

Montgomery is absolutely committed to the establishment, implementation and maintenance of an effective Injury and Illness Prevention Program (IIPP). This program is intended to conform with requirements of the California Labor Code section 6401.7 and implementing regulations, commonly known as California SB198. THIS PROGRAM IS NOT ONLY MANDATORY IN CALIFORNIA (TITLE 8, #1509 AND #3203), IT IS ALSO MANDATORY, BY ADOPTION AS COMPANY POLICY, IN ALL OTHER MONTGOMERY OFFICES. It is the intent of this program to ensure that each and every employee has a safe and healthful work environment and the knowledge to properly and safely perform his/her work.

Besides company employees, this IIPP covers all other workers (temporary, part time, contractor) that Montgomery controls, directs or supervises on the job, to the extent these workers are exposed to worksite and job assignment specific hazards.

II. RESPONSIBILITIES

In order to accomplish the objectives of this program a "team" effort on the part of all Montgomery employees is needed. It is essential that all personnel take an interest and participate actively in all phases of the IIPP. Every employee must accept responsibility for his/her own actions and conduct, follow safety and health procedures, and to recognize and report hazards in his/her work area.

The responsibility for overseeing and maintaining the IIPP has been designated to the Corporate Health and Safety Manager. The role of the Technology Division is to provide corporate guidance and direction to facilitate the development and implementation of effective programs in the function/operating groups. Each of the function/operating groups has the responsibility to develop any specific procedures and specialized applications that improve the effectiveness of the IIPP.

Each Cost/Profit Center Supervisor, or senior Montgomery Management representative on a field job-site, has the responsibility to implement the Montgomery IIPP at their location. As further discussed in this procedure, it is this individual's responsibility to identify and evaluate location-specific workplace hazards, conduct inspections, correct unsafe conditions, conduct accident investigations, communicate the requirements of the IIPP to employees, train employees and perform the necessary record keeping tasks.

For each location, the name of the person responsible to implement the IIPP, and his or her authority, must be provided in writing as an attachment to this Bulletin.

III. IDENTIFYING AND EVALUATING WORKPLACE HAZARDS

A. General

The identification and control of hazards is essential in order to maintain a safe and healthful workplace. Our system for identifying and evaluating hazards includes three general components: (1) an operational review when the Environmental/ Occupational Health and Safety Program is first established or when a new substance, process, procedure or operation is introduced to the workplace, (2) the determination of Cal-OSHA/OSHA standards applicability, (3) the utilization of worksite inspections.

B. Hazard Control System

The Montgomery system for identifying and evaluating workplace hazards to prevent occupational health and safety injuries and illnesses includes the following:

- Hazard assessment survey of Montgomery operations and facilities during the development of the SB 198 Program.
- Review of OSHA General Industry Safety Orders (GISO) and other Safety Orders that apply to Montgomery.
- Review of industry and general information (including Material Safety Data Sheets for chemicals used) on potential occupational health and safety hazards.
- Review and utilization of information and resources of insurance carrier loss control services, other health and safety consultants, and OSHA consultation.
- Identification and development of job safety classes applicable to Montgomery that utilize common work conditions and hazard potential to group employees into general categories.
- Periodic and scheduled inspections of general work areas and specific work sites, including formal follow-up procedures for corrective actions.
- Investigation of all occupational accidents, injuries, and illnesses to determine cause and eliminate repeat occurrences.
- Encouraging employees to inform management of hazards in the workplace without fear of reprisal.

IV. INSPECTIONS

A. General

At Montgomery, inspections are an integral component of our comprehensive health and safety program. Inspections perform two roles in injury and illness prevention: first, they are a means of identifying potential hazards not previously recognized;

second, they are used to verify ongoing compliance with controls and safe practices designed to prevent previously identified occupational hazards.

In terms of the Montgomery Injury and Illness Prevention Program, inspections are formal, regularly scheduled, involve careful observation to detect new hazards, properly documented, and utilize written checklists to identify unsafe conditions and work practices.

- Cost/Profit Center Supervisors have the responsibility to ensure that proper inspections are scheduled, conducted, documented, and discrepancies corrected.
- Health & Safety Coordinators have general program oversight, through regular review audits, to insure compliance.

B. Frequency

As a part of our Injury and Illness Prevention Program, all Montgomery Cost/Profit Center Supervisors will perform, either personally or through directive, periodic scheduled inspections of their work areas. In general, inspections are based on hazard potential and severity. The frequency of these inspections depends on the operations involved, the magnitude of the hazards, the proficiency of employees, changes in equipment or work processes, and the history of workplace injuries and illnesses.

The following guidelines may serve as a general approach in determining the appropriate frequency of inspections for each Montgomery Cost/Profit Center.

Quarterly: Shop, chemicals, lab, construction sites

Annually: Office areas.

In addition to scheduled periodic inspections based on the hazard potential of a work area, there are other situations where an inspection is required. These situations include:

- When the Injury and Illness Prevention Program is first established.
- Whenever new substances, processes, procedures, or equipment are introduced that present new occupational health and safety hazards.
- Whenever Montgomery is made aware of a new or previously unrecognized hazard.
- When investigating an occupational injury or illness.
- Special inspections required by an OSHA/Cal-OSHA standard or other regulatory agency on a prescribed timetable.

V. CORRECTING UNSAFE CONDITIONS

All hazards discovered during an inspection or coming to the attention of Montgomery must be corrected in a timely manner consistent with the seriousness of the hazard. All reasonable efforts should be made to abate recognized hazards as soon as possible and to advise employees of any uncorrected hazards. However, if there is an imminent danger of serious harm, an immediate corrective action, such as taking the piece of equipment or work station out of service, is required. If an imminent hazard exists which cannot be immediately abated without endangering people/property, then all potentially exposed personnel will be removed from the area except those necessary to correct the hazardous condition. Employees correcting the hazardous condition shall be provided with the necessary safeguards.

In regard to the correcting of unsafe conditions, Montgomery Cost/Profit Center Supervisors shall ensure the health and safety of their employees/guests by:

- Promptly correcting unsafe or unhealthy conditions.
- Setting a target date for correcting any hazard that cannot be immediately corrected, and following-up to confirm the hazard abatement.
- Utilizing the area inspection checklist or to track and document identified hazards and corrective measures.
- Providing interim protection to employees while the correction of hazards is proceeding.
- Informing area personnel of the status of the hazardous condition.
- Immediately removing/supporting the removal of any personnel exposed or potentially exposed to an imminent hazard.
- Securing the resources (maintenance personnel, health and safety specialists, consultants) necessary to assess the hazard severity and recommend corrective action/abate the hazard.

VI. ACCIDENT INVESTIGATION

The Montgomery Injury and Illness Prevention Program requires that all occupational injury and illness cases be thoroughly investigated to determine the cause and to prevent recurrence. Any accident, injury or other exposure to hazardous substances will trigger an investigative inspection of the subject work area, in accordance with the guidelines outlined in the attached Accident Investigation Procedure (See Montgomery Environmental/ Occupational Health and Safety Bulletin VI–1).

VII. COMMUNICATIONS

A. General

All Montgomery employees will be provided and are encouraged to seek/request information regarding occupational health and safety. Montgomery's system for communicating with employees on occupational health and safety matters includes:

- Written communications (memos, paycheck inserts, booklets)
- Electronic mail messages
- Postings (posters, general bulletins)
- Meetings (safety, staff)
- Training programs
- Montgomery Health and Safety Working Group
- Safety & Health Videos (Contact the Health & Safety Coordinator or the Corporate Health & Safety Manager for latest listing of videos.)

In addition, all employees are encouraged and should inform their Cost/Profit Center Supervisor about any workplace hazards they are aware of. No Montgomery employee will incur any form of reprisal or discrimination if they disclose a safety hazard. If they so choose, employees may report the potential hazard anonymously to either the Health & Safety Coordinator or the Corporate Health & Safety Manager.

B. Ensuring Employee Compliance

In order to have an effective Injury and Illness Prevention Program, all Montgomery employees must contribute by complying with the safety-related requirements of their jobs. The majority of all accidents are a result of unsafe acts and most of these can be prevented by following safe work practices. The Montgomery system for ensuring employee compliance with safe and healthy work practices includes:

- Providing relevant information to employees on health and safety issues.
- Training and retraining personnel on the specific safe work practices associated with each job assignment.
- A communications system that encourages the reporting of occupational hazards by employees and a company commitment to correct all hazardous conditions.
- An inspection program that identifies violations of safe work practices.
- Ensuring that management understands and enforces safety rules and policies.

- Human Resources Administration procedures on disciplinary action including violation of Montgomery environmental/occupational health and safety standards.

- Recognizing employees who follow safe and healthful work practices.

VIII. EMPLOYEE TRAINING

A. General

Training of employees is considered one of the most effective means of achieving an injury-and illness-free workplace. Employees who understand the hazards of their work environment and safe work practices, have a lower injury frequency and are able to identify and report problems before an injury or illness results.
The Injury and Illness Prevention Program serves as the umbrella for Montgomery environmental/occupational health and safety training efforts. Other previous employee health and safety training designed to meet the requirements of a specific standard must continue but the IIPP incorporates additional employer responsibilities. Under the IIPP, employees must be instructed in general safe and healthy work practices and specifically on the hazards of each employee's job assignment. All employees must be advised of:

- Potential occupational hazards identified in their workplace generally and those specifically related to their job assignment.

- Means of minimizing potential hazards, including work conditions, safe work practices, and personal protective equipment.

- Any new hazards introduced by a change in equipment, processes, raw materials, etc.

B. Frequency

The frequency of IIPP health and safety training is dependent on the potential severity of the hazards associated with an assignment/area. To maximize time and efficiency, IIPP training should be incorporated with any other required training efforts such as Hazard Communication, Emergency Preparedness, Respiratory Protection, etc. In addition to ongoing efforts, training must also be provided as follows:

- When the Injury and Illness Prevention Program is first established;

- To all new employees;

- To all employees given new job assignments for which training has not been previously received;

- Whenever new substances, processes, procedures or equipment are introduced to the workplace and represent a new hazard;

- Whenever Montgomery is made aware of a new or previously unrecognized hazard;

- For Profit Center Supervisors to familiarize them with the health and safety hazards to which employees under their immediate direction and control may be exposed.

IX. RECORD KEEPING

Every Montgomery Cost/Profit Center Supervisor has the responsibility to maintain the records associated with the development, implementation and maintenance of the Injury and Illness Prevention Program for his/her Cost/Profit Center. All records must be maintained for a minimum of three (3) years, but other specific regulatory standards may impose longer time requirements. Individual employee training, chemical exposure, and disciplinary action documentation should be placed in the respective employee's department and corporate personnel folders.

The following documents/actions are required to be maintained as part of each Cost/Profit Center Supervisor's record keeping program.

- Records of scheduled and periodic inspections including persons conducting the inspection, any identified unsafe condition or work practice, and all corrective action taken.
- Documentation of health and safety training for each employee including employee name, employee number, training dates, type(s) of training and training providers.
- Descriptions of the content of the training that details what the employees were trained on.
- Complete and thorough accident investigations including records of inspection and corrective action.
- Records of safety meetings and classes (include topics covered), individual training, employee communications, field training, safety meetings, etc.
- Records of employee exposure to hazardous materials.
- Records of employee disciplinary action taken as a result of non-compliance with a company safety/health policy.

Records must be maintained by each Cost/Profit Center Supervisor.

The following records must be forwarded immediately by the Cost/Profit Center Supervisor to the Corporate Health & Safety Manager:

1. Disciplinary Action
2. Injury/Illness Investigation Reports
3. Open Items (previously identified, serious discrepancies)

X. OBLIGATIONS & RESPONSIBILITIES CONCERNING NON-MONTGOMERY EMPLOYEES

A. It is not uncommon for Montgomery personnel to interface with client, contractor, or subcontractor personnel on a daily basis. This is an integral and necessary part of the company's business activities.

There exist other considerations, however, when dealing with workplace health and safety issues. These may include OSHA regulations, various Labor Codes, and contractual provisions.

B. Unless clearly stated and authorized in a contract, the Cost/Profit Center Supervisor must insure that Montgomery employees observe the following when dealing with client, contractor, or subcontractor personnel on health and safety issues:

1. Montgomery employees must not train or certify non-employees on any health and safety issue. This is a legal responsibility of each employer. However, voluntary attendance without any obligation of non-employees in Montgomery Health & Safety training courses is acceptable.

2. Montgomery employees must not issue personal protective equipment to non-employees. Again, the providing of this type equipment is the responsibility of each employer.

3. Montgomery employees must not direct non-employees in carrying out specific, "step-by-step" elements of a work task. The general work product or expected end result must, of course, be conveyed to a non-employee. However, the incremental completion of the task and the methodologies used must be left to the non-employee who should receive appropriate training from his/her employer.

4. If a Montgomery employee observes any unsafe act which could jeopardize his/her personal safety, or the personal safety of others, including the contract employee, the Montgomery employee must take steps to resolve the issue.

This is formal procedure and is described in Bulletin #X-1.

C. Please contact the Corporate Health & Safety Manager if there are any questions.

XI. COMPLIANCE SUMMARY

After reviewing this Bulletin, complete Attachment A ('Injury and Illness Prevention Program") which summarizes major compliance provisions. Review completed attachment with employees.

COMPLIANCE SUMMARY
INJURY AND ILLNESS PREVENTION PROGRAM

I. List Resident Responsible Person:

Corporate Health & Safety Manager: Paul T. Shiroma, PAS-3/12B, 818/568-6678

II. Identify Workplace Hazards/Conditions. Some Examples:

- ☐ Chemical Exposure (potential)
- ☐ Compressed Air
- ☐ Confined Spaces
- ☐ Cranes & Hoists
- ☐ Electrical
- ☐ Elevated Work Surfaces
- ☐ Ergonomics
- ☐ Explosives
- ☐ Flammable Liquids, Gases, Vapors
- ☐ Gas Cylinders
- ☐ Hazardous Chemicals
- ☐ Industrial Vehicles/Forklifts
- ☐ Ladders
- ☐ Lockout/Tagout
- ☐ Machinery
- ☐ Noise
- ☐ Office
- ☐ Protective Equipment
- ☐ Radiation
- ☐ Sampling Equipment, i.e., "Smeals", Boats
- ☐ Thermal Stress (Heat & Cold)
- ☐ Tools, Hand/Powered
- ☐ Trenching/Excavation
- ☐ Vehicle (Auto)
- ☐ Welding/Cutting/Brazing

COMPLIANCE SUMMARY
INJURY AND ILLNESS PREVENTION PROGRAM

☐ Other _____

III. Inspection

☐ For hazards identified above, generate an inspection checklist. (Utilize the manufacturer's operations manual, consult industry references, or contact the Health & Safety Manager for sample checklists.)

☐ Conduct inspection on a regular basis. Recommended frequencies*:

Office areas:Annually

Field Sites: Quarterly

*Dependent on exposures and severity of conditions

IV. Correction of Inspection Findings

☐ Assign responsibility for correction.

☐ Track and close/elevate discrepancies on ongoing basis.

V. Accident Investigation (Refer to Health and Safety Manual Bulletin VI-1)

☐ Complete Employee Injury Report Form for every workplace injury/illness.

☐ Send copy to Corporate Health & Safety Manager.

VI. Training (Assigned, transferred, and new employees)

☐ Train employees to general program requirements

COMPLIANCE SUMMARY
INJURY AND ILLNESS PREVENTION PROGRAM

- Hazard Communication (HAZCOM)
- Emergency Preparedness
- Fire Prevention

☐ Train employees to specific workplace hazards identified in II above.

☐ Conduct refresher training classes as appropriate.

VII. Disciplinary Action

☐ Document all disciplinary action (coordinate with Human Resources).

VIII. Employee Communications

☐ Distribute regular bulletins issued from Health & Safety Manager.

☐ Raise issues through Health & Safety Coordinators or Health/Safety Working Group.

☐ Raise issues directly to Health & Safety Manager.

IX. Documentation

☐ Retain records (inspections, correction, training, investigation) for 3 years.

☐ Make available for Internal Audits/Regulatory Inspections.

ATTACHMENT 3

EMERGENCY ASSISTANCE INFORMATION

N00236.001107
ALAMEDA POINT
SSIC NO. 5090.3

SENSITIVE RECORD

PORTIONS OF THIS RECORD ARE CONSIDERED SENSITIVE AND ARE NOT FOR PUBLIC VIEWING

PRIVATE CITIZEN'S PHONE NUMBER HAS BEEN REDACTED IN ACCORDANCE WITH THE PRIVACY ACT

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

EMERGENCY ASSISTANCE INFORMATION

Local Emergency Contacts	Base Phone	Off-Base Phone
Ambulance	9-911	(510) 869-4444
Industrial Medical Clinic (Building 10)	4444	(510) 869-3173
Fire Department	9-911	(510) 869-4333
Security	6575	(510) 869-3053

Hospital Facilities

Alameda Hospital 2070 Avenue	9-522-3700	(510) 522-3700
Emergency Room	9-523-4357	(510) 523-4357

Directions:

From the main gate, follow Main Street to Atlantic Avenue. Turn left on Atlantic Avenue heading east.

From the east gate, go straight on to Atlantic Avenue heading east.

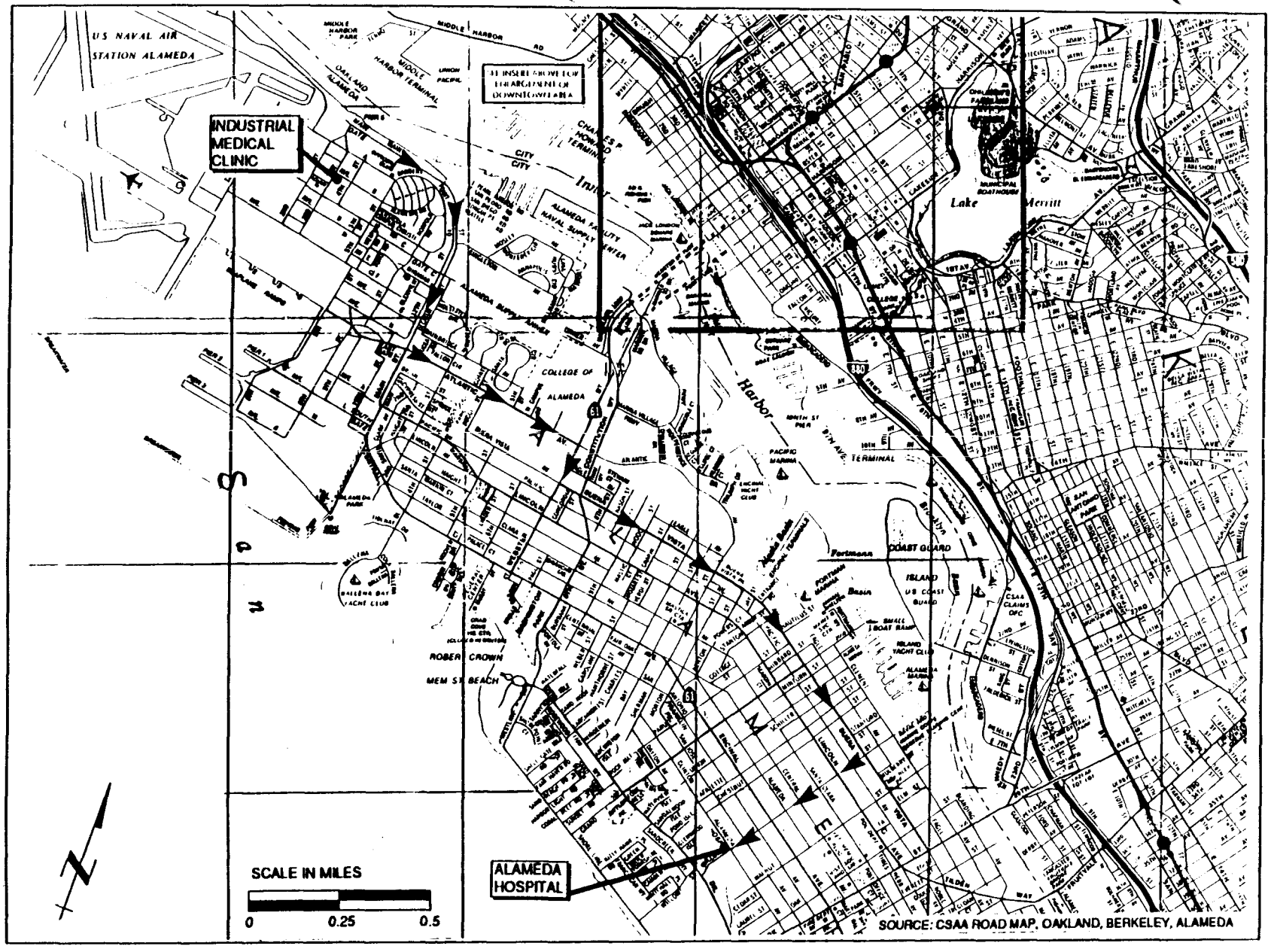
Take Atlantic Avenue to Street (California Highway 61). Turn right on to Webster Street heading south. Take Webster Street two blocks south to Buena Vista Avenue. Turn left on to Buena Vista Avenue heading east. Take Buena Vista for 1.7 miles east to Willow Street. Turn right on to Willow Street heading south. Take Willow Street nine blocks south to Clinton Avenue. The hospital is at 2070 Clinton Avenue on the southeast corner of Clinton Avenue and Willow Street. Refer to the attached map for more details.

Montgomery Watson Contacts

Ken Leung (Project Manager)	(510) 975-3400
Beth Darnell, CIH (Project Health and Safety Coordinator)	(818) 568-6946 (W) (714) 222-1844 (W)

PRC Contacts

Fred Stanley (CLEAN Program Health and Safety Manager)	(415) 543-4800



HOSPITAL LOCATION MAP

FIGURE C.4-1

APPENDIX B

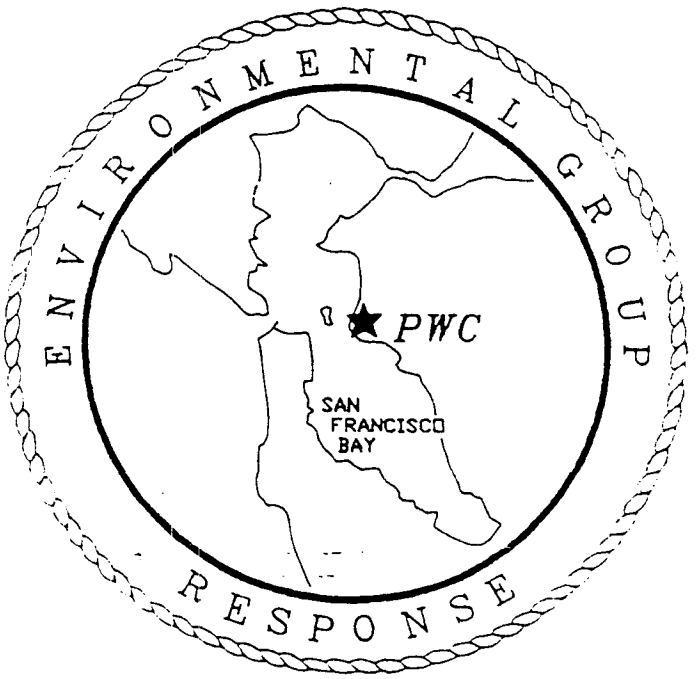
APPENDIX B

NAVY PUBLIC WORKS CENTER SITE HEALTH AND SAFETY PLAN

FINAL
COPY

SITE HEALTH AND SAFETY PLAN
LEAD AND ACID SOILS REMOVAL
INTERMEDIATE MAINTENANCE FACILITY SITE
NAVAL AIR STATION, ALAMEDA, CA.

A M E N D M E N T 1
27 August 1993



Prepared by:
Navy Public Works Center, San Francisco Bay
Safety Office, Code 09A
Environmental Engineering/Services Branch, Code 614
Oakland, California

Based upon approved Site Work Plan prepared by:
Montgomery Watson
365 Lennon Lane
Walnut Creek, CA 94598

PUBLIC
WORKS
CENTER

TABLE OF CONTENTS

Rev 9/15

1. Facility Background:

The objective of the project is to excavate and dispose of contaminated soil in the immediate vicinity of soil boring B-7 at IR Site 13 at NAS Alameda. The interim removal action will be conducted in phases; first, an area of 10 feet by 10 feet by 4.5 feet will be excavated. The excavated soil will be stored in covered 20 cy bins and disposed of immediately after filling at the Chemical Waste Management disposal facility in Kettleman City, near Fresno, CA. The site will then be tested for acid and lead to determine whether additional soil must be excavated. If the results show lead in greater than 100 ppm, or high levels of acid remaining in the soil, an additional area of 20 feet by 20 feet by 4.5 feet will be excavated, the soil will be transferred to a bin and disposed of at the Chemical Waste Management, Inc. disposal facility, and additional sampling conducted. Excavation, disposal and sampling will continue until sampling results show the site to be free of contamination.

All wastes generated by this project will be loaded directly into bins approved for hauling of hazardous waste soils. The soil will be transported by a licensed hauler and disposed of immediately at the Chemical Waste Management Inc, disposal facility. This facility is an EPA approved Class I hazardous waste landfill licensed to accept solid, semi-solid and liquid hazardous and extremely hazardous, restricted and non-restricted wastes. The waste will be soil contaminated with gasoline (16,000 ppm), diesel (76,000 ppm), oil and grease (120,000 ppm), 2-Methylnapththalene (220 ppm), lead (13,000 ppm), Ph (1.6), benezene (7 ppm), toluene (39 ppm), ethylbenzene (7.8 ppm), and xylene (22 ppm).

Personnel assigned to the project are:

Project leader: HOWARD NODDING (resonsible for on site supervision, work tasks, equipment operation and decontamination)
Project Engineer: Mary Nguyen (responsible for coordination of regulatory issues, screening sample analysis, project administration and issuance of the final report)
Site Health and Safety Officer: The Project Leader is ultimately responsible for the safe conduct of all aspects of this project. He is advised by PWC Safety Office personnel, including Aida Villagracia and Carlito Reyes (Industrial Hygenists) who will conduct specialized site monitoring.
Equipment Operator: Sterling Malgrough (backhoe operator)

I. Site Background:

Naval Air Station (NAS) Alameda (Figure 1) is located on the west end of the City of Alameda in Alameda County, California. The Intermediate Maintenance Facility (IMF) (Figure 2) is within Installation Restoration (IR) Site No. 13 of NAS Alameda.

Previous site investigations of Site 13 indicated that the soil is contaminated with Gasoline at 16,000 ppm, Diesel at 76,000 ppm, Oil and Grease at 120,000 ppm, 2-Methylnaphthalene at 220 ppm, Lead at 13,000 ppm, pH at 1.6, Benzene at 7 ppm, Toluene at 39 ppm, Ethylbenzene at 7.8 ppm, and Xylene at 22 ppm. The high concentrations of lead (13,000 ppm) and low pH (1.6) were detected in soil in the Harding Lawson Associates soil boring B-7 in the IMF area (Figure 3). The subsequent soil samples were taken by PRC Environmental Management, Inc. in 1992 and the test results indicated that the contamination is localized in the immediate vicinity of soil boring B-7. The Navy, the California Environmental Protection Agency's Department of Toxic Substances Control and the Regional Water Quality Control Board agreed to an interim removal action by excavating in phases to a maximum of 45 feet by 50 feet by 5 feet below ground surface.

REW 9/15

2. Key Personnel:

All personnel are responsible for continuous adherence to the safety procedures during the performance of their work. In no case may work be performed in a manner that conflicts with the intent of, or the inherent safety and environmental cautions expressed in this site safety and health plan.

The Site Supervisor for this project, HOWARD NODDINGS, will be responsible for the field implementation of the health and safety plan. This will include communicating site requirements to all personnel and field supervision. Other responsibilities include, but are not limited to, the following:

* Updating equipment or procedures based on new information obtained during site operation.

* Stopping work as required to ensure personal safety and protection of property or where noncompliance with safety requirements are found.

The Site Supervisor can be reached at:

(510) 302-6593 Office
220-3345 Cellular Phone (Site)

CONTAMINATION MATRIX

ALAMEDA NAVAL WEAPONS STATION
OCCUPATIONAL HEALTH EXPOSURE GUIDELINES - VOLATILE ORGANICS

Site Contaminant	ANALYSIS PRESENT	Federal - OSHA PEL (ppm)	Cal-OSHA PEL (ppm)	NIOSH REL (ppm)	ACGIH TLV-TWA (ppm)	NIOSH IDLH (ppm)	Ionization Potential (eV)	Routes of Exposure[b]	Symptoms[b]
Volatile Organics									
Methyl ethyl ketone		200	200	200	200	200	9.54	INH, ING CON	Irrit eyes, nose; head dizz; vomit
* Benzene	7 ppm	1	1	0.1(Ca)[a]	10(A2)[a]	Ca[a]	9.24	INH, ABS,	Irrit eyes, nose, resp sys; giddiness; head, nau, staggered
Carbon Tetrachloride		2	2(S)[a]	2(STEL)[b](Ca)[a]	5(A2)[b](S)[a]	Ca[a] [300]	11.47	INH, ABS ING, CON	CNS depres; nau, vomit; liver, kidney damage; skin irrit; [carc].
Ethylbenzene	7.8 ppm	100	100	100	100	2,000	8.76	INH, ING, CON	Irrit eyes, muc memb; head; derm; narco, coma.
Methylene Chloride		500	100	Ca[a]	50(A2)[a]	Ca[a] [5,000]	11.35	INH, ING, CON	Ftg, weak, sleepiness, light-headed, limbs numb, tingle; nau; irrit eyes, skin; [carc].
* Toluene	39 ppm	100	100(S)	100	100	2,000	8.82	INH, ABS, ING, CON	Ftg, weak; confusion, euphoria, dizz, head; dilated pupil, lacrimation; ner, musc ftg, insom; pares; derm.
1,1,1-Trichloroethane		350	350	350(C)[a]	350	1,000	11.00	INH, ING, CON	Head, lass, CNS depressant, poor equilibrium, irrit eyes, derm; card arrhy.
Trichloroethene		50	25	25(Ca)[a]	50	Ca[a] [1,000]	9.45	INH, ING, CON	Head, vertigo, vis dist, tremors, somnolence, nau, vomiting; irrit eyes; derm; card arrhy, pares, [carc].
Trichlorofluoromethane		1,000(C)	1,000(C)	1,000(C)	1,000(C)	10,000	11.77	INH, ING, CON	Inc, tremors; derm; frostbite; card arrhy, card arrest.
* Xylenes	22 ppm	100	100	100	100	1,000	8.44/8.56	INH, ABS, ING, CON	Dizz, excitement, drow, inco, staggering gait, irrit eyes, nose, throat; corneal vacuolization; anor nau, vomiting, abdom pain; derm.

* CONTAMINANTS PRESENT AT THE SITE ARE INDICATED AND THE LEVELS OF CONTAMINATION IDENTIFIED ARE INDICATED.

RW 9/15

ALAMEDA NAVAL [illegible]ONS STATION
OCCUPATIONAL HEALTH EXPOSURE GUIDELINES - VOLATILE ORGANICS

Site Contaminant	Federal - OSHA PEL (ppm)	Cal-OSHA PEL (ppm)	NIOSH REL (ppm)	ACGIH TLV-TWA (ppm)	NIOSH IDLH (ppm)	Ionization Potential (eV)	Routes of Exposure[a]	Symptoms[b]
Fuels, Oils, Solvent Products								
AVGAS	See benzene						INH, ING, CON	CNS depress; dizz, head, inco, anes; resp arrest; pulm irrit, pulm edema; stomach irritant.
Bunker "C" Fuel	100	100	100	100	10,000	No Value	INH, ING	Head, nau, confusion, drow, convuls, possibly coma; pulm injury; skin irrit.
* Diesel Fuel 76 000 ppm	See benzene, toluene, xylene, and benzo(a) pyrene						INH, ING CON	Head; nausea; CNS depress, anes; pulm irrit, edema; kidney, liver damage.
* Gasoline 16000 ppm	See benzene, ethylbenzene, toluene, and xylenes							
* Hydraulic Fluid/Motor Oils 120 000 ppm	No PEL	No PEL	No REL	No TLV	NA[d]	No Value	ING, INH	Gastro irrit; pulm irrit.
JP-5	See benzene						ING, INH, CON	Irrit; eyes, nose, stomach; pulm edema.
JP-7	See benzene						ING, INH, CON	Irrit; eyes, nose, stomach; pulm edema.
PD-680	100	100	100	100	29,500 mg/m^3		INH, CON ING	CNS depressant; dizz, head; irrit nose, throat, eyes; derm.

Rev 9/15

Site Contaminant	Federal - OSHA PEL (ppm)	Cal-OSHA PEL (ppm)	NIOSH REL (ppm)	ACGIH TLV-TWA (ppm)	NIOSH IDLH (ppm)	Ionization Potential (eV)	Routes of Exposure[b]	Symptoms[b]
Base/Neutral/Acid Extractables								
Phenol	5(S)[c]	5(S)[c]	5(S)[c]	5(S)[c]	250	8.5	INH, ABS, ING, CON	Irrit eyes, nose, throat, anor, low-wgt, weak, musc ache, pain; dark urine; cyan; liver, kidney damage; skin burns; derm; ochronisis; tremor, convuls, twitch.
✗ Methylnaphthalene 220 ppm	No PEL	No PEL	No REL	No TLV	NA	7.955	INH, CON	*Skin irrit.*

[a] NIOSH abbreviations: ABS (skin absorption); CON (skin and/or eye contact); ING (ingestion); and INH (inhalation).

[b] NIOSH abbreviations: abdom (abdominal); anes (anesthesia); anos (anosmia), anor (anorexia); arrhy (arrhythmias); carc (carcinogen); card (cardiac); CNS (central nervous system); convuls (convulsions); CVS (*cardiovascular system*); cyan (cyanosis); derm (dermatitis); diarr (diarrhea), dist (disturbance) dizz (dizziness); drow (drowsiness); dysph (dyspnea), ftg (fatigue); GI (gastrointestinal); head (headache); hema (hematuria), inco (incoordination); insom (insomnia), irrit (irritation); irrit (irritability), lass (lassitude); li-head (light headedness); low-wgt (low-weight); muc memb (mucous membranes); musc (muscle), narco (narcosis); nau (nausea); ner (nervousness); num (numbness); *pares (paresthesia); peri neur (peripheral neuropathy), photo* (photophobia); polyneur (polyneuropathy); pulm (pulmonary), resp (respiratory), resp irrit (respiratory irritation), resp sys (respiratory system), subs (substernal), vis dist (visual disturbances).

[c] (S) OSHA and ACCGIH skin notation (potential contribution to overall exposure via the cutaneous route).

[d] NIOSH notation indicating that an *IDLH* has not been assigned.

[e] (C) OSHA, NIOSH, ACGIH notation for ceiling limit. An employee's exposure must not exceed the ceiling limit during any part of the workday. If instantaneous monitoring is not feasible, then the ceiling limit will be assessed based on a 15-minute time weighted average exposure which must not be exceeded at any time during a work day.

[f] *ACGIH notations* (A1) *confirmed human carcinogen*; (A2) suspect human carcinogen.

[g] (Ca) NIOSH notation for caramogen

[h] 60-minute STEL.

[i] 10-minute STEL

Rev 9/15

ALAMEDA NAVAL WEAPONS STATION
OCCUPATIONAL HEALTH EXPOSURE GUIDELINES - METALS, PESTICIDES, AND PCBs

Site Contaminant	Federal-OSHA PEL (mg/m^3)	Cal-OSHA PEL (mg/m^3)	REL TWA (mg/m^3)	ACGIH TLV-TWA (mg/m^3)	IDLH (mg/m^3)	Route of Exposure[a]	Symptoms[b]
Metals							
Barium	0.5	0.5	0.5	0.5	1,100	INH, ING, CON	Upper Resp irrit; GI; musc spasm; slow pulse, extra systoles; hypokalemia; irrit eyes, skin; skin burns.
Cadmium	0.2	0.05	Ca[w]	0.05(A2)[f] [50]	Ca[w]	INH, ING	Pulm edema, dysp, cough, tight chest, subs pain; head; chills; muscle aches; nau, vomiting, diarr; anos, emphysema; proteinuria; mild anemia; carc.
Chromium	1	0.5	0.5	0.5	NA[d]	INH, ING	Histologic fibrosis of lung.
Copper	1	1	1	1	NA[d]	INH, ING CON	Irrit nasal muc memb, pharynx, nasal perforation; eye irrit; metal taste; derm.
* Lead 13,000 ppm	0.05	0.05	0.1	0.15	700	INH, ING, CON	Weak, lass; insom, facial pallor, palcye, anor, low-wgt, malnutrition constipation, abdom pain, colic; anemia; gingival lead line; tremors, paralysis, para wrist, ankles; encephalopathy.
Mercury	0.05(S)[c]	0.05(S)[c]	0.05(S)[c]	0.05(S)[c]	28	INH, ABS CON	Cough, chest pain, dysp, bronchitispneuitis; tremor; insom; irrity; indecision; head, fig, weak; stomatitis, salivation; GI dist, anor, low-wgt, proteinuria; irrit eyes, skin
Nickel	1	1	0.015(Ca)[w]	1	Ca[w] [7ppm]	INH, ING, CON	Sensitization derm; allergic asthma; pheuitis; carc.
Silver	0.01	0.1	0.01	0.1	NA[d]	INH, ING CON	Blue-gray eyes, nasal septum, throat, skin; irrit skin, ulceration; GI dist.
Vanadium	0.05	0.05	0.05	0.05(C)[e]	70	INH, ING	Irrit eyes; green tongue; metallic taste, eczema; cough; fine rales, wheez,
Coal Tar Pitch Volatiles (benzene soluble fraction)							
Phenanthrene	0.2	0.2	Ca	0.2(A1)	Ca[w] [700]	INH, CON	Derm, bronchitis, carc.
Fluorene	No PEL	No PEL	No REL	No TLV	NA[d]	INH, CON	Skin/eye irrit, head, dizz, drow, nausea.

Rev 9/15

Rev 9/15

3. Physical Hazards:
The project required the Navy PWC to furnish labor, material, and equipment for the soil excavation of approximately 170 cubic yards of low pH acid and lead contaminated soils from the boring B-7 vicinity of the Intermediate Maintenance Facility Site at NAS Alameda. The interim removal action will be done in phases and up to a maximum of 30 feet by 30 feet by 4.5 feet below ground surface. The potential physical safety hazards associated with soil excavation are as follows:

* Physical injuries due to proximity of workers to mechanical equipment and tools.

* Exposure to airborne contaminants released during intrusive activities. Flammable atmosphere encountered in excavation.

* Side of excavation can cave in. Possible burying or crushing or workers due to 1) absence of shoring, 2) misjudgment of stability, 3) defective shoring, and/or 4) undercut sides.

* Falling during access/egress or while monitoring or dismounting equipment, or stumbling into excavation.

* An overhead hazard can result from material, tools, rock, and/or soil falling into the excavation.

* Congested work area due to too many workers in a small area.

STEPS TO TAKE TO MINIMIZE HAZARD

* Only trained PWCSFB personnel will operate equipment and tools. ONLY authorized employees will be on-site.

* Monitor for airborne contaminants. Allow excavated area to purge or naturally ventilate and/or use appropriate personal protective equipment. (Entry into trenches will be in a minimum Level C protection.)

* Provide adequate shoring, sloping, or benching sides of the excavation. Regularly inspect trenches for changing conditions.

* Provide ramps or ladders to trenches to allow safe access or egress.

* Provide an adequate barrier around open pits. Excavation spoils must be placed away from edge to prevent cave-ins and instability of pit.

* To prevent overexertion, limit manual lifting. Use mechanical means where practical.

* Maintain adequate work room between workers and equipment.

The Navy PWC San Francisco Bay does not belong to Underground Service Alert (USA) for any of the facilities within our responsibility. Our Utilities Department is staffed with qualified personnel for identifying all underground utility systems similar to what USA does. We follow all federal regulations, particularly 29 CFR 1926, and the National Utility Contractors Association Safety Manual in the execution of this function.

Heat stress potential is not anticipated because employes will not be exposed to either extremely high or low temperatures and relative humidity. When ambient temperatures reach 70 degrees F and workers are wearing impervious clothing, work/rest cycles will be scheduled on a regular basis.

One or more of the following control measures will be used to help control heat stress:

* Provide adequate liquid to replace lost body fluids. Employees will be encouraged to drink more than the amount required to satisfy thirst.

* Liquids with electrolytes (Gatorade) will be available.

* A work regimen that will provide adequate rest periods for cooling down will be established. This may require additional shifts for workers or earlier/later work schedules.

* All breaks will be taken in a shaded rest area.

* Employees shall remove impermeable protective garments during rest periods.

* Employees shall not be assigned other tasks during rest periods.

* All employees shall be informed of the importance of adequate rest, acclimatization, and proper diet in the prevention of heat stress.

4. Risk Assessment of Hazards:

LEAD RISKS ASSESSMENT

HEALTH HAZARDS

"LEAD" means metallic lead, all inorganic lead compounds, and organic lead soap. Lead poisoning is one of the commonest of occupational diseases. The presence of lead-bearing materials or lead compounds in an industrial plant does not necessarily result in exposure on the part of the worker. The lead must be in such form, and so distributed, as to gain entrance into the body or tissues of the worker in measurable quantity, otherwise no exposure can be said to exist. Some are carcinogens of the lungs and kidneys. Others are experimental neoplastigens and tumorigens. Mode of entry into body:

1. By inhalation of the dusts, fumes, mists or vapors. (Common air contaminants).

2. By ingestion of lead compounds trapped in the upper respiratory tract or introduced into the mouth on food, tobacco, fingers or other objects.

3. Through the skin; this route is of special importance in the case of organic compoounds of lead, as lead tetraethyl. In the case of the inorganic forms of lead, this route is of no practical importance

Prolonged exposure to high concentration of airborne lead may cause flu symptoms. Other symptoms include weakness, sleep problems, headache, aching bones and muscles, constipation, abdominal pains, and loss of appetite. These symptoms are completely reversible. Continued exposure can lead to anemia, pallor, "lead-line" of the gums, less hand-grip strength, lead colic and central nervous and kidney damage. Repeated over-exposure to lead may result in less sex drive, along with impotence and sterility. Drinking alcohol and physical stress may increase these symptoms.

PERMISSIBLE EXPOSURE LIMIT (PEL) / MEDICAL SURVEILLANCE ACTION LEVEL (MSAL)

The PEL for lead is fifty micrograms per cubic meter of ambient air as an eight-hour time weighted average (8-hr. TWA). Exposure to airborne lead above the PEL triggers requirements for housekeeping, engineering controls, showers/change rooms/lunch rooms, posting, personal protective equipment, and respiratory protection.

The MSAL for airborne lead is thirty micrograms per cubic meter of air as an 8-hr. TWA. Exposure to airborne lead above the MSAL triggers requirements for medical surveillance, training, exposure monitoring, and recordkeeping.

METHODS OF CONTROL

Rev 9/15

WORK PRACTICE DUST CONTROL

A fine low-pressure spray of water shall be applied to prevent dust disturbance preceding removal or excavation. Saturate the area sufficiently to prevent emission of airborne dust in excess of the exposure limits prescribed in the OSHA regulations. Water shall be sprayed on as often as necessary to ensure that the soil is adequately wetted throughout to prevent dust emission.

PERSONAL HYGIENE

Food storage, eating, smoking, or drinking is not allowed in the area. "Blowing down" or shaking clothing to remove lead dust is prohibited. Workers should wash their face and hands before they leave the work area for lunch or at the end of the shift.

SHOWERS/CHANGE ROOMS/LUNCH ROOMS

Clean change rooms shall have separate storage for street and protective clothing if lead levels exceed the PEL.

Personnel are required to shower at the end of each work shift if exposures exceed the PEL.

Lunch area shall be separated from lead work area and have temperature controlled, positive-pressure, filtered air. Supervisors shall ensure workers do not enter lunch area wearing PPE.

POSTING

Warning signs shall be posted by or at the control area boundary when exposure exceeds the PEL.

PPE

PPE shall be worn principally to ensure that lead is not breathed or swallowed and to prevent exposure to family members.

PROTECTIVE CLOTHING

Employees exposed to airborne lead exceeding the PEL, without regard to the use of respirators or where the possibility of skin or eye irritation exists, require use of coverall (disposable or reusable), head covers (hoods), gloves, respiratory protection, safety shoes, and safety glasses/goggles.

RESPIRATORY PROTECTION

Where engineering and work practice controls do not reduce employee exposure to or below the 50 microgram per cubic meter permissible exposure limit, respiratory protection will be used in accordance with the direction from the Industrial Hygienist and/or Site Safety Officer.

SECTION II – PERSONS RESPONSIBLE

PAGE 2

FINAL INTERIM REMOVAL ACTION LEAD AND ACID SOILS REMOVAL INTERMEDIATE MAINTENANCE FACILITY SITE IMPLEMENTATION WORK PLAN

THE ABOVE IDENTIFIED SECTION IS NOT AVAILABLE.

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

QUESTIONS MAY BE DIRECTED TO:

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TELEPHONE: (619) 532-3676

III. Risk Analysis:

A. Chemical Hazards: exist due to disturbance of soil.

1. Benzene:

a) Characteristics: Clear, flammable, colorless to light-yellow liquid with aromatic odor and slightly soluble in water. Its vapor is heavier than air and may travel considerable distances to a source of ignition and flash back.

b) Routes of exposure: Inhalation, skin contact ingestion and absorption.

c) High exposure levels may cause acute restlessness, loss of sleep, convulsions, depression, respiratory failure, eye and nose irritation, nausea, abdominal pain, dermatitis and it is suspected carcinogen. The target organs affected are the bone marrow, central nervous system, skin, eyes, respiratory systems, liver and kidneys.

d) Emergency/First Aid Procedure: Eyes: Flush with running water for 15 minutes while holding eyelids open, call Base Medical Clinic ((510) 263-4410) for medical assistance. If this chemical comes in contact with the skin, promptly wash the contaminated

skin with soap and water. If this chemical penetrates through the clothing, promptly remove the clothing and wash the skin with soap and water. Call Base Medical Clinic ((510) 263-4410) for medical assistance.
Inhalation: remove victim to fresh air and provide oxygen or artifical respiration if breathing has stopped. Call 911 for medical assistance.
Ingestion: If conscious, give water to drink and induce vomiting, keeping victim's head below hips while awaiting for ambulance. Call 911 for ambulance. Ingestion of this chemical unlikely happens in this project.

e) Fire Fighting: Flash Point for Benzene is 12F or -11C. It may cause a fire and/or explosion if exposed to heat/flame.
Do not extinguish fire unless flow can be stopped. Use water in flooding quantities as fog. Solid streams of water may spread fire. Apply water from as far a distance as possible. Foam, Carbon Dioxide or Dry Chemical can be used to stop fire. Build dike to contain flow as necessary by using foamed polyurethane. Absorb liquid with sorbents. Call 911 for fire fighting assistance.

f) Permissible Exposure Level in air (PEL) for a Time Weighted Average (TWA) over an eight hour period: 1 ppm.

2. Toluene:

a) Characteristics: Clear, colorless, flammable liquid with benzene like odor and very slightly soluble in water. Its vapor is heavier than air.

b) Routes of exposure: Inhalation, ingestion, skin contact and absorption.

c) High exposure levels may cause headache, nausea, eye and skin irritation, drowsiness, unconsciousness and death. It is not considered a carcinogen.

d) Emergy/First Aid Procedures: Use the same First Aid procedure of Benzene for Toluene.

e) Fire Fighting: Flash Point for Toluene is 41 degree F. Fire Hazard is considerated moderate. In case of fire, the same fire fighting procedure for Benzene can be used.

f) PEL for an 8-hour TWA: 100 ppm

3. Xylene:

a) Characteristics: Clear, light color, and flammable liquid with benzene like odor.

Its vapor is heavier than air.

b) Routes of exposure: Inhalation, ingestion, skin contact and absorption.

c) High exposure levels may cause skin, nose and eye irritation, dizziness, ataxia, loss of consciousness, respiratory failure, nausea, abdominal pain and dermatitis. It is not considered a carcinogen.

d) Emergency/First Aid Procedures: Use the same First Aid procedure used for Benzene for Xylene.

e) Fire Fighting: Flash Point for Xylene is 80 degree F. Fire hazard is considerated moderate. Use the same fire fighting procedure of Benzene for Xylene.

f) PEL for an 8 hour TWA: 100 ppm

4. Inorganic Lead:

a) Characteristics: Bluish-gray soft metal, malleable, odorless and insoluble in water.

b) Routes of exposure: Inhalation, ingestion, and contact.

c) High exposure levels may cause affects of the central nervous system, gastrointestinal track, kidneys, blood, reproductive system and gingival tissues. Symptoms are

general body weakness, hypertension, insomnia, low weight, malnutrition, colic, tremor, wrist drop, encephalopathy.

d) Emergency/First Aid Procedures: It is likely that lead exposure from inhalation may result if respirators are defective, inappropriate size or of the wrong type. Inspect canisters or filters, gasket, exhalation valve cover, or speaking diaphragm. Change to a new respirator and/or cartridges as necessary. Check with HSO for the right type of cartridges and correct size of respirator. If a person breathes large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artifical respiration. Call 911 for medical assistance. If this chemical comes in contact with the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. If this chemical comes in contact with the skin, immediately flush the contaminated skin with water.

e) Fire Fighting: Flash Point for lead is not applicable. Moderate fire hazard when it is in form of dust if exposing to heat/flame. It emits highly toxic fumes. Dry Chemical or water

or sand should be used to stop fire. Call 911 for fire fighting assistance.

f) OSHA PEL for lead is 0.05 mg/m3.

5. Total Petroleum Hydrocarbon (TPH) as Gasoline, and Diesel:

a) Characteristics: Clear and flammable liquid with characteristic odor. They are slightly soluble in water. Gasoline vapor is heavier than air.

b) Routes of exposure: inhalation, ingestion and skin contact.

c) High exposure levels may cause affects of the skin and central nervous system. Symptoms include central nervous system depression, irritation of the skin and mucous membranes, and hypersensitivity.

d) Emergency/First Aid Procedures: Eyes: Flush eyes with plenty of water. Skin: Wash with soap and water. Inhalation: If adverse effects occur, remove to uncontaminated area. Give artifical respiration if not breathing. Call 911 for medical attention. Ingestion: If swallowed, do not induce vomiting, call 911 for medical assistance. Ingestion is unlikely in this project.

e) Fire Fighting: Flash Point for gasoline is -45 degree F and for diesel 140 degree F. Combustion or heat of fire may produce hazardous decomposition products and vapors. Carbon Dioxide, foam, dry chemical are used to extinguish the fire. Water may be ineffective and spread fire. Call 911 for fire fighting assistance.

f) PEL for gasoline is 300 ppm. PEL for diesel has not been established.

6. Oil/Grease:

a) Characteristic: Oil is dark brown/black liquid with hydrocarbon/sulfide odor. It affects the skin when it is in the mist form. It has a very low vapor pressure and slightly soluble in water.

b) Routes of exposure: inhalation and skin contact.

c) High exposure levels may cause dermatitis, eye irritation, redness, tearing, blurred vision, inflammation, excitation, euphoria, dizziness, drowsiness, fatigue, nausea, tremors, convulsions, loss of consciousness, coma, depression, diarrhea, vomiting.
It is not a carcinogen.

d) Emergency/First Aid Procedures: Use the same First Aid procedure of Gasoline and Diesel for Oil/Grease.

e) Fire Fighting: Flash Point for Oil varies from -40 to 200 degree F. Improper use of water may cause frothing and spread fire over larger area. Vapor or gas may spread to distant ignition sources and flash back. Use dry chemical, halon, foam and carbon dioxide to stop a fire. Call 911 for fire fighting assistance.

f) PEL is 5 ppm for mist exposure.

7. Inorganic acids: Hydrochloric, Nitric and Sulfuric.

a) Characteristic: It is clear, colorless, fuming liquid and soluble in water. Its vapor is a little heavier than air.

b) Routes of exposure: inhalation, skin and eye contact, ingestion.

c) High exposure levels may cause inflammation of nose & throat, tearing of the eyes, skin and eye burns, coughing, choking, pneumonia and dermatitis.

d) Emergency/First Aid Procedures: In case of contact, immediately flush eyes or skin with

plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call 911 for medical assistance. If inhaled, remove to fresh air or give artifical respiration if not breathing. Call 911 for medical assistance. If swallowed, do not induce vomiting, give water, milk or milk of magnesia. Call 911 for medical assistance.

e) Fire Fighting: They are not flammable but are strong oxidizers. Contact with other material may cause fire and produce toxic fumes and hydrogen. Use water spray and NIOSH approved SCBA and full protective equipment when fighting chemical fire. Call 911 for fire fighting assistance.

f) OSHA PEL ceiling value for Hydrochloric is 5 ppm, PEL for Nitric is 2 ppm and PEL for Sulfuric is 1 mg/m3.

8. Ethyl Benzene:

a) Characteristic: Clear, colorless liquid with aromatic odor and slightly soluble in water. Its vapor is much heavier than air.

b) Routes of exposure: inhalation, ingestion, skin contact.

c) High exposure levels may cause irritation of eyes, nose and respiratory lining, headache, abdominal pain, dermatitis.

d) Emergency/First Aid Procedures: Use the same First Aid Procedures of Benzene for this chemical.

e) Fire Fighting: Flash Point is 55 degree F. It is flammable. Its characteristics are similar to Benzene. Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. It may travel a considerable distance to the source of ignition and flash back. Do not extinguish fire unless flow can be stopped. See Fire Fighting Procedure for Benzene.

f) PEL is 100 ppm.

9. 2-Methylnaphthalene:

a) Characteristics: It is an inflammable liquid.

b) Routes of exposure: inhalation, absorption, contact and ingestion.

c) High exposure levels cause skin, nose and mucous membrane irritation, nausea and diarrhea.

d) Emergency/First Aid Procedures: Use the same First Aid Procedures of Benzene for this chemical.

e) Fire Fighting: Flash Point is 208 degree F. It not flammable. When exposed to heat/flame, it produces toxic fumes of CO, CO2. Water spray, CO2, dry chemical powder, alcohol or polymer foam are used to stop a fire.

f) No allowable PEL has been established.

B. Potential Physical Safety Hazards: Physical injuries may due to proximity of workers to engine-driven heavy equipment and tools, site activities and conditions. Heavy equipment used during the excavation will include PWCSFB backhoe and/or excavator. Only trained PWCSFB personnel will operate machines, tools and equipment. All equipment will be kept clean and in good repair as part of the PWCSFB Shop Operations Procedures (SOP). Safety apparel required around heavy equipment will include a hard hat, safety shoes, glasses, coveralls and gloves.

1. Task Hazard Description:

a. Clearing/Grading/Site Survey: Hazards encountered during mobilization, site walk-throughs, site survey, and sampling grid layout include the following:

o Back strain from clearing vegetation and carrying equipment.

o Irritation from dust generated from excavation and soil clearing.

o Driving vehicles, placing trailers, and collecting rubbish on uneven surfaces creates a possibility of the vehicle rolling, getting stuck in the soil, or of an accident due to flat tires or striking obstacles.

o Crushing or pinching hazard due to trailer placement.

Hazard Prevention:

o Back strain can be prevented by frequent breaks in routine. Use slow, even, movements and proper lifting techniques (i.e., with the legs). Use gloves to reduce the incidence of hand injury and blisters.

o Wet the soil with water to reduce dust exposure.

o A site surveillance should be performed on foot to choose a clear driving path to prevent accidents from uneven terrain, obstacles.

o Seatbelts shall be worn at all times.

o All heavy equipment shall have the safety features outlined in OSHA 29 CFR 1910/1926 Subpart O.

b. Soil Excavations: Hazards encountered during soil and test pit excavation include both chemical and physical agents, and are as follows:

o Exposure to airborne contaminants released during intrusive activities. Flammable atmospheres encountered in excavation.

o Falling during access/egress or while monitoring, or stumbling into excavation.

o An overhead hazard can result from material, tools, rock, and/or soil falling into the excavation.

Hazard Prevention:

o Monitor for airborne contaminants and use personal protective equipment.

o Provide ramps or ladders into trench to allow safe access and egress.

o Provide an adequate barrier around open pits. Material from pit must be placed away from edge to prevent cave in and instability of pit.

c. Air Sampling/Monitoring: General hazards frequently encountered during air sampling and monitoring include:

o Electrical hazards as a result of power sources to run sampling pumps.

o Placing sampling pumps in elevated areas or areas where slip/trip and fall hazards exist.

o Exposure to contaminants being released by intrusive activities.

o Readings indicating nonexplosive atmospheres, low concentrations of toxic substances, or other conditions may

crease or decrease suddenly, changing the associated risks.

o Air sampling matrix solutions may be acidic or basic, causing a corrosive hazard, and broken glass collection tubes can cut hands if mishandled.

Hazard Prevention:

o Grounded plugs should be used when a power source is needed to reduce the hazard of electric shock.

o Generators or air pumps should be used in dry areas, away from possible ignition sources. Do not stand in water or other liquids when handling equipment. Electrical equipment shall conform with OSHA 1910.303(a), 1910.305(a), (f), (f)(3).

o Ground fault interrupters are used in the absence of properly grounded circuitry or when portable tools must be used in wet areas.

o Extension cords should be protected from damage and maintained in good condition.

o Air pumps should be placed within easy reach using an OSHA approved ladder, elevated platform or by placing the pump on the stake.

o Personnel should be thoroughly familiar with the use, limitations and operating characteristics of the monitoring instruments.

o Perform continuous monitoring in variable atmospheres.

o Use intrinsically safe instruments until the absence of combustible gases or vapors is anticipated.

o Proper protective clothing such as gloves and goggles should be used when handling corrosive substances. 15-minute eyewash/portable shower and first aid should be available. Handle and store corrosives in appropriate areas.

d. Heat stress is considered a hazard due to the potential for work to be scheduled during summer months, the physical work load associated with construction activities, and the use of personal protective clothing. When ambient temperatures reach 70 F and workers are wearing impervious clothing, work/rest cycles will be scheduled on a regular basis and liquids with electrolytes (such as Gatorade) will be available to replenish body fluids. Because the incidence of heat stress depends upon a variety of factors, all workers, even those not wearing protective equipment. will be observed and encouraged to report any symptoms of heat stress. In addition, all personnel are specifically instructed to take breaks when they feel they are necessary. Cold Stress is not anticipated in this project.

e. Noise hazard is not encountered in this project.

IV. Training Requirement:

All personnel on-site shall have training and prior experience which meets the applicable requirements of 29 CFR 1910. In addition to annual Safety Training, all technical field personnel must received mandatory 40 hr Hazardous Waste Operations Training program which includes:

Chemical hazards

Physical hazards (heat stress, noise, material handling, etc.)

Hazard recognition

Toxicology

Permissible exposure limits

Personal protective equipment and protection levels

Respiratory protection (20 CFR 1910.134)

Air monitoring

Confined space entry

Corporate policies and site management

Supervision of health and safety

Site control

Health and safety plans

Medical monitoring

OSHA compliance

Personnel training

Decontamination

Drum handling

Hazardous material sampling

Practical exercises

Case histories

First Aid/CPR (Not all)

All on-site personnel shall receive site-specific training which includes:

Site chemical hazards (including acute and chronic effects)

Site control and decontamination procedures

Contingency plan

Protection levels and equipment

Proper use and maintenance of protective equipment

Review of health and safety plan

Emergency route to hospital

Periodic on-site safety meetings must be held to inform site personnel of changes in the Health and Safety Plan, air monitoring results, PPE, evacuation routes and other related information. Scheduling of these meetings shall be at minimum of once at start of work shift and as determined by the site HSO.

All regulatory personnel and visitors needing access to an active work area shall be expected to demonstrate compliance with the applicable training requirements.

6. The Personal Protective Equipment (PPE) selected for this project was identified in accordance with the criteria identified in the PPE program as per CCR Title 8 5192(g)(3) through (5).

Equipment is selected to ensure the workers will be protected from the hazards and potential hazards they are likely to encounter, identified by previous sampling and summarized in the contamination matrix.

Criteria used to determine the appropriate level of PPE included the limitations, hazards and requirements of the site, the equipment which must be operated during the project while the equipment is worn, the task specific conditions and durations, and the hazards and potential hazards identified in the work plan above. Level C is to be worn when the criteria for using air purifying respirators are met; the oxygen concentrations are not less than 19.5% by volume; measured air concentrations of identified substances will be reduced by the respirator below the substances's TLV and the concentration is within the service limit of the canister; atmospheric contaminant concentrations do not exceed IDLH levels; atmoshperic contaminants, liquid splashes, or other direct contact will not adversely affect any body area left unprotected by chemical-resistant clothing; job functions do not require self-contained breathing apparatus; and direct readings are a few ppms abouve background on instruments such as PID, GCI, colorimetric indicator tube or similar instruments.

Personnel have been trained on the proper usage and length of time the equipment may be worn; the equipment maintenance and storage requirements; the equipment decontamination and disposal procedures; proper fitting of equipment; equipment donning and doffing; inspection prior to, during and after use; and limitations during temperature extremes. If site monitoring or analysis of waste indicates a higher level of contamination than previously detected, the level of protection will be modified to reduce employee exposure below established PELs and published exposure levels for hazardous substances and health hazards.

Specific Level C equipment worn by each employee will be MSHA/NIOSH approved full face air-purigying dual cartfidge respirator with combination filters for organic vapors/acid gas/HEPA (yellow and purple stacked cartridge), long sleeved neoprene overall with hood and jacket, tyvex coveralls, butyl rubber inner gloves, neoprene outer gloves, steel toe and shank inner boots, neoprene outer boots, and lightweight polyethylene hard hat. This equipment meets the criteria outlined above and the chemical hazards identified in the chemical hazard matrix. All employees will be respirator fit tested. The breathing apparatus includes a full face mask and 30-minute air supply in a back pack harness. Respirators will be either full or half mask with HEPA organic vapors/dusts/mists/cartridge with HEPA filter cartridge and HEPA prefilter for potential exposure to organic vapors, gases and dusts. Masks will provide either supplied air or air purifying. Safety glasses and/or goggles shall be scratch resistant

polycarbonate lens with side shield and brow guards. Eye wear shall be impact resistant, nylon frames and fog resistant glass/lens. Employees working in areas not identified as being contaminated will be protected with cloth overalls and steel toe shoes with skid resistant soles and cushioned insoles at all times.

V. Personal Protection Equipment (PPE):

Personal wear protective equipment when response activities involve known or suspected atmospheric contamination vapors, gases, or particulates may be generated by site activities, or when direct contact with skin-affecting substances may occur. Full facepiece respirators protect lungs, gastrointestinal tract, and eyes against airborne toxicants. Chemical-resistant clothing protects the skin from contact with skin-destructive and absorbable chemicals. The specific levels of protection and necessary components for each have been divided into four categories according to the degrees of protection afforded:

Level A: Should be worn when the highest level of respiratory, skin, and eye protection is needed. Level A is the primary level of choice when encountering known highly toxic chemicals, or toxic chemical with a high degree of hazard to the skin, or unknown chemicals/ environments.

Level B: Should be worn when the highest level of respiratory protection is needed, but a lesser level of skin protection than Level A. These would be:

- o Atmospheres with IDLH concentrations, but the chemical or its concentration in air does not represent a severe skin hazard, or
- o Chemicals or concentrations involved do not meet

the selection criteria permitting the use of air-purifying respirators.

- o The atmosphere contains less than 19.5% oxygen.
- o The work will generate high concentrations of vapors, gases or particulates, or splashes of material that will affect the skin.
- o Atmospheric concentrations of unidentified vapors or gases are indicated by direct readings on instruments such as GCI, PID, colorimetric indicator tube or similar instruments, but vapors and gases are not suspected of containing concentrations of skin toxicants.

Level C: Should be worn when the criteria for using air-purifying respirators are met.

- o The oxygen concentrations are not less than 19.5% by volume.
- o Measured air concentrations of identified substances will be reduced by the respirator below the substance's TLV and the concentration is within the service limit of the canister.
- o Atmospheric contaminant concentrations do not exceed IDLH levels.
- o Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect any body area left unprotected by chemical-resistant clothing.

- o Job functions do not require self-contained breathing apparatus.
- o Direct readings are a few ppms above background on instruments such as PID, GCI, colorimetric indicator tube or similar instrument.

Level D: Should be worn only as a work uniform and not in any area with respiratory or skin hazards (no contaminants are present).

Modifications of these levels are permitted, and routinely employed during site work activities to maximize efficiency. Level C respiratory protection is required for this project. However the level of chemical protective equipment will depend upon contaminants and degrees of contact.

- o Type and measured concentration of the chemical substance in the ambient atmosphere and its toxicity.
- o Potential for exposure to substances in air, liquids, or other direct contact with material due to work being done.

When a significant change occurs, PPE shall be upgraded or downgraded based upon a change in site conditions or findings of investigations at that time. The hazards should be reassessed. Some indicators of the need for reassessment are:

- o Commencement of new work phase.
- o Change in job tasks during a work phase.

- o Change of season/weather.
- o When the temperature extremes or individual medical considerations limit the effectiveness of PPE.
- o Contaminants other than those previously indentified are encountered.
- o Change in ambient levels of contaminants.
- o Change in work scope which effects the degree of contact with contaminants.

A. Level of Protection

Level A Personal Protective Equipment:

- o MSHA and NIOSH approved pressure-demand, self-contained breathing apparatus (SCBA)
- o Fully encapsulating neoprene suit.
- o Tyvex coverall
- o Butyl rubber gloves (inner)
- o Neoprene gloves (outer)
- o Boots (inner) with steel toe and shank
- o Neoprene boots (outer)
- o Hard hat (under suit)
- o Two-way radio communications

Level B Personal Protective Equipment

- o MSHA/NIOSH approved pressure-demand, self-contained breathing apparatus (SCBA)
- o Long sleeved neoprene coverall with hood

- o Butyl rubber gloves (inner)
- o Neoprene gloves (outer)
- o Boots (inner) with steel toe and shank
- o Neoprene boots (outer)
- o Hard hat
- o Two-way radio communications

Level C Personal Protective Equipment:

o MSHA/NIOSH approved full face air-purifying dual cartridges respirator with combination filters for organic vapors/acid gas/HEPA (yellow and purple stacked cartridge)

- o Neoprene clothing (overalls and long-sleeved jacket; hooded)
- o Tyvex coverall
- o Neoprene gloves (outer)
- o Butyl rubber gloves (inner)
- o Boots (inner), steel toe and shank
- o Neoprene boots (outer)
- o Hard hat
- o 2-way radio communications (intrinsically safe)

Level D Personal Protective Equipment

- o Tyvex coveralls
- o Gloves
- o Steel toe and shank boots (inner)
- o Safety glass
- o Hard hat

B. Specific Safety Equipment

The Scott 2.2 SCBA shall be chosen for use at work sites requiring SCBAs. It includes a full-face mask and 30-minute air supply in a back pack harness.

Eye wear - Safety eyeglasses and/or goggles shall be scratch resistant polycarbonate lens with side shields and brow guard. Eye wear shall be impact resistant, nylon frames and fog resistant glass/lens.

Hard hats - Shall be of durable polyethylene, lightweight, with headgear suspension to provide a snug fit.

Tripod, body harness, lifelines, lanyards, industrial safety belts shall be available when there is a potential for a fall.

Eye wash/shower stations are inside decon trailer located in the contamination reduction zone.

Respirators - As a minimum half mask or full mask with HEPA organic vapors/dusts/mists/cartridge with HEPA filter cartridge and a HEPA prefilter for potential exposure to organic vapors, gases and dusts shall be available. Masks shall be either supplied air or air purifying.

Hand gloves - Gloves with high permeation resistance shall be used to handle contamination, if any, and utility type gloves shall be used to absorb moisture and cushion the hands to prevent chafing.

In addition to tyvek coveralls, cloth coveralls shall be provided at all times for employees use.

Safety shoes - Steel toe shoes shall be worn at all times. Shoes shall be of skid resistant soles and cushioned insoles.

C. Standard Operation Procedure (SOP) for SCBA and Respiratory Equipment: See Appendix B.

All workers must receive Respirator Fit Test approved by HSO.

D. SOP for Personal Protective Equipment (PPE):

The primary inspection of PPE in use at the site shall occur prior to immediate use and should be conducted by user.

1. Clothing:

Before use:

o Determine that the clothing material is correct for the specified task at hand.

o Visually inspect for:

- imperfect seams
- non-uniform coatings

- tears
- malfunctioning closures

o Hold up to light and check for pinholes.

o Flex product:

- observe for cracks
- observe for other signs of shelf deterioration

o If the product has been used previously, inspect inside and out for signs of chemical attack:

- discoloration
- swelling
- stiffness

During the work task

o Evidence of chemmical attack such as discoloration, swelling, stiffening, and softening. Keep in mind, however, that chemical permeation can occur without any visible effects.

o Closure failure.

o Tears.

o Punctures.

o Seam discontinuities.

2. Gloves:

Before use:

o Visually inspect for:

- imperfect seams

- tears
- non-uniform coating
- pressurize glove with air; listen for pin-hole leaks

E. <u>In-Use Monitoring of Personal Protective Equipment</u>

The wearer must understand all aspects of the clothing operation and its limitations. During equipment use, workers is encouraged to report any perceived problems or difficulties to site supervisor or HSO. These malfunctions include, but are not limited to:

- o Degradation of the protective ensemble
- o Perception of odors
- o Skin irritation
- o Unusual residues on personal protective equipment
- o Discomfort such as resistance to breathing or fatigue due to respirator use
- o Interference with vision or communication
- o Restriction of movement
- o Personal responses such as rapid pulse, nausea, and chest pain

VI. MEDICAL SURVEILLANCE

All on-site technical personnel are subject to a medical surveillance program which meets or exceeds the requirements or 29 CFR 1910.120. This includes an annual physical examination which includes:

Medical history
Physical examination
Urinalysis
Blood chemistry
Complete blood count including platelets and differential
Pulmonary function test
Resting EKG
Audiogram
Eye exam including glaucoma

All personnel hired specifically for work on-site receive a pre-employment examination which includes a chest X-ray in addition to the examination described above. End of employment physicals shall be conducted.

All visitors and regulatory personnel who will enter the active work areas are expected to demonstrate participation in a medical program which is equivalent to or exceeds the requirements of 29 CFR 1910.120.

Ken 7/15

5. Air Monitoring and Personal Protection:

The Direct Reading Instrument Monitoring protocol has been established as per Appendix A of the Health and Safety Plan.

Personnel monitoring was not anticipated because qualitative determination was made that there was no potential for an employee to be exposed to a chemical, physical or biological agent at or above the Action Level. This determination was made by reviewing the chemical, physical, biological,and toxicological characteristics of the chemicals and past experiences with similar operations. The Mobile Heavy Equipment operator who will be performing the task (soil excavation) will be wearing a full-face, positive-pressure air purifying respirator while situated in an enclosed equipment cab. The equipment will be located at least 15-20 feet upwind of the excavation area. The adequacy of the control methods in use or additional controls required to eliminate or minimize the hazard provided the rationale for not requiring personnel monitoring.

Rev 9/15

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To ED SMITH	From GARY MUNEKAWA
Co PWC	Co WESTON T4E2
Dept. HAZWRAP RAMEP	Phone # (415) 244 2524
Fax # (510) 301 4245	Fax # (415) 244 2551

ork gloves should be worn when handling the
ceable gloves are required when handling soil and water from the site.

MONITORING EQUIPMENT AND ACTION LEVELS

Section 6 of the original HSP provides information about the air monitoring program, specific monitoring requirements for the IMF IRA are presented below.

1. A PID with a 10.2 or 10.6 eV Probe. At 1 ppm, averaged for a fifteen minute period of time, a Dreager tube for Benzene will be taken. If the Dreager tube is negative, site activities may continue in Level D up to 5 ppm. At 5 ppm, sustained for fifteen minutes, Level C will be required. At 25 ppm, sustained for fifteen minutes, site work shall cease pending an evaluation by the project health and safety coordinator and the PRC health and safety manager.

2. Colorimetric tubes will be used for Benzene to supplement PID measurements. Benzene Dreager Tube 0.5/c order number 8101841 will be used. At 1 ppm benzene, Level C will be required. At 10 ppm benzene a full-face respirator will be required, at 25 ppm benzene site work shall cease pending an evaluation by the project health and safety coordinator and the PRC health and safety manager.

3. A combustible gas indicator will be required to test the excavation prior to collection of soil samples and personnel entry. No work shall be permitted when readings exceeding 10% LEL are detected, nor when the oxygen concentration falls below 19.5 % or is detected at greater than 22%.

4. Dust suppression activities will be implemented and dust monitoring will be conducted continuously during excavation and soil stockpiling activities. The action level to upgrade into Level C respiratory protection is 2 mg/m^3, averaged over a five minute period of time. At 10 mg/m^3 work activities will cease pending a method to control dust exposure. Typical dust suppression techniques involve using a water spray to wet the soil. The potential problem with this method at the IMF is the presence of low pH in the soil. The may cause the surface to become more acidic creating a dermal hazard.

5. To accurately assess the worker inhalation exposure to lead-contaminated soil from the excavation activities, personal industrial hygiene air monitoring will be conducted during the first two days of field activities. The air monitoring will be conducted in accordance with NIOSH Analytical Method 7300 *Elements (ICP)* . This sampling will provide backup and confirmation to the total dust monitoring that will be conducted on site with the direct read dust monitor. The sample collection will be at the direction of a certified industrial hygienist and the samples will be analyzed by a laboratory accredited by the American Industrial Hygiene Association.

6. It is recommended that the field team be equipped with pH paper so that quick tests of soil can be made in the field.

7. Noise and heat stress monitoring will be conducted in accordance with the original HSP.

ED. THIS INFO IS FROM THE PRC MONTGOMERY WATSON HAS PLANS DTSC FAXED THIS TO MARC BOMBEL I.H. HOPEFULLY THIS WILL PUT AIR MONITORING TO BED

Gary

VII. Air Monitoring: (See Appendix A)

VIII. Site Control Measures

Buddy System: During all Level C activities or when some conditions present a risk to personnel, the implementation of a buddy system is mandatory. A buddy system requires at least two people who work as a team; each looking out for each other.

Site communications Plan: Communications between field teams and contact with personnel in the support zone is essential. The following communication systems will be available during activities at the Site.

- Two-way radio
- Whistle
- Hand signals

Signal	Definition
Hands clutching throat	Out of air/cannot breath
Hands on top of head	Need assistance
Thumbs up	OK/I am all right/I understand
Thumbs down	No/negative
Arms waving upright	Send backup support
Grip partners wrist	Exit area immediately

Work Zone Definition

Three work zones shall be established at the Site are the Exclusion Zone, Contamination Reduction Zone, and Support Zone.

The Exclusion Zone is the area where contamination is likely to be present. Person who enters into this zone must have Level C personal protective equipment. No smoking, eating, drinking, matches/lighters in this zone. This zone requires check-in on entrance and check-out on exit.

The Contamination Reduction Zone is the area where personnel conduct personal and equipment decontamination. No smoking, eating, drinking, matches or lighters in this zone. Activities to be conducted in this zone will require Level C personal protective equipment.

The support zone is situated in clean areas where the chance to encounter hazardous materials or conditions is minimal. Personal protective equipment is not required.

Evacuation Routes/Procedures: In the event of an emergency which necessitates an evacuation of the site. The HSO should notify everyone on site to vacate the area verbally supplemented using the hand held radios. All personnel should evacuate upwind of any activities. Personnel will remain at that area for further instructions until the HSO authorizes to re-enter.

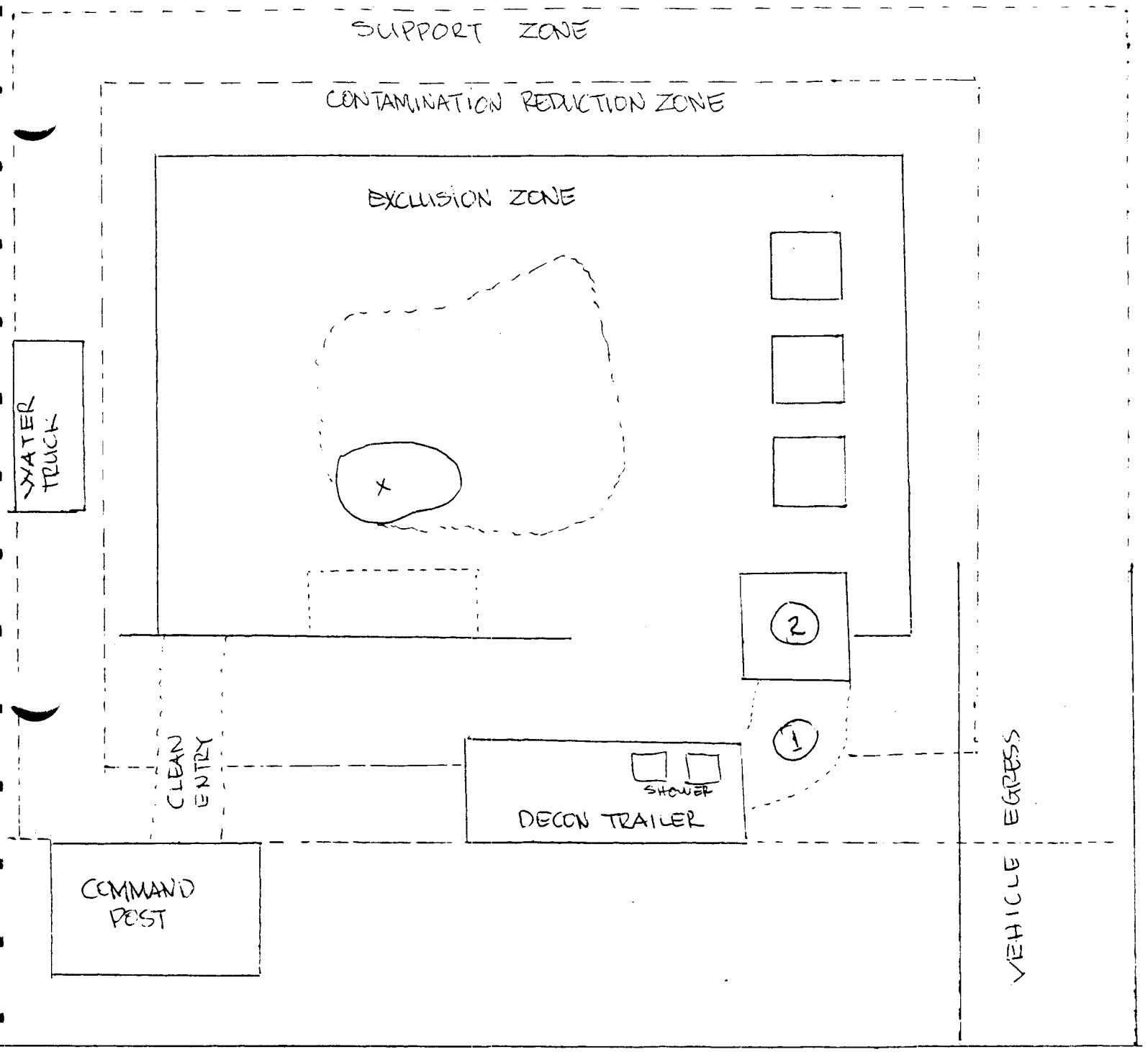
See Contigency Plan for Emergency Medical Treatment Procedures or Fire or Explosion

7. Site control: A map of the general site and specific work area is attached. The Support Zone, Contamination Reduction Zone, and Exclusion Zone will each be separated by flagging and yellow hazard tape or equivalent boundary. Avenue L will be blocked off and closed between Main Street and 9th Street. The excavation site itself is secured by a locked chain link fence. Excavations will be covered with steel anchor plates suitable to withstand four times the maximum anticipated load.

The Support Zone is the area surrounding the Contamination Reduction Zone; the Contamination Reduction Zone is an approximately 100 foot wide boundary surrounding the Exclusion Zone; the Exclusion Zone is an approximately 60 foot wide area surrounding the fenced work site, and the fenced work site is a 45 foot by 60 foot area in the lot bounded by Avenue L, Main Street and 9th Street at the Intermediate Maintenance Facility. The fence will remain locked during non-working hours, and no personnel will be allowed on to the site who are not protected by the appropriate level of PPE. Contaminated waste storage bins will be staged in the Contamination Zone. Bins fully loaded with waste will be disposed of the day they are filled; partially loaded bins will be secured with locks to prevent opening during non-working hours. The Decontamination trailer will be located in the Reduction Zone; the trailer will remain locked when empty and during non-working hours. A diagram of the of the decontamination trailer is attached.

On site communications will be through use of the buddy system; two way radios between the site, NAS Alameda site offices, and security; whistles; and hand signals. Off-site communication will be through two way radios between the site and PWC Utilities Control, and the use of the project leader's hand held telephone.

Rev 9/15



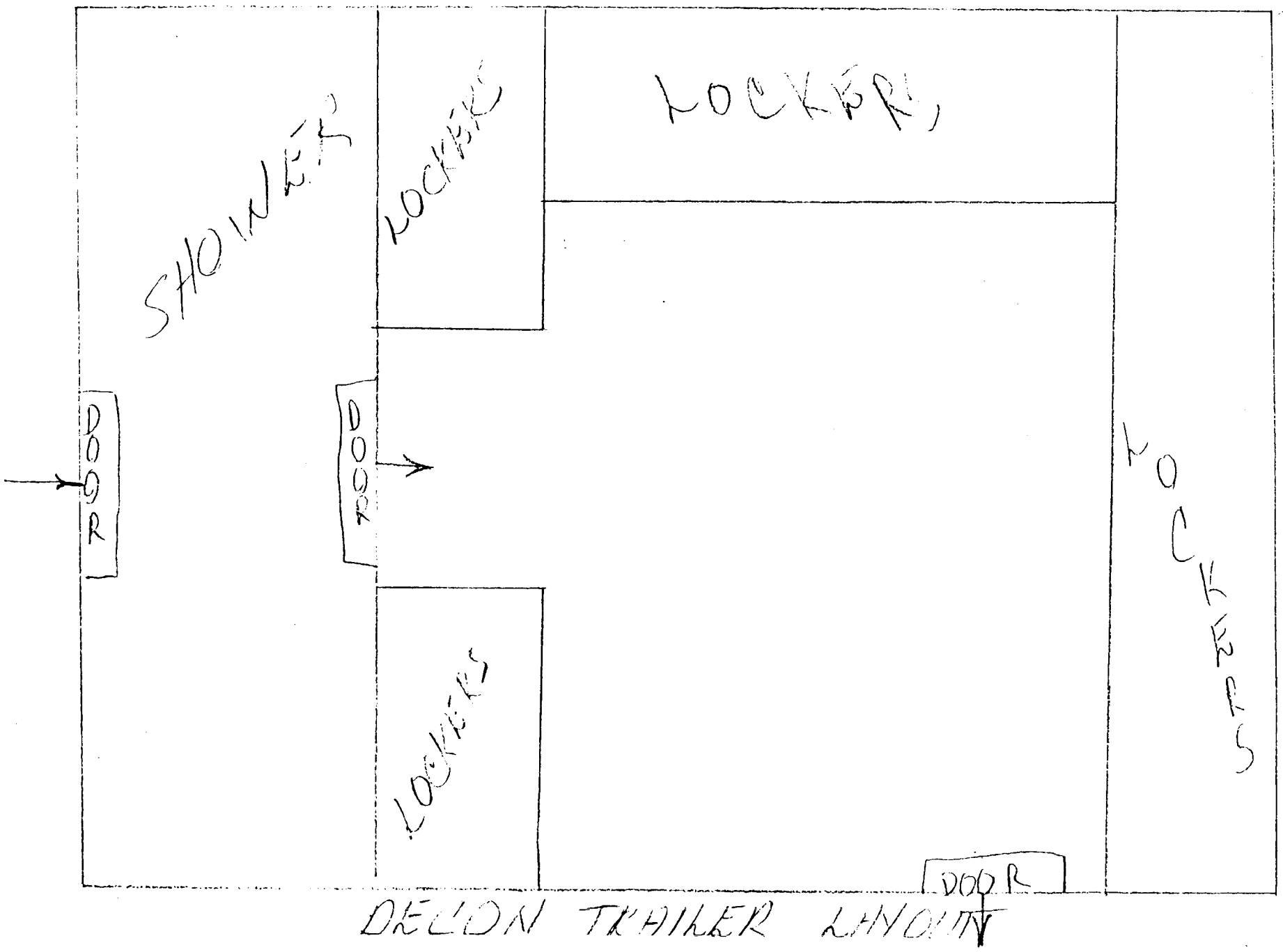
① Drum for contaminated coveralls, gloves, boots etc.

② Drum for excavator bucket decon

AVENUE L

N

BLDG 350


SHOWERS
LOCKERS
LOCKERS
DOOR
DOOR
LOCKERS
LOCKERS
DOOR
DECON TRAILER LAYOUT

KEU 7/15

8. Decontamination:

STANDARD OPERATING PROCEDURE
FOR
EQUIPMENT DECONTAMINATION

LEVEL "C" DOFFING

STEP	SEQUENCE	INFORMATION/OPERATING GOALS/ SPECIFICATIONS
1.	Segregate equipment drop	Deposit equipment used on site (tools, sampling devices, containers, monitoring equipments, radios, clipboards, etc.) on plastic dropcloths or in different containers with plastic liners. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool down station may be set up within this area.
2.	Boot cover & gloves wash	Scrub outer boot covers and gloves with decon solution or detergent and water.
3.	Boot cover & gloves rinse	Rinse off decon solution using copious amounts of water.
4.	Tape removal	Remove tape around boots and gloves and deposit in container with plastic liner.
5.	Boot cover removal	Remove boot covers and deposit in container with plastic liner.
6.	Outer glove removal	Remover outer gloves and deposit in container with plastic liner.
7.	Suit and boot wash	Wash splash unit, gloves, and safety boots. Scrub with long-handle scrub brush and decon solution.
8.	Suit, boot,& glove rinse	Rinse off decon solution using water.
9.	Canister or mask change	If worker leaves exclusion zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, and joints taped, worker returns to duty.

10. Safety boot removal	Remove safety boots and deposit in container with plastic liner.
11. Splash suit removal	With assistance of helper, remove splash suit. Deposit in container with plastic liner.
12. Inner glove wash	Wash inner gloves with decon solution.
13. Inner glove rinse	Rinse inner gloves with water.
14. Face piece removal	Remove face piece. Deposit in container with plastic liner. Avoid touching face with fingers.
15. Inner glove removal	Remove inner gloves and deposit in lined container.
16. Inner clothing removal	Remove clothing soaked with perspiration and place in lined container. Do not wear inner clothing off-site since there is a possibility that small amounts of contaminants might have been transferred in removing the fully-encapsulated suit.
17. Field wash.	Shower if highly toxic, skin-corrosive or skin absorbable materials are known or suspected to be present. Wash hands and face if shower is not available.
18. Redress	Put on clean clothes.

Rev 9/15

STANDARD OPERATING PROCEDURE
FOR
EQUIPMENT DECONTAMINATION

EXCAVATOR BUCKET DECONTAMINATION

MATERIALS : Plastic liner
55 gallon drums
Bucket
Scrub brush
Detergent, liquid, all-purpose
Garden hose
Water source (Water Truck)

LEVEL OF PROTECTION : LEVEL C

STEP	INFORMATION/OPERATING GOALS/SPECIFICATIONS
1	Lay plastic liner in designated Decon area (10' x 10').
2.	Build berm around containment area to catch run-off.
3.	Place open top 55-gallon drum in center.
4.	Swing back-hoe and place excavation bucket on top of drum.
5.	Scrub bucket with hand held scrub brush and detergent-water solution.
6.	Rinse off decon solution using water using low pressure garden hose. Repeat as many times as necessary.
7.	Collect all wash and rinse water in waste drum.

KEW 7/15

9. Sanitation: Sanitation facilities at Bldg 530, adjacent to the work site, will be available at to the employees. Personnel will be decontaminated before using the facilities. Personnel will discard contaminated equipment and perform decontamination functions prior to departing the work site. Potable water and electrolyte replacement liquids will be available at all times.

IX . DECONTAMINATION

A. Standard Operating Procedures: Decontamination involves the orderly controlled removal of contaminants. All site personnel should minimize contact with contaminants in order to minimize the need for extensive decon. The HSO is responsible for monitoring decontamination procedures and determining their effectiveness. Decontamination trailer shall be set up in reduction zone.

1. Equipment Decontamination:

All equipment coming in contact with potentially contaminated material at the site shall be decontaminated prior to being removed from the site or being reused.

2. Personnel Protective Equipment Decontamination:

Level A Decontamination:

Step 1 Segregated equipment drop

Step 2 Boot cover and glove wash

Step 3 Boot cover and glove rinse

Step 4 Tape removal

Step 5 Boot cover removal

Step 6 Outer glove removal

Step 7 Suit and Safety Boots wash

Step 8 Suit and Safety Boots rinse

Step 9 Safety Boots removal

Step 10 Suit removal

Step 11 SCBA Backpack removal

Step 12 Inner glove wash

Step 13 Inner glove rinse

Step 14 Face piece removal

Step 15 Inner glove removal

Step 16 Coverall removal

Step 17 Field wash

Step 18 Redress

Level B Decontamination:

Step 1 Segregated equipment drop

Step 2 Boot cover and glove wash

Step 3 Boot cover and glove rinse

Step 4 Tape removal

Step 5 Boot cover removal

Step 6 Outer glove removal

Step 7 Suit/Safety Boot wash

Step 8 Suit/SCBA/Boot/Glove rinse

Step 9 Safety boot removal

Step 10 SCBA Backpack removal

Step 11 Splash Suit removal

Step 12 Inner glove wash

Step 13 Inner glove rinse

Step 14 Face piece removal

Step 15 Inner glove removal

Step 16 Coverall removal

Step 17 Field wash

Step 18 Redress

Level C Decontamination :

Step 1 Segregated equipment drop

Step 2 Boot cover and glove wash

Step 3 Boot cover and glove rinse

Step 4 Tape removal

Step 5 Boot cover removal

Step 6 Outer glove removal

Step 7 Suit and safety boot wash

Step 8 Suit and safety boot rinse

Step 9 Safety boot removal

Step 10 Splash suit removal

Step 11 Inner glove wash

Step 12 Inner glove rinse

Step 13 Face piece removal

Step 14 Inner glove removal

Step 15 Inner clothing removal

Step 16 Field wash

Step 17 Redress

Level D Decontamination

Step 1 Remove coveralls

Step 2 Remove gloves

Step 3 Wash hand and face

3. Disposition of Decontamination Wastes:

All equipment and materials used for decontamination shall be separately disposed of in 55 gallon barrels and treated as hazardous waste.

Water used in decontamination may be collected in a portable 5,000 gallon tank. Rinse water placed in the tank and all barrels used in the decontamination area shall be labeled and collected on site for subsequent analysis and disposal.

Storage of PPE shall be away from dust, moisture, sunlight, damaging chemicals, extreme temperatures, and impact. PPE shall be stored and maintained in the support area.

X. Site's SOP:

Underground utilities: will be identified prior to the commencement of excavation. Overhead utilities will be identified and a minimum distance of 20 ft will be maintained at all times.

Traffic warning devices: shall be placed at all excavations which are adjacent to pedestrian or vehicle thoroughfares in accordance with the U. S. Department of Transportation Federal Highway Administration "Work Zone Traffic Control" standards and guidelines. Streets shall be blocked and rerouted with visible signs from 100 ft apart.

If excavation is to remain overnight, standard trenching, shoring, guardrails, fences, or barricades shall be in place. Warning mediums shall be lighted at night. Alternately, excavations may be covered by steel plates anchored into the ground, with suitable ramping, where required. The steel plates must be able to withstand 4 times the maximum anticipated load.

Notify NAS Alameda Security Officer at 911 and Fire Department at the same number for the street closure at the NAS Alameda.

STANDARD OPERATING PROCEDURE FOR BACKHOE (See Appendix C)

A pre-inspection of all equipment must be completed before operation of unit is begun.

Listed below are the things that should be checked on every piece of equipment before any work is started:

1. Check oil
2. Check water (if air cooled engine)
3. Transmission oil
4. Hydraulic fluid levels
5. Check tires for inflation and/or abnormal wear
6. Check all hoses
7. Check for leaks
8. Clean unit if necessary

Daily meetings shall be held with all on site to discuss procedure of the job for that day. Plan the job so that it can be accomplished the safest and most efficient way.

Check the area in which you will be working for possible problems including uneven terrains, utilities that pose a danger, including any overhead utilities.

Provide cones or barricades where construction is to take place both during and whenever the job site is vacated

for any significant length of time. A flagman on the jobsite is not considered likely but may be required if necessary.

After job is completed or workers are securing for the day, cover any open holes or trenches, fence the excavation areas and rope off the construction area with caution tape.

Lower all buckets or out-riggers to the ground and secure units in a safe location.

OPERATOR RESPONSIBILITY (See Appendix C)

The operator is responsible to check equipment thoroughly using operator inspection guides (Appendix C) and trouble reports. Report any unusual malfunction or unsafe condition of equipment to the site supervisor.

Be on time for job assignments and make sure you understand what needs to be done, where and when to be there. Use the most direct route to jobsite and when a delay is encountered, notify the site supervisor at the first opportunity available via radio or telephone.

When transporting soil or debris, ensure vehicle is not overloaded and material is secured from blowing dust and debris.

When picking up material from vendor with pump or dump trailers, pull onto scales to take in then follow vendor procedures for picking up the materials. At end of shift turn paper work into the site supervisor.

XI CONTINGENCY PLAN

A. Emergency Medical Treatement Procedures:

Any person who becomes ill or injured in the exclusion zone must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed (i.e. complete disrobing of the victim and redressing in clean overalls or wrapping in the blanket). First aid should be administered while awaiting an ambulance or paramedics. All injuries and illnesses must immediately report to the project manager.

Any person being transported to a clinic or hospital for treatment should take with them list of chemicals (Chemical Hazards in Section III: Risk Analysis of this Health and Safety Plan) they have been exposed to at the site.

B. Fire or Explosion:

In the event of a fire or explosion, the base fire department should be summoned immmediately. Upon their arrival, the HSO will advise the fire chief of the location, nature, and identification of the chemicals on site.

Use fire extinguisher if it is safe to control or extinguish fire and remove flammable and hazardous materials which may contribute

to the fire meanwhile awaiting for the fire crew arrival.

The following emergency equipment will be found in the decon trailer:

- o First aid kit
- o Fire extinguisher
- o Cellular phone
- o Eye wash
- o Emergency shower

Local Emergency Contacts

Ambulance	911
Medical Clinic (Bldg. 16)	(510) 263-4410
Alameda Hospital	911
Fire Department	911
Security	911

Hospital Emergency Route

Alameda Hospital: (See attached route map)

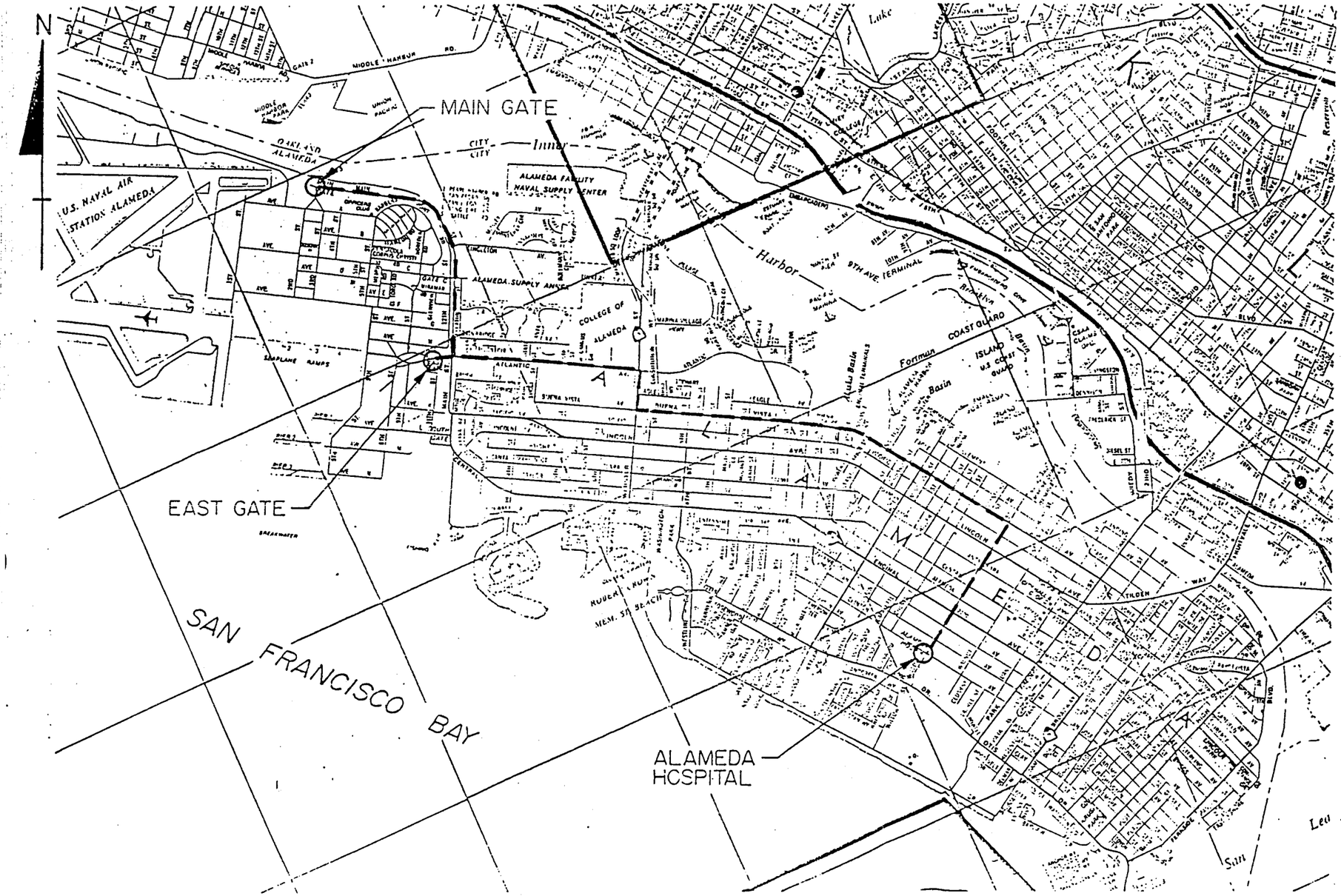
From the main gate, follow Main Street to Atlantic Avenue. Turn left on Atlantic Avenue heading east.

From the east gate, go straight on to Atlantic Avenue heading east. Take Atlantic Avenue to Webster Street (California Highway 61). Turn right on to Webster Street heading south. Take Webster

Street two blocks south to Buena Vista Avenue. Turn left on to Buena Vista Avenue heading east. Take Buena Vista for 1.7 miles east to Willow Street. Turn right on to Willow Street heading south. Take Willow Street nine blocks south to Clinton Avenue. The hospital is at 2070 Clinton Avenue on the southwest corner of Clinton Avenue and Willow Street.

Station Medical Clinic (Bldg.16):

Located on Third Street between "B" and "C" Avenues. The emergency telephone number is 263-4410.



LEGEND:

EMERGENCY ROUTE

SCALE

0 0.5 MILES

Appendix A

Air Monitoring

FREQUENCY AND TYPES OF AIR MONITORING/SAMPLING

This section explains the general concepts of an air monitoring program and specifies the surveillance activities that will take place during project completion at the Site.

The purpose of air monitoring is to identify and quantify airborne contaminants in order to verify and determine the level of worker protection needed. Initial screening for identification is often qualitative, i.e., the contaminant, or the class to which it belongs, is demonstrated to be present but the determination of its concentration (quantification) must await subsequent testing. Two principal approaches are available for identifying and or quantifying airborne contaminants.

- The onsite use of direct reading instruments.
- Laboratory analysis of air samples obtained by gas sampling bag, collection media (i.e., filter, sorbent), and/or wet-contaminant collection methods.

1. DIRECT-READING MONITORING INSTRUMENTS

Unlike air sampling devices, which are used to collect samples for subsequent analysis in a laboratory, direct-reading instruments provide information at the time of sampling, enabling rapid decision making. Data obtained from the real-time monitors are used to assure proper selection of personnel protection equipment, engineering controls, and work practices. Overall, the instruments provide the user the capability to determine if site personnel are being exposed to concentrations which exceed exposure limits or action levels for specific hazardous materials. Of significant importance, especially during initial entries, is the potential for IDLH conditions or oxygen deficient atmospheres. Real-time monitors can be useful in identifying any IDLH conditions, toxic levels of airborne contaminants, flammable atmospheres, or radioactive hazards. Periodic monitoring of conditions is critical, especially if exposures may have increased since initial monitoring or if new site activities have commenced.

1.1 SOME DIRECT READING INSTRUMENTS FOR GENERAL SURVEY

Instrument: COMBUSTIBLE GAS INDICATOR (GCI)

Hazard Monitored: Combustible gases and vapors.

Application: Measures the concentration of a combustible gas or vapor.

Detection Method: A filament, usually made of platinum, is heated by burning the combustible gas or vapor. The increase in heat is measured, Gases and vapors are ionized in a flame. A current is produced in proportion to the number of carbon atoms present.

General Care/Maintenance: Recharge or replace battery. Calibrate immediately before use.

Typical Operating time: Can be used for a s long as the battery lasts, or for the recommended interval between calibrations, whichever is less.

Instrument: ULTRAVIOLET (UV) PHOTOIONIZATION DETECTOR (PID)
Example: HNU

Hazard Monitored: Many organic and some inorganic gases and vapors.

Application: Detects total concentration of many organic and some inorganic gases and vapors. Some identification of compounds are possible if more than one probe is measured.

Detection Method: Ionizes molecules using UV radiation;' produces a current that is proportional to the number of ions.

General Care/Maintenance: Recharge or replace battery. Regularly clean lamp window. Regularly clean and maintain the instrument and accessories.

Typical Operating Time: 10 hours. 5 hours with strip chart recorder.

Instrument: DIRECT READING COLORIMETRIC INDICATOR TUBE

Hazard Measured: Specific gas and vapors.

Application: Measures concentration of specific gases and vapors.

Detection Method: The compound reacts with the indicator chemical in the tube, producing a stain whose length or color change is proportional to the compound's concentration.

General Care/Maintenance: Do not use a previously opened tube even if the indicator chemical is not stained. Check pump for leaks before and after use. Refrigerate before use to maintain a shelf life of about two years. Check expiration date of tubes. Calibrate pump volume at least quarterly. Avoid rough handling which may cause channeling.

Instrument: OXYGEN METER

Hazard monitored: Oxygen

Application: Measures the percentage of oxygen in the air.

Detection Method: Uses an electrochemical sensor to measure the partial pressure of oxygen in the air, and converts that reading to oxygen concentration.

General Care/Maintenance: Replace detector cell according to manufacturers recommendations. Recharge or replace batteries prior to expiration of the specified intervals. If the ambient air is more than the 0.5% carbon dioxide, replace the detector cell frequently.

Typical operating time: 8-12 hours

2. SPECIFIC CONTAMINANTS TO BE MONITORED AT THE SITE.

The following checklist provides a summary of the contaminants to be monitored for and frequency/schedule of monitoring. The air sampling checklist will serve as a site monitoring plan.

2.1 SITE AIR MONITORING AND SAMPLING PROGRAM.

A. Air Monitoring Instruments

Combustible Gas Indicator (GCI)

Frequency: 3 times/day

Location: Upwind and downwind of site activities.
Excavation area
Hot zone area
Fixed stations

Ultraviolet (UV) Photoionization Detector (PID)

Frequency: 3 times/day

Location: Upwind and downwind of site activities
Staging area
Hot zone area
Fixed stations

Direct Reading Colorimetric Indicator Tube

Frequency: 3 times/day

Location: Upwind and downwind of site activities
Staging area
Hot zone area -
Fixed stations

Oxygen Meter

Frequency: 3 times/day

Location: Upwind and downwind of site activities
Staging area
Hot zone area
Fixed stations

B. Action Levels

Explosive Atmosphere:

Action Level	Action
<10% LEL	Continue investigation
10% - 25% LEL	Continue on-site monitoring with caution as higher levels are encountered.
>25% LEL	Explosion hazard. Withdraw from area immediately.

Oxygen:

Action Level	Action
<19.5%	Monitor wearing self-contained breathing apparatus. NOTE: Combustible gas readings are not valid in atmospheres with <19.5% oxygen.
19.5% - 25%	Continue investigation with caution. Deviation from normal level may be due to presence of other substances.
>25%	Fire hazard potential. Discontinue investigation. Consult a fire safety specialist.

Organic gases and vapors.

Action Level	Action
Depends on contaminants	Consult standard reference manuals for air concentration/toxicity data. Action level depends on PEL/TLV. Action level is 1/2 the current standard.

Inorganic gases and vapors.

Action Level	Action
Depends on contaminants	Consult standard reference manuals for air concentration/toxicity data. Action level depends on PEL/TLV. Action level is 1/2 the current standard.

Particulates:

Action Level	Action
Depends on contaminants	Consult standard reference manuals for air concentration/toxicity data. Action level depends on PEL/TLV. Action level is 1/2 the current standard.

5103/4 cr
21 September 1993

MEMORANDUM

From: Project Engineer
To: WESDIV Attn: Gary M.

Subj: MONITORING AT DERA SITE

1. Ongoing monitoring of atmospheric hazards will be conducted at the site using a combination of stationary sampling equipment, personnel monitoring devices, and periodic/continuous area monitoring with direct reading instruments (DRI).

2. The following protocols are addendum to the Health and Safety Plan for the DERA Site project at NAS Alameda.

a. Montgomery-Watson will conduct personal and area sampling for particulate contaminants using OSHA-approved methods and instrumentations. (Air chek Sampler Model 224-PCXR3 & Calibrator Acuflow SKC. West, Inc.)

b. PWCSFB will facilitate the continuous evaluation and quantification of the following conditions:

1) Organic/Inorganic vapors
2) Oxygen concentration
3) Flammable/Combustible atmosphere

Appendix A of the Health and Safety Plan specify the general concepts and procedures for air monitoring utilizing direct reading instruments and detectors. GasTech GX4000 and HNU DL101 will be the onsite principal DRI to be used for this purpose.

3. Questions regarding this matter can be directed to Mary Nguyen, Code 614, Tel# 302-5482.

MARY NGUYEN

Appendix B

Respirator Equipment SOP

SOP for Respiratory Protection Devices

The following sections define the standard operating procedures for air purifying respirators and self-contained breathing apparatus.

Cleaning and Disinfecting Air Purifying Respirators (APR)

APRs in routine use should be cleaned and disinfected at least daily. Where respirators are used only occasionally or when they are in storage, the cleaning interval is weekly or monthly, as appropriate.

Daily Cleaning Procedure

The steps to be followed for cleaning and disinfecting daily are as follows:

- Respirator Disassembly. Respirators are taken to a clean location where the filters, cartridges or canisters are removed, damaged to prevent accidental reuse, and discarded. For thorough cleaning, the inhalation and exhalation valves, speaking diaphragm, and any hoses are removed.

- Cleaning. In most instances, the cleaning and disinfecting solution provided by the manufacturer is used, and is dissolved in warm water in an appropriate tube. Using gloves, the respirator is placed in the tub and swirled for

a few moments. A soft brush may be used to facilitate cleaning.

- Rinsing. The cleaned and disinfected respirators are rinsed thoroughly in water to remove all traces of detergent and disinfectant. This is very important for preventing dermatitis.

- Drying. The respirators may be allowed to dry in room air on a clean surface. They may also be hung upside down like drying clothes, but care must be taken not to damage or distort the facepieces.

- Reassembly and Inspection. The clean, dry respirator facepieces should be resembled and inspected in an area separate from the disassembly area to avoid contamination. Special emphasis should be given to inspecting the respirators for detergent or soap residue left by inadequate rinsing. This appears most often under the seat of the exhalation valve, and can cause valve leakage or sticking.

After Routine Use in Exclusion Zone

The steps to be followed for cleaning and disinfecting in the field are as follows:

- The mask may be washed/rinsed with soap and water.

- At a minimum, the mask should be wiped with disinfectant wipes (benzoalkaloid or isopropyl alcohol), and allowed to air dry in a clean area.

APR Inspection and Checkout

1. Visually inspect the entire unit for any obvious damages, defects, or deteriorated rubber.
2. Make sure that the facepiece harness is not damaged. The serrated portion of the harness can fragment which will prevent proper face seal adjustment.
3. Inspect lens for damage and proper seal in facepiece.
4. Exhalation Valve - pull off plastic cover and check valve for debris or for tears in the neoprene valve (which could cause leakage).
5. Inhalation Valves (two) - screw off cartridges/ canisters and visually inspect neoprene valves for tears. Make sure that the inhalation valves and cartridge receptacle gaskets are in place.
6. Make sure a protective cover lens is attached to the lens.
7. Make sure the speaking diaphragm retainer ring is hand tight.
8. Make sure that you have the correct cartridge.
9. Don and perform negative pressure test.

Storage of Air Purifying Respirators

OSHA requires that respirators be stored to protect against:

Dust
Sunlight
Heat

Extreme cold
Excessive moisture
Damaging chemicals
Mechanical damage

Storage of respirators should be in a clean which minimizes the chance for contamination or unsanitary conditions.

Cleaning and Disinfecting Self Contained Breathing Apparatus

Cleaning procedures for Self Contained Breathing Apparatus (SCBA) facepieces are identical to those for Ultratwin APRs. The backpiece is cleaned with cleaning solution and a brush. Following cleaning, the facepiece is combined with the regulator and an operational check is performed.

SCBA Inspection & Checkout

Monthly Inspection:

1. Check cylinder label for current hydrostatic test date.
2. Inspect cylinder for large dents or gouges.
3. Inspect cylinder gauge for damage.
4. Complete routine inspection.
5. Fill out the appropriate records with results and recommendations.

Routine Inspection: Perform immediately prior to donning or after cleaning.

1. Before proceeding, check that the:

   - o High-pressure hose connector is tight on cylinder fitting.
   - o By-pass valve is closed.
   - o Mainline valve is closed.
   - o Regulator outlet is not covered or obstructed.

2. Backpack and harness assembly:

   - o Visually inspect straps for wear, damage, and completeness.
   - o Check wear and function of belt.
   - o Check backplate and cylinder holder for damage.

3. Cylinder and high pressure hose assembly:

- o Check cylinder to assure that it is firmly attached to backplate.
- o Open cylinder valve; listen or feel for leakage around packing and hose connection.
- o Check high pressure hose for damage or leaks.

4. Regulator:

- o Cover regulator outlet with palm of hand.
- o Open mainline valve.
- o Note stoppage of air flow after positive pressure builds.
- o Close mainline valve.
- o Remove hand from regulator outlet.
- o Open by-pass valve slowly to assure proper function.
- o Close by-pass valve.

- o Open mainline valve.
- o Note pressure reading on regulator gauge.
- o Close cylinder valve while keeping hand over regulator outlet.
- o Slowly remove hand from outlet and allow air to flow.
- o Note pressure when low-pressure warning alarm sounds; it should be between 550-650 psi.
- o Remove hand from regulator outlet.
- o Close mainline valve.
- o Check regulator for leaks by blowing air into regulator for 5-10 seconds. Draw air from outlet for 5-10 seconds. If a positive pressure or vacuum cannot be maintained there is a leak. DO NOT USE SCBA.

5. Facepiece and corrugated breathing hose:

- o Inspect hand harness and facepiece for damage, serrations, and deteriorated rubber.
- o Inspect lens for damage and proper seal in facepiece. Inspect exhalation valve for damage and dirt build-up.
- o Stretch breathing hose and carefully inspect for holes and deterioration.
- o Inspect connector for damage and presence of washer.
- o Perform negative pressure test with facepiece donned.

6. Storage:

- Refill cylinder to 2216 psi
- Close cylinder valve
- Tightly connect high pressure hose to cylinder
- Bleed pressure from high pressure hose by opening mainline valve.
- Close by-pass valve
- Close mainline valve
- Fully extend all straps
- Store facepiece in a clean plastic bag for protection

Appendix C

Equipment SOP and Operator Responsibility

1. Job site inspection to ensure that all safe procedures are being followed.
   a. Check for under ground utility clearances.
   b. Equipment inspection sheets filled out properly.
   c. Assist in minor operator maintenance.
   d. Assist WC 722 leader to ensure P 7 area OAB wood is ready to be crushed and hauled away, and area does not become an eye sore.
   e. Check Corp yard stockpiles and cleanliness.

2. Review dispatch operations and assist with NFTS input, when available.

3. Keep up with training matrix and train as needed on new, rented or unusual equipment that is not in our fleet.

4. Assist in gather all proper J.O.#'s, chits, and minors and sign-off when completed.

5. Encourage everyone to participate in "SAFE PRACTICES".

6. Inspect all equipment for any safety violations and ensure equipment is ready to be dispatched upon request.

7. Ensure that all safety equipment is on hand or ready availability at our tool room.

8. Ensure general area where equipment is parked is generally clean.

9. Ensure when assigned to hi-priority jobs that there is someone available to take your place while gone, using training matrix.

10. Ensure that all materials for various jobs are in conformance with what job requirements are.

11. While in training, or on leave, rotate these daily responsibilities to other operators when workload permits or WC 722 Leader.

ENGINEERING EQUIPMENT OPERATORS RESPONSIBILITIES: WC 732

1. Operator is responsible to check equipment thurouly. Using Operators Inspection guide and trouble report. If there is any discrepancies or any malfunction or unsafe conditions of equipment notify your supervisor or dispatcher check for the following:

A. Walk around equipment.
B. Inspect visually and look for leaks.
C. Use steps and hand rails.
D. Adjust seat.
E. Never operate starter more than 20 seconds.
F. Check fuel, controls, lights and mirrors.
G. Check steering.
H. Test brakes and controls.
I. Move backwards to test back-up alarm.

2. Be on time for job assignments make sure you understand what needs to be done, where, and when to be there. Use the most direct route to jobsites whenever possible and when a delay is encountered notify your supervisor or dispatcher at the first opportunity available via telephone or radio.

A. Upon completion of assignments, or in between assignments the operator will perform operational inspection such as take to shop and lubricate grease fittings and "CLEAN

3. When delivering debris to the dump check your load before leaving jobsite check for:

A. Overloaded
B. Secured from blowing dust and debris by covering load with tarp and perhaps wetting load with water.
C. When arriving at dump site be sure to weight in before and after and return dump slips to dispatcher.

4. When picking up material from vendor W/Dump Trucks or Trailers follow vendors procedures. When picking up sand , gravel etc.. DO NOT EXCEED GVWR RATING to avoid overweight fines. These vehicles GVWR RATING ARE AS FOLLOWS:

DUMP TRUCKS

96-40018	47,000 lbs
96-40019	47,000 lbs
96-41593	40,000 lbs
96-41594	40 000 lbs
96-42654	48,500 lbs
96-44119	48,500 lbs

5. Operators responsible for keeping Equipment fueled you can obtain fuel at these work sites:

BASE	BLDG.	PH #
T.I.	64	X6141
N.S.C.O.	511	* use proper fuel chip key for vehicle
N.A.S.	6	263-3598 NSCO fuel chip key will work at fuel pumps.
PT.MOL.	6	6207
NRMC	8	6019
H.POINT	CONTACT SUP/DISP.OR CALL 302-5893	
HAMILTON	960	portable fuel tank notify SUP/Disp. To refuel tanker when low.

6. Operator is responsible for operating equipment in a SAFE MANNER and is responsible to READ and UNDERSTAND Operators Safety Manual before operating equipment.

A. Operator is responsible for having safety gear w/ him or her at all times. Hard hat, steel toe shoes, hearing protection, safety glasses etc..

7. Operator is responsible for Operators Preventive Maintenance using Operators Safety Manual to ensure safety supports are properly placed or on articulated loaders secure steering frame locks before performing maintenance.

8. Operator is responsible to ensure that "Utility Clearence" sheet is signed off by the requesting work center, this is encouraged to eliminate any unforseen delays once job is in progress.

Last Date Edited: 11/25/91

ENGINEERING EQUIPMENT OPERATING PROCEDURES:

OPERATING TIPS: BACKHOE/LOADERS

1. Reduce speed when driving over rough terrain, carrying your load or working in a congested area. When ever possible avoid obstacles, rough terrain, rocks, curbs, and ditches. Remember to decrease speed to increase control.

2. When backhoe is not being used, backhoe must be in locked position some backhoes have locking mechanisms, these should be locked into the raised position others should be lowered all the way to the ground.

3. While driving, carrying loader bucket low for good visibility and equipment stability.

4. Before starting work, walk around the jobsite to uncover any hazards that may be in your way.

5. Keep site clean and level to maximize equipment stability, this will help operator fatigue, and will keep area clear for any cave ins that may occur.

6. To break up material as it enters bucket, learn to excavate material in thin layers rather than jamming it into backhoe bucket. Use the MINIMUM amount of force when rapping bucket against stop. Clean bucket by hand if rapping bucket lightly does not work. " DO NOT " try to remove terial from bucket by striking bucket against concrete or any other ject.

LEVELING MACHINE:

1. Always provide a firm, level location for tractor when using backhoe. Use cribbing under stabilizer using plywood etc..

2. Lower stabilizers to level machine, provide side to side and front to rear stability, and take load of tires. Clearance between the tires and ground should be a minimum. One stabilizer may be lower than the other to level machine.

3.With front loader bucket lowered until weight of tractor is off the front tires. If desired , add material to bucket for additional counterweight.

4. When ground surface is icy, wet or rocky position loader bucket in the full dump position and lower until weight of tractor is off the front tires.

ENGINEERING EQUIPMENT OPERATING PROCEDURES

MOVING MACHINE WITH BACKHOE BUCKET:

1. When digging on level ground, an experience operator may instead use the backhoe to move the tractor forward. When doing this use the following methods:

a. Wheels must be pointed straight ahead and the path must be clear. The backhoe and tractor must be in line.
b. Ensure there are no bystanders in the area.
c. Move gear selector to neutral.
d. Move " FNR " lever to neutral.
e. Release parking brake.
f. Raise loader bucket.
g. Rise stabilizers so tires are on the ground.
h. Retract backhoe boom and dipperstick. Place backhoe bucket teeth firmly on the ground.
i. Slowly extend dipperstick and lower boom to move tractor forward.
h. After tractor has been moved, lower stabilizers and loader bucket. Engage parking brake.

USING BACKHOE BUCKET:

1. Most digging for general excavation, leveling material, and digging trenches is called Crowd Digging and the procedures are as follows:

a. To begin excavating, position dipperstick in vertical position and then it away from the tractor approximately 2 ft.
b. Using mainly the crowd cylinder (A), retract the dipperstick. As the bucket fills, curl the bucket while retracting the dipperstick. The first cut should be approximately 4 ft. long and 3-4 in. deep. Remaining cuts should be approximately 4ft. long and 4-6 in. deep.

2. For power digging and for working in a small or cramped excavations. Using the bucket cylinder for digging is called Bucket Digging and the procedures are as follows:

a. Lower bucket to the digging area and use boom to force the bucket into the ground. Work two functions at once; retracting the dipperstick, and curling the bucket until the bucket is full.
b. If the bucket stalls, raise the boom slightly and continue to curl bucket.
c. If dipperstick stalls, roll back bucket to break out.

ENGINEERING EQUIPMENT OPERATING PROCEDURES

USING BACKHOE BUCKET:

a. TRENCHING:

1. Before starting work, walk the site to uncover any hazards that may be in your way.

2. To prevent cave-ins, dig trench in a " V " shaped and place spoil piles about 3 ft. away from trench. It is important that the deeper the trench the farther the spoils should be placed from it.

3. If you have to clean up a cave-in and cannot reach it from the tractors present position, " DO NOT " back over the trench. Drive tractor beside the trench to the cave-in. Park the tractor at a 90 degree angle to the trench and clean cave-in from the side of the trench.

4. When trenching on a hillside slope, place the spoils on the upper side of the trench or the side of the hill going up. The machine is more stable and backfilling is much easier and " SAFER ".

USING LOADER BUCKET:

1. Place bucket in the return-to-dig position and lower to the ground.

2. Move gear shift lever to first or second gear depending on ground condition.

3. Move forward into the material and raise and curl bucket to hold the load.

a. EXCAVATING ON LEVEL GROUND:
Position bucket at a slightly downward angle on ground

b. DOZING:
With bucket parallel to ground, remove as little dirt as possible from the top surface. Let dirt spill from partially dumped bucket to fill in low spots.

c. FLOAT POSITION:
Place the boom in float position and bucket in return-to-dig position to prevent gouging the surface, as in cleaning concrete and snow removal. Also use float position to avoid mixing surface material.

ENGINEERING EQUIPMENT OPERATING PROCEDURES

USING LOADER BUCKET:

d. EXCAVATING BANKS OR STOCKPILES:

a. IMPORTANT to remove any overhang before starting to dig at the base of bank or stockpile. Do this by working from the top of the bank or stockpile. Material can be also be loosened by using the backhoe to pull material down and then using the loader bucket.

After the overhang has been knocked down and is safe to load material you must follow these procedures:

1. Position bucket on the ground in return to dig position.
2. Place gear shift lever in first or second gear depending on ground conditions. In loose material, use second gear for better traction. Use first gear for better bucket fill. Use differential lock as necessary.
3. Raise and curl bucket as bucket fills.

e. BACKDRAGGING:

Leveling and grading can be done with the boom in the float position by backdragging the loader bucket while traveling in reverse. The float position allows the bucket to follow contour of the ground.

BACKFILLING:

1. When backfilling with loader or backhoe bucket, position machine a 90 degree angle to the excavation. To prevent damage to equipment " DO NOT " backfill with loader in dump position.

2. Finish grading can be done with loader bucket in dump position. The backhoe bucket side can also be used for finish grading. In tight quarters such as housing areas and commercial areas the backhoe bucket is easier to maneuver than the loader bucket.

3. When backfilling next to a building, push load as close as possible with loader bucket, then back drag to pull excess material away.

4. An excavation is filled nearly to grade, begin to compact material. Cautiously move front wheels off firm ground into the fill material while gradually emptying loader bucket. Front wheels will compact loose soil. As the excavation fills, steadily move further into fill area.

5. To level the surface and fill tracks as grade is reached, back drag with loader boom in float position.

ENGINEERING EQUIPMENT OPERATING PROCEDURES

TRUCK LOADING:

1. Always level and smooth loading area during wait time between trucks to maximize machine stability, decrease operator fatigue, and increase productivity.

2. Raise backhoe boom fully and lock in place. Curl backhoe bucket and retract dipperstick.

3. Know location of all persons in working area, including truck driver.

4. Park truck close to stockpile to reduce backhoe travel time. If possible, park truck where wind will be behind backhoe operator to keep dust of the dumped load out of operator's eyes and out of engine air cleaner.

5. Follow the alphabet letter "V" between truck and stockpile. Raise the loader bucket while moving toward the truck. Load dump truck from center front to center rear. Dumping load into truck at a steady pace to minimize damaging dump bed.

6. If loading with backhoe bucket," DO NOT " swing the bucket over the cab.

7. Load truck on driver's side for easy communication between operator and truck driver.

TRANSPORTING CONSTRUCTION EQUIPMENT:

1. While transporting equipment use caution while loading, ensure you have a firm and level place to load and offload equipment.

2. Ensure that all equipment has been fueled and ready to be transported prior to delivery.

3. Ensure that all equipment, such as backhoes should be loaded all the way forward and all "RAISED" b/hoe arms, buckets etc.. lowered to ensure that equipment will not come in contact with any overhead obstructions. Ensure that outriggers are not extended out while in transport, if necessary use a chain to secure.

4. Ensure that equipment is secured properly to trailer, b/hoes should have a minimum of three chains, one over the front bucket, rear bucket and across the center frame.

5. While towing compressors, light plants, utility trailer with one ton, ensure that pintle hook is secured and locked in place and carter pin has gone through hook to lock in place. Ensure that weight is evenly distributed on trailer.

Last date revised: 12/29/92

ENGINEERING EQUIPMENT OPERATING PROCEDURES

FUEL TANK EXCAVATIONS PROCEDURES & EXCAVATION OF CONTAMINATED SOIL:

All excavations should have all underground utilities identified prior excavation. This is important to know what your excavation is going to require.

2. All certificates for the 40 hour Hazpower Training should be on the jobsite in a binder or folder.

3. All safety gear required such as disposable overalls, respirator with the proper filters, hard hats, gloves, spill kit, portable eye wash, plastic to cover any contaminated soil etc. should be in your possession at all times.

4. Ensure that there has been written permission required by the State of California usually a permit in your possession or on the jobsite prior to excavation. This should be in a binder or folder.

5. Ensure that you ask to review the job package with your supervisor, leader or any designated person who has the lead on the job.

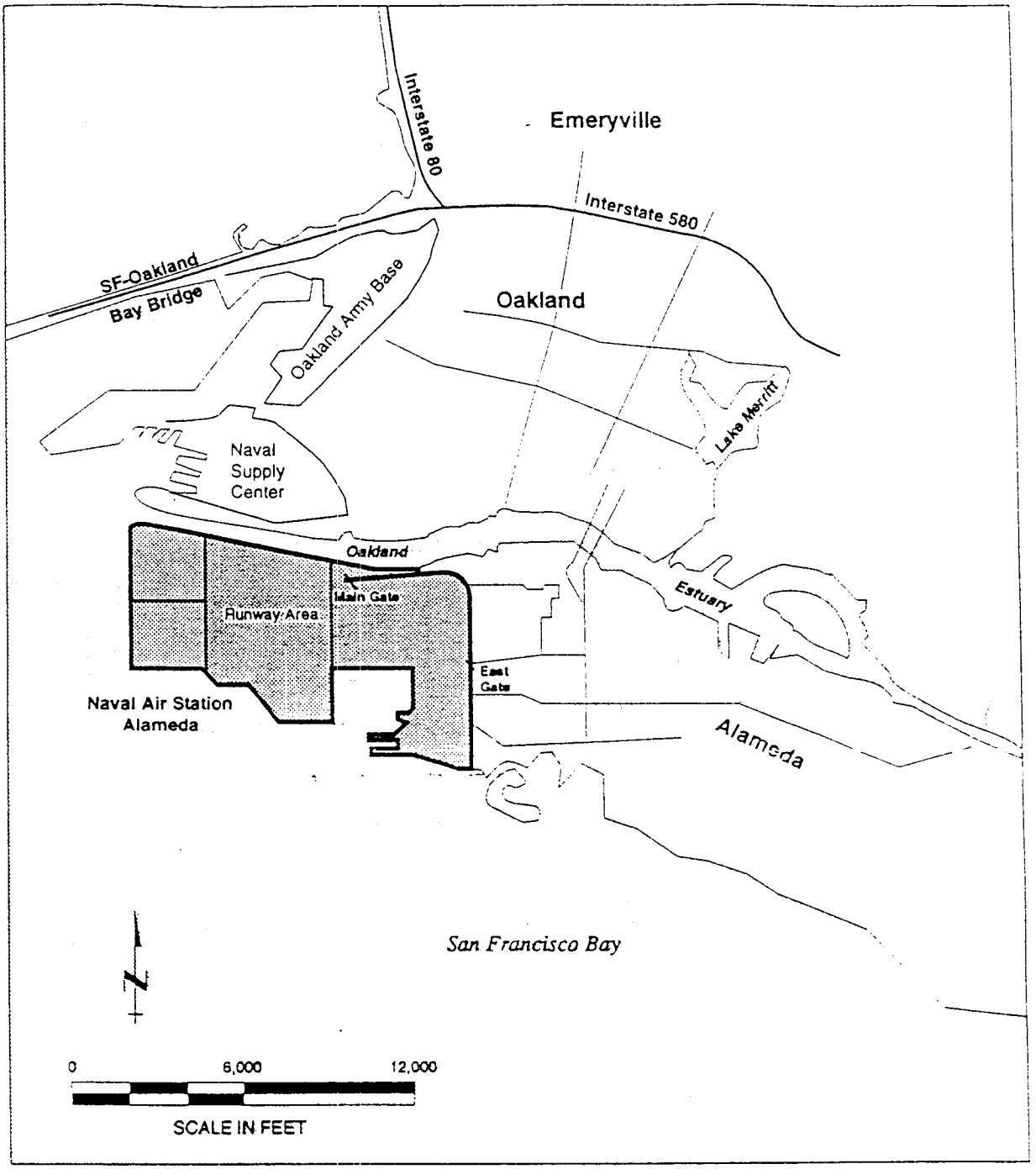
6. Ensure that all material has been ordered pertaining to the safety of WC 732, if we have the lead on the job ensure that portable fencing has been ordered or on the jobsite already.

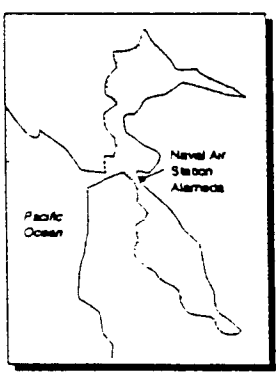
7. Ensure all spoils you are excavating are put on top of plastic and covered.

If there are any further questions and there needs to be some clarification code 614 will have an Environment Engineer assigned to each project who will have the overall responsibility of permit applications and procedures.

Appendix D

Figures

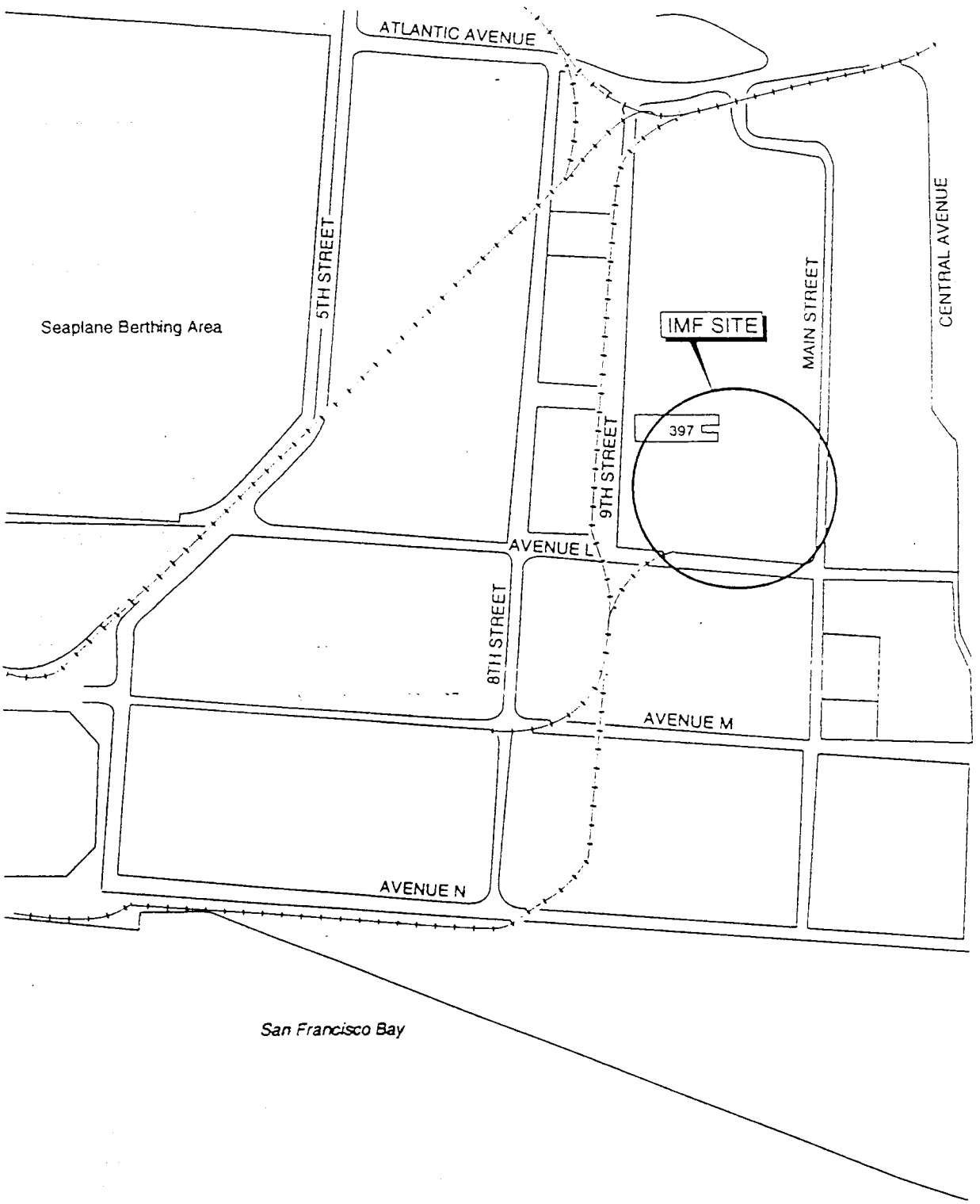




NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

REGIONAL LOCATION MAP

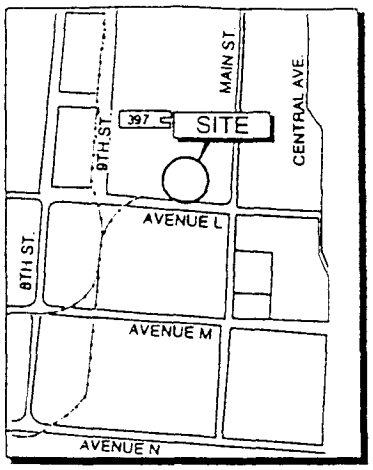
FIGURE 1

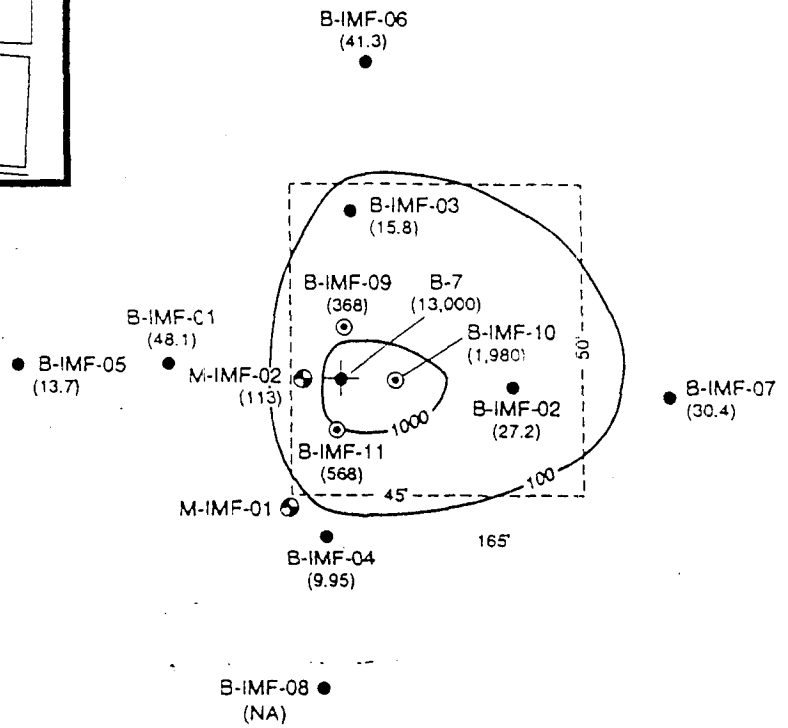


NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

LOCATION MAP
IMF SITE

FIGURE 2





* Assumed Depth to Groundwater = 5.0 ft.

AVENUE L

LEGEND

- Monitoring Well Location
- HLA Soil Boring Location
- Soil Boring Location, Phase I Investigation
- Soil Boring Location, Phase III Investigation
- Excavate to 100 mg/kg (maximum allowable extent of excavation is 45 feet by 50 feet)
- 100 — Total Lead Concentration, mg/kg
- (41.3) — Maximum Total Lead Concentration Detected Within Soil 5 feet bgs in mg/kg
- NA — Not Analyzed

0 15 30
SCALE IN FEET

Sources:
Modified from PRC/JMM, 1992;
Modified from HLA, 1989

NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

EXTENT OF EXCAVATION
IMF SITE

FIGURE 3

APPENDIX C

APPENDIX C

QUALITY ASSURANCE PROJECT PLAN

APPENDIX C[1]

3.0 QUALITY ASSURANCE PROJECT PLAN - QUALITY ASSURANCE/QUALITY CONTROL PLAN REVISIONS

This section describes both quality assurance and quality control procedures for the remedial investigation/feasibility study (RI/FS) at Naval Air Station (NAS) Alameda and replaces Volume 3 of the Canonie work plan (Canonie, 1990b) as the revised Quality Assurance Project Plan (QAPjP). In particular, the revised QAPjP presented below describes both the general methodologies, objectives, and evaluations used to ensure that sufficient types and quality of data will be obtained. The data quality objectives (DQOs) and specific procedures that encompass all work from the field sampling, data quality management, laboratory equipment calibration, corrective action, performance and system audits, and the final quality control (QC) data report are discussed in the following sections. The final section also covers several other quality assurance (QA) reports provided for management.

3.1 DATA QUALITY OBJECTIVES FOR MEASUREMENT DATA

The DQOs are qualitative and quantitative statements developed by data users to specify the types and quality of data needed from a particular data collection activity to support specific decisions or regulatory actions (EPA Region 9, 1989a). The three-stage process for developing DQOs, as described in U.S. Environmental Protection Agency (EPA) guidance (1987a), is based on the following:

- Identifying project objectives.
- Specifying the data necessary to meet project objectives.
- Describing the methods that will yield data of acceptable quality and quantity to support the required decisions.

The third stage of the process is the basis for preparing this QAPjP, which includes appropriate field techniques; appropriate analytical level and methods; and measurement objectives for precision,

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[1] Section 3.0 of Remedial Investigation/Feasibility Study Work Plan Addendum (Draft). PRC and Montgomery Watson. May 7, 1993.

accuracy, representativeness, completeness, and comparability (PARCC). Field techniques are described in the field sampling plans (FSPs), (current FSPs are those of PRC/Tetra Tech [1992] and PRC/Montgomery Watson [1993b,c]; see Appendix A for a list of previous FSPs), and the remaining topics are discussed below.

3.1.1 Analytical Level

The analytical level for this project will be Navy Level D (similar to EPA Level 4). In addition to meeting the Navy Level D QC requirements, the selected laboratory must also be certified by the Department of Toxic Substances Control (DTSC) to perform hazardous waste testing. The analytical laboratory must successfully analyze a performance sample, undergo an audit performed by the PRC team and be approved by the Navy, correct any deficiencies found during the audit, and provide monthly progress reports on quality assurance. The certification activities will be administered by the Navy contract representative (currently, Martin Marietta Energy Systems, Inc.). The selected laboratory will have experience with EPA Contract Laboratory Program (CLP) procedures and will be able to generate CLP deliverables.

CLP Routine Analytical Services (RAS) procedures will be used for the analysis and reporting of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), organochlorine (OC) pesticides, polychlorinated biphenyls (PCBs), cyanide, and metals in the samples. CLP Special Analytical Services (SAS) procedures, provided in Appendix E to this work plan addendum, will be used for analysis and reporting of dibenzodioxins and dibenzofurans. Additionally, VOC analysis in water will be performed by CLP SAS to achieve lower detection limits. EPA procedures will be used for the analysis and reporting of total petroleum hydrocarbons (TPH) (EPA Method 8015-Modified purgeable and extractable) and general chemical parameters for both soil and water samples. Specific parameters are discussed further in Section 3.6.

Field measurements for this project will follow two levels: A and B. Level A is characterized by the use of portable instruments that provide data for optimum sampling points and for health and safety support. Level B is used for field analyses where both qualitative and quantitative data can be obtained, as with use of the photoionization detector (PID).

3.1.2 PARCC Criteria

Critical indicators of project data quality are precision, accuracy, representativeness, completeness, and comparability (EPA, 1987a). Objectives for these indicator parameters were developed for this project based on past experience and on the objectives of this RI/FS. Field procedures, analytical methods, and the project QA program were selected and developed to meet these objectives. The PARCC criteria are discussed below, as defined by EPA guidance (EPA, 1987a).

3.1.2.1 Precision

Precision refers to the reproducibility of measurements of the same characteristic, usually under a given set of conditions. For duplicate measurements, precision is expressed as the relative percent difference (RPD) of the pair and is calculated using the following equation:

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

where

D_1 = concentration of analyte in a field sample

D_2 = concentration of analyte in a duplicate/replicate sample

Precision control limits are presented in Appendix D.

The precision of field measurements (such as photoionization detector (PID) response) will be evaluated based on the results of duplicate measurements (two measurements taken with the same instrument). As described in Section 3.7.1.1 for field samples, at least 10 percent of the field measurements will be obtained in duplicate. Duplicate PID results will be compared to the established acceptance criteria of $\pm$ 25 percent.

The precision of chemical analyses will be assessed through the analysis of field duplicate samples, matrix spike/matrix spike duplicate (MS/MSD) samples, matrix duplicate samples, and referee duplicate samples (if collected). Each QC sample type will provide unique information regarding the precision of the program, including the following:

- Field duplicate samples: Sampling and intralaboratory analytical precision
- MS/MSD samples: Analytical precision for organic analyses
- Matrix duplicate samples: Analytical precision for inorganic/physical parameters
- Referee duplicate samples: Interlaboratory precision

General precision acceptance criteria for duplicate and MS/MSD samples are presented in Appendix D. When analytes are present in samples either near the method detection limit or substantially above the detection limit, these objectives may not be met. If precision objectives are not met, an anomaly will be noted, and other QC data will be evaluated to determine the validity of the data.

3.1.2.2 Accuracy

Accuracy refers to the degree of agreement of a measurement to the true value. The accuracy of a measurement system 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 results of the analysis of field blanks, VOC trip blanks, and equipment rinsate samples. Analytical accuracy will be evaluated on the basis of matrix spike samples, reference standards such as internal and surrogate standards, and method blank samples.

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

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

The results of blank samples will provide information on positive bias. The method blanks must be below the reported method reporting limit (MRL) for every analyte in the analytical procedure, with the exception of common laboratory and field contaminants including methylene chloride, acetone, toluene, 2-butanone, and phthalate esters. For these five potential contaminants, the results are qualified when the reported sample concentration is less than 10 times the blank concentration. The results of spiked samples and reference standards will be expressed as percent recovery and will provide information on positive and negative bias. Objectives for matrix spike samples and surrogate

compounds, expressed in percent recovery, are presented in Appendix D. Objectives for reference standards will be based on the type analyzed.

3.1.2.3 Representativeness

Representativeness is a qualitative expression of the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is maximized by ensuring that the number and location of sampling points and sample collection and analysis techniques are appropriate and will provide information that reflects "true" site conditions.

3.1.2.4 Completeness

Completeness is defined as the percentage of measurements that are judged valid compared to the number of samples needed for the project. The project completeness goal for field samples is 90 percent, and the project completeness goal for background samples is 100 percent. 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 samples planned for analyses listed in the FSPs. Complete results are defined as results that meet all QC criteria, such as sample holding times and acceptable surrogate recoveries. Samples without complete QC criteria are listed as incomplete. Incomplete results may be used as part of the RI/FS; however, these data will not be considered defensible.

3.1.2.5 Comparability

Comparability is a qualitative parameter that expresses the confidence that one data set may be compared to another. This goal is achieved through the use of standardized techniques to collect and analyze samples and appropriate units to report analytical results. These techniques are described in the FSP and this QAPjP.

3.2 SAMPLING PROCEDURES

To achieve the RI/FS objectives, follow-on sampling activities at NAS Alameda will include surface soil sampling at approximately eight sites, soil sampling from borings at all sites, a soil-gas survey at potentially two sites, and a geophysical survey at approximately two sites. The number of sites is approximate because the FSPs being prepared have not been finalized and the FSP for the Phase 2A sites has not been written.

Soil and groundwater sampling and analysis will be conducted to assess the horizontal and vertical extent of contamination. Samples will be recovered using a variety of drilling and sampling methods, all of which are described in the FSPs. With the exception of field analyses, all soil and groundwater analyses will be conducted at the contract laboratory. Samples will be handled in a manner appropriate for the intended analyses. A summary of sample containers, holding times, and preservative requirements for all sampling parameters is presented in Table 3-1 for soil and Table 3-2 for water. Analytical details, including procedures and compound reporting limits, are presented in Section 3.6.

Because of the variation in site histories, sampling efforts will vary from site to site. The FSPs contain details on the sampling design for the sites, including the following information:

- Site sampling rationale
- Sampling techniques and equipment
- Sample selection criteria
- Sample documentation, handling, and shipment
- Sampling equipment preparation and decontamination

3.3 SAMPLE CUSTODY

Documentation during sampling activities is essential to ensure proper sample identification. Standard sample custody procedures will be used to maintain and document sample integrity during collection, transportation, storage, and analysis. The field team leader (FTL) is responsible for proper sample handling and documentation that will allow for tracing the possession and handling of individual samples from the time of collection to laboratory receipt. The laboratory QA coordinator is

responsible for establishing a sample control system that will allow for tracing sample possession from laboratory receipt to final sample disposition.

3.3.1 Field Procedures

The sample custody and documentation procedures employed in the field are discussed below. All sample custody and documentation material will be completed in ink by field personnel. Corrections will be made by drawing one line through the incorrect entry, entering the correct information, and initialing and dating the change.

3.3.1.1 Sample Custody

Sample custody materials discussed below include sample labels, custody seals, and chain-of-custody records.

Sample Label. A sample label (Figure 3-1) will be affixed to all sample containers sent to the laboratory. This identification label will be completed with the following information:

- Project name and location
- Sample location
- Laboratory identification number
- Date and time of sample collection
- Preservative used, if any
- Sampler's initials
- Type of sample (for example, grab or composite)
- Analyses requested

If a sample is split with another party, sample labels with identical information will be attached to each sample container. After labeling, each sample will be refrigerated or placed in a cooler containing ice or "blue ice" to maintain the sample temperatures at 4 degrees Celsius (°C).

Custody Seals. Custody seals will be used on each ice chest containing samples (sample cooler) to ensure that no tampering occurs. Custody seals used during the course of the project will consist of security tape with the date and initials of the sampler (Figure 3-2). Two seals will be placed on each

sample cooler so that they must be broken to gain access to the contents. If the seals are serially numbered, these numbers will be cross-referenced on both the field logbook and chain-of-custody (COC) form.

Chain-of-Custody Records. COC procedures provide an accurate written record tracing the possession of individual samples from the time of field collection through laboratory receipt. A sample is considered in custody if one of the following applies:

- It is in a person's possession.
- It is in view after being in physical custody.
- It is in a secure area after having been in physical custody.
- It is in a designated secure area, restricted to authorized personnel.

The COC record (Figure 3-3) will be used to document the samples taken and the analyses requested. Information that field personnel will record on the COC record includes the following:

- Project name and number
- Printed name and signature of sampler(s)
- Destination of samples (laboratory name)
- Laboratory sample identification number
- Date and time of collection
- Sample designation (for example, grab or composite)
- Sampling location
- Number and type of containers filled
- Analyses requested
- Preservatives used, if any
- Sample matrix
- Signatures of individuals involved in custody transfer (including date and time of transfer)
- Airbill number noted at bottom, if appropriate

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

Occasionally, multiple coolers will be sent in one shipment to the laboratory. Each cooler will have a separate COC record with the samples contained in that cooler listed. In addition, the outside of the coolers will be marked to indicate how many coolers are in the shipment.

3.3.1.2 Sample Documentation

Sampling activities during the field effort require several forms of documentation. While some custody documentation is discussed in Section 3.3.1.1 (i.e., sample labels, custody seals, and COC records), additional documentation is mandatory. The documents discussed in Section 3.3.1.1 are prepared to maintain sample identification and chain of custody, as well as provide records of significant events or observations. Other documents that will be prepared during the conduct of this RI include the following:

- Project Log Books
- Boring Logs
- Well Construction Diagrams
- Groundwater Sampling and Well Development Logs
- Sample Register
- Daily Field Progress Reports
- Field Change Notification

Project Log Books. Log books are prenumbered, hardbound notebooks in which a full description of all activities associated with the field investigation are recorded. The books are intended to provide sufficient data to reconstruct events occurring during the field project. Log books consist of the site log book and the field log book. The site log book is kept by the field team leader and acts somewhat as a directory. The field log book is more task specific and is kept by the field geologist or task leader. Both drilling and sampling activities will be recorded in the field log book. The field team leader will record in the site log book which field log book contains the task-specific information. The log books will be signed and dated daily by appropriate project personnel. The general information to be recorded within the site log books includes, at a minimum:

- Summary of daily activities
- Equipment on site
- Equipment calibration records
- Observations made during drilling and sampling activities

- Water levels, if encountered
- Descriptions of deviations from sampling plan
- Information of addresses and contacts
- Personnel on site
- Weather
- Sampling and shipping summary including airbill number, COC number, sample destination, and time of pickup

Other observations may be included as appropriate.

Boring Logs. All observations made during the drilling process will be recorded on the boring log. Boring logs are graphical representations of the subsurface providing a summary of information recorded during drilling activities. The recorded data can aid in preparing cross sections and in characterizing the hydrogeological environment.

Specific information to be recorded on the boring logs during the drilling process will include the following:

- Boring/well number
- Project name/client
- Project number
- Site
- Logger's name
- Project engineer/geologist
- Drilling contractor
- Drill rig type/method
- Driller's name
- Borehole diameter/drill bit type
- Total depth
- Reference elevation (if available)
- Hammer weight (if applicable)
- Hammer drop (if applicable)
- Start time/date
- Completion time/date
- Depth to first-encountered groundwater/boring depth/casing depth/water depth/time/date
- PID/organic vapor analyzer (OVA) readings
- Sampler type and depth
- Blow counts per 6 inches
- Sampler distance advanced
- Sample recovery
- Casing type and size
- Annulus filler

- Description of sediments and material encountered while drilling
- Quality and source of water, if any, added during drilling
- Depth and thickness of each stratum
- Lithologic description of each stratum, and classification according to the Unified Soil Classification System (USCS)
- Sample depths
- Depth to static water level
- Depth or location of any loss of circulation, tools, or equipment
- Location of any fractures, joints, faults, cavities, or weathered zones

Well Construction Diagrams. A well construction diagram provides a detailed summary of a well design. The diagram will be developed from information recorded in the field log book and from the boring log at the time of installation. Information presented in the diagram will include the following:

- Reference elevation (if available)
- Nominal borehole diameters
- Type, length, depth, and diameter of well screen
- Type, length, depth, and diameter of blank casing
- Centralizers (if applicable)
- Total depth of boring
- Type and depth of backfill material
- Total depth of complete well
- Type and depth of filter pack material
- Depth and amount of bentonite seal
- Depth and amount of grout seal
- Any sealing off of water-bearing zones (if applicable)
- Type and size of riser pipe
- Surface seal
- Depth of first water
- Depth of static water level

Groundwater Sampling and Well Development Logs. The groundwater sampling and well development log will be used during well development activities as well as during any pre-purging and sampling rounds. Specific well information will be recorded at the top of the log, including casing and borehole volumes. During development, the following information will be recorded:

- Static water level
- Standing water column
- Well and purging volumes
- Development method

- Time
- Field parameters measured
- Any conditions that may affect sample results
- Initials of field technician(s)

The same form may be used during sampling activities. In addition to the previously listed items, the methods used for purging prior to sampling and the sampling method will be recorded. Selected information from either development or sampling activities will be recorded in the field log book in addition to being recorded on the groundwater sampling and well development log.

Sample Register. The sample register is a blank book used for tracking all samples collected for chemical analyses; it provides a cross reference for laboratory and field identification numbers. The sample register is kept separate from other field documents because it is used during the data validation. Specific information to be recorded in the sample register will include the following:

- Sample numbers (field and laboratory identification numbers)
- Number and size of containers for each analysis
- Destination of sample
- Analyte(s)
- Date and time of collection
- Miscellaneous relevant information (e.g., collection method, PID readings, name of sampler)

Daily Field Progress Reports. The daily field progress report will be prepared by the field team leader and submitted to the project manager each week during field activities. The report will include a discussion of the following topics at a minimum:

- Date
- Weather, including temperature, and wind speed and direction
- Personnel performing site activities
- Any visitors to the site
- Work performed
- Sampling performed, including specifics
- Quality control activities initiated
- Field parameter measurements including calibration checks
- Health and safety issues - level of protection
- Problems encountered and corrective actions taken
- Next day's anticipated work schedule
- Signature of individual completing the report

Field Change Notification. Field change request procedures provide a written record documenting proposed changes to project plans. The rationale for the proposed changes and anticipated impacts of the deviation will be included in the request. The field change request form will be signed by appropriate project personnel including the field team leader (FTL), the health and safety officer (HSO), and the project manager (PM). Approval of the change by the Navy engineer-in-charge (EIC) is necessary prior to implementing any change to the field program.

3.3.2 Shipping Requirements

Procedures for transporting samples to the laboratory will be based on the estimated contaminant concentrations in the samples to be shipped. During the RI/FS at NAS Alameda, all samples collected during the field effort are expected to be identified as environmental samples. Environmental samples are defined as soil or groundwater that is not saturated or mixed with product material. All Department of Transportation (DOT) regulations will be followed for packaging and shipment. The procedures outlined below meet these requirements, which are taken from EPA guidance on field operation methods (1987b).

- A cooler will be lined with a large plastic bag. Once the bag is in place, the cooler will be filled with "bubble wrapped" sample bottles and packing material such as "plastic peanuts." Sufficient packing material will be used to prevent sample containers from making contact during shipment. Enough ice or "blue ice" will be added to maintain sample temperatures at 4°C. The large inner (plastic bag) liner will be taped shut; evidence tape may be used for additional security.

- As mentioned in Section 3.3.1.1, the COC records going to the laboratory will be placed inside a plastic bag. The bag will be sealed and taped to the inside of the cooler lid. The airbill will be filled out before the samples are handed over to the carrier. The laboratory will be notified if the shipper suspects that the sample contains any substance for which laboratory personnel should take safety precautions.

- The cooler will be closed and taped shut with strapping tape (filament type) around both ends. If there is a drain in the cooler, it will be taped shut both inside and outside of the cooler.

- Two signed custody seals will be placed on the cooler, one on the front and one on the back. Additional seals may be used if the sampler or shipper determines more seals are necessary.

- The cooler will be handed over to the overnight carrier, such as Federal Express. A standard airbill is necessary for shipping environmental samples. Figure 3-4 shows an example of the standard Federal Express airbill.

No samples will be held on site for more than 24 hours except during weekend or holiday field activities. Samples collected on the weekends or holidays will be stored under refrigeration and shipped the following Monday. Sampling for analytes with extremely short holding times (such as 24 hours) will not be scheduled as a weekend or holiday activity. All DOT regulations will be followed for packaging and shipping.

3.3.3 Laboratory Procedures

Upon receipt of an ice chest, laboratory personnel will review the contents and will sign and retain the COC record and the airbill. Information that will be recorded on the COC record, or another appropriate document, at the time of sample receipt will include the following:

- Status of the custody seals
- Temperature of the ice chest upon receipt
- Identification number of any broken sample containers
- Description of discrepancies between the COC records, sample labels, and requested analyses
- Observations of visible headspace in VOC sample containers indicating inadequate sample collection
- pH of water samples upon receipt (Note: pH of VOC water samples will be documented at the time of analysis)

Laboratory personnel will contact the analytical coordinators regarding discrepancies in paperwork and sample preservation and will document nonconformances and corrective actions according to the laboratory's standard operating procedures (SOPs). These procedures will be on file at the laboratory.

Once samples have been accepted by the laboratory, checked, and logged in, they must be maintained in a manner consistent with custody and security requirements specified in the laboratory's QA plan. Specific laboratory chain-of-custody procedures are described in SOPs available on file at the laboratory.

3.4 CALIBRATION PROCEDURES AND FREQUENCY

Standard calibration procedures exist for all field equipment to be used for on-site monitoring and testing. Laboratory equipment used for sample analysis also have prescribed calibration procedures. These procedures, along with the required frequency of calibration, are discussed below.

3.4.1 Field Measurement Equipment

Measurement equipment to be used during field activities will be calibrated at the beginning of the field effort and at prescribed intervals. The FTL will be responsible for ensuring that the field equipment is properly calibrated. The frequency of calibration is dependent on the type and stability of equipment, the analytical methods employed, the intended use of the equipment, and the recommendations of the manufacturer. A summary of calibration requirements for the field equipment to be used at NAS Alameda is presented in Table 3-3. More detailed calibration procedures for equipment listed in Table 3-3 are provided in the specific manufacturer's instruction manuals.

All calibration information will be recorded in the field log book. Additionally, a label specifying the date of the next calibration will be attached to the equipment. If this identification is not feasible, calibration records for the piece of equipment will be readily available for reference.

Should a piece of equipment become inoperable, it will be removed from service and tagged to indicate that repair, recalibration, or replacement is needed. The FTL will be notified so that prompt service can be performed or substitute equipment can be obtained. Any action of this type will be reported in a corrective action report (CAR). Additional details on the corrective action are presented in Section 3.10.

3.4.2 Laboratory Measurement Equipment

Laboratory instrument calibration procedures and frequency will be performed in accordance with the referenced analytical method requirements. All laboratory calibration procedures and frequencies are listed in the laboratory QA plan.

3.5 PREVENTIVE MAINTENANCE

Regularly scheduled preventive maintenance will be performed to keep all field and laboratory equipment in good working condition.

3.5.1 Field Equipment

Detailed information regarding maintenance and servicing is available in the operation manual of the specific instrument to be used. Service and maintenance information will be recorded in site log books by field personnel. Instrument problems encountered during the field program will be recorded in the site log book and, if possible, remedied in the field. Spare batteries will be kept on hand for replacement, if needed. Specific preventive maintenance practices will follow the manufacturer's recommendations.

General preventive maintenance tasks for the field equipment are outlined in Table 3-4, including the type of equipment and regularly scheduled maintenance tasks. Common spare parts for all field equipment will be kept on site, readily available to all field personnel. Preventive maintenance tasks will be the responsibility of the FTL. Additional details on equipment maintenance procedures are presented in the EPA field operations guidance document (1987b) and the operation manual for the specific equipment.

3.5.2 Laboratory Equipment

A description of specific preventive maintenance procedures for laboratory equipment will be available in the laboratory QA plan or in written SOPs maintained by the selected laboratory, as required by Navy Installation Restoration Program (IRP) QA guidelines (NEESA, 1988). These

documents will identify the personnel responsible for major, preventive, and day-to-day maintenance; the frequency and type of maintenance; and the documentation procedures.

3.6 ANALYTICAL PROCEDURES AND REPORTING LIMITS

Analytical methods that will be used for the analysis of water and soil samples collected at NAS Alameda are presented in Table 3-5. Other EPA-approved analytical methods may be selected, with approval from the Navy EIC, if existing DQOs are met or exceeded. An addendum will be issued to describe any modifications to the analytical methods presented here.

As described in Section 3.1.1, the subcontract laboratory will be certified by DTSC and approved by the Navy. The analyses, data reporting and validation will be performed according to a Navy Level D QC program. The following sections provide details regarding the specific procedures that will be used to analyze samples.

3.6.1 Volatile Organic Compounds

VOCs, both halogenated and nonhalogenated, will be quantified in numerous soil samples to evaluate levels of contamination. The CLP VOC analysis will be performed on NAS Alameda soil samples while the CLP SAS will be performed on water samples. By specifying a 25-milliliter (mL) purge volume, the SAS method will provide detection limits that generally meet applicable or relevant and appropriate requirements (ARARs). The target compound list (TCL) will be quantified in both water and soil samples; in addition to the TCL, a library search will be performed to identify the ten highest concentration non-target compounds in each sample; these are commonly known as the tentatively identified compounds (TICs). CLP contract required quantitation limits (CRQLs) for TCL VOCs are listed in Table 3-6.

3.6.2 Semivolatile Organic Compounds

SVOCs will be analyzed in samples to further evaluate the presence of these compounds at the site. In particular, the SVOC analysis will be performed at locations where there are known or suspected petroleum or other semivolatile compounds present in soil. The CLP SVOC procedure will be used,

and the complete TCL specified in the statement of work (SOW) will be evaluated. In addition, a library search will be performed to identify the 20 highest concentration TICs. Table 3-7 presents the compound list and detection limits for SVOCs.

3.6.3 Organochlorine Pesticides and Polychlorinated Biphenyls

The standard CLP RAS procedure will be used for analysis of OC pesticides and PCBs in NAS Alameda water and soil samples. Compounds and reporting limits for OC pesticides and PCBs are presented in Table 3-8.

3.6.4 Dioxins and Furans

The analysis of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans homologs will be conducted on selected NAS Alameda samples. These analyses will be performed according to the CLP SAS Method B requirements for the 1989 EPA 8280 Method. Reporting limits for dioxins and furans are presented in Table 3-9.

3.6.5 Metals

Soil samples will be analyzed for metals. Analyses will be performed according to CLP RAS procedures, and metal analytes on the target analyte list (TAL) will be measured in the samples. The detection limits for metals are presented in Table 3-10.

3.6.6 Total Petroleum Hydrocarbons

TPH will be analyzed in selected water and soil samples. Samples will be analyzed according to the California Leaking Underground Fuel Tank (LUFT) Manual (State Water Resources Control Board [SWRCB], 1989) by Modified EPA Method 8015 - for both purgeable and extractable hydrocarbons (EPA, 1983). The reporting limit for TPH is 10 milligrams per kilogram (mg/kg) and 50 micrograms per liter (μg/L) for soil and equipment water samples, respectively.

3.6.7 Inorganic Parameters

Analyses for various inorganic parameters will be performed on soil and water samples collected at NAS Alameda. Moisture values will be utilized to report data on a dry-weight basis for soil samples. In addition, soil samples will be analyzed for total organic carbon (TOC) and pH.

Water samples collected and analyzed for general chemical characteristics (acidity, alkalinity, chemical oxygen demand, hardness, pH, specific conductivity, total dissolved solids [TDS], and TOC). In addition, water samples will be analyzed for the following anions: chloride, fluoride, sulfate, nitrate, nitrite, and cyanide. Table 3-11 lists the reporting limits for these parameters analyzed for in the laboratory.

3.6.8 Radionuclides

Selected water samples will be analyzed for gross alpha and beta particle counts. If gross alpha particles are identified, then further characterization will be performed by a gamma-ray scan. This scan will identify daughter isotopes such as Radium 226.

3.7 INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

Internal quality control checks were developed to ensure accuracy and precision during field sampling and measurement as well as laboratory analysis. As described below, field checks will be conducted on a regularly scheduled basis. Laboratory checks will be conducted according to referenced analytical method protocols. A discussion of measurements and procedures for internal quality control is presented in this section.

3.7.1 Field Quality Control Samples

Field QC samples are collected for laboratory analysis to check sampling and analytical accuracy and precision. The QC samples for this project include the samples described in the following sections. These samples are consistent with guidelines presented in the Navy quality assurance requirements (NEESA, 1988). Additionally, the requirements presented in this section meet or exceed those

presented in regulatory guidance (EPA Region 9, 1990). A summary of all field QC samples is presented in Table 3-12; the proposed field samples and associated QC are found within each FSP.

3.7.1.1 Field Duplicate Samples

A field duplicate sample is collected at the same time and from the same source as the original sample but submitted to the laboratory separately to assess the consistency of the overall sampling and analytical system. Field duplicate samples, with the exception of those designated for VOC analysis, will be composited prior to submittal to the laboratory. VOC samples will not be homogenized; rather, a second brass liner of soil from the sampler will be taken as a duplicate. Compositing for the other analytes will be performed by removing the soil from the remaining brass liners and placing the soil sample in a stainless steel bowl. The sample will be thoroughly mixed using a stainless steel stirring device. The samples will then be containerized and appropriately labeled.

Field duplicates will be collected and analyzed on a 10 percent basis or one sample per week, whichever is greater. Sample duplicates will be sampled from locations having the greatest potential for contamination. The samples will be collected, numbered, packaged, and sealed in the same manner as that for other samples and submitted blind to the laboratory.

3.7.1.2 Matrix Spike and Matrix Spike Duplicate Samples

MS/MSD samples will be selected in advance by the field team leader in coordination with the laboratory to ensure ample sample volume. As outlined in EPA guidance (EPA, 1987a), MS/MSD pairs will be analyzed at a rate of 5 percent, or at least one pair per analytical batch of up to 20 samples for organics. MS/MSD soil samples will be obtained from the same container as the field sample. The MS/MSD samples will be labeled appropriately and identified as such on the COC reports.

Upon arrival at the laboratory, the MS/MSD samples will be spiked with appropriate analytes and analyzed according to the referenced method. Results from the analysis of MS/MSD samples will be used to evaluate the effect of the matrix on precision and accuracy. The percent recoveries will be calculated for each of the analytes detected and used to assess analytical accuracy. The relative

percent difference between MS and MSD samples will be calculated and used to assess analytical precision.

For the analysis of inorganic parameters, a matrix replicate is analyzed instead of an MSD. Unlike an MS/MSD, the replicate is merely a duplicate analysis of a field sample. The precision is based on this replicate and the original analysis. A 5 percent frequency will still be used.

3.7.1.3 Referee Duplicate Samples

The collection of referee duplicates or referee splits is identical to the sampling method associated with the field duplicate samples described above. However, these samples will not be sent to the primary laboratory for analysis. After collection, the referee samples will be sent to a referee QA laboratory for analysis. The samples will be used to evaluate interlaboratory analytical consistency and accuracy, as well as serve as external QA samples. Referee duplicate samples will be collected and sent to the referee QA laboratory only when regulatory agencies collect split samples or if a special problem occurs in sample collection or analysis.

3.7.1.4 Source Samples

Source samples consist of the source water used in detergent wash and steam cleaning decontamination activities. The domestic water source on the base will be used for decontamination during the investigation. This water may be obtained at taps or fire hydrants as approved by the public works department. At a minimum, one source sample from each sampling event or work period will be collected and analyzed for the same parameters as the samples collected during the event. A sampling event is defined as a period of time during which sampling personnel arrive at the site until they leave for more than 72 hours. An extended absence for more than 72 hours followed by a return to the site would constitute two events.

A final rinse water sample will be submitted and analyzed for the same parameters as the samples collected during the sampling event. Analyzing the deionized-distilled water will provide information on potential sources of sample contamination bias that may occur by use of these waters.

3.7.1.5 Equipment Rinsate Samples

Equipment rinsate samples are used to evaluate sampling device cleanliness. The rinsate samples will be collected after a sample collection device is subjected to standard decontamination procedures. Deionized-distilled water for the intended analysis will be poured over or through the sampling device, collected in a sample container, and sent blind to the laboratory for analysis. The equipment rinsate samples will be collected on a daily basis. During the data validation process, the results of the analyses will be used to flag data or assess the levels of analytes in the samples.

3.7.1.6 Trip Blanks

Trip blanks are samples used to identify possible sample contamination originating from sample transport, shipping, or site conditions. These sealed samples will be prepared in the laboratory using organic-free water. They will then be shipped with the sample containers to the field, stored with the field samples, and returned to the laboratory with the VOC samples. One trip blank will accompany each cooler containing VOC samples and will only be analyzed for VOCs, since these compounds have the greatest potential for cross-contamination.

3.7.2 Laboratory Quality Control Samples

Laboratory QC samples will be analyzed at the frequency specified in the current CLP Statement of Work for CLP RAS analyses (EPA, 1990b;c) and in the EPA Region 9 SAS Methods Compendium (1989b) for CLP SAS analyses. The following laboratory QC samples will be analyzed as appropriate.

3.7.2.1 Method Blanks

Method blanks provide a measure of the combined contamination from the laboratory water, the instrument, the reagents, and the sample preparation steps. The method blanks aid in distinguishing between low-level field contamination and laboratory contamination.

3.7.2.2 Internal Standards

Internal standard (IS) addition to samples introduces a known concentration of one or more non-target analytes to each sample after sample preparation but just prior to instrumental analysis. The purpose of the internal standards is to measure the instrument's efficiency in target analyte measurements. It is assumed that the internal standards behave identically to the target analytes. An additional use of the IS is to correct for gas chromatography (GC) or gas chromatography/mass spectrometry (GC/MS) injection efficiency.

3.7.2.3 Surrogate Standards

Surrogate standards are non-target analytes of known concentration that are added to each sample prior to preparation and instrumental analysis. The surrogate standards measure the efficiency of all steps of the analytical method in recovering the target analytes from an environmental sample matrix. These standards are based on the assumption that the non-target analytes behave identically to the target analytes.

3.7.2.4 Matrix Spike and Matrix Spike Duplicate Samples

These samples are discussed in Section 3.7.1.2.

3.7.2.5 Laboratory Control Samples

The laboratory control sample (LCS) incorporates a known concentration of target analytes added to a controlled interference-free matrix. The LCS is used to measure the laboratory accuracy in the absence of matrix interferences.

The specific schedule for the analysis of laboratory QC samples will be included in the laboratory QA manual or in laboratory SOPs.

3.8 DATA REDUCTION, VALIDATION, AND REPORTING

Accurate data reduction, validation, and reporting methods are essential in summarizing information to support conclusions. Proper techniques for both field and laboratory activities are described in this section.

3.8.1 Data Reduction

Data reduction methods can include the computation of summary statistics, their standard errors, and confidence intervals or limits. Reduction of analytical data will be performed using the format specified in the EPA- or CLP-approved method and will conform with all Navy specifications.

3.8.2 Data Validation

Data validation techniques include reviewing, accepting, rejecting, or qualifying data on the basis of sound criteria. Data validation is based on the following criteria:

Field Criteria

- Preservation
- Chain of custody
- Sample integrity
- Confirmation

Laboratory Criteria

- Initial calibration
- Continuing calibration
- Holding times
- Blank sample results
- Other QC sample results

Data values that are significantly different from the population are referred to as "outliers." Outliers can result from improper sampling or analytical methodology, matrix interferences, errors in data transcription, and real but extreme changes in analytical parameters. Outliers resulting from errors found during data validation will be identified and corrected, and those that cannot be attributed to

analytical, calculation, or transcription errors will be retained in the database for further evaluation. The validation methods for field and laboratory activities are presented below.

3.8.2.1 Field Data

PRC team QA personnel will validate field data through reviews of data sets to identify inconsistencies or anomalous values. Any inconsistencies discovered will be resolved immediately, if possible, by seeking clarification from those personnel responsible for data collection. All field personnel will be responsible for following the sampling and documentation procedures described in the FSP and this QAPjP to ensure that defensible and justifiable data are obtained.

3.8.2.2 Laboratory Data

Laboratory personnel will assess data at the time of analysis and reporting through reviews of the raw data for any nonconformances of the analytical method protocols.

Data validation will be performed by a subcontractor independent of the project laboratory. At a minimum, final data will be validated according to the CLP criteria outlined in the following documents:

- Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses, (EPA, 1988a).
- Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, (EPA, 1988b).

Initially, 10 percent of the analytical data will be randomly selected for full validation. Full validation not only includes review of data sheets, initial and continuing calibrations, MS/MSD, LCS, method blanks, and surrogates, but it also includes raw data review. Additionally, background samples will be selected for full validation. This percentage may be increased if substantial data quality issues are raised during the initial assessment. All data will undergo a cursory review. A cursory review includes examination of the items found in a full validation (such as forms I through X), but it does not include raw data evaluation.

3.8.3 Data Reporting

Following data validation, both field and laboratory data will be reported according to procedures described in this section.

3.8.3.1 Field Data

Field data recorded during the sampling activities will be compiled and reported in summary tables for review. Corresponding descriptions and units will also be provided to accurately reflect the field conditions.

3.8.3.2 Laboratory Data

The laboratory data reporting format is dependent upon the specific laboratory used for the sample analyses. The following items are required from the laboratory in the presentation of the Level D data:

- The final data presentation will be checked in accordance with data verification requirements and approved and certified by the laboratory manager.
- Data will be presented in a tabular format whenever possible.
- Each page of data will be identified with the project number and name, date of issue, and client name.
- Reported data will include the Montgomery Watson sample identification number, laboratory sample identification number, analytical method, associated QC reported value, unit of measure, and quantification limits.
- Field QC results will be reported in the same format as real samples.
- Footnotes will be referenced to specific data if required to explain reported values.
- The laboratory will report case narratives that include any problems that occurred at the laboratory in reference to the samples.

Laboratory data packages and reports will be archived at Montgomery Watson, PRC, or Navy offices. The remaining data will be archived at the laboratory for a minimum of 10 years.

3.9 DATA QUALITY MANAGEMENT

The caliber of data for achieving well-founded decisions rests upon the scientific validity and integrity of the data. The degree of validity is based on the comparison of the analytical and QC results to the DQOs for the project. The integrity of the data is maintained by observing procedures designed to prevent errors and loss of data during manipulation and transfer. Upon receipt of the data collected from the field, including laboratory analytical data, PRC, Montgomery Watson, or the contractor/consultant will review and validate data (if appropriate), and then enter it into the database for storage, further manipulation, and retrieval. The following section describes the processes of data handling at the contractor/consultant level.

3.9.1 Review and Validation of Data

Upon receipt of the analytical data package from the laboratory, project personnel will check for the following items:

- Data package includes all requested deliverables.
- Samples were analyzed as requested.
- Sample holding times were met.
- QC sample results are within established control limits.
- Appropriate detection limits were obtained.
- Completeness.

Data review will be performed by the contractor/consultant independent from the project laboratory. Once the data are verified, data will be compiled and reported in the field investigation report. All summary tables and figures produced will be checked for errors with the original data reports prior to including them in the final report.

3.9.2 Database Management

After review and validation of the field and laboratory data reports, the data will be entered into the database system at Montgomery Watson. Data will be received from the laboratory in electronic format. The database will be used to provide data for contamination and geologic analyses and for preparing reports and graphics.

3.10 CORRECTIVE ACTION PROCEDURES

An effective QA program requires prompt and thorough correction of nonconformances affecting quality. Rapid and effective corrective action minimizes the possibility of questionable data or documentation.

Two types of corrective actions exist: immediate and long term. Immediate corrective actions include the correction of documentation deficiencies or errors, the repair of inaccurate instrumentation, or the correction of inadequate procedures. Often, the source of the problem is obvious and can be corrected quickly. Long-term corrective actions are designed to eliminate the source of problems. Examples of long-term corrective actions include the correction of systematic errors in sampling or analysis, or the correction of procedures producing questionable results. Corrections can be made through additional personnel training, instrument replacement, and/or procedural improvements.

All QA problems and corrective actions will be documented to provide a complete record of QA activities and help identify needed long-term corrective actions. Defined responsibilities are required for scheduling, performing, documenting, and assuring the effectiveness of the corrective action. This section describes the corrective action procedures to be followed in the field and laboratory.

3.10.1 Field Procedures

The definition of field nonconformances as well as the corrective action procedures that will be used to eliminate any nonconformances are presented in the following sections.

3.10.1.1 Definition of Field Nonconformances

Field nonconformances are defined as occurrences or measurements that are (1) either unexpected or do not meet established acceptance criteria and (2) will impact data quality if corrective action is not implemented. Nonconformances may include the following:

- Incorrect use of field equipment
- Improper sample collection, preservation, and shipment procedures
- Incomplete field documentation, including chain-of-custody records
- Incorrect decontamination procedures
- Incorrect collection of QC samples

3.10.1.2 Field Corrective Action Procedures

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

Nonconformances identified during an audit that have a substantial impact on data quality require the completion of a corrective action request form. This form may be filled out by an auditor or any individual who suspects that any aspect of data integrity is being affected by a field nonconformance. Each form is limited to a single nonconformance. If additional problems are identified, multiple forms will be used for documentation. A sample form is presented as Figure 3-5.

Copies of the corrective action request form will be distributed to the project manager, FTL, the project QA officer, and the project file. The project QA officer will forward forms to the program manager and the QA program manager as appropriate. Key personnel will meet to discuss the following activities:

- Determination of when the problem developed.
- Assignment of responsibility for problem investigation and documentation.
- Determination of the corrective action needed to eliminate the problem.
- Design of a schedule for completion of the corrective action.
- Assignment of responsibility for implementing the corrective action.
- Documentation and verification that the corrective action has eliminated the problem.
- Determination of whether the Navy should be notified.

Figure 3-6 presents a corrective action status report form to be used by the project QA officer to monitor the status of all corrective actions. In addition to a brief description of the problem and the individual who identified it, the report will list personnel responsible for the determination and

implementation of the corrective action. Completion dates for each phase of the corrective action procedure will also be listed, along with the due date for the QA program manager to review and check the effectiveness of the solution. A follow-up date, or "poke date," will also be listed to check that the problem has not reappeared. This followup is conducted to ensure 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 nonconformance eliminated. The QA program manager can also request the reanalysis of any or all data acquired since the system was last in control.

3.10.2 Laboratory 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 analytical coordinator 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 QA coordinator.

3.11 PERFORMANCE AND SYSTEM AUDITS

An audit evaluates the capability and performance of a measurement system or its components, and identifies problems warranting correction. At NAS Alameda, two types of audits will be conducted during the RI/FS. The first type of audit, a systems audit, is used to verify adherence to QA policies and SOPs. This type of audit may consist of on-site reviews of measurement systems, including facilities, equipment, and personnel. Additionally, procedures for measurement, quality control, and documentation will be evaluated. System audits are conducted on a regularly scheduled basis, with the first audit conducted shortly after a system becomes operational.

The second type of audit, a performance audit, is used to determine the accuracy of a measurement system or its components. Performance audits are conducted regularly in conjunction with laboratory performance evaluations.

Performance and system audits will be conducted on both field activities and laboratory analyses. Specific audit activities are discussed in this section.

3.11.1 Field Activities

A performance QA audit will be conducted during field activities to assess and document the performance of technical operations. A flow chart showing the QA audit pathway is presented on Figure 3-7. The audit will be performed by the QA program manager, project QA officer, or senior technical staff. All auditors will be independent of the activities audited and will be selected by the project QA officer. Technical expertise and experience in auditing will be considered in the selection of an auditor or audit team.

The audit team will develop an individual audit plan to provide a basis for each audit. Audits may include review of project plan adherence; training status; health and safety procedures; activity performance and records; budget status; QC data; calibrations; conformance to SOPs; and compliance with laws, regulations, policies, and procedures. Following completion of the audit, the auditor or audit team will prepare and submit an audit report to the project QA officer and QA program manager. The QA program manager will coordinate a management review of any deficiencies that are noted.

The auditor or audit team will, if necessary, issue a corrective action request to identify and schedule specific corrective actions to be undertaken and completed by the project managers. Completion of corrective action is verified by the auditor or audit team. After acceptance and verification of all corrective actions, the corrective action request form will be used to close the audit.

3.11.2 Laboratory Activities

Laboratory performance audits will be conducted by the PRC team. Prior to initiation of field work, the Navy will approve the use of the selected laboratory on the basis of an audit and performance sample results. PRC or Montgomery Watson may perform an additional audit if data quality concerns are identified. Internal audit routines are described in the laboratory QA plan.

3.12 QUALITY ASSURANCE REPORTS TO MANAGEMENT

Several reports will be prepared during the course of the RI/FS at NAS Alameda addressing quality assurance. These reports are summarized in this section.

3.12.1 Daily Field Progress Report

The daily field progress report, as described in Section 3.3.1, will summarize the daily field activities throughout the field program. This may include work performed, QA/QC activities, health and safety activities, problems encountered, and corrective actions taken. The daily field progress report is used to further document the field activities and is prepared by the FTL and submitted to the project manager. The content of the progress reports will be summarized and included in the final RI/FS report.

3.12.2 Laboratory Monthly Progress Report

During the period that the laboratory is analyzing NAS Alameda samples, the laboratory QC coordinator will submit a monthly progress report (MPR) to the Navy contract representative (currently, Martin Marietta Energy Systems, Inc.) and the project QA officer by the fifteenth of each month. Topics discussed in the MPR include, at a minimum, chains of custody for samples received during the reporting month, control sample results, control charts, out-of-control events, CARs, and any significant changes in the laboratory QA plan.

3.12.3 Project Monthly Progress Report

A summary report will be prepared on a monthly basis by the project manager and project QA officer and submitted to the program manager and QA program manager. This report may include the following:

- Audit results, if any audit was conducted during period
- Status of the project
- Instrument, equipment, or procedural problems affecting QA and recommended solutions
- Summary of laboratory MPR
- Objectives from the previous report that were achieved
- Objectives from the previous report that were not achieved
- Work planned for the next month

This information will also be required from any subcontractors and will be included in the laboratory MPR.

3.12.4 Final QC Data Report

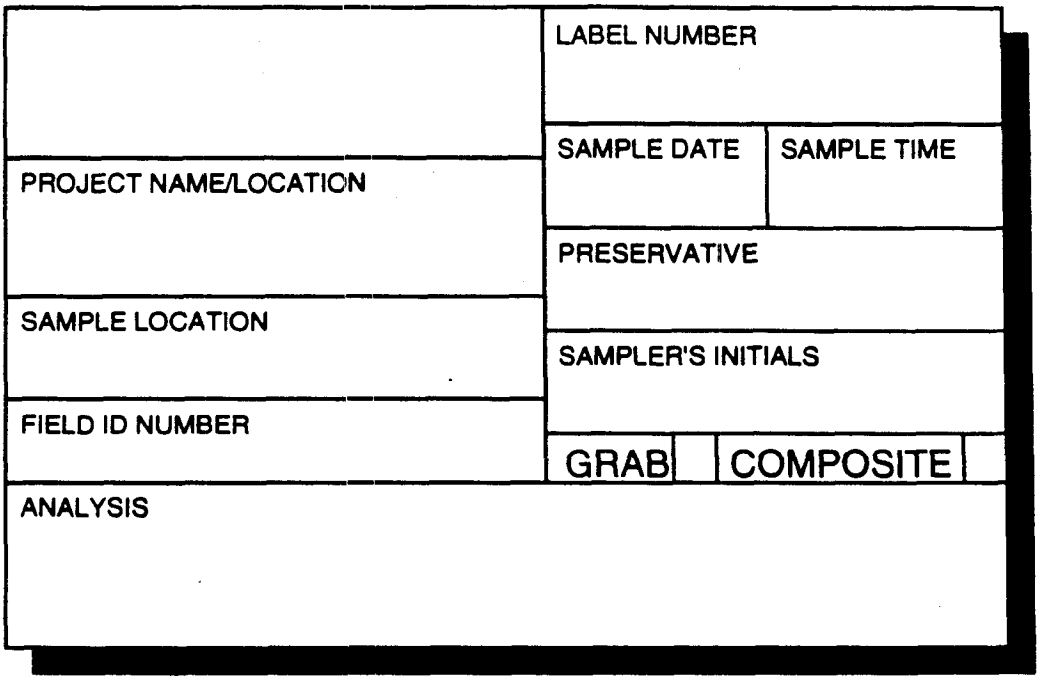
A final QC data report will be prepared by the contractor/consultant and submitted to the Navy EIC 3 weeks prior to submittal of the final RI/FS report. The QC data report will indicate the duration and location of storage for the complete data set.

3.12.5 Remedial Investigation Report

The final RI report will contain a section summarizing data quality information collected during the project. Information in this section may include the following:

- Results of performance audits
- Results of systems audits
- Significant QA problems encountered
- Corrective actions taken
- Summary of data quality
- Modifications to the FSP

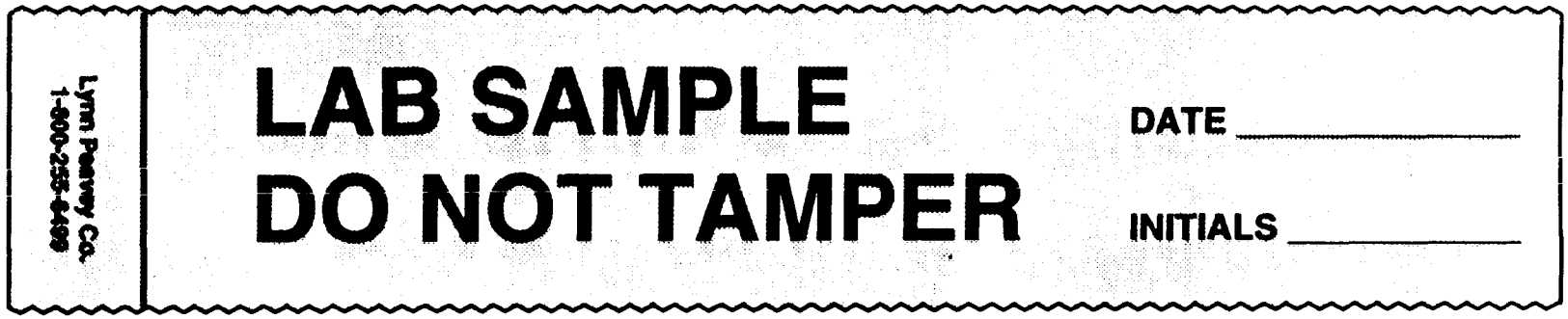
Particular emphasis will be placed on determining whether project data quality objectives were met and whether data are of sufficient quality to support required decisions.



SAMPLE LABEL

FIGURE 3-1

AL-29



CUSTODY SEAL

FIGURE 3-2

MF

CHAIN-OF-CUSTODY RECORD

DESTINATION: _____ ☐

PROJECT NAME	PROJECT JOB #
SAMPLER(S): PRINTED NAME AND SIGNATURE	

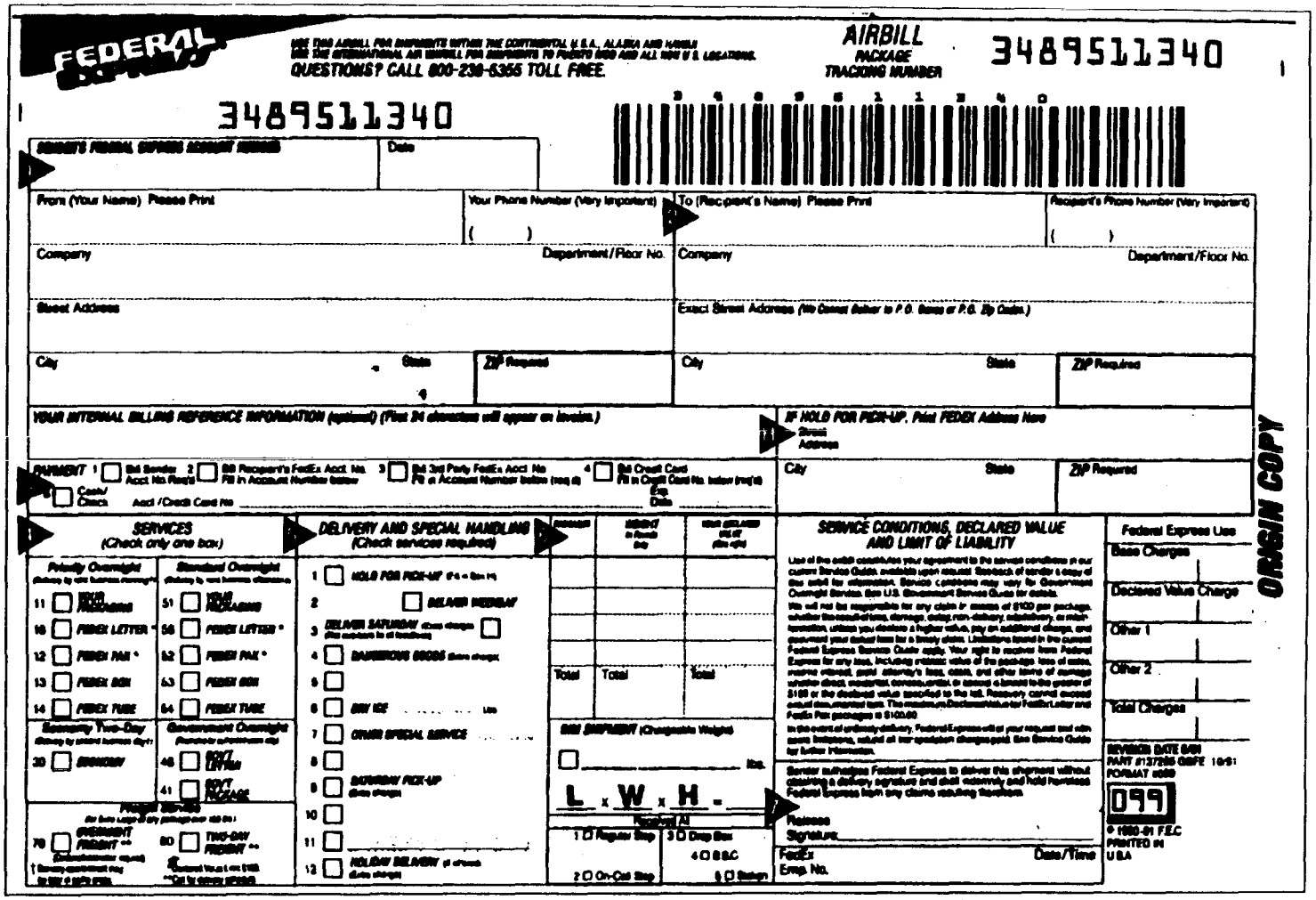
SAMPLE I.D.	DATE OF COLLECTION	TIME OF COLLECTION	GRAB	COMP	SAMPLE LOCATION	NUMBER/SIZE OF CONTAINERS	ANALYSES REQUIRED							REMARKS

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
RELINQUISHED BY:					
RECEIVED BY:					
RELINQUISHED BY:					
RECEIVED BY:					
RELINQUISHED BY:					
RECEIVED BY (LAB):					

ORIGINAL COPY: SEND WITH SAMPLE YELLOW COPY: RETAINED BY SAMPLER PAGE ____ OF ____ WCK: 1/90

CHAIN-OF-CUSTODY RECORD

FIGURE 3-3



STANDARD FEDERAL EXPRESS AIRBILL

FIGURE 3-4

MF

CTO Project Number: _____

Location: _____

To (Project Manager): _____

From (Reviewer): _____

Date: _____

Description of Problem: _____

_____

_____

_____

_____

Corrective Action Required: _____

_____

_____

_____

_____

_____

The above corrective action must be completed by: _____

Corrective Action Taken: _____

_____

_____

_____

_____

_____

CORRECTIVE ACTION REQUEST FORM
(SHEET 1 OF 2)

FIGURE 3-5

CTO PROJECT MANAGER: _____
(Subcontractor QA Manager)

Acknowledgement of Receipt

_____
(Date / Initial)

Corrective Action Completed

_____
(Date / Initial)

Reviewer:
Corrective Action is / *is not* satisfactory

_____
(Date / Initial)

Remarks: _____
_____
_____
_____

QAQC Coordinator:
Corrective action is / *is not* satisfactory

_____
(Date / Initial)

Remarks: _____
_____
_____
_____

cc: Program Manager
Program QA Manager

CORRECTIVE ACTION REQUEST FORM
(SHEET 2 OF 2)

FIGURE 3-5

PROJECT NUMBER: _____ Navy QC Level _____

PROJECT MANAGER: _____ STATUS AS OF (DATE): _____

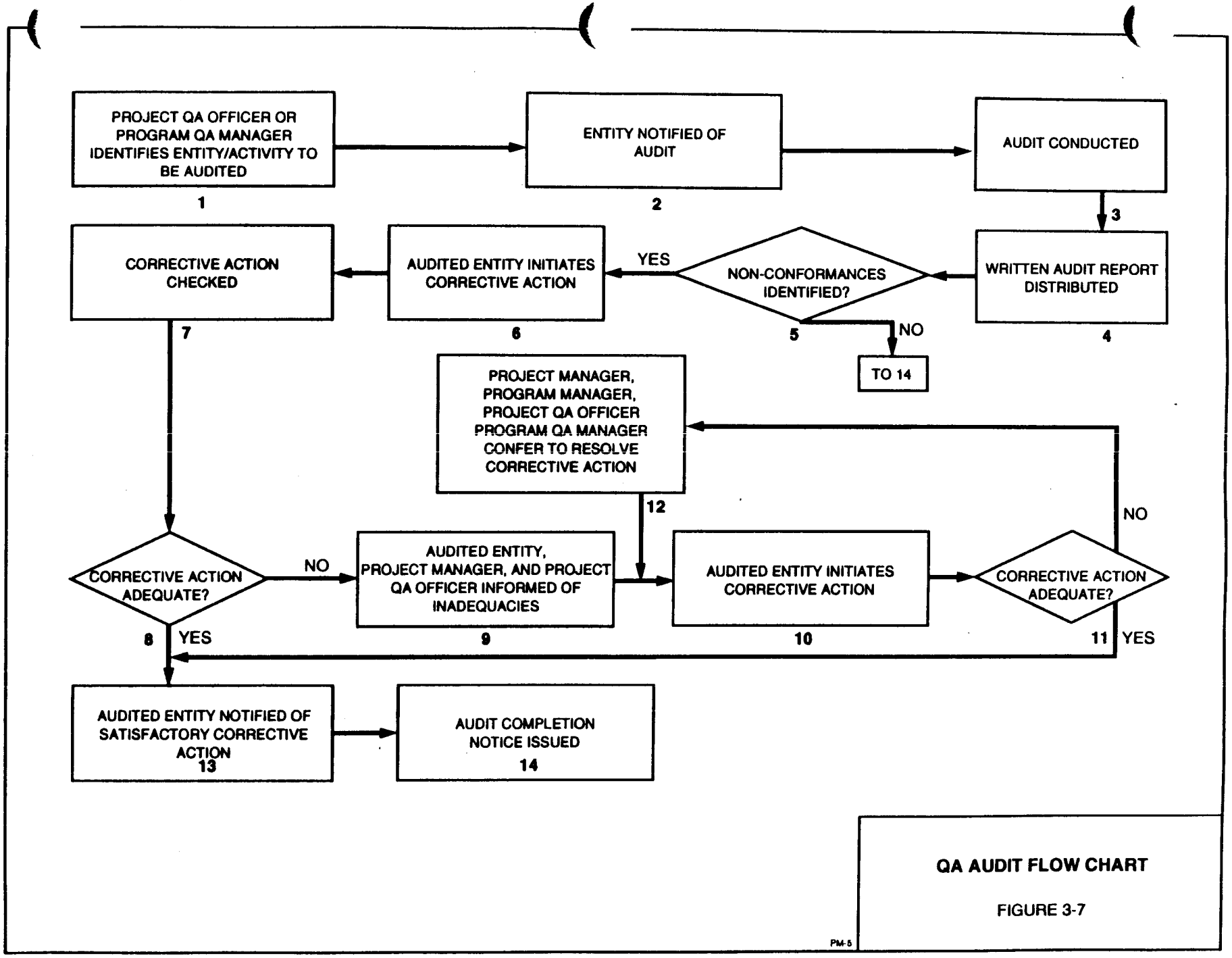
Corrective Action No.	Brief Description	Originator Initials and Date	Determination and Implementation				Effectiveness	
			Initials	Due Date	Initials	Due Date	Initials	"Poke Date"

Project QC Coordinator Signature / Date: _____

CORRECTIVE ACTION STATUS REPORT

FIGURE 3-6

PM-5



QA AUDIT FLOW CHART

FIGURE 3-7

SAMPLE CONTAINER, HOLDING TIMES, AND PRESERVATIVE REQUIREMENTS FOR SOIL SAMPLES

Parameter	Method No.[a]	Sample Container	Preservatives	Holding Time[b]
ORGANIC ANALYSES:				
Volatile Organic Compounds (VOCs)	CLP RAS[c]	6-in stainless steel[d] No Headspace	Cool, 4°C,	14 days
Semivolatile Organic Compounds (SVOCs)	CLP RAS[c]	6-in stainless steel	Cool, 4°C	14 days/40 days
Total Petroleum Hydrocarbons (TPH)[e]	Modified EPA 8015 (purgeable)	6-in stainless steel No Headspace	Cool, 4°C	14 days
	Modified EPA 8015 (extractable)	6-in stainless steel	Cool, 4°C	14 days/40 days
Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs)	CLP RAS[c]	6-in stainless steel	Cool, 4°C	14 days/40 days
Dioxins and Furans	8280/SAS B[f]	6-in stainless steel	Cool, 4°C	30 days/45 days[g]
INORGANIC/PHYSICAL ANALYSES:				
Metals	CLP RAS[c]	6-in stainless steel	Cool, 4°C	Hg, 28 days; others, 6 mo.
Cyanide	CLP RAS[c]	6-in stainless steel	Cool, 4°C	14 days
pH	SW 9045	6-in stainless steel	Cool, 4°C	Analyze ASAP
Total Organic Carbon	SW 9060	6-in stainless steel	Cool, 4°C	28 days
Gross Alpha/Beta	EPA 9000	6-in stainless steel	Cool, 4°C	6 months
Gamma Scan	EPA 901.1	6-in stainless steel	Cool, 4°C	6 months

[a] Complete method references are presented in Section 8.0, Table 8-1.
[b] "x" days/"s" days refers to the maximum number of days from sampling to extraction/the maximum number of days from extraction to analysis.
[c] Routine Analytical Services (RAS) - Inorganic Analyses (EPA, 1990b), Organic Analyses (EPA, 1990c).
[d] Auger will contain two 6-in stainless steel sleeves. The bottom sleeve will be unopened and used for VOC, SVOC, and TPH analysis. The top sleeve will be emptied into a glass jar for the remaining analyses.
[e] TPH as purgeable and extractable
[f] Special Analytical Services (SAS) B refers to low resolution dioxin/furan method.
[g] 45 days from collection.

SAMPLE CONTAINER, HOLDING TIMES, AND PRESERVATIVE REQUIREMENTS FOR WATER SAMPLES

Parameter	Method No.	Sample Container[a]	Sample Volume	Preservatives[b]	Holding Time[c]
ORGANIC ANALYSES:					
Volatile Organic Compounds (VOCs)	CLP SAS[d]	V	160 mL No headspace	HCl to pH < 2 Cool, 4°C	14 days
Semivolatile Organic Compounds (SVOCs)	CLP RAS[e]	G	2L	Cool, 4°C	7 days/40 days
Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs)	CLP RAS[e]	G	1L	Cool, 4°C	7 days/40 days
Total Petroleum Hydrocarbons (TPH)[f]	Modified EPA 8015 (purgeable)	V	160 mL No headspace	HCl to pH < 2 Cool, 4°C	14 days
	Modified EPA 8015 (extractable)	G	1L	Cool, 4°C	7 days/40 days
Dioxins and Furans	EPA 8280/SAS B[d]	G	2L	Cool, 4°C	30 days/45 days[g]
INORGANIC ANALYSES:					
Metals	CLP RAS[e]	P	1L	Filter, HNO_3 to pH < 2	Hg, 28 days; others, 6 months
Cyanide	CLP RAS[e]	P	1L	NaOH pH > 12	14 days
Acidity	EPA 305.1	P	100 mL	Cool, 4°C	14 days
Alkalinity	SM 403	P	100 mL	Cool, 4°C	14 days
Chloride, Fluoride, Sulfate	EPA 300.0	P	1L	Cool, 4°C	28 days
Nitrate/Nitrite	EPA 353.2	P	500 mL	Cool, 4°C H_2SO_4 to pH < 2	28 days
pH	EPA 150.1	P	10 mL	Cool, 4°C	analyze immediately
Specific Conductivity	EPA 120.1	P	100 mL	Cool, 4°C	28 days
Total Dissolved Solids	EPA 160.1	P	100 mL	Cool, 4°C	48 hours
Total Hardness	EPA 130.1	P	100 mL	Cool, 4°C HNO_3 to pH < 2	6 months
Total Orgnic Carbon	EPA 415.2	P	100 mL	Cool, 4°C	28 days

TABLE (Continued)

SAMPLE CONTAINER, HOLDING TIMES, AND PRESERVATIVE REQUIREMENTS FOR WATER SAMPLES

Parameter	Method No.	Sample Container[a]	Sample Volume	Preservatives[b]	Holding Time[c]
Gross Alpha, Beta	EPA 9000	P	1L	Cool, 4°C HNO_3 to pH<2	6 months
Gamma Scan	EPA 901.1	P	1L	Cool, 4°C HNO_3 to pH<2	6 months

[a] Container Types: G = Amber glass with Teflon-lined lid, sized according to sample volume.
P = Polyethylene container sized according to sample volume.
V = VOC (VOA) vial with Teflon-lined septum, 40 mL size.

[b] Add 0.008% $Na_2S_2O_3$ to all organic analyses when residual chlorine is present.

[c] "x" days/"s" days refers to the maximum number of days from sampling to extraction/the maximum number of days from extraction to analysis.

[d] Special Analytical Services (SAS) B refers to low resolution dioxin/furan method.

[e] Routine Analytical Services (RAS), Inorganic Analyses (EPA, 1990b), Organic Analyses (EPA, 1990c).

[f] Total Petroleum Hydrocarbons as purgeable and extractable.

[g] 45 days from collection.

TABLE 3-5

FIELD EQUIPMENT CALIBRATION

Instrument Type	Standard Reference	Calibration Technique	Calibration Frequency	Acceptance Specifications
Combustible Gas Indicator	Standard calibration gas isobutylene	Manufacturers' User's Manual	Daily	Indication of standard percent of lower explosive limit and zero settings
Photoionization Detector (PID) (10.2 or 11.7 eV lamp)	Gas standard kit (isobutylene)	Manufacturer's User's Manual	Daily	Indication of standard ppm concentrations and zero settings
Noise Dosimeter	Sound level calibrator	Manufacturer's User's Manual	Daily	Indication of standard value
Particle Density Meter	Particle level indicator	Manufacturer's User's Manual	Daily	Indication of standard value
Electromagnetometer	Standard reading	Sensitivity test	Daily	Deflection of 25%
Magnetometer	Standard reflection	Manufacturer's User's Manual	Daily	Indication of standard value
pH Meter	4.0, 7.0, and 10.0 pH Buffers	Set range and span based on anticipated field conditions	Daily	Proper buffer solution range and span settings
Temperature Meter with Temp Compensation Probe	Mercury thermometer	Manufacturer's User's Manual	Daily	Mercury thermometer value
Soil-Gas Probe	Factory-certified standard	Manufacturer's User's Manual	Daily	Indication of standard ppm concentration and zero settings
Specific Conductance Meter	Standard solution (7,000 ppm)	Manufacturer's User's Manual	Daily	Indication of standard value
Turbidity Meter	Standard solution (7,000 ppm)	Manufacturer's User's Manual	Daily	Proper range for standard solutions
Geiger-Mueller Meter	Built-in source	Manufacturer's User's Manual	Daily	Indication of standard value

FIELD EQUIPMENT PREVENTIVE MAINTENANCE

Instrument Type	Maintenance Tasks
Photoionization Detector	• Check charge on battery regularly. Recharge or replace, as appropriate. • Check UV lamp and ion chamber for cleanliness. • Clean probe if deposits develop on UV lamp surface or in ion chamber. • Clean air fan and/or pump if sand grains or dirt are present. • Regularly clean and maintain the instrument and accessories.
Combustible Gas Indicator	• Check charge on battery regularly. Recharge or replace, as appropriate. • Check alarm horn to ensure correct operation. • Test for leaks by plugging the inlet. • Inspect intake hose and nozzle.
Noise Dosimeter	• Check battery level indicator. Recharge or replace, as appropriate. • Regularly clean and maintain the instrument and accessories.
Particle Density Meter	• Check charge on battery regularly. Recharge or replace, as appropriate. • Regularly clean and maintain the instrument and accessories.
Temperature Meter	• Check charge on the battery regularly. Recharge or replace, as appropriate. • Rinse temperature probe with DI water after each use. • Store in DI water when not in use.
pH Meter	• Check charge on battery regularly. Recharge or replace, as appropriate. • Rinse electrode probe with DI water after each use and replace storage cap. • Store in DI water when not in use. • Regularly clean and maintain the instrument and accessories.
Electromagnetometer	• Check charge on battery regularly. Recharge or replace, as appropriate. • Regularly clean and maintain the instrument and accessories.
Magnetometer	• Check charge on battery regularly. Recharge or replace, as appropriate. • Regularly clean and maintain instrument.
Soil-Gas Probe	• Check charge on battery regularly. Recharge or replace, as appropriate. • Inspect intake hose and nozzle and test for leaks by plugging the inlet.

TABL (Continued)

FIELD EQUIPMENT PREVENTIVE MAINTENANCE

Instrument Type	Maintenance Tasks
Turbidity Meter	• Check charge on battery regularly. Recharge or replace, as appropriate. • Clean glassware thoroughly. • Check light source to ensure correct operation. • Regularly clean and maintain the instrument and accessories.
Water Level Indicator	• Check charge on battery regularly. Recharge or replace, as appropriate. • Check indicator lights and alarm horn to ensure correct operation. • Regularly clean and maintain the instrument and accessories. • Rinse probe and tape with DI water after each use. • Check the tape for cuts and abrasions.
Geiger-Mueller Meter	• Check charge on battery regularly. Recharge or replace, as appropriate. • Check alarm horn to ensure correct operation. • Regularly clean and maintain the instrument and accessories.
Specific Electrical Conductance Meter	• Check charge on battery regularly. Recharge or replace, as appropriate. • Regularly clean and maintain the instrument and accessories. • Rinse probe with DI water after each use. • Store probe in DI water when not in use.

TABLE 3-5

ANALYTICAL METHODS WATER AND SOIL SAMPLES

Parameter		Method No.[a]	Reference	Analyte List[g]	Technique[h]
ORGANIC ANALYSES:					
Volatile Organic Compounds (VOCs)		CLP RAS	CLP RAS, 1990	TCL + 10 TIC	GC/MS
Organochlorine Pesticides and Polychlorinated biphenyls (PCBs)		CLP RAS	CLP RAS, 1990	TCL	GC
Semivolatile Organic Compounds (SVOCs)		CLP RAS	CLP RAS, 1990	TCL + 20 TIC	GC/MS
Total Petroleum Hydrocarbons (TPH)	(Purgeable)	Modified EPA 8015	EPA, 1983[c]/CA LUFT Manual, 1989[d]		GC
Total Petroleum Hydrocarbons (TPH)	(Extractable)	Modified EPA 8015	EPA, 1983/CA LUFT Manual, 1989		Extraction, GC/FID
Dioxins and Furans		EPA 8280/SAS B	EPA, 1986/SAS, 1989[e]	Homolog Series	GC/MS
INORGANIC/PHYSICAL ANALYSES:					
Metals		CLP RAS	CLP RAS, 1990	TAL	ICP & AA
Cyanide		CLP RAS	CLP RAS, 1990	TAL	Spectrophotometric
Acidity		305.1	EPA, 1983		Titrimetric
Alkalinity		SM 403	Standard Methods, 1989[f]		Titrimetric
Chloride, Fluoride, Sulfate		EPA 300.0	EPA, 1984		IC
Nitrate/Nitrite		EPA 353.3	EPA, 1983		Colorimetric
pH		EPA 150.1	EPA, 1983		Electrometric
Specific Conductivity		EPA 120.1	EPA, 1983		Electrometric
Total Dissolved Solids		EPA 160.1	EPA, 1983		Gravimetric
Total Organic Carbon		EPA 415.2	EPA, 1983		Electrometric
Gross Alpha and Beta		EPA 9000	EPA, 1983		Electrometric

[a] CLP: Contract Laboratory Program
RAS: CLP Routine Analytical Services
SAS: Special Analytical Services
Other EPA and Navy-approved methods may be selected with approval from the project manager. All method changes will be documented in writing.

[b] Organic Analyses (EPA, 1990b), Inorganic Analyses (EPA, 1990c).

[c] Methods for Chemical Analysis of Water and Wastes (EPA, 1983).

[d] California Leaking Underground Fuel Tank (LUFT) Manual (SWRCB, 1989)

[e] EPA, 1989.

[f] Standard Methods for the Examination of Water and Wastewater, (American Public Health Association [APHA], American Water Works Association [AWWA], Water Pollution Control Federation [WPCF], 1989).

[g] TCL: Target Compound List
TIC: Tentatively Identified Compounds
TAL: Target Analyte List

[h] GC: Gas Chromatography
MS: Mass Spectrometry
ICP: Inductively Coupled Plasma Emission Spectroscopy
AA: Atomic Absorption Spectorscopy
FID: Flame Ionization Detector
PLM: Polarized Light Microscopy

TABLE 3-6

VOLATILE ORGANIC COMPOUNDS
REPORTING LIMITS, CLP RAS AND SAS[a]

Analytes	Water (µg/L)	Soil (µg/kg)
Chloromethane	2	10
Bromomethane	2	10
Vinyl Chloride	0.5[b]	10
Chloroethane	2	10
Methylene Chloride	2	10
Acetone	2	10
Carbon Disulfide	2	10
1,1-Dichloroethene	2	10
1,1-Dichloroethane	2	10
1,2-Dichloroethene	2	10
Chloroform	2	10
1,2-Dichloroethane	0.5[b]	10
2-Butanone	2	10
1,1,1-Trichloroethane	2	10
Carbon Tetrachloride	0.5[b]	10
Vinyl Acetate	2	10
Bromodichloromethane	2	10
1,2-Dichloropropane	2	10
cis-1,3-Dichloropropene	2	10
Trichloroethene	2	10
Dibromochloromethane	2	10
1,1,2-Trichloroethane	2	10
Benzene	2	10
trans-1,3-Dichloropropene	0.5[b]	10
Bromoform	2	10
4-Methyl-2-pentanone	2	10
2-Hexanone	2	10
Tetrachloroethene	2	10
Toluene	2	10
1,1,2,2-Tetrachloroethane	2	10
Chlorobenzene	2	10
Ethylbenzene	2	10
Styrene	2	10
Total Xylenes	2	10

[a] CLP: Contract Laboratory Program
RAS: Routine Analytical Services
SAS: Special Analytical Services

Soil/sediment reporting limits are equivalent to 1990 Contract Required Quantitation Limits (CRQL). Water reporting limits are lower than CRQLs (EPA, 1990c), (EPA, 1989b).

[b] A detection limit of 0.5 micrograms per liter (µg/L) is required to meet the California Maximum Contaminant Levels (MCL). However, this limit may not be achievable.

TABLE 3-7

SEMIVOLATILE ORGANIC COMPOUNDS REPORTING LIMITS, CLP RAS[a]

Analytes	Water (μg/L)	Soil/Sediment[b] (μg/kg)
Phenol	10	330
bis (2-Chloroethyl) ether	10	330
2-Chlorophenol	10	330
1,3-Dichlorobenzene	10	330
1,4-Dichlorobenzene	5[c]	330
1,2-Dichlorobenzene	10	330
2-Methylphenol	10	330
2,2'-oxybis(1-Chloropropane)	10	330
4-Methylphenol	10	330
N-Nitroso-di-n-propylamine	10	330
Hexachloroethane	10	330
Nitrobenzene	10	330
Isophorone	10	330
2-Nitrophenol	10	330
2,4-Dimethylphenol	10	330
bis(2-Chloroethoxy)methane	10	330
2,4-Dichlorophenol	10	330
1,2,4-Trichlorobenzene	10	330
Naphthalene	10	330
4-Chloroaniline	10	330
Hexachlorobutadiene	10	330
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	10	330
2-Methylnaphthalene	10	330
Hexachlorocyclopentadiene	10	330
2,4,6-Trichlorophenol	10	330
2,4,5-Trichlorophenol	25	800
2-Chloronaphthalene	10	330
2-Nitroaniline	25	800
Dimethylphthalate	10	330
Acenaphthylene	10	330
2,6-Dinitrotoluene	10	330
3-Nitroaniline	25	800
Acenaphthene	10	330
2,4-Dinitrophenol	25	800
4-Nitrophenol	25	800
Dibenzofuran	10	330
2,4-Dinitrotoluene	10	330
Diethylphthalate	10	330
4-Chlorophenyl-phenyl ether	10	330
Fluorene	10	330
4-Nitroaniline	25	800
4,6-Dinitro-2-methylphenol	25	800
N-nitrosodiphenylamine	10	330
4-Bromophenyl-phenylether	10	330
Hexachlorobenzene	10	330
Pentachlorophenol	25	800
Phenanthrene	10	330
Anthracene	10	330
Carbazole	10	330

TABLE 3-7 (Continued)

SEMIVOLATILE ORGANIC COMPOUNDS REPORTING LIMITS, CLP RAS[a]

Analytes	Water (µg/L)	Soil/Sediment[b] (µg/kg)
Di-n-butylphthalate	10	330
Fluoranthene	10	330
Pyrene	10	330
Butylbenzylphthalate	10	330
3,3'-Dichlorobenzidine	20	660
Benzo(a)anthracene	10	330
Chrysene	10	330
bis(2-Ethylhexyl)phthalate	10	330
Di-n-octylphthalate	10	330
Benzo(b)fluoranthene	10	330
Benzo(k)fluoranthene	10	330
Benzo(a)pyrene	10	330
Indeno(1,2,3-cd)pyrene	10	330
Dibenz(a,h)anthracene	10	330
Benzo(g,h,i)perylene	10	330

[a] Contract Laboratory Program (CLP) Routine Analytical Services (RAS) 1990 contract required quantitation limits (CRQLs) are listed (EPA, 1990c). Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable

[b] Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the CLP protocols, will be higher.

[c] A reporting limit of 5 micrograms per liter (µg/L) is required for 1,4-dichlorobenzene to meet the California Maximum Contaminant Levels (MCLs). The CLP limit is 10 µg/L.

TABLE 3-8

ORGANOCHLORINE PESTICIDES AND PCBs REPORTING LIMITS, CLP RAS[a]

Compound	Water (μg/L)	Soil/Sediment[b] (μg/kg)
OC Pesticides		
alpha-BHC	0.05	1.7
beta-BHC	0.05	1.7
delta-BHC	0.05	1.7
gamma-BHC (Lindane)	0.05	1.7
Heptachlor	0.05	1.7
Aldrin	0.05	1.7
Heptachlor epoxide	0.05	1.7
Endosulfan I	0.05	1.7
Dieldrin	0.10	3.3
4,4'-DDE	0.10	3.3
Endrin	0.10	3.3
Endosulfan II	0.10	3.3
4,4'-DDD	0.10	3.3
Endosulfan sulfate	0.10	3.3
4,4'-DDT	0.10	3.3
Methoxychlor	0.50	17.0
Endrin Ketone	0.10	3.3
alpha-Chlordane	0.05	1.7
gamma-Chlordane	0.05	1.7
Toxaphene	5.0	170.0
PCBs		
Aroclor-1016	1.0	33.0
Aroclor-1221	2.0	67.0
Aroclor-1232	1.0	33.0
Aroclor-1242	1.0	33.0
Aroclor-1248	1.0	33.0
Aroclor-1254	1.0	33.0
Aroclor-1260	1.0	33.0

[a] Contract Laboratory Program (CLP) Routine Analytical Services (RAS) contract required quantitation limits (CRQLs) are listed (EPA, 1990c). Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

CLP RAS 1990: Statement of Work for Organic Analyses.

[b] Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry weight basis as required by the 1990 CLP protocols, will be higher.

TABLE 3-9

DIOXIN AND FURAN REPORTING LIMITS, CLP SAS METHOD B[a]

Analyte	Water (μg/L)	Soil/Sediment (μg/kg)
Tetra CDFs[b]	1.0-5.0	0.1-0.5
Penta CDFs	1.0-5.0	0.1-0.5
Hexa CDFs	5.0-10.0	0.5-1.0
Hepta CDFs	10.0-50.0	1.0-5.0
Octa CDFs	10.0-50.0	1.0-5.0
Tetra CDDs[c]	1.0-5.0	0.1-0.5
Penta CDDs	1.0-5.0	0.1-0.5
Hexa CDDs	5.0-10.0	0.5-1.0
Hepta CDDs	10.0-50.0	1.0-5.0
Octa CDDs	10.0-50.0	1.0-5.0

[a] Reporting limits for Contract Laboratory Program (CLP) Special Analytical Services (SAS) Method B are included in the CLP SAS method (EPA Region 9, 1989b).

[b] CDFs: Chlorinated dibenzofurans

[c] CDDs: Chlorinated dibenzo-p-dioxins

TABLE 3-10

INORGANIC TARGET ANALYTE LIST DETECTION LIMITS

Analyte	Water Contract Required Detection Limit[a] (μg/L)	Soil Contract Required Detection Limit[a] (mg/kg)
Aluminum	200	40
Antimony	60	12
Arsenic	10	2
Barium	200	40
Beryllium	5	1
Cadmium	5	1
Calcium	5,000	1,050
Chromium	10	2
Cobalt	50	10
Copper	25	5
Iron	100	20
Lead	3	1
Magnesium	5,000	1,000
Manganese	15	3
Mercury	0.2	0.1
Nickel	40	8
Potassium	5,000	1,000
Selenium	5	1
Silver	10	2
Sodium	5,000	1,000
Thallium	10	2
Vanadium	50	10
Zinc	20	4

[a] The contract required detection limits (CRDLs) are the instrument detection limits obtained in pure water that must be met using the procedure described in the CLP Statement of Work (EPA, 1990b). The detection limits for samples may be considerably higher depending on the sample matrix. Soil detection limits were calculated based on an aliquot of 10 grams of soil.

TABLE 3-11

REPORTING LIMITS FOR INORGANIC PARAMETERS[a]

Parameter	Water (mg/L)[b]	Soil (mg/kg)
Acidity	1.0	NA[c]
Alkalinity	10.0	NA
Chemical Oxygen Demand	50	NA
pH	0.1 unit	NA
Specific Conductance	0.1 μmhos/cm	NA
Total Dissolved Solids	10.0	NA
Total Hardness	0.1	NA
Total Organic Carbon	1.0	5.0[d]
Anions		
Nitrate/Nitrite	0.01	NA
Chloride, Fluoride, Sulfate	1.0	NA
Cyanide	5.0 μg/L	0.1

[a] Reporting limits may change with the selection of subcontract laboratory. Sources: (EPA, 1983; 1986).
[b] Units are milligrams per liter except where noted.
[c] NA - Not applicable.
[d] Percentage of total organic content.

TABLE 3-12

FIELD QC SAMPLES[a]

Sample Type	Frequency of Analysis
Duplicate	10%
MS/MSD Pair	5%[b]
Referee Duplicate	Variable[c]
Source Samples (Field Blank)	1/source/event for all analytes[d]
Equipment Rinsate	1/day
Trip Blanks[e]	1/cooler
High Performance Light Chromatography (HPLC)-Grade Water	1/lot
Deionized - distilled water	1/source

[a] Source: Martin Marietta Systems, 1988.

[b] At least one matrix spike/matrix spike duplicate (MS/MSD) pair will be included with each analytical batch. MS/MSD samples will be selected by the laboratory.

[c] Referee duplicates will be collected and sent to the referee QA laboratory only in the case where regulators collect split samples or if a special problem occurs in sample collection or analysis.

[d] A sampling event is defined as a period of time during which sampling personnel arrive at the site until they leave for more than 72 hours.

[e] Trip blanks accompany volatile organic compound (VOC) samples only.

APPENDIX D

IMPLEMENTATION WORK PLAN ADDENDUM

NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA
SITE 13 INTERMEDIATE MAINTENANCE FACILITY
ADDITIONAL SOIL REMOVAL ACTION
IMPLEMENTATION WORK PLAN ADDENDUM

This addendum describes the technical approach for additional excavation to complete the remedial action (RA) for lead and acid contaminated soils at the Intermediate Maintenance Facility (IMF) site at Naval Air Station (NAS) Alameda in California. PRC Environmental Management, Inc. (PRC) and its CLEAN team subcontractor, Montgomery Watson (the PRC team), will conduct the technical work described in this work plan addendum. This addendum discusses the following information:

- Background
- Objectives
- Operations Plan
- References

BACKGROUND

The IMF site at NAS Alameda is located within Installation Restoration (IR) Site No. 13, the former oil refinery. High concentrations of lead and low pH were detected in soils at this site in the former Harding Lawson Associates (HLA) soil boring B-7. Based on subsequent soil sampling by the PRC team in 1992, the extent of the lead and acid contamination appears to be limited to a localized area in the immediate vicinity of soil boring B-7. The Navy and the California Environmental Protection Agency's (Cal-EPA) Department of Toxic Substances Control (DTSC) agreed that an RA should be conducted to remove soil with high lead concentrations and low pH in the vicinity of soil boring B-7.

An engineering evaluation of RA disposal and treatment alternatives was conducted by the PRC team in April 1993. Based on the IMF site RA engineering evaluation/cost analysis (EE/CA) report (PRC and Montgomery Watson 1993a), excavation with disposal at a Class I landfill was completed by the Public Work Center (PWC) San Francisco Bay Area personnel in September 1993. The cleanup goal was 100 milligrams per kilogram (mg/kg) for total lead.

The RA was performed in a phased approach. On completion of the excavation, screening-level results indicated that the excavation was successful and confirmation samples were collected. However, confirmation sampling results indicated that total lead concentrations exceeded 100 mg/kg from soil samples collected along the west wall of the excavated area at a depth of 4 feet (137-S13-005) and approximately 5 feet west of the excavated area at a depth of 5 feet (137-S13-001). The final excavation extent and confirmation sample locations and analytical results are shown in Figure 1. Confirmatory results for total lead ranged from 1.4 mg/kg to 218 mg/kg, and pH results ranged from 1.6 to 8.8. RA cleanup goals at the IMF site are specified for total lead only (PRC and Montgomery Watson 1993a).

Because soils in the excavation at the IMF site were found to contain total lead in excess of the RA cleanup goal of 100 mg/kg, the Navy will remobilize to the IMF site to remove soils containing total lead in excess of 100 mg/kg in the area west of the previously excavated area.

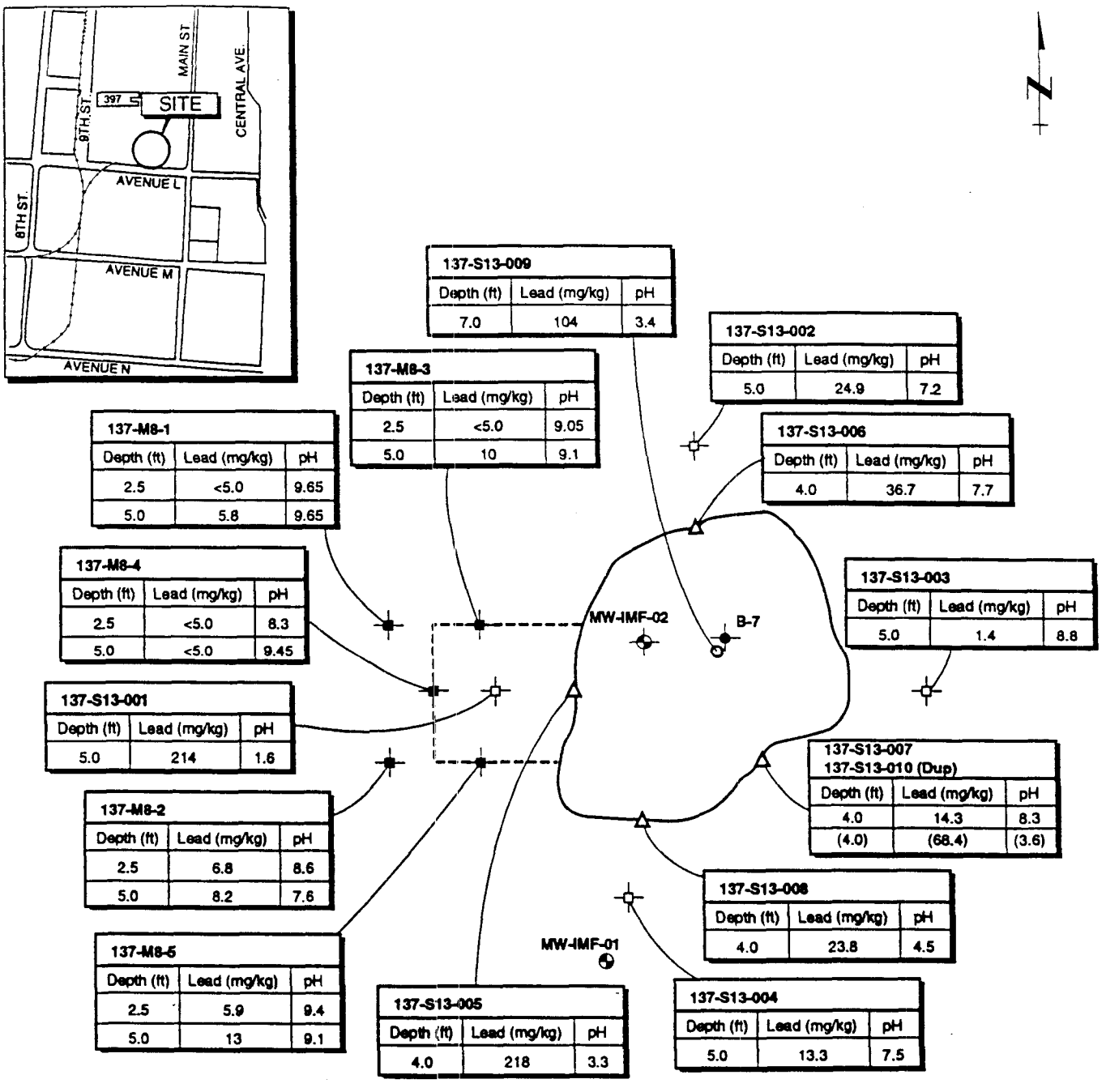
OBJECTIVES

The objectives of the additional removal action excavation are as follows:

- Provide preliminary field screening to assess the extent of additional excavation.
- Provide engineering oversight and coordination with PWC personnel for excavation and disposal of contaminated soils. Confirmation sampling and analysis will also be conducted.
- Incorporate the results of the additional excavation into the implementation report.

OPERATIONS PLAN

This section discusses preliminary field screening, engineering oversight, and confirmation sampling and analysis activities, and incorporation of additional excavation results into the IMF site implementation report. The PRC team will conduct the work in accordance with the IMF site implementation work plan (PRC and Montgomery Watson 1993b), which includes an addendum to the health and safety plan, and this work plan addendum.



LEGEND

- Monitoring Well Location
- Monitoring Well (Destroyed) Location
- HLA Soil Boring Location
- Final Confirmation Hand-Auger Sample Location
- Final Confirmation Floor Sample Location
- Final Confirmation Wall Sample Location
- Preliminary Field Screening Hand-Auger Sample Location
- 137-S13-001 Sample Identification
- Lateral Extent of Previous Excavation
- Proposed Extent of Additional Excavation (9 ft x 9 ft x 5 ft)

0 5 10
SCALE IN FEET

NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

FINAL CONFIRMATION AND PRELIMINARY FIELD SCREENING SAMPLE LOCATIONS AND RESULTS AND EXCAVATION EXTENTS IMF SITE

FIGURE 1

99/94 AL

Field progress reports summarizing each day's field activities will be generated by the PRC field team engineer and sent via facsimile machine to the Department of the Navy, Western Division, Naval Facilities Engineering Command (WESTDIV); DTSC; and the California Regional Water Quality Control Board (RWQCB) on a daily basis.

Perform Preliminary Field Screening

On August 30, 1994, the PRC team collected preliminary field screening samples at the IMF site for total lead and pH analyses to guide PWC personnel for the upcoming excavation effort. Preliminary field screening included hand augering five holes and collecting samples at 2.5 and 5 feet below ground surface (bgs) from each hole. A slide hammer sampler was used to collect a total of 10 preliminary field screening samples at each depth. Samples were collected in 2-inch-diameter, 6-inch-long stainless steel sleeves.

Preliminary field screening samples were collected near the location of final confirmation sample 137-S13-001 (aka C-1), which had a total lead content of greater than 100 mg/kg (Figure 1). Sample C-1 was collected approximately 27 feet northwest of monitoring well MW-IMF-01. Three sample holes were located approximately 5 feet west southwest (WSW), west northwest (WNW), and west of sample location C-1. Two holes were located approximately 9 feet WSW and WNW of C-1.

The 10 soil samples were delivered under chain-of-custody to PWC at the Naval Supply Center Oakland. Sequoia Analytical analyzed the samples with a 24-hour turnaround time for total lead using U.S. Environmental Protection Agency (EPA) Method 6010. The PRC team measured the pH of the preliminary field screening samples in the field using the method described in the implementation work plan. Preliminary field screening sample locations and results are presented in Figure 1.

Perform Engineering Oversight and Confirmation Sampling and Analysis

Based on final confirmation sampling and preliminary field screening results, the Navy proposes to excavate a 9-foot by 9-foot area west of the previously excavated area (Figure 1). The excavation depth will be 7 feet. The PRC team will oversee the additional excavation and disposal of soil by

PWC personnel in accordance with the implementation work plan (PRC and Montgomery Watson 1993b).

The IMF site RA soil has been previously profiled and accepted for disposal by Chemical Waste Management's Kettleman Hills Class I facility. No additional waste profiling will be required. The PRC team will not be responsible for hauling and disposal costs and associated state and federal taxes. NAS Alameda Environmental Office personnel will be responsible for signing all manifests.

On completing the additional excavation, the PRC team will conduct confirmation sampling and analysis for lead and pH in accordance with the implementation work plan to assess the residual levels of lead and pH in the remaining soil. The final number of confirmation samples required for verification will depend upon the final areal and vertical extent of the excavation. A sampling density of one sample per 100 square feet will be used to determine the number of confirmation samples required. Assuming an excavation extent of 9 feet by 9 feet by 7 feet, five final confirmation samples (four wall and one floor) would be required. One matrix spike/matrix spike duplicate (MS/MSD) sample will also be collected.

The PRC team will attempt to collect confirmation samples from areas where visibly stained soil exists. The primary objective of the sampling plan is collection of representative lead and pH samples. Once the PRC team field staff has identified the final confirmation sample location, the backhoe operator will collect a bucket of soil from these locations. If the excavation walls exhibit no visible discoloration, samples will be collected from approximately half the depth of the excavation wall. Immediately upon retrieval of a bucket of soil, the PRC team field sampler will collect a sample using a hand-held drive sampler lined with 6-inch-long, stainless-steel tube. The stainless-steel tubes will be immediately sealed with Teflon sheets and plastic end caps and the end caps will be secured with silicone tape. Each sample will be labeled in the field with a unique identification number.

Confirmation samples will be sent to a Navy-certified laboratory and analyzed for lead using EPA Method 6010, pH using EPA Method 9045, and total petroleum hydrocarbons (TPH) using EPA Method Modified 8015. The contract required detection limit for lead in soils is 1.0 mg/kg. One confirmation sample will also be analyzed for volatile organic compounds (VOC), semivolatile

organic compounds (SVOC), and a full suite of metals according to the contract laboratory program (CLP) protocol. Required reporting and detection limits for the target analytes are presented in Appendix C of the implementation work plan. Data deliverables will be CLP Level D and delivered within 35 days of receipt of the samples.

The PRC team will be responsible for conducting air and health and safety monitoring in accordance with the site health and safety plan. Results of the monitoring will be provided to PWC. PWC personnel will be responsible for evaluating the monitoring results and determining appropriate health and safety actions. Air monitoring will also be conducted during field activities by the PRC team to accurately assess the worker inhalation exposure to lead-contaminated soil from the excavation activities. Air monitoring will be conducted in accordance with National Institute for Occupational Safety and Health (NIOSH) Analytical Method 7300, *Elements (ICP)*. Samples will be analyzed by a laboratory accredited by the American Industrial Hygiene Association.

PWC will restore the site by covering the additional excavation with high-density polyethylene (HDPE) sheeting to reduce the potential for contaminants to leach from soil to groundwater. Clean fill may or may not be used to restore the excavation to the level of the surrounding grade. A temporary chain-link fence with warning signs will be installed around the excavation area by PWC personnel.

Incorporate Results of Additional Excavation into Implementation Report

On completing the additional excavation and receiving laboratory data reports, the PRC team will summarize the results of additional confirmation sampling and analyses and the extent of the additional excavation and incorporate the summary into a implementation report. The implementation report will also include similar information collected from the previous three phases of excavation. The IMF site implementation report will summarize soil excavation and disposal activities, including the results of the confirmation sampling and analysis and previous waste profiling.

On receiving the laboratory reports, the PRC team will review and validate the analytical data using current EPA functional guidelines. Data will be validated based on quality control parameters reported by the laboratory. After review, validated data will be summarized in the implementation

report. The report will present the sample locations; validated results of soil sampling and analysis for lead, pH, TPH, VOCs, and SVOCs; and a discussion of the results.

REFERENCES

PRC Environmental Management, Inc. (PRC) and Montgomery Watson 1993a. "Naval Air Station Alameda, IMF Site Interim Removal Action, Engineering Evaluation/Cost Analysis Report (Final)." September 29.

PRC and Montgomery Watson 1993b. "Naval Air Station Alameda, Removal Action, Lead and Acid Soils Removal, Intermediate Maintenance Facility Site, Implementation Work Plan (Final)." October 12.