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Naval Facilities Engineering Command
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MCAS EL TORO
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**COMPREHENSIVE LONG-TERM ENVIRONMENTAL
ACTION NAVY
CLEAN II**

**FINAL
HEALTH AND SAFETY PLAN SUPPLEMENT
PHASE II REMEDIAL INVESTIGATION/
FEASIBILITY STUDY
MCAS EL TORO, CALIFORNIA**

CTO-0059

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This document refers to specific sections contained in the CLEAN II Site Health and Safety Plan. Section numbering corresponds to section numbering contained in that document. Only sections of the Plan that have been modified appear in this Health and Safety Plan Supplement for Phase II RI/FS.

FOR SECTIONS NOT MODIFIED

PROGRAM HEALTH AND SAFETY PLAN
(REVISION 0)

DATED 07 JANUARY 1994

AND

SITE HEALTH AND SAFETY PLAN
(REVISION 1)

DATED 18 JULY 1994

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ACRONYMS/ABBREVIATIONS

ACGIH	American Conference of Government Industrial Hygienists
ACM	asbestos-containing material
ALARA	as low as reasonably achievable
bgs	below ground surface
BNI	Bechtel National, Inc.
CLEAN	Comprehensive Long-Term Environmental Action Navy
CPT	cone penetrometer testing
CTO	Contract Task Order
dba	decibels measured on the A-weighted scale
DRMO	Defense Reutilization Marketing Office
EC	Emergency Coordinator
EM	electromagnetic
ERT	Emergency Response Team
eV	electron volt
FID	flame ionization detector
FMD	Facilities Management Department
FOD	foreign object debris
GPR	ground-penetrating radar
HAZMAT	Hazardous Materials (Team)
HEPA	high-efficiency particulate air
HSM	Health and Safety Manager
HSS	Health Safety Supervisor
HWP	hazardous work permit
IDLH	immediately dangerous to life and health
IDW	investigation-derived waste
IDWMP	Investigation-Derived Waste Management Plan
IR	Installation Restoration
LEL	lower explosive limit
MCAS	Marine Corps Air Station
mR	milliroentgen
NIOSH	National Institute for Occupational Safety and Health

ACRONYMS/ABBREVIATIONS (continued)

NOSCOR	Naval On-Scene Commander
OSHA	Occupational Health and Safety Administration
OV	organic vapor
PCB	polychlorinated biphenyl
PID	photoionization detector
PP	Program Procedure
PPE	personal protection equipment
ppm	parts per million
PWC	Public Works Center
RI/FS	Remedial Investigation/Feasibility Study
ROICC	Resident Officer in Charge of Construction
RPM	Remedial Project Manager
SHSO	Site Health and Safety Officer
SOP	Standard Operating Procedure
Supplement	Site-Specific Health and Safety Plan Supplement
SVOC	semivolatile organic compound
SWDIV	Southwest Division Naval Facilities Engineering Command
TCE	trichloroethylene
TPH	total petroleum hydrocarbon
VOC	volatile organic compound
v/v	volume per volume

SECTION 1

INTRODUCTION

Section 1

INTRODUCTION

1.1 INTRODUCTION

A Phase II Remedial Investigation and Feasibility Study (RI/FS) is being performed under the Comprehensive Long-Term Environmental Action Navy (CLEAN) II Program at the Marine Corps Air Station (MCAS) in El Toro, California. The objectives of the RI/FS are to address concerns expressed by federal and state regulatory agencies, to determine whether remedial actions are necessary, and to evaluate remedial solutions for the site. This study is being performed for the Southwest Division Naval Facilities Engineering Command (SWDIV), San Diego, California, by Bechtel National, Inc. (BNI), under Contract Task Order (CTO)-0059.

Work plans for this proposed RI/FS have been prepared to further evaluate the findings of a Phase I RI/FS conducted under CLEAN I at the base. The Phase I investigation indicated that historic base operations have impacted base soil and groundwater.

1.3 PURPOSE OF PLAN

This Site-Specific Health and Safety Plan Supplement (Supplement) addresses sections of the CLEAN II Site Health and Safety Plan that have been modified specifically for the Phase II RI/FS at MCAS, El Toro. Section numbering parallels the Site Health and Safety Plan. Sections not modified are not included in this Supplement. As a result, certain sections will appear to be "missing" from this plan. These sections are indicated in the Table of Contents as "Section Not Modified."

The purpose of this Supplement is to describe the nature of work to be performed and to address health and safety concerns with respect to proposed MCAS El Toro field activities. Health and safety topics include personal protection requirements and safe working practices, monitoring and site control procedures, and contingency plans for emergency situations.

1.4 REFERENCE DOCUMENTS

This Supplement is not intended to serve as a stand-alone document; it has been prepared for use in conjunction with the following CLEAN II health and safety documents:

- Program Health and Safety Plan (January 1994);
- Site Health and Safety Plan, Revision 1 (July 1994);
- Health and Safety Standard Operating Procedures (SOPs); and
- Health and Safety Program Procedures (PPs).

SECTION 2

SITE DESCRIPTION

Section 2

SITE DESCRIPTION

2.1 GENERAL

MCAS, El Toro is located in Orange County, California, approximately 8 miles southeast of the city of Santa Ana and 12 miles inland from the city of Laguna (Figure 2-1). The air station covers 4,741 acres, including runways, aircraft maintenance and training facilities, housing, shopping facilities, and other support facilities. For over 50 years, aviation activities at the station have generated waste oils, paint residues, hydraulic fluids, used batteries, and other wastes, some of which have been disposed on-site. Previous studies have indicated areas impacted by these contaminants. A soil and groundwater investigation is planned to characterize the nature and extent of contamination detected during these previous studies.

2.2 WORK AREAS

This Supplement addresses 22 sites located in various areas of the MCAS El Toro Base (Figure 2-2). These areas include aircraft waiting and refueling areas, equipment storage areas, landfills, vehicle and aircraft service areas, and hazardous materials storage and management areas. Descriptions of individual sites and known or suspected waste characteristics can be found in Section 2.3. Site 1 (OU-3), the Explosive Ordnance Disposal Range, is being considered for later work and is not included in this Supplement. A separate job-hazard analysis will be written and added as an addendum to this Supplement before work will commence at this site.

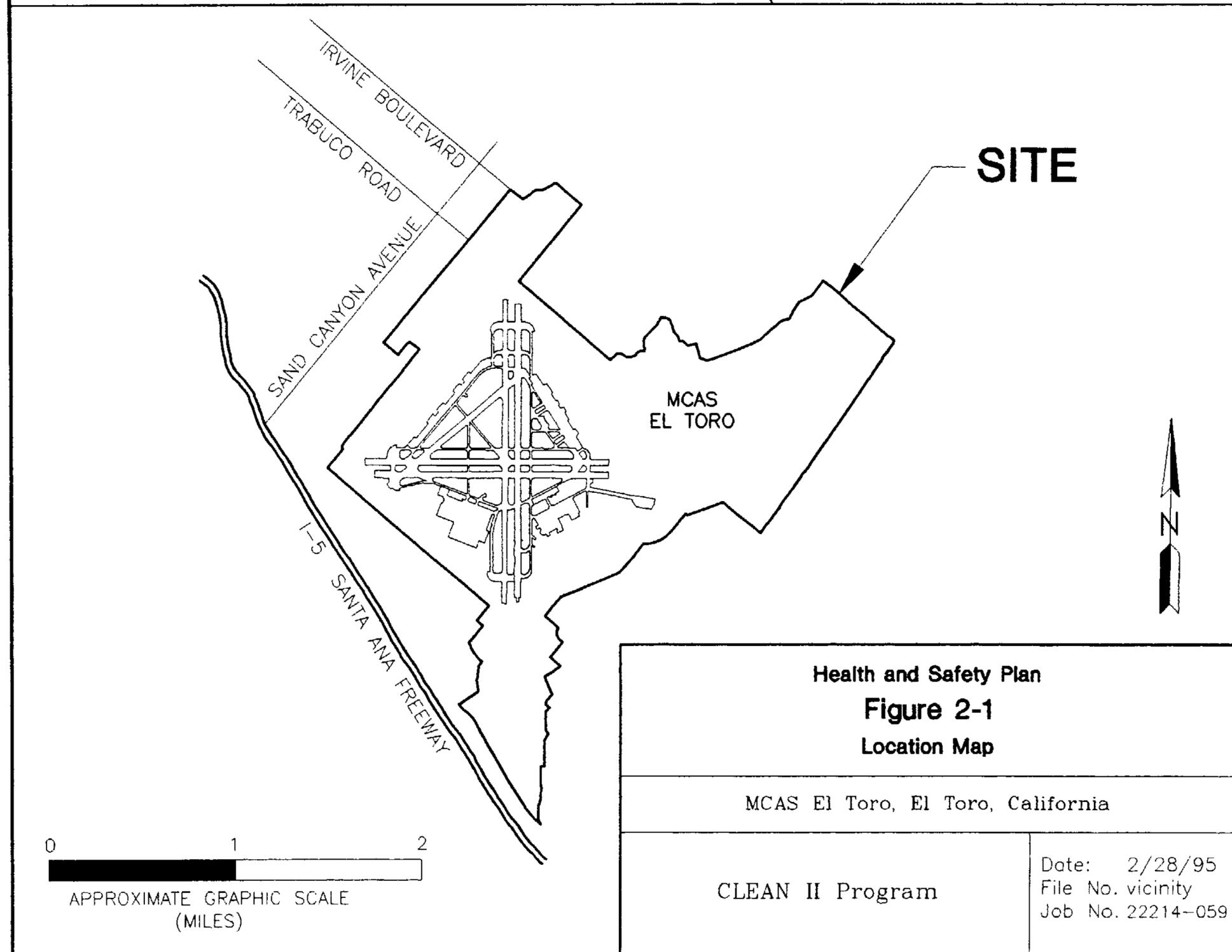
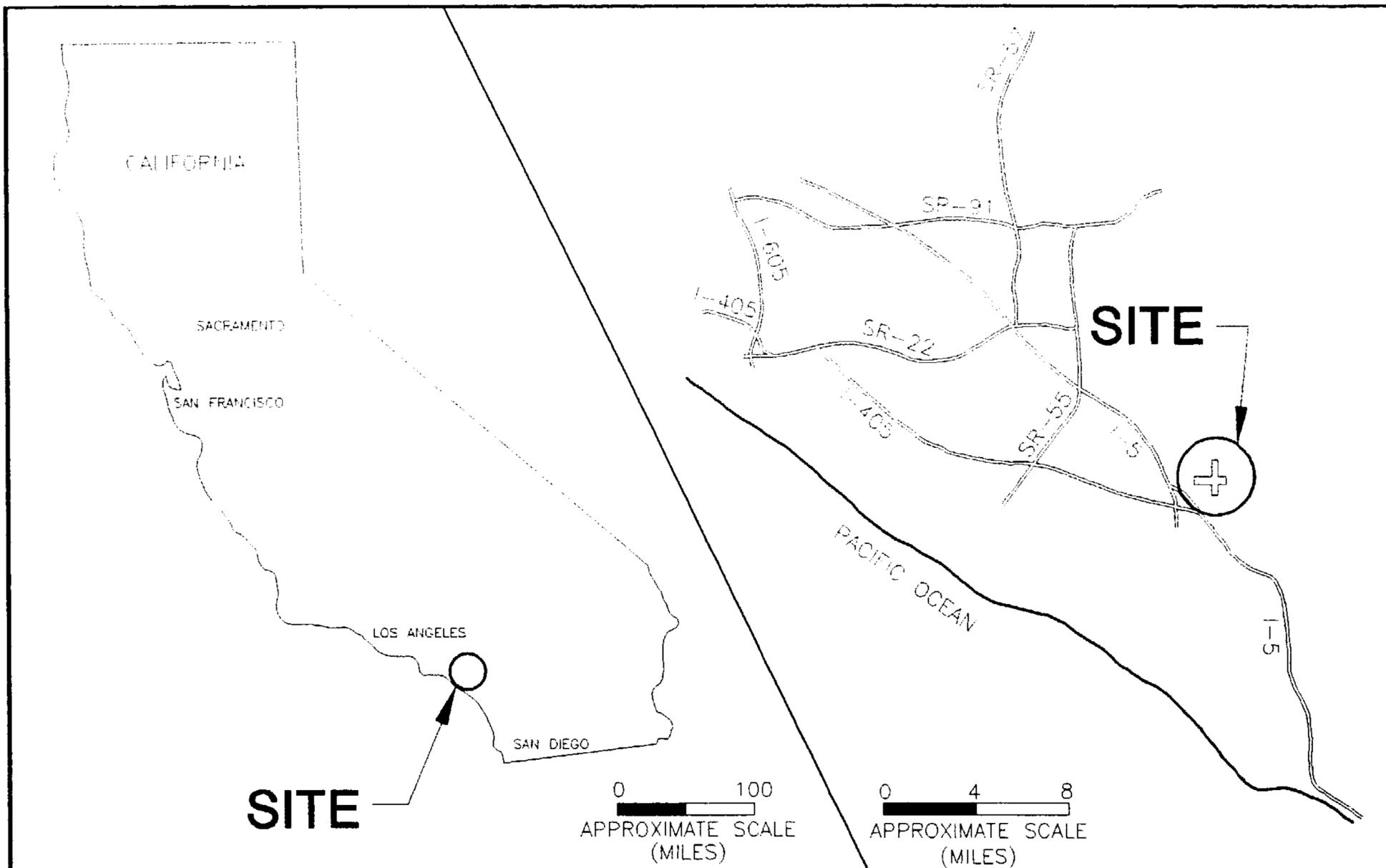
2.3 SITE DESCRIPTION AND HISTORY

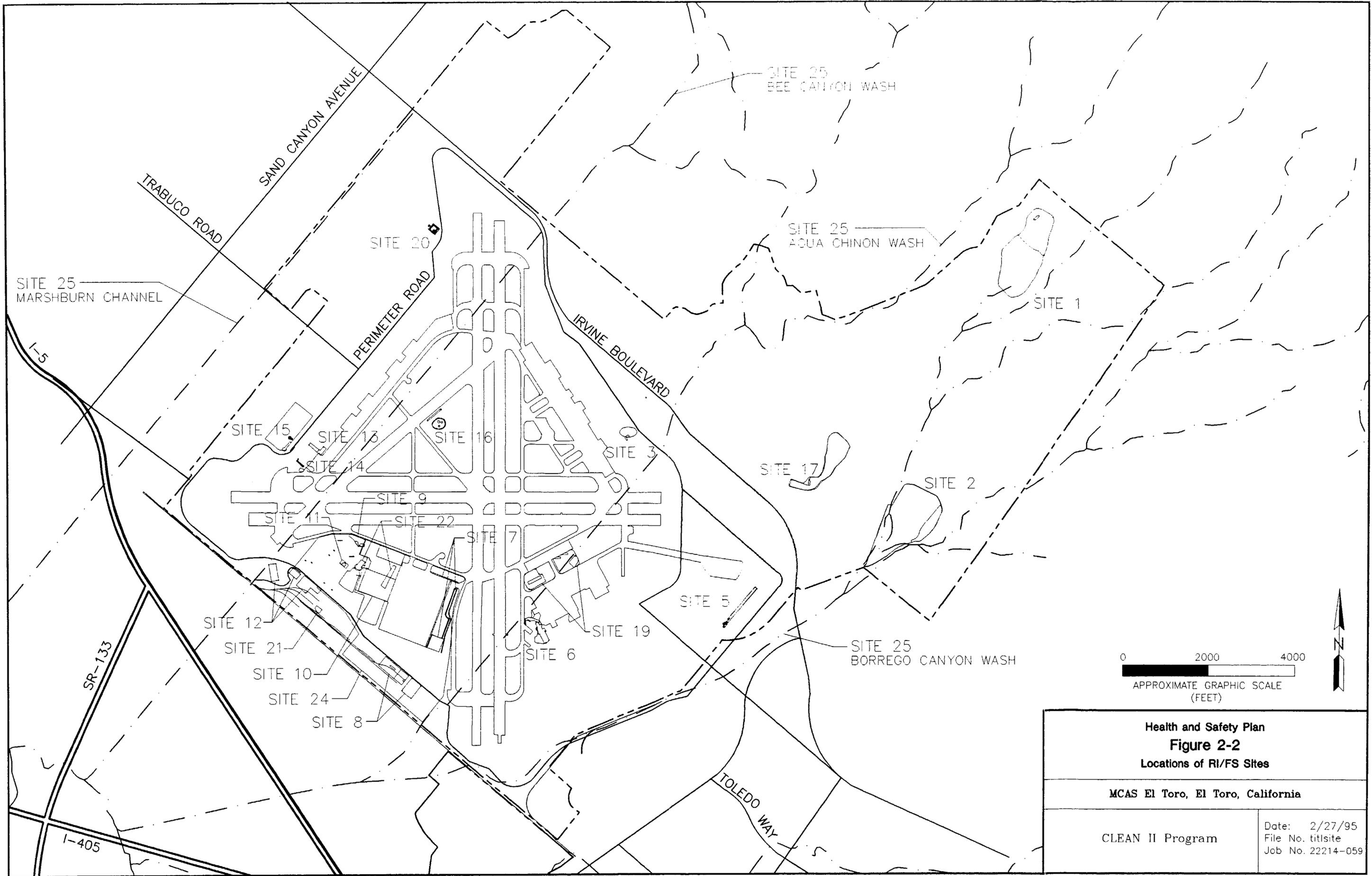
2.3.1 Site 2, Magazine Road Landfill

Site 2 is a large, rolling area of approximately 22 acres of dry grass and soil between Borrego Canyon Wash and one of its tributaries. From 1960 to 1980, the site served as a disposal landfill for all solid wastes from MCAS El Toro and for some wastes from MCAS Tustin. Wastes disposed at this landfill include construction debris, municipal waste, batteries, waste oils, hydraulic fluids, paint residues, transformers, and waste solvents.

2.3.2 Site 3, Original Landfill

Site 3 is a 20-acre area located between Perimeter Road and North Marine Way along the Agua Chion Wash. The site was operated as a landfill disposal facility from 1943 to 1955. Some of the deposited materials were burned at the site to reduce waste volume. Suspected wastes and chemicals of potential concern include metals, incinerator ash, solvents, paint residues, hydraulic fluids, engine coolants, construction debris, oily wastes, municipal solid wastes, and various inert solid wastes.





Health and Safety Plan
Figure 2-2
Locations of RI/FS Sites

MCAS El Toro, El Toro, California

<p>CLEAN II Program</p>	<p>Date: 2/27/95 File No. titlsite Job No. 22214-059</p>
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Section 2 Site Description

2.3.3 Site 4, Ferrocene Spill Area

Site 4 is located just southeast of Building 658, which is an engine test facility. The area includes a drainage ditch, a catch basin, and a small decontamination pad. Approximately 5 gallons of ferrocene (an antiknock agent used in gasoline) in a hydrocarbon carrier solution was spilled onto the ground during washing of a 500-gallon tank. Other suspected chemicals of potential concern include hydrocarbon carrier solution, engine test hydrocarbons, oil discharges, and fuel-related volatile and semivolatile aromatic and aliphatic organic compounds.

2.3.4 Site 5, Perimeter Road Landfill

Site 5 is located in the southeast quadrant of the Station, north of Gate 3 along the Station boundary, approximately 800 feet north-northwest of Borrego Canyon Wash. The site encompasses approximately 72,000 square feet. It operated as a landfill disposal facility from 1955 into the 1960s. Waste was reportedly burned at the site to reduce waste volume. Suspected wastes and soil and groundwater chemicals of potential concern include burnable trash, municipal solid waste, cleaning fluids, scrap metals, paint residues, and unspecified fuels, oils, and solvents.

2.3.5 Site 6, Drop Tank Drainage Area

Site 6 consists of a concrete apron, bordered by a grassy area southwest of Building 727 in the southern quadrant of the Station. Aircraft drop tanks were drained and rinsed of residual JP-5 jet fuel at this site from 1969 through 1983. Rinseate and surface water runoff from these operations flowed west of the tank drainage area into a ditch connected to a catch basin that discharges into Agua Chion Wash. Suspected affected areas include the soil around the edge of the pad, the drainage area from the pad to the catch basin, and the former drum storage areas. Soil chemicals of potential concern detected during previous investigations include aromatic hydrocarbons, chlorinated hydrocarbons, ketones, and petroleum distillates as diesel and gasoline. Chlorinated hydrocarbons were found in groundwater.

2.3.6 Site 7, Drop Tank Drainage Area No. 2

Site 7, located north and east of Hangar Buildings 295 and 296, was also used for draining drop tanks filled with JP-5 jet fuel. These operations started in 1969 and ended in 1983. During this time, approximately 11,000 gallons of lubrication oil and 4,000 gallons of JP-5 jet fuel were applied directly to the ground as a dust-suppression measure. Confirmed or suspected soil or groundwater chemicals of potential concern include volatile aromatic and aliphatic organic compounds, chlorinated solvents, petroleum hydrocarbons as diesel and gasoline, and miscellaneous pesticides, and/or polychlorinated biphenyls (PCBs).

Section 2 Site Description

2.3.7 Site 8, Defense Reutilization Marketing Office Storage Yard

Site 8 is a portion of the Defense Reutilization Marketing Office (DRMO) used for storage of unknown containerized liquids and various scrap materials. The site is located on the southwest corner of Marine Way and "R" Street, and comprises two primary areas of concern: the Old Salvage Yard (eastern portion) and the current Storage Yard (western portion). The Old Salvage Yard has a history of PCB spillage from transformers in 1984. Known or suspected chemicals of potential concern in soil or groundwater include miscellaneous pesticides and PCBs, volatile aromatic and aliphatic organic compounds, chlorinated solvents, and petroleum hydrocarbons as diesel and gasoline.

2.3.8 Site 9, Crash Crew Pit No. 1

Site 9 consists of two separate pits that lie west of Building 435 and north of the Transformer Storage Area. The west pit was used for fire-fighting training from 1965 to 1971, receiving an estimated 123,000 gallons of waste liquids including JP-5 jet fuel, aviation gasoline, and crankcase oil. It is unknown when the east test pit was operational, and what liquid volumes may have been used there. Contaminants to soil or groundwater detected during the CLEAN I investigation included volatile aromatic organic compounds, chlorinated solvents, and esters. Although not detected, trace dioxins are suspected.

2.3.9 Site 10, Petroleum Disposal Area

Site 10 encompasses an area of approximately 1,200 by 800 feet and is located directly south of Building 435 and east of Building 369. The site is covered with aircraft matting and a concrete apron. From 1952 through the mid-1960s, an estimated 52,000 gallons of waste crankcase oil, antifreeze, hydraulic and transmission fluids, motor oils, and solvents were applied to the area for dust suppression. Chemicals of potential concern detected in groundwater or soil during previous investigations include chlorinated solvents, volatile aromatic organic compounds, inorganic salts (as nitrates and nitrites), and selenium.

2.3.10 Site 11, Transformer Storage Area

Site 11 consists of a 30-foot concrete pad located northeast of Building 369, where approximately 50 to 75 transformers were stored from 1968 to 1983. It has been estimated that approximately 60 gallons of PCB-containing transformer oil may have leaked onto the pad and subsequently flowed to an adjacent asphalt-lined drainage ditch and surrounding soil. Suspected chemicals of potential concern are limited to PCBs and pesticides.

2.3.11 Site 12, Sludge Drying Beds

Site 12 is located in the southwest corner of the facility, west of Building 307 near Plant Road, South Marine Way, and Bee Canyon Wash. The site consists of wastewater

Section 2 Site Description

treatment plant sludge dewatering areas that were active from 1943 until 1972. The site includes a drainage ditch running east to west and into Bee Canyon Wash. Suspected or confirmed chemicals of potential concern include volatile aromatic organic compounds, ketones, chlorinated solvents, and miscellaneous pesticides and PCBs.

2.3.12 Site 13, Oil Change Area

Site 13 consists of two areas: an area southeast of the Tank Farm No. 2 fence line and an area between the tank farm and Building 242. From 1977 to 1983, approximately 7,000 gallons of heavy equipment waste crankcase oil were drained onto the ground at the fence line area. Oily soils were subsequently removed to a pile at the north end of the site. Types of contamination under investigation at this site include volatile aromatic organic compounds, chlorinated solvents, heavy metals, ketones, petroleum compounds, and PCBs.

2.3.13 Site 14, Battery Acid Disposal Area

Site 14 is located approximately 50 feet southwest of Building 245, which was formerly a heavy equipment maintenance shop. The site consists of two areas. The first area is an L-shaped strip of land of approximately 225 square feet reportedly used as a disposal location for battery acid from Station vehicles and miscellaneous paints during the period from 1977 until 1983. The second area is a drainage ditch and catch basin that discharges into the Bee Canyon Wash. Suspected chemicals of potential concern include lead and other priority pollutant metals, waste oils, methylene chloride, other solvents from paint products, and phenols from paint strippers.

2.3.14 Site 15, Suspended Fuel Tanks Area

Site 15, located north of Building 31 and west of Building 29 is a stained soil area where two aboveground 500-gallon diesel fuel tanks were located from 1979 to 1984. An estimated 500 gallons of diesel fuel leaked onto the ground in this area. The tanks were removed in 1984. Volatile aromatic and aliphatic organic compounds, ketones, chlorinated solvents, and petroleum hydrocarbons as diesel and gasoline were detected in area soil and groundwater.

2.3.15 Site 16, Crash Crew Pit No. 2

Site 16 is located near the center of the Station near the intersection of Runways 34-16 and 25-07. A drainage ditch parallels Runway 21-30 to the northwest and discharges into Bee Canyon Wash. From 1972 to about 1985, the site served as a training area for Crash Crew practice in extinguishing fires. Three pits exist in this area. A main pit was filled with water and a mixture of JP-5 jet fuel, leaded aviation gasoline, hydraulic fluid, and crankcase oil. A secondary holding pit stored residual liquids from the main pit. A shallow, smaller pit was used for practicing with handheld fire extinguishers. Chemicals of potential concern include JP-5 jet fuel, leaded aviation gasoline, hydraulic fluid,

Section 2 Site Description

crankcase oil, and other waste oils. Although not detected, dioxins are suspected in trace amounts.

2.3.16 Site 17, Communication Station Landfill

Site 17 is an open, rolling, dry-grass area of approximately 26 acres in a small canyon west of the Magazine Road Landfill. The landfill was actively used from 1981 to 1983 as a stationwide disposal facility. Suspected contaminants include domestic waste and rubble, cooking grease, and oils and fuels from sumps and empty drums.

2.3.17 Site 19, Aircraft Expeditionary Refueling Site

Site 19 is located in the southeast region of the facility, southwest of Buildings 404 and 415. The site was operated as a fuel storage area, served with six 20,000-gallon JP-5 jet fuel tanks from 1964 through 1987. During this period, at least one tank was known to have ruptured and released an estimated 15,000 gallons of JP-5 jet fuel. Suspected wastes and chemicals of potential concern include petroleum hydrocarbons, heavy metals, and aromatic and aliphatic organic compounds.

2.3.18 Site 20, Hobby Shop

Site 20 is located in and around Building 626 near the intersection of North Ninth Street and West Marine Way, in the northwest section of the Station. Since 1967, military personnel have used the Hobby Shop to service their privately owned vehicles. Prior to 1976, kerosene was used to wash down the asphalt pavement in the area (a task now accomplished with biodegradable soap), and drained into underground oil/water separators. Petroleum hydrocarbons as diesel and gasoline, ketones, volatile aliphatic organic compounds, and chlorinated solvents have all been detected in area soil. Chlorinated solvents were detected in area groundwater.

2.3.19 Site 21, Materials Management Group

Site 21 is a supply distribution center for MCAS El Toro and other Marine facilities. The main area of concern is the outside storage area northwest of the building where drums of chemicals were stored from 1964 through 1986. No documented leakage or spillage has occurred at the site. Detected chemicals of potential concern in soil include aliphatic and aromatic organic compounds, chlorinated solvents, petroleum hydrocarbons as diesel and gasoline, and PCBs and pesticides. Chlorinated solvents were detected in the groundwater.

2.3.20 Site 22, Tactical Air Fuel Dispensing System

Site 22 comprises two areas: the original, fuel-dispensing area located east of the Petroleum Disposal Area (Site 10), and a dispensing area relocated west of Site 10, south of Building 435 and east of Building 369. Reportedly, the sites had a history of spillage and leaks of petroleum-based fuels during routine operation. A particular spill was cited as occurring in 1983 or 1984, after which an unknown quantity of fuel and soils was

Section 2 Site Description

cleaned up. Detected chemicals of potential concern in soil included ketones, volatile aromatic organic compounds, and miscellaneous pesticides. Chlorinated solvents were detected in groundwater.

2.3.21 Site 24, Potential Volatile Organic Compound Source Area

Site 24, located adjacent to Building 296, is the area where most of the aircraft maintenance operations took place. Degreasing operations occurred both within Building 296 and on the tarmac. Chemicals of potential concern in soil and/or groundwater include volatile aromatic organic compounds and chlorinated solvents.

2.3.22 Site 25, Major Drainages

Site 25 consists of drainages and washes found throughout, and in the general vicinity of, MCAS El Toro. These areas include the Agua Chinon Wash, Bee Canyon Wash, Borrego Canyon Wash, the Marshburn Channel, and San Diego Creek. Chemicals of potential concern include metals in all surface water and dry wash sediment in the Marshburn Channel, semivolatile organic compounds (SVOCs) in the San Diego Creek, pesticides and PCBs in the Marshburn Channel, and total petroleum hydrocarbons (TPH) for gasoline and diesel in the Agua Chinon and Bee Canyon Washes.

2.4 SITE TOPOGRAPHY AND CLIMATE

MCAS El Toro is located on the edge of the Tustin Plain. The plain is bounded on the north and east by the Santa Ana Mountains and on the south by the San Joaquin Hills. MCAS El Toro gently slopes down to the west-southwest and extends eastward into the Santa Ana Mountains. Elevation gains across the air station range from 215 feet to 800 feet above sea level at the foothills of the Santa Ana Mountains.

The climate in the vicinity of MCAS El Toro is semiarid, characterized by hot dry summers and mild winters. Annual precipitation averages 12.2 inches per year with early morning fogs in late spring and early summer. Most of the precipitation falls between November and April. The mean low temperature in winter is 37°F and summer temperatures rarely exceed 100°F. Prevailing winds are from the west from March through October and from the east during November through February. Occasionally, strong, dry winds from the northeast, known as Santa Anas, occur in the fall, winter, and early spring.

2.5 KNOWN WASTE CHARACTERISTICS

The sources and contaminants are varied and unique to each of the 22 individual sites. Chemicals of potential concern at these sites include waste oils, solvents, jet and diesel fuel, aviation gasoline, antifreeze, paint residues, used batteries, municipal and construction wastes, sludge, and other wastes.

SECTION 3

SCOPE OF WORK

Section 3

SCOPE OF WORK

3.1 WORK PLAN SUMMARY

The Phase I Remedial Investigation/Feasibility Study Report prepared for CLEAN I in 1992, identified both soil and groundwater as areas of concern at MCAS El Toro; however, the extent of impacted areas had not been determined. This Phase II RI/FS, conducted under the CLEAN II Program, will address this series of sites, which were previously identified in the Phase I RI/FS under the designation "OU-3." Work will be performed to further characterize the site, including the collection of soil samples and water samples as described in the task summary below.

3.2 TASK SUMMARY

The following specific tasks will be performed at MCAS El Toro:

Soil Investigation

1. Nonintrusive geophysics surveys will be conducted prior to intrusive work.
2. Mud-rotary borings to depths ranging from approximately 100 to 250 feet will be continuously cored to provide data for subsurface stratigraphic control and to assess the presence and magnitude of soil contamination.
3. Cone penetrometer testing (CPT) will be conducted at eight sites where deeper soils may have been impacted by historic surficial activities or contaminant releases.
4. Hollow-stem auger borings will be drilled to 10-foot depths to provide data on shallow soil conditions at 17 sites.
5. Hollow-stem auger and air-rotary borings will be drilled to depths of up to 180 feet to provide data on deep and shallow soil conditions. Soil samples will be collected at 5-foot intervals during drilling of the auger and air-rotary boreholes.
6. Shallow borings to approximately 5-foot depths will be hand augured, and samples will be collected at the soil refuse pile within the boundaries of Site 8.
7. Seven soil borings will be completed as monitoring wells.
8. Approximately 300 shallow soil-gas samples and 6 to 8 gas flux chamber samples will be collected in the landfills at Sites 2 and 17. These samples will be analyzed for chemicals of potential concern. In addition, deep soil gas samples may be collected at Site 24, using hollow-stem augers.

Groundwater and Wastewater Investigation

1. An estimated seven new groundwater monitoring wells will be installed at selected upgradient and downgradient locations. Wells will be sampled on a quarterly basis.

Section 3 Scope of Work

2. Existing wells, which define upgradient and downgradient conditions at sites where groundwater contamination is suspected, will be sampled concurrent with initial the sampling of new wells. An estimated total of 22 groundwater samples will be collected from new and existing wells during the Phase II RI field activities.
3. Wastewater generated from well development, equipment decontamination, and pump testing will be collected, transported to the field operations staging area, and treated using the on-site treatment system installed during the Phase I RI/FS. Approximately 18 wastewater samples will be collected from the influent and effluent ends of the existing water treatment system.

3.3 PERIOD OF EXECUTION

It is anticipated that on-site activities will be conducted from April 1995 through October 1996.

3.4 PRINCIPAL SUBCONTRACTORS ON-SITE

CLEAN II subcontractor activities scheduled to be performed at MCAS El Toro include land surveying, geophysical site characterization, drilling, and soil-gas monitoring. These activities are identified in Table 3-1. Authorized field representatives for subcontract personnel will be identified within 10 days of initiating each field activity involving a CTO-0059 subcontractor.

Table 3-1
Subcontractors for RI/FS Activities at MCAS El Toro
 (To be completed prior to on-site activities)

Subcontractor	Authorized Field Representative	Telephone
Drilling/sampling/well installation	To be determined	To be determined
Cone penetrometer testing	To be determined	To be determined
Backhoe operation	To be determined	To be determined
Soil-gas	To be determined	To be determined
Geophysics	To be determined	To be determined
General contractor (fencing, locks, cleanup)	To be determined	To be determined
Concrete/metal aircraft mat cutting	To be determined	To be determined
Thermal desorption	To be determined	To be determined
Land surveying	To be determined	To be determined

SECTION 4

ORGANIZATION AND RESPONSIBILITIES

Section 4

ORGANIZATION AND RESPONSIBILITIES

4.1 GENERAL

Responsible personnel for Phase II RI/FS site work for each task are identified in Table 4-1. Additional contact information is provided in Table 4-2. When the Health and Safety Coordinators for major field subcontractors are identified, the plan will be amended.

**Table 4-1
 Responsible Personnel for the Site**

Title	Name	Daytime	After Hours
Project Manager	David Cowser	(619) 687-8802	To be determined
Contract Task Order Leader	Tim Latas	(619) 541-1145	To be determined
BNI SHSO ¹	To be determined	To be determined	To be determined
BNI Health and Safety Manager	Conrad Sherman	(619) 581-3453	(619) 581-3453
BNI Health and Safety Supervisor	Robert Brounstein	(310) 807-2797	To be determined
Drilling\CPT ² Subcontractor Safety Coordinator	To be determined	To be determined	To be determined
Aircraft Mat Cutting Safety Coordinator	To be determined	To be determined	To be determined
General Contractor Safety Coordinator	To be determined	To be determined	To be determined
Soil-Gas Safety Coordinator	To be determined	To be determined	To be determined
Waste Management Safety Coordinator	To be determined	To be determined	To be determined

Notes:

¹ SHSO – Site Health and Safety Officer

² CPT – cone penetrometer test

Section 4 Organization and Responsibilities

**Table 4-2
 Additional Contact Information**

Entity	Address	Main Telephone	Facsimile	Contact/Project Manager
BNI	401 West A Street Suite 1000 San Diego, CA 92101-7905	(619) 687-8700	(619) 687-8787	Dave Cowser
Brown and Caldwell	9040 Friars Road, Suite 220 San Diego, CA 92108	(619) 528-9090	(619) 528-9199	Vijay Bedi
Kleinfelder	9555 Chesapeake Drive Suite 101 San Diego, CA 92123	(619) 541-1145	(619) 541-1645	Jerry Jackson
Drilling Subcontractor ¹	To be determined	To be determined	To be determined	To be determined
Soil-Gas Subcontractor	To be determined	To be determined	To be determined	To be determined
Waste Management Subcontractor	To be determined	To be determined	To be determined	To be determined
SWDIV RPM ²	1220 Pacific Highway San Diego, CA	(619) 532-1164	(619) 532-4986	Jason Ashman

Notes:

¹ names of contractor contacts to be entered prior to fieldwork

² SWDIV RPM – Southwest Division Naval Engineering Facilities Command Remedial Project Manager

SECTION 5

HAZARD IDENTIFICATION

Section 5

HAZARD IDENTIFICATION

5.1 RISK ASSESSMENT

A job-hazard analysis for MCAS El Toro field conditions and activities is presented in Table 5-1. A multiple site-hazard assessment for MCAS El Toro activities is presented in Table 5-2.

5.2 SIGNIFICANT HAZARDS

5.2.1 Heat Stress

Weather conditions characterized by high temperatures and low humidity and/or work in personal protective clothing, may create the potential for heat-stress problems. Standard measures, including designating a shaded rest area, taking frequent rest breaks, and performing heat-stress monitoring, shall be used to minimize heat-stress-related problems.

5.2.2 Radioactive Materials

The potential for being exposed to radioactive materials exists during work at MCAS El Toro military landfills (Sites 2, 3, 5, and 17) in the form of aircraft dials (radium) or aircraft ballast (uranium). Other potential areas of concern are the Aircraft Restoration Area (Site 13) and the DRMO (Site 8). Radiation monitoring will be conducted for health and safety purposes on soil samples and suspect objects or material uncovered during intrusive work at these locations. This monitoring will be conducted with a Geiger Mueller detector in pancake configuration. Action levels for instrument readings in excess of background levels are found in Section 10 (Table 10-4).

Radiation monitoring is designed to identify any discrete radiation sources that could present a health hazard to site workers, to ascertain if contamination control practices might be necessary for future work at the site, and to identify contamination on or within the landfills or work areas that could be indicative of a general problem with radioactive materials.

5.2.3 Fire and Explosion Hazards

The potential for TPH concentrations to reach explosive levels during intrusive work exists at MCAS El Toro. In addition, leaded gasoline may be present at many of the work sites. Leaded gasoline can poison an explosimeter filament causing malfunction. All intrusive work shall be monitored with an explosimeter fitted with the manufacturers' approved leaded gas filter. Ignition sources shall be controlled or eliminated during intrusive work.

Section 5 Hazard Identification

**Table 5-1
 Job-Hazard Analysis**

Risk or Hazard	Evaluation	General Compensatory Measures
Airborne exposure exceeding the permissible exposure limit	Not expected, but possible during intrusive field activities.	Frequent exposure monitoring shall be utilized. Respiratory protection will be readily available on-site.
Radioactive contamination spread, of airborne radioactivity	Not expected, but possible in some areas.	Radiation monitoring shall be performed at Sites 2, 3, 5, 8,13, and 17.
Substances identified without OSHA ¹ , ACGIH ² , NIOSH ³ , or other recognized exposure limits	All substances identified have exposure limits.	
Unidentified substances or uncontrolled dumping of objects on-site	Unidentified substances may be present in subsurface areas.	Direct instrumentation, colorimetric indicator tubes, geophysical surveys.
Substances that may be skin-absorbed and/or for which skin is the principle target organ	PCBs ⁴ , methylene chloride and TCE ⁵ are confirmed contaminants at some sampling locations.	Skin protection will be utilized during intrusive operations.
Explosion-sensitive substances present	This hazard was not identified during the job-hazard analysis.	Work at Site 1 is unauthorized without a special addendum to this plan.
Oxygen deficiency	This hazard was not identified during the job-hazard analysis.	
Substances with no warning properties that are likely to be present in toxic concentrations	This hazard was not identified during the job-hazard analysis.	
Explosive mixtures in air	This hazard may be encountered during intrusive operations.	An explosimeter will be utilized during intrusive activities.
Substances that may interfere with combustible gas instrumentation	Leaded gasoline may be present in many drilling locations.	Explosimeters shall be fitted with the manufacturer's leaded gas filter.
Tank entry, enclosed space, or restricted access	Confined space entry is unauthorized for site work.	A separate job-hazard analysis will be prepared by the HSS ⁶ if confined space entry becomes necessary.

(table continues)

Section 5 Hazard Identification

Table 5-1 (continued)

Risk or Hazard	Evaluation	General Compensatory Measures
Fire hazard	A slight risk of fire is present.	Fire extinguishers will be present on all site vehicles and heavy equipment. Dry brush will be cleared from site operations.
Excavation	Not expected but heavy equipment may be used for excavation.	Safety measures will be reviewed during site briefing; personnel will not enter excavations; all open pits will be barricaded.
Fall	Climbing on the drill rig.	Fall protection will be required for drilling subcontractors.
Acute poisons, PCBs	PCBs and pesticides are a confirmed contaminant at many sampling locations. Dioxins are suspected at some sites.	Skin protection will be utilized during intrusive operations. Respiratory protection will be readily available on-site.
Regulated carcinogens	Low concentrations of TCE, methylene chloride, DDT, tetrachloroethylene, chloroform, methoxychlor, carbon tetrachloride, and benzene below the action levels are expected; other recognized but unregulated carcinogens are potentially present.	Monitoring with direct-reading instrumentation and screening devices; respiratory protection; ALARA ⁷ policy applies.
High-voltage electric lines	This hazard is present.	Observation of required clearances.
Buried cables	This hazard may be present.	Utility plan check, underground utility screening; hand augering may be required.
Heat stress	This hazard may be present.	Increase fluid intake; implement work rest regimen; monitor worker pulse.
Asbestos	This hazard may be present within landfill areas.	PPE ⁸ , respiratory protection, decontamination.
Unexploded ordnance	This hazard was not identified during the job hazard analysis. Work at Site 1 is unauthorized.	
Buried tanks	This hazard may be present.	Plan check, underground utility screening
Ionizing radiation	Not expected, but possible in some areas.	Radiation monitoring shall be performed at Sites 2, 3, 5, 8, 13, and 17.

(table continues)

Section 5 Hazard Identification

Table 5-1 (continued)

Risk or Hazard	Evaluation	General Compensatory Measures
Nonionizing radiation	This hazard was not identified during the job-hazard analysis.	
Solar radiation	Outdoor work presents this hazard.	Personnel encourage to use sunscreen or covering clothing.
Dioxins	Traces are potentially present in landfills and burn areas.	Level C required at Sites 2, 3, 5, 17, 9, and 16; PPE, decontamination.
Noise in excess of 85 dBA ⁹	This hazard is present in many areas.	Hearing Conservation Program hearing protection.
Vibration	This hazard was not identified during the job-hazard analysis.	
Traffic	This hazard is present in some areas.	Cones, flags, tape, or barricades will be used to mark work areas; where a drill or development rig is utilized, a two-zone system will be used.
Cold stress	This hazard was not identified during the job-hazard analysis.	

Notes:

- ¹ OSHA – Occupational Safety and Health Administration
- ² ACGIH – American Conference of Government Industrial Hygienists
- ³ NIOSH – National Institute for Occupational Safety and Health
- ⁴ PCBs – polychlorinated biphenyls
- ⁵ TCE – trichloroethylene
- ⁶ HSS – Health and Safety Supervisor
- ⁷ ALARA – As low as reasonably achievable
- ⁸ PPE – personal protective equipment
- ⁹ dBA – decibels measured on the A-weighted scale

**Table 5-2
Multiple Site-Hazard Assessment**

Site	Traffic	Fire Hazard	Utilities	Radioactivity	Skin Absorbed Organics	Explosive Mixtures	Leaded Gasoline	PCBs/ Pesticides	Dioxins	Asbestos	Ordnance	Chlorinated Solvents	Carcinogens
Site 1											known		
Site 2		known		suspect	known	suspect	suspect	known	suspect	suspect		suspect	suspect
Site 3		known		suspect	suspect	suspect	suspect	suspect	known	suspect		suspect	suspect
Site 4			suspect			suspect	suspect						suspect
Site 5		known		suspect	suspect	suspect	suspect	suspect	suspect	suspect		suspect	suspect
Site 6			suspect		known	suspect	suspect					known	known
Site 7			suspect		known	suspect	suspect	suspect				suspect	suspect
Site 8	known		suspect	suspect	known	suspect	suspect	known				suspect	suspect
Site 9			suspect		known	suspect	suspect	suspect	suspect			known	known
Site 10			suspect		known	suspect	suspect					known	known
Site 11	known		suspect		known	suspect		known					suspect
Site 12					suspect	suspect	suspect	suspect				suspect	suspect
Site 13	known		suspect	suspect	suspect	suspect	suspect	suspect				suspect	suspect
Site 14			suspect		suspect	suspect						suspect	suspect
Site 15			suspect		known	suspect	suspect					known	known
Site 16					suspect	suspect	suspect	suspect	suspect			suspect	suspect
Site 17		known		suspect	suspect	suspect		suspect	suspect	suspect			
Site 19			suspect			suspect							suspect
Site 20		known	suspect		known	suspect	suspect					known	known
Site 21	known		suspect		known	suspect		known				known	known
Site 22			suspect		suspect	suspect	suspect					suspect	known
Site 24	known		suspect		known	suspect	suspect					known	known
Site 25					suspect	suspect							suspect

Section 5 Hazard Identification

Dry brush exists at many of the site locations particularly Site 2, the Magazine Road Landfill, and Site 17, the Communication Station Landfill. Vehicles shall not be parked over dry brush or dry grass. Drilling locations shall be cleared of flammable materials, including brush, prior to placement of the drilling rig at the sampling location.

5.2.4 Overhead Electrical Hazards

MCAS El Toro is an operating facility with live utilities near many of the proposed sampling locations. The Site Health and Safety Officer (SHSO) shall inspect drilling/sampling locations for overhead hazards prior to movement of heavy equipment onto the location, and be present during the "booming up" of drill rig masts. A detailed hazard analysis shall be prepared by the subcontractor in accordance with SOP 4.1.1, Job Hazard Analysis, prior to operating heavy equipment (drilling rigs, excavators, cranes) underneath or within 20 feet of the maximum reach of the equipment, considering equipment failure, of overhead electrical hazards or switch gear.

5.2.5 Vehicle and Aircraft Traffic

MCAS El Toro is a busy military facility with numerous roadways, runways, and taxiways. Work near these areas requires traffic control by means of cones, flags, barricades, and/or flagmen. Employees performing traffic control shall wear orange garments. Work near very wet roadways and/or at night is not authorized. Work on any roadway, runway, or taxiway requires prior authorization from the Resident Officer in Charge of Construction (ROICC) and traffic control by base personnel. The Base Contractor Safety Director, Joe Bucho, is to be contacted at (714) 726-2902 for assistance with traffic control when near these areas.

5.2.6 Foreign Object Debris

Good housekeeping practices will be practiced at all times during field activities to minimize the potential for damage to aircraft resulting from foreign object debris (FOD) produced during field activities. If such debris is introduced onto taxiways, runways, tarmacs, or aircraft storage areas, it can cause damage if it is swept into aircraft engines. Good housekeeping practices to comply with FOD minimization shall include strict site-control barriers, immediate site cleanup and sweeping, and site inspection prior to the field team leaving the area.

5.2.7 Carcinogens

Carcinogens are any chemicals or products capable of causing or inducing cancer or leukemia in humans. Many confirmed or suspected carcinogenic compounds have been detected during previous investigations of MCAS El Toro, including TCE, methylene chloride, DDT, tetrachloroethylene (perchloroethylene), PCBs, chloroform, methoxychlor (1,1,1-trichloroethane), carbon tetrachloride, and benzene. Action levels have been specifically modified and special instrument needs specified in this Supplement to protect site workers from these hazards.

Section 5 Hazard Identification

5.2.8 Polychlorinated Biphenyls

PCBs are common contaminants of oily type waste. They are recognized environmental pollutants and suspected human carcinogens. During previous investigations of MCAS El Toro, PCBs have been detected in a number of base areas. Sites where PCBs are suspected or confirmed are Sites 2, 3, 5, 7, 8, 9, 11, 12, 13, 16, 17, and 21. Special precautions, such as specific medical surveillance and personal protective equipment, have been incorporated into this Supplement.

5.2.9 Dioxins

Dioxins are produced in industrial processes as contaminants in production of herbicides and as by-products of combustion of chlorinated hydrocarbons, particularly PCBs and trichlorobenzene. Dioxins are considered highly toxic and are suspected carcinogens, even in trace quantities. Dioxins have been detected in trace quantities at MCAS El Toro at Site 3, Original Landfill. Other MCAS El Toro sites where dioxins could be expected include landfills where burning or pesticide dumping may have taken place (Sites 2, 5, and 17) and Crash Crew Pit Sites 9 and 16. Level C will be required during all intrusive work at these six sites.

5.2.10 Chlorinated Solvents

A variety of chlorinated solvents have been detected at MCAS El Toro during previous investigations. Chlorinated solvents present a wide range of toxic modalities, with certain compounds being highly toxic and others being essentially inert. They are often identified by a familiar characteristic odor. The required instrument for volatile chemical detection specified in this supplement is a photoionization detector (PID) with a lamp of the energy 11.7 electron volt (eV). This detector has the most desirable response to chlorinated solvents.

SECTION 6

HAZARD ANALYSIS

Section 6 HAZARD ANALYSIS

6.1 GENERAL

This section presents a hazard analysis and more detailed discussion of the physical/industrial and chemical hazards identified or potentially present at MCAS El Toro during RI/FS activities. This section also provides a task-specific analysis of hazards encountered and/or associated with work at this site.

6.2 RISK ANALYSIS

A summary of hazards associated with field activities is presented in Tables 6-1A and 6-1B. A list of these activities in terms of relative worker exposure levels to health and/or safety hazards is presented below:

Low	Moderate	High
Land surveying	Groundwater/wastewater sampling	Drilling and subsurface soil sampling (See sites listed in Table 6-1-B)
Geophysical surveying	Drilling and subsurface soil sampling	
Soil gas sampling		
Surface soil sampling		
Radiological surveying		

6.3 PHYSICAL HAZARDS

Physical hazards associated with proposed MCAS El Toro field activities include noise, heavy equipment operation, falling, slipping and tripping, manual lifting, heat stress, fire and/or explosion hazards, electrocution, and vehicle and/or aircraft traffic in fire lanes and/or access roads.

6.3.1 Noise

MCAS El Toro is an operating air base with the accompanying high levels of aircraft noise. CLEAN II and subcontractor personnel are required to wear hearing protection during drilling operations and whenever aircraft noise exceeds 85 decibels measured on the A-weighted scale (dBA) at the work location (aircraft noise may exceed 114 dBA). It is expected that hearing protection will be worn in all areas of the base. This will require all field personnel to don double hearing protection (ear plugs and muffs). In addition, field operations personnel shall not leave equipment, materials, or debris on the runways because these materials can be drawn into aircraft engines and can cause damage to aircraft engines and excess noise. Initial noise monitoring will be conducted by the Health and Safety Supervisor (HSS) or SHSO in accordance with PP H.S. 3.3, "Hearing Conservation." Personal noise dosimeters will be used if noise monitoring indicates levels are consistently greater than 85 dBA.

Section 6 Hazard Analysis

**Table 6-1A
 Industrial Hazards Analysis**

Task	Hazard	Controls	Estimated Task Duration
Mobilization and setup	Vehicle operation Material handling Lifting Pinch points	Training Inspection, training	Week 1 through completion
Drilling, coring, and subsurface soil sampling	Operation of drill rig Noise Chemical exposure	Safety rules training Use of ear protection site control; decontamination protocols; PPE*; respirators; air monitoring	24 weeks
Surface soil sampling	Chemical exposure	Safety rule training; site control; decontamination protocols; PPE; respirators; air monitoring	20 weeks
Decontamination of equipment	Chemical exposure Steam and hot water Chemical cleaners	Safety rule training; site control; Decontamination protocols; PPE; respirators; air monitoring	Daily
Land/geophysical surveying, other nonintrusive activities	Base industrial hazards	Refer to Table 6-1 of Programmatic Health and Safety Plan	30 weeks

Note:

* PPE – personal protective equipment

Section 6 Hazard Analysis

Table 6-1B
Site-Specific Industrial Hazards Analysis

Site	Task	Hazard	Additional Controls
Landfills			
Sites 2, 3, 5, 17	Land/geophysical surveying, other nonintrusive activities	Base industrial hazards	No additional controls
	Surface soil sampling/soil gas surveys	Chemical exposure, including PCBs, dioxins; radioactive materials	Blood-serum PCB surveillance Level C required (w/polycoat Tyvek®) Radiation monitoring
	Drilling, coring, and subsurface soil sampling	Operation of drill rig Noise Chemical exposure including PCBs, dioxins	Blood-serum PCB surveillance Level C required (w/polycoat Tyvek®) Radiation monitoring
Burn Sites			
Sites 9, 16	Land/geophysical surveying, other nonintrusive activities	Base industrial hazards	No additional controls
	Surface soil sampling/soil gas surveys	Chemical exposure including PCBs, dioxins	Blood-serum PCB surveillance Level C required (w/polycoat Tyvek®)
	Drilling, coring, and subsurface soil sampling	Operation of drill rig Noise Chemical exposure including PCBs, dioxins	Blood-serum PCB surveillance Level C required (w/polycoat Tyvek®)
PCB Sites			
Sites 2, 3, 5, 7, 8, 9, 11, 12, 13, 16, 17, and 21	Land/geophysical surveying, other nonintrusive activities	Base industrial hazards	No additional controls
	Surface soil sampling/soil gas surveys	Chemical exposure including PCBs	Blood-serum PCB surveillance
	Drilling, coring, and subsurface soil sampling	Operation of drill rig Noise Chemical exposure including PCBs	Blood-serum PCB surveillance Level C during dust producing operations
Potentially Radioactive Sites			
Landfill Sites 2, 3, 5, and 17, and Sites 8 and 13	Land/geophysical surveying, other nonintrusive activities	Base industrial hazards	No additional controls
	Surface soil sampling/soil gas surveys	Chemical exposure including PCBs	Radiation monitoring
	Drilling, coring, and subsurface soil sampling	Operation of drill rig Noise Chemical exposure including PCBs	Radiation monitoring

Section 6 Hazard Analysis

6.3.2 Falling, Slipping, and Tripping

Many tripping hazards exist at MCAS El Toro, including overgrown landfill areas or aircraft tie-downs in aircraft maintenance areas. Site personnel shall exercise caution when working in unfamiliar areas and shall warn coworkers of unobvious physical hazards when observed. Two open storm drains present a falling hazard at Site 6, Drop Tank Drainage Area. These open holes shall be properly covered and secured or barricaded before work may commence at this site.

6.6 INDUSTRIAL HAZARDS

MCAS El Toro is an active air base that will continue uninterrupted during RI/FS field activities. Industrial hazards common to all sites are identified in Table 6-1A and described below. Site-specific hazards and additional controls are identified in Table 6-1B.

6.6.1 Underground Pipelines and Utilities

Drilling and coring operations at the MCAS El Toro facility shall not be conducted until preliminary screening has been performed to determine if underground utilities or other subsurface obstructions are present at proposed subsurface investigation locations.

Preliminary screening will consist of review of the MCAS El Toro facility pipeline and utility plans, site walks, and geophysical surveys. An underground utility clearance will be performed at each proposed boring, drilling, soil gas, or coring location. Utility clearances will be performed in accordance with MCAS El Toro Facility Public Works Center (PWC) procedures. The following steps will be followed at each proposed subsurface investigation location:

- proposed drilling and coring locations will be marked on as-built pipeline and utility plans for the facility.
- a site walk will be conducted with PWC and area personnel to locate and mark documented and undocumented underground facilities and proposed sampling locations;
- geophysical surveys using ground-penetrating radar (GPR), electromagnetic (EM), and magnetometry techniques will be conducted to confirm the presence of documented utilities and to identify undocumented utilities and other subsurface obstructions.
- the MCAS El Toro facility ROICC representative for sampling areas will be advised of the locations of all proposed drilling, and coring locations; and a utility clearance form signed by the ROICC representative will be obtained prior to initiating these field activities.

Section 6 Hazard Analysis

The final decision to perform ground-intrusive work at a proposed location shall be made in accordance with the following criteria:

- proposed drilling, and coring locations known to be underlain by underground pipeline or, as shown on a utilities site plan or interpreted from GPR and/or EM data, will be relocated and rescreened; and
- where utilities are interpreted to be present based on geophysical surveys but are not shown on as-built plans, and in all industrial/residential areas, a hand auger will be advanced to approximately 5 feet below ground surface (bgs) prior to the initiation of intrusive activities at the location; and
- where utilities have not been detected by geophysical surveys and are not shown on as-built plans, soil gas, CPT, and drilling, and coring operations in agricultural areas will proceed at a slow rate until advanced below a depth of 5 feet bgs.

6.7 CHEMICAL HAZARDS

Chemicals of potential concern detected or suspected to be present in facility soils or groundwater are identified in Table 6-2. The toxicological properties of these chemicals are summarized in Table 6-3.

Any free liquids encountered during MCAS El Toro field activities shall be field-tested for corrosivity with a pH-indicator test strip and shall be evaluated by the HSS. The HSS shall decide if the field activities should be stopped or allowed to continue under specified conditions.

6.8 LANDFILL DECOMPOSITION HAZARDS

Decomposition of organic materials within landfills often results in the production of methane, hydrogen sulfide, and/or vinyl chloride. Methane can produce a flammable environment; hydrogen sulfide and vinyl chloride are highly toxic. Explosive gases and hydrogen sulfide will be continuously monitored with direct-reading instruments during intrusive operations. Detector tubes that are specific for vinyl chloride and hydrogen sulfide will be utilized at all landfill operations (Sites 2, 3, 5, and 17).

Section 6 Hazard Analysis

Table 6-2
Chemicals and Metals Suspected or Identified at Site

Chemical Class	Representative Compounds
Organic Compounds	
Volatile Aromatic Organics	Ethylbenzene, toluene, benzene, xylenes
Volatile Aliphatic Organics	Methane, carbon disulfide, various combinations as petroleum hydrocarbons
Petroleum Hydrocarbons	Diesel fuel, gasoline, solvents
Ketones	2-hexanone (MBK), acetone
Esters	Dimethylphthalate
Halogenated Hydrocarbons	
Chlorinated Solvents	1,1,1-trichloroethane, trichloroethylene, methyl chloride, methylene chloride, carbon tetrachloride, chloroform, 1,1-and 1,2-dichloroethene, 1,2-dichloroethane, tetrachloroethene, tetrachloroethylene
Vinyl Chloride*	Vinyl chloride
Polychlorinated Biphenyls	Aroclor 1254, Aroclor 1260
Metallic Compounds	
Heavy Metals	Arsenic, cadmium, copper, chromium, lead, zinc, antimony, vanadium, molybdenum, mercury, nickel, silver, barium, cobalt
Other Metals	Selenium
Minerals	
Silica	Major component of sand
Asbestos*	Various forms may be present in soil and in demolition debris
Inorganic salts	
Inorganic Salts	Nitrates, nitrites
Pesticides	
Miscellaneous Pesticides	4,4-DDE, 4,4-DDD, 4,4 DDT, endrin aldehyde, endosulfan II, dalapon, MCPP
Radioactive Materials	
Uranium*, Radium*	Uranium-238, radium-226

Note:

* Suspected as a contaminant of concern

Section 6 Hazard Analysis

**Table 6-3
 Toxicological Properties of Chemical Compounds Suspected to Be Present**

Class/Compounds (example compounds)	Principal Routes of Entry	Acute Exposure Effects/Symptoms	Chronic Exposure Effects/Symptoms
ORGANIC COMPOUNDS			
Aromatic Hydrocarbons			
Benzene ¹	Inh ² /Ing ³ /Skin	Dizziness; nose, throat, skin, and eye irritation	Blood changes, bone marrow changes, carcinogen
Ethylbenzene, Styrene, Toluene, Xylene	Inh/Ing/Skin	Dizziness; nose, throat, skin, and eye irritation; olfactory changes; irritant; poison; distortion; hallucination; CNS ⁴ effects	Cardiac arrhythmia
Aliphatic Hydrocarbons			
Alkanes, Alkenes, Alicyclics (C ₁ - C ₁₄)		Anesthesia, dizziness, headache, nausea, vomiting, sleepiness, fatigue, disorientation, depression, unconsciousness, respiratory tract irritation, sore throat, cough	Dermatitis, headache, mood shifts, CNS effects, fatigue
Petroleum Distillates			
Rubber Solvent, Naphtha, Gasoline, Diesel, Kerosene, Aviation Gasoline	Inh/Skin/Ing	Anesthesia, dizziness, headache, nausea, vomiting, sleepiness, fatigue, disorientation, depression, unconsciousness, respiratory tract irritation, sore throat, cough	Dermatitis, headache, mood shifts, CNS effects, fatigue
Chlorodiphenyl (PCB)⁵			
Aroclor 1254 ⁶	Skin/Ing/Inh	Chloracne	Liver effects/ suspected carcinogen
Aroclor 1260 ⁶	Skin/Ing/Inh	Chloracne	Liver effects/ suspected carcinogen
Semivolatile Organics			
Polynuclear Aromatic Hydrocarbons ¹ (group all as polynuclear aromatic hydrocarbons or coal tar pitch volatiles)	Skin/Inh/Ing	Irritant to skin, vomiting, photosensitization, headache	As a class overall, can be considered mutagenic and tumorigenic with several compounds known carcinogens; also causes liver damage

(table continues)

Section 6 Hazard Analysis

Table 6-3 (continued)

Class/Compounds (example compounds)	Principal Routes of Entry	Acute Exposure Effects/Symptoms	Chronic Exposure Effects/Symptoms
Ketones Methyl ethyl ketone (MEK) Methyl n-butyl ketone Acetone	Inh/Ing/Skin	Respiratory tract irritation, sore throat, cough, anesthesia, headache, nausea, vomiting, fatigue, disequilibrium, depression, unconsciousness	Dermatitis: dry, cracked, erythematous skin; neurological disorders; peripheral neuropathy; kidney and liver damage
Esters Dimethylphthalate	Inh/Ing/Skin	Respiratory tract irritation, sore throat, cough, strong anesthetic action, headache, nausea, vomiting, fatigue, disequilibrium, depression, unconsciousness	Dermatitis: dry, cracked, erythematous skin; neurological disorders, peripheral neuropathy, kidney and liver damage, optic nerve damage
Glycol Ethers Cellosolve Methyl Cellosolve Ethylene Glycol Monoethyl Ether 2-Butoxyethanol Diethylene Glycol Ether	Inh/Ing/Skin	Anesthetic action, headache, nausea, vomiting, fatigue, disequilibrium, depression, unconsciousness	Dermatitis: dry, cracked, erythematous skin; anemia: low erythrocyte count, pancytopenia, hemolysis, bone marrow suppression; encephalopathy: confusion, disorientation; reproductive toxicity
Chlorinated Hydrocarbons Trichloroethylene (TCE) ¹	Inh/Skin	Anesthesia, headache, fatigue, disorientation, depression, unconsciousness, respiratory tract irritation, sore throat, nausea, vomiting	Dermatitis, CNS symptoms, liver damage, kidney damage
Carbon Tetrachloride ¹ , Chloroform ¹	Inh/Skin	Carcinogen, anesthesia, headache, fatigue, disorientation, depression, unconsciousness, respiratory tract irritation, sore throat, nausea, vomiting	Dermatitis, CNS symptoms, liver and kidney damage
1,2-Dichloroethane	Inh/Skin	Moderately toxic/nausea, vomiting, diarrhea	Carcinogen/renal, lungs

(table continues)

Section 6 Hazard Analysis

Table 6-3 (continued)

Class/Compounds (example compounds)	Principal Routes of Entry	Acute Exposure Effects/Symptoms	Chronic Exposure Effects/Symptoms
Methylene Chloride ¹	Inh/Skin	Carboxyhemoglobin former, anesthesia, headache, fatigue, disorientation, depression, unconsciousness, respiratory tract irritation, sore throat, nausea, vomiting	Dermatitis, CNS symptoms, liver and kidney damage
Vinyl Chloride ¹	Inh		Carcinogen, liver tumors
1,1,1-Trichloroethane	Inh/Skin	Cardiac sensitizer, anesthesia, headache, fatigue, disorientation, depression, unconsciousness, respiratory tract irritation, sore throat, nausea, vomiting	Dermatitis, CNS symptoms, liver damage, kidney damage
Metal Compounds			
Antimony	Inh/Ing	Respiratory tract irritation, GI ⁷ distress, dermatitis	Dermatitis, pneumoconiosis
Arsenic ¹	Skin/Inh/Ing	Dermatitis, respiratory tract irritation, GI distress, jaundice	Carcinogen, dermatitis, anemia, cardiac and vascular disease
Molybdenum	Skin/Inh/Ing	Weakness, dizziness, headache, dyspnea, cyanosis, pulmonary edema	Liver and kidney damage
Cadmium ¹	Inh/Ing	Metal fume fever	Carcinogen, lung, liver, kidney disorders
Chromium (VI) ¹	Skin/Inh/Ing	Skin, respiratory tract irritation, dermatitis, skin ulceration	Carcinogen, lung and skin effects, nasal septum perforation
Chromium	Skin/Inh/Ing	Skin, respiratory tract irritation	Lung disease
Cobalt	Inh/Ing	Respiratory tract irritation	Hypersensitivity, respiratory diseases
Copper	Inh/Ing	Respiratory tract irritation, nasal septum perforation	Respiratory illness
Lead ⁶	Inh/Ing	GI distress, kidney failure	Neuropathy, CNS anemia
Mercury	Inh/Ing/Skin	Dermatitis, respiratory tract irritation, GI distress	CNS effects, GI system effects, fatigue

(table continues)

Section 6 Hazard Analysis

Table 6-3 (continued)

Class/Compounds (example compounds)	Principal Routes of Entry	Acute Exposure Effects/Symptoms	Chronic Exposure Effects/Symptoms
Silver	Inh/Ing	Respiratory tract irritation, dermatitis	Dermatitis, skin ulceration
Vanadium	Inh/Ing	Respiratory tract irritation, bronchitis	Respiratory tract disease, asthma
Zinc	Inh/Ing	Metal fume fever, skin irritation.	GI tract effects, dermatitis
Nickel	Skin/Inh/Ing	Skin, nasal irritation, respiratory tract irritation	Carcinogen, lung, GI system disease

Notes:

- ¹ confirmed human carcinogen
- ² Inh – inhalation
- ³ Ing – ingestion
- ⁴ CNS – central nervous system
- ⁵ PCB – polychlorinated biphenyl
- ⁶ suspected human carcinogen
- ⁷ GI – gastrointestinal

SECTION 7

SITE CONTROL

Section 7

SITE CONTROL

7.1 GENERAL REQUIREMENTS

Work conducted at MCAS El Toro for this project will have a site-control program established in accordance with CLEAN II SOP 5.1.13, Site Control, based on site-specific characteristics. Although the project site may not be considered a "hazardous waste site or facility," all field operations will comply with the MCAS El Toro Investigation-Derived Waste Management Plan (IDWMP), which establishes appropriate site storage, labeling, and transportation control procedures (Section 21).

7.2 SITE WORK AUTHORIZATION

Field activities at MCAS El Toro will be authorized under a hazardous work permit (HWP) system. HWPs may be prepared either for general activities at a number of Site work areas with similar hazards and control measures, or they may be specific to a single activity and location. The HWPs will be prepared prior to the initiation of fieldwork by the SHSO. HWPs will be prepared in accordance with CLEAN II Health and Safety SOP 5.1, Hazardous Work Permit Program.

7.3 CONTROLLED AREA DESIGNATION

For intrusive field activities such as drilling operations, precautions shall be taken to assure that only authorized personnel with the proper training and PPE enter work areas associated with the operation of heavy equipment and/or the potential for exposure to hazardous conditions/materials. In uncontaminated areas where exposure to elevated levels of hazardous materials is not anticipated, controlled areas shall be delineated with safety cones and/or barricades.

In work areas where hazardous materials are present or suspected, a three-zone controlled area system shall be established including an inner "exclusion zone" (contaminated area), a "contamination reduction zone" (decontamination area), and an outer "support" zone. While in the support zone, workers would not be exposed to hazardous conditions. Cones, flags, or barricades will be used to delineate these zones.

7.4 ACCESS CONTROL

While overseeing activities during the MCAS El Toro RI/FS, the SHSO shall compile an Authorized Personnel Roster. Only individuals listed on the roster will be permitted in controlled areas. Work performed in controlled areas shall be in accordance with the CLEAN II Program "buddy system" as discussed in the Program Health and Safety Plan.

SECTION 8

DECONTAMINATION

Section 8

DECONTAMINATION

8.2 PERSONNEL DECONTAMINATION

A three-zone decontamination system will be established at each MCAS El Toro field location where intrusive activities involve exposure to hazardous materials. The necessity for decontamination stations will be based on the level of exposure established by the Health and Safety Supervisor and the HWP. When Level C or modified Level D PPE is utilized, the standard decontamination protocol for Level C PPE will be as set forth in CLEAN II Health and Safety SOP 4.3.1. When Level D PPE is utilized, a minimal decontamination procedure, consisting of washing all exposed skin, shall be required.

8.3 VEHICLE AND EQUIPMENT DECONTAMINATION

The primary focus of any decontamination program is to minimize the spread of contaminated material beyond a given site. During MCAS El Toro field activities, a variety of vehicles and small equipment may be used at multiple work areas. The level of potential contamination for these vehicles and equipment will range from "high" for drill rig augers operated in known hazardous waste areas, to "low" for support vehicles used in uncontaminated areas and/or for nonintrusive field activities.

Where "high" exposure is anticipated (i.e., during drilling and sampling activities in areas of known contamination), vehicles and/or equipment will be decontaminated at a decontamination pad designed and constructed by a drilling subcontractor. The pad will be constructed in a location agreed upon by the CLEAN II Program on-site health and safety personnel and the MCAS El Toro ROICC. The area will be easily accessed by vehicles working in areas that are known or suspected to be contaminated. Access routes from a given work area to the decontamination pad will be via the shortest route practical. To minimize the potential for contaminated material being released en route, gross contamination will be removed from each vehicle before leaving the exclusion zone. If gross removal of contaminants is impractical for some items (such as augers), these items will be wrapped in plastic prior to transport.

Nonintrusive field activities, including land surveying, geophysical surveys, and site walks, will not entail driving vehicles where exposure levels would potentially be classified as "high." Therefore, only vehicle wheels will be decontaminated before leaving the area, unless otherwise directed by the SHSO.

8.4 APPAREL DECONTAMINATION

Single-use PPE clothing will be disposed of accordance with the MCAS El Toro IDWMP and Site-Specific Supplement.

Section 8 Decontamination

8.7 TESTING REQUIREMENTS FOLLOWING DECONTAMINATION

In the event that radioactive contamination is detected at concentrations equal to or in excess of established state and/or federal action levels, each piece of equipment removed from the location shall be checked for contamination by the SHSO. Frequent radiation monitoring shall be subsequently conducted at the location.

8.8 CERTIFICATION OF DECONTAMINATION

A "certification of decontamination" shall be prepared prior to releasing any government-furnished equipment from MCAS El Toro to uncontrolled areas. The SHSO will maintain a decontamination record log for all other equipment.

8.9 SUBCONTRACTOR REQUIREMENTS

Subcontractors shall notify the SHSO in advance of removing equipment from controlled areas.

8.10 DECONTAMINATION AREA ARRANGEMENTS

Specific areas shall be designated for waste storage, vehicle and equipment decontamination, emergency supplies, and other necessary equipment upon the approval of the ROICC representative for MCAS El Toro.

8.10.1 Waste Storage Area

A waste storage area shall be established at MCAS El Toro for temporary storage of investigation-derived waste (IDW) as approved by the ROICC representative and the Environmental Coordinator, David Crawley, at Site 3. Signs shall be posted stating that potentially hazardous wastes are stored in the area.

8.10.2 Decontamination Pad

If the drilling subcontractor does not provide a portable decontamination sump, a decontamination pad shall be constructed in the site staging area (Figure 2-2) for the decontamination of drill rigs, augers, and associated equipment. The pad, which will be designed and constructed by the drilling subcontractor, shall be large enough to contain any single piece of equipment with an allowance of a 3-foot border on all sides. The pad may be sloped or provided with a moveable entry section to contain liquid if built on level ground. It is anticipated that the design will incorporate a sloped pad with a liquid-collection sump. The pad shall be operated such that all wash water can be contained and collected within the pad. The IDWMP for MCAS El Toro specifies the procedures and responsible personnel for the storage, labeling, testing, and disposal of materials generated as a result of decontamination operations.

SECTION 9

MEDICAL SURVEILLANCE

Section 9

MEDICAL SURVEILLANCE

9.1 GENERAL

Medical surveillance submittals, as described in the Site Health and Safety Plan, are required for CLEAN II personnel that will perform field activities at all MCAS El Toro sites.

Workers authorized for entry into exclusion zones established in areas of potential PCB soil contamination during intrusive activities shall obtain a pre- and postactivity blood serum PCB-level determination from a medical provider. The designated CLEAN II medical surveillance provider will administer these tests for CLEAN II and subcontract personnel. The following sites are designated, for health and safety purposes, as potentially contaminated with PCBs:

- Site 2, Magazine Road Landfill;
- Site 3, Original Landfill;
- Site 5, Perimeter Road Landfill;
- Site 7, Drop Tank Drainage Area No. 2;
- Site 8, DRMO Storage Yard;
- Site 9, Crash Crew Pit No. 1;
- Site 11, Transformer Storage Area;
- Site 12, Sludge Drying Beds;
- Site 13, Oil Change Area;
- Site 16, Crash Crew Pit No. 2;
- Site 17, Communication Station Landfill; and
- Site 21, Materials Management Group, Building 320.

SECTION 10

HAZARD MONITORING

Section 10 **HAZARD MONITORING**

10.1 GENERAL

During MCAS El Toro field activities, any potentially toxic air contaminants, explosive gas mixtures, radioactive materials and/or potentially hazardous noise levels shall be monitored. Monitoring instruments to be used at the MCAS El Toro Site during various RI/FS field activities include a PID or a dual PID/flame ionization detector (FID), colorimetric indicator tubes, an explosimeter fitted with the manufacturer's leaded gas filter, a real-time aerosol monitor, a sound-level meter or a noise dosimeter, and an alpha-beta-gamma-sensitive Geiger-Mueller detector.

10.3 CHEMICAL AGENT MONITORING

Monitoring instruments to be used for detecting potentially toxic air contaminants and explosive mixtures during MCAS El Toro field activities include, at a minimum, a PID or a PID/FID, an explosimeter fitted with the manufacturer's leaded gas filter; colorimetric indicator tubes, including those specific for benzene, vinyl chloride, and hydrogen sulfide; and a real-time aerosol monitor (mini-RAM). The PID must be equipped with an 11.7-eV lamp. The methods and frequencies for chemical agent monitoring are specified in Table 10-1.

10.4 ENVIRONMENTAL MONITORING

In the event that air concentrations of contaminants exceeding action levels are detected in workers' breathing zones and work continues (in Level C protection), perimeter monitoring will be conducted at the outer edge of the controlled area. If contaminants exceeding action levels are detected at any perimeter area, work will be suspended until engineering controls or natural ventilation allows ambient area contaminant concentrations to fall below acceptable (action) levels.

10.5 AREA MONITORING

Area monitoring will be conducted for site locations where intrusive activities take place and which are suspected to be contaminated with volatile organic compounds (VOCs), PCBs, metals, or any combination of contaminants. At some site locations, asbestos-containing material (ACM) and radioactive material may be present. Direct-reading monitoring for metals, radioactive materials, and ACM in air is not feasible; therefore, a conservative action level for total dust will be used. The action levels for known metals in dust and for unidentified mixtures of dust are summarized in Table 10-2. Direct-reading monitoring will be performed for detection of VOCs in air. The action levels for those compounds are summarized in Table 10-3.

Section 10 Hazard Monitoring

**Table 10-1
 Chemical/Physical Agent Monitoring Requirements**

Scope of Work Task	Chemical/Hazard	Instrument	Responsible Group	Initial Frequency
Nonsoil-intrusive activities	Hydrocarbons	PID ¹	SHSO ²	Start of task
Mobilizing equipment to the site	Explosive gases	Explosimeter	SHSO	Start of task
Land surveying; geophysical surveys	Dusts	Mini-RAM	SHSO	Two times per day
Low-hazard subsurface activities; soil-gas survey (shallow and deep soil); subsurface soil sampling; gas flux chamber	Hydrocarbons	PID	SHSO	Start of task, hourly, continuous if zone of contamination encountered
Install, develop, and sample monitoring wells; cone penetrometer testing; coring	Explosive gases	Explosimeter	SHSO	Start of task, hourly, continuous during subsurface if boring location has history of contamination
Decontamination of equipment	Hydrocarbons	PID	SHSO	At completion of decontamination sequence
	Radiation contamination	General α , β , λ Geiger-Mueller survey	SHSO	Items used at landfill sites only after final decontamination
High-hazard subsurface activities; drilling; conducting subsurface soil sampling;	Hydrocarbons	PID	SHSO	Start of task, every 15 minutes, continuous if zone of contamination encountered
excavation activities	Explosive gases	Explosimeter Vinyl chloride H ₂ S	SHSO	Continuous if boring location has history of contamination
	Radiation	General α , β , λ Geiger-Mueller survey	SHSO	Start of task, Sites 2, 3, 5, 8, 13, and 17 every sample, continuously if contamination is detected
	Dusts	Mini-RAM	SHSO	Hourly at the SHSO discretion

Notes:

- ^a PID – photoionization detector
- ^b SHSO – Site Health and Safety Officer

Section 10 Hazard Monitoring

**Table 10-2
 Monitoring Methods and Action Levels for Dusts**

Hazard	Method	Action Level	Protection Action
Heavy Metals			
Total dust (no toxic constituents)	Dust monitoring Mini-RAM	< 1 mg/m ³	No action required
		> 1 mg/m ³	Air-purifying respirator
Total dust (toxic constituents present)	Dust monitoring Mini-RAM	> 0.5 mg/m ³	Air-purifying respirator
Metal*	Personal monitoring		
Chromium		> 0.5 mg/m ³	Air-purifying respirator
Chromium (VI)		> 0.05 mg/m ³	Air-purifying respirator
Nickel (sol)		> 0.1 mg/m ³	Air-purifying respirator
Nickel (insol)		> 1.0 mg/m ³	Air-purifying respirator
Mercury (alkyl)		> 0.01 mg/m ³	Air-purifying respirator
Zinc		> 1.0 mg/m ³	Air-purifying respirator
Vanadium		> 0.05 mg/m ³	Air-purifying respirator
Lead		> 0.05 mg/m ³	Air-purifying respirator
Cobalt		> 0.05 mg/m ³	Air-purifying respirator
Copper		> 0.2 mg/m ³	Air-purifying respirator
Cadmium		> 0.05 mg/m ³	Air-purifying respirator
Selenium		> 0.2 mg/m ³	Air-purifying respirator
Arsenic		> 0.01 mg/m ³	Air-purifying respirator

Note:

- * Based on American Conference of Government Industrial Hygienists threshold limit value

Section 10 Hazard Monitoring

**Table 10-3
 Action Levels for Uncharacterized Mixtures^a Using Screening Survey Instruments**

Hazard	Method	Action Level	Protection Action
Total organic vapor	Photoionization detector	Background to < 2 ppm ^b above background	No action required
		> 2 ppm	Air-purifying respirator, full face, Level C protection,
		> 5 ppm	Air-purifying respirator, full face, Level C protection, personnel monitoring required
		> 10 ppm	Supplied air protection, Level B
		> 50 ppm	STOP WORK
Combustible gas	Explosimeter	< 5% LEL ^c	No action
		> 10% LEL	Start continuous monitoring
		< 20% LEL	Permit only classified electrical equipment and nonsparking tools
		> 20% LEL	STOP WORK, ascertain source of gas
Oxygen concentration	Oxygen analyzer	< 19.5% v/v ^d	Leave area, evaluate reason for deficiency, monitor again remotely or with IDLH ^e entry program
		< 20.5 - > 19.5 v/v	Slight deficiency, continue continuous monitoring
		20.5 - 21.0% v/v	Normal range
		> 21.0% v/v	Elevated reading, check calibration, investigate cause, STOP any potential spark-producing activity

Notes:

- ^a carcinogenic and highly toxic materials not verified absent from atmosphere
- ^b ppm – parts per million
- ^c LEL – lower explosive limit
- ^d v/v – volume per volume
- ^e IDLH – immediately dangerous to life and health

Section 10 Hazard Monitoring

10.6 PERSONNEL MONITORING

Personnel monitoring will be initiated if the action levels for dusts and/or VOCs are equaled or exceeded, and personnel are required to work using respiratory protection for periods exceeding one hour. Action levels for radionuclide monitoring are summarized in Table 10-4.

10.8 INSTRUMENT CALIBRATION AND MAINTENANCE

Instrument calibration and maintenance procedures are summarized in Table 10-5.

10.9 RADIATION MONITORING

A general purpose, alpha-beta-gamma-sensitive Geiger-Mueller detector will be utilized for health and safety screening at MCAS El Toro military landfills (Sites 2, 3, 5, and 17), the Aircraft Restoration Area (Site 13), and the DRMO Area (Site 8). Radiation monitoring will be conducted for health and safety purposes on soil samples and suspect objects or material uncovered during intrusive work at these locations. An alpha scintillation probe and beta-gamma probe in pancake configuration will be used at landfill sites which are considered to have higher potential for existing contamination.

10.10 SPECIAL INSTRUMENT REQUIREMENTS

Because of the large variety of chlorinated solvents detected during previous studies at MCAS El Toro, a PID equipped with an 11.7-eV lamp will be required for all intrusive work. Because of the potential for leaded gasoline at many site locations, the explosimeter utilized shall be fitted with a leaded gas filter, provided by the manufacturer.

Section 10 Hazard Monitoring

**Table 10-4
 Action Levels for Radionuclides**

Type Measurement	Action Level	Action
External gamma	> 0.100 mR ^a /hour	Contact HSM ^b
Transferable beta-gamma contamination	> 2 x background (300 dpm/100 cm ²)	Contact HSM
Transferable alpha contamination scintillation detector	> 2 x background (50 dpm/100 cm ²)	Contact HSM
Transferable alpha contamination pancake detector	> 2 x background (300 dpm/100 cm ²)	Contact HSM

Notes:

- ^a mR – milliroentgen
- ^b HSM – Health and Safety Manager

**Table 10-5
 Instrument Calibration and Maintenance Information**

Instrument	Calibration Data
Photoionization Detector	Each day zero and span with zero and isobutylene standards. Adjust zero and span after lunch break or whenever zero appears to drift.
Flame Ionization Detector	Each day zero and span with zero and isobutylene standards. Calibrate with a low-range and mid-range standard or calibrate at 10 parts per million on both scales. Adjust zero and span hourly or whenever zero appears to drift.
Explosimeter	Each day zero and span with zero and mixed hydrocarbon standards. Adjust zero and span after lunch break or whenever zero appears to drift.
Oxygen Sensor	Each day zero and span with ambient area away from any sources of contamination. Adjust zero and span prior to every entry, after lunch break, or whenever zero appears to drift.
Air Sample Pump Low Volume	Calibrate with burette or auto calibrator both pre- and postsampling. Check flow during shift at break.
Scintillation Detector, Alpha Probe, Beta Gamma Probe	Verify response with check source daily. Obtain semiannual calibration.
Air Sample Counter	Determine background and response factor daily.
Combustible Gas Indicator	Calibrate daily with methane or gas mixture (nominal 50 lower explosive level).
Dräger Tubes and Pump	Verify that tubes are not expired. Test pump for leakage daily. Verify pump volume weekly.

SECTION 11

PERSONAL PROTECTION EQUIPMENT

Section 11

PERSONAL PROTECTION EQUIPMENT

11.1 GENERAL

Based on analytical results for soil and groundwater samples collected and tested during previous investigations (CLEAN I), the anticipated level of PPE for most MCAS El Toro field activities will be modified Level D. Level C PPE will be required during intrusive work at Landfill sites (Sites 2, 3, and 5) and Crash Crew Pit sites (Sites 9 and 16). Level C PPE will be required at other sites only if levels of contaminants exceed the action levels listed in Section 10. The increased level of protection at landfill and Crash Crew Pit sites is due to the possibility of the presence of dioxins.

All personnel within controlled areas are required to comply with the CLEAN II buddy system policy as specified in Section 2.8.4 of the Program Health and Safety Plan.

Land surveying, geophysical surveys, soil gas surveys, CPT, and pavement coring work performed in background (i.e., uncontaminated) areas will entail use of Level D PPE since chemical exposure is anticipated to be minimal. As summarized in Table 11-1, Level D PPE includes the following items:

- hard hat,
- safety glasses, and
- normal work clothes, including long pants.

Modified Level D will be used during surface and subsurface soil sampling, well development, well sampling activities, soil gas, and CPT in areas of concern. Modified Level D PPE includes the following items:

- polyethylene-coated Tyvek[®] suits, taped at the cuffs and at ankles;
- latex or nitrile gloves;
- hard hats;
- safety glasses; and
- rubber steel-toe boots, or steel-toe boots with rubber overboots.

The PPE listed for Modified Level D is to be used with the addition of a full-face respirator with high-efficiency particulate air (HEPA) and organic vapor (OV) cartridges to upgrade to Level C PPE.

11.2 PROJECT POLICY

Standard safety equipment is dictated in the project policy. Site-specific PPE is listed in Table 11-1 by work task.

Section 11 Personal Protection Equipment

Table 11-1
Personal Protection Equipment
(potential or actual chemical exposure)

Task	Hazard	Level	Body	Respirator	Skin	Other
Drilling and subsurface soil sampling	Chemical exposure	C High Hazard	PE ¹ -coated Tyvek [®] suit taped at cuffs and ankles	Full face w/ HEPA ² and OV ³	Latex or nitrile gloves; chemical protective gloves	Hard hat; safety glasses; rubber steel-toe boots or overboots over steel-toe work shoes ⁴ ; ear plugs
Excavation and soil sampling						
Asbestos suspect; Asbestos-containing material visible	Asbestos exposure	C	Plain Tyvek [®] suit w/hood taped at cuffs and ankles	Full face w/ HEPA	Latex or nitrile gloves	Hard hat; safety glasses; rubber steel-toe boots or overboots; ear plugs
Well development; well sampling; sampling surface soils; well abandonment; aquifer testing; coring; decontamination of equipment; controlling spread of contamination	Skin contact	Mod. D Moderate Hazard	PE-coated Tyvek [®] suit	Full face w/ HEPA and OV ready for use	Latex or nitrile gloves	Hard hat; safety glasses; rubber steel toed or overboots; hearing protection
Site walkover; geophysical surveys; soil-gas surveys; radiological survey; cone penetrometer testing in background areas	Minimal chemical exposure	D	Normal work clothes Long pants			Hard hat; safety glasses; hearing protection; sturdy work shoes

(table continues)

Section 11 Personal Protection Equipment

Table 11-1 (continued)

Task	Hazard	Level	Body	Respirator	Skin	Other
Excavation (if required) initial entry	Operation of drill rig; noise; toxic chemicals; oxygen deficiency; explosive gases; radioactivity	B	Saranex [®] - coated Tyvek [®] suit hooded with booties taped at cuffs and ankles	Type C airline respirator, pressure- demand mode or self- contained breathing apparatus	Chemical protective gloves Viton [®] or Silver Shield [®]	Hard hat; safety glasses; rubber steel-toe boots or overboots; ear plugs; a separate job- hazard analysis must be written for excavation entry.

Notes:

- ¹ PE – polyethylene
- ² HEPA – high-efficiency particulate air
- ³ OV – organic vapor filter
- ⁴ steel-toe boots are required when mandated by activity (installation) or in close proximity to drilling, heavy equipment

SECTION 14

TRAINING ASSIGNMENTS

Section 14 TRAINING ASSIGNMENTS

14.1 BASIC TRAINING REQUIRED

A matrix summarizing training requirements for CLEAN II personnel, subcontract supervisors and personnel, visitors, and vendors is presented in Table 14-1.

**Table 14-1
 Training Assignment Matrix¹**

Category	40-Hour Basic	8-Hour Refresher	24 Hours Supervised Experience	8-Hour Supervisor/ Supervisor Refresher	Site-Specific ²	CLEAN II Orientation	Air Line Use ³
CLEAN II Employee	X	X	X	⁴	X	X	X
CLEAN II or Subcontractor Supervisor	X	X	X	X	X	X	X
Subcontractor ⁵	X	X	X		X	X	X
Visitor ⁶	X	X	⁷		X		
Vendor ⁶	X	X	⁷		X		

Notes:

- ¹ A minimum of two people who have a valid certificate in basic first aid/CPR from the American Red Cross (or equivalent) documented training will be on-site during fieldwork.
- ² Site-specific and CLEAN II orientation may be combined for non-CLEAN II personnel.
- ³ For those employees involved in supplied-air operations.
- ⁴ Most program employees will take supervisor training in lieu of standard refresher training.
- ⁵ The requirement for 40-hour basic and 8-hour refresher training for land survey and geophysical subcontractors shall be made on a case-by-case basis by the CLEAN II Health and Safety Manager.
- ⁶ For vendors/visitors requiring controlled area access to work on contaminated equipment.
- ⁷ Not required if escorted.

SECTION 16

EMERGENCY RESPONSE

Section 16

EMERGENCY RESPONSE

16.1 GENERAL

In the event of a medical emergency or fire during MCAS El Toro fieldwork, the standard "911" emergency telephone number shall be called. The emergency telephone number "911" must be preceded by a "9" to access fire-fighting or other emergency equipment, an ambulance, or first-aid assistance from an on-base telephone. Base fire department personnel will respond. The SHSO will announce the locations of nearby office and public phones at each new work area.

If a public phone is used, the prefix "726" must be dialed to access on-base emergency responders. Therefore, the emergency telephone number from a pay phone is "726-9-911" to access help in an emergency.

A mobile telephone will be available at all El Toro work locations. The telephone number to call when using a mobile phone is also "726-9-911." This seven-digit number will access emergency personnel at the El Toro Base. Mobile phones shall be checked daily and at each new work location to verify that they are operational.

Pertinent emergency phone numbers are listed in Table 16-1. Emergency facilities for MCAS El Toro are listed in Table 16-2. MCAS El Toro and CLEAN II Program emergency notification contacts are listed in Table 16-3.

The closest hazardous material exposure emergency medical facility to MCAS El Toro is the Irvine Medical Center located at 16200 Sand Canyon Avenue, Irvine, California 92718. To get to the medical facility from the Trabuco Road Gate, make a left turn on to Sand Canyon Avenue and travel 2 miles to Alton Parkway and make a left turn. The medical facility is located immediately left of the Sand Canyon Avenue and Alton Parkway intersection. The emergency room phone number is (714) 753-2250.

Figure 16-1 shows the most direct route from MCAS El Toro to the emergency medical facility. Evacuation routes from MCAS El Toro are shown on Figure 16-2.

16.2 EMERGENCY EQUIPMENT

The following additional emergency equipment shall be maintained in a "ready" condition at the MCAS El Toro staging area:

- 2 full-face respirators (HEPA/acid/OV)
- 4 pairs of Saranex[®] coveralls
- 1 spill cleanup and control supply kit

Section 16 Emergency Response

Table 16-1
Emergency Phone Numbers
(To be posted by Site Health and Safety Officer at all phone locations)

Emergency	Number	Contact	Notes
Emergency	9-911	Emergency Operator	726-9-911 from a mobile or pay phone
Medical	9-911	Emergency Operator	726-9-911 from a mobile or pay phone
Fire	9-911	Fire Department	726-9-911 from a mobile or pay phone. Nonemergency 726-3921
Duty Officer	726-3901	Command Duty Officer/ Resident Officer in Charge of Construction	Off-shift first aid Other emergencies
Medical Center	(714) 753-2250	Irvine Medical Center Emergency Room	

Reporting an Emergency:

When calling for assistance in an emergency situation, the following information should be provided:

- Name of the person making the call,
- Telephone number at the location of the person making the call,
- Name of the injured person (if known),
- Nature of incident,
- Actions already taken,
- Location of the incident, and
- What assistance is needed.

IMPORTANT! DO NOT HANG UP UNTIL THE OPERATOR HAS ALL THE INFORMATION NEEDED.

Section 16 Emergency Response

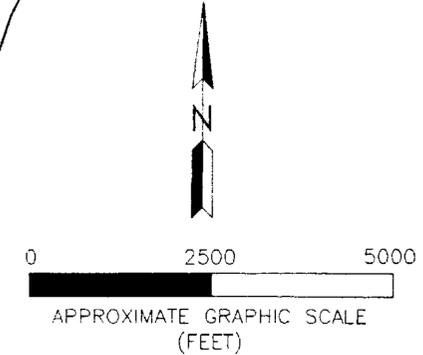
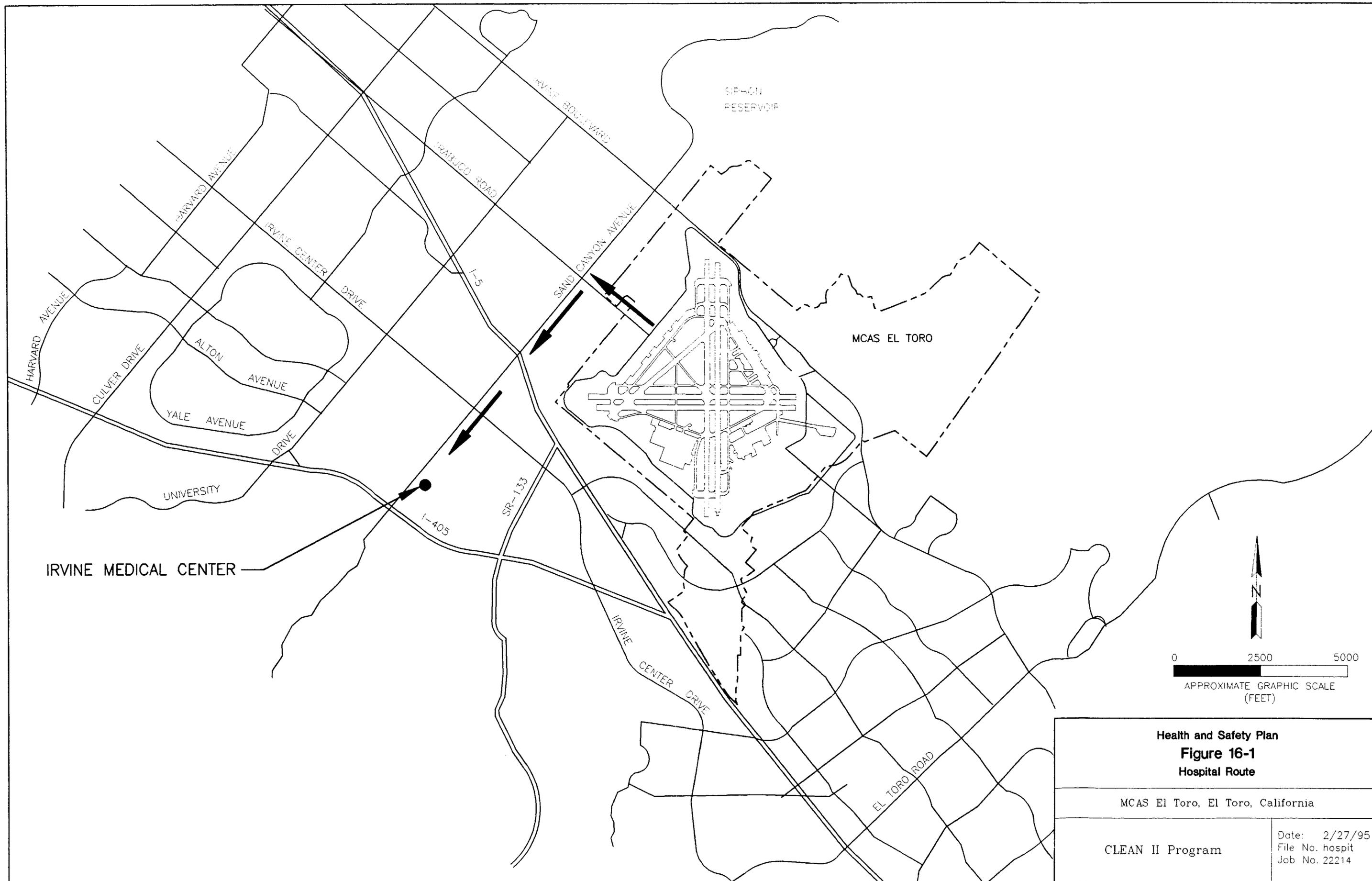
**Table 16-2
Emergency Facilities Locations**

Facility	Nearest Location	Alternate Location
Safety Shower	Not required	Not applicable
Potable Deluge	Each work area	Vehicle decontamination pad
Decontamination Area	Each group of sites	Vehicle decontamination pad
Eyewash	Each work area	Vehicle decontamination pad
First Aid Kit	Each work area	Vehicle decontamination pad
Other Emergency Supplies	Site staging area	Not applicable
Self-Contained Breathing Apparatus Packs	Site staging area	Not required
Fire Extinguishers	Subcontractor vehicles	Not applicable
Emergency Decontamination Supplies	Site staging shed	Not required

Section 16 Emergency Response

Table 16-3
Site and Program Emergency Notification Contacts
 (To be completed by Site Health and Safety Officer prior to field activity)

Contact	Telephone	Alternate
Command Duty Officer	(714) 726-3901	Not applicable
Mark Schoeppner Resident Officer In Charge of Construction	(714) 726-4186	Not applicable
David Cowser BNI Project Manager	(415) 768-3286	Not applicable
Tim Latas BNI Contract Task Order Leader	(619) 541-1145	
Site Health and Safety Officer	To be determined	Not applicable
Joe Bucho Base Contractor Safety Director	(714) 726-2902	Not applicable
David Crawley Environmental Coordinator	(714) 726-3309	Not applicable
Vishe Parpiani Remedial Project Manager	(714) 726-4432	Not applicable
BNI, San Diego Office	(619) 687-8700	To be determined
Kleinfelder, San Diego Office	(619) 541-1145	To be determined
Brown and Caldwell, San Diego Office	(619) 528-9090	To be determined
Conrad Sherman BNI Health and Safety Manager	(619) 687-8711 (Work) (619) 993-8711 (Mobile)	To be determined

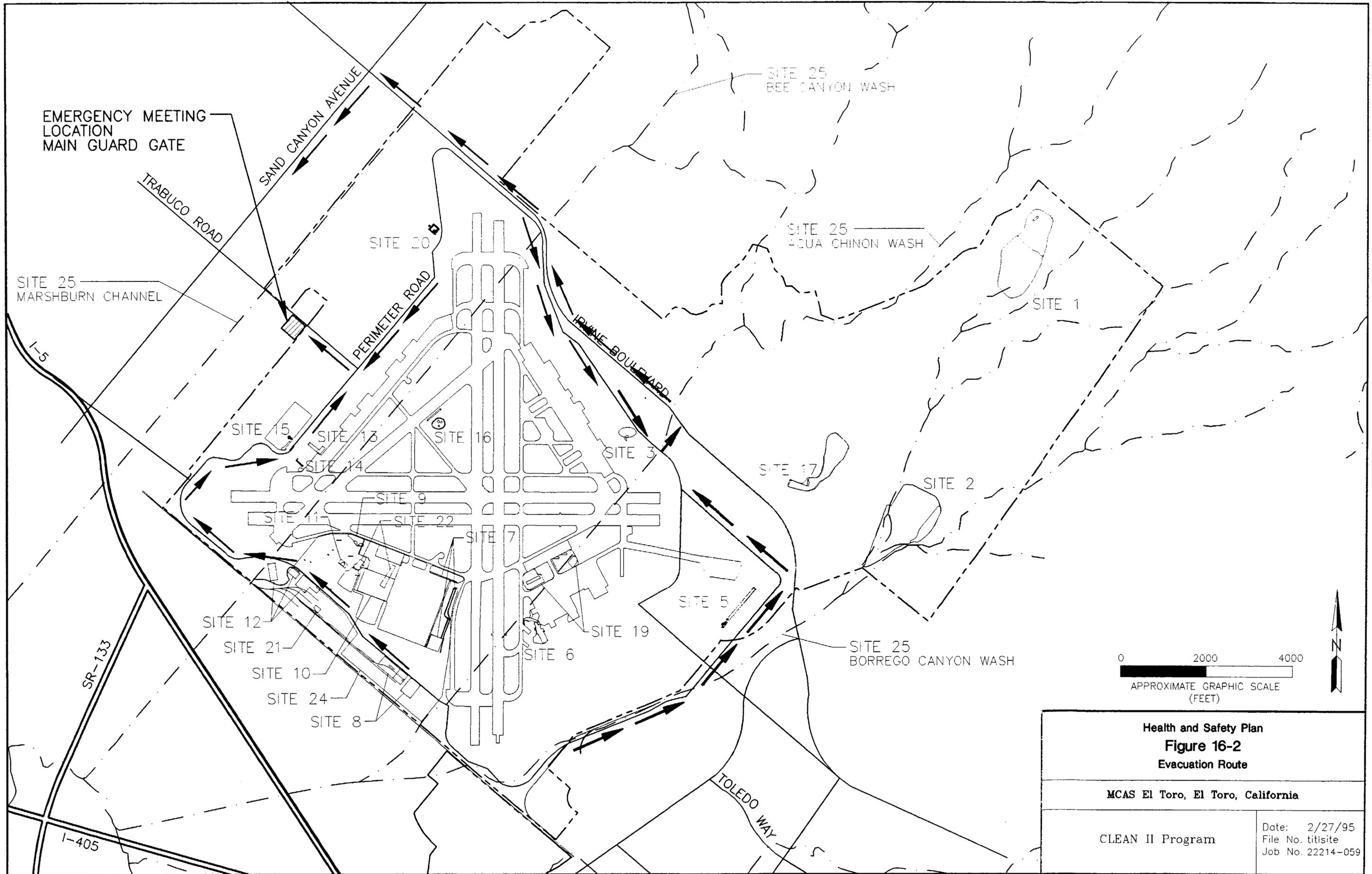


Health and Safety Plan
Figure 16-1
Hospital Route

MCAS El Toro, El Toro, California

CLEAN II Program

Date: 2/27/95
 File No. hospit
 Job No. 22214



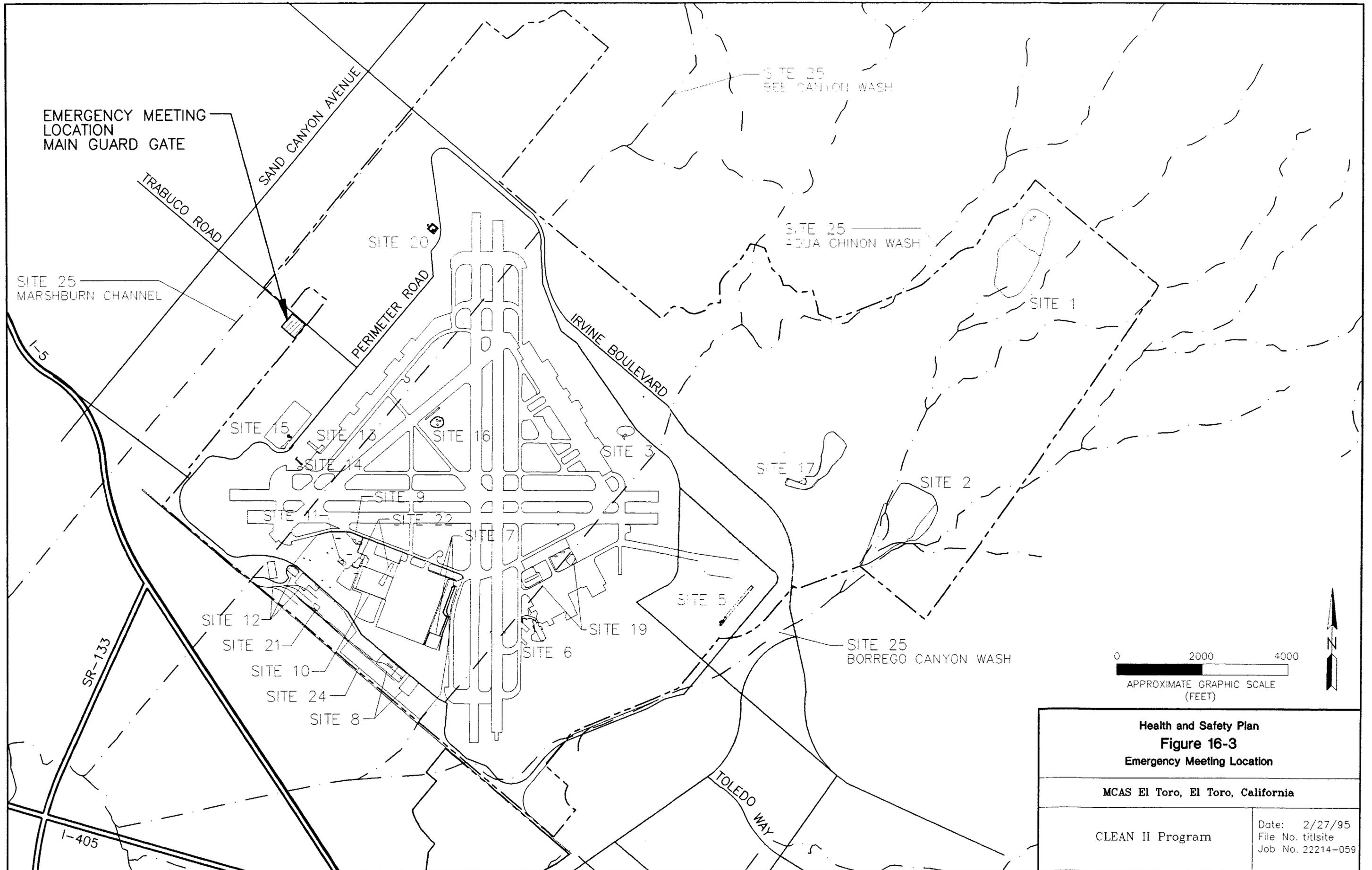
Section 16 Emergency Response

16.7 EVACUATION PLAN

The emergency meeting location for all MCAS El Toro work is the Main Guard Gate located at the North end of the base, as shown in Figure 16-3. In the event of a fire or explosion, all personnel shall vacate the work areas and proceed immediately to the emergency meeting location. The SHSO shall perform a "headcount" at the emergency meeting location to account for CLEAN II and subcontract personnel. The work area shall not be reentered until MCAS El Toro Security have indicated an "allclear" condition.

16.8 EMERGENCY SIGNAL SYSTEM

While there is no basewide public address system or audible alarm at MCAS El Toro, each CTO-0059 field team will be provided with mobile phones or communication radios. These devices will be operated by the SHSO or field team leader as the primary method of alerting field personnel and others in the nearby vicinity of emergency conditions. These communications will also be used to contact outside agencies and/or hospitals to facilitate immediate emergency responses.



**Health and Safety Plan
Figure 16-3
Emergency Meeting Location**

MCAS El Toro, El Toro, California

CLEAN II Program

Date: 2/27/95
File No. titlsite
Job No. 22214-059

SECTION 21

SPILL PREVENTION AND CONTROL MEASURES

Section 21

SPILL PREVENTION AND CONTROL MEASURES

21.1 SPILL PREVENTION, CONTROL, AND CONTAINMENT

21.1.1 Facility and General Prevention/Control Measures

The following site-specific IDW spill prevention and control measures include procedures to be implemented in the field by MCAS El Toro field personnel to reduce the possibility of liquid waste spillage as well as actions to be taken if a spill occurs.

Preventive Measures

- Inspect 55-gallon drums, bins, and/or Baker tanks upon delivery to the site for visible defects (e.g., holes, corrosion).
- Inspect all 55-gallon drums upon delivery to the site to assure that each drum includes a resealable lid or a resealable lid with a small resealable sampling port (bung) near the top, side, or on the lid and to assure that the closure is not deformed or distorted.
- Set the 55-gallon drums on wooden pallets to facilitate transport via forklift (if necessary).
- Use portable, polyurethane, secondary containment (or the equivalent) for storage of drums that are to contain hazardous liquids.
- Perform weekly inspections of the storage area, including 55-gallon drums, bins, and/or Baker tanks while being filled and immediately after relocation to a temporary on-site storage area to check for possible leaks.
- Select flat areas for temporary storage away from high-traffic zones and storm or sewer drains. On-site storage areas will be designated by the ROICC and/or his representative.

Spill Containment Measures

The following actions will be taken by CLEAN II field personnel assigned to MCAS El Toro in the event of a spill.

- The Site Coordinator and SHSO are to be notified immediately.
- Workers not involved in spill containment and/or cleanup shall evacuate the immediate area to reduce the likelihood of spreading contamination or being exposed to contamination.
- Designated emergency response personnel attired in Saranex[®] coveralls and Level C PPE shall proceed to the spill area with a spill cleanup and control kit, including absorbent materials.
- Attempts shall be made to stop the source(s) of spillage immediately.
- The SHSO shall monitor for exposures to chemicals or hazardous substances during spill cleanup work.

Section 21 Spill Prevention and Control Measures

- The SHSO shall stay at the spill area until the area has been cleared, inspected, and readied for reentry.
- A spill incident report shall be prepared by the SHSO.
- In the event the spill is of known or potential hazardous waste and is stored under the 90-day accumulation rule, additional reports required by state law will be prepared.

21.1.2 Spill Prevention

General

The purpose of this section is to provide planning instructions for response to spills of IDW or other hazardous materials stored for disposal at the MCAS El Toro waste storage site location. IDW from CLEAN II site operations will be stored with other Base waste at the IR site facility already established at MCAS El Toro. It is the responsibility of the field team leader, waste storage area supervisor, and other designated individuals to identify situations having potential for hazardous material releases. The IDW storage area inspection checklist identifies items that will be checked on a weekly basis at each IDW storage area operation. Weekly inspections of the IDW storage area and emergency response supplies are to be performed by the SHSO. The following forms are used and maintained as part of the storage area facility record.

- IDW Storage Area Inspection Checklist
- Emergency Response Supplies Inspection Checklist (IDW Storage Area)

21.1.3 Spill Containment

Assessment

Each IDW spill, leak, or incident shall be assessed by the waste area storage supervisor or other qualified individual promptly upon discovery. This assessment shall be conducted to characterize the degree of hazard to personnel and the environment and to implement effective control procedures. The responsible individual should attempt to determine the following information:

- description of materials released, container types, storage location;
- amount of materials released or at risk of being released;
- location and direction of flow of the release;
- hazardous characteristics of the released material; and
- occurrences due to spill (i.e., fire, injury, illnesses, damage to environment).

The assessment shall include possible environmental and human health hazards from the release, including inhalation exposure, water runoff, and chemical agents used to control the emergency.

Section 21 Spill Prevention and Control Measures

21.1.4 Containment Equipment

Table 21-1 lists site specific spill control equipment, location, and capabilities that will be maintained for each IDW storage area.

21.1.5 Personal Protection Equipment

An HWP for the waste storage area shall be prepared to indicate the appropriate PPE for an emergency response. This HWP shall be updated based upon the hazard potential for any particular waste stored. The Emergency Response Team (ERT) will use the PPE ensemble specified until the release has been characterized. Typical PPE for spill containment operations which shall be maintained ready for use include two sets of the following:

- hard hat,
- safety goggles,
- rubber boots (at least knee length) with toe protection,
- chemical resistant inner and outer gloves,
- Saranex-coated Tyvek[®] coveralls with hood, and
- full or half-face air purifying respirators with OV/acid gas/HEPA cartridges.

The SHSO may assess that upgrading or downgrading of PPE is necessary.

21.1.6 Monitoring

While the ERT is cleaning the spill, the SHSO will monitor for chemical exposures. During the cleanup, direct-reading instrumentation will be employed, including a PID and/or an FID, a combustible gas indicator, and colorimetric indicator tubes. Personal monitoring using sampling pumps and collection media, such as activated charcoal tubes, may also be employed, depending on the HSS assessment.

21.1.7 Record Keeping

The Health and Safety Supervisor and CTO Leader shall document the spill in an Incident Report in accordance with CLEAN II PPs. The Incident Report will be forwarded to the BNI HSM and Operations Manager. Records of all hazardous materials releases shall be maintained with the project files and the facility operating record. Information shall include:

Section 21 Spill Prevention and Control Measures

**Table 21-1
 Containment Equipment**

Item	Capability	Location
Absorbent 10-lb bag (minimum) or sufficient material to contain a 55-gallon drum spill (sorbent packs/pillows) compatible with the stored wastes	absorb contents of a single drum of liquid or leakage from larger containers of solid or semisolids	emergency supply bin within storage area
Shovel, polyethylene (nonsparking material) long-handled	collect spilled material	emergency supply bin within storage area
Scoop, short-handled	collect spilled material	emergency supply bin within storage area
Containers, two extra drums, or overpacks for material storage and disposal	overpack for damaged drum or container to collect used absorbent material	emergency supply bin within storage area
Pump, noncorrosive hand-operated for liquid transfer with appurtenances	transfer liquid from damaged drum at 2 gallons/minute	emergency supply bin within storage area
Duct tape	seal or join plastic sheet, temporary patch of drums	emergency supply bin within storage area
Emergency barrier warning tape or traffic cones	control access to site, warn unauthorized personnel	emergency supply bin within storage area
Plastic bags, heavy-duty	collect contaminated trash, personal protective equipment	emergency supply bin within storage area
Labels for drums	label all generated waste	emergency supply bin within storage area
Sheet plastic, 6-mil polyethylene or herculite (400 square feet)	cover ground, cover waste piles	emergency supply bin within storage area
Warning signs	warn unauthorized personnel	posted
Spill kit inventory list	assure kit content complete	emergency supply bin within storage area
Fire extinguisher	size 3A: 40BC	emergency supply bin within storage area

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- time and date of incident,
- location of incident,
- size of release,
- chemicals involved,
- names of SHSO and ERT members,
- cleanup procedures,
- unusual or pertinent incidents during the cleanup,
- disposition of cleanup waste, and
- followup actions and government agencies contacted.

In addition to the above information, the final release report will be maintained in the project files.

21.1.8 Waste Management

All cleanup material resulting from an incident shall be managed as the initial waste material.

21.2 EMERGENCY RESPONSE CALLOUT

21.2.1 Response Implementation

A basic emergency plan is incorporated in Section 21 of the Site Health and Safety Plan. This plan will be activated in the event of unplanned spills or releases of hazardous or unknown substances. This plan provides for designation of a Program Emergency Coordinator (EC), and SHSO, and it specifies responsibilities during an emergency. The plan also specifies that nonessential workers should leave the immediate area. This will reduce the likelihood of spreading contamination outside the restricted area and minimizing the number of potentially contaminated, exposed, or injured personnel.

The EC notifies activity-designated personnel who may implement the activity spill control plan. The activity will request outside or off-site assistance if required. Once at the site, the EC will designate the spill as a restricted area and only authorized personnel, such as the ERT, will be permitted within the spill confines. ERT members are MCAS El Toro Fire Department personnel who have been trained to contain and cleanup spills from typical materials and quantities used on the project location. The SHSO will set up physical barriers, warning unauthorized personnel to stay clear from the site, and provide technical guidance to the ERT as needed.

Once barriers have been established, the EC and SHSO will assess the spill conditions, as described in the above-mentioned assessment section, and determine whether the spill is small or large. This determination is based on the following criteria:

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- Small spills: involve a maximum volume of 55 gallons of a liquid or 100 pounds of a solid.
- Large spills: involve liquids greater than 55 gallons or solids greater than 100 pounds.

Small spills may be remediated with absorbent materials. This task will be conducted by on-site workers, supervised by the SHSO and EC. The SHSO will direct spill-response operations and stay at the spill area until the area has been cleaned, surveyed, and prepared for release.

Action plans for large spills or small spills of highly toxic material need to be assessed quickly because the potential exists for catastrophic events and off-site environmental contamination to the groundwater or neighboring facilities.

In the event of large spills, proper health and safety procedures shall be established and communicated to the ERT prior to any control activity. Should efforts by the ERT require additional support, a Naval On-Scene Commander (NOSCDR) may be designated by activity personnel. The EC shall transfer response to the NOSCDR and activity Hazardous Materials (HAZMAT) Team.

Until the HAZMAT Team can respond, ERT responsibilities consist of containing the spill from spreading to outside areas and keeping unauthorized personnel from entering the restricted area. The actual spill containment and materials release termination will be the responsibility of the base HAZMAT Team in accordance with the activity spill containment and emergency response plans.

The EC and ERT will provide requested assistance to the NOSCDR and will stay at the spill area until they are released or until the area has been cleaned, surveyed, and authorized for reentry.

The CTO Leader and Health and Safety Manager will approve the reentry of the site for routine use and will issue a final release report pertaining to cleanup of the area.

21.2.3 Notification

If, in the EC's assessment, off-site impacts are possible, the EC shall immediately notify the NOSCDR or other designated individual. The base representative will notify off-site authorities. The EC will provide a report for immediate transmission to the state Office of Emergency Services (or other state-designated agency), which will contain the following information:

- name and telephone number of reporter,
- name and address of facility,
- time and type of incident,
- name and quantity of materials involved,
- extent of injuries, and

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- possible off-site hazards to human health and/or the environment.

The types and quantities of hazardous material spills/releases that could be anticipated at this site are within the capabilities of control by on-site personnel. However, should an incident involve a situation that represents potential life-threatening situations or damage to the environment, the EC will contact the designated activity environmental contacts for emergency response support. It is the EC's responsibility to notify the NOSCDR and relate pertinent information for response purposes. It may also be necessary for the EC to contact federal, state, or local agencies for compliance with environmental and safety and health regulations. Agency notification is the responsibility of the CTO Leader in coordination with the Activity Environmental Coordinator.

Prior to reactivation of the facility, the Department of Toxic Substances Control and other appropriate state and local authorities shall be notified that the facility is in compliance with Health and Safety Code Section 66265.58(h).

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IDW Storage Area Inspection Checklist

Site _____ CTO _____ Date _____

Inspector _____

Inspection Item	Status	Action Complete
Inspect drums for leakage, damage, or corrosion		
Inspect secondary containment for leakage or damage		
Inspect secondary containment for accumulated liquid		
All containers labeled and dated		
All containers less than 10 days from end of 90-day period		
All signs posted		
Security devices are intact and functional		
Communications are functional		
Loading areas are clean and free of spills (daily item)		
Unloading areas are clean and free of spills (daily item)		
Secondary containment areas free of standing water		
Containers are properly closed		
Fire extinguisher in place and charged		
Phone numbers posted		
Spill control materials available and inspection list complete		
Adequate aisle space for fire fighting		
First aid kit, eyewash and deluge water placed		

Area Acceptable _____ Date _____

Unacceptable _____ Date Reported _____ Reported to _____

Section 21 Spill Prevention and Control Measures

Emergency Response Supplies Inspection Checklist
 IDW Storage Area

Site _____ CTO _____ Date _____

Inspector _____

Inspection Item	Quantity	Status	Action Complete
Absorbent material, bulk			
Chemical neutralizer absorbent material			
Absorbent material, pillow or sheet type			
Shovel, long handle			
Shovel, scoop, short handle			
Heavy-duty plastic bags			
Pump			
Pump, hose and fittings			
Barriers			
Sheet plastic, 400 square feet			
Warning signs			
Duct tape			

Reinspect each time emergency storage equipment seal is broken

HAZARDOUS MATERIALS SPILL CONTAINMENT TEAM IDW STORAGE AREA

(complete for each waste storage area and post with other emergency information)

Project Name: _____

Project Site: _____

Project Location: _____

CTO Number: _____

Title	Name	Location	Telephone	Alternate Telephone
Emergency Coordinator	To be determined	To be determined	To be determined	To be determined
Emergency Coordinator (alt1)	To be determined	To be determined	To be determined	To be determined
Health and Safety Officer (EC alt 2)	To be determined	To be determined	To be determined	To be determined
CTO Leader (EC alt 3)	Tim Latas	San Diego	(619) 541-1145	To be determined
ERT Member 1	To be determined	To be determined	To be determined	To be determined
ERT Member 2	To be determined	To be determined	To be determined	To be determined
ERT Member 3	To be determined	To be determined	To be determined	To be determined
ERT Member 4	To be determined	To be determined	To be determined	To be determined

***This table to be completed prior to start of work**

ACTIVITY EMERGENCY RESPONSE CONTACTS

Title	Name	Location	Telephone	Alternate Telephone
ROICC	Mark Schoeppner	MCAS El Toro	(714) 726-4186	To be determined
Environmental Coordinator	David Crawley	MCAS El Toro	(714) 726-3309	To be determined
Public Works	David Crawley	MCAS El Toro	(714) 726-3309	To be determined
Duty Officer	Changes daily	MCAS El Toro	(714) 726-3901	To be determined

To be posted in the Waste Storage Area