CLEAN

Contract No. N262474-88-D-5086

Contract Task Order 0107

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ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

REMEDIAL INVESTIGATION/FEASIBILITY STUDY
HEALTH AND SAFETY PLAN
FINAL

Prepared for:

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REMEDIAL INVESTIGATION/FEASIBILITY STUDY

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ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

CONTRACT TASK ORDER NO. 0107
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Prepared For

Department of the Navy

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REMEDIAL INVESTIGATION/FEASIBILITY STUDY
HEALTH AND SAFETY PLAN

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ABBREVIATIONS AND ACRONYMS

1,1,1-TCA	1,1,1-Trichloroethane
2,4-D	2,4-Dichlorophenoxyacetic Acid
μg	Micrograms
μmhos	Micromhos
AA	Atomic Absorption Spectroscopy
AAL	Applied Action Level
ACGIH	American Conference of Governmental Industrial Hygienists
ANSI	American National Safety Institute
ARAR	Applicable or Relevant and Appropriate Requirements
ASTM	Association of Soil Testing and Materials
AWQC	Ambient Water Quality Criteria
BETX	Benzene, Ethylbenzene, Toluene and Xylene
BLM	Bureau of Land Management
BNA	Base/Neutral/Acid Extractable Compound
BTX	Benzene, Toluene and Xylene
°C	Degrees Celsius
CAC	California Administrative Code
CAL-OSHA	California Occupational Safety & Health Administration
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CGI	Combustible Gas/Oxygen Indicator
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	Contract Laboratory Program
cm	Centimeter
COC	Chain-Of-Custody
CPF	Cancer Potency Factor
CRL	Certified Reporting Limits
CRP	Community Relations Plan
CRQL	Contract Required Quantitation Limits
CTO	Contract Task Order
CWA	Clean Water Act
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DHS	Department of Health Services (California)
DI	Deionized water
DOD	Department of Defense
DOT	Department of Transportation
DQO	Data Quality Objective
EC	Electric Conductance
EIC	Engineer-In-Charge
EPA	Environmental Protection Agency
eV	Electron-Volt
°F	Degrees Fahrenheit
FID	Flame Ionization Detector
FS	Feasibility Study
FSP	Field Sampling Plan
FTL	Field Team Leader
GC	Gas Chromatograph

ABBREVIATIONS AND ACRONYMS
(Continued)

GCMS	Gas Chromatography/Mass Spectrometry
GMC	Geiger-Mueller Counter
GPR	Ground Penetrating Radar
HCl	Hydrochloric Acid
HEPA	High Efficiency Particulate Air
Hg	Mercury
HHA	Health Hazard Assessment
HLA	Harding Lawson Associates
HNO_3	Nitric Acid
hr	Hour
H_2SO_4	Sulphuric Acid
HSP	Health and Safety Plan
IAS	Initial Assessment Study
ICP	Inductively Coupled Plasma Emission Spectroscopy
ID	Inside Diameter
IRP	Installation Restoration Program
JMM	James M. Montgomery, Consulting Engineers, Inc.
KCl	Potassium Chloride
kg	Kilograms
l	Liter
LEL	Low Explosive Limit
LUFT	Leaking Underground Fuel Tank
MCL	Maximum Contaminant Levels
MCLG	Maximum Contaminant Level Goals
mg	Milligrams
ml	Milliliter
mph	Miles Per Hour
MPN	Most Probable Number
MPR	Monthly Progress Reports
mR/hr	Millirem Per Hour
MSHA	Mine Safety and Health Administration
MSL	Mean Sea Level
mR	Milliroentgen
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NACIP	Navy Assessment and Control of Installation Pollutants
NAS	Naval Air Station
$NA_2S_2O_3$	Sodium thiosulfate
nCi	Nanocuries
NCP	National Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NH_3	Ammonia
NIOSH	National Institute for Occupational Safety and Health
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OC	Organochlorine Pesticides
OD	Outside Diameter
OP	Organophosphorous Pesticides
OSO	On-Site Safety Officer
OSHA	Occupational Safety and Health Administration
OUFS	Operable Unit Feasibility Study

ABBREVIATIONS AND ACRONYMS
(Continued)

OVA	Organic Vapor Analyzer
PAO	Public Affairs Office
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PCB	Polychlorinated Biphenyl
PCE	Perchloroethene (-ylene), also known as Tetrachloroethene
pCi	Picocuries
PEL	Permissible Exposure Limit
PHSC	Project Health and Safety Coordinator
PID	Photoionization Detector
PM	Project Manager
PPE	Personal Protective Equipment
PRC	PRC Environmental Management, Inc.
PRM	Program Manager
PVC	Polyvinyl Chloride
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
R&D	Research and Development
RA	Risk Assessment
RAS	Routine Analytical Services
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limit
RfD	Reference Dose
RI	Remedial Investigation
ROD	Record of Decision
RPD	Relative Percent Difference
RWQCB	Regional Water Quality Control Board
SALs	State Action Levels
SARA	Superfund Amendments and Reauthorization Act
SAS	Special Analytical Services
SDWS	Secondary Drinking Water Standard
SMCL	Secondary Maximum Contaminant Level
SOP	Standard Operating Procedures
SOW	Statements of Work
SWAT	Solid Waste Assessment Test
SWPL	Salt Wells Propulsion Laboratory
TAL	Target Analyte List
TBC	"To Be Considered"
TBD	To Be Determined
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethene (-ylene)
TCL	Target Compound List
TDS	Total Dissolved Solids
TFH	Total Fuel Hydrocarbons
TIC	Tentatively Identified Compounds
TLV	Threshold Limit Value
TKN	Total Kjeldahl Nitrogen
TM	Technical Memorandum
TMV	Toxicity, Mobility, and Volume
TOC	Total Organic Carbon
TOX	Total Organic Halides

ABBREVIATIONS AND ACRONYMS
(Continued)

TPH	Total Petroleum Hydrocarbons
TWA	Time-Weighted Average
USA	Underground Service Alert

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 Order 0107 of Contract N62474-88-D5086 for a Remedial Investigation/Feasibility Study (RI/FS) 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 at two potential hazardous waste sites and the area upgradient of the waste sites, the runway area, at ANAS.

This HSP meets the federal and California Occupational Safety and Health Administration (OSHA), United States Environmental Protection Agency (EPA) and California Department of Health Services (DHS) requirements. OSHA requires employers involved in hazardous waste activities to comply with Title 29 (OSHA) of the Code of Federal Regulations, Part 1910, Section 120 (29 CFR 1910.120), "Hazardous Waste Operations and Emergency Response." JMM must comply with 29 CFR 1910, Occupational Safety and Health Standards and 29 CFR 1926, Construction Safety and Health Standards, and California Code of Regulations (CCR), Title 8, General Industry Safety Orders and Construction Safety Orders. Working conditions may necessitate modification of this plan. No deviations from this plan may be implemented without the prior notification and approval of the JMM Project Health and Safety Coordinator (JMM PHSC) and PRC Comprehensive Long-Term Environmental Action Navy (CLEAN) Health and Safety Program Manager, except in emergency situations.

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, EPA 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, EPA, DHS, PRC Navy CLEAN, and JMM requirements.

1.2 SITE 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).

1.2.1 Project Description

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

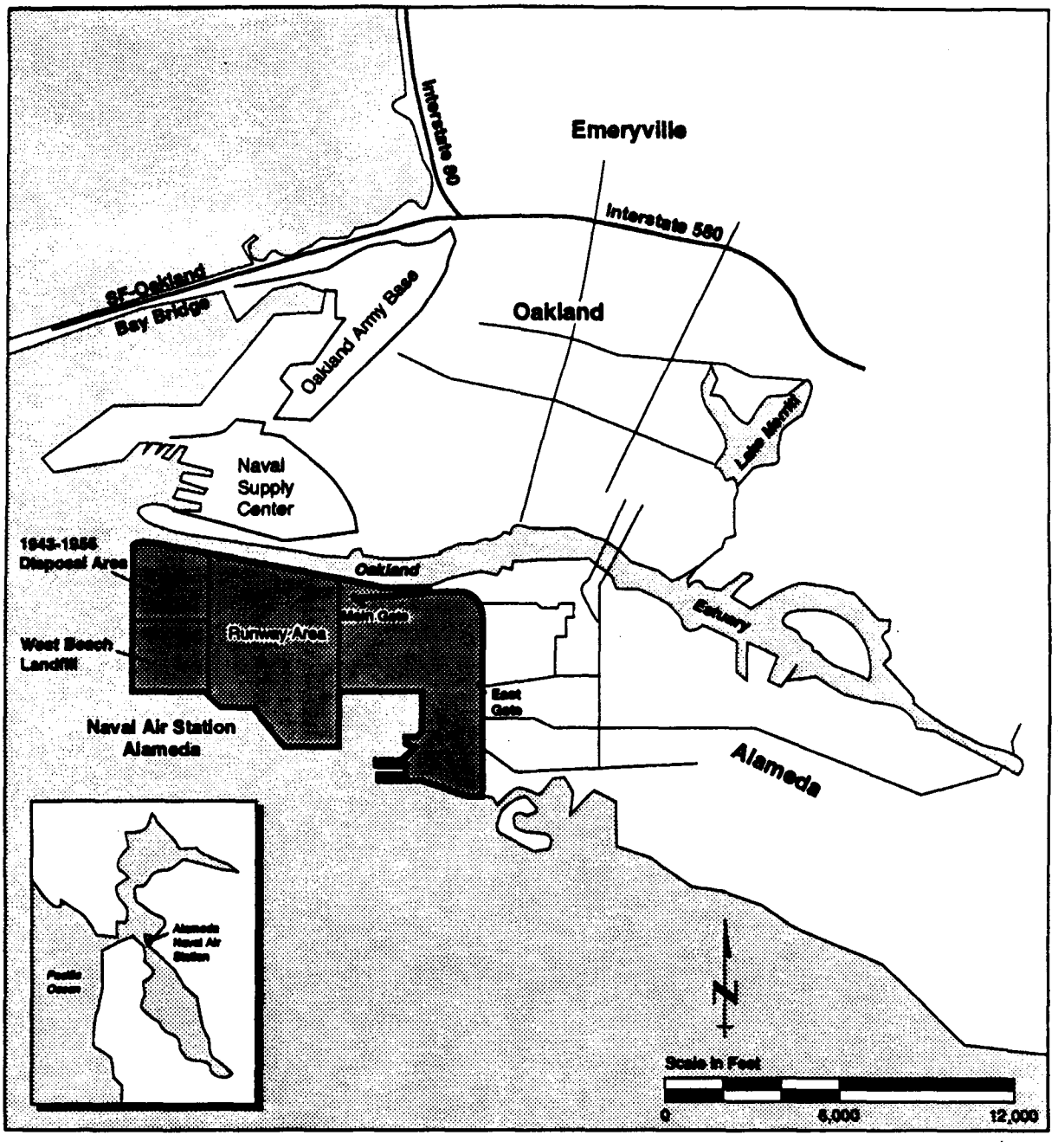
- 1943 - 1956 Disposal Area
- West Beach Landfill
- Runway Area
- West Beach Landfill Surface Soil Samples, Wetland Water and Sediment Sampling
- Offshore Sediment Sampling

1.2.2 Site History, Site Hazard Summary, and Proposed Investigation Activities

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 with the addition of water and boating safety at two 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.

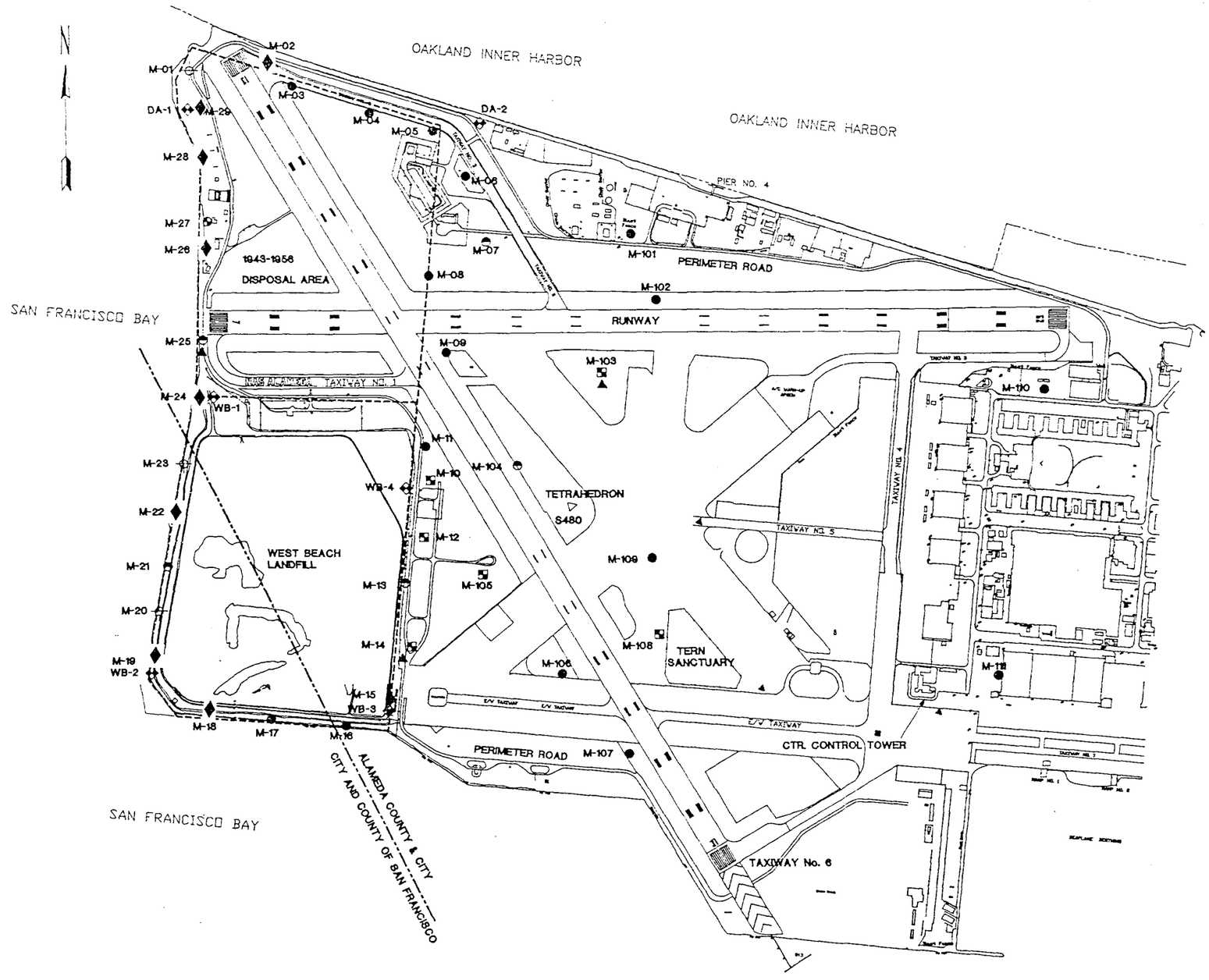
To aid in the identification of chemical hazards, a brief history of site use and the predominant known, or suspected contaminants of concern are described in Sections 1.2.2.1, 1.2.2.2, 1.2.2.3, 1.2.2.4, and 1.2.2.5. Details regarding the specific sampling collection techniques and RI/FS locations are provided in the Field Sampling Plan (FSP). In summary, field surveying and sample collection techniques to be employed at the ANAS sites are:

- Soil borings and soil sampling
- Monitoring well installation and groundwater sampling



SITE LOCATION MAP
ALAMEDA NAVAL AIR STATION

FIGURE 1-1



LEGEND:

- Proposed monitoring well location, each site to have one well: one well screened within the uppermost water bearing zone.
- Proposed monitoring well location, each site to have two wells: one well screened within the uppermost water bearing zone, one well screened within the lower portion of the "Bay Mud Sand" zone.
- Proposed monitoring well location, each site to have three wells: one well screened within the uppermost water bearing zone, one well screened in the lower portion of the "Bay Mud Sand" zone, and one well screened within the upper portion of the second water bearing zone.
- Proposed monitoring well location, each site to have three wells: one well screened within the uppermost water bearing zone, one well screened in the lower portion of the "Bay Mud Sand" zone, and one well screened within the lower portion of the second water bearing zone.
- Proposed monitoring well location, each site to have four wells: one well screened within the uppermost water bearing zone, one well screened in the lower portion of the "Bay Mud Sand" zone, one well screened within the upper portion of the second water bearing zone, and one well screened within the lower portion of the second water bearing zone.
- Proposed monitoring well location, one well screened throughout the second water bearing zone.
- Deep exploration boring location drilled by Canonie, May 1990.
- Monitoring well location drilled by JMM, Nov. and Dec. 1990. Each site has two wells: one well screened within the uppermost water bearing zone, and one well screened within the upper portion of the second water bearing zone.

SCALE IN FEET

500 0 500 1,000

GROUNDWATER MONITOR WELL LOCATIONS
NAVAL AIR STATION
ALAMEDA, CALIFORNIA

PREPARED FOR

WESTERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
SAN BRUNO, CALIFORNIA

JAMES M. MONTGOMERY
CONSULTING ENGINEERS, INC.

MARCH 1991

Figure 1-2

- Collection of surface water and sediment samples from Wetland Area in the West Beach Landfill
- Offshore sediment sampling

1.2.2.1 1943-1956 Disposal Area. Waste disposal operations at the 1943-1956 Disposal Area began in the early 1940s and continued through 1956. Estimates of the quantities of waste material disposed of range from 15,000 tons to 200,000 tons; exact quantities are unknown. It is reported by base employees that all waste generated by the base went to the landfill except waste dumped directly to the storm sewers. Aerial photographs from March 1947 and September 1949 show that most of the waste disposal activity was concentrated in the northern half of the site. Closure of the site began in 1952 in order to lengthen runways 13-31 and 7-25. An aerial photo from August 1953 indicate the present runways were in place over the landfill.

Construction details of the 1943-1956 Disposal Area are limited. Prior to 1940 the site was part of the San Francisco Bay. The area just to the east of the disposal area was also part of the bay until it was filled with dredge spoils in the late 1930s. Water depths from nautical charts of the day indicate water depths in the vicinity of the 1943-1956 Disposal Area varied from 4 to 18 feet deep, relative to mean lower low water. A rock sea wall was constructed prior to 1915 and this served as a jetty which protected the harbor, and included railroad tracks along its length. Originally the landfill was filled with dredge spoils during the early 1940s.

Materials known to have been disposed of at the site include old aircraft engines, cooked garbage, cables, scrap metal, waste oil, paint waste, solvents, cleaning compounds, construction debris, and radioactive material.

The disposal method reportedly used consisted of digging trenches to the water table, filling them with waste, and compacting the material with a bulldozer. Cover material was applied on an irregular basis. Eventually the whole disposal area was covered with soil to an unrecorded depth (E&E, 1983). Disposal operations continued in the areas between the runways until approximately 1956. After 1956, disposal operations were moved to the West Beach Landfill.

In the mid-1950s, the western edge of the 1943-1956 Disposal Area was developed as the West Beach Fleet Recreation Area. The facilities included a baseball diamond, picnic area, and a recreation building. The facilities are presumed to be directly on top of the old landfill. Nearby are two ammunition storage facilities and a pistol range. Today the area is covered to an unknown depth by soil

cover.

Tables 1-1 and 1-2 present maximum concentrations of contaminants found at the site in soil and groundwater, respectively, based on the results of previous investigations.

Initial activities at the site will include a visual survey and possibly surface geophysics. Other activities will include offshore sampling of sediment, soil sampling, installation of groundwater monitoring wells around the perimeter of the disposal area, sampling, and surveying of the wells. Nineteen monitoring wells will be installed around the perimeter of the 1943-1956 Disposal Area. Fourteen of the wells will be drilled to a shallow depth of approximately 20 feet. Two wells will be drilled to an intermediate depth of approximately 75 feet. Three deep wells will be drilled to approximately 140 feet. They will be installed in pairs at three locations, three wells will be installed at one location and 10 single shallow wells will be installed. One surface soil sample will be collected from each of the single well site locations or clusters. One subsurface soil sample will be collected from the vadose zone in each of the wells. The wells will be completed and developed, and groundwater samples will be collected. Aquifer tests will be conducted in selected wells.

1.2.2.2 West Beach Landfill. The West Beach Landfill served as an ANAS disposal area from approximately 1952 through March 1978. Waste disposal operations began at the site in the early 1950s with the disposal of waste chemical drums in the northwest corner of the site. Disposal operations increased after 1956 when waste disposal at the 1943-1956 Disposal Area ceased. By the late 1960s and early 1970s, most of the disposal of hazardous waste at the site had been discontinued. Disposal operations at this landfill ceased in March 1978. At present, the West Beach Landfill is surrounded by an earthen berm approximately 15 feet wide and 15 feet above the surface of the landfill. The area is moderately- to well-vegetated, primarily by grasses. San Francisco Bay lies approximately 30 feet beyond the berm.

In addition to wastes from NAS Alameda, this landfill was used for disposal of wastes from the Oak Knoll Naval Hospital (now Oakland Naval Hospital), Naval Supply Center, Oakland, and Treasure Island. Materials reportedly disposed of at the landfill included municipal garbage; solvents; oily waste and sludges; paint waste, strippers, thinners, and sludges; plating wastes; industrial strippers and cleaners; acids; mercury; polychlorinated biphenyl (PCB)-contaminated fluids and rags; batteries; low level radiological wastes; scrap metal; inert ordnance; spoiled food; asbestos; pesticides; tear gas agent

TABLE 1-1

1943 - 1956 DISPOSAL AREA
CONTAMINANTS DETECTED IN SOIL

Element or Compound	Maximum Concentration (mg/kg)
Metals:	
Aluminum	39,700
Arsenic	49
Barium	260
Cadmium	24
Chromium	130
Cobalt	10
Copper	330
Lead	1100
Mercury	2.3
Nickel	70
Titanium	878
Vanadium	66
Zinc	1,800
Volatile Organic Compounds:	
Acetone	0.13
2-Butanone (MEK)	0.051
Methylene Chloride	0.032
Toluene	0.009
Poly Aromatic Hydrocarbons:	
Benzo(a)anthracene	17
Benzo(b)fluoranthene	2
Benzo(g,h,i)perylene	1.8
Benzo(a)pyrene	5.8
Fluoranthene	17
Ideno(1,2,3-cd)pyrene	27
Pyrene	21
Chrysene	20
Phenanthrene	3.6
Base/Neutral/Acid Extractable Compounds	
di(2-ethylhexyl)phthalate	8.5
di-n-butyl phthalate	2.7
Acenapthene	2.03
Acenaphthylene	0.04
Napthalene	5.2
2-Methylnapthalene	0.8
Pesticides:	
4,4'-DDD	0.0038
4,4'-DDE	0.064
4,4'-DDT	0.45
Dibenzofuran	1.36
Radioactive Particles (pCi/g):	
Gross Alpha	45.7 ± 10.8
Gross Beta	31.7 ± 4.4
Radium 226	0.6 ± 0.5
Radium 228	0.8 ± 1.3

TABLE 1-2

1943 - 1956 DISPOSAL AREA
CONTAMINANTS DETECTED IN GROUNDWATER

Element or Compound	Maximum Concentration (μg/l)
Metals:	
Molybdenum	770
Zinc	130
Poly Aromatic Hydrocarbons:	
Acenapthene	64
Acenaphthelene	5
Di(2-ethylhexyl)phthalate	60
Dibenzofuran	14
Fluorene	16
Pyrene	43
Radioactive Particles (pCi/l):	
Gross Alpha	7.7 $\pm$ 6.6
Gross Beta	69.3 $\pm$ 31.6

[(o-chlorobenzylidene malononitrile (CS)]; infectious waste; creosote; and waste medicines and reagents.

Disposal methods used at the site reportedly consisted of excavating a trench to the water table, filling in the trench with disposal materials, spreading and compacting the material with a bulldozer, and then covering the area with the excavated soil on an intermittent basis.

Estimates of the amounts of waste in the landfill vary. It has been estimated that a maximum of 1.6 million tons of municipal garbage and 30,000 tons to 500,000 tons of hazardous waste are present in the landfill. Specific wastes include:

- Approximately three tons of PCB-contaminated soils and oil-soaked tac rags.
- Several hundred pounds of tear gas agents (CS) that were disposed into the landfill as a dry powder in containers after the Berkeley student riots in 1968 or 1969.
- Approximately four truckloads of inert ordnance ranging in size from small inert ammunition, to 4-foot long by 1-foot wide, were buried in 1976.
- In the late 1970s, a quantity of pesticides covered by the Toxic Substances Control Act (TSCA) and the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) were reportedly disposed of in an area covering 900 to 2,500 square feet. The pesticides included both solids and liquids, but were primarily solids that were contained in cardboard containers, glass bottles, and plastic containers. No official record regarding the various types and quantities of pesticides that were disposed of in the landfill are available. However, previous studies performed at the landfill have detected the presence of organochlorine pesticides, Ecology and Environment, Inc., 1983.
- Two unlined oil sumps into which tanker trucks drained waste oils were located on the site.
- In 1981, 24,000 cubic yards of dredge spoils from the Seaplane Lagoon were deposited in the southwest corner of the site.

Tables 1-3 and 1-4 present maximum concentrations of contaminants (based on the results of previous investigations) found at the site in soil and groundwater, respectively.

Initial activities at the site will include a visual survey, land surveying, and surface geophysics. Other activities will include surface sediment and water sampling in the wetland area, surface soil sampling from approximately 153 locations, offshore sampling of sediment, soil sampling, installation of groundwater monitoring wells, around the perimeter of the landfill, sampling, and surveying of the wells. Sixteen monitoring wells will be installed around the perimeter of the West Beach Landfill. Twelve of the wells will be shallow, drilled to approximately 20 feet. Two wells will be drilled to an intermediate

TABLE 1-3

WEST BEACH LANDFILL
CONTAMINANTS DETECTED IN SOIL

Element or Compound	Maximum Concentration (mg/kg)
Metals:	
Aluminum	15,500
Arsenic	26
Barium	86
Cadmium	6.4
Calcium	11,000
Chromium	56
Cobalt	10
Copper	100
Iron	216,000
Lead	81
Magnesium	6,700
Manganese	240
Mercury	0.27
Nickel	52
Potasium	2,600
Sodium	2,700
Titanium	749
Vanadium	39
Zinc	100
Volatile Organic Compounds:	
Acetone	0.13
2-Butanone (MEK)	0.051
Methylene Chloride	0.043
Polycyclic Aromatic Hydrocarbons:	
Benzo(a)anthracene	2.5
Benzo(b)fluoranthene	8.3
Benzo(k)fluoranthene	3.4
Benzo(g,h,i)perylene	4.8
Benzo(a)pyrene	5
Fluoranthene	2.3
Ideno(1,2,3-cd)pyrene	2.8
Pyrene	2.7
Chrysene	3.3
Pesticides and PCBs:	
4-4'DDE	0.0057
4,4'-DDT	0.019
PCB-1260	0.4
PCB-1266	0.38
Radioactive Particles (pCi/gm):	
Gross Alpha	9.8± 5
Gross Beta	16± 7
Radium 226	0.8± 0.5
Radium 228	2.3± 1.8

TABLE 1-4

WEST BEACH LANDFILL
CONTAMINANTS DETECTED IN GROUNDWATER

Element or Compound	Maximum Concentration (μg/kg)
Metals:	
Antimony	700
Arsenic	90
Beryllium	12
Cadmium	57
Chromium	57
Copper	720
Lead	330
Magnesium	120,000
Mercury	0.8
Nickel	400
Selenium	80
Silver	53
Thallium	200
Zinc	480
Volatile Organic Compounds:	
Acetone	620
Benzene	6
Chlorobenzene	31
Ethylbenzene	5
Toluene	235
O-Xylene	11
Base/Neutral/Acid Extractable Compounds:	
2,4-dimethylphenol	38
Napthalene	104
Di(2-ethylhexyl)phthalate	10
Phenol	26
Pesticides and PCBs:	
Aldrin	0.1
Alpha-BHC	0.2
delta-BHC	0.2
gamma-BHC	0.3
pp-DDT	0.7
Endrin (Aldehyde)	0.1
Endosulfan (Sulfate)	0.5
Heptachlor	0.4
PCB-1248	0.52

depth of approximately 75 feet. Two deep wells will be drilled to approximately 140 feet. They will be installed in pairs at four locations, and eight single shallow wells will be installed. One surface soil sample will be collected from each of the single well site locations or clusters. One subsurface soil sample will be collected from the vadose zone in each of the wells. The wells will be completed and developed, and groundwater samples will be collected. Aquifer tests will be conducted in selected wells.

1.2.2.3 Runway Area. Part of the investigation will take place east of the 1943 - 1956 Disposal Area and the West Beach Landfill near an active runways. No known contamination is present in this area, although this area was built on fill material.

Field activities will include soil sampling, installation of groundwater monitoring wells around the perimeter of the landfill, sampling, and surveying of the wells. Nine monitoring wells will be installed around the airfield area. Eight of the wells will be shallow, drilled to approximately 20 feet, and one deep well will be drilled to approximately 140 feet. They will be installed in a pair at one location, and seven single shallow wells will be installed. One surface soil sample will be collected from each of the single well site locations or clusters. One subsurface soil sample will be collected from the vadose zone in each of the wells. The wells will be completed and developed, and groundwater samples will be collected. Aquifer tests will be conducted in selected wells.

1.2.2.4 West Beach Landfill-Surface Soil Sampling and Wetland Water and Sediment Sampling. Initial activities at the site will include a visual survey, land surveying, surface geophysics. Other field activities will include surface soil sampling, and wetland water sampling and sediment sampling, and surveying of the surface soil sample locations. A grid with 200-foot spacing will be surveyed across the West Beach Landfill. A surface soil sample will be collected from the top 6 inches at approximately 153 grid locations.

Within the bermed area of the landfill is a wetland area, 24 water samples and 12 sediment samples will be collected. Twelve of the sediment and water sample locations will coincide.

Sampling operations for the wetlands may require the use of a boat. Work done over or near water will be conducted in accordance with OSHA regulation 29 CFR 1926.106. Communications with land personnel will be maintained at all times.

1.2.2.5 Offshore Sediment Sampling. Twenty-four sediment samples will be collected from along the south, west, and north offshore areas from the 1943-1956 Disposal Area and West Beach Landfill. Sampling will consist of shallow grab samples collected at various distances and evenly spaced along the shoreline of the disposal area and landfill.

Sampling operations for the offshore sampling will require the use of a boat. The boat and driver will be supplied by a subcontractor. Work done over or near water will be conducted in accordance with OSHA regulation 29 CFR 1926.106. Communications with land personnel will be maintained at all times.

1.3 SAFETY AND HEALTH ANALYSIS

1.3.1 Chemical Toxicity Hazards

The risk of adverse occupational chemical exposure to JMM field team members and JMM subcontractor personnel is slight based upon the anticipated low part per billion to low part per million concentrations of solvents, pesticides, and tear gas agent.

Tables 1-5 and 1-6 present occupational exposure limit standards for contaminants at the three 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 it 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.

TABLE 1-5
ALAMEDA NAVAL AIR STATION
OCCUPATIONAL HEALTH EXPOSURE GUIDELINES FOR SITE CONTAMINANTS - ORGANICS

Site Contaminant	Federal OSHA PEL (ppm)	Cal-OSHA PEL (ppm)	NIOSH REL (ppm)	ACGIH TLV-TWA (ppm)	NIOSH IDLH (ppm)	Ionization Potential (eV)
Organics						
Acetone	750;1,000(STEL)	750;3,000(C)	250	750;1,000(STEL)	20,000	9.69
Benzene	1(X);5(STEL)	1(S)	0.1(X);1(C)	10(A2)[a]	3,000	9.25
Chlorobenzene	75	75	No REL	75	2,400	9.07
2,4-Dimethylphenol	No PEL	No PEL	No REL	No TLV	NA	No Value
Ethylbenzene	100;125(STEL)	100;125(STEL)	100;125(STEL)	100;125(STEL)	2,000	8.76
Methyl ethyl ketone (2-Butanone)	200;300(STEL)	200;300(STEL)	200;300(STEL)	200;300(STEL)	3,000	9.53
Naphthalene	10;15(STEL)	10;15(STEL)	10;15(STEL)	10;15(STEL)	500	8.1
Phenol	5(S)	5(S)	5;15.6(C)	5(S)	250	8.5
o-Chlorobenzylidene malononitrile	0.05	0.05	0.05	0.05	.25	No Value
Polycyclic Aromatic Hydrocarbons	No PEL	No PEL	No REL	A2	NA	No Value
Toluene	100;150(STEL)	100(S);500(C)	100;150(STEL)	100;150(STEL)	2,000	8.82
Xylenes	100;150(STEL)	100;300(C)	100;150(STEL)	100;150(STEL)	1,000	8.45

Sources: NIOSH, 1990
ACGIH, 1990

Notes:

All limits are 8-hour time-weighted averages unless otherwise indicated.
[a] Notice of intended change of ACGIH TLV-TWA to 0.1 (A1) for benzene
[b] 60-minute Short-term Exposure Limit (STEL)
[c] Based on Limit of Quantitation (LOQ)

Abbreviations:

(A1) ACGIH Confirmed Human Carcinogen.
(A2) ACGIH Suspected Human Carcinogen.
(S) Skin notation (potential contribution to overall exposure via the cutaneous route).
(C) Ceiling value (concentration should not be exceeded during any part of working exposure).
(X) Carcinogen with no further categorization.
(STEL) Short-term Exposure Limit (usually a 15-minute time-weighted average, unless otherwise indicated).
NA Not Applicable (no recommemdation applies).

TABLE 1-6

ALAMEDA NAVAL AIR STATION
OCCUPATIONAL HEALTH EXPOSURE GUIDELINES FOR SITE CONTAMINANTS - METALS, PESTICIDES, AND PCBs

Site Contaminant	Federal OSHA PEL (mg/m^3)	Cal-OSHA PEL (mg/m^3)	NIOSH REL (mg/m^3)	ACGIH TLV-TWA (mg/m^3)	IDLH (mg/m^3)
Metals (Measured as metal)					
Antimony	0.5	0.5	0.5(S)	0.5	80
Arsenic	0.01[a];0.5[b](X)	0.01[a];0.2[b]	0.002(X,C)[g]	0.2	100
Cadmium	0.2(A2);0.6(C)	0.05;0.6(C)	0.1(X)[c]	0.05[d]	50
Chromium (total)	1	0.5	0.5	0.5	NA
Copper	1	1	1	1	NA
Lead	0.05	0.05	0.1	0.15	700
Manganese	5(C)	5(C)	1	5	NA
Mercury	0.05(S)	0.05(S)[g]	0.05(S)	0.05(S)	28
Nickel	1	1[h];0.1[i]	0.015(X)	1.0[e]	NA
Zinc	10	10[j]	5;15(C)	10[f]	NA
Pesticides/PCBs					
DDE	No PEL	No PEL	No REL	No TLV	NA
DDT	1(S)	1(S)	0.5(X)	1	NA
PCB	0.5(S)	0.5(S)	0.001(X)	0.5(S)	5(X)
Lindane	0.5(S)	0.5(S)	0.5	0.5(S)	1,000
Endrin	0.1(S)	0.1(S)	0.5(S)	0.1(S)	2,000
Endosulfan	0.1(S)	0.1(S)	0.1(S)	0.1(S)	NA
Heptachlor	0.5(S)	0.5(S)	0.5(X,S)	0.5(S)[k]	700(X)

Sources: NIOSH, 1990
ACGIH, 1990

Notes:

[a] For inorganic arsenic and arsenic compounds
[b] For organic arsenic and arsenic compounds
[c] Minimize exposure based on Limit of Quantitation (LOQ)
[d] Notice of intended change of ACGIH TLV-TWA to 0.01 (A2)
[e] Notice of intended change of ACGIH TLV-TWA to 0.05 (A1)
[f] Total dust
[g] As mercury vapor
[h] Nickel metal
[i] Soluble nickel compounds
[j] Zinc oxide dust (based on total nuisance particulates)
[k] Notice of intended change of ACGIH TLV-TWA to 0.05 (A2)

Abbreviations:

(A1) ACGIH Confirmed Human Carcinogen.
(A2) ACGIH Suspected Human Carcinogen.
(S) Skin notation (potential contribution to overall exposure via the cutaneous route).
(C) Ceiling value (concentration should not be exceeded during any part of working exposure).
NA Not applicable (No recommendation applies).
(X) NIOSH Occupational Carcinogens

- 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:

  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 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 vapor 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 1-7 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

TABLE 1-7

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			
Acetone	3.6-5.3	0.40-800	Sweet, fruity
Benzene	34-119	0.78-160	Sweet, solventy
Chlorobenzene	NA	0.087-5.9	Sweet, almond-like "shoe polish"
Ethylbenzene	None	0.092-0.60	Oily, solvent
Methyl ethyl ketone (2-Butamone)	5.4-55	0.25-85	Sweet, sharp
Toluene	1.9-69	0-21-69	Sour, burnt
Xylenes	--[b]	0.12-21	Sweet
Base/Neutral/Acid Extractables			
Naphthalene	--[b]	0.0095-0.64	Mothballs, tar, creosote
Phenol	--[b]	0.0045-1	Medicinal, acid, creosote
o-Chlorobenzylidene malononitrile	NA	NA	Peppery
Pesticides			
DDE	NA	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)

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:

- 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.
- Housekeeping 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 Inert Ordnance

Although the West Beach Landfill contains inert ordnance, invasive field activities will not occur within this site. Therefore, it will not be necessary to use an explosive ordnance subcontractor to screen the area for these materials.

1.3.4 Biological Hazards

Although infectious wastes were deposited in the 1943 - 1956 Disposal Area and West Beach Landfill, there will not be any intrusive activities within these sites. Biological hazards will not be considered further in this HSP.

1.3.5 Radiological Hazards

Although low level radiological wastes were deposited in the 1943 - 1956 Disposal Area and West Beach Landfill, there will not be any intrusive activities within these sites. As precautionary measures, JMM field team members will be required to wear EPA Level C protection, radiation film badges, and monitor for radionuclides when working around the perimeter of the West Beach Landfill, 1943 - 1956 Disposal Area and in the West Beach Landfill during surface soil, surface water and sediment sampling activities.

1.3.6 Levels of Personal Protection

Based on the expected low level chemical contaminants, initial RI/FS site work in the runway areas, activities conducted upgradient of the 1943 - 1956 Disposal Area, and the West Beach Landfill will be performed in EPA Level D protection. Section 6.2 provides information regarding upgrading to EPA Level C or B protection and provides guidelines to cease field activities.

Based predominantly on the potential presence of radionuclides RI/FS site work on the West Beach Landfill, and in the immediate vicinity of the perimeter of the 1943 - 1956 Disposal Area, and the West Beach Landfill will be performed in EPA Level C protection (half-face or full-face). Section 6.2 provides information on downgrading to EPA Level D or upgrading to EPA Level B protection and provides guidelines to cease field activities.

1.3.7 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 operations leader, a JMM OSO officer, and several geologists and environmental technicians. Subcontractors will perform site tasks, which include:

- Topographic Surveying
- Surface Geophysics
- Soil borings
- Drilling
- Monitoring well installation

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, or 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 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 officers 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.

- Sampling operations in the wetland of the West Beach Landfill may require the use of a boat and the sediment sampling offshore will require a boat Work done over or near water will be conducted in accordance with OSHA regulation 29 CFR 1926.106. Communications with land personnel will be maintained at all times.

- 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 (either by ambulance or JMM field vehicle) this individual to the designated emergency medical facilities. After completing these tasks, the JMM OSO will immediately notify the JMM PHSC. The JMM PHSC will immediately notify the PRC Navy CLEAN Health and Safety Manager. The JMM OSO will then complete an accident investigation report, the JMM OSO will be providing recommendations to the JMM PHSC. The JMM PHSC, in consultation with the JMM OSO, will be developing hazard control measures to prevent similar events from recurring. Field activities will not resume until implementing these control measures.

1.4.2 Activity Hazard Analysis

The field sampling activities, identified in Section 1.2.2, consist of soil borings and monitoring well installation. The field activities planned at the 1943 - 1956 Disposal Area will not require the JMM field team members to actually enter the site but rather to characterize it from the perimeter to ascertain if contaminants are migrating from it. The field activities planned at the West Beach Landfill site will require JMM field team members to enter the site to collect surface soil samples, and surface water and sediment samples. Drilling will only be around the perimeter of the landfill. Information about infectious waste at the 1943 - 1956 Disposal Area and the West Beach Landfill is unclear as to the specific types, but this contaminant exists. Since this infectious waste will not be disturbed during field activities it should not pose health concerns to JMM field team members. 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 Soil Borings and Sample Collection. Potential hazards include exposure to organic vapors, skin contact with contaminants, heat stress, the presence of infectious waste, tear gas, radionuclides and noise. The site will be monitored for organic vapors/gases, and radionuclides, 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 upgraded at each worksite, as described in Section 6.2. Equipment to suppress airborne particulates/vapors will be available. Protective clothing (see Section 5.1 and 5.2) will be utilized to minimize potential skin contact with contaminants. Heat stress will be monitored, depending upon ambient conditions.

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 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 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.

1.4.2.4 Monitoring Well Installation and Groundwater Sampling. The same potential hazards and control measures exist as described for the borehole drilling.

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.

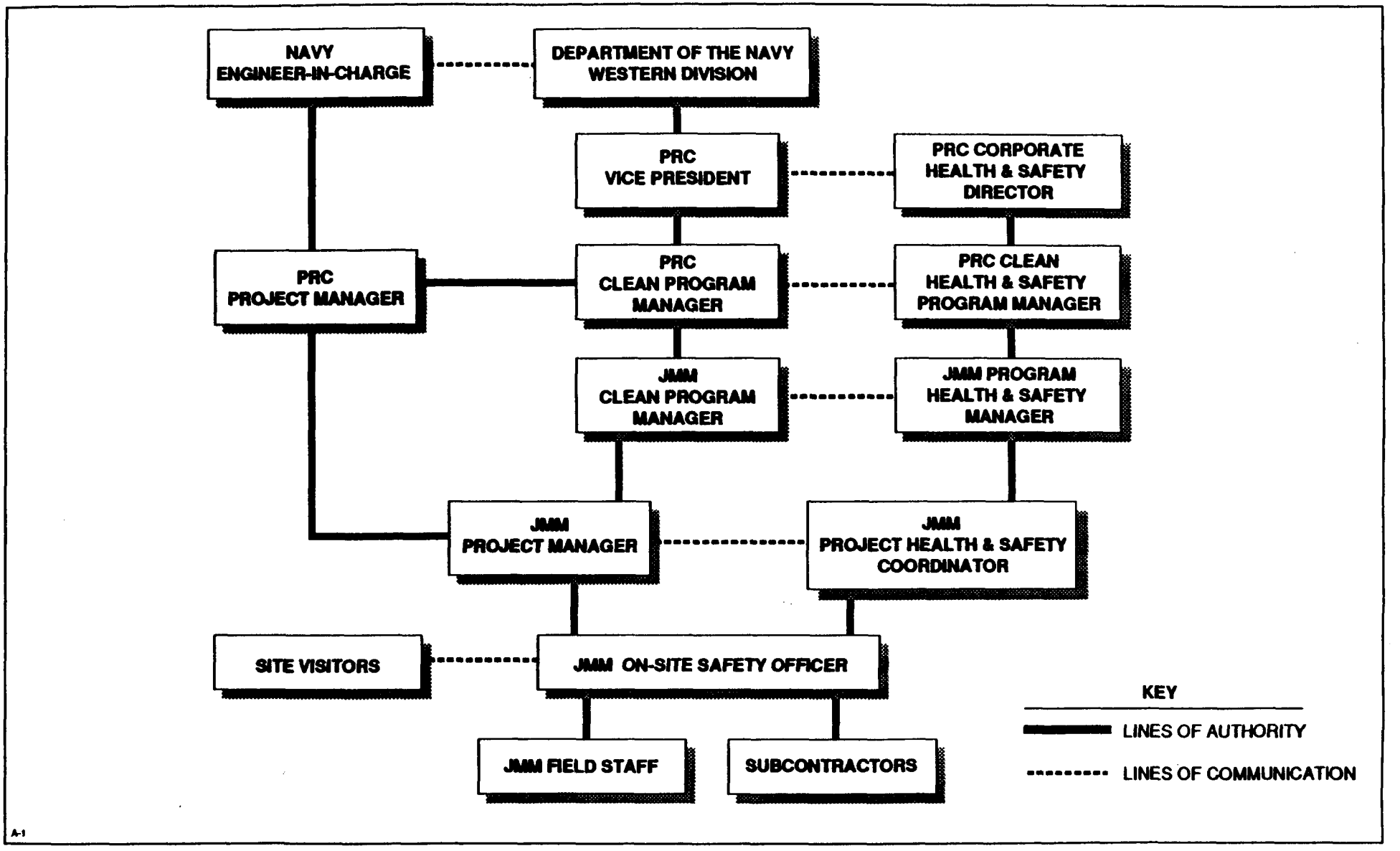
2.1 NAVY LEAD ENGINEER-IN-CHARGE

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 Field Team Leader (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 ensure 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 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 sheet (Appendix B), 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, U.S. EPA, 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 the 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.

JMM field team members will understand the hazards associated with this specific RI/FS, the JMM PHSC will be designing and implementing training for this project. 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 field team members are receiving the same information related to specific hazards associated with the project, any new changes that have occurred, and information on physical changes that have occurred, and information on physical changes that would require changing EPA levels of protection. The JMM OSO or JMM PHSC will be conducting 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

Personal protective equipment (PPE) will be required during site activities at ANAS. Selection will be based primarily on health hazard assessment data and work task requirements.

Based upon the site histories, the initial level of protection for all sampling activities in the RI/FS exclusion zones in the runway areas will be EPA Level D. The initial level of protection for sampling activities in the RI/FS exclusion zones in the immediate vicinity of the 1943 - 1956 Disposal Area and the West Beach Landfill will be EPA Level C. Table 5-1 summarizes the initial level of personal protection for the ANAS sites. Provisions are made in Section 6.2 for upgrading the EPA level of protection to Level C (in the runway areas) or downgrading the EPA level of protection to Level D (in the landfill areas). The rational for downgrading will be discussed in Section 6.2. Section 6.2 describes action levels for ceasing field work within exclusion zones, pending evaluation. The following sections present the requirements for EPA Level C or D personal protective equipment.

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 and High Efficiency Particulate Air (HEPA) filters.
- Coveralls, disposable chemical resistant (polyethylene coated Tyvek).
- 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."

TABLE 5-1

INITIAL LEVEL OF PERSONAL PROTECTION FOR SOIL BORING, MONITORING WELL INSTALLATION, AND SAMPLE COLLECTION PROGRAM AT ALAMEDA NAS

Site	Known/Suspected Contaminants	Initial Level of Personal Protection
West Beach Landfill*	Solvents, Oily Waste, Paint Waste, Strippers, Thinners, Plating Wastes, Acids, Mercury, PCBs, Batteries, Low Level Radiological Waste, Asbestos, Pesticides, Creosote, Waste Medicines, Infectious Waste, Tear Gas Cannisters, inert ordnance	EPA Level C
Runway	No known contamination	EPA Level D
1943-1956 Landfill	Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc, Trichloroethylene, Trans-1,2-Dichloroethylene, Benzene, Acetone, Bis(2-Ethylhexyl)phthalate, Di-n-butylphthalate, Acenaphthylene, Napthalene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Ideno(1,2,3-cd)pyrene, Pyrene, Chrysene, Fluorene, Phenanthrene, Dibenzofuran, 2-methylnaphthalene, 2-cyclohexen-1-one, 2,5-diethyltetrahydrofuran, Gross alpha particles, Gross beta particles	EPA Level C

* - West Beach Landfill includes: activities within the bermed area, surface soil sampling, wetland surface water and sediment sampling

5.2 EPA LEVEL D PERSONAL PROTECTIVE EQUIPMENT

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

- Cotton or disposable chemical resistant coveralls (standard Tyvek). Standard Tyvek coveralls are to be used as a means of keeping work clothes clean, this 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 type of activities that warrant wearing nitrile gloves to minimize the possibility of dermal contact includes:
    - 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 this activity 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 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. The procedures that the JMM OSO will be using 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. At the runway area sites all JMM field team will begin all initial RI/FS field work within exclusion zones in EPA Level D protection. 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), oxygen meter (OM) and Geiger-Mueller counter (GMC). All direct "real time" field instruments will be calibrated daily in accordance with manufacturers guidelines.

At the 1943 - 1956 Disposal Area and the West Beach Landfill, invasive field work will be conducted in Level C PPE for the first 15 minutes of the activity, during which time the OSO will continue air monitoring as described above. After this period, the OSO may elect to downgrade to Level D PPE, if warranted by monitoring results. The runway area sites will be entered in Level D. If monitoring indicates an increase in site contaminants to concentrations above those acceptable for Level C PPE, the OSO will evacuate the site and notify the JMM PHSC. The PHSC will then revise the HSP to reflect the use of Level B PPE as appropriate, and the necessary equipment will be obtained prior to reentry of the site. In the interim, the RI field team will proceed to another site, where Level B PPE is not required.

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) probe and radiation levels will be monitored with the GMC. The PID will be operated in the zero to 200 ppm range and the GMC operated in the 0-5 millirem per hour (mR/hr) range. Organic vapor and radiation levels will be measured upwind of the site to determine background concentrations. (Action levels at which levels of work will be upgraded, downgraded or work will be stopped based on PID measurements in the JMM field team member 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. JMM field team members will be wearing radiation film badges to record gamma, beta and X-ray radiation during work at the 1943-1956 Disposal Area, West Beach Landfill, and runway areas.

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 metals, pesticides, and semivolatile compounds 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 the site.

6.2 ACTION LEVELS

During the first 15 minutes of invasive activities at the 1943 - 1956 Disposal Area and West Beach Landfill sites, the OSO will conduct an HHA to verify the selected level of PPE for that particular activity, and upgrade/downgrade as appropriate. During surface soil sampling activities in the West Beach Landfill the expected level of PPE will be EPA Level C. During wetland surface water and sediment sampling activities in the West Beach Landfill the expected level of PPE will be EPA Level C, unless meter readings from the PID or GMC indicate that another PPE is appropriate as discussed below. During the offshore sediment sampling, the expected PPE will be EPA Level D, unless meter readings from the PID indicate that another PPE is 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 metals, semivolatiles, and pesticides)
- Radionuclides
- Oxygen content
- Combustible atmosphere

The action levels for upgrading to Level C and 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 conditions. The expected levels of PPE for individual site activities are

TABLE 6-1

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

Photoionization Detector Readings				Dust Meter Readings	
	Level B Action level (ppm)				
Level C Action Level	From Half-Face Respirator (a)	From Full-Face Respirator	Level B Governing Compound	Level C Action Level (mg/m^3)	Evacuate Site (mg/m^3)
1	5	25	Benzene	5.0	10.0

(a) If the PID concentrations exceed the limits for half-face but not full-face respirators, site workers may elect to upgrade to full-face units.

TABLE 6-2

ACTION LEVELS TO EVACUATE ALAMEDA NAS RI/FS SITES
BASED ON OXYGEN CONCENTRATION, COMBUSTIBLE GAS, AND RADIOACTIVITY READINGS

Oxygen Meter Readings		Combustible Gas Indicator Readings	Geiger Mueller Counter Readings
Evacuate Site[a] (%)	Evacuate Site (%)	Evacuate Site (% LEL)	Evacuate Site (mR/hr)[b]
<20	>23	>10% (methane)	0.10

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

[b] Action level is defined to be five times background, assumed to be 0.02 mr/hr. If actual background concentrations are different, the action level may be revised to reflect five times actual background.

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 listed in Table 1-5. 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, benzene is considered to be the governing contaminant, based on PID readings established in Table 6-1, and corresponding to the upgrade categories as described below. These criteria were derived on the basis of the site contaminant with the lowest federal or Cal-OSHA exposure limit, thus ensuring a conservative approach. (This contaminant is referred to as the "governing compound" in subsequent discussions.) 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, the Level B action level of 25 ppm is based on the assumption that only benzene is present.

6.2.1.1 Upgrade from Level D to Level C. For sites with known contaminants, the criterion for upgrading from Level D to Level C PPE is set at the PEL for the governing compound (Table 6.1). In no case should this level exceed 1 ppm above background, as consistently measured on the PID for a period of 15 minutes. 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 this case where the PEL of the governing compound of benzene is greater than 5 ppm, 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 level has been established (25 ppm), which, if exceeded, will be cause for the 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.

Should the above action levels be exceeded, the PHSM and HSPM will be notified of the situation, and will provide guidance to the 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, 1989).

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., semivolatile organics, metals, and pesticides), dust concentrations corresponding to unacceptable exposures were calculated for each contaminant, as shown below:

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

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

The lowest calculated dust concentration for upgrading to Level C on the basis of metals exposure was 50 mg/m^3. Therefore, the specified level of 5.0 mg/m^3 of dust, for upgrading to Level C PPE, was determined to be sufficiently protective for all ANAS RI/FS sites.

6.2.3 Radionuclides

For any site or site-specific activity, where the potential for alpha radiation exposure exists, site workers will wear Level C protection (half-or full-face respirators), with HEPA filters. At those sites where potential alpha exposure is not an issue, site work will be conducted in Level D, unless higher levels are mandated due to potential chemical exposure, based on chemical-specific action levels and direct read instrumentation readings (e.g., PID). Radiation readings in excess of five times normal background (assumed to be 0.02 mR/hr), as measured by a Geiger-Mueller Counter (GMC), will be cause for the OSO to cease work and evacuate the site, pending further evaluation by a Certified Health Physicist. Re-entry of the site will be based on the recommendations of the Health Physicist, with the concurrence of the HSPM and PHSM. At no time will work be conducted at the site if readings are in excess of 10.0 mR/hr, per the Navy CLEAN Health and Safety Program (PRC, 1989).

6.2.4 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 low-oxygen atmospheres only) or implement engineering controls.

6.2.5 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. As work will not be conducted in confined spaces, upper exposure limits (UEL) are not of concern for the NWC RI/FS and thus no UEL action level has been established.

6.3 HEAT STRESS MONITORING

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

Air temperature measured with bulb shielded from radiant heat, percent sunshine is 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
- Hot skin, temperature rise (yet may feel chilled)
- Unconsciousness
- Mental confusion
- Convulsions
- 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)] of 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 hearing protective devices during all drilling activities and when working near the 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 involve 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 be involved in 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

Roads will not have to be built nor will buildings have to be 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, contamination reduction (CRZ), and support. 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

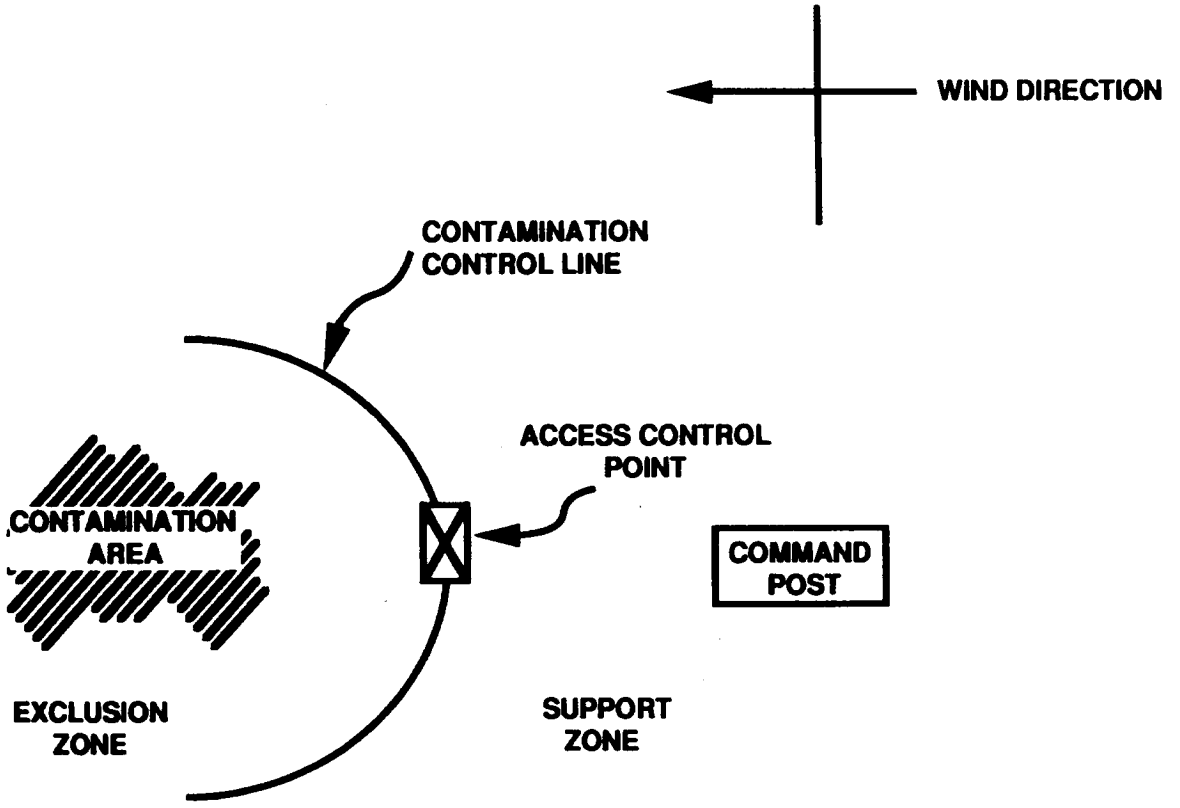


DIAGRAM OF LEVEL D SITE ZONES

FIGURE 7-1

near the "hotline", before proceeding to the CRZ. Prior to field work occurring in this zone, the JMM OSO will develop an emergency exit area. The minimum distance radially for 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 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, the amount of contaminants 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.

- Resources: water, mobile telephone, or other communication equipment.

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 be instituting 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 these airborne contaminants contacting the JMM field team members' 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 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 decontaminating 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, 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 project manager 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. 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 on-site OSO will be the lead person in all emergency situations.

- The 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 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 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 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 assessing is a continual process; JMM field team members must be aware of their surroundings. These potential hazards include physical and chemical hazards.
- 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 of communication devices and 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 be performed cautiously.

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

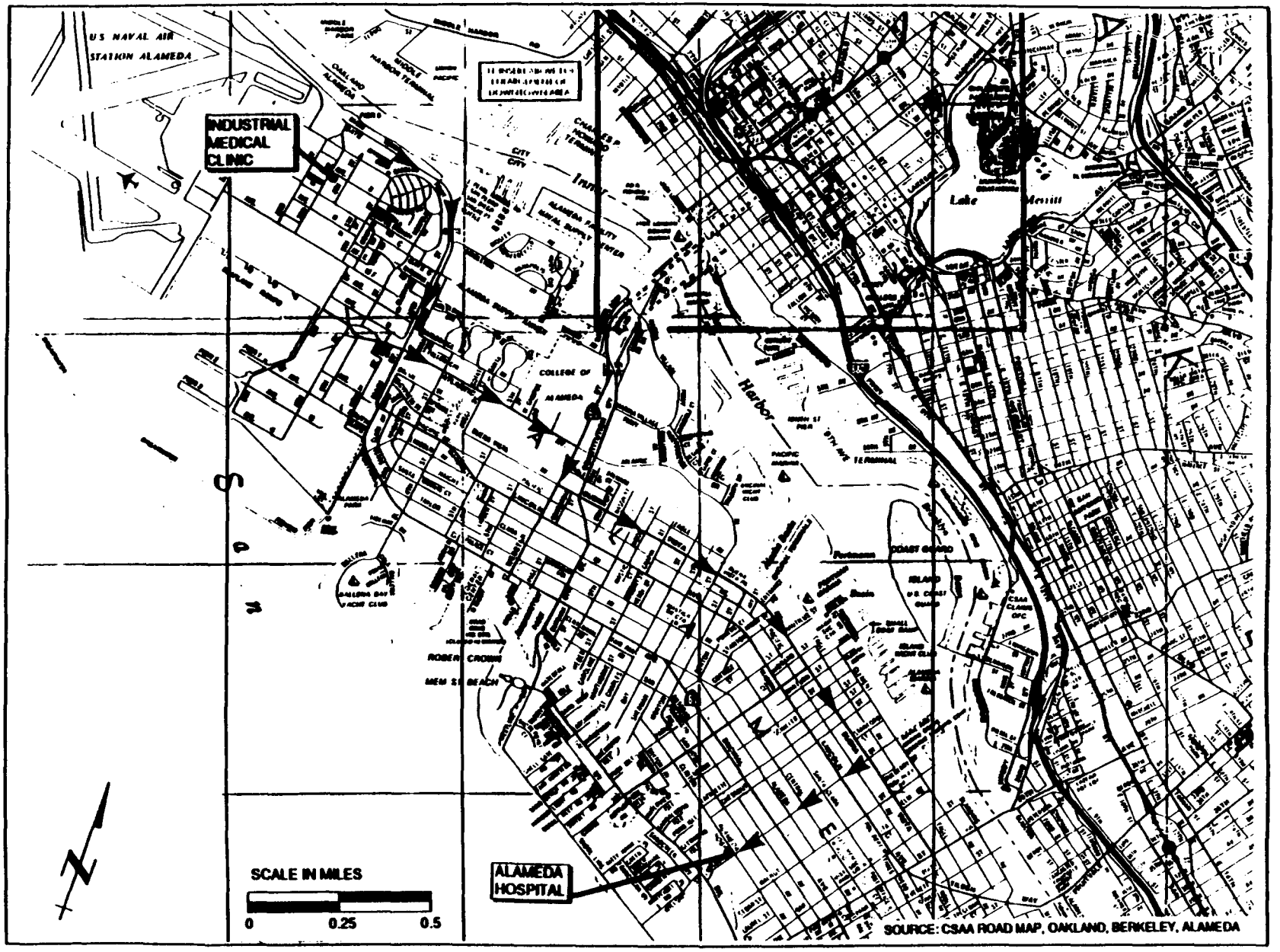
EMERGENCY ASSISTANCE INFORMATION

	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

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 Supplement 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)

5. INJURY/ILLNESS INFORMATION *(Include name on line and corresponding code number in box for items e, 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		TYPE	
SECONDARY	(CODE)		
f. NATURE OF INJURY	(CODE)	SOURCE	(CODE)

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? ☐ 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)

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 sheet, 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. BEGINNING *(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 09-85-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 in 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
	AS	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
EAR, 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
700	ENVIRONMENTAL CONDITION
0	TEMPERATURE EXTREME (INDOOR)
20	WEATHER (ICE, RAIN, HEAT, ETC.)
230	FIRE, FLAME, SMOKE (NOT TOBACCO)
240	NOISE
250	RADIATION
260	LIGHT
270	VENTILATION
271	TOBACCO SMOKE
280	STRESS (EMOTIONAL)
290	CONFINED SPACE
300	MACHINE OR TOOL
310	HAND TOOL (POWERED: SAW, GRINDER, ETC.)
320	HAND TOOL (NONPOWERED)
330	MECHANICAL POWER TRANSMISSION APPARATUS
340	GUARD, SHIELD (FIXED, MOVEABLE, INTERLOCK)
350	VIDEO DISPLAY TERMINAL
360	PUMP, COMPRESSOR, AIR PRESSURE TOOL
370	HEATING EQUIPMENT
380	WELDING EQUIPMENT
400	VEHICLE
411	AS DRIVER OF PRIVATELY OWNED/RENTAL VEHICLE
412	AS PASSENGER OF PRIVATELY OWNED/RENTAL VEHICLE
421	DRIVER OF GOVERNMENT VEHICLE
422	PASSENGER OF GOVERNMENT VEHICLE
430	COMMON CARRIER (AIRLINE, BUS, ETC.)
440	AIRCRAFT (NOT COMMERCIAL)
450	BOAT, SHIP, BARGE
500	MATERIAL HANDLING EQUIPMENT
510	EARTHMOVER (TRACTOR, BACKHOE, ETC.)
520	CONVEYOR (FOR MATERIAL AND EQUIPMENT)
530	ELEVATOR, ESCALATOR, PERSONNEL HOIST
[illegible]	HOIST, SLING CHAIN, JACK
40	CRANE
	FORKLIFT
50	HANDTRUCK, DOLLY
600	DUST, VAPOR, ETC.
610	DUST (SILICA, COAL, ETC.)
620	FIBERS
621	ASBESTOS
630	GASES
631	CARBON MONOXIDE
640	MIST, STEAM, VAPOR, FUME
641	WELDING FUMES
650	PARTICLES (UNIDENTIFIED)
700	CHEMICAL, PLASTIC, ETC.
711	DRY CHEMICAL—CORROSIVE
712	DRY CHEMICAL—TOXIC
713	DRY CHEMICAL—EXPLOSIVE
714	DRY CHEMICAL—FLAMMABLE
721	LIQUID CHEMICAL—CORROSIVE
722	LIQUID CHEMICAL—TOXIC
723	LIQUID CHEMICAL—EXPLOSIVE
724	LIQUID CHEMICAL—FLAMMABLE
730	PLASTIC
740	WATER
750	MEDICINE
800	INANIMATE OBJECT
810	BOX, BARREL, ETC.
820	PAPER
830	METAL ITEM, MINERAL
831	NEEDLE
840	GLASS
850	SCRAP, TRASH
860	WOOD
870	FOOD
0	CLOTHING, APPAREL, SHOES
	ANIMATE OBJECT
911	DOG
912	OTHER ANIMAL
920	PLANT
930	INSECT
940	HUMAN (VIOLENCE)
950	HUMAN (COMMUNICABLE DISEASE)
960	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. ROW BOAT	7. DREDGE/DIPPER
2. SAIL BOAT	8. DREDGE/CLAMSHELL, BUCKET
3. MOTOR BOAT	9. DREDGE/PIPE LINE
4. BARGE	10. DREDGE/DUST PAN
5. DREDGE/HOPPER	11. TUG BOAT
6. DREDGE/SIDE CASTING	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	7. HAULAGE UNIT
2. UPPER GUIDE WALL	8. BREAKING TOW
3. UPPER LOCK GATES	9. TOW BREAKING UP
4. LOCK WALL	10. SWEPT DOWN ON DAM
5. LOWER LOCK GATES	11. BUOY/DOLPHIN/CELL
6. LOWER GUIDE WALL	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 sets 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

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

b. 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, diffential 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 urinanalysis 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 qualatitive 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 isntructed 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

PAGE G-1
HOT WEATHER OPERATIONS

FINAL HEALTH AND SAFETY PLAN
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

THE ABOVE IDENTIFIED PAGE
IS NOT AVAILABLE.

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

QUESTIONS MAY BE DIRECTED TO:

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

TELEPHONE: (619) 532-3676

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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