CLEAN

Contract No. N262474-88-D-5086

Contract Task Order 0121 and 0137

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JMM Project Manager: Steve Newton

ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

RI/FS PHASES 2B AND 3
IMF SITE EE/CA
HEALTH AND SAFETY PLAN
FINAL

Prepared for:

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May 1991

REMEDIAL INVESTIGATION/FEASIBILITY STUDY

HEALTH AND SAFETY PLAN
FINAL

NAVAL AIR STATION
ALAMEDA, CALIFORNIA

CONTRACT TASK ORDER NOS. 0121 & 0137
CONTRACT NO. N62474-88-D-5086

Prepared For

Department of the Navy

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ADDENDUM

FINAL
HEALTH AND SAFETY PLAN
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
PHASES 2B AND 3
INTERMEDIATE MAINTENANCE FACILITY
SITE ENGINEERING EVALUATION/COST ANALYSIS

DATED 02 NOVEMBER 1992

IS ENTERED IN THE DATABASE AND FILED AT
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REMEDIAL INVESTIGATION/FEASIBILITY STUDY
HEALTH AND SAFETY PLAN

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1.0 BACKGROUND AND PROPOSED ACTIVITIES

1.1 SCOPE AND PURPOSE

James M. Montgomery, Consulting Engineers, Inc. (JMM) has prepared a Health and Safety Plan (HSP) for PRC Environmental Management in response to Contract Task Orders 0121 and 0137 of Contract N62474-88-D5086 for Remedial Investigation/Feasibility Study (RI/FS) Phases 2B and 3, and the Engineering Evaluation/Cost Assessment (EE/CA) at the Intermediate Maintenance Facility (IMF) Site at the Department of Navy, Alameda Naval Air Station (ANAS), in Alameda, California. This HSP describes specific responsibilities, requirements, and procedures for the protection of personnel while performing the RI/FS field work at ANAS. This plan provides guidelines and requirements for the JMM On-Site Safety Officer (JMM OSO) to use and protect JMM field team members engaged in field activities at 11 potential hazardous waste sites at ANAS.

The Occupational Safety and Health Administration (OSHA) requires employers involved in hazardous waste activities to comply with Title 29, Code of Federal Regulations, Part 1910, Section 120 (29 CFR 1910.120) "Hazardous Waste Operations and Emergency Response;" Part 1926 "Safety and Health Regulations for Construction" (29 CFR 1926); and other applicable provisions of Title 29, Code of Federal Regulations, Part 1910, "Occupational Safety and Health Standards" (29 CFR 1910). Additionally, the U.S. Environmental Protection Agency (EPA) has developed guidelines for conducting remedial investigations and feasibility studies under the Comprehensive Environmental Response, Compensation Liability Act (CERCLA, or "Superfund"). This HSP was designed to meet federal OSHA, EPA, and California Occupational Safety and Health (Cal-OSHA) and Department of Health Services (DHS) requirements. Except in emergency situations, no deviations from this plan may be implemented without the prior notification and approval of the designated JMM Project Health and Safety Coordinator (PHSC), with oversight and concurrence, as warranted, by the JMM Program Health and Safety Manager (PHSM), and the PRC Health and Safety Program Manager (HSPM).

The implementation of this HSP will provide the JMM field team, including JMM sub-contractors, with a safe working environment during RI/FS activities at ANAS. Implementation of this HSP will enable the JMM OSO to minimize injuries and illnesses to the JMM field team members and physical damage to equipment, supplies, or Navy property. This HSP describes specific responsibilities of JMM field team members and includes guidelines for such activities as pre-mobilization and pre-planning coordination activities before RI/FS activities begin, medical surveillance and training requirements, periodic work site evaluations and audits, accident investigations and record keeping

requirements, USEPA levels of protection, hazard assessment criteria, site controls, decontamination procedures, and general site safety requirements.

All JMM employees and JMM subcontractors working at the ANAS sites will be required at all times to employ safe working practices and will comply with all U.S. Navy, federal and California OSHA, USEPA, DHS, PRC, Navy CLEAN, and JMM requirements.

1.2 SITE AND PROJECT DESCRIPTION

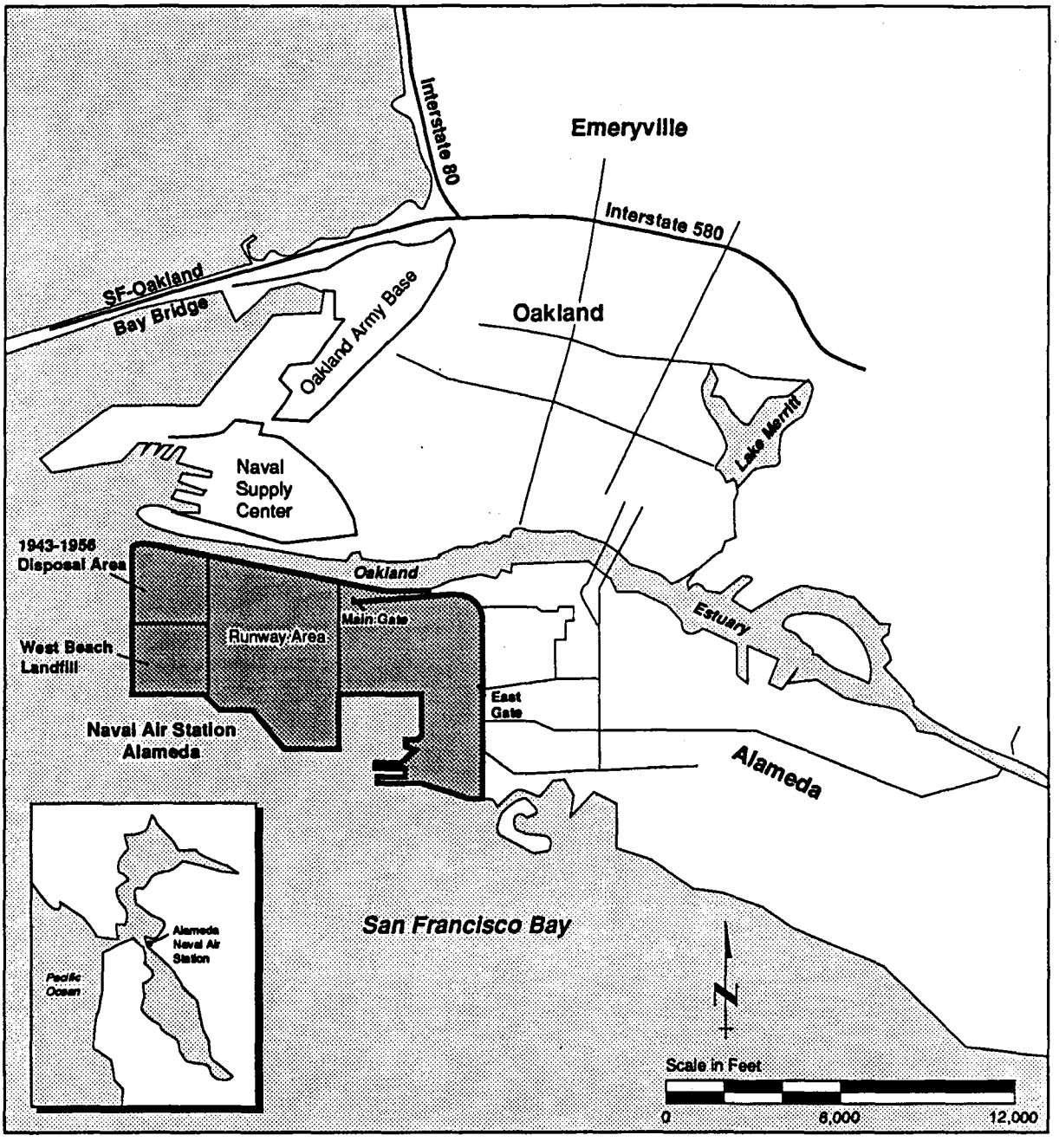
ANAS is located on the east side of San Francisco Bay in Alameda, California (Figure 1-1). The station occupies the western end of the island of Alameda. Most of the eastern half of the station is developed with office and industrial facilities. Runways and support facilities occupy the western part of the stations (Canonie Environmental, 1990a).

RI/FS activities are limited to the following potential hazardous waste sites (Figure 1-2).

- Site 4 - Building 360
- Site 5 - Building 5
- Site 6 - Building 41
- Site 7 - Buildings 162 and 459
- Site 8 - Building 114
- Site 10 - Building 400
- Site 11 - Building 14
- Site 12 - Building 10
- Site 14 - Fire Fighting Training Area
- Site 15 - Buildings 301 and 389
- IMF Site - Location of Proposed Intermediate Maintenance Facility

Site hazards during the RI/FS will potentially be both chemical and physical in nature. It is anticipated that the physical hazards will be similar at most of the sites. However, due to the large acreage of ANAS and the unique operations associated with each RI site, potential chemical contaminants are site-specific.

To aid in the identification of chemical hazards, a brief history of site use and the predominant known or suspected contaminants of concern are summarized and described in Sections 1.2.1 through 1.2.11. Details regarding the specific sampling collection techniques and locations are provided in the Field Sampling Plan (FSP) developed by Canonie Environmental (1990a). Investigation activities will



SITE LOCATION MAP
ALAMEDA NAVAL AIR STATION

FIGURE 1-1

OAKLAND INNER HARBOR

OAKLAND INNER HARBOR

PIER NO. 4

E 1476000

N 476000

E 1483000

N 476000

N 475000

E 1475000

TAXIWAY NO. 3

A/C WARM-UP APRON

TAXIWAY NO. 4

TAXIWAY NO. 5

E/W TAXIWAY

TAXIWAY NO. 6

TAXIWAY NO. 7

RAMP NO. 1

RAMP NO. 2

RAMP NO. 3

RAMP NO. 4

SEAPLANE BERTHING

SAN FRANCISCO BAY

Dense Brush

N 470000

E 1480000

N 470000

Piling

MAIN ST.

AVENUE A

AVENUE C

AVENUE D

AVENUE E

AVENUE F

AVENUE G

AVENUE H

FIRST ST.

SECOND ST.

THIRD ST.

FOURTH ST.

NINTH ST.

ATLANTIC AVE

BARBERS RD

CORPUS CHRISTI

ABAMAR

NORTON

BROWN VIEW

MAIN ST.

0 350 700

FEET

LEGEND

- BUILDINGS AND STRUCTURES
- ROAD
- FENCE
- RAILROAD
- PROJECT STUDY AREA

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FIGURE 1-2

ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

SITES LOCATION MAP

ALA-AL

consist of visual inspection, land surveying, shallow soil sampling, soil borings, and installation of monitoring wells. Additional activities will include soil gas investigations, and geophysics.

1.2.1 Site 4 - Building 360

Site 4 consists of Building 360. The site is located near the eastern perimeter of the base (Figure 1-3). The building has been in operation since 1954 and houses machine shops, a paint and cleaning shop, and a plating shop. Work performed under this phase of the investigation will focus on the plating shop area. The plating shop is currently inactive and the Navy is preparing plans for dismantling equipment formerly used in the shop. Processes performed in the plating shop included paint stripping by blasting; chrome, silver, and nickel stripping; etching; and chrome, silver, nickel, and copper plating. Four paint spray booths were also operated in the plating shop area. Two degreasing tanks containing 111-trichloroethane (1,1,1-TCA) are used at the paint shop.

Soil samples collected from beneath the plating shop in a previous investigation reportedly contained high levels of cyanide and were highly alkaline (Canonie, 1990). Laboratory reports for these samples were not provided.

Planned activities in the plating shop area include an initial visual inspection, surface geophysical surveys, concrete coring, and land surveying. In addition, boreholes will be drilled and subsurface soil and groundwater samples will be collected for laboratory analysis.

Contaminants of potential occupational health concern in the plating shop area include metals (chromium, copper, nickel, and silver), chromic acid, cyanide, and 1,1,1-TCA.

1.2.2 Site 5 - Building 5

Site 5 consists of Building 5. The site is located between First and Second Streets (Figure 1-4). The building has been in operation since 1942 and houses shops used for cleaning, reworking, and manufacturing of metal parts, tool maintenance, plating, and painting operations. Processes in the plating shop include degreasing, caustic and acid etching, metal stripping and cleaning, and chrome, nickel, silver, cadmium, and copper plating. The paint shop contains two paint bays and several smaller paint booths.

Scale in Feet

0 20 40 60

DEGREASER

½" COOLING WATER

RECTIFIER

RECTIFIER

½" COOLING WATER

WET TRENCH

DRY TRENCH

WET TRENCH

1 STM | •2 STM | 3 HWR | 4 CWR | 5 | 6 | 7 STM | 8 STM | 9 STM | 10 — LINE 1

COND LINE

SLOPE

NEW ½" SLOPE

11 | 12 | •13 | 14 | 15 | 16 STM | 17 CWR | •18 HWR | 19 | 20 STM | 21 HWR — LINE 2

NEW 3/4"

NEW 1/2" SLOPE @ 1/8"/FT. ON FLOOR

CUT & REMOVE ½" LINE TO TANK 17

ACID RESISTANT BRICK FLOORING

4"

6"

NEW 3/4"

WET TRENCH

DRY TRENCH

22 | 23 CWR | 24 STM | 25 | 26 STM | 27 CWR | 28 HWR STM | 29 STM | 30 | 31 | 32 STM | 34A | 34B | 35 STM — LINE 3

COND

COND

COND

COND

4"

WET TRENCH

38 | 39 | 40 CWR | 41 HWR STM | 42 | 43 | 44 CWR | 45 STM | 47 | 48 STM | 49 | 50 | 51 | 52 | 53 | STILL STM — LINE 4

4"

57 | 58

DRY TRENCH

55 STM | 56 CWR | A | B | 59 CWR | 60 | 61 STM | 62 CWR | 63 STM | 64 | 65 | 66 | 67 | 68 CWR | 69 HWR | 70 STM — LINE 5

COND

75 | 80

71 STM | 72 CWR | 73 STM | 74 | A | B | 76 CWR | 77 | 78 | 79 | 81 | 82 | 84 CWR | 85 | 86 CWR | 87 HWR STM — LINE 6

4"

DEGREASER

½" COOLING WATER

WET TRENCH

6" CHROME WASTE LINE

6" CYANIDE WASTE LINE

6" CHROME WASTE LINE

OVERFLOWS FROM CHROME RINSE TANKS

C.O.

C.O.

6" CYANIDE WASTE LINE

6" CHROME WASTE LINE

LEGEND

- ○ ALTERNATIVE BOREHOLE LOCATION
- ● SHALLOW BOREHOLE LOCATION
- ⊕ BOREHOLE WITH GROUNDWATER SAMPLE

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FIGURE 1-3

ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

BUILDING 360
SAMPLING LOCATIONS
SITE 4

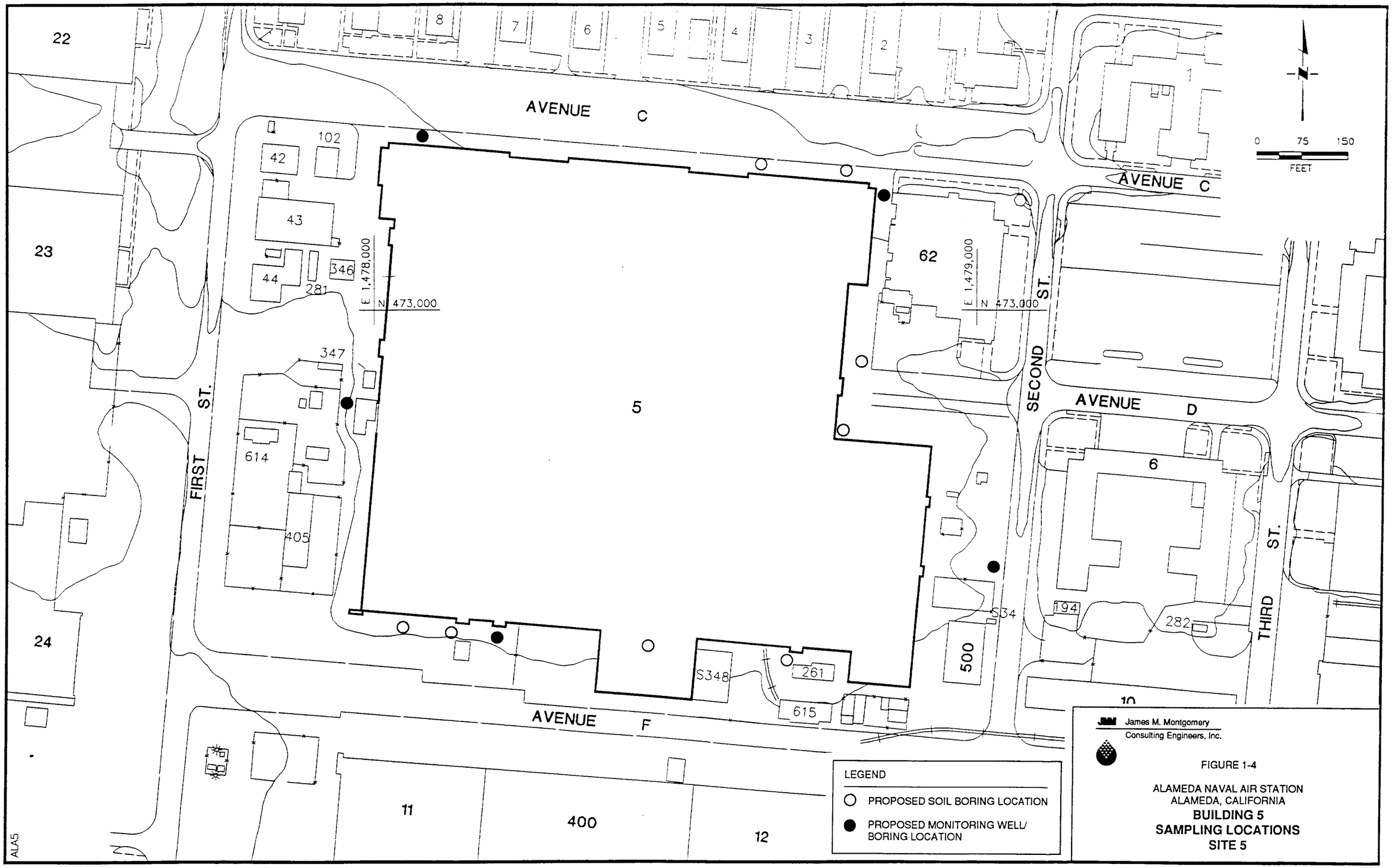
22
23
24
AVENUE C
AVENUE F
AVENUE D
FIRST ST.
SECOND ST.
THIRD ST.
102
42
43
44
346
281
347
614
405
5
62
6
194
282
534
500
348
261
615
11
400
12
10
E 1,478,000
N 473,000
E 1,479,000
N 473,000
0 75 150
FEET
LEGEND
PROPOSED SOIL BORING LOCATION
PROPOSED MONITORING WELL/ BORING LOCATION
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FIGURE 1-4
ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA
BUILDING 5
SAMPLING LOCATIONS
SITE 5
ALA5

A previous assessment of wastewater from the processes housed in Building 5 identified high levels of chemical oxygen demand (COD), chromium, iron, phenol, and zinc in paint bay process waters. Paint stripping wastewaters contained chromium, methylene chloride, oil and grease, and phenol. High pH wastewaters containing aluminum, chromium, and iron are produced in conversion coating operations (E&E, 1983; Canonie, 1990). No laboratory reports for these analyses or for soil and groundwater quality are available.

Initial activities planned for Site 5 include surface geophysical surveys and concrete coring. In addition, soil borings will be drilled around the perimeter of the building and in the hangar used for paint stripping to collect subsurface soil and groundwater samples for laboratory analysis. Compounds of potential occupational health concern at this site include heavy metals (cadmium, copper, chromium, nickel, and silver), cyanide, phenol, and methylene chloride.

1.2.3 Site 6 - Building 41

Site 6 consists of Building 41. The site is located along the northern boundary of the sea-plane lagoon (Figure 1-5). The building currently houses an aircraft repair shop. In the past, Building 41 was used to store 55-gallon drums of waste from repair and maintenance activities. These drums reportedly contained PD-680 dry cleaner, trichlorofluoroethane, 6083 oil, 1,1,1-TCA, paint wastes and strippers, and hydraulic fluids. Approximately 30 55-gallon drums and a tank containing paint stripper are currently located immediately west of the building.

No information on soil or groundwater quality in the vicinity of the site is available. Initial activities planned for Site 6 include surface geophysical surveys and concrete coring. Following completion of these activities, soil borings will be drilled around the perimeter of the building and in the paved storage area west of the building and subsurface soil and groundwater samples will be collected. Contaminants of potential occupational health concern include solvents, paint strippers (e.g., methylene chloride), and waste paint components (e.g., phenol).

1.2.4 Site 7A and 7B - Buildings 459 and 162

Site 7 consists of Buildings 459 and 162. Building 459 is designated as Site 7A and Building 1162 is designated Site 7B. Site 7A is located north of the east gate on the perimeter of ANAS (Figure 1-6A). Site 7B is located on the southeast corner of the intersection of Fifth Street and Atlantic Avenue

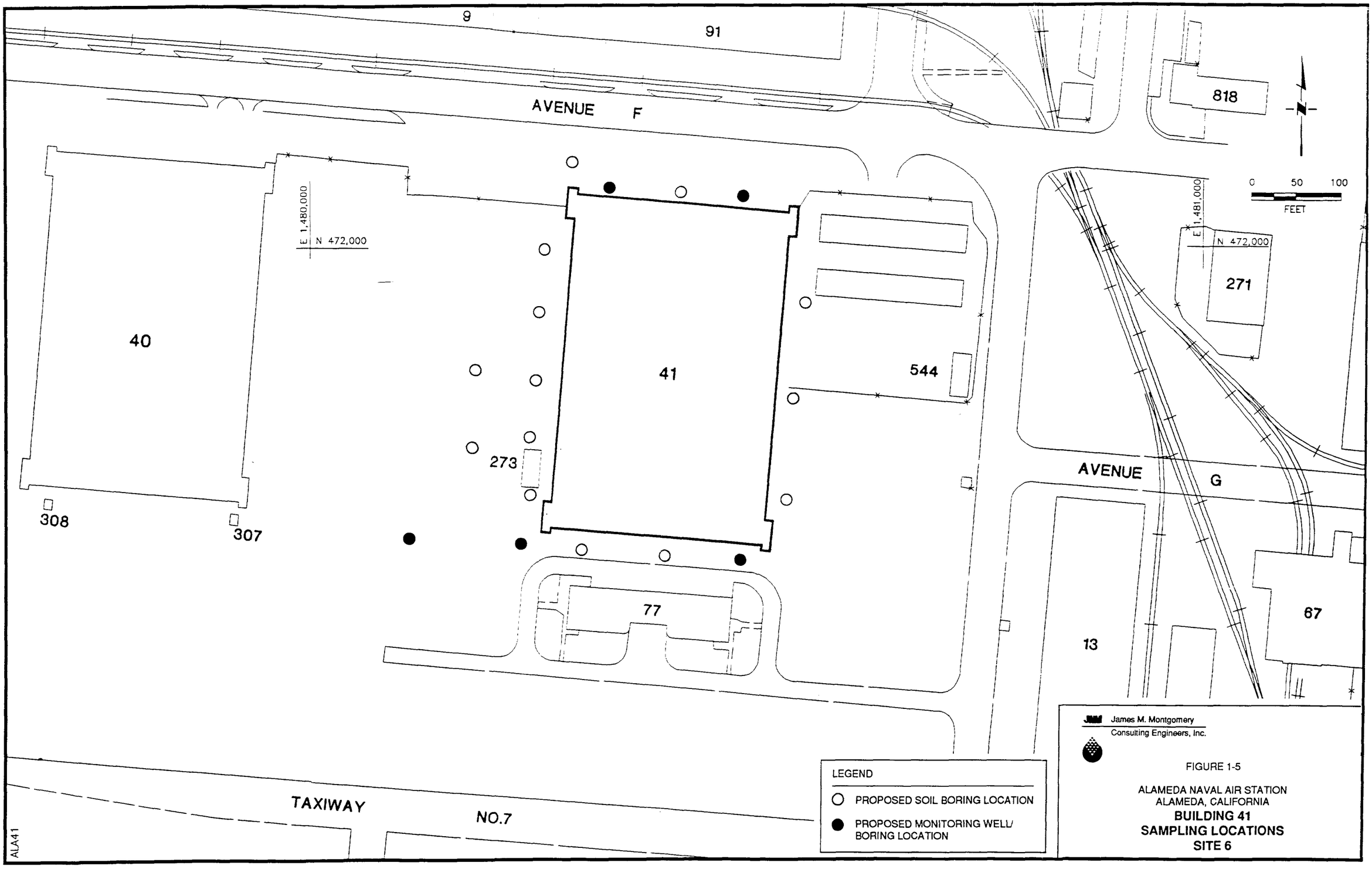
9
91
AVENUE F
818
E 1,480,000
N 472,000
40
41
544
273
308
307
77
E 1,481,000
N 472,000
271
AVENUE G
67
13
0 50 100
FEET
TAXIWAY NO.7
ALA41
LEGEND
PROPOSED SOIL BORING LOCATION
PROPOSED MONITORING WELL/ BORING LOCATION
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FIGURE 1-5
ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA
BUILDING 41
SAMPLING LOCATIONS
SITE 6

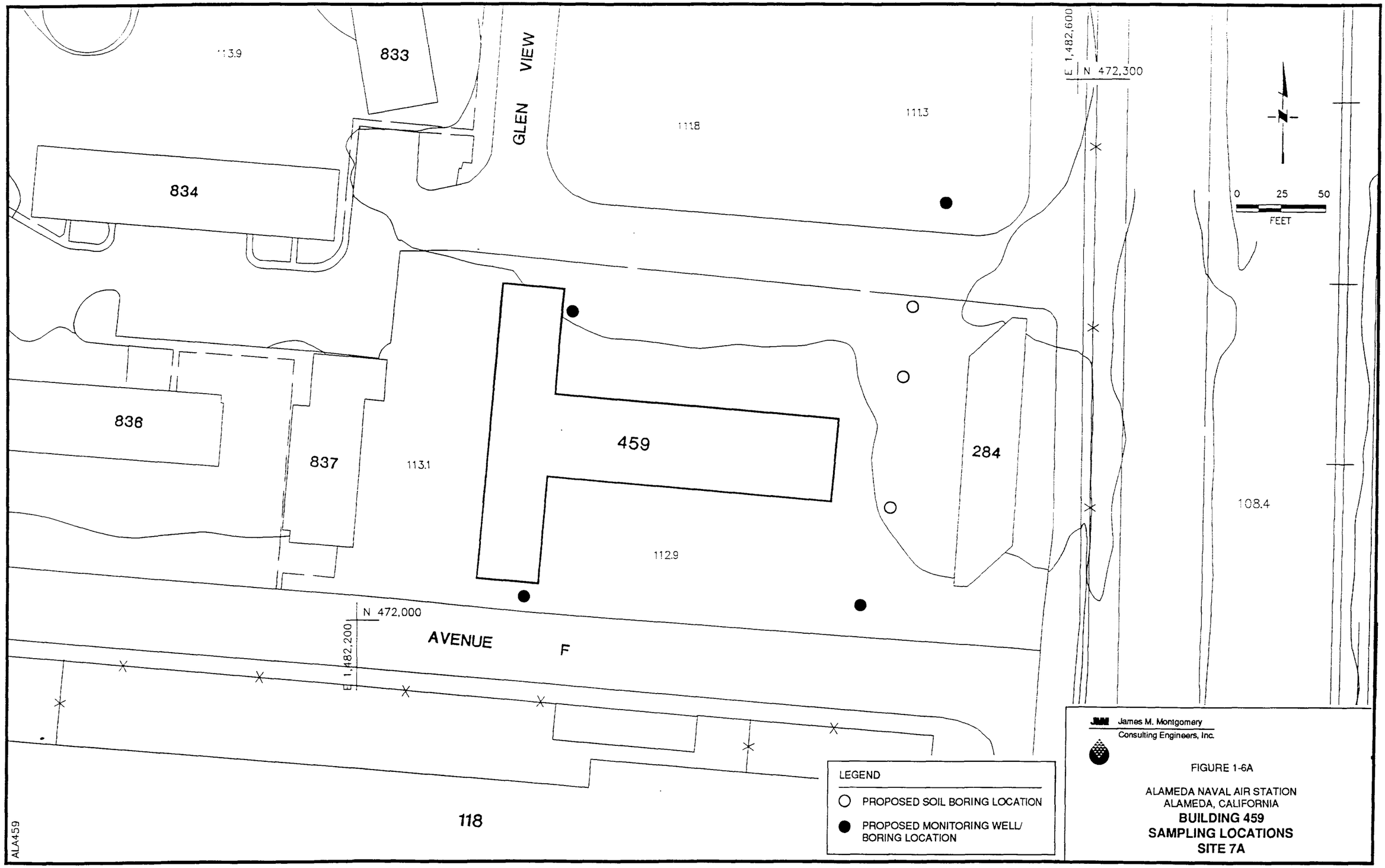

FIGURE 1-6A

ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

BUILDING 459
SAMPLING LOCATIONS
SITE 7A

(Figure 1-6B). Site 7A is the location of a gasoline service station which has been in operation since 1966. There are currently four 10,000-gallon underground storage tanks (USTs), and one waste oil tank of unknown size, at Site 7A. Three of the four tanks are used at present and contain gasoline; the fourth tank was taken out of service due to suspected leakage. The remaining three fuel tanks failed a pressure test in 1987. In addition, releases from the waste oil tank are known to have occurred. An oil sheen was noted in piping trenches during the removal of two additional underground storage tanks from Site 7A. Site 7B was used as a service station in the past; however, information as to whether USTs were in use at Site 7B and the types of fuel stored there is not available.

Laboratory data on soil or groundwater quality is not available for either Site 7A or 7B. The investigation at Site 7A will assess the degree of possible soil and/or groundwater contamination resulting from the known releases of gasoline and waste oil. The investigation will include surface geophysical surveys, concrete coring, a soil gas survey, borehole drilling and well installation, and land surveying.

Planned activities at Site 7B include surface geophysical surveys to identify the locations of USTs. In addition, boreholes will be drilled and subsurface soil and groundwater samples will be collected for laboratory analysis.

Contaminants of potential occupational health concern at Sites 7A and 7B are gasoline and gasoline constituents including benzene, ethylbenzene, toluene, and xylenes (BETX).

1.2.5 Site 8 - Building 114

Site 8 consists of Building 114. The site is located on Avenue C between Third and Fourth Streets (Figure 1-7). The building formerly housed the base Public Works woodworking, painting, and steam cleaning shops; and pesticide and herbicide storage and operations. Equipment containing pesticides and herbicides was routinely rinsed in the yard. Currently, the western portion of Building 114 houses administrative personnel, while the eastern portion is retained by the Public Works Department. A shed at the northeast corner of the south wing of the building is used to store pesticides. A small paint shop still operates in the building.

No characterization of potential soil and groundwater contamination resulting from past activities has been undertaken at Site 8. The investigation of Site 8 will assess whether contamination of soils and groundwater has occurred through surface spills or from leaks in the subsurface sewer system. The

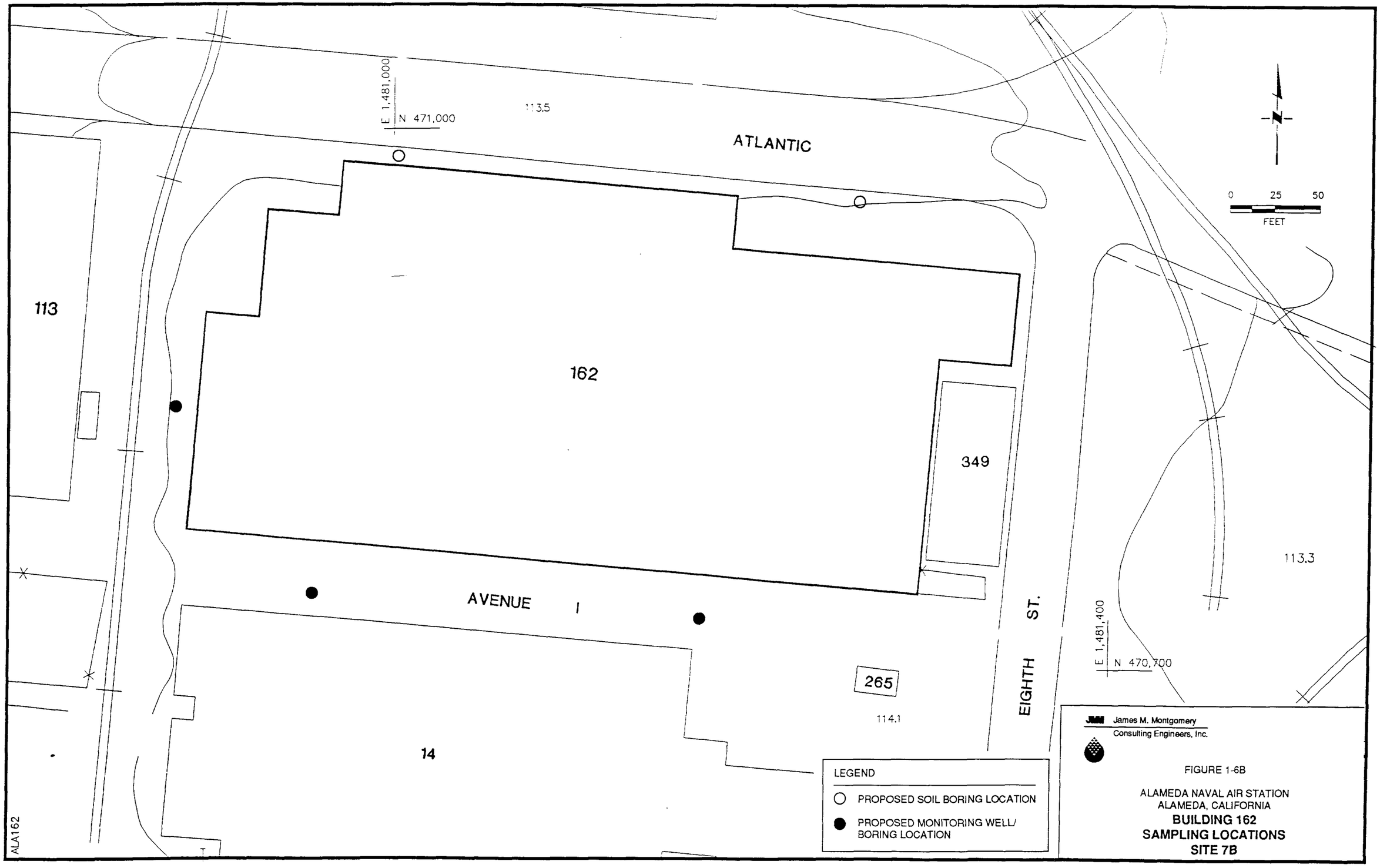

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FIGURE 1-6B

ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

BUILDING 162
SAMPLING LOCATIONS
SITE 7B

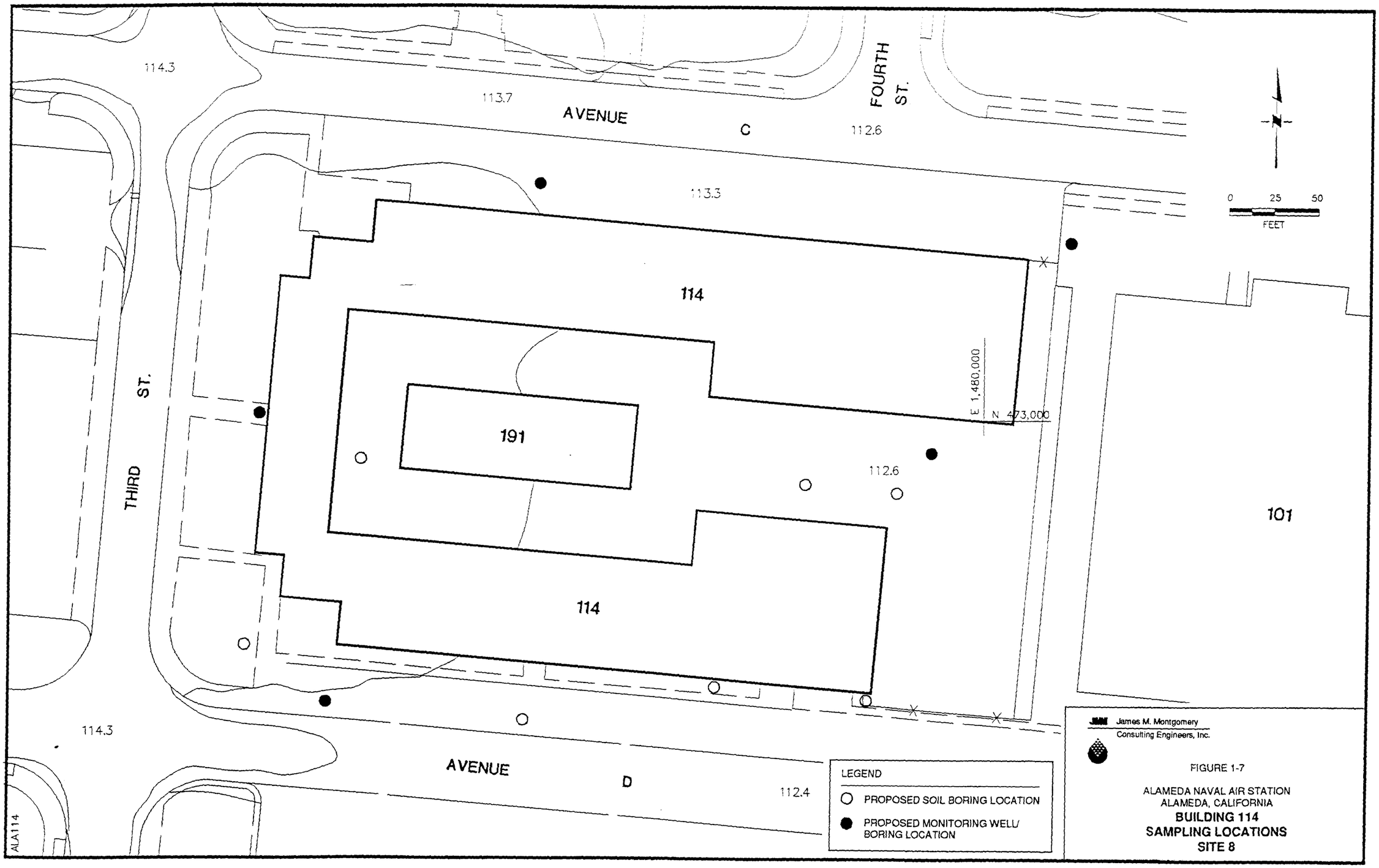


FIGURE 1-7

ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

BUILDING 114
SAMPLING LOCATIONS
SITE 8

investigation will include surface geophysical surveys, borehole drilling to collect subsurface soil and groundwater samples, and land surveying.

Contaminants of potential occupational health concern at Site 8 include pesticides (chlordane, DDT, diazinon, lindane, malathion), herbicides (2,4-D, Chlorvar, Krovar I, Princep, Roundup, and Telvar), and compounds potentially present in association with past painting activities (e.g., phenol and methylene chloride).

1.2.6 Site 10 - Building 400

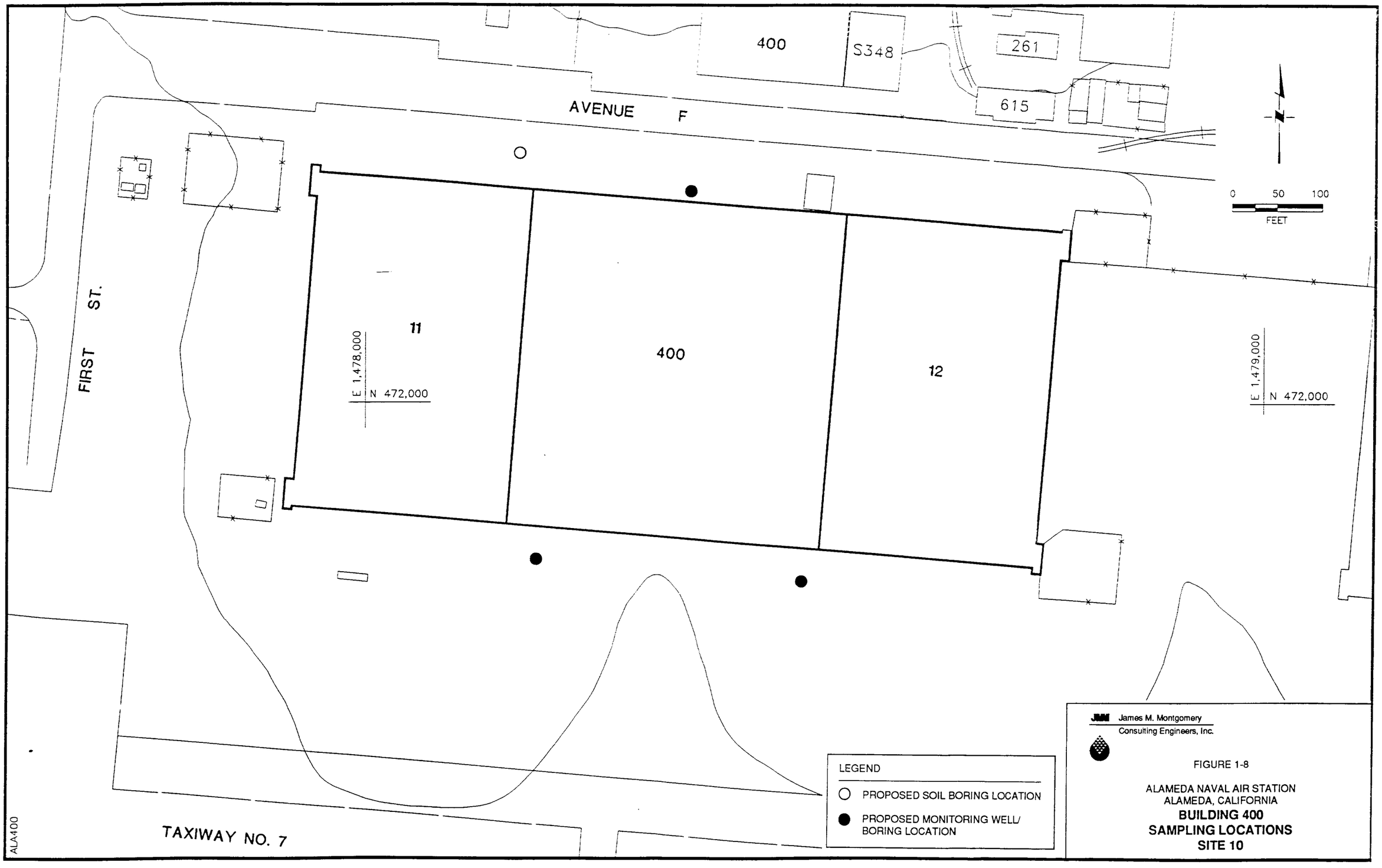
Site 10 consists of Building 400. The site is located south of Avenue F (Figure 1-8). Building 400 was formerly a site for missile rework operations, but currently is used for paint stripping, fiberglass, and aircraft parts cleaning operations. Wastes generated at this site included paint sludges, paint strippers, cleaning solvents [trichloroethene (TCE) and carbon tetrachloride], and miscellaneous waste oils, greases, and cleaning fluids. Solid wastes generated at the site were disposed at the West Beach Landfill. Wastewater streams were discharged to the industrial waste collection system. Prior to 1972, there was no pre-treatment of wastewater (Canonie, 1990).

Samples of wastewater generated at Site 10 have not been collected. Based on an investigation of Site 5 (where similar processes are conducted), and a physical inspection of Site 10, wastewater constituents are assumed to include high levels of solvents, heavy metals, and phenols (E&E, 1985 and Canonie, 1990).

The investigation of Site 10 will assess whether the subsurface has been contaminated by surface spills or leaks in the sewer system. A visual inspection will be performed to look for evidence of such releases. In addition, soil borings will be drilled to collect subsurface soil and groundwater samples for laboratory analyses. Contaminants of potential occupational health concern include heavy metals, TCE, carbon tetrachloride, and phenol.

1.2.7 Site 11 - Building 14

Site 11 consists of Building 14. The site is located between Fifth Street, Eighth Street, and Avenue 1 (Figure 1-9). Building 14 currently houses laboratories, located on the second floor, and two aircraft engine testing chambers. Potential contaminants associated with the laboratory involve small quantities of mercury that are present in manometers and thermometers. Although the laboratories are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FIRST ST.
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0 50 100
FEET
TAXIWAY NO. 7
ALA400
LEGEND
PROPOSED SOIL BORING LOCATION
PROPOSED MONITORING WELL/ BORING LOCATION
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Consulting Engineers, Inc.
FIGURE 1-8
ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA
BUILDING 400
SAMPLING LOCATIONS
SITE 10

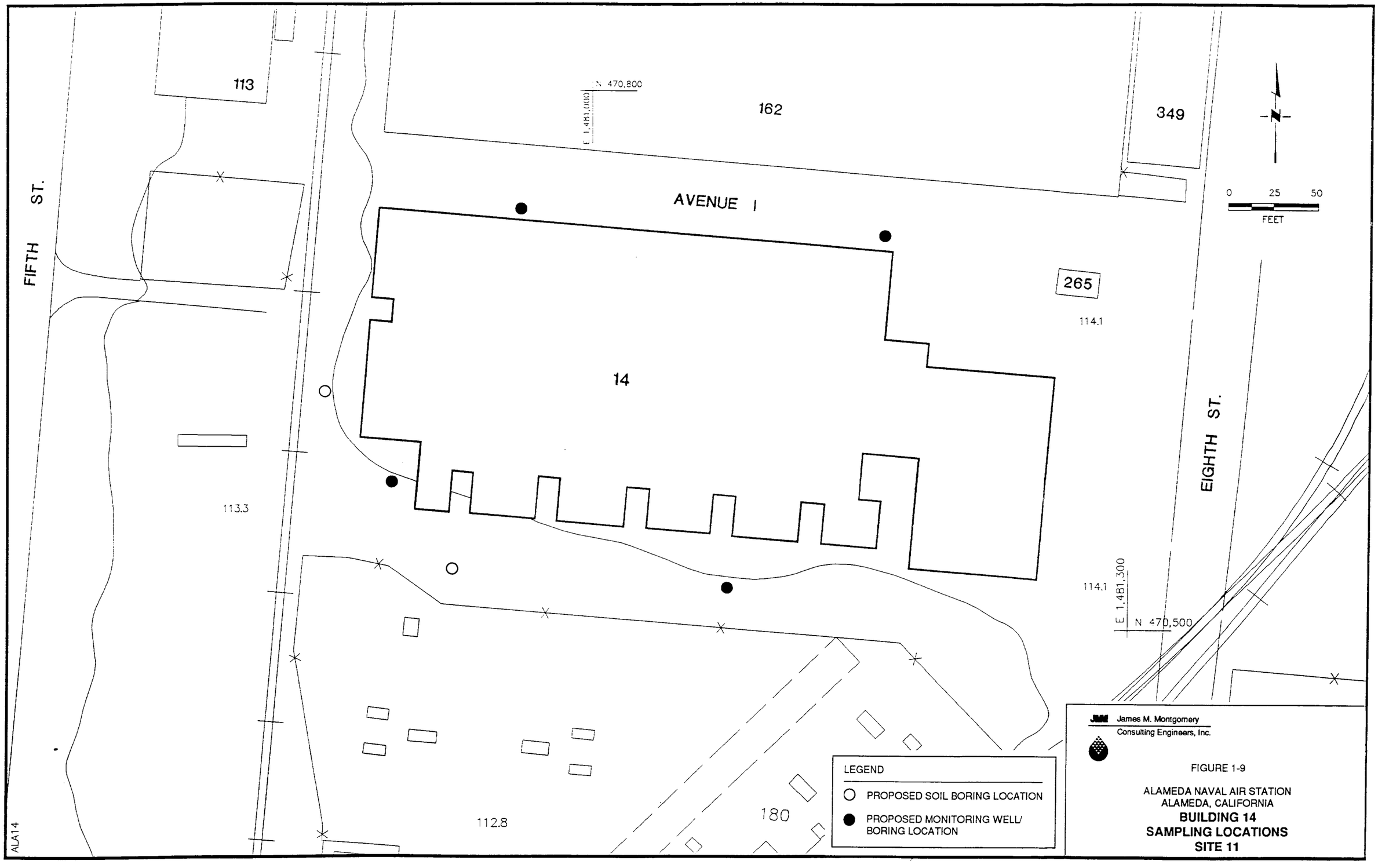

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FIGURE 1-9

ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

BUILDING 14
SAMPLING LOCATIONS
SITE 11

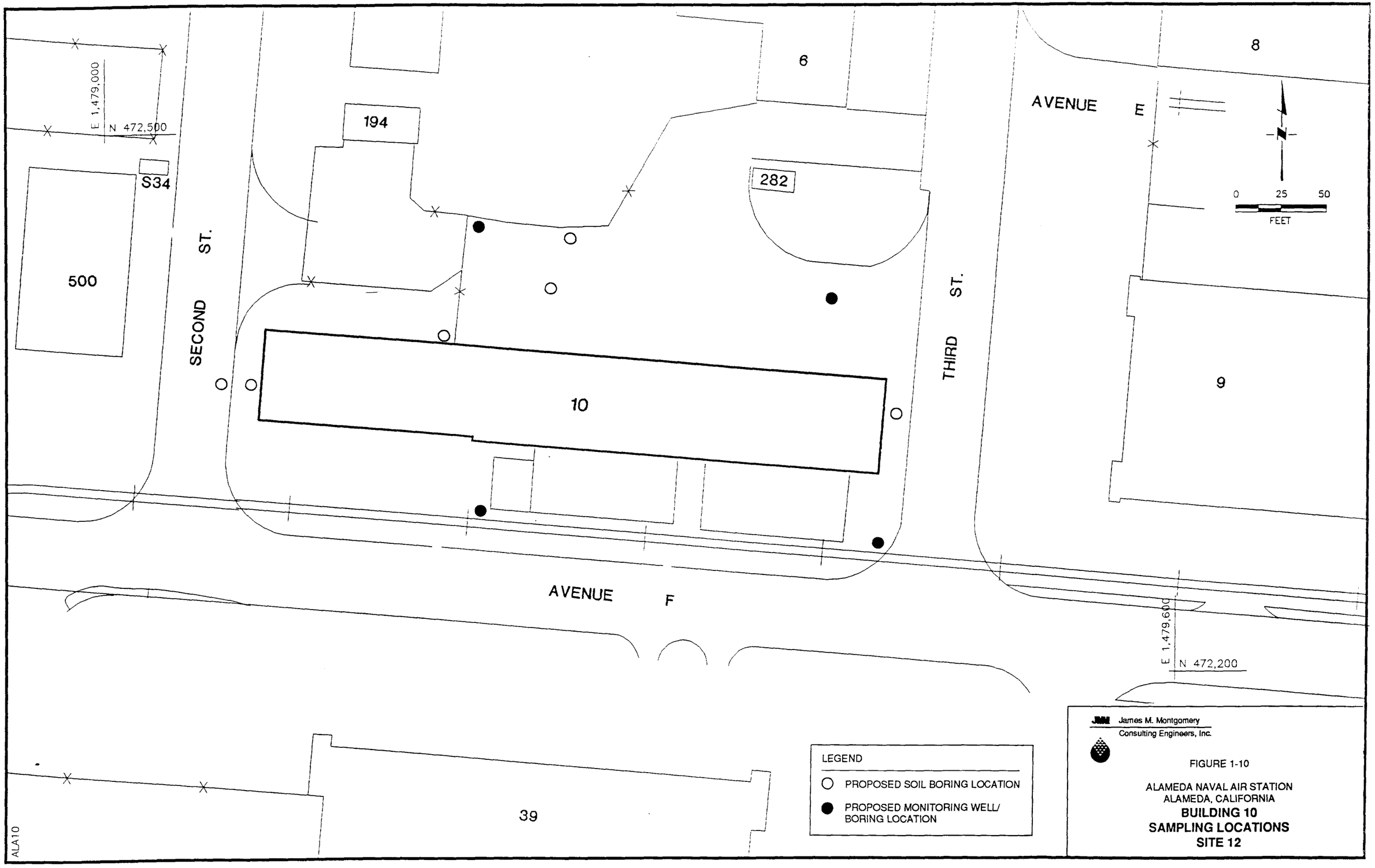
generally self-contained, minor mercury spills of up to several ounces have occurred in the past and there are indications that mercury has washed into the industrial waste collection system (Canonie, 1990). Potential contaminants associated with the two aircraft engine testing chambers involve fuels, solvents, and cleaning chemicals. Fuel types include AVGAS, JP-5, and JP-7. Solvents used for cleaning processes include PD-680 and BNB-3100. General purpose chemicals used included 10-10 weight oil, and lubrication oils.

Samples of wastewater discharges have not been collected from Site 11. The investigation of this site will assess whether the subsurface has been contaminated by mercury or hydrocarbons from surface spills or releases into, or leaks from, the sewer system. The investigation will include a visual inspection of laboratory floor drains and will be conducted to find any evidence of mercury spills. This inspection could identify sewer lines that, if leaky, could contaminate the subsurface. In addition, soil borings will be drilled to collect subsurface soil and groundwater samples for laboratory analyses. Contaminants of potential occupational health concern include mercury and a variety of fuels and solvents.

1.2.8 Site 12 - Building 10

Site 12 consists of Building 10. The site is located between Avenues E and F (Figure 1-10). Building 10 currently houses seven boilers and serves as a power plant. The boilers are fueled by natural gas, although diesel fuel is used for backup purposes. Nine aboveground diesel storage tanks with a total capacity of 158,000 gallons are located on the south side of Site 12. Bunker "C" fuel also was stored at the site in five underground tanks along the northeast side of the building. Spills of Bunker "C" fuel have occurred in the past and resulted in the accumulation of fuel oil in steam-pipe trenches on the northern side of Building 10. Four of the underground tanks have been abandoned in place, and the fifth has been proposed for removal.

No soil or groundwater samples have been collected at Site 12. The investigation of this site will assess whether the subsurface has been contaminated by petroleum hydrocarbons. A visual inspection will be performed to look for evidence of such releases. In addition, subsurface soil and groundwater samples will be collected for laboratory analyses. Contaminants of potential occupational health concern at the site include "heavy-end" petroleum hydrocarbons, Bunker "C" fuel, and diesel fuel.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AVENUE E
SECOND ST.
THIRD ST.
10
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FEET
AVENUE F
E 1,479,600
N 472,200
39
ALA10
LEGEND
PROPOSED SOIL BORING LOCATION
PROPOSED MONITORING WELL/ BORING LOCATION
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Consulting Engineers, Inc.
FIGURE 1-10
ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA
BUILDING 10
SAMPLING LOCATIONS
SITE 12

1.2.9 Site 14 - Fire Fighting Training Area

Site 14 is used as a fire-fighting training and fire extinguisher discharge area, and consists of a steel tank installed on a 20-foot by 30-foot concrete slab. The site is located on the northern perimeter of ANAS in the vicinity of Building 443 (Figure 1-11). Waste fuels from plane defueling operations are burned during training exercises. Probable wastes discharged at the site include petroleum fuels and oils from plane defueling operations (E&E, 1983).

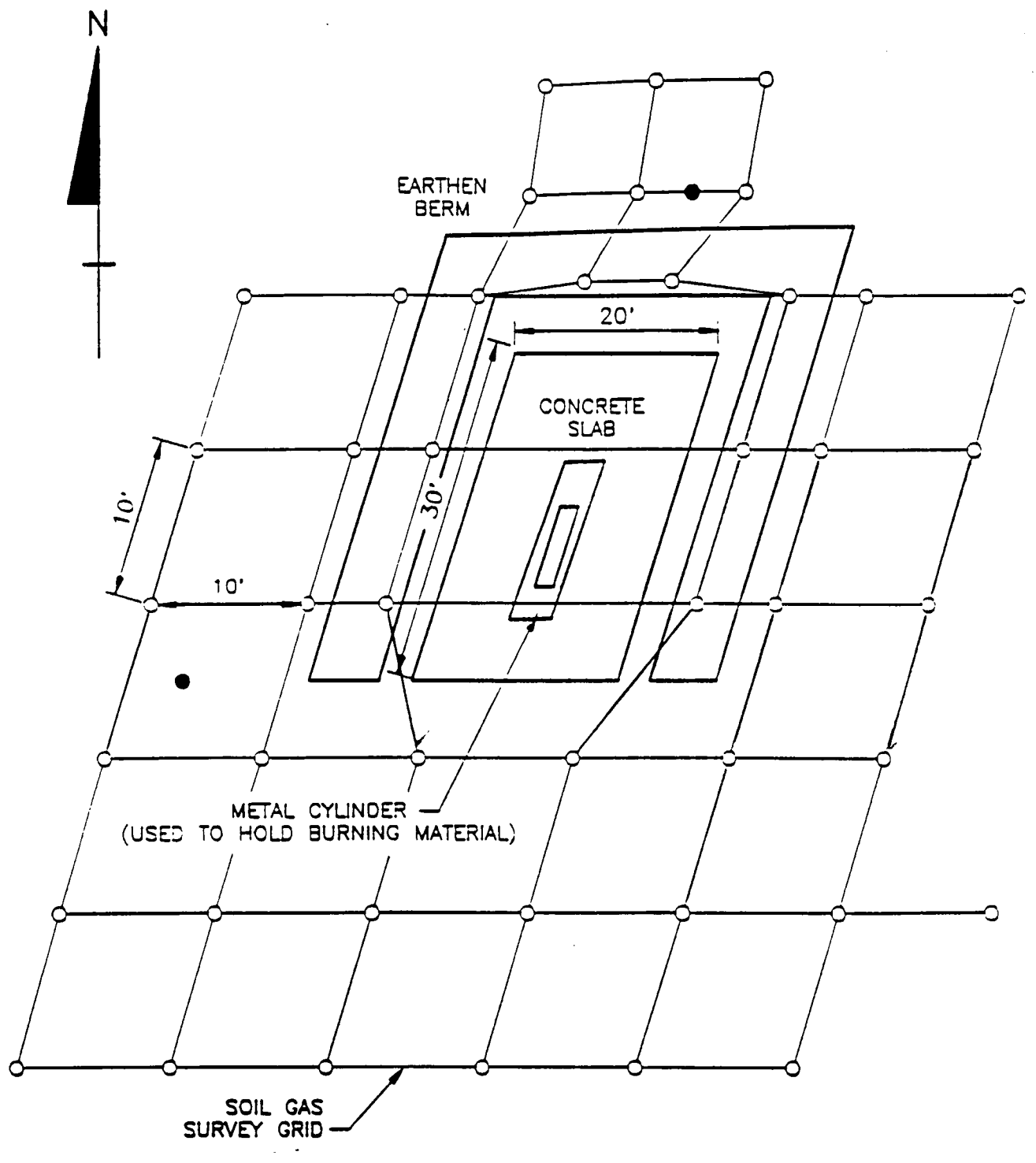
Samples of soil or groundwater have not been collected at Site 12. This site investigation will assess whether the subsurface has been contaminated from surface spills, leaks, or releases of petroleum fuels. A visual inspection will be performed to look for evidence of such releases and a soil gas survey will be performed. In addition, soil borings will be drilled to collect subsurface soil and groundwater samples for laboratory analyses. Contaminants of potential occupational health concern include petroleum hydrocarbons.

1.2.10 Site 15 - Buildings 301 and 389

Site 15 consists of Building 301 and the concrete slab foundation of former Building 389. The site is located north of Runway 7-25, approximately 500 feet inland of the Oakland Inner Harbor channel (Figure 1-12). Building 301 serves as storage areas for electrical equipment, oil-filled transformers, and other disused machinery. Building 389 has been torn down but formerly was used to store transformers.

A site visit of Building 301 revealed several 55-gallon drums of hydraulic fluids. No visible signs of contamination were observed with the exception of a small area of bare ground immediately to the north of the building (Canonie, 1990). An estimated 200 to 400 gallons of PCB oil may have been present in the transformers stored in Building 389 and occasional leaks are believed to have occurred. In addition, oil was routinely drained from the transformers and sprayed on the ground to control weeds in the adjacent yards (E&E, 1983). Surface soil samples have been collected at 12 locations north of the Building 389 concrete foundation and analyzed for PCBs. The highest concentration of PCBs detected was 3 ppm (Wahler, 1985).

The investigation of Site 15 will more fully assess the nature and extent of subsurface PCB contamination in the site vicinity. The investigation will include a visual inspection of surface runoff channels leading to the Oakland Estuary. In addition, soil borings will be drilled to collect surface soil,



LEGEND

- ○ PROPOSED SOIL GAS SURVEY POINT
- ● PROPOSED MONITORING WELL/ BORING LOCATION

SOURCE: BEST AVAILABLE U.S. NAVY BLUEPRINT

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FIGURE 1-11

ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

FIRE TRAINING AREA SAMPLING LOCATIONS SITE 14

300

110.8

111.3

110

28

27

283

301

N 475,800 E 1,476,900

0 25 50

FEET

110.2

110

108.4

108.0

N 475,400 E 1,476,300

ALA283

LEGEND

- PROPOSED SOIL BORING LOCATION
- PROPOSED MONITORING WELL/ BORING LOCATION

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FIGURE 1-12

ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

BUILDINGS 301 AND 389
SAMPLING LOCATIONS
SITE 15

subsurface soil, and groundwater samples for laboratory analyses. The major contaminants of potential occupational health concern at this site are PCBs.

1.2.11 Intermediate Maintenance Facility ("IMF" Site)

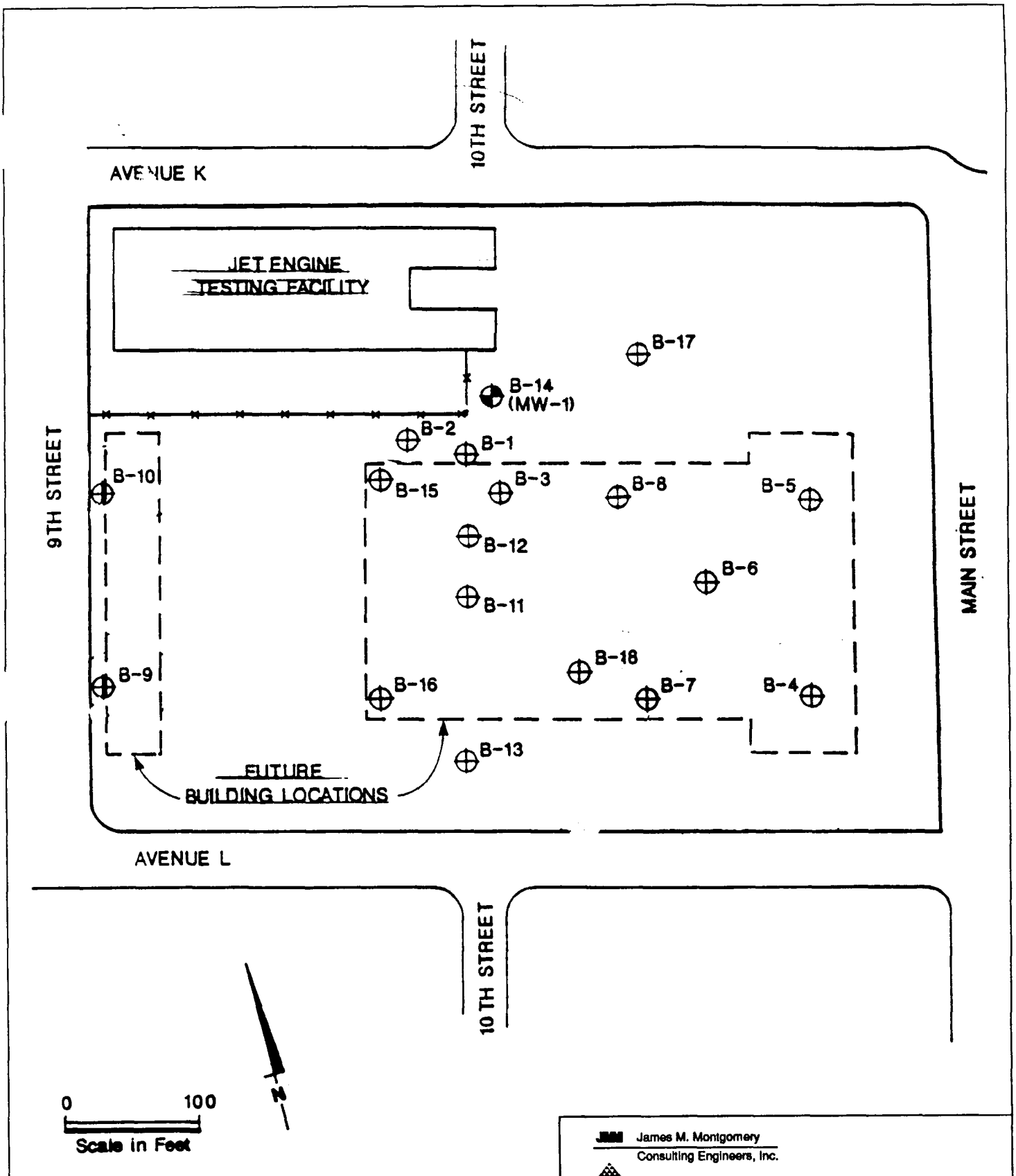
The IMF Site is the location of the proposed Intermediate Maintenance Facility (IMF). Stained soil and petroleum odors were noted during initial construction activities at the site. The site and proposed location of the IMF are shown in Figure 1-13.

During subsequent environmental investigations, a layer of black tar-like material was encountered in two borings located in the southern area of the proposed facility. At the time, it was thought that the material may have been a waste product from the former oil refinery that was located opposite Avenue L, which borders the southern edge of the site. Soils in this area were found to have a low pH. A sample of this material, collected at a depth of 4.5 feet, contained the following contaminants (HLA, 1989):

Contaminant	Soil Concentration
TPH (as gasoline)	16,000 mg/kg
TPH (as diesel)	76,000 mg/kg
Oil and Grease	120,000 mg/kg
2-Methylnaphthalene	220 mg/kg
Lead (total)	13,000 mg/kg
Lead (soluble)	140 mg/l
pH	1.6

Soil collected from a boring located at the northern edge of the facility, near the Jet Engine Testing Facility, also contained TPH (diesel) at 490 and 860 mg/kg at depths of 4 and 15 feet, respectively; and oil and grease (O & G) at 33,000 mg/kg (4.5 feet bgs). The source of the hydrocarbons in this boring was not defined, but may have been released from the oil-water separator near the Jet Engine Testing Facility. Methylethylketone was detected in concentrations of 10 mg/kg at 8.5 feet bgs in a boring along the northern edge of the proposed facility (HLA, 1989).

The results of groundwater analyses from a monitoring well installed in the borehole nearest to the Jet Engine Testing Facility are presented below (HLA, 1989):



LEGEND

- EXISTING MONITORING WELL LOCATION
- PREVIOUS BORING LOCATION

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Consulting Engineers, Inc.

FIGURE 1-13

ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

IMF SITE VICINITY MAP

Contaminant	Groundwater Concentration
TPH (as gasoline)	11 mg/l
Oil and Grease	60 mg/l
Benzene	440 μg/l
Phenol	37 μg/l
Fluorene	2.3 μg/l
Phenanthrene	3.8 μg/l
Barium	0.4 μg/l
Lead	0.05 mg/l
Nickel	0.02 mg/l
Vanadium	0.01 mg/l

Based on the results of previous investigations, it was determined that soil beneath portions of the eastern two-thirds of the site have been impacted by TPH, O & G, and other hydrocarbon compounds. Potential sources identified by previous investigators included waste disposal from the former refinery, a possible release from the oil water separator near the Jet Engine Testing Facility (Building 397), and/or contaminants that migrated beneath the site through the permeable bedding material around utility lines (HLA, 1989).

1.3 SAFETY AND HEALTH ANALYSIS

1.3.1 Chemical Toxicity Hazards

Potential chemical hazards associated with each of the 11 ANAS RI/FS sites are dependent upon the type of activities being performed at a given site (e.g., visual inspections, land surveying, soil gas surveying, shallow soil sampling, soil boring, monitoring well installation, and groundwater sampling) and the location of a given activity (i.e., in the center of known or suspected contamination or on the perimeter or upgradient of a given site). Based on site-specific contaminant data (or in its absence the Navy CLEAN Health and Safety Program default action levels), and the types of activities to be performed at a given site, action levels to upgrade/downgrade levels of personal protective equipment will be specified (as discussed in Section 1.3.3). As discussed in Section 2.0, little quantitative data are available for the 11 ANAS sites (analytical data exist at Site 15 and the IMF Site). In reviewing the site historical information and the limited site data from the perspective of hazards to personnel conducting RI/FS field activities, the contaminants of possible occupational health concern (by site) are as follows:

- Site 4 - Building 360: This area consisted of former machine, paint, and plating shops. Based on the historical information, contaminants of potential occupational health concern include metals (chromium in particular), cyanide, and 1,1,1-TCA.

Additionally, soil borings conducted inside the building in the vicinity of former plating tanks present a potential exposure to acidic conditions (chromic acid).

- Site 5 - This area consisted of former metal parts, tool maintenance, and plating/painting shops. Based on the historical information, contaminants of potential occupational health concern include metals (chromium in particular), cyanide, phenol, and methylene chloride.

- Site 6 - This area was used for aircraft component repair. Based on the historical information, compounds of potential occupational health concern include phenol, hydraulic fluid, methylene chloride, 1,1,1-TCA, trichlorofluoroethane, and PD-680 (a Stoddard solvent-based material). PD-680 can be represented by Stoddard solvent or petroleum distillates when considering occupational exposure limits.

- Site 7 - This area consists of an active gasoline station and four underground storage tanks. Potential compounds of occupational health concern are gasoline (including the aromatic hydrocarbons - benzene, ethylbenzene, xylene, and toluene) and waste oil.

- Site 8 - Building 114 - This area consisted of a former public works shop that included woodworking, painting, and steam cleaning. Additionally, the facility was used for the storage of pesticides and herbicides. Based on historical information, contaminants of potential occupational health concern include phenol, methylene chloride, pesticides (such as chlordane, lindane, DDT, malathion, and diazinon), and a variety of herbicides.

- Site 10 - Building 400 - This area consisted of a missile rework, paint stripping, and parts cleaning facility. Based on the historical information, contaminants of potential occupational health concern include metals, TCE, carbon tetrachloride, and phenols (as represented by phenol).

- Site 11 - This area consisted of engine test chambers and a laboratory. Based on the historical information, contaminants of potential occupational health concern include mercury and a variety of hydrocarbon compounds (AVGAS, JP-5, JP-7, PD-680). The AVGAS, JP-5 and JP-7 can be conservatively represented by benzene (as a governing compound) in establishing occupational exposure limits and action levels for personal protective equipment.

- Site 12 - Building 10 - This area consisted of a power plant with seven boilers. Based on the historical information, contaminants of potential occupational health concern include Bunker "C" fuel and diesel fuel. The Installation Restoration Program Toxicology Guide, Vol. 2 (AD Little, 1987) indicates that these fuels can be represented by petroleum distillates (naphtha) for the purpose of evaluating occupational exposure potential.

- Site 14 - This area consisted of a fire fighting training area. Based on the historical information, contaminants of potential occupational health concern include a variety of hydrocarbon fuels (JP-5, JP-7, and fuel oils). As stated above, JP-5 and JP-7 can be evaluated using benzene as a governing compound; the fuel oils can be evaluated using petroleum distillates (naphtha).

- Site 15 - Building 301 and 389 - This area was used for storage of electrical equipment and hydraulic oils. Based on analytical data, PCBs were detected in surface soils at a

concentration ranging up to a maximum of 3 mg/kg. Governing compounds for evaluation of this site are PCBs and petroleum distillates (naphtha) as representative of hydraulic oils.

- Intermediate Maintenance Facility - Soils at the site of the proposed IMF were found to contain high levels of TPH, O & G, methylnaphthalene, and lead, attributed to disposal of refinery wastes and a possible oil-water separator spill. Groundwater at the northern edge of the site was found to contain TPH, O & G, benzene, phenol, fluorene, phenanthrene, and metals (barium, lead, nickel, and vanadium). The governing compounds for the evaluation of this site are lead and benzene.

Tables 1-1 and 1-2 present occupational exposure limit standards for contaminants at the 11 sites. These occupational health exposure standards include: federal and state OSHA Permissible Exposure Limits (PELs), National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limits (RELs), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), NIOSH Immediately Dangerous to Life or Health (IDLH) concentrations, lower and upper explosive limits, ionization potentials, and routes and symptoms of exposure. JMM will be using the lowest occupational health exposure concentrations (whether they be federal or California OSHA, NIOSH RELs, ACGIH TLVs, and NIOSH IDLH concentrations) to protect JMM field team members.

- PELs are established by federal or state OSHA. PELs may be expressed as an 8-hour Time Weighted Average (TWA), short-term exposure limit (STEL), or as a ceiling limit. Ceiling limits may not be exceeded at any time during a working day. PELs are enforceable by law.

- RELs are developed by NIOSH RELs are published guidelines that recommend employee exposure limits for airborne contaminants. RELs are expressed as a TWA or Ceiling Limit.

- The ACGIH TWA-TLV is defined as the airborne concentration of a substance to which nearly all workers (8 hours/day, 40 hours/week) may be repeatedly exposed, day after day, without experiencing adverse health effects.

- For some substances, the overall exposure to a substance is intensified by being absorbed by the skin, mucous membrane or eyes, either by airborne, or more particularly, by direct contact with the substance. These substances are identified by a notation(s) following the TLV-TWA values. Other substances have a ceiling value (c); this concentration should not be exceeded during any part of the working day.

- IDLH values are defined as conditions that pose an immediate threat to life or health, or conditions that pose an immediate threat of severe exposure to contaminants, such as the contaminants at ANAS RI/FS sites, which are likely to have adverse cumulative or delayed effects on health. Two factors are considered when establishing IDLH concentrations:

ALAMEDA NAVAL WEAPONS STATION
OCCUPATIONAL HEALTH EXPOSURE GUIDELINES - VOLATILE ORGANICS
(Sheet 1 of 3)

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]
Volatile Organics								
Methyl ethyl ketone	200	200	200	200	200	9.54	INH, ING CON	Irrit eyes, nose; head dizz; vomit
Benzene	1	1	0.1(Ca)[g]	10(A2)[f]	Ca[g]	9.24	INH, ABS,	Irrit eyes, nose, resp sys; giddiness; head, nau, staggered
Carbon Tetrachloride	2	2(S)[c]	2(STEL)[h](Ca)[g]	5(A2)[b](S)[g]	Ca[g] [300]	11.47	INH, ABS ING, CON	CNS depres; nau, vomit; liver, kidney damage; skin irrit; [carc].
Ethylbenzene	100	100	100	100	2,000	8.76	INH, ING, CON	Irrit eyes, muc memb; head; derm; narco, coma.
Methylene Chloride	500	100	Ca[g]	50(A2)[f]	Ca[g] [5,000]	11.35	INH, ING, CON	Ftg, weak, sleepiness, light-headed; limbs numb, tingle; nau; irrit eyes, skin; [carc].
Toluene	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)[e]	350	1,000	11.00	INH, ING, CON	Head, lass, CNS depressant, poor equilibrium, irrit eyes, derm; card arrhy.
Trichloroethene	50	25	25(Ca)[g]	50	Ca[g] [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	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.

ALAMEDA NAVAL WEAPONS STATION
OCCUPATIONAL HEALTH EXPOSURE GUIDELINES - VOLATILE ORGANICS
(Sheet 2 of 3)

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	See benzene, toluene, xylene, and benzo(a) pyrene						INH, ING CON	Head; nausea; CNS depress, anes; pulm irrit, edema; kidney, liver damage.
Gasoline	See benzene, ethylbenzene, toluene, and xylenes							
Hydraulic Fluid/Motor Oils	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.

ALAMEDA NAVAL WEAPONS STATION
OCCUPATIONAL HEALTH EXPOSURE GUIDELINES - VOLATILE ORGANICS
(Sheet 3 of 3)

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]
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	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

TABLE 1-2

ALAMEDA NAVAL WEAPONS STATION
OCCUPATIONAL HEALTH EXPOSURE GUIDELINES - METALS, PESTICIDES, AND PCBs
(Sheet 1 of 3)

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[g]	0.05(A2)[f] [50]	Ca[g]	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	0.05	0.05	0.1	0.15	700	INH, ING, CON	Weak, lass; insom; facial pallor; paleye, 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, ftg, weak; stomatitis, salivation; GI dist, anor, low-wgt, proteinuria; irrit eyes, skin.
Nickel	1	1	*0.015(Ca)*[g]	1	Ca[g] [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[g] [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.

TABLE 1-2

ALAMEDA NAVAL WEAPONS STATION
OCCUPATIONAL HEALTH EXPOSURE GUIDELINES - METALS, PESTICIDES, AND PCBs
(Sheet 2 of 3)

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]
Inorganics							
Chromic Acid (as Cr)	0.1(C)[g]	No PEL	0.001(Ca)	0.05	Ca[e] [30]	INH, ING, CON	Resp sys irrit, nasal septum perf; liver, kidney damage; leucyt, leupen, monocy, eosin; eye inj, conj; skin ulcer, sens derm; [carc].
Cyanide	5	5(S)[c]	4.7(C)[g]	5	50	INH, ABS, ING, CON	Asphy and death can occur; weak, head, conf; nau, vomit; incr rate resp; slow gasping resp; irrit eyes, skin.
Pesticides							
4,4'-DDT	1(S)[c]	1	0.5(Ca)[e]	1	Ca[e] [NA]	INH, ABS, ING, CON	Pares tongue, lips, face; tremor; apprehension, dizz, confusion, malaise; head; convuls; paresis hands; vomiting; irrit eyes, skin; carc.
Chlordane	0.5(S)[c]	0.5(S)[c]	0.5(S)[c](Ca[e]	0.5(S)[c]	Ca[e] [500]	INH, ABS ING, CON	Blurred vision; confusion; ataxia; delerium; cough; abdom pain, nau, vomiting, diarr; irrity, tremor, convuls; anuria.
Diazinon	0.1(S)[c]	0.1(S)[c]	0.1(S)[c]	0.1(S)[c]	NA[d]	ING, CON	Cholinesterase inhibition; weakness head, tightness in chest, blurred vision; naus, vomiting, diarr, abdom cramps; slurred speech, sweating, salivation.
Gamma-BHC (Lindane)	0.5(S)[c]	0.5(S)[c]	0.5	0.5(S)[c]	1,000	INH, ABS, ING, CON	Irrit eyes, nose, throat; head; naus; clonic convuls; resp difficulty; cyan; aplastic anemia; skin irrit; musc spasm.
Malathion	10(S)[c][k]	10(S)[c]	10(S)[c]	10(S)[c]	5,000 mg/m^3	INH, ABS, ING, CON	Miosis, aching eyes, blurred vision, lac; eye, skin irrit; salv; anor, nau, vomit, abdom cramps, diarr, gidd, conf, ataxia; rhin, head; tight chest, wheez, lar spasm.
Herbicides							
Bromacil	10	10	10	11	NA[d]	ING, CON	Mild eye irritant
Chlorvar	No PEL	No PEL	No REL	No TLV	NA[d]	CON	
2,4-D	10	10	10	No TLV	500	INH, ABS, ING, CON	Weak, stupor; hyporeflexia; musc twitch, convuls; derm
Diuron	10	10	10	10	NA[d]	CON	Eye, nose, throat, skin irrit.

TABLE 1-2

ALAMEDA NAVAL WEAPONS STATION
OCCUPATIONAL HEALTH EXPOSURE GUIDELINES - METALS, PESTICIDES, AND PCBs
(Sheet 3 of 3)

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]
Krovar I	See bromacil and diuron					CON	Irritate eyes, nose, and throat.
Princep (Simazine)	No PEL	No PEL	No REL	No TLV	NA[d]	CON	Irritate eyes, skin.
Roundup (glyphoshate)	No PEL	No PEL	No REL	No TLV	NA[d]	CON	Irritate eyes, skin.
Telvar	No PEL	No PEL	No REL	No TLV	NA[d]	CON	Irritate eyes, nose, throat, skin.
PCBs							
Arochlor - 1260 Chlorodiphenyl (42% chlorine)	1(S)[c]	No PEL	0.001(Ca)[g]	1(S)[c]	Ca[g] [10]	INH, ABS ING, CON	Irrit eyes; cloracne; liver damage; [carc].
Arochlor - 1254	0.5(S)[c]	No PEL	0.001(Ca)[g]	0.5(S)[c]	Ca[g] [5]	INH, ABS ING, CON	Irrit eyes, skin; acne-form derm; [carc].

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

[b] NIOSH abbreviations: abdom (abdominal); anes (anesthesia); anor (anorexia); anos (anosmia); 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); dysp (dyspnea); ftg (fatigue); GI (gastrointestinal); head (headache); hema (hematuria); inco (incoordination); insom (insomnia); irrit (irritation); irrity (irritability); lass (lassitude); low-wgt (low-weight); muc memb (mucous membranes); musc (muscle) narco (narcosis); nau (nausea); ner (nervousness); pares (parethesia); 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 carcinogen.

[h] Respired Fraction

[i] 10-minute STEL

[j] As CrO_3

1. The worker must be able to escape without losing his or her life or suffering permanent health damage within 30 minutes. Thirty minutes is considered by OSHA as the maximum PEL time for escape.

2. The worker must be able to escape without severe eye or respiratory irritation or other reactions that could inhibit escape. If the concentration is above the IDLH levels, only a highly reliable breathing apparatus, such as pressure-demand self-contained breathing apparatus (SCBA), is allowed. Since the IDLH limits are conservative, any approved respirator may be used up to this limit as long as its maximum use concentration, or the limitations on the air-purifying element, are not exceeded.

- When certain proportions of combustible vapors are mixed with air and a source of ignition is present, explosion can occur. The range of concentrations over which this will occur is called the explosive or flammable range. This range includes all concentrations in which a flash will occur or a flame will travel if the mixture is ignited. The lowest percentage at which this occurs is the lower explosive limit (LEL), and the highest percentage is the upper explosive limit (UEL). Mixtures below the LEL are too lean to ignite, and mixtures above the LEL are too rich. (Care must be taken, however, when a mixture is too rich, because dilution with fresh air could bring the mixture into the flammable or explosive range.)

Table 1-3 presents odor thresholds, odor characteristics, and vapor pressures for solvents disposed at ANAS. Odor threshold information is extremely important especially when wearing air purifying respirators (APRs). This information would enable a JMM field team member to recognize chemical cartridge saturation within his/her APR, or a faulty face piece seal and evacuate the exclusion zone. Odor threshold information is also important when chemicals have a low odor threshold as field team members could detect contaminants before a photoionization detector (PID) would be able to detect the concentration. Odor threshold information is a component of conducting a Health Hazard Assessment, as discussed in Section 6.0.

1.3.2 Physical Hazards

Physical hazards are anticipated during RI/FS activities at ANAS. These hazards include heat stress, noise, mechanical irritation, working around heavy equipment, and working at sites where potential obstacles and/or wet conditions could cause slipping, tripping, and falling. Vehicle traffic on base surface streets and base underground utilities will receive top priority to control these exposures. NO CONFINED SPACE ENTRIES ARE ANTICIPATED DURING THE RI/FS ACTIVITIES AT ANAS. The control measures to be instituted for these physical hazards include the following techniques:

ALAMEDA NAVAL WEAPONS STATION
ODOR THRESHOLDS AND ODOR DESCRIPTIONS

Site Contaminant	Odor Threshold: Range of Acceptable Values (ppm)[a]	Odor Threshold: Range of all Referenced Values (ppm)[a]	Description of Odor[a]
Volatile Organics			
Benzene	34-119	0.78-160	Sweet, solventy
Carbon Tetrachloride	140-584	1.6-706	Sweet/dry cleaner
Ethylbenzene	None	0.092-0.60	Oily, solvent
Methylene Chloride	--[b]	1.2-440	Sweet
Methylethylketone (2-Butanone)	5.4-55	0.25-85	Sweet, sharp
PD-680 (Stoddard solvent)	NA	5.2500-157.5000[c]	Kerosene-like
Toluene	1.9-69	0-21-69	Sour, burnt
1,1,1-Trichloroethane	--[b]	16-714	Sweet/etherish
Trichloroethene	--[b]	0.5-167	Ether/solvent
Trichlorofluoromethane	NA	28.0000-1170.4000[c]	Sweet
Xylenes	--[b]	0.12-21	Sweet
Base/Neutral/Acid Extractables			
2-Methylnaphthalene	NA	0.0581-0.2905[c]	
Naphthalene	--[b]	0.0095-0.64	Mothballs, tar, creosote
Phenol	--[b]	0.0045-1	Medicinal, acid, creosote
Pesticides			
Chlordane	NA	0.0084-0.0419[c]	NA
DDT	73.5	73.5	Solventy

[a] From AIHA, 1989, unless otherwise noted.

[b] Only one acceptable value; therefore, range not reported in AIHA, 1990.

[c] From Ruth, 1986.

NA - Not applicable (no recommendation applies)

- Heat stress will be controlled using the techniques described in Section 6.4.

- Noise will be controlled by monitoring, using a sound level meter or dosimeter, as described in Section 6.5. All JMM field team members will be required to wear hearing protection during all drilling activities.

- Good housekeeping practices will be an integral part of the JMM OSO responsibilities described in Section 2.9, to prevent slipping, tripping, and falling hazards.

- Underground Service Alert (USA) utility service and ANAS facilities department will be used to mark underground utilities before intrusive activities are allowed. No drilling will be allowed within 5 feet of marked underground utilities.

- Drill Rig Safety: Before raising the drill rig mast in the vicinity of electrical power lines, the operator will walk completely around the drill rig to determine the distance of the rig to the nearest power line when the mast is raised (this distance must be equal to or greater than 20 feet). Voltage greater than 370 to 550 kilovolts will require a minimum distance of 30 feet. Voltage greater than 550 kilovolts will require a minimum distance of 45 feet. Any questions regarding the appropriateness of a drilling location will be brought to the attention of the JMM OSO or JMM PHSC.

- Before drilling, the location must be adequately cleaned and leveled to accommodate the drill rig.

- Suitable storage for all tools, materials, and supplies will be provided. Pipe, drill rods, casings, augers, and similar drilling tools will be arranged to prevent rolling, spreading, or sliding by using chocks.

- Work areas and drilling platforms will be kept free of materials, obstructions and substances that could cause a surface to become slick or otherwise hazardous.

- Before raising the mast, all drill rig personnel (with the exception of the operator) and field staff will be cleared from the area immediately to the rear and the sides of the mast. All drill rig personnel and other field staff must be informed that the mast is being raised prior to raising it.

- Before the mast of a drill rig is raised and drilling is commenced, the drill rig must be first leveled and stabilized with leveling jacks or solid cribbing. The drill rig should be releveled if settling occurs after initial set-up. The mast will be lowered only when the leveling jacks are down and the leveling jack pads will not be raised until the mast is lowered completely.

- Augers will be used in accordance with the manufacturer's recommended methods for securing the auger to the power coupling. Additionally, the operator and tool handler will be responsible for establishing safe procedures for drilling, auger connection and disconnection, and auger fork insertion and removal.

- Augers will only be cleaned when the drill rig is in neutral and the auger has ceased to rotate.

- Unattended boreholes must be properly covered or otherwise protected.

1.3.3 Levels of Personal Protection

Initial site work at the ANAS RI/FS sites will be conducted in either Level C (Navy CLEAN Health and Safety Program default) or Level D personal protective equipment (PPE) depending upon the availability of analytical data and/or adequate site historical information. Analytical data are only available for two of the ANAS Sites (Site 15 and the IMF Site). Historical data are available to develop governing compounds for several of the remaining sites (Sites 6, 7, 11, 12, and 14). For those sites without analytical data or solid historical use/disposal information, the Navy CLEAN Health and Safety Program default conditions will apply (i.e., Level C - full-face air purifying respirator protection for initial entry). Section 6.2 provides information regarding action levels for all site activities.

1.3.4 Project Personnel Requirements

JMM will have between five and nine field team members at ANAS during the field program to oversee all site activities. They will consist of a field team leader (FTL), a JMM OSO, and several geologists and environmental technicians. Subcontractors will perform site tasks, which include:

- Visual inspections
- Land surveying
- Soil gas survey
- Surface geophysics
- Soil borings
- Shallow soil sampling
- Monitoring well installation
- Groundwater sampling

Additional non-JMM personnel will come to ANAS during the course of the project to drop off supplies such as drums, Baker Tanks, roll off bins, and drilling materials. Delivery personnel will not be allowed to enter site contamination reduction or exclusion zones unless they meet the training requirements (Section 3.0) and medical surveillance requirements (Section 4.0) specified in this HSP.

1.4 RISK PREVENTION

Risk prevention procedures are incorporated into this HSP as a part of the overall field sampling program to prevent and minimize accidents.

1.4.1 Risk Prevention Plan

This plan is a component of the HSP to meet OSHA requirements and to assure a safe and healthy working environment. The JMM OSO will be responsible for implementing these established procedures and all JMM field team members will be responsible and held accountable for reading, understanding, and following these guidelines.

- The JMM OSO will be responsible for maintaining the housekeeping program throughout the entire duration of the ANAS RI/FS program.

- The initial indoctrination of JMM field team members and site-specific safety training will be accomplished during the training session conducted by the JMM PHSC. JMM field team members will receive a site orientation. They must review the HSP and sign the Personal Acknowledgement form (Appendix A) prior to initiating RI/FS activities.

- A tailgate safety meeting will be conducted daily to discuss pertinent site safety topics at the beginning of each shift, whenever new personnel arrive at the job site, or as site conditions change. These meetings will be conducted by the JMM OSO or JMM PHSC. The minutes of these meetings must be posted at each jobsite and a copy maintained in the JMM project files. An example of the ANAS Tailgate Safety Meeting form is found in Appendix B.

- The JMM OSO will be the lead person in all emergency situations. Emergency phone numbers (fire, security, ambulance service, and emergency clinic or hospital) will be posted at each jobsite by the JMM OSO. These ANAS emergency telephone numbers for on-base and off-base services are found in Appendix C. The emergency response plan is contained in Section 10.0.

- The JMM OSO will document instances of noncompliance with either ANAS Safety Rules or this HSP, and follow up on "near miss" incidents and rectify any noted safety problems. An incident is defined as any observable human activity sufficiently complete in itself to permit references and predictions to be made about the person performing the activity. Some examples of near miss incidents include:

  - Cleaning a machine or removing a part while the machine is in operation.
  - Wearing loose clothing around machine tools.
  - Handling hot objects with unprotected hands.

  (Accident Prevention Manual for Industrial Operations; Administration and Programs, Ninth Edition, National Safety Council, 1988.)

- To avoid drilling into underground power cables or other utilities, the Underground Service Alert (USA) telephone service will be consulted prior to drilling at a site. Standard drilling procedures forbid drilling within 5 feet of marked underground utilities or within 20 feet of overhead electrical hazards.

- In the event of an accident, the OSO will immediately notify the JMM PHSC and the ANAS Safety Officer [(415) 869-3173], complete an accident report (Appendix D), and

investigate the cause. Any recommended hazard control must be discussed with the PHSC and meet his/her approval, prior to implementation. Any chemical exposures or occupational injuries and illnesses will also be reported to the PHSC and recorded, if recordable (medical and lost time cases), on a OSHA Form No. 200. Any incident resulting in a fatality, a lost time injury, five or more persons hospitalized or damage to government or contractor property (occurring during the performance of the contract at the project site) in excess of $1,000, will also be reported. Records of all site accidents and first-aid treatments will be maintained by the OSO. Additionally, records of recordable workplace injuries and illnesses will be maintained at PRC and JMM offices for at least five years, as required by OSHA. Incident reports will be prepared for "near misses" and minor injuries not requiring medical evaluation. These reports will be retained by the JMM PHSM and PRC HSPM.

- All site sampling locations will be outlined using surveyor tape; the site exit/entry point will be established upwind of site operations. All atmospheric monitoring will follow the procedures established in Section 6.1. Soil brought to the surface will be monitored, using a photoionization detector (PID), for the presence of organic vapors.

- In the event of an injury or illness (but not a first-aid case) the JMM OSO will provide first-aid treatment or cardio-pulmonary resuscitation (CPR), stabilize the injured JMM field team member, and transport the individual to the designated emergency medical facilities either by ambulance or JMM field vehicle. After completing these tasks, the JMM OSO will immediately notify the JMM PHSC who will then immediately notify the PRC HSPM. The JMM OSO will then complete an accident investigation report for submittal to the JMM PHSC, along with any recommendations for future action. The JMM PHSC, in consultation with the other PRC and JMM health and safety personnel, will then develop hazard control measures to prevent similar events from recurring. Field activities will not resume until these control measures have been implemented.

1.4.2 Activity Hazard Analysis

The field sampling activities, identified in Section 1.2, consist of visual inspection, land surveying, soil gas, surface geophysics, shallow soil sampling, soil borings, monitoring well installation, and groundwater sampling. The potential hazards of these sampling activities, and the control measures to be implemented to minimize or eliminate them, are discussed below.

1.4.2.1 Visual Inspection and Land Surveying. These non-invasive tasks are not expected to present a chemical exposure potential. The major hazard associated with these activities is the potential for heat stress, or slip, trip, or fall.

1.4.2.2 Geophysical Surveys. Chemical exposure hazards associated with the geophysical surveys are expected to be minimal. The major physical hazard is the potential for heat stress (Section 6.3).

1.4.2.3 Soil Gas Survey. Chemical exposure hazards associated with the soil gas surveys are expected to be minimal. The major physical hazard is the potential for heat stress (Section 6.3).

1.4.2.4 Shallow Soil Sampling. This activity will involve coring of concrete and collection of underlying soils. The potential exists for heat stress, chemical exposure, and noise exposure. Personnel will wear suitable respiratory protection when collecting surface soil samples. Hearing protection will be worn by personnel performing the concrete coring work.

1.4.2.5 Soil Borings and Sample Collection. Potential hazards include exposure to organic vapors, skin contact with organic or inorganic contaminants, heat stress, and noise. The site will be monitored for organic vapors/gases as stated in Section 6.1 to minimize exposure hazards prior to conducting RI/FS activities. Chemical-resistant gloves will be used when handling contaminated soils. If necessary, the sites will be evacuated (as per Section 10.0) or the levels of protection will be altered (upgraded or downgraded) at each worksite, as described in Section 6.2. Equipment to suppress airborne particulates/vapors will be available. Protective clothing (see Sections 5.1 and 5.2) will be utilized to minimize potential skin contact with contaminants. Heat stress will be monitored, depending upon ambient conditions.

At Site 4 (Building 360) twenty of the borings will be placed inside the building. Many of these will be located adjacent to former plating tanks within trenches up to 4 feet deep. This operation increases the potential for skin/eye contact with corrosive material and also enhances the possibility of inhalation exposure. For these borings, personnel will be required to don a different type of protective clothing for splash protection (PVC or butyl suits, gloves, and eyewear). Additionally, organic vapor/acid gas/High Efficiency Particulate Air (HEPA) cartridges will be used for respiratory protection during these activities. This distinction in Level C protection is further detailed in Section 5.1. Due to the extremely low soil pH encountered during previous work at the IMF Site, similar precautions will be taken during invasive activities at that site.

1.4.2.6 Monitoring Well Installation and Groundwater Sampling. The same potential hazards and control measures exist as described for soil borings.

1.4.2.7 Utilities. As stated in Section 1.4.1, Underground Service Alert will be utilized. No drilling will be allowed within 5 feet of marked underground utilities or within 20 feet of overhead electrical hazards. The following safety provisions will be adhered to by the drill rig operator:

- Before raising the drill rig mast in the vicinity of electrical power lines, the operator will walk completely around the drill rig to determine the distance of the rig to the nearest power line when the mast is raised (this distance must be greater than 20 feet). Any questions regarding the appropriateness of a drilling location will be brought to the attention of the JMM OSO.

- Before drilling, the location must be adequately cleared and leveled to accommodate the drill rig.

- Suitable storage for all tools, materials, and supplies will be provided. Pipe, drill rods, casings, augers, and similar drilling tools will be arranged to prevent rolling, spreading, or sliding by using chocks.

- Work areas and drilling platforms will be kept free of materials, obstructions, and substances that could cause a surface to become slick or otherwise hazardous.

- Before raising the mast (derrick), all drill rig personnel (with the exception of the operator) and field staff will be cleared from the area immediately to the rear and the sides of the mast. All drill rig personnel and other field staff will be informed that the mast is being raised prior to raising it.

- Before the mast (derrick) of a drill rig is raised and drilling is commenced, the drill rig will be first leveled and stabilized with leveling jacks or solid cribbing. The drill rig will be releveled if it settles after initial set-up. The mast (derrick) will be lowered only when the leveling jacks are down and the leveling jack pads will not be raised until the mast (derrick) is lowered completely.

- Augers will be used in accordance with the manufacturer's recommended methods for securing the auger to the power coupling. Additionally, the operator and tool handler will be responsible for establishing safe procedures for drilling, auger connection and disconnection, and auger fork insertion and removal.

- Augers will only be cleaned when the drill rig is in neutral and the auger has ceased to rotate.

- Unattended boreholes must be properly covered or otherwise protected.

2.0 ASSIGNMENT OF RESPONSIBILITIES

Individuals with varying degrees of organizational responsibility for health and safety activities during the Alameda NAS RI/FS include:

- Navy Lead Engineer-in-Charge (EIC)
- PRC CLEAN Program Manager (PRC CPRM)
- PRC CLEAN Health and Safety Program Manager (HSPM)
- JMM CLEAN Program Manager (JMM CPRM)
- JMM Program Health and Safety Manager (PHSM)
- PRC Project Manager (PRC PM)
- JMM Project Manager (JMM PM)
- JMM Project Health and Safety Coordinator (PHSC)
- On-site Safety Officer (OSO)
- JMM Field Staff
- Site Visitors (Non-JMM)
- Subcontractor Staff

In addition to the above, senior PRC personnel (Vice-President and Corporate Health and Safety Director) will provide high-level oversight and direction as needed. Figure 2-1 shows the project team organization as it relates to health and safety issues. The responsibilities of each of the individuals listed above are presented in the following sections.

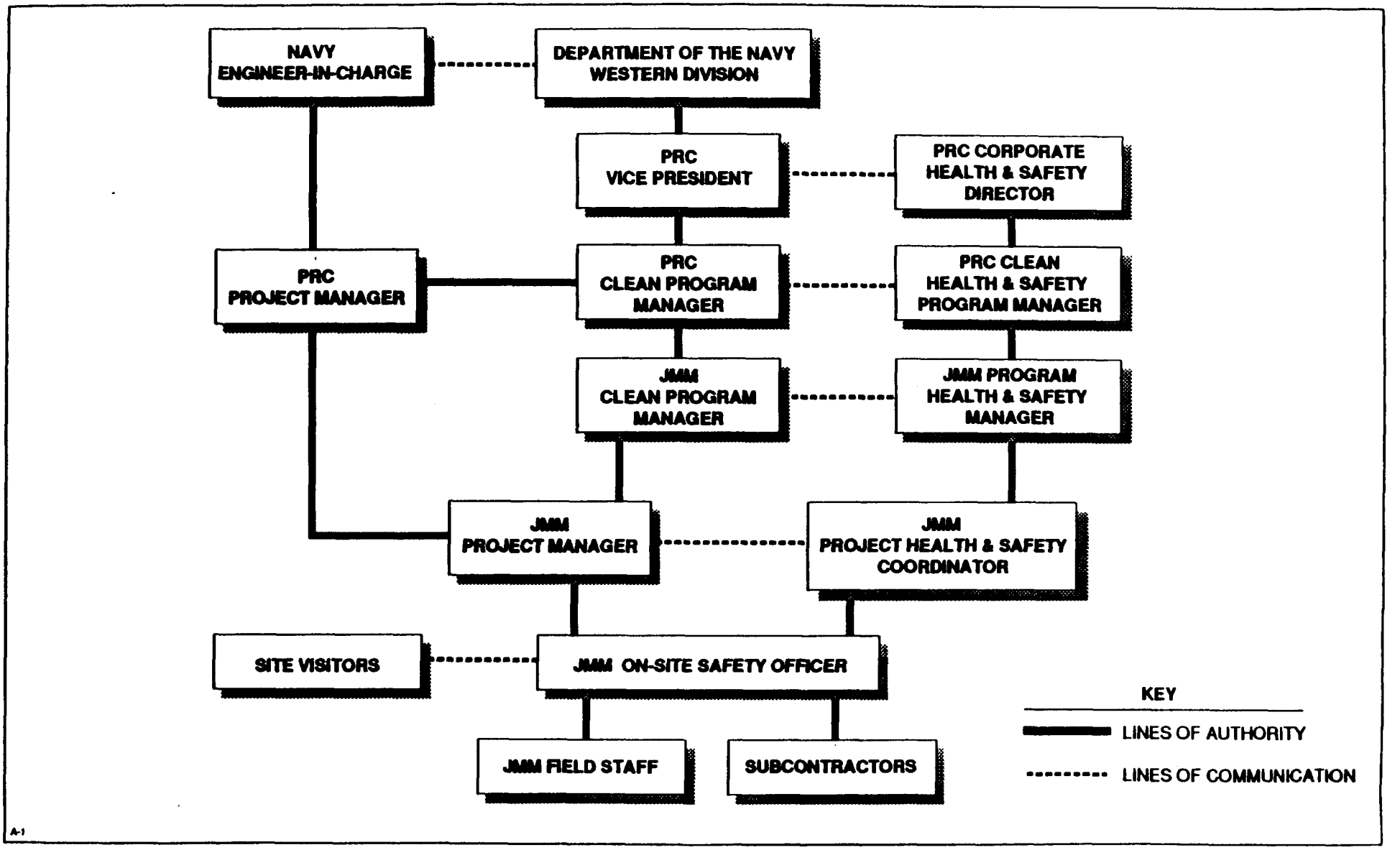
2.1 NAVY LEAD ENGINEER-IN-CHARGE

The EIC is responsible for the following:

- Providing logistical assistance.
- Specifying sites requiring investigation.
- Reviewing all results and recommendations and providing management and technical oversight.
- Ensuring proper review and distribution of all documents.
- Communicating comments from technical reviewers to contractors.
- Ensuring that contractors address all comments and take appropriate corrective actions.

2.2 PRC CLEAN PROGRAM MANAGER

The PRC CLEAN Program Manager (CPRM) is responsible for and has authority over all work performed by PRC personnel assigned to the Navy CLEAN program. He establishes program policies and procedures, monitors costs and performances, and resolves conflicts and problems in the Navy CLEAN Health and Safety Program, principally through the PRC HSPM. The CPRM monitors the CLEAN Health and Safety Program Manager's actions and may request him or her to provide information on specific questions. The CPRM may delegate authority, as appropriate.



HEALTH AND SAFETY ORGANIZATION CHART
ALAMEDA NAVAL AIR STATION RI/FS

FIGURE 2-1

2.3 PRC CLEAN HEALTH AND SAFETY PROGRAM MANAGER

The PRC HSPM is responsible for developing, establishing, and coordinating the implementation of health and safety policies and procedures for the Navy CLEAN Health and Safety Program on all site-specific projects. The HSPM also coordinates and supervises the required health and safety training of PRC personnel and monitors PRC's medical surveillance program. The responsibilities of the HSPM, or other qualified person designated by the CPRM, include:

- Keeping JMM management and the JMM PHSC informed on the status of the Navy CLEAN Health and Safety Program.
- Participating in audits to evaluate compliance with site-specific HSP and the Navy CLEAN Health and Safety Program.
- Reviewing the JMM HSP for technical accuracy, compliance with the Navy CLEAN Health and Safety Program, and contractual requirements.
- Developing, implementing, and assessing the needs of the Navy CLEAN Health and Safety Program and keeping JMM informed of changes that occur within this program.
- Providing consultation to JMM on health and safety policy and procedural issues as they relate to the Navy CLEAN Health and Safety Program.

2.4 JMM CLEAN PROGRAM MANAGER

The JMM CLEAN Program Manager is responsible for the following activities:

- Ensuring that all JMM contract requirements are met.
- Providing necessary resources to the JMM project team to allow adequate response to all requirements of the investigation.
- Maintaining consistency in JMM procedures and work products with respect to other task orders.
- Establishing and maintaining communication between the Navy EIC, PRC program and project personnel, and JMM program and project personnel.
- Providing technical oversight and reviewing the final project report(s).
- Giving guidance to the JMM PM as needed.

2.5 JMM PROGRAM HEALTH AND SAFETY MANAGER

The JMM Program Health and Safety Manager (PHSM) is responsible for developing health and safety standards, implementing health and safety policies, and providing consultation to JMM management and the JMM PHSC, in keeping with the Navy CLEAN Health and Safety Program. The JMM PHSM's responsibilities include:

- Keeping JMM management and the JMM PHSC informed on the status of the Navy CLEAN Health and Safety Program.
- Providing consultation on health and safety policy and procedural issues.
- Ensuring that medical monitoring, incident reporting and recordkeeping meet all federal and state regulatory requirements.
- Developing, implementing, and maintaining employee training programs.
- Reviewing and approving a site-specific HSP.
- Ensuring that site-specific HSP meets the requirements of the Navy CLEAN Health and Safety Program.
- Participating in audits to evaluate compliance with the site-specific HSP and the Navy CLEAN Health and Safety Program.
- Participating in professional organizations to obtain and exchange information to keep the program current.
- Monitoring state and federal requirements to maintain program at a current status.
- Utilizing federal and state labor departments to obtain the latest information pertaining to occupational health and safety.

2.6 PRC PROJECT MANAGER

The PRC Project Manager (PM), with the assistance of the PRC HSPM, is responsible for ensuring that JMM has established appropriate procedures for the safety of field personnel and for managing the risks associated with equipment and facilities used during the ANAS investigation. These procedures include:

- Ensuring the JMM PM and FTL provide for the safe operation of facilities, equipment, and vehicles under their control during a project.
- Participating in the completion of investigations and corrective action reports.
- Reviewing project-specific health and safety plans, in consultation with the PRC HSPM.

- If necessary, specifying and enforcing project rules and procedures for the safe performance of the project team's work.

- Ensuring JMM personnel take prudent measures to reduce hazards or to correct unsafe conditions or actions when made aware of such unsafe work conditions.

2.7 JMM PROJECT MANAGER

The JMM Project Manager is responsible for oversight of all RI activities. The management of daily field activities and the risks associated with equipment, facilities and personnel and subcontractors, as performed by the FTL, is the responsibility of the JMM PM. The PM is specifically responsible for:

- Participating in accident investigations and having responsibility for implementing corrective actions.

- Reviewing and providing input on the HSP, in conjunction with the JMM PHSM, PHSC, and OSO.

- Implementing project health and safety policies and procedures.

- Recognizing and implementing corrective measures when unsafe acts or conditions could create an unsafe or potentially unsafe work condition.

- Designating the FTL and OSO for the ANAS project and overseeing coordination of the RI field activities.

- Coordinating and scheduling health and safety activities for project personnel.

2.8 JMM PROJECT HEALTH AND SAFETY COORDINATOR

The JMM Project Health and Safety Coordinator (PHSC) is responsible for developing, instituting, coordinating, and supervising the ANAS health and safety program. The responsibilities of the JMM PHSC include:

- Preparing a site-specific HSP.

- Providing assistance to the JMM PHSM for health and safety program development, preparing training sessions, conducting accident investigations and providing recommendations to prevent future occurrences.

- Ensuring that the site-specific HSP complies with all federal, state, and local health requirements.

- Coordinating with the OSO on all modifications to the HSP and being available for consultation, when required.

- Preparing materials to be used in the training program and ensuring that the OSO is knowledgeable in all components of the HSP.
- Conducting periodic on-site visits to verify that site personnel adhere to the site safety requirements.
- Establishing and maintaining communication between the OSO, JMM PM, and JMM PHSM.
- Providing guidance on appropriate corrective action procedures to the JMM PM and support personnel.

2.9 JMM ON-SITE SAFETY OFFICER

The JMM OSO is responsible for field implementation of the HSP, and he/she has the authority to correct and change site control measures and the required health and safety protection. The OSO has primary on-site enforcement authority, as delegated by the JMM PM, for the policies and provisions of the Navy CLEAN Health and Safety Program and the ANAS HSP.

In addition, subcontractors shall designate a qualified person to serve as a Health and Safety representative concerning the activities of their own employees. The subcontractor has overall responsibility for enforcement of the HSP concerning their own personnel and operations. The subcontractor Health and Safety representative will follow the guidance and direction of the OSO.

The OSO's responsibilities include:

- Serving as the initial contact for all site-specific health and safety activities.
- Assisting the JMM PM in documenting compliance with the Navy CLEAN Health and Safety Program and site-specific HSP.
- Obtaining documentation from all field personnel that they have received the required medical and training certification.
- Enforcing written medical restrictions concerning JMM employees.
- Conducting briefing sessions and tailgate safety meetings for all JMM and subcontractor personnel on site-specific hazards, emergency procedures, and symptoms associated with exposure.
- Documenting health and safety briefings, meetings, and training conducted in the field.
- Determining the required EPA level of protection, based both on guidance given in the site-specific HSP and on actual on-site circumstances and operations.
- Assuring the proper selection, use, care, inspection, and maintenance of all personal protective equipment (PPE) prior to and during any on-site use.

- Assuring that only respirators approved by NIOSH or the U.S. Mine Safety and Health Administration (MSHA) are provided and used.

- Seeking guidance from the JMM PHSM and PM when unanticipated conditions develop, and obtaining approved site-specific HSP amendments before implementing any deviation from the site-specific HSP.

- Conducting air monitoring operations to determine the appropriate level of PPE, evaluating changes in on-site operations and necessary changes in the level of protection, and documenting the air monitoring operations and results.

- Ensuring proper operation, calibration, and storage of required health and safety monitoring equipment.

- Enforcing the "buddy system" (organizing employees into work groups such that each employee is designated to be observed by at least one other employee in the work group) for all on-site work and, when required by the site-specific HSP, for designated off-site work.

- Establishing, enforcing, and documenting decontamination operations for personnel and sampling equipment, sample containers, and heavy equipment.

- Suspending any operation that threatens the health or safety of team members or the surrounding population, and immediately notifying the JMM PM.

- Inspecting and maintaining the first aid kit and other emergency equipment.

- Posting emergency phone number information (i.e., police, fire, ambulance, security, corporate or field office).

- Notifying the appropriate local public emergency offices, such as police and fire departments, of the nature of the field team's operations.

- Determining and posting locations and routes to medical facilities and arranging for emergency transportation to medical facilities.

- Notifying the proper response agency in the event of any emergency.

- Directing medical emergency staff to the location of an injured employee.

- Providing on-site first aid and CPR, as required.

- Assuming JMM's lead role during medical emergencies.

- Observing work party members for symptoms of heat overexposure or stress, and taking prudent measures to evaluate, reduce, or treat these symptoms.

- Coordinating with the JMM PM in preparing accident/incident reports.

- Conducting periodic safety inspections.

- Maintaining health and safety supplies and field supplies.

- Overseeing the subcontractors' field activities.

- Acting as the field liaison between subcontractors, client, and site visitors.
- Completing and coordinating incident reports such as "near misses," potential or actual losses involving individuals, property, or both, with the assistance of the JMM PM.
- Utilizing the authority to suspend field activities that could adversely affect the project, employees (including subcontractors), or surrounding community.
- Administering the respiratory protection program for field application, including qualitative fit testing, and recording the results in the field logbook.
- Maintaining and calibrating direct reading air monitoring equipment such as photoionization detector (PID), a flame ionization detector (FID), or an oxygen deficiency, combustible gas indicator (CGI), and recording the results in the field logbook.
- Maintaining and controlling the decontamination process at the project.
- Maintaining the field safety log books pertaining to daily job site evaluations, worksite activities, training and accident reporting logs.

2.10 JMM FIELD STAFF

Health and safety precautions are of paramount importance during on-site activities at all hazardous waste project sites. Despite thorough preparation, an employee may not have complete knowledge of site conditions, and it is impossible to anticipate every health and safety hazard that could arise. Therefore, the employee should use common sense, experience, and the best professional judgment at all times. The employee should notify the OSO and potentially affected fellow employees whenever a potential hazard is observed.

The employee should also consult the OSO for a pre-entry briefing to review potential hazards and safety precautions before beginning on-site work. Whenever JMM field personnel work at a hazardous waste project site, the field team is required to be fully trained and medically certified in accordance with 29 CFR 1910.120.

All field personnel are responsible for:

- Adhering to all safety guidance and work practices.
- Using safety equipment in accordance with training received and written instructions.
- Inspecting safety equipment to determine whether it is in good condition and proper working order.
- Looking for health and safety hazards and reporting them to the OSO for corrective action.
- Meeting all training and refresher training requirements and medical monitoring requirements.

- Knowing and observing any and all medical restrictions placed on their activities (such as corrective lenses or lifting limitations) and informing the PHSC of those restrictions.

- Refraining from activities that would create additional hazards during field work including smoking, eating, chewing tobacco or gum, drinking, or using cosmetics.

- Practicing reasonable health maintenance procedures - the employee shall realize that some personal habits, such as alcohol consumption, smoking, or controlled substance abuse, heighten the risks and deleterious effects resulting from exposure to contaminants and may create a hazard to the health and safety of fellow workers. Therefore, working at a hazardous waste project site while under the influence of alcohol or controlled substances is strictly forbidden.

- Reading the site-specific HSP, signing the personal acknowledgement form (Appendix A), and agreeing to comply with these requirements at the project. This must be done by each field staff employee.

- Meeting all training, re-training requirements and medical monitoring requirements.

- Utilizing the buddy system on the project.

- Using the assigned PPE correctly and maintaining the equipment properly.

- Inspecting equipment and project conditions prior to conducting each phase of work.

- Conducting and performing hazard recognition techniques and informing the OSO of potential hazards that could impact the project. Field activities should cease until corrective actions have occurred.

- Being aware of his/her physical limitations that could impact the project such as the wearing of contact lenses with a respirator, medical limitations or physical limitations (e.g., lifting of heavy objects). This information should be conveyed to the OSO.

2.11 SITE VISITORS (NON-JMM)

Occasionally, a situation will arise in which a party wishes to visit a hazardous waste site during project activities. These parties may be local, state, or federal officials, representatives of citizens groups, members of an audit group, the press, or representatives of the potentially responsible parties (PRP). In general, most visitors can be accommodated by providing a viewing area in a safe location (outside of the site boundaries) and presenting a briefing conducted by the client community relations personnel, public awareness specialists, client representative, or the project manager, at the direction of the client.

In some instances, visitors will expect access to the site. These visiting parties are usually representatives of the regulatory agencies, owner, or PRP. Approval or denial of access is the responsibility of the client, not JMM. If a visitor desires access to a site (for example, a consultant hired by the PRP wishes to conduct parallel sampling efforts), the JMM PM should notify the PRC PM and the client; then upon approval of the PRC PM and further direction from the client, the JMM PHSC, OSO, and PM will make

arrangements for such activities. These activities must not disrupt work or place JMM or subcontractor personnel at increased risk. Arrangements might include separate decontamination facilities, provisions for separate disposal of investigation-derived wastes, or constraints on the visitor's on-site work activity based on time of day, wind speed and direction, and type of activity, among others. If a workable, safe arrangement cannot be agreed upon, or if the activities of the visitor jeopardize on-site activities, the JMM PM and OSO should immediately contact the JMM PHSC, JMM PHSM, and PRC HSPM, and the client, as necessary, to rectify the situation.

JMM will not assume responsibility for any personnel whose names are not included with the authorized personnel listed in the ANAS HSP.

All visitors to a hazardous waste site controlled by JMM should be informed of regulatory requirements for medical monitoring, health and safety training, and on-site training. Visitors will be responsible for obtaining the PPE specified for access to the site. All site visitors will be escorted by the OSO or JMM PM.

Employees or consultants of the U.S. Navy, USEPA, other federal agencies or the state, the PRPs, or other interested party must be advised by the JMM PM or OSO that their entry into the site is not covered by the JMM health and safety plan and that they and their employer must assume all risks. Copies of this ANAS HSP may be provided to these personnel for information only.

2.12 SUBCONTRACTORS

All associate and professional firms (e.g., drillers, surveyors, etc.) who perform work on site under the supervision of JMM are responsible for developing their own health and safety programs. In addition, these firms are responsible for providing health and safety training to their employees and implementing a medical monitoring program. The subcontractor must provide documentation indicating compliance with the health and safety training and medical examination requirements. This documentation will be in the form of a letter or company letterhead and must be signed by an authorized representative of the company; the letter will state that the named employees have been trained and medically certified to work on hazardous waste sites and are medically approved to wear respirators. The letter should be addressed to the JMM PHSC. The date of the medical examination must be within 12 months preceding the work to be performed; otherwise, a reexamination and recertification will be required. The existence and maintenance of the appropriate certification for the duration of the subcontractor's participation in the RI/FS will be made a condition of JMM's contract with that subcontractor.

3.0 PERSONNEL TRAINING

JMM field team members inspecting, visiting, or working at uncontrolled hazardous waste sites or hazardous waste treatment, storage and disposal facilities must be trained in accordance with 29 CFR 1910.120 (Hazardous Waste Operations and Emergency Response). These requirements include initial training as well as project site-specific training. JMM field team members will have received the initial and site-specific health and safety training prior to conducting the RI/FS at ANAS. 29 CFR 1910.120 categorizes workers as either:

(1) A general site worker, defined as equipment operators, general laborers and supervisory personnel engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards; or

(2) An occasional site worker, defined as workers on site only occasionally for a specific limited task such as, but not limited to, groundwater monitoring, land surveying, or geophysical surveying and who are unlikely to be exposed over permissible exposure limits and published exposure limits.

Individuals meeting the general site worker requirements will receive 40 hours of off-site training, three days of on-the-job field training and 8 hours of annual "refresher" training. Individuals acting in a supervisory capacity will need an additional 8 hours of training on managing health and safety concerns at hazardous waste sites. Individuals meeting the occasional site worker requirements will receive 24 hours of off-site training, one day of on-the-job field training and 8 hours of annual "refresher" training.

The JMM OSO will assure that all JMM field team members have received the required training prior to working on-site. This training program will include these components:

- HSP Review
- Hazard Recognition
- Review of Potential Site Contaminants
- Site Physical Hazards
- Protective Equipment Requirements (EPA Level D and C)
- Decontamination Procedures
- Site Control Measures
- Emergency Action/Assistance
- Site Safety Rules/Standard Operating Procedures

Each JMM field team member must sign and date a Personal Acknowledgement form (Appendix A) stating that he/she has read and understood the HSP and attended the requisite training.

All JMM field team members, including JMM subcontractor employees, will attend the JMM tailgate safety meetings. This will ensure that all JMM and subcontractor field team members receive the same information related to specific hazards associated with the project, any changes in site conditions or activities, and information on physical changes that would require changing EPA levels of protection. The JMM OSO or JMM PHSC will conduct the tailgate safety meetings on a daily basis, or more frequently if job site conditions change.

4.0 MEDICAL SURVEILLANCE PROGRAM

The JMM PHSM is responsible for administering the medical surveillance program composed of baseline, annual, special, and exit physicals. Baseline medical surveillance data are important since they provide a picture of pre-existing health condition(s). All medical examinations will be conducted by a qualified physician under the guidance of a Board Certified Occupational Health Physician.

All on-site personnel that will be assigned to ANAS will be participating in a Medical Surveillance Program. All JMM subcontractor personnel will also be participating in a medical surveillance program. The baseline physical/medical examination is described in Appendix E. Basic components include:

- Occupational history
- Medical history
- Physical examination
- Laboratory tests
- Pulmonary function tests
- Chest X-ray
- Vision and hearing testings

5.0 PERSONAL PROTECTIVE EQUIPMENT

Based upon site histories, the collected analytical data, and an evaluation of the locations for planned ANAS RI invasive field activities, it is possible to assess the necessary initial level of personal protection for activities at each of the 11 specific sites. In those cases where no data are available, the "default" Navy CLEAN Health and Safety Program initial level of personal protective equipment (Level C) and action levels will apply. For those sites where data are available, alternative initial levels of personal protective equipment and action levels are established. Initial levels of PPE, by site and task are presented in Table 5-1. Justifications for alternative action levels are presented in Table 6-1.

5.1 EPA LEVEL C PERSONAL PROTECTIVE EQUIPMENT

In EPA Level C, JMM field team members and subcontractor personnel working in a contamination reduction zone (CRZ) or exclusion zone will wear, at a minimum, the following prescribed equipment:

- Full-face or half-face air purifying respirators, NIOSH/MSHA approved, dual cartridges consisting of organic vapor/HEPA filters for all sites except Site 4 and the IMF Site. At these sites organic vapor/acid gas/HEPA cartridges will be used.
- Coveralls, disposable chemical resistant (polyethylene coated Tyvek), except for soil boring activities at Site 4 and the IMF Site.
- Boots, chemical resistant, steel toe, meeting ANSI standard Z41-1983, Safety-Toe Footwear, Classification 75 (Leather boots with chemical-resistant overboots are optional).
- Hardhat meeting ANSI standard Z89.1-1986, Class A, B, and C.
- Gloves, chemical-resistant (nitrile) as the outer protection level, and butyl as the inner glove.
- Hearing protection that has a Noise Reduction Rating (NRR) of at least 28 and meets ANSI Standard S3.19-R1979, "Method for the Measurement of Real Ear Protection and Physical Attenuation of Earmuffs."

As discussed in Section 1.4.2.5, a specific corrosivity hazard may exist while placing borings at Site 4 and the IMF Site. Based on permeation characteristics, either butyl or PVC suits and gloves will be required by staff performing this work. Additionally, either splash shields or full-face air purifying respirator equipment must be used during all such invasive activity at Site 4. Full-face respirators will be used at the IMF Site, as discussed in Section 6.2.2.

TABLE 5-1

INITIAL LEVEL OF PERSONAL PROTECTION FOR THE RI PROGRAM AT ALAMEDA NAVAL AIR STATION

Site	Known/Suspected Contaminants of Occupational Health Concern	Investigation Activities	Initial Level Personal Protection[a]
4	Metals, Cyanide, 1,1,1-TCA	Visual Inspection	D
		Land Survey	D
		Geophysics	D
		Concrete Coring/Soil Borings	C
		MW Sampling	C
5	Metals, Cyanide, Phenol, Methylene Chloride	Geophysics	D
		Concrete Coring/Soil Borings	C
		MW Installation/Sampling	C
6	Hydraulic Fluid, 1,1,1-TCA, Methylene Chloride, Phenol, PD680, Trichlorofluoroethane	Geophysics	D
		Concrete Coring/Soil Borings	C[b]
		MW Installation/Sampling	C[b]
7	Waste Oil, Gasoline (Benzene, Ethylbenzene, Toluene, Xylene)	Land Survey	D
		Geophysics	D
		Soil Gas Survey	D
		Concrete Coring/Soil Borings	C[b]
		MW Installation/Sampling	C[b]
8	Phenol, Methylene Chloride, Pesticides, and Herbicides	Land Survey	D
		Geophysics	D
		Soil Borings	C
		MW Installation/Sampling	C
10	Metals, TCE, Carbon Tetrachloride, Phenol	Visual Inspection	D
		Soil Borings	C
		MW Installation/Sampling	C
11	Mercury, AVGAS, JP-5, JP-7, PD680	Visual Inspection	D
		Soil Borings	C[b]
		MW Installation/Sampling	C[b]
12	Bunker "C" Fuel, Diesel Fuel	Visual Inspection	D
		Soil Borings	C[b]
		MW Installation/Sampling	C[b]
14	Hydrocarbon Fuels (JP-5, JP-7), Fuel Oils	Visual Inspection	D
		Soil Gas Survey	D
		Soil Borings	C[b]
		MW Installation/Sampling	C[b]
15	PCB Hydraulic Oil	Visual Inspection	D
		Soil Borings	C[b]
		MW Installation/Sampling	C[b]
IMF Site	Lead, refinery wastes, benzene, phenol	Visual Inspection	D
		Soil Borings	C
		MW Installation/Sampling	C

[a] Unless specified, Level C will be full-face air purifying respirator in accordance with the Navy CLEAN Health and Safety Program default requirements.

[b] Based on governing compounds, the initial level of protection can be half-face air purifying respirators rather than full-face units.

5.2 EPA LEVEL D PERSONAL PROTECTIVE EQUIPMENT

In EPA Level D, JMM field team members, and subcontractor personnel working in a support zone, contamination reduction zone (CRZ) or exclusion zone, will wear, at a minimum, the following prescribed equipment:

- Cotton or disposable chemical resistant coveralls (standard Tyvek). The purpose of using standard Tyvek coveralls is to keep work clothes clean, and does not mean that JMM field team members are being exposed to site contaminants.
- Leather or chemical-resistant, steel toe boots, meeting ANSI standard Z41-1983, Safety-Toe Footwear, Classification 75 (boot type assigned by the JMM OSO).
- Eye protection such as faceshields, goggles, or safety glasses which meets ANSI standard Z87.1-1979,"Practice for Occupational and Educational Eye and Face Protection." Selection of the specific eye protection will be by the JMM OSO.
- Hardhat meeting ANSI standard Z89.1-1986, Class A, B, and C.
- Chemical-resistant gloves (when the potential for contact with water or soil contaminants exists as a result of field activities) with nitrile as the outer, and vinyl and/or 4-mil nitrile as the inner glove. This precautionary measure has been developed to protect field team members from possible exposure to site contaminants as a result of field activities. The types of activities that warrant wearing nitrile gloves to minimize the possibility of dermal contact include:
  - A field team member collecting water samples from a groundwater monitoring well; or
  - A geologist characterizing soil from a borehole or monitoring well outside of a known contaminated area, such as upgradient or downgradient situations to determine contamination migration.
- Disposable chemical resistant overboot protection, as needed. The use of this type of foot protection would include situations when a site reconnaissance is conducted prior to implementing intrusive field activities within an exclusion zone. This control technique minimizes the possibility of contaminating standard workboots since site reconnaissance usually entails walking around a site that is possibly contaminated.
- Hearing protection that has a Noise Reduction Rating (NRR) of at least 28 and meets ANSI Standard S3.19-R1979, "Method for the Measurement of Real Ear Protection and Physical Attenuation of Earmuffs."

5.3 RESPIRATOR SELECTION AND FIT TEST

The JMM PHSC has selected either half-face or full-face respirators for the JMM field team working at ANAS. The JMM field team will be using either North Model 8700 8A, or Scott Models 65 or 66 respirators for EPA Level C protection. The JMM OSO or JMM PHSC is responsible for fit testing all

JMM field team members, including JMM subcontractor staff, prior to using this respiratory protective equipment. Appendix F provides a detailed description of this qualitative fit test procedure.

The JMM OSO will document the size, brand and model number of the full-face or half-face air purifying respirator assigned to each JMM field team member. After completing each field team member's fit test, the JMM OSO will document the results on the JMM Respirator Fit Test form found in Appendix F. The results will be provided to the JMM PHSC and copies will be retained in the project files. These procedures will comply with the OSHA Respiratory Protection Standard (29 CFR 1910.134) requirements.

6.0 HEALTH HAZARD ASSESSMENT

A Health Hazard Assessment (HHA) is essential to determining the hazards and developing control measures during site activities. The HHA involves characterizing chemical and physical stressors at the ANAS sites and is a continuous process.

The JMM OSO or JMM PHSC will conduct HHAs to recognize and evaluate potential airborne contaminants. The initial HHA will be conducted by the JMM OSO in the appropriate level of PPE, based on previous knowledge of the sites and historical data. During drilling and site sampling activities, air monitoring will be conducted continuously using "real time" field instruments including a photoionization detector (PID), combustible gas indicator (CGI), and oxygen meter (OM). All direct "real time" field instruments will be calibrated daily in accordance with manufacturers' guidelines.

6.1 AIR MONITORING

Each work site will be monitored for organic vapors with a PID equipped with a 10.2 or 10.6 electron-volt (eV). The PID will be operated in the zero to 200 ppm range. Organic vapor levels will be measured upwind of the site to determine background concentrations. (Action levels at which levels of work will be upgraded or downgraded, or work stopped will be based on PID measurements in the field team breathing zone, 4 to 6 feet above ground surface.) Additionally, potentially flammable and combustible vapors and oxygen levels will be assessed using a CGI/OM.

During activities resulting in the generation of dust (e.g., drilling), a dust monitor will be used to quantify the concentration of airborne particulates at the site. Particulate levels will be monitored during such activities at all sites using a dust monitor. The dust monitoring equipment will be fastened to a tripod and placed in proximity to drilling or other dust-generating activities to identify the highest potential exposure concentrations. The potential presence of PCBs (Site 15) or lead (IMF Site) adsorbed onto particulates will also be taken into consideration, as warranted, on the basis of action levels calculated from maximum soil concentrations measured during previous environmental investigations at each site (Section 6.2.2).

6.2 ACTION LEVELS

During the first 15 minutes of invasive activities at each site, the OSO will conduct an HHA to verify the selected level of PPE for that particular activity, and upgrade/downgrade as appropriate. This

decision will be made by the OSO by comparing the results of air monitoring with "action levels" developed for specific contaminants and parameters. Action levels have been developed for the following:

- Volatile organic compounds
- Dust (both "nuisance" dust, and associated adsorbed lead and PCBs)
- Oxygen content
- Combustible atmosphere

The action levels for downgrading to Level D or upgrading to Level B (site evacuation) for the above contaminants and working zone conditions are presented in Tables 6-1 and 6-2. If the action levels specified for upgrading to Level B PPE are exceeded, the site will be evacuated and the JMM PHSC and PHSM contacted for further advice. At this time, engineering controls may be undertaken to control the conditions of concern (e.g., dust suppression, ventilation, etc.), or the activity may halt, pending revision of this HSP to reflect the need for Level B PPE. In the latter case, site workers will move on to another activity that does not require use of Level B equipment. The expected levels of PPE for individual site activities are presented in Table 5-1. The actual levels of PPE used will be determined in the field on the basis of the action levels in Tables 6-1 and 6-2.

6.2.1 Volatile Organic Compounds

Action levels for all sites are based on federal or California OSHA exposure limits for the known and suspected site contaminants, as discussed in Section 1.3.1. These action levels were established using a three-tiered approach for the following situations:

- Upgrade from Level D PPE to Level C PPE (half-face or full-face respirator)
- Upgrade from Level C PPE (half-face respirator) to Level C PPE (full-face respirator)
- Upgrade from Level C PPE (full-face respirator) to Level B PPE (or, for purposes of this HSP, evacuate site and consult with HSPM and PHSM).

Based on evaluation of suspected contaminants at ANAS sites, the volatile organic compound with the lowest federal or Cal-OSHA exposure limits ("governing compound") has been established for seven sites:

- Site 6 - phenol
- Site 7 - benzene
- Site 11 - benzene
- Site 12 - petroleum distillates (naphtha)
- Site 14 - petroleum distillates (naphtha)

TABLE 6-1

ACTION LEVELS TO UPGRADE PPE OR EVACUATE ALAMEDA NAVAL AIR STATION RI/FS SITES
BASED ON PID AND DUST METER READINGS

Site	Photoionization Detector Readings (ppm)				Particulate Meter Readings (mg/m^3)	
		Level B Action Level				
	Level C Action Level	From Half-Face Respirator[a]	From Full-Face Respirator[b]	Level B Governing Compound	Level C Action Level	Level B Action Level
4	Default[b] (>0 to 5 ppm)	--	>5 to 50 ppm	None	5-10 mg/m^3	>10 mg/m^3
5	Default[b] (>0 to 5 ppm)	--	>5 to 50 ppm	None	5-10 mg/m^3	>10 mg/m^3
6	5 ppm	25 ppm	50 ppm	Phenol	5-10 mg/m^3	>10 mg/m^3
7	1 ppm	5 ppm	25 ppm	Benzene	5-10 mg/m^3	>10 mg/m^3
8	Default[b] (>0 to 5 ppm)	--	>5 to 50 ppm	None	5-10 mg/m^3	>10 mg/m^3
10	Default[b] (>0 to 5 ppm)	--	>5 to 50 ppm	None	5-10 mg/m^3	>10 mg/m^3
11	1 ppm	5 ppm	25 ppm	Benzene	5-10 mg/m^3	>10 mg/m^3
12	10 ppm	25 ppm	50 ppm	Petroleum Distillate (Naphtha)	5-10 mg/m^3	>10 mg/m^3
14	10 ppm	25 ppm	50 ppm	Petroleum Distillate (Naphtha)	5-10 mg/m^3	>10 mg/m^3
15	10 ppm	25 ppm	50 ppm	Petroleum Distillate (Naphtha)	5-10 mg/m^3	>10 mg/m^3
IMF Site	1 ppm	5 ppm	25 ppm	Benzene	2 mg/m^3[c]	>10 mg/m^3

[a] If the photoionization detector concentrations exceed the limits for half-face but not full-face respirators, field team members may elect to upgrade to full-face units.

[b] Navy Health and Safety Program default conditions for total organic vapors (note that JMM will cease site work and evaluate conditions at 50 ppm total organic vapors rather than 500 ppm)

[c] Level C PPE will be worn during all invasive activities (i.e., soil boring and monitoring well installation (Section 6.2.2)).

TABLE 6-2

ACTION LEVELS TO EVACUATE ALAMEDA NAVAL AIR STATION RI/FS SITES BASED ON OXYGEN CONCENTRATION AND COMBUSTIBLE GAS READINGS

Oxygen Meter Readings		Combustible Gas Indicator Readings
Evacuate Site[a] (%)	Evacuate Site (%)	Evacuate Site (% LEL[b])
<20	>23	>10% methane

[a] Re-entry to be in Level B PPE after revision of this HSP, as appropriate.

[b] LEL: Lower Explosive Limit

- Site 15 - petroleum distillates (naphtha)
- IMF Site - benzene

The specification of action levels on the basis of the governing compounds ensures a conservative approach. It should be noted that this approach assumes that the total volatile hydrocarbon concentration measured by the PID is caused by a single compound. For example, Level B action level of 25 ppm specified for sites where benzene is the governing compound is based on the assumption that benzene is the only compound present.

6.2.1.1 Upgrade from Level D to Level C. At sites for which governing compounds can be established, the criterion for upgrading from Level D to Level C PPE is set at or below the PEL for the governing compound (Table 6-1). Either full-face or half-face respirators may be used for Level C, subject to limitations of the respective respirator factors, as described in Section 6.2.1.2.

6.2.1.2 Upgrade from Level C (Half-Face Respirator) to Level C (Full-Face Respirator). Because the protection factors are lower for half-face respirators, action levels have also been derived for upgrading from half-face to full-face respirators. These calculations assume a protection factor of 10 for half-face respirators. The corresponding action levels are calculated on the basis of the following equation:

$$\textit{Exposure Limit-Based Action Level} = \frac{(\textit{Exposure Limit}) * (\textit{Respirator PF}) * (\textit{PID Sensitivity})}{(\textit{Arbitrary Safety Factor})}$$

$$= \frac{(\textit{Exposure Limit}) * (10) * (\textit{PID Sensitivity})}{(2)}$$

In the case of benzene as the governing compound, the default criterion for upgrading to a full-face respirator is 5 ppm. This assumes a protection factor of 10 and an arbitrary safety factor of 2, as presented above. In no case should PID readings exceed the limits established for site evacuation/Level B upgrade in Section 6.2.1.3.

6.2.1.3 Evacuate Site (Upgrade from Level C to Level B). As discussed in Section 5.0, Level B conditions are not expected at the sites to be investigated under this RI/FS. However, site-specific action levels have been established which, if exceeded, will be cause for the JMM OSO to cease work and evacuate the site. These criteria are presented in Table 6-1, and were derived using the above equation and a full-face respirator factor of 50, or the Navy CLEAN Health and Safety Program default criteria.

Should the above action levels be exceeded, the JMM PHSC, JMM PHSM, and PRC HSPM will be notified of the situation, and will provide guidance to the JMM OSO. Reentry will occur only: (1) after the conditions causing the unacceptable readings have been eliminated; or (2) personnel are equipped with Level B PPE. At no time will work, even in Level B PPE, be conducted if PID readings are in excess of 500 ppm, per the Navy CLEAN Health and Safety Program (PRC, 1991).

6.2.2 Dust Concentrations

Should dust concentrations reach 5.0 mg/m^3, the OSO will either upgrade the personal protection to Level C or institute dust suppression techniques to lower dust concentrations below 5.0 mg/m^3. Level C PPE for protection against dust will include use of HEPA filters. Work on a particular activity will cease if readings exceed 10.0 mg/m^3 and cannot be lowered using dust suppression techniques. At this time, the OSO will notify the PHSC of the situation. The field team will move on to another activity until the situation is resolved and dust levels can be maintained below 10.0 mg/m^3.

To ensure that the Level C upgrade criterion of 5.0 mg/m^3 adequately protects field personnel against exposure to specific non-volatile site contaminants (i.e., PCBs at Site 15 and lead at the IMF Site) dust concentrations corresponding to unacceptable exposures were calculated as shown below:

$$\text{Dust Level C Concentration } (mg/m^3) = \frac{[Exposure\ Limit\ (mg/m^3)]}{[Soil\ Concentration\ (mg/mg)] * [Safety\ Factor]}$$

$$= \frac{[Exposure\ Limit\ (mg/m^3)]}{[Soil\ Concentration\ (mg/mg)] * [2]}$$

The lowest calculated dust concentrations for upgrading to Level C on the basis of PCB exposure at Site 15 and lead exposure at the IMF Site were greater than 8,000 mg/m^3 and 2 mg/m^3, respectively. Therefore, the specified level of 5.0 mg/m^3 of nuisance dust, for upgrading to Level C PPE, was determined to be sufficiently protective for all ANAS RI/FS sites except the IMF Site. Due to the potential for unacceptable exposures to lead at dust concentrations below the "nuisance" action level of 5.0 mg/m^3 for Level C PPE, all invasive work at the IMF Site (i.e., soil borings and monitoring well installation) will be conducted in Level C, using organic vapor/acid gas/HEPA filters and full-face air purifying respirators.

6.2.3 Oxygen Content

Although work will be conducted in the ambient environment and no change in oxygen concentration is expected, oxygen meter readings less than 20 percent or greater than 23 percent will be

cause to halt site work and evacuate the site. The PHSC will be notified, and will make a judgement as whether to upgrade to Level B (for oxygen deficient atmospheres only) or implement engineering controls.

6.2.4 Combustible Atmosphere

Combustible Gas Indicator (CGI) meter readings greater than 10 percent of the lower explosive limit (10 percent LEL) for methane, taken approximately 1 to 2 feet above a given borehole, will be cause to cease field activities and evacuate the site until CGI readings are reduced to less than 10 percent of the LEL.

6.3 HEAT STRESS MONITORING

Historical data indicate that the average annual temperatures for the Bay Area are between 55-65 degrees Fahrenheit (°F). Summer temperatures have reached 100 plus °F but are rare for the Bay Area.

The stress of working in a hot environment can cause a variety of illnesses including heat exhaustion or heat stroke; the latter can be fatal. Personal protective equipment (EPA Level C protection) can significantly increase heat stress. To reduce or prevent heat stress, frequent rest periods and controlled beverage consumption to replace body fluids and salts may be required.

Additionally, quantitative physiological monitoring for heat stress may be conducted. Physiological monitoring for heat stress includes heart rate as a primary indicator and oral temperature as a secondary indicator. The frequency of monitoring depends on the ambient temperature and the level of protection used on site. To determine the initial monitoring frequency, after a work period of moderate exertion, use the following information:

Adjusted Temperature*	Level D	Level C
90°F or above	After 45 minutes	After 15 minutes
87.5° to 90°F	After 60 minutes	After 30 minutes
82.5° to 87.5°F	After 90 minutes	After 60 minutes
77.5° to 82.5°F	After 120 minutes	After 90 minutes
72.5° to 77.5°F	After 150 minutes	After 120 minutes

* Adjusted air temperature (°F) = observed temp + (13 x %sunshine)

In the above equation, air temperature is measured with the bulb shielded from radiant heat, and percent sunshine is defined as the time sun is not covered by clouds thick enough to produce a

shadow (100% = no cloud cover and a sharp, distinct shadow; 0% = no shadows) (The Industrial Environment, its Evaluation and Control; U.S. Department of Health and Human Services, 1973).

The following procedures and action levels are to be used for the physiological monitoring of heat stress:

- **Heart rate:** Count the radial pulse during a 30-second period as early as possible in the rest period. If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle one-third and keep the rest period the same. If the heart rate exceeds the 110 beats per minute at the next rest period, shorten the following work cycle by another one-third and also monitor oral temperature.

- **Oral temperature:** Use a clinical thermometer (3 minutes under the tongue) to measure the oral temperature at the end of the work period (before drinking). If oral temperature exceeds 99.6°F, shorten the next work cycle by one-third without changing the rest period. If oral temperature exceeds 99.6°F at the beginning of the next rest period, shorten the following work cycle by one-third. **DO NOT** allow a field team member to wear EPA Level C protection when oral temperature exceeds 100.6°F.

Personnel will be trained to recognize the symptoms of heat stress and the appropriate action to take upon recognition. Even though physiological monitoring is not always necessary, it is essential that personnel understand the significance of heat stress and its recognition.

Some of the symptoms which indicate heat exhaustion are:

- Clammy skin
- Light headedness
- Slurred speech
- Rapid pulse
- Weakness, fatigue
- Confusion
- Fainting
- Nausea (vomiting)

If these conditions are noted, the following steps should be performed:

- Remove the victim to a cool and uncontaminated area.
- Remove protective clothing
- Give water to drink, if conscious

Symptoms that indicate heat stroke include:

- Staggering gait
- Mental confusion

- Hot skin, temperature rise (yet may feel chilled)
- Convulsions
- Unconsciousness
- Incoherent, delirious

If heat stroke conditions are noted, immediately perform the following steps:

- Remove victim to a cool, uncontaminated area.
- Cool the victim, whole body, with water, compresses and/or rapid fanning.
- Give water to drink, if conscious.
- Transport the victim to the designated medical facility for further cooling and monitoring of body functions. **HEAT STROKE IS A MEDICAL EMERGENCY!**

Appendix G contains information on the specific symptoms and health effects of heat stress.

6.4 NOISE MONITORING

Noise monitoring will be conducted periodically during invasive site activities such as drilling and when aircraft are departing or arriving. A sound level meter or noise dosimeter will be used which meets OSHA requirements [ANSI S1.4-1971 (R1976), (Specifications for Sound Level Meters, Type 2)] for measuring noise levels in decibels with an A-weighted scale, in slow-response mode. Time-weighted average exposures greater than 85 dBA will necessitate implementation of the hearing conservation requirements stated in 29 CFR 1910.95 (Occupational Noise Exposure). These include continued area noise monitoring, additional personnel training regarding noise hazards and protective measures, and the mandatory use of hearing protective devices. JMM field team members will be required to wear protective hearing devices during all drilling activities and when working near any active runways.

7.0 STANDARD OPERATING PROCEDURES

This JMM HSP has specific Standard Operating Procedures (SOPs) to ensure a safe and healthful work environment during the duration of the project. These procedures include a premobilization meeting, site preparation, site work zones, and site security.

7.1 PREMOBILIZATION MEETING

All JMM field team members, including JMM subcontractors and other individuals (such as Navy representatives, regulatory representatives, PRC staff members) entering the field sites will attend a premobilization meeting conducted by JMM. This meeting will describe the project plan to be utilized for the site, ensure that all involved parties understand the health and safety requirements, discuss site-specific health and safety concerns, and recognize potential or existing health or safety risks. ANAS representatives will be required to provide any site-specific health and safety information at this meeting.

7.2 SITE PREPARATION

No roads will be built or buildings demolished during the ANAS RI/FS activities. The JMM Project Manager is responsible for coordinating road and site access for drill rigs and other heavy equipment.

7.3 SITE WORK ZONES

The EPA requires contaminated work sites to be divided into three working zones: exclusion zone, contamination reduction zone (CRZ), and support zone. Site work zones are presented in Figure 7-1, and discussed in the following paragraphs.

7.3.1 Exclusion Zone

The exclusion, or "hot" zone, is the zone where contamination or potential contamination exists. Since this zone has the potential for workers to be exposed to contaminants, all JMM field team members entering this zone will wear EPA Level C protection, unless the JMM field team members have downgraded to EPA Level D protection in accordance with Section 6.2. Areas with higher concentrations of contaminants within this zone will be identified with field stakes with orange or yellow flags. JMM field team members entering the exclusion zone or the higher concentration part of the exclusion zone will enter and exit through a controlled center monitored by the JMM OSO. Gross decontamination will take place

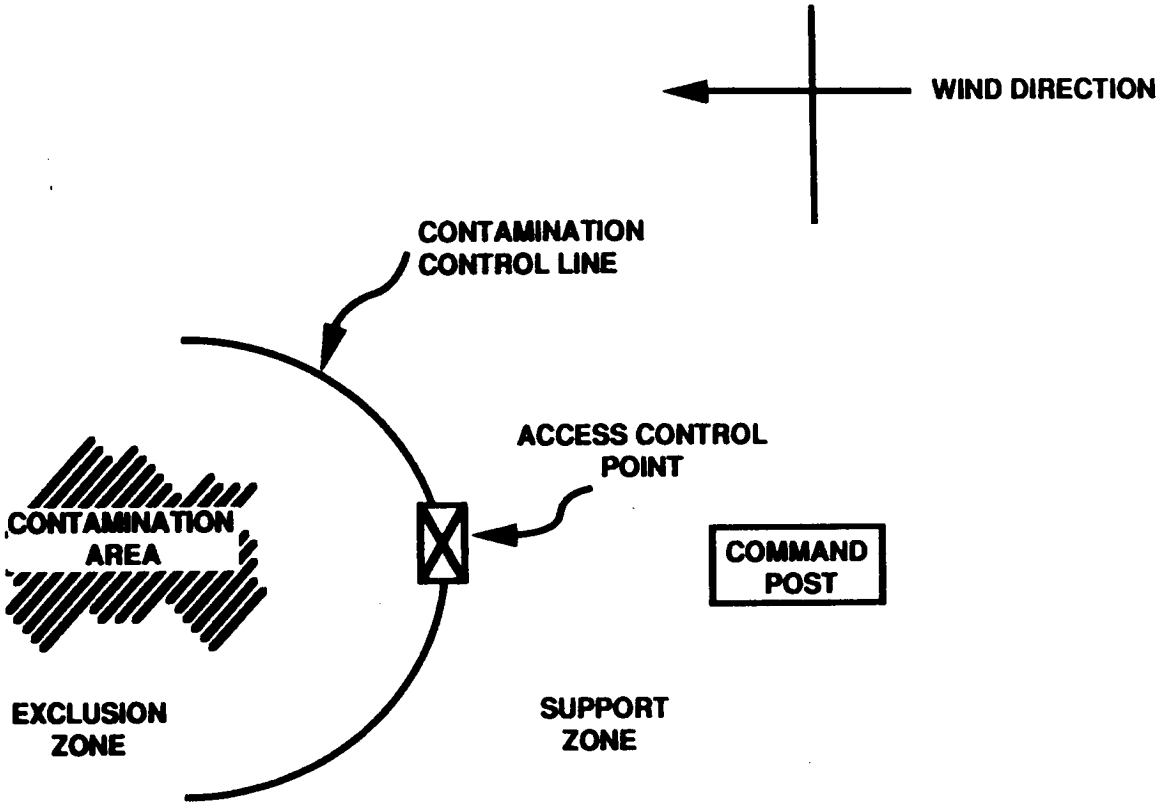


DIAGRAM OF LEVEL D SITE ZONES

FIGURE 7-1

near the "hotline", before proceeding to the CRZ. Prior to initiation of field work occurring in this zone, the JMM OSO will develop an emergency exit area. The minimum radial extent of this zone is 25 feet from the drilling activities.

7.3.2 Contamination Reduction Zone (CRZ)

The CRZ is the zone where JMM field team members and equipment will undergo decontamination. This zone is located between the exclusion and support zones. The CRZ will serve as a buffer to further reduce the probability of the clean zone becoming contaminated or being affected by other existing hazards. It will provide additional assurance that the physical transfer of contaminants via personnel or equipment is limited through a combination of decontamination procedures and a minimum required distance between exclusion and support zones.

Initially, the CRZ will be considered to be a noncontaminated area. At the boundary between the exclusion zone and the CRZ, decontamination stations will be established, one for personnel and one for heavy equipment. Exit from the exclusion zone will be through a designated decontamination corridor. As operations proceed, the area around the decontamination station may become contaminated, but to a much lesser degree than the exclusion zone. On a relative basis, contamination will decrease from the "hotline" to the support zone due to the distance involved and the decontamination procedures used. The "contamination control line" separating the CRZ and the support zone will be designated with yellow or orange surveyor tape.

7.3.3 Support Zone

The support zone, the outermost part of the regulated area, will be considered noncontaminated. Support equipment, such as the command post and safety vehicles, will be located in this area. Since normal work attire is appropriate within this zone, potentially contaminated personal protective clothing, equipment, and samples will not be permitted.

The location of the command post and other support facilities in the support zone at each site will depend on a number of factors, including:

- Accessibility: topography, open space available, locations of roads, or other limitations.
- Wind direction: preferably the support facilities should be located upwind of the exclusion zone. Shifts in wind direction and other conditions may be such that an ideal location based on wind direction alone does not exist.

Access to the CRZ from the support zone will be through a controlled access point. JMM field team members entering the CRZ to assist in decontamination will wear the prescribed PPE. Re-entrance into the support zone will require removal of any PPE worn in the CRZ.

Only authorized JMM field team members will enter regulated areas associated with the field activities. The JMM OSO, in consultation with the JMM PHSC, will establish the bounds of the regulated areas. The following measures will be taken to assure site security:

- All JMM field team members entering the regulated areas will be subject to the provisions of this HSP. The JMM OSO will have the responsibility and authority to enforce this requirement.
- All JMM field team members entering the CRZ or the exclusion zone will have the appropriate training, PPE and respiratory protection, and will be enrolled in an established medical surveillance program.
- The JMM OSO will maintain a Site Visitor's Logbook, located in the support zone.

7.4 SITE SECURITY

ANAS has existing strict base controls which consist of the following:

- Navy military police guarding base entrances and exits.
- Navy military police frequently patrolling by the RI/FS sites.
- Navy representatives, including the military police, will be instructed to investigate any suspicious activities at the investigation sites. Security at the sites will be the responsibility of ANAS during non-activity times (including weekends).

Project security at ANAS is a JMM priority and the following control techniques will be instituted during the course of the investigation activities. The specific techniques that will be used are described below:

- The JMM OSO will have the responsibility and authority to refuse unauthorized representatives from entering the CRZ or exclusion zones.
- JMM will establish a personnel identification system, including limitations to an individual's approved activities.
- Temporary barricades will be used, where feasible, to prevent unauthorized representatives from entering the CRZ or exclusion zones.

- Warning signs will be posted around the perimeter of the support zone, if temporary barricades are not feasible.

JMM will institute security control techniques during non-working hours. The JMM OSO will secure each investigation site prior to leaving at the end of each working day. All equipment and supplies will be secured or stored in locked facilities, and all open holes and trenches will be covered with plywood or similar materials.

8.0 DECONTAMINATION PROCEDURES

The establishment of decontamination procedures is necessary to protect JMM field team members and control the spread of contamination by either personnel or equipment. Personnel participating in the ANAS field activities may potentially become contaminated in a number of ways, including:

- Being exposed to vapors, gases, mists or particulates in the air and subsequent deposition of these airborne contaminants on an individual's PPE; or
- Being splashed by site contaminants while sampling or decontaminating field equipment; or
- Being exposed to site contaminants by walking on top of or kneeling on contaminated soil.

8.1 LEVEL C DECONTAMINATION

A general decontamination plan for EPA Level C is presented in Appendix H. Decontamination will include the following:

- A decontamination station in the CRZ will be located where JMM field team members will routinely enter/exit the exclusion zone. When exiting the exclusion zone, personnel will doff chemical resistant boots, coveralls, and outer gloves only at the specified decontamination station. When in use, air purifying respirators will be removed last.
- Personnel will be instructed in proper decontamination techniques. This will entail removal of protective clothing in an "inside out" manner. Removal of contaminants from clothing or equipment by blowing, shaking or any other means that may disperse material into the air will be prohibited.
- All personal protective clothing removed will remain at the decontamination station pending personnel re-donning the clothing. At the conclusion of work in a site exclusion zone, all protective equipment will be placed in a DOT-approved 55-gallon drum and be properly labeled prior to disposal or transfer off site.
- Personnel will not be permitted to exit the regulated work area until contaminated clothing and equipment have been removed and employees have washed their hands with soap and water.
- All employees will wash their hands and face with soap and water before eating, drinking, smoking or applying chapstick or cosmetics. These activities will be restricted to the designated rest area(s) in the support zone.

Decontamination procedures can be modified by the JMM OSO, with the approval of the JMM PHSC, to eliminate unnecessary stations or otherwise adapting procedures to site conditions.

An area within the CRZ will be designated as the Contamination Reduction Corridor (CRC). The CRC controls access into and out of the exclusion zone and confines personnel decontamination activities to a limited area. The size of the corridor will depend on the number of stations in the decontamination procedure, the overall dimensions of work control zones, and the amount of space available. Boundaries will be conspicuously marked, with entry and exit restricted. The far end is the "hotline", defining the boundary between the exclusion zone and the CRZ. Personnel exiting the exclusion zone must go through the CRC. Another corridor will be required for the entrance and exit of heavy equipment needing decontamination. The corridor will be dedicated to decontamination activities only.

Nondisposable PPE, monitoring equipment, and sampling supplies will be maintained adjacent to the CRC. Personnel will don their protective equipment and enter the Exclusion Zone through a separate point at the hotline.

8.2 LEVEL D DECONTAMINATION

Specific site investigation tasks will be conducted in EPA Level D protection, based on criteria presented in Section 6.0 and will consist of the following:

- Personnel will doff overboots, chemical resistant boots, coveralls, and outer gloves only at the specified decontamination station.
- All PPE removed will remain at the decontamination station pending personnel redonning the clothing. At the conclusion of work, all protective equipment will be placed in plastic bags prior to disposal or transfer off site.
- Personnel will not be permitted to exit the regulated work area until contaminated clothing and equipment are removed and employees have washed their hands and face with soap and water.
- All employees will wash their hands and face with soap and water before eating, drinking, smoking or applying chapstick or cosmetics. These activities will be restricted to the designated rest area(s) in the support zone.

8.3 EQUIPMENT DECONTAMINATION

The specific equipment decontamination procedures are presented in Section 5.5, Decontamination Procedures of the Quality Assurance/Quality Control Plan, Volume 3, developed by Canonie Environmental, January 1990. Field sampling equipment will be decontaminated with Liquinox, tap water, deionized water, and isopropanol in the EZ or CRZ. The JMM OSO will oversee this process. Drilling equipment that will require decontamination will be steam-cleaned in a central decontamination location. JMM field team

members will be required to wear EPA Level C protection when steam-cleaning large heavy pieces of equipment.

All materials and equipment used for decontamination must be properly disposed. Disposable clothing, tools, buckets, brushes, and all other contaminated equipment will be secured in appropriate Department of Transportation (DOT) 55-gallon drums, or other containers, and properly labeled. Protective clothing that will be reused and not completely decontaminated on site, will be secured in plastic bags before removal from the site. Contaminated wash water will be transferred into DOT-approved 55-gallon drums and properly stored.

Soil cuttings from the drilling process will be stored in DOT-approved 55-gallon drums, sealed, and stored in a secured area. The JMM PM will consider all soil cuttings placed in these drums to be contaminated until receiving the laboratory analytical results. Drums containing contaminated cuttings will be properly labeled and documented. ANAS will be responsible for manifesting and properly disposing of all contaminated groundwater and soil cuttings to a Resource Conservation and Recovery Act (RCRA) permitted treatment, storage, and disposal facility.

8.4 DECONTAMINATION DURING MEDICAL EMERGENCIES

If prompt life-saving first-aid and medical treatment is required, decontamination procedures should be omitted. On-site personnel will accompany contaminated victims to the medical facility to advise on matters involving decontamination.

Life-saving care will be instituted immediately without considering decontamination. Outer garments can be removed if they do not cause delays, interfere with treatment, or aggravate the problem. Respiratory equipment must always be removed. Chemical resistant clothing can be cut away. If the outer contaminated garments cannot be safely removed, the individual will be wrapped in plastic, rubber or blankets to help prevent contamination of ambulances and/or medical personnel. Outer garments will then be removed at the medical facility. No attempt will be made to wash or rinse the victim, unless it is known that the individual has been contaminated with an extremely toxic or corrosive material that could also cause severe injury or loss of life. For minor medical problems or injuries, the normal decontamination procedure will be followed.

Heat stress (hyperthermia) requires prompt treatment to prevent irreversible damage or death. Less serious forms of heat stress also require prompt attention. Unless the victim is obviously contaminated, decontamination should be omitted or minimized and treatment begun immediately.

Exposure to chemicals can be divided into two categories:

- Injuries from direct contact, such as contact with skin or inhalation of toxic chemicals; or
- Potential injury due to gross contamination on clothing or equipment.

For inhalation exposure cases, treatment can only be performed by a qualified physician. If the contaminant is on skin or in the eyes, immediate measures can be taken on-site to counteract the substance's effect. First-aid treatment consists of flooding the affected area with copious amounts of water for 15 minutes. The JMM OSO will assure that an adequate supply of running water or a portable emergency eyewash is available on-site prior to commencing field activities.

When protective clothing is grossly contaminated, contaminants can potentially be transferred to treatment personnel and cause an exposure. Unless severe medical problems have occurred simultaneously with personnel contamination, the protective clothing should be carefully removed.

9.0 SITE HEALTH AND SAFETY PROGRAM DOCUMENTATION

Health and Safety documentation for ANAS will consist of the following:

- Site Safety Plan: All site work will be performed in accordance with the provisions stated in this HSP.

- Site Visitor's Log: The JMM OSO will maintain a Visitor's Log for the duration of the site investigation.

- JMM On-Site Safety Officer's Daily Log: The JMM OSO will maintain a daily log that includes pertinent observations including direct-read instrumentation monitoring results and changes in implementation of the HSP (and their justification).

- Personnel Training Documentation: The JMM OSO will maintain documentation of site personnel training. The JMM OSO will maintain documentation that each JMM field team member has successfully completed this training program. Each JMM field team member must sign and date a Personal Acknowledgement (Appendix A) stating that he/she has read and understood the HSP and attended the requisite training.

- Tailgate Safety Meeting Documentation: The JMM OSO will be conducting tailgate safety meetings at least once daily. These meetings must be documented in writing, signed by the attendees at each meeting and posted at the site. A file of Tailgate Safety Meeting forms will be kept by the JMM OSO. As discussed in Sections 2.9 and 3.0, the JMM OSO will conduct the tailgate safety meeting at the beginning of each shift, whenever new personnel arrive at the site, as conditions change, or as needed.

10.0 EMERGENCY RESPONSE PLAN

It is the objective of this HSP to minimize chemical/physical hazards and operational incidents during the ANAS RI/FS. The following directions are provided to ensure that personnel respond to emergency situations in a calm, reasonable manner:

- Prior to commencement of field operations, an emergency medical assistance network will be established. The fire department, ambulance and hospital with an emergency room are identified (with telephone numbers) in Appendix C. A contractor's vehicle will be available on site during all activities to transport injured personnel to the identified emergency medical facilities.

- Telephone numbers and locations (including the fastest routes) of the emergency room facilities will be posted at the site.

- Each ANAS RI work location will be equipped with a radio transmitter and receiver. A total of three to five such units will be employed at ANAS; one unit will be maintained at the JMM field office. The JMM field office will also be equipped with a mobile telephone which can be used in the case of any on-site emergency. All radio frequencies used will be cleared by the Range Department, Frequency Monitoring Branch.

- The JMM OSO will be the lead person in all emergency situations.

- The JMM OSO will be certified to render first-aid and CPR prior to the initiation of field activities. A first-aid kit containing the items listed in Table 10-1 will be available at the site. An adequate supply of fresh water, a portable emergency shower, and a portable eyewash will be available at each work site.

- Site personnel will be trained in emergency procedures as described in Section 3.0.

- Evacuation routes from each specific sampling area will be established by the JMM OSO, and communicated to all personnel during the tailgate safety meeting conducted before each work shift.

- A means to determine wind direction (wind sock or surveyor ribbon) will be set up in the vicinity of the CRZ.

- Either the JMM OSO or the supervisor in the Exclusion Zone will carry a compressed air horn. In the event of fire, hazardous substance spill, vapor release or other hazardous event, three short blasts will signal all personnel to evacuate the site. All personnel evacuating the exclusion zone will proceed to a predetermined location upwind, where the OSO will conduct a head count and provide further instructions.

- The JMM OSO will be responsible for assuring that all site personnel understand ANAS emergency signals and procedures.

TABLE 10-1

SUPPLIES FOR FIRST AID KIT

	Supplies	Quantity[a]
1.	Adhesive Dressings	12
2.	Adhesive Tape Rolls, 1-inch Wide	6
3.	Eye Dressing Packet	4
4.	1-inch Gauze Bandage Roll or Compress	6
5,	2-inch Gauze Bandage Roll or Compress	4
6.	4-inch Gauze Bandage Roll or Compress	4
7.	Sterile Gauze Pads, 2-inch Square	12
8.	Sterile Gauze Pads, 4-inch Square	12
9.	Sterile Surgical Pads Suitable for Pressure Dressings	6
10.	Triangular Bandages	6
11.	Safety Pins	12
12.	Tweezers and Scissors	2

[a]Supplies for 6 to 15 field personnel.

11.0 GENERAL SITE SAFETY REQUIREMENTS

This section presents a listing of general site safety practices. The following practices are expressly forbidden during RI/FS activities:

- Smoking, eating, drinking, applying chapstick or cosmetics, or chewing tobacco while in the exclusion zone, CRZ, or any potentially contaminated area.
- Igniting flammable or combustible materials in the work zone; equipment will be bonded and grounded, sparkproof and explosion resistant, as appropriate.
- Contacting potentially contaminated substances. Walking through puddles or pools of liquid, kneeling on the ground or leaning, sitting or placing equipment on the contaminated soil should be avoided.
- Performance of tasks in the exclusion zone individually; personnel will be required to work using the "buddy system" at all times.

JMM field team members must keep in mind the following prudent guidelines while conducting field activities:

- Hazard assessment is a continual process; JMM field team members must be aware of their surroundings. Potential hazards are both physical and chemical in nature.
- The number of JMM field team members allowed in the exclusion zone will be kept to a minimum. This allows work tasks to be completed in a safe and efficient manner.
- JMM field team members will be familiar with the physical characteristics of each site including wind direction, site access, location and use of communication devices, and location and use of safety equipment.
- The location of underground utilities will be marked prior to conducting intrusive activities. The JMM OSO will oversee all drilling activities conducted within 5 feet of these marked underground utilities and ensure they are performed with appropriate caution.

JMM field team members will be familiar with emergency hand signals:

• Hand gripping throat:	"Respirator problems,can't breathe."
• Grip team member's wrist or place both hands around waist:	"Leave site immediately, no debate!"
• Thumbs up:	"OK, I'm alright, I understand."

- Thumbs down: "No, negative."
- Hands on face: "Put on respirator"

APPENDIX A

PERSONAL ACKNOWLEDGEMENT

As a component of the Health and Safety Plan (HSP) designed to provide personal safety during the field activities at the Alameda Naval Air Station, Alameda, California, you are required to read and understand the HSP. When you have fulfilled this requirement, please sign and date this personal acknowledgement.

_____ _____

Signature Name (Printed)

_____

Date

APPENDIX B

TAILGATE SAFETY MEETING FORM

Date:_____ Time:_____ Job Number:_____Client: NAVY CLEAN

Site Location: Alameda Naval Air Station, Alameda, California

Safety Topics Presented

Protective Clothing/Equipment:_____

_____

Chemical Hazards:_____

_____

Physical Hazards:_____

_____

Special Equipment:_____

_____

Other:_____

Emergency Procedures:_____

_____

Hospital:_____ Phone:_____ Ambulance Phone:_____

Hospital Address and Route:_____

_____

ATTENDEES

NAME PRINTED	SIGNATURE
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Meeting Conducted By:_____ _____
Name Printed Signature

Project Safety Officer:_____ Project Manager:_____

APPENDIX C

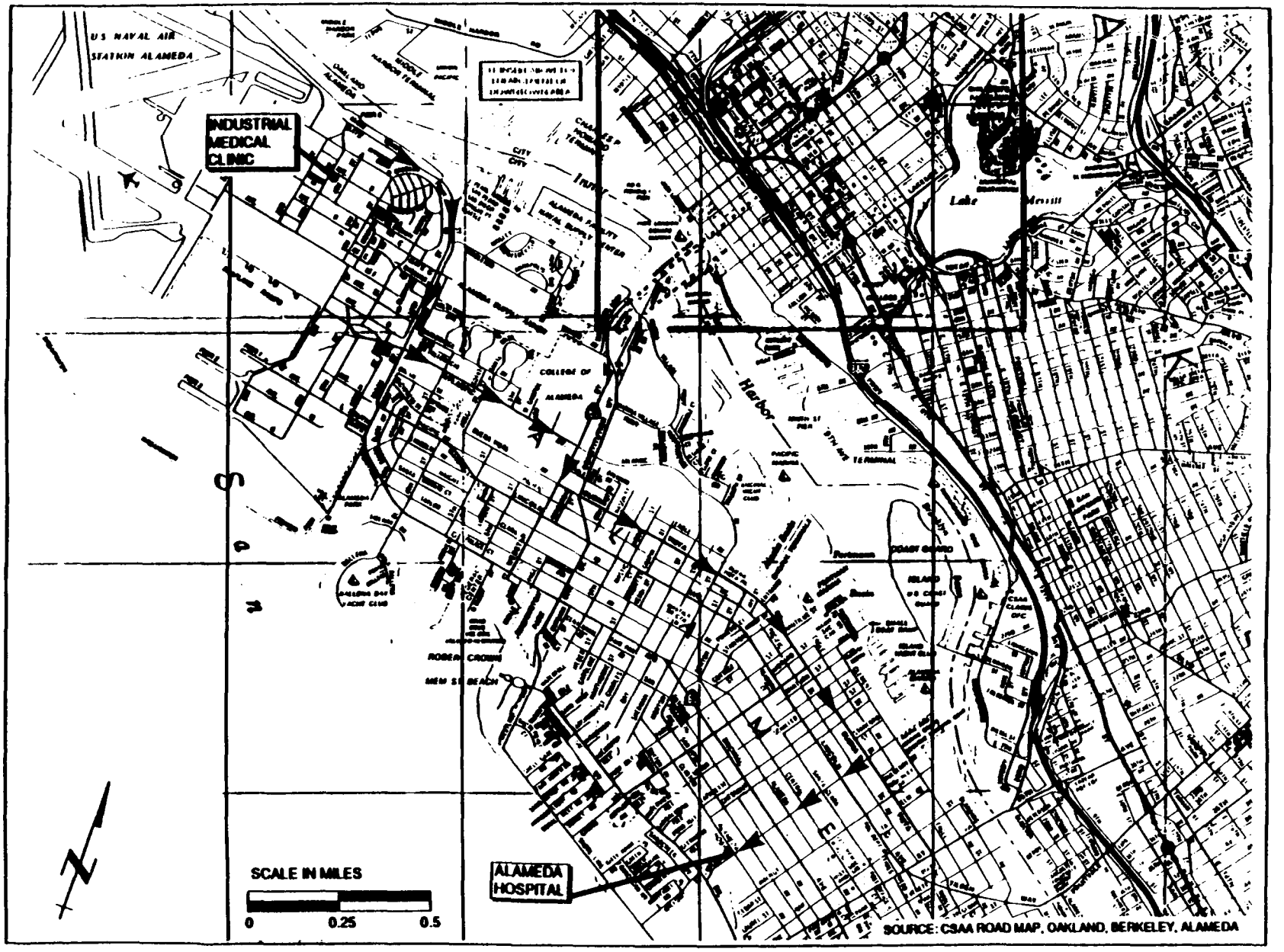
EMERGENCY ASSISTANCE INFORMATION

	Base Phone	Off-Base Phone
Local Emergency Contacts		
Ambulance	4444	869-4444
Industrial Medical Clinic (Building 16)	3173	869-3173
Fire	4333	869-4333
Security	3053	869-3053
Hospital Facilities		
Alameda Hospital (2070 Clinton Avenue)	9-522-3700	522-3700
Emergency Room	9-523-4357	523-4357

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 southeast corner of Clinton Avenue and Willow Street.

JMM Contacts	
Steve Newton (Project Manager)	(415) 975-3400
Peter Carroll (JMM Project Health and Safety Supervisor)	(818) 568-6847
PRC Contacts	
Mike Richards (Program Manager)	(415) 543-4880
Kirk Switzer (Project Manager)	(916) 852-8300
Fred Stanley (CLEAN Program Health and Safety Manager)	(415) 543-4800
Kathy Andersen (Personnel Manager)	(312) 856-8700



HOSPITAL LOCATION MAP

FIGURE C-1

APPENDIX D
ACCIDENT/INCIDENT REPORT FORM

FINAL
HEALTH AND SAFETY PLAN
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
PHASES 2B AND 3
INTERMEDIATE MAINTENANCE FACILITY SITE
ENGINEERING EVALUATION/COST ANALYSIS

DATED 01 MAY 1991

For Safety Staff only)	REPORT NO	EROC CODE	UNITED STATES ARMY CORPS OF ENGINEERS ACCIDENT INVESTIGATION REPORT (For Use of this Form See Attached Instructions and USACE Supp to AR 385-40)	REQUIREMENT CONTROL SYMBOL: CEEC-S-8(R2)

1. ACCIDENT CLASSIFICATION

a GOVERNMENT	(1) INJURY/ILLNESS/FATAL	(2) PROPERTY DAMAGE	(3) MOTOR VEHICLE INVOLVED	(4) DIVING
☐ CIVILIAN ☐ MILITARY →	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
b CONTRACTOR →	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
c PUBLIC →	☐ FATAL ☐ OTHER		☐	

2. PERSONAL DATA

a NAME (Last,First,MI)	b. AGE	c SEX ☐ MALE ☐ FEMALE
JOB SERIES/TITLE	g. DUTY STATUS AT TIME OF ACCIDENT (1) ☐ ON DUTY (2) ☐ TDY (3) ☐ OFF DUTY	

3. GENERAL INFORMATION

a DATE OF ACCIDENT (month/day/year)	b. TIME OF ACCIDENT (Military time))	c. EXACT LOCATION OF ACCIDENT	d CONTRACTOR'S NAME (1) PRIME (2) SUBCONTRACTOR
e CONTRACT NUMBER # _____ ☐ CIVIL WORKS ☐ MILITARY ☐ OTHER	f TYPE OF CONTRACT ☐ CONSTRUCTION ☐ SERVICE ☐ A/E ☐ DREDGE ☐ OTHER (Specify) _____	g. HAZARDOUS/TOXIC WASTE ACTIVITY ☐ SUPERFUND ☐ DERP ☐ IRP ☐ OTHER (Specify) _____	

4. CONSTRUCTION ACTIVITIES ONLY (Fill in line and corresponding code number in box from list - see instructions)

a CONSTRUCTION ACTIVITY	(CODE)	b. TYPE OF CONSTRUCTION EQUIPMENT	(CODE)
	0		0

5. INJURY/ILLNESS INFORMATION (Include name on line and corresponding code number in box for items a, f & g - see instructions)

a. SEVERITY OF INJURY (1) ☐ FATAL (2) ☐ LOST- TIME (3) ☐ NON LOST -TIME (4) ☐ FIRST AID	b. ESTIMATED DAYS LOST	c. ESTIMATED DAYS HOSPITALIZED	d. ESTIMATED DAYS RESTRICTED DUTY

e. BODY PART AFFECTED	(CODE)	g. TYPE AND SOURCE OF INJURY	(CODE)
PRIMARY _____	0	TYPE _____	0
SECONDARY _____	(CODE) 0		
f. NATURE OF INJURY _____	(CODE) 0	SOURCE _____	(CODE) 0

6. PUBLIC FATALITY (Fill in line and corresponding code number in box - see instructions)

a ACTIVITY AT TIME OF ACCIDENT	(CODE)	b PERSONAL FLOATATION DEVICE USED?
	0	☐ YES ☐ NO ☐ NA

7. MOTOR VEHICLE ACCIDENT

a TYPE OF VEHICLE	b TYPE OF COLLISION	c. SEAT BELTS	USED	NOT USED	NOT AVAILABLE
☐☐ PICKUP/VAN ☐☐ AUTOMOBILE ☐☐ TRUCK ☐☐ OTHER (Specify) _____	☐ HEAD ON ☐ REAR END ☐ BACKING ☐ BROADSIDE ☐ SIDE SWIPE ☐ ROLL OVER ☐ OTHER	(1) FRONT SEAT			
		(2) REAR SEAT			

8. PROPERTY/MATERIAL INVOLVED

a. NAME OF ITEM	b OWNERSHIP	c $ AMOUNT OF DAMAGE
(1)		
(2)		
(3)		

9. VESSEL/FLOATING PLANT ACCIDENT (Fill in line and corresponding code number in box from list - see instructions)

a TYPE OF VESSEL/FLOATING PLANT	(CODE)	b TYPE OF COLLISON/MISHAP	(CODE)
	0		0

10. ACCIDENT DESCRIPTION (Use additional paper, if necessary)

11. CAUSAL FACTOR(S) (Read instruction before completing)

a. (Explain YES answers in item 13)	YES	NO
DESIGN. Was design of facility, workplace or equipment a factor?	☐	☐
INSPECTION/MAINTENANCE. Were inspection & maintenance procedures a factor?	☐	☐
PERSON'S PHYSICAL CONDITION. In your opinion, was the physical condition of the person a factor?	☐	☐
OPERATING PROCEDURES. Were operating procedures a factor?	☐	☐
JOB PRACTICES. Were any job safety/health practices not followed when the accident occurred?	☐	☐
HUMAN FACTORS. Did any human factors such as, size or strength of person, etc., contribute to accident?	☐	☐
ENVIRONMENTAL FACTORS. Did heat, cold, dust, sun, glare, etc., contribute to the accident?	☐	☐

a. (CONTINUED)	YES	NO
CHEMICAL AND PHYSICAL AGENT FACTORS. Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident?	☐	☐
OFFICE FACTORS. Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident?	☐	☐
SUPPORT FACTORS. Were inappropriate tools/resources provided to properly perform the activity/task?	☐	☐
PERSONAL PROTECTIVE EQUIPMENT. Did the improper selection, use or maintenance of personal protective equipment contribute to the accident?	☐	☐
DRUGS/ALCOHOL. In your opinion, was drugs or alcohol a factor to the accident?	☐	☐

b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT?

☐ YES (If yes, attach a copy) ☐ NO

12. TRAINING

a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?	b. TYPE OF TRAINING.	c. DATE OF MOST RECENT FORMAL TRAINING.
☐ YES ☐ NO	☐ CLASSROOM ☐ ON JOB ☐ NONE	/ / (Month) (Day) (Year)

13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT: INCLUDE DIRECT AND INDIRECT CAUSES (See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)

a. DIRECT CAUSE

b. INDIRECT CAUSE(S)

14. ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S).

DESCRIBE FULLY

15. DATES FOR ACTIONS IDENTIFIED IN BLOCK 14

a. SECTION C (Month/Day/Year) | b. ANTICIPATED COMPLETION (Month/Day/Year) / /

c. SIGNATURE AND TITLE OF SUPERVISOR COMPLETING REPORT	d. DATE (Mo/Da/Yr)	e. ORGANIZATION IDENTIFIER (Div Br Sect)	f. OFFICE SYMBOL
CORPS _____	___ / ___ / ___		
CONTRACTOR _____	___ / ___ / ___		

16. MANAGEMENT REVIEW (1st).

a ☐ CONCUR b ☐ NON CONCUR c COMMENTS

SIGNATURE	TITLE	DATE

17. MANAGEMENT REVIEW (2nd - Chief Operations, Construction, Engineering, etc.)

a ☐ CONCUR b ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

18. SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW

a ☐ CONCUR b ☐ NON CONCUR c ADDITIONAL ACTIONS/COMMENTS

SIGNATURE	TITLE	DATE

19. COMMAND APPROVAL

...MENTS

COMMANDER SIGNATURE	DATE

GENERAL. Complete a separate report for each person who was injured, caused, or contributed to the accident (excluding uninjured personnel and witnesses). Use of this form for reporting USACE employee first-aid type injuries *NOT* to be submitted to the Department of Labor (DOL), Office of Workers' Compensation Programs (OWCP) will be at the discretion of the FOA Commander. Please type or print legibly. Appropriate items shall be marked with an "X" in the box(es). If additional space is needed, provide the information on a separate sheet and attach to the completed form. Ensure that these instructions are forwarded with the completed report to the designated management reviewers indicated in sections 16. and 17.

INSTRUCTIONS FOR SECTION 1 — ACCIDENT CLASSIFICATION. *(Mark All Boxes That Are Applicable.)*

a. GOVERNMENT. Mark "CIVILIAN" box if accident involved government civilian employee; mark "MILITARY" box if accident involved U.S. military personnel.

(1) INJURY/ILLNESS/FATALITY — Mark if accident resulted in any government civilian employee injury, illness, or fatality that requires the submission of Office of Workers Compensation Programs (OWCP) Forms CA-1 (injury), CA-2 (illness), or CA-6 (fatality), to the Department of Labor OWCP, or military personnel lost-time or fatal injury.

(2) PROPERTY DAMAGE — Mark the appropriate box if accident resulted in any damage of $1000 or more to government property (including motor vehicles).

(3) VEHICLE INVOLVED — Mark if accident involved a motor vehicle, *regardless* of whether "INJURY/ILLNESS" or "PROPERTY DAMAGE" are marked.

(4) DIVING ACTIVITY — Mark if the accident involved an in-house USACE diving activity.

b. CONTRACTOR

(1) INJURY/ILLNESS/FATALITY — Mark if accident resulted in any contractor lost-time injury/illness or fatality.

(2) PROPERTY DAMAGE — Mark the appropriate box if accident resulted in any damage of $1000 or more to contractor property (including motor vehicles).

(3) VEHICLE INVOLVED — Mark if accident involved a motor vehicle, regardless of whether "INJURY/ILLNESS" or "PROPERTY DAMAGE" are marked.

(4) DIVING ACTIVITY — Mark if the accident involved a USACE Contractor diving activity.

c. PUBLIC

(1) INJURY/ILLNESS/FATALITY — Mark if accident resulted in public fatality. (The "OTHER" box will be marked when requested by the FOA to report an unusual non-fatal public accident that could result in claims against the government or as otherwise directed by the FOA Commander).

(2) VOID SPACE — Make no entry.

(3) VEHICLE INVOLVED — Mark if accident resulted in a fatality to a member of the public and involved a motor vehicle, *regardless* of whether "INJURY/ILLNESS" is marked.

(4) VOID SPACE — Make no entry.

INSTRUCTIONS FOR SECTION 2 — PERSONAL DATA

a. NAME — (MANDATORY FOR GOVERNMENT ACCIDENTS. OPTIONAL AT THE DISCRETION OF THE FOA COMMANDER FOR CONTRACTOR AND PUBLIC ACCIDENTS). Enter last name, first name, middle initial of person involved.

b. AGE — Enter age.

c. SEX — Mark appropriate box

d. SOCIAL SECURITY NUMBER — (FOR GOVERNMENT PERSONNEL ONLY) Enter the social security number (or other personal identification number if no social security number issued)

e. GRADE — (FOR GOVERNMENT PERSONNEL ONLY) Enter pay grade. Example: O-6, E-7, WG-8; WS-12; GS-11; etc.

f. JOB SERIES/TITLE — For *government civilian employees* enter the pay plan, full series number, and job title, e.g. GS-0810/Civil Engineer. For *military personnel* enter the primary military occupational specialty (PMOS), e.g., 15A30 or 11G50. For *contractor employees* enter the job title assigned to the injured person, e.g. carpenter, laborer, surveyor, etc..

g. DUTY STATUS — Mark the appropriate box.

(1) ON DUTY — Person was at duty station during duty hours or person was away from duty station during duty hours but on official business at time of the accident.

(2) TDY — person was on official business, away from the duty station and with travel orders, at time of accident.

(3) OFF DUTY — person was not on official business at time of accident.

h. EMPLOYMENT STATUS — (FOR GOVERNMENT PERSONNEL ONLY) Mark the most appropriate box. If "OTHER" is marked, specify the employment status of the person.

INSTRUCTION FOR SECTION 3 — GENERAL INFORMATION

a. DATE OF ACCIDENT — Enter the month, day, and year of accident.

b. TIME OF ACCIDENT — Enter the local time of accident in military time. Example: 1430 hrs (not 2:30 p.m.).

c. EXACT LOCATION OF ACCIDENT — Enter facts needed to locate the accident scene. (Installation/project name, building number, street, direction and distance from closest landmark, etc..).

d. CONTRACTOR NAME

(1) PRIME — Enter the exact name (title or firm) of the prime contractor.

(2) SUBCONTRACTOR — Enter the name of any subcontractor involved in the accident.

e. CONTRACT NUMBER — Mark the appropriate box to identify if contract is civil works, military, or other; if "OTHER" is marked, specify contract appropriation on line provided. Enter complete contract number of prime contract, e.g., DACW 09-86-C-0100.

f. TYPE OF CONTRACT — Mark appropriate box. A/E means architect/engineer. If "OTHER" is marked, specify type of contract on line provided.

g. HAZARDOUS/TOXIC WASTE ACTIVITY (HTW) — Mark the box to identify the HTW activity being performed at the time of the accident. For Superfund, DERP, and Installation Restoration Program (IRP) HTW activities include accidents that occurred during inventory, predesign, design, and construction. For the purpose of accident reporting, DERP Formerly Used DoD Site (FUDS) activities and IRP activities will be treated separately. For Civil Works O&M HTW activities mark the "OTHER" box.

INSTRUCTIONS FOR SECTION 4 — CONSTRUCTION ACTIVITIES

a. CONSTRUCTION ACTIVITY — Select the *most appropriate* construction activity being performed at time of accident from the list below. Enter the activity name and place the corresponding code number identified in the box.

CONSTRUCTION ACTIVITY LIST

1. MOBILIZATION	14. ELECTRICAL
2. SITE PREPARATION	15. SCAFFOLDING/ACCESS
3. EXCAVATION/TRENCHING	16. MECHANICAL
4. GRADING (EARTHWORK)	17. PAINTING
5. PIPING/UTILITIES	18. EQUIPMENT/MAINTENANCE
6. FOUNDATION	19. TUNNELING
7. FORMING	20. WAREHOUSING/STORAGE
8. CONCRETE PLACEMENT	21. PAVING
9. STEEL ERECTION	22. FENCING
10. ROOFING	23. SIGNING
11. FRAMING	24. LANDSCAPING/IRRIGATION
12. MASONRY	25. INSULATION
13. CARPENTRY	26. DEMOLITION

c. TYPE OF CONSTRUCTION EQUIPMENT – Select the equipment involved in the accident from the list below. Enter the name and place the corresponding code number identified in the box. If equipment is not included below, use code 24, "OTHER", and write specific type of equipment.

CONSTRUCTION EQUIPMENT

1. GRADER
2. DRAGLINE
3. CRANE (ON VESSEL/BARGE)
4. CRANE (TRACKED)
5. CRANE (RUBBER TIRE)
6. CRANE (VEHICLE MOUNTED)
7. CRANE (TOWER)
8. SHOVEL
9. SCRAPER
10. PUMP TRUCK (CONCRETE)
11. TRUCK (CONCRETE/TRANSIT MIXER)
12. DUMP TRUCK (HIGHWAY)
13. DUMP TRUCK (OFF HIGHWAY)
14. TRUCK (OTHER)
15. FORKLIFT
16. BACKHOE
17. FRONT-END LOADER
18. PILE DRIVER
19. TRACTOR (UTILITY)
20. MANLIFT
21. DOZER
22. DRILL RIG
23. COMPACTOR/VIBRATORY ROLLER
24. OTHER

INSTRUCTIONS FOR SECTION 5 – INJURY/ILLNESS INFORMATION

a. SEVERITY OF INJURY – Mark the appropriate box

(1) FATAL – injured person died or is missing and presumed dead.

(2) LOST TIME – a non-fatal injury that causes any loss of time from work beyond the day or shift in which it occurred or a non-fatal illness/disease that causes disability at any time.

(3) NO LOST TIME – a non-fatal, traumatic injury that does not cause loss of time from work beyond the day or shift in which it occurred.

(4) FIRST AID – One time treatment (and/or one follow visit for observation) for minor scratches, cuts and similar injuries that do not ordinarily require medical attention.

b. ESTIMATED DAYS LOST – Enter the estimated number of workdays the person will lose from work.

c. ESTIMATED DAYS HOSPITALIZED – Enter the estimated number of workdays the person will be hospitalized.

d. ESTIMATED DAYS RESTRICTED DUTY – Enter the estimated number of workdays the person, as a result of the accident, will not be able to perform all of their regular duties.

e. BODY PART AFFECTED – Select the most appropriate primary and when applicable, secondary body part affected from the list below. Enter body part name on line and place the corresponding code letters identifying that body part in the box.

GENERAL BODY AREA	CODE	BODY PART NAME
ARM/WRIST	AB	ARM AND WRIST
	AR	ARM OR WRIST
TRUNK, EXTERNAL MUSCULATURE	B1	SINGLE BREAST
	B2	BOTH BREASTS
	B3	SINGLE TESTICLE
	B4	BOTH TESTICLES
	BA	ABDOMEN
	BC	CHEST
	BL	LOWER BACK
	BP	PENIS
	BS	SIDE
	BU	UPPER BACK
	BW	WAIST
	BZ	TRUNK OTHER
HEAD, INTERNAL	C1	SINGLE EAR INTERNAL
	C2	BOTH EARS INTERNAL
	C3	SINGLE EYE INTERNAL
	C4	BOTH EYES INTERNAL
	CB	BRAIN
	CC	CRANIAL BONES
	CD	TEETH
	CJ	JAW
	CL	THROAT, LARYNX
	CM	MOUTH
	CN	NOSE
	CR	THROAT, OTHER
	CT	TONGUE
	CZ	HEAD OTHER INTERNAL
ELBOW	EB	BOTH ELBOWS
	ES	SINGLE ELBOW
FINGER	F1	FIRST FINGER
	F2	BOTH FIRST FINGERS
	F3	SECOND FINGER
	F4	BOTH SECOND FINGERS
	F5	THIRD FINGER
	F6	BOTH THIRD FINGERS
	F7	FOURTH FINGER
	F8	BOTH FOURTH FINGERS
TOE	G1	GREAT TOE
	G2	BOTH GREAT TOES
	G3	TOE OTHER
	G4	TOES OTHER
HEAD, EXTERNAL	H1	EYE EXTERNAL
	H2	BOTH EYES EXTERNAL
	H3	EAR EXTERNAL
	H4	BOTH EARS EXTERNAL
	HC	CHIN
	HF	FACE
	HK	NECK/THROAT
	HM	MOUTH/LIPS
	HN	NOSE
	HS	SCALP
KNEE	KB	BOTH KNEES
	KS	KNEE
LEG, HIP, ANKLE, BUTTOCK	LB	BOTH LEGS, HIPS, ANKLES/BUTTOCKS
	LS	SINGLE LEG/HIP ANKLE/BUTTOCK
HAND	MB	BOTH HANDS
	MS	SINGLE HAND
FOOT	PB	BOTH FEET
	PS	SINGLE FOOT
TRUNK, BONES	R1	SINGLE COLLAR BONE
	R2	BOTH COLLAR BONES
	R3	SHOULDER BLADE
	R4	BOTH SHOULDER BLADES
	RB	RIB
	RS	STERNUM (BREAST BONE)
	RV	VERTEBRAE (SPINE; DISC)
	RZ	TRUNK BONES OTHER
SHOULDER	SB	BOTH SHOULDERS
	SS	SINGLE SHOULDER
THUMB	TB	BOTH THUMBS
	TS	SINGLE THUMB
TRUNK, INTERNAL ORGANS	V1	LUNG, SINGLE
	V2	LUNGS, BOTH
	V3	KIDNEY, SINGLE
	V4	KIDNEYS, BOTH
	VH	HEART
	VL	LIVER
	VR	REPRODUCTIVE ORGANS
	VS	STOMACH
	VV	INTESTINES
	VZ	TRUNK, INTERNAL; OTHER

f. NATURE OF INJURY – Select the most appropriate nature of injury from the list below. This nature of injury shall correspond to the *primary body part* selected in 5.e. above. Enter the nature of injury name on the line and place the corresponding CODE letters identifying the nature of injury in the box provided.

CODE	SOURCE OF INJURY NAME
00	ENVIRONMENTAL CONDITION
0	TEMPERATURE EXTREME (INDOOR)
_20	WEATHER (ICE, RAIN, HEAT, ETC.)
0230	FIRE, FLAME, SMOKE (NOT TOBACCO)
0240	NOISE
0250	RADIATION
0260	LIGHT
0270	VENTILATION
0271	TOBACCO SMOKE
0280	STRESS (EMOTIONAL)
0290	CONFINED SPACE
0300	MACHINE OR TOOL
0310	HAND TOOL (POWERED: SAW, GRINDER, ETC.)
0320	HAND TOOL (NONPOWERED)
0330	MECHANICAL POWER TRANSMISSION APPARATUS
0340	GUARD, SHIELD (FIXED, MOVEABLE, INTERLOCK)
0350	VIDEO DISPLAY TERMINAL
0360	PUMP, COMPRESSOR, AIR PRESSURE TOOL
0370	HEATING EQUIPMENT
0380	WELDING EQUIPMENT
0400	VEHICLE
0411	AS DRIVER OF PRIVATELY OWNED/RENTAL VEHICLE
0412	AS PASSENGER OF PRIVATELY OWNED/RENTAL VEHICLE
0421	DRIVER OF GOVERNMENT VEHICLE
0422	PASSENGER OF GOVERNMENT VEHICLE
0430	COMMON CARRIER (AIRLINE, BUS, ETC.)
0440	AIRCRAFT (NOT COMMERCIAL)
0450	BOAT, SHIP, BARGE
0500	MATERIAL HANDLING EQUIPMENT
0510	EARTHMOVER (TRACTOR, BACKHOE, ETC.)
0520	CONVEYOR (FOR MATERIAL AND EQUIPMENT)
0530	ELEVATOR, ESCALATOR, PERSONNEL HOIST
[illegible]	HOIST, SLING CHAIN, JACK
1	CRANE
	FORKLIFT
_0	HANDTRUCK, DOLLY
0600	DUST, VAPOR, ETC.
0610	DUST (SILICA, COAL, ETC.)
0620	FIBERS
0621	ASBESTOS
0630	GASES
0631	CARBON MONOXIDE
0640	MIST, STEAM, VAPOR, FUME
0641	WELDING FUMES
0650	PARTICLES (UNIDENTIFIED)
0700	CHEMICAL, PLASTIC, ETC.
0711	DRY CHEMICAL—CORROSIVE
0712	DRY CHEMICAL—TOXIC
0713	DRY CHEMICAL—EXPLOSIVE
0714	DRY CHEMICAL—FLAMMABLE
0721	LIQUID CHEMICAL—CORROSIVE
0722	LIQUID CHEMICAL—TOXIC
0723	LIQUID CHEMICAL—EXPLOSIVE
0724	LIQUID CHEMICAL—FLAMMABLE
0730	PLASTIC
0740	WATER
0750	MEDICINE
0800	INANIMATE OBJECT
0810	BOX, BARREL, ETC.
0820	PAPER
0830	METAL ITEM, MINERAL
0831	NEEDLE
0840	GLASS
0850	SCRAP, TRASH
0860	WOOD
0870	FOOD
1	CLOTHING, APPAREL, SHOES
	ANIMATE OBJECT
0911	DOG
0912	OTHER ANIMAL
0920	PLANT
0930	INSECT
0940	HUMAN (VIOLENCE)
0950	HUMAN (COMMUNICABLE DISEASE)
0960	BACTERIA, VIRUS (NOT HUMAN CONTACT)

CODE	SOURCE OF INJURY NAME
1000	PERSONAL PROTECTIVE EQUIPMENT
1010	PROTECTIVE CLOTHING, SHOES, GLASSES, GOGGLES
1020	RESPIRATOR, MASK
1021	DIVING EQUIPMENT
1030	SAFETY BELT, HARNESS
1040	PARACHUTE

INSTRUCTIONS FOR SECTION 6 — PUBLIC FATALITY

a. ACTIVITY AT TIME OF ACCIDENT — Select the activity being performed at the time of the accident from the list below. Enter the activity name on the line and the corresponding number in the box. If the activity performed is not identified on the list, select from the *most* appropriate primary activity area (water related, non-water related or other activity), the code number for "Other", and write in the activity being performed at the time of the accident.

WATER RELATED RECREATION

1. Sailing
2. Boating—powered
3. Boating—unpowered
4. Water skiing
5. Fishing from boat
6. Fishing from bank, dock or pier
7. Fishing while wading
8. Swimming/supervised area
9. Swimming/designated area
10. Swimming/other area
11. Underwater activities (skin diving, scuba, etc.)
12. Wading
13. Attempted rescue
14. Hunting from boat
15. Other

NON-WATER RELATED RECREATION

16. Hiking and walking
17. Climbing (general)
18. Camping/picnicking authorized area
19. Camping/picnicking unauthorized area
20. Guided tours
21. Hunting
22. Playground equipment
23. Sports/summer (baseball, football, etc.)
24. Sports/winter (skiing, sledding, snowmobiling etc.)
25. Cycling (bicycle, motorcycle, scooter)
26. Gliding
27. Parachuting
28. Other non-water related

OTHER ACTIVITIES

29. Unlawful acts (fights, riots, vandalism, etc.)
30. Food preparation/serving
31. Food consumption
32. Housekeeping
33. Sleeping
34. Pedestrian struck by vehicle
35. Pedestrian other acts
36. Suicide
37. "Other" activities

b. PERSONAL FLOTATION DEVICE USED — If fatality was water-related was the victim wearing a person flotation device? Mark the appropriate box.

INSTRUCTIONS FOR SECTION 7 — MOTOR VEHICLE ACCIDENT

a. TYPE OF VEHICLE — Mark appropriate box for each vehicle involved. If more than one vehicle of the same type is involved, mark both halves of the appropriate box. USACE vehicle(s) involved shall be marked in left half of appropriate box.

b. TYPE OF COLLISION — Mark appropriate box.

c. SEAT BELT — Mark appropriate box.

INSTRUCTIONS FOR SECTION 8 — PROPERTY/ MATERIAL INVOLVED

a. NAME OF ITEM — Describe all property involved in accident. Property/material involved means material which is damaged or whose use or misuse contributed to the accident. Include the name, type, model; also include the National Stock Number (NSN) whenever applicable.

b. OWNERSHIP — Enter ownership for each item listed. (Enter one of the following: *USACE; OTHER GOVERNMENT; CONTRACTOR PRIVATE*)

c. $ AMOUNT OF DAMAGE — Enter the total estimated dollar amount of damage (parts and labor) if any.

INSTRUCTIONS FOR SECTION 9 — VESSEL/ FLOATING PLANT ACCIDENT

a. TYPE OF VESSEL/FLOATING PLANT — Select the most appropriate vessel/floating plant from list below. Enter name and place corresponding number in box. If item is not listed below, enter item number for "OTHER" and write in specific type of vessel/ floating plant.

VESSEL/FLOATING PLANTS

1. BOW BOAT
2. SAIL BOAT
3. MOTOR BOAT
4. BARGE
5. DREDGE/HOPPER
6. DREDGE/SIDE CASTING
7. DREDGE/DIPPER
8. DREDGE/CLAMSHELL BUCKET
9. DREDGE/PIPE LINE
10. DREDGE/DUST PAN
11. TUG BOAT
12. OTHER

b. COLLISION/MISHAP — Select from the list below the object(s) that contributed to the accident or were damaged in the accident.

COLLISION/MISHAP

1. COLLISION W/OTHER VESSEL
2. UPPER GUIDE WALL
3. UPPER LOCK GATES
4. LOCK WALL
5. LOWER LOCK GATES
6. LOWER GUIDE WALL
7. HAULAGE UNIT
8. BREAKING TOW
9. TOW BREAKING UP
10. SWEPT DOWN ON DAM
11. BUOY/DOLPHIN/CELL
12. WHARF OR DOCK
13. OTHER

INSTRUCTIONS FOR SECTION 10 — ACCIDENT DESCRIPTION

DESCRIBE ACCIDENT — Fully describe the accident. Give the sequence of events that describe what happened leading up to and including the accident. Fully identify personnel and equipment involved and their role(s) in the accident. Ensure that relationships between personnel and equipment are clearly specified. Continue on blank sheets if necessary and attach to this report.

INSTRUCTIONS FOR SECTION 11 — CAUSAL FACTORS

a. Review thoroughly. Answer each question by marking the appropriate block. If any answer is yes, explain in item 13 below. Consider, as a minimum, the following:

(1) DESIGN — Did inadequacies associated with the building or work site play a role? Would an improved design or layout of the equipment or facilities reduce the likelihood of similar accidents? Were the tools or other equipment designed and intended for the task at hand?

(2) INSPECTION/MAINTENANCE — Did inadequately or improperly maintained equipment, tools, workplace, etc. create or worsen any hazards that contributed to the accident? Would better equipment, facility, work site or work activity inspections have helped avoid the accident?

(3) PERSON'S PHYSICAL CONDITION — Do you feel that the accident would probably not have occurred if the employee was in "good" physical condition? If the person involved in the accident had been in better physical condition, would the accident have been less severe or avoided altogether? Was over exertion a factor?

(4) OPERATING PROCEDURES — Did a lack of or inadequacy within established operating procedures contribute to the accident? Did any aspect of the procedures introduce any hazard to, or increase the risk associated with the work process? Would establishment or improvement of operating procedures reduce the likelihood of similar accidents?

(5) JOB PRACTICES — Were any of the provisions of the Safety and Health Requirements Manual (EM 385-1-1) violated? Was the task being accomplished in a manner which was not in compliance with an established job hazard analysis or activity hazard analysis? Did any established job practice (including EM 385-1-1) fail to adequately address the task or work process? Would better job practices improve the safety of the task?

(6) HUMAN FACTORS — Was the person under undue stress (either internal or external to the job)? Did the task tend toward overloading the capabilities of the person: i.e., did the job require tracking and reacting to many external inputs such as displays, alarms, or signals? Did the arrangement of the workplace tend to interfere with efficient task performance? Did the task require reach, strength, endurance, agility, etc., at or beyond the capabilities of the employee? Was the work environment ill-adapted to the person? Did the person need more training, experience, or practice in doing the task? Was the person inadequately rested to perform safely?

(7) ENVIRONMENTAL FACTORS — Did any factors such as moisture, humidity, rain, snow, sleet, hail, ice, fog, cold, heat, sun, temperature changes, wind, tides, floods, currents, dust, mud, glare, pressure changes, lightning, etc., play a part in the accident?

(8) CHEMICAL AND PHYSICAL AGENT FACTORS — Did exposure to chemical agents (either single shift exposure or long-term exposure) such as dusts, fibers (asbestos, etc.), silica, gases (carbon monoxide, chlorine, etc.), mists, steam, vapors, fumes, smoke, other particulates, liquid or dry chemicals that are corrosive, toxic, explosive or flammable, by-products of combustion or physical agents such as noise, ionizing radiation, non-ionizing radiation (UV radiation created during welding, etc.) contribute to the accident/incident?

(9) OFFICE FACTORS — Did the fact that the accident occurred in an office setting or to an office worker have a bearing on its cause? For example, office workers tend to have less experience and training in performing tasks such as lifting office furniture. Did physical hazards within the office environment contribute to the hazard?

(10) SUPPORT FACTORS — Was the person using an improper tool for the job? Was inadequate time available or utilized to safely accomplish the task? Were less than adequate personnel resources (in terms of employee skills, number of workers, and adequate supervision) available to get the job done properly? Was funding available, utilized, and adequate to provide proper tools, equipment, personnel, site preparation, etc?

(11) PERSONAL PROTECTIVE EQUIPMENT — Did the person fail to use appropriate personal protective equipment (gloves, eye protection, hard-toed shoes, respirator, etc.) for the task or environment? Did protective equipment provided or worn fail to provide adequate protection from the hazard(s)? Did lack of or inadequate maintenance of protective gear contribute to the accident?

(12) DRUGS/ALCOHOL — Is there any reason to believe the person's mental or physical capabilities, judgement, etc., were impaired or altered by the use of drugs or alcohol? Consider the effects of prescription medicine and over the counter medications as well as illicit drug use. Consider the effect of drug or alcohol induced "hangovers".

b. WRITTEN JOB/ACTIVITY HAZARD ANALYSIS — Was a written Job/Activity Hazard Analysis completed for the task being performed at the time of the accident? Mark the appropriate box. *If one was performed, attach a copy of the analysis to the report.*

INSTRUCTIONS FOR SECTION 12 — TRAINING

a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK? — For the purpose of this section "trained" means the person has been provided the necessary information (either formal and/or on-the-job (OJT) training) to competently perform the activity/task in a safe and healthful manner.

b. TYPE OF TRAINING — Mark the appropriate box that best indicates the type of training; (classroom or on-the-job) that the injured person received before the accident happened.

c. DATE OF MOST RECENT TRAINING — Enter the month, day, and year of the last *formal* training completed that covered the activity-task being performed at the time of the accident.

NSTRUCTIONS FOR SECTION 13 — CAUSES

- DIRECT CAUSES — The direct cause is that single factor which most directly lead to the accident. See examples below.

- INDIRECT CAUSES — Indirect causes are those factors which contributed to but did not directly initiate the occurrence of the accident.

Examples for section 13:

a. Employee was dismantling scaffold and fell 12 feet from unguarded opening.
Direct cause: failure to provide fall protection at elevation.
Indirect causes: failure to enforce USACE safety requirements: improper training/motivation of employee (possibility that employee was not knowledgeable of USACE fall protection requirements or was lax in his attitude towards safety); failure to ensure provision of positive fall protection whenever elevated; failure to address fall protection during scaffold dismantling in phase hazard analysis.

b. Private citizen had stopped his vehicle at intersection for red light when vehicle was struck in rear by USACE vehicle. (note USACE vehicle was in proper/safe working condition).
Direct cause: failure of USACE driver to maintain control of and stop USACE vehicle within safe distance.
Indirect cause: Failure of employee to pay attention to driving (defensive driving).

INSTRUCTIONS FOR SECTION 14 — ACTION TO ELIMINATE CAUSE(S)

DESCRIPTION — Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent reoccurrence of similar accidents/illnesses. Continue on blank sheets of paper if necessary to fully explain and attach to the completed report form.

INSTRUCTIONS FOR SECTION 15 — DATES FOR ACTION

a. BEGIN DATE — Enter the date when the corrective action(s) identified in Section 14 will begin.

b. COMPLETE DATE — Enter the date when the corrective action(s) identified in Section 14 will be completed.

c. TITLE AND SIGNATURE — Enter the title and signature of supervisor completing the accident report. For a GOVERNMENT employee accident/illness the immediate supervisor will complete and sign the report. For PUBLIC accidents the USACE Project Manager/Area Engineer responsible for the USACE property where the accident happened shall complete and sign the report. For CONTRACTOR accidents the Contractor's project manager shall complete and sign the report and provide to the USACE supervisor responsible for oversight of that contractor activity. This USACE Supervisor shall also sign the report. Upon entering the information required in 15.d, 15.e and 15.f below, the responsible USACE supervisor shall forward the report for management review as indicated in Section 16.

d. DATE SIGNED — Enter the month, day, and year that the report was signed by the responsible supervisor.

e. ORGANIZATION NAME — For GOVERNMENT employee accidents enter the USACE organization name (Division, Branch, Section, etc.) of the injured employee. For PUBLIC accidents enter the USACE organization name for the person identified in block 15.c. For CONTRACTOR accidents enter the USACE organization name for the USACE office responsible for providing contract administration oversight.

f. OFFICE SYMBOL — Enter the latest complete USACE Office Symbol for the USACE organization identified in block 15.e.

INSTRUCTIONS FOR SECTION 16 — MANAGEMENT REVIEW (1st)

1ST REVIEW — Each USACE FOA shall determine who will provide 1st management review. The responsible USACE supervisor in section 15.c shall forward the completed report to the USACE office designated as the 1st Reviewer by the FOA. Upon receipt, the Chief of the Office shall review the completed report, mark the appropriate box, provide substantive comments, sign, date, and forward to the FOA Staff Chief (2nd review) for review and comment.

INSTRUCTIONS FOR SECTION 17 — MANAGEMENT REVIEW (2nd)

2ND REVIEW — The FOA Staff Chief (i.e., FOA Chief of Construction, Operations, Engineering, Planning, etc.) shall mark the appropriate box, review the completed report, provide substantive comments, sign, date, and return to the FOA Safety and Occupational Health Office.

INSTRUCTIONS FOR SECTION 18 — SAFETY AND OCCUPATIONAL HEALTH REVIEW

3RD REVIEW — The FOA Safety and Occupational Health Office shall review the completed report, mark the appropriate box, ensure that any inadequacies, discrepancies, etc. are rectified by the responsible supervisor and management reviewers, provide substantive comments, sign, date and forward to the FOA Commander for review, comment, and signature.

INSTRUCTION FOR SECTION 19 — COMMAND APPROVAL

4TH REVIEW — The FOA Commander shall (to include the person designated Acting Commander in his absence) review the completed report, comment if required, sign, date, and forward the report to the FOA Safety and Occupational Health Office. Signature authority shall not be delegated.

APPENDIX E

MEDICAL SURVEILLANCE PROGRAM

The medical surveillance program will include the following components:

OCCUPATIONAL HISTORY

A description of previous employment, work responsibilities and off the job hobbies or activities that have involved potential exposure(s) to chemical, biological, physical or ergonomic stressors. Additional information pertaining to specific incidents regarding known exposures to workplace or off-the-job exposures that resulted in an injury or illness must be provided.

OCCUPATIONAL HISTORY

A compilation of information regarding height, weight, blood pressure, past illnesses (physical or mental), physical injuries (broken bones, surgeries), smoking history, respiratory illnesses (lung disorders, asthma, bronchitis, pulmonary restrictions), alcohol consumption, exercise rate, vaccinations, allergies (skin or lung disorders) and family medical history.

PHYSICAL EXAMINATION

Routine physical examination designed to screen for gross abnormalities.

LABORATORY TESTS

On-site personnel shall receive a basic panel of blood counts and chemistries to evaluate metabolic, kidney, liver, endocrine and blood forming functions. The following blood tests are the desired minimum:

- White blood cell, differential cell count and platelet estimate
- Hemoglobin and/or hematocrit
- Albumin, globulin and total protein
- Total bilirubin
- Serum glutamic oxalacetic transaminase (SGOT)
- Lactic dehydrogenase
- Inorganic phosphate
- Alkaline phosphatase
- Calcium
- Phosphorus
- Uric acid
- Creatinine
- Urea nitrogen
- Cholesterol
- Glucose

URINE TESTS

On-site personnel shall have a routine urinalysis that includes:

- Specific gravity
- Microscopic examination
- Acetone
- Albumin
- pH
- Protein
- Glucose

PULMONARY FUNCTION TEST

Pulmonary function testing is a requirement of the baseline medical examination. At minimum, the tests shall include lung ventilation evaluations of forced expiratory volume in one second (FEV_1) and forced vital capacity (FVC).

X-RAY

X-Ray examinations should be obtained only when clinically indicated by other testing procedures, (i.e., pulmonary function testing). A chest X-ray, when required, should be a standard 14 by 17 inch P-A (posterior-anterior) exposure. However, no chest X-ray shall be obtained if the employee has had one within the past three years or is pregnant. Records should be requested from the former examining physician, radiologist or hospital. All films shall be read or reviewed by a board-certified "B" reader physician or other competent medical specialist.

VISION AND HEARING TEST

Vision testing that measures refraction, depth perception and color vision should be administered by a qualified technician or physician.

Audiometric testing performed at 500, 1000, 2,000, 3,000, 4,000 and 8,000 hertz pure tone should be conducted in an approved booth (29CFR1910.95, Appendix D) by a qualified technician and the results read by a certified audiologist or a physician familiar with audiometric evaluation.

At the completion of the examination, the employee will receive a written opinion concerning their medical and physical status. Should any restrictions be found during the physical examination it will be conveyed to the employee and the information included in their personnel file.

APPENDIX F

RESPIRATORY FIT TESTING PROTOCOL

When **Level C** is required, all personnel will be fit-tested with air purifying respirators prior to initiation of site work. Fit testing will qualitative using the oxystannic chloride testing method. Personnel will be allowed to select a respirator with which they can achieve a proper face seal. A written record of results of the fit tests and the equipment issued is necessary. The OSO is responsible to assure that the JMM Respiratory Training Completion Form is completed prior to use of respiratory protective equipment by any JMM site worker.

Personnel will be instructed in the uses and limitations of air purifying respirators. It will be stressed that any breakthrough (odor, taste or irritation) or an increased resistance is cause to immediately leave the exclusion zone. Upon return to the support zone, the respirator must be thoroughly inspected. Cartridges will be replaced as appropriate.

Non-disposable respirators will be cleaned with a mild detergent, air dried and inspected after each use. Each respirator will be stored in a plastic bag prior to the next use.

The following shall be the standard operating protocol for Respirator Fit Testing Using Oxystannic Chloride Irritant Smoke:

Qualitative fit testing involves two distinct steps: performance of positive/negative pressure checks and then fit testing using oxystannic chloride (smoke tubes) or isoamyl acetate (banana oil). Testing with isoamyl acetate is less satisfactory for three reasons: people have varying odor thresholds for the substance, the possibility of olfactory fatigue and the fact that personnel may not acknowledge breakthrough even when they are aware it is occurring. Oxystannic chloride is an irritant smoke that will elicit an involuntary cough upon breakthrough.

Before conducting the negative and positive pressure checks, the wearer shall be told to "seat" his/her mask by rapidly moving the head side-to-side and up and down, taking a few deep breaths. The pressure checks will be conducted as follows:

- Negative pressure check: the wearer closes off the respirator inhalation valve and inhales. A vacuum and partial inward collapse of the mask should result. If a vacuum can not be maintained for at least 10 seconds, re-adjust the facepiece and try again.

- Positive pressure check: the wearer closes off the respirator exhalation valve and breaths out gently. Air should escape through any gaps in the seal.

- After the pressure checks are completed the wearer shall be questioned regarding the comfort of the respirator. If it has become uncomfortable, another size or model of respirator shall be tried.

When the respirator has passed the pressure checks, the wearer is ready to proceed with the qualitative fit test using oxystannic chloride smoke tubes:

- Facepieces equipped with high efficiency dust mist filters will be used for the qualitative fit test.

- A large transparent plastic bag may be used as the fit test chamber by hanging it from a door frame.

- Personnel will be instructed to keep their eyes tightly closed when being fit tested for half-face air purifying respirators.

- The tester shall direct a stream of irritant smoke towards the faceseal area of the test subject. Start at least 12 inches from the facepiece and gradually move to within one inch, moving around the whole perimeter of the mask.

- The test subject will move his/her head around, count out loud slowly from one to ten, and take deep breaths while the respirator face seal is being challenged by the irritant smoke.

- If the irritant smoke produces an involuntary reaction (cough) by the test subject, the test shall be stopped and the respirator rejected. If the test subject feels comfortable with the face seal achieved, the brand, model and size shall be noted on the JMM Respiratory Training Completion Form and submitted to the OSO.

James M. Montgomery
Consulting Engineers Inc.

REPIRATORY FIT TEST RECORD

Name: _____ Date: _____
(Please Print)

Respirator:

Make: _____ Model: _____ Size: _____

	Isoamyl Acetate	**Irritant Smoke**
Fit	_____	_____
No Fit	_____	_____

Comfort:

Very Comfortable: _____ Tolerable: _____

Comfortable: _____ Uncomfortable: _____

Comments: _____

_____

_____

Signature: _____ Certified by: _____

_____
Name Printed

Date: _____

Respirator:

Make: _____ Model: _____ Size: _____

	Isoamyl Acetate	**Irritant Smoke**
Fit	_____	_____
No Fit	_____	_____

Comfort:

Very Comfortable: _____ Tolerable: _____

Comfortable: _____ Uncomfortable: _____

Comments: _____

_____

_____

Signature: _____ Certified by: _____

_____
Name Printed

APPENDIX G
HOT WEATHER OPERATIONS

FINAL
HEALTH AND SAFETY PLAN
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
PHASES 2B AND 3
INTERMEDIATE MAINTENANCE FACILITY SITE
ENGINEERING EVALUATION/COST ANALYSIS

DATED 01 MAY 1991

APPENDIX G
HOT WEATHER OPERATIONS
PAGE G-1

FINAL
HEALTH AND SAFETY PLAN
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
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TABLE G-1

CLASSIFICATION, MEDICAL ASPECTS, AND PREVENTION OF HEAT ILLNESS

Category	Clinical Features	Predisposing Factors	Underlying Physiological Disturbance	Treatment	Prevention
1. Temperature Regulation					
Heat Stroke and Heat Hyperpyrexia	Heat Stroke: 1) Hot dry skin: red, mottled or cyanotic. 2) High and rising T_c 40.5°C and over. 3) Brain disorders: mental confusion, loss of consciousness, convulsions, coma as T_c continues to rise. Fatal if treatment delayed. Heat hyperpyrexia: milder form. T_c lower; less severe brain disorders, some sweating.	1) Sustained exertion in heat by unacclimatized workers. 2) Lack of physical fitness and obesity. 3) Recent alcohol intake. 4) Dehydration. 5) Individual susceptibility. 6) Chronic cardiovascular disease in the elderly.	Heat Stroke: Failure of the central drive for sweating (cause unknown) leading to loss of evaporative cooling and an uncontrolled accelerating rise in T_c. Heat Hyperpyrexia: Partial rather than complete failure of sweating.	Heat Stroke: Immediate and rapid cooling by immersion in chilled water with massage or by wrapping in wet sheet with vigorous fanning with cool dry air. Avoid overcooling. Treat shock if present. Heat Hyperpyrexia: Less drastic cooling required if sweating still present and T_c < 40.5°C.	Medical screening of workers. Selection based on health and physical fitness. Acclimatization for 8-14 days by graded work and heat exposure. Monitoring workers during sustained work in severe heat.
2. Circulatory Hypostasis					
Heat Syncope	Fainting while standing erect and immobile in heat.	Lack of acclimatization.	Pooling of blood in dilated vessels of skin and lower parts of body.	Remove to cooler area. Recovery prompt and complete.	Acclimatization: Intermittent activity to assist venous return to heart.

TABLE G-1 (Continued)

CLASSIFICATION, MEDICAL ASPECTS, AND PREVENTION OF HEAT ILLNESS

Category	Clinical Features	Predisposing Factors	Underlying Physiological Disturbance	Treatment	Prevention
3. Salt and/or Water Depletion					
a) Heat Exhaustion	1) Fatigue, nausea, headache, giddiness. 2) Skin clammy and most. Complexion pale, muddy or hectic flush. 3) May faint on standing with rapid thready pulse and low blood pressure. 4) Oral temperature normal or low but rectal temperature usually elevated (37.5-38.5°C). Water restriction type: urine volume small, highly concentrated. Salt restriction type: urine less concentrated, chlorides less than 3 g/1.	1) Sustained exertion in heat. 2) Lack of acclimatization. 3) Failure to replace water and/or salt lost in sweat.	1) Dehydration from deficiency of water and/or salt intake. 2) Depletion of circulating blood volume. 3) Circulatory strain from competing demands for blood flow to skin and to active muscles.	Remove to cooler environment. Administer salted fluids by mouth or give I-V infusions of normal saline (.9%) if unconscious or vomiting. Keep at rest until urine volume and salt content indicate that salt and water balances have been restored.	Acclimatize workers using a breaking-in schedule for 1 or 2 weeks. Supplement dietary salt only during acclimatization during acclimatization. Ample drinking water to be available at all times and to be taken frequently during work day.

TABLE G-1 (Continued)

CLASSIFICATION, MEDICAL ASPECTS, AND PREVENTION OF HEAT ILLNESS

Category	Clinical Features	Predisposing Factors	Underlying Physiological Disturbance	Treatment	Prevention
b) Heat Cramps	Painfull spasms of muscles used during work (arms, legs, or abdominal). Onset during or after work hours.	1) Heavy sweating during hot work. 2) Drinking large volumes of water without replacing salt loss.	Loss of body salt in sweat. Water intake dilutes electrolytes. Water enters muscles, causing spasm.	Salted liquids by mouth, or more prompt relief by I-V infusion.	Adequate salt intake with meals. In unacclimatized men, provided salted (0.1%) drinking water.
4. Skin Eruptions					
a) Heat Rash (miliaria rubra; "prickly heat")	Profuse tiny raised red vesicles (blister-like) on affected areas. Pricking sensations during heat exposure.	Unrelieved exposure to humid heat with skin continuously wet with unevaporated sweat.	Plugging of sweat gland ducts with retention of sweat and inflammation reaction.	Mild drying lotions. Skin cleanliness to prevent infection.	Cooled sleeping quarters to allow skin to dry between heat exposures.
b) Anhidrotic Heat Exhaustion (miliaria profunda)	Extensive areas of skin which do not sweat on heat exposure, but present goose flesh appearance, which subsides with cool environments. Associated with incapacitation in heat.	Weeks or months of constant exposure to climatic heat with previous history of extensive heat rash and sunburn. Rarely seen except in troops in wartime.	Skin trauma (heat rash; sunburn) causes sweat retention deep in skin. Reduce evaporative cooling causes heat intolerance	No effective treatment available for anhidrotic areas of skin. Recovery of sweating occurs gradually on return to cooler climate.	Treat heat rash and avoid further skin trauma by sunburn. Periodic relief from sustained heat.
5. Behavioral Disorders					
a) Heat Fatigue - Transient	Impaired performance of skilled sensorimotor, mental, or vigilance tasks, in heat.	Performance decrement greater in unacclimatized, and unskilled men.	Discomfort and physiological strain.	Not indicated unless accompanied by other heat illness.	Acclimatization and training for work in the heat.

TABLE G-1 (Continued)

CLASSIFICATION, MEDICAL ASPECTS, AND PREVENTION OF HEAT ILLNESS

Category	Clinical Features	Predisposing Factors	Underlying Physiological Disturbance	Treatment	Prevention
b) Heat Fatigue - Chronic	Reduced performance capacity. Lowering of self-imposed standards of social behavior (e.g., alcoholic overindulgence). Inability to concentrate, etc.	Workers at risk come from homes in temperate climates, for long residence in tropical latitudes.	Psychosocial stresses probably as important as heat stress. May involve hormonal imbalance but no positive evidence.	Medical treatment for serious cases. Speedy relief of symptoms on returning home.	Orientation on life abroad (customs, climate, living, conditions, etc).

TABLE G-2

SIGNS AND SYMPTOMS OF HEAT STRESS[a]

- **Heat rash** may result from continuous exposure to heat or humid air.

- **Heat cramps** are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include:

  - muscle spasms
  - pain in the hands, feet, and abdomen

- **Heat exhaustion** occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include:

  - pale, cool, moist skin
  - heavy sweating
  - dizziness
  - nausea
  - fainting

- **Heat stroke** is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Signs and symptoms are:

  - red, hot, usually dry skin
  - lack of or reduced perspiration
  - nausea
  - dizziness and confusion
  - strong, rapid pulse
  - coma

TABLE G-3

SUGGESTED FREQUENCY OF PHYSIOLOGICAL MONITORING FOR FIT AND ACCLIMATIZED WORKERS[a]

Adjusted Temperature[b]	Normal Work Ensemble[c]	Impermeable Ensemble
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5° - 90°F (30.8° - 32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5° - 87.5°F (28.1° - 30.8°C)	After each 90 minutes of work	After each 60 minutes of work
77.5° - 82.5°F (25.3° - 28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5° - 77.5°F (22.5° - 25.3°C)	After each 150 minutes of work	After each 120 minutes of work

[a] For work levels of 250 kilocalories/hour.

[b] Calculate the adjusted air temperature (ta adj) by using this equation: ta adj °F = ta °F + (13 x % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud over and a sharp, distinct shadow; 0 percent sunshine = no shadows).

[c] A normal work ensemble consist of cotton coveralls or other cotton clothing with long sleeves and pants.

APPENDIX H

LEVEL C DECONTAMINATION PROCEDURES

A. EQUIPMENT WORN

The decontamination procedure outlined is for field personnel wearing Level "C" protection consisting of:

- One-piece chemical-resistant suit
- Air purifying respirator
- Hard hat with eye protection
- Boot covers (optional)
- Inner and outer gloves

B. PROCEDURE FOR DECONTAMINATION

All decontamination procedures will take place in the Contamination Reduction Zone (CRZ).

Station 1 Equipment Drop

Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, clipboards, etc.) in different containers with plastic liners. Segregation at this drop point reduces the probability of cross-contamination.

Equipment: various size containers
plastic liners

Station 2 Boot Cover Removal

Remove boot covers (if used) and dispose of in container with plastic liner or save for next use.

Equipment: container (30-50 gallons)
plastic liners
bench or stool

Station 3 Outer Glove Removal

Remove outer gloves and dispose in container with plastic liner or save for next use.

Equipment: container (20-30 gallons)
plastic liners

Station 4 Chemical-Resistant Disposal Suit Removal

Remove suit. Deposit in 55-gallon drum for disposal.

Equipment: container (55-gallon drum)
bench or stool

Station 5 Hardhat with Eye Protection Removal

Remove hardhat. Avoid touching face with gloves. Save for next use.

Station 6 Air Purifying Respirator Removal

Remove air purifying respirator and place in a designated location. Facepieces will be disassembled, cleaned, dried, inspected and maintained prior to the next use.

Station 7 Inner Glove Removal

Remove the inner gloves last and dispose of in a designated 55-gallon drum.

Equipment: container (55-gallon drum)

APPENDIX I

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