

**FINAL WORK PLAN FOR REMOVAL OF
MUNITIONS AND EXPLOSIVES OF CONCERN SCRAP AND
NON-MUNITIONS AND EXPLOSIVES OF CONCERN SCRAP**
*Installation Restoration Program Site 1
Explosive Ordnance Disposal Range
Former Marine Corps Air Station, El Toro, California*

*Environmental Remedial Action
Contract Number N62474-98-D-2076
Contract Task Order 0109*

*Document Control Number 6775
Revision 0*

July 13, 2004

Prepared for:



U. S. Department of the Navy
Southwest Division
Naval Facilities Engineering Command
Environmental Division
1220 Pacific Highway
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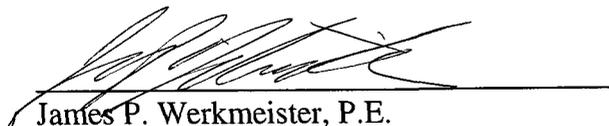
July 13, 2004

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Date



James P. Werkmeister, P.E.
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Date



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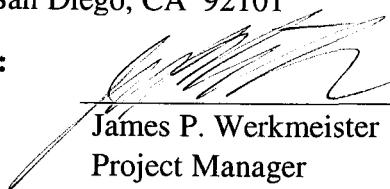
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Date : July 14, 2004

CTO : 0109

Location: MCAS El Toro

FROM:


James P. Werkmeister
Project Manager

DESCRIPTION *Final Work Plan for Removal of Munitions and Explosives of Concern Scrap and Non-Munitions
OF and Explosives of Concern Scrap, IRP Site 1, Explosive Ordnance Disposal Range, Former MCAS, El
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Acronyms and Abbreviations

AEDA	Ammunition, Explosives, & Dangerous Articles
AHA	Activity Hazard Analysis
BNI	Bechtel National, Inc.
BRAC	Base Realignment and Closure
CEHNC	Corps of Engineers – Huntsville Center
CFR	Code of Federal Regulations
CTO	Contract Task Order
DOD	Department of the Defense
DON	Department of the Navy
EFA	Engineering Field Activity
EOD	Explosive Ordnance Disposal
EP	Engineer Pamphlet
ESS	Explosive Safety Submission
EZ	exclusion zone
FBI	Federal Bureau of Investigation
FS	Sulfur Trioxide Chlorosulfonic Acid
INST	Instruction
IRP	Installation Restoration Program
MCAS	Marine Corps Air Station
MCO	Marine Corps Order
MEC	munitions and explosives of concern
msl	mean sea level
NAVEODTECHDIV	Naval Explosive Ordnance Disposal Technical Division
NAVSEA	Naval Sea Systems Command
NOSSA	Naval Ordnance Safety and Security Activity
OP	Ordnance Publication
OPNAV	Operations Naval
PPE	personal protective equipment
RAC	Remedial Action Contract
SHSP	Site Health and Safety Plan
SSO	Site Safety Officer
SUXOS	Senior UXO Supervisor
SWDIV	Southwest Division Naval Facilities Engineering Command
USACE	U.S. Army Corps of Engineers
UXO	unexploded ordnance
UXOQC	UXO Quality Control

1.0 Introduction

This Munitions and Explosives of Concern (MEC) Support Plan has been prepared by Shaw Environmental, Inc. The purpose is to provide procedures for the proper segregation, demilitarization, certification, and disposal of the MEC and non-MEC scrap located at Installation Restoration Program (IRP) Site 1, Explosive Ordnance Disposal (EOD) Range, Former Marine Corps Air Station (MCAS), El Toro. The work is being performed under the U.S. Department of the Navy (DON), Southwest Division Naval Facilities Engineering Command (SWDIV), Engineering Field Activity (EFA), Remedial Action Contract (RAC) No. N62474-98-D-2076, Contract Task Order (CTO) No. 0109.

1.1 Site Description

MCAS El Toro is located in a semi-urban, agricultural area of southern California, approximately 8 miles south of Santa Ana and 12 miles northeast of Laguna Beach (Figure 1). MCAS El Toro covers approximately 4,738 acres. Land use around the MCAS includes commercial, light industrial, and residential. MCAS El Toro closed on 2 July 1999, as part of the Base Realignment and Closure (BRAC) Act.

IRP Site 1 is located in the northeast portion of MCAS El Toro in the foothills of the Santa Ana Mountains (Figure 2). IRP Site 1 is situated within a tributary canyon of Borrego Canyon Wash at elevations ranging from approximately 610 to 760 feet above mean sea level (msl). IRP Site 1 includes the Northern EOD Range (approximately 737,250 square feet [16.9 acres]) and the Southern EOD Range (approximately 721,600 square feet [16.6 acres]), and an approximate 40-acre buffer zone, for a total of 73.7 acres (Bechtel National, Inc. [BNI] 1995) (Figure 2).

1.2 Site Background

Training for EOD and detonation of munitions has been conducted at IRP Site 1 since 1952 (BNI 1995). Use of the EOD Range has been discontinued with the closure of MCAS El Toro in July 1999. The majority of military EOD training took place at the Northern EOD Range and EOD training by the Orange County Sheriff Department and federal agencies took place at the Southern EOD Range (BNI 1995).

Military ordnance used at the site included hand grenades, land mines, cluster bombs, smoke bombs, and rocket warheads. Civilian and commercial explosives, such as dynamite, and plastic/gelatinous explosives were also used at the site. Munitions were detonated in trenches and pits, which were continually filled with soil and then re-excavated. Approximately 2,000 gallons of sulfur trioxide chlorosulfonic acid (FS smoke) were reportedly burned in trenches located in the northern portion of the site in 1982. It has been estimated that approximately

300,000 gallons of petroleum fuels were burned at Site 1 during disposal activities from 1952 through 1993.

The Federal Bureau of Investigation (FBI), in conjunction with the Orange County Sheriff's Department, used IRP Site 1 for training purposes for many years (FBI 2000). The type of training included bomb technician training, post-blast investigation training, and emergency response operations. During the EOD practices, every reasonable effort was made to collect and preserve all explosive evidence during the FBI's training and emergency response operations and at no time were materials discarded or disposed.

From January 2002 to April 2002, field investigation activities were performed at IRP Site 1 to locate and remove any unexploded ordnance (UXO) and MEC scrap in support of the MEC range evaluation (Earth Tech 2002). Four areas were investigated: Northern EOD Range, Southern EOD Range, Buffer Zone, and the Range Perimeter. For each of the areas, a surface survey was conducted, the area was geophysically surveyed, and then subsurface MEC sampling was conducted.

Following the surface survey and geophysical survey in each area, subsurface MEC sampling was performed using a backhoe and/or hand tools to investigate the various pit areas and anomalies identified. During the intrusive MEC sampling activities, 4 Safe-to-Move MEC items and 776 MEC scrap items (totaling approximately 5,000 pounds) were recovered. No Unsafe-to-Move MEC was found during the field investigation. MEC was recovered in the Northern EOD Range, while MEC scrap was recovered in all four areas investigated.

Twenty-three MEC or potential MEC items recovered during the field investigation were destroyed by means of explosive detonation and subsequently inspected. After detonation, a thorough inspection of the metal components confirmed that only 4 of the 23 potential MEC items had contained explosive compounds.

Approximately 5,000 pounds of MEC scrap and 2,500 pounds of non-MEC scrap were collected and consolidated during the field activities on a concrete pad adjacent to Building 795 located at IRP Site 1 (Figure 2). The recovered scrap must be resorted, demilitarized, certified free of energetic material, and properly disposed. During this process, all items will be cleared of any obstructions and cut into pieces that no longer resemble military ordnance. A Senior Unexploded Ordnance Supervisor (SUXOS) will sign a DD-1348-1A form certifying that all items are free and clear of explosives. The type and quantity of MEC and non-MEC scrap is listed in Table 1.

1.3 Guidance Documentation

The procedures in this plan incorporate the guidance and requirements of the following regulations:

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction (INST) 8020.15
- Operations Naval (OPNAV) INST 8020.15/Marine Corps Order (MCO) 8020.13
- Naval Sea Systems Command (NAVSEA) Ordnance Publication (OP) 5 Vol. 1
- Department of Defense (DOD) 4160.21
- DOD 4160.21-m-1
- Code of Federal Regulations (CFR) 40 Part 260, et al; Military Munitions Rule
- U.S. Army Corps of Engineers (USACE) Huntsville Engineer Pamphlet (EP) 75-1-2
- USACE Huntsville EP 1110-1-18
- USACE EP 385-1-95a Basic Safety Concepts and Considerations for OE Operations (June 2001).

1.4 Site Health and Safety Plan

The site health and safety plan (SHSP) for IRP Site 1 (Appendix A) presents health and safety procedures required by Title 29, CFR, Section 1910.120. The SHSP addresses health and safety issues pertaining to protection of workers against exposure to contamination and physical hazards associated with the tasks described in the work plan, including air monitoring, accident reporting, and emergency procedures. All activities will be conducted in accordance with this SHSP and the Shaw Environmental, Inc. Program Health and Safety Plan for Environmental Remedial Actions (Shaw 2004).

1.5 Explosive Safety Submission

During the scrap segregation, decontamination, and demilitarization activities, there will be no intrusive activities within the EOD range and therefore, an Explosives Safety Submission (ESS) is not required for these activities.

1.6 Sign Off

All UXO technicians will sign the attached acknowledgement form, which documents that they have read, understand, and will comply with this plan. All site workers will comply with the following MEC and non-MEC scrap evaluation and management procedures for this project. These procedures are designed to ensure all scrap is properly categorized, any energetic material

is discovered and correctly handled, and DOD MEC scrap management documentation policies are followed.

1.7 Project Schedule

Fieldwork is expected to commence on July 19, 2004 and will take approximately 2-3 weeks to complete.

2.0 Unexploded Ordnance Team Composition

Consistent with OPNAV INST 8020.15/MCO 8020.13 (DON 2003) and NOSSA INST 8020.15 (NOSSA 2004) and conforming to the requirements of USACE Huntsville EP 1110-1-18, the UXO team will be made up of a minimum of two Shaw Environmental, Inc. UXO technicians designated by the Shaw Environmental, Inc. Munitions Response and Range Services Center. They will be qualified in accordance with Corps of Engineers – Huntsville Center (CEHNC), EP 1110-1-18. The Shaw Environmental, Inc. team for this project will consist of a Senior UXO Supervisor (SUXOS) and two UXO Tech IIIs, one of whom will serve additionally, as the UXO Safety Officer and the other will serve as the UXO Quality Control (UXOQC) Officer. In addition, a UXO/Equipment Specialist from the Naval EOD Technical Division (NAVEODTECHDIV, Code 50) located in Indian Head, Maryland will be on-site overseeing all field activities. The SUXOS and NAVEODTECHDIV Specialist will sign any DOD 1348-1A documents and the UXOQC Officer will verify compliance with the requirements of DOD 4160.21-m-1 (Section 7).

3.0 Exclusion Zone and Ordnance and Explosives Discovery Procedures

The IRP Site 1 range perimeter is enclosed by a fence with one point of entry (access gate). Entrance to the site will be controlled at the gate and only personnel directly involved with the field activities will be allowed on-site.

3.1 Exclusion Zone

Since the likelihood of encountering any energetic material in the existing, recovered OE scrap is extremely remote, an exclusion zone (EZ) will initially be established at 200 feet from the existing scrap pile as required by USACE Huntsville EP 1110-1-18. If energetic material is discovered, an EZ will be established based on the net explosive weight of the OE item in accordance with the requirements of Table 7-9 of OP 5. A guard will be established and the EZ will include access and egress control. Only UXO and EOD support personnel will be given unescorted access in the EZ.

3.2 Ordnance and Explosives Discovery

All Shaw Environmental, Inc. UXO technicians along with the NAVEODTECHDIV Specialist will evaluate any item that is encountered with energetic material, or any item in which the contents of all cavities cannot be assessed that may contain explosives or propellants. If the item is determined safe to move, it will be transported to an area where the required EZ will not jeopardize explosive safety or encumber other operations at the base. The other actions indicated for the EZ in the paragraph above will be instituted for the new site.

4.0 Scrap Segregation Procedures

The UXO team will first separate the scrap listed in Table 1 into two areas; one for non-MEC and one for MEC scrap. They will then evaluate and process both types of scrap. This will entail performing a visual inspection of all internal cavities. There are three possible MEC categories:

1. Inert MEC scrap.
2. Inert MEC scrap requiring additional demilitarization.
3. MEC – This last category is for MEC scrap that is either found to contain energetic material or the contents cannot be determined to be free of energetics because of the inability to gain access to all cavities. Any such items will require the actions described in MEC discovery above.

4.1 Ordnance and Explosives Scrap Area and Sealable Containers

The UXO team will establish an area for MEC scrap segregation sufficiently distant from the non-MEC scrap area to prevent mixing of the two types of scrap. Each of the two scrap areas will be placarded to again preclude possible mixing of the categories. The items will be placed in containers that are capable of being locked or sealed once carefully examined, inventoried, verified as inert, and properly demilitarized following the procedures listed in Section 5.0.

5.0 Inert Certification Requirements

Decontamination of MEC scrap is based on a system that assigns decontamination levels commensurate with the post-treatment use.

All scrap is given the 3X degree of decontamination. The scrap will be examined and inspected visually to determine if accessible surfaces or concealed housings are free of explosive residues. If no explosive residues are identified after a visually inspection of each MEC item and non-MEC item, the inspection materials are considered certified free of explosives to the 3X level. Items certified to this degree can then be furnished to a qualified DOD or industry user who has the capability to treat the MEC scrap by using a metal smelter system.

It is Shaw's intentions to contract the MEC and non-MEC scrap to FACT International, which is at metal recycling company out of Los Angeles, California. FACT International does have the capability to provide lockable bins, transportation of the bins to and from the scrap site and final disposition of the scrap by smelting.

MEC and non-MEC scrap at IRP Site 1 is scheduled to be recycled off site. If demilitarized and/or certified items are to be hauled offsite as scrap, current procedures require two signatures for certification, of which only one signature may be from a government contractor.

6.0 Demilitarization Requirements in Accordance with Department of Defense 4160.21-m-1

All items will be rendered free of energetic materials to the 3X level prior to demilitarization. Once the items at this site have been determined inert, they must be deformed to the extent indicated in the following paragraphs to preclude their use as munitions or to be even identified as munitions in the future.

SAFETY NOTE: No cutting torches of any type will be used for demilitarization at this site.

- **Artillery/Mortar Ammunition Components and Similar Items of All Types.** Remove rotating band and deform fuse cavity threads or score or deform bourrelet or gas check band. Deform fin assembly threads or fin blades. Cartridge cases will be deformed by off-center punch-out of primer or split case neck or puncture the lower sidewall with a minimum of ¼-inch hole or deform lower sidewall, which will prevent chambering, or crush, or press.
- **Inert Loaded Ammunition, Projectiles, and Similar Items of All Types Loaded with Inert Filler to Simulate Service Item.** Remove rotating band from artillery projectiles and open the closure of the projectile body to expose the inert filler. On items without rotating bands, open the body closure to expose the inert filler and damage the closure surface to prevent reloading or resealing.
- **Ammunition and Components Which Have Been Fired or Expended and Other Non-Explosive Items.** All items will be rendered free of energetic materials prior to demilitarization. After all required demilitarization is accomplished, range residue will be processed in accordance with the defense Material Disposition Manual, DOD 4160.21-M, Chapter 4, paragraph B.3.
- **Small Explosive Items, Rocket Motors, Warheads, Components and Similar Items of All Types, Including High Explosive, Inert, Loaded, Practice and Smoke.** Mutilate casing by crushing, or cutting, and deforming threaded area.
- **Mines, Anti-Personnel/Anti-Tank Explosive, Components and Similar Items of All Types Including High Explosive, Practice, Inert Loaded Associated Explosive Components.** Mutilate by crushing and deforming threaded area.

7.0 *Inert Certification/Verification/Disposal of Scrap Metal*

The UXO team will ensure that the quantities of demilitarized property released are accurate and that these quantities are readily verifiable by the receiving party. Property will not be accepted unless the DOD Form 1348-1A (Figure 3) contains the demilitarization code or clear text statement of the demilitarization required.

The scrap metal, excavated at the site, will be disposed of through an approved scrap metal dealer and will be transferred using DOD Form 1348-1A. Prior to release of the material, the SUXOS will physically inspect the material in the containers to ensure that they are free of dangerous items or conduct demilitarization operations, if necessary. Inert certifications require dual signatures. The first signature (certifier) will be from a qualified contractor personnel (SUXOS). The second signature (verifier) must be a technically qualified DOD person, who is also a United States citizen (NAVEODTECHDIV Specialist). The certification and verification signatures must be directly above the typed, or clearly stamped, or legibly printed full name, rank/rate, complete organization name and address, and phone number (commercial and Defense Switching Network) of the personnel that certified and verified the inspection. The SUXOS will sign the DOD Form 1348-1A for Shaw Environmental, Inc. It will include the following statement:

- “We certify and verify that the Ammunition, Explosives, & Dangerous Articles (AEDA) Residue, Range Residue, and/or Explosive Contaminated Property listed has been 100-percent properly inspected by us and to the best of our knowledge and belief, are inert and/or free of explosives or other dangerous materials.”

MEC scrap does not have to be segregated into like metals. Upon completion of inert certification and demilitarization, the MEC scrap will be placed in steel lockable bins and then sealed. The same procedures will be used for non-MEC materials. A signed Statement of Inert Certification/Verification will be forwarded with each type of materials being transported. The bins can then be transported to a scrap yard for smelting

8.0 Site Safety and Personal Protective Equipment

UXO personnel performing work at this site will follow the SHSP (Appendix A) approved for work under this task order. Exceptions to the SHSP are as follows for the UXO personnel:

- Hard hats may create an unsafe condition by falling off of the head of a UXO technician at a critical moment. During scrap segregation, decontamination, and demilitarization activities, UXO technicians will not wear hard hats.

Except for the above, personal protective equipment (PPE) will be worn by Shaw Environmental, Inc. UXO personnel in accordance with the guidance in the SHSP (Appendix A). This modification complies with the requirements of the CEHNC's EP 385-1-95a *Basic Safety Concepts and Considerations for OE Operations* (June 2001).

A Shaw Environmental, Inc. Site Safety Officer (SSO) will work with the UXOQC to ensure that the requirements of the SHSP are followed and the UXO team members conduct a review of the Activity Hazard Analysis (AHA) (Appendix A).

9.0 References

Bechtel National, Inc., 1995, *Final Work Plan Phase II Remedial Investigation/Feasibility Study*, San Diego, CA.

Corps of Engineers, Huntsville Center, 2001, *Engineer Pamphlet (EP) 385-1-95a Basic Safety Concepts and Considerations for OE Operations*, June.

Department of Navy, Office of the Chief of Naval Operations, 2003, *OPNAV Instruction 8020.15/MCO 8020.13, Explosives Safety Review, Oversight, and Verification of Response Actions Involving Military Munitions*, Washington DC, October.

Department of Navy, Naval Ordnance Safety and Security Activity, 2004, *NOSSA Instruction 8020.15, Military Munitions Response Program Oversight*, Indian Head, MD, March.

Earth Tech, 2002, *Preliminary Draft Technical Memorandum, Ordnance and Explosives Range Evaluation at IRP Site 1, Explosive Ordnance Disposal Range, Marine Corps Air Station, El Toro, California*, Honolulu, HI, October.

Federal Bureau of Investigation, 2000, *Letter Report Stating the FBI's Use of MCAS El Toro EOD Range*, Los Angeles, CA, March.

Shaw Environmental, Inc., 2004, *Program Health and Safety Plan for Environmental Remedial Actions*, April.

Figures

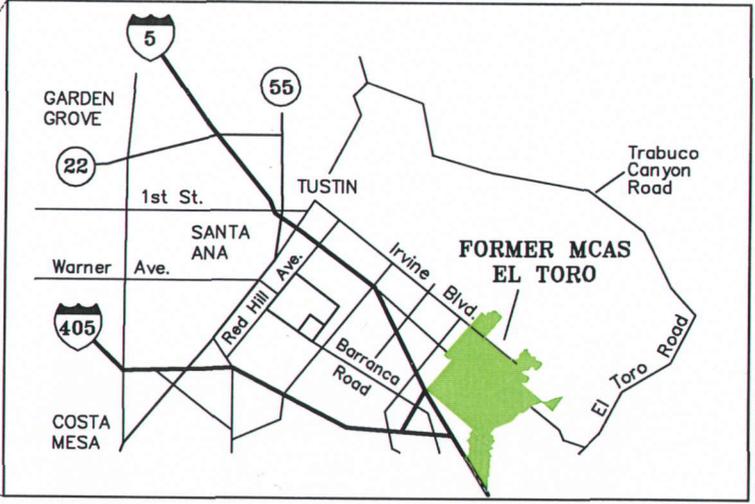
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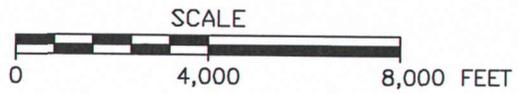
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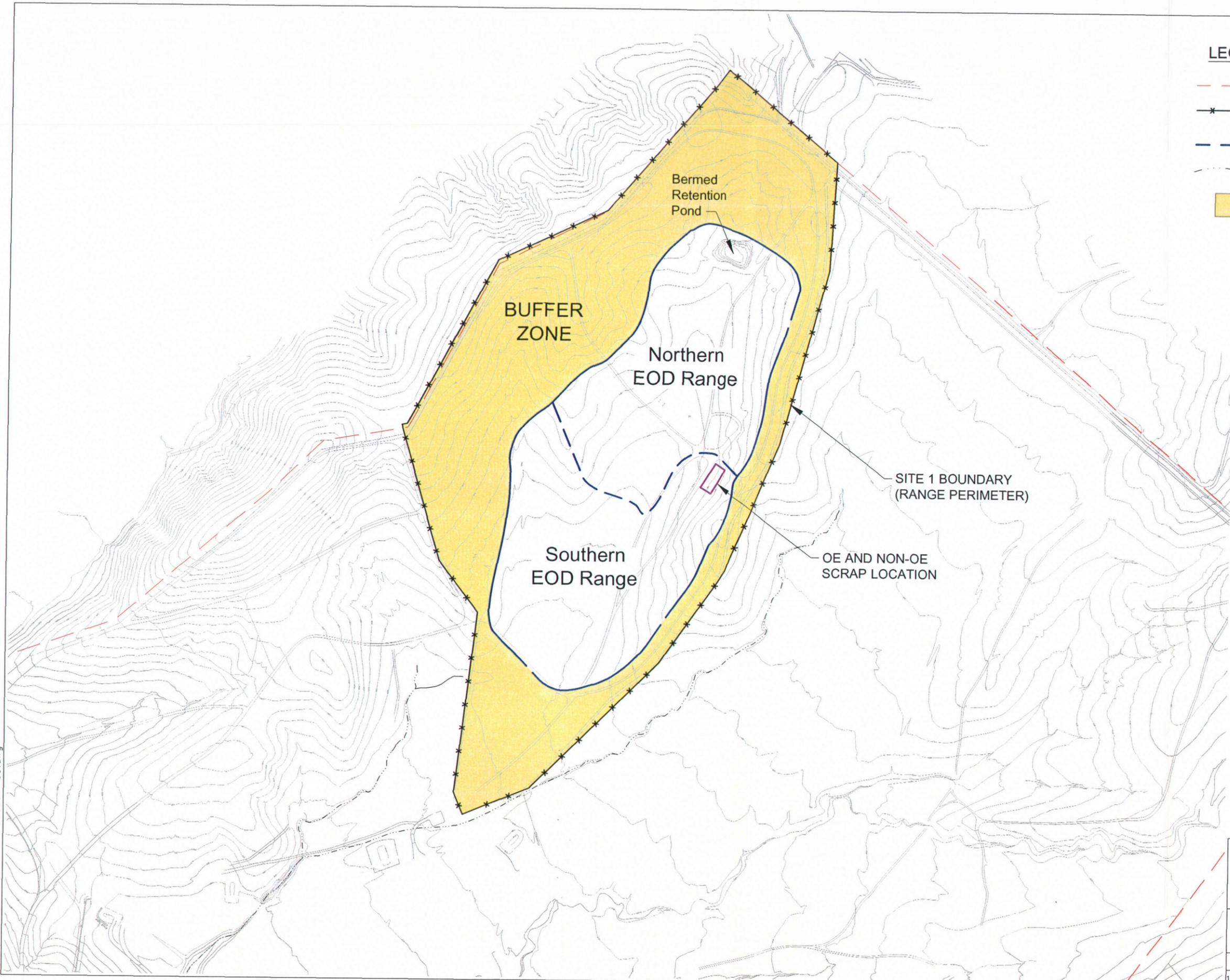

Shaw Environmental, Inc.

EFA WEST
 SOUTHWEST DIVISION
 NAVAL FACILITIES ENGINEERING COMMAND
 CTO 109

FIGURE 1
FACILITY LOCATION MAP
IRP SITE 1

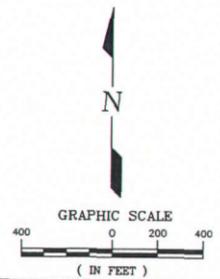
FORMER MARINE CORPS AIR STATION
 EL TORO, CALIFORNIA

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LEGEND:

-  FORMER MCAS EL TORO BOUNDARY
-  SECURITY FENCE/ RANGE PERIMETER/ IRP SITE 1 BOUNDARY
-  EOD RANGE BOUNDARY
-  STREAM OR WASH
-  BUFFER ZONE



SOUTHWEST DIVISION
NAVAL FACILITIES
ENGINEERING COMMAND

SITE PLAN IRP SITE 1 FORMER MCAS EL TORO, CA		
FILE NO. 100357-05.DWG	FIGURE 2	DATE 4/7/04

Table

Table 1
MEC Scrap and Non-MEC Scrap

Type	Description	Quantity
Non-OE	Automobile part	>1
Non-OE	Automobile part	>1
Non-OE	Wire pallet	1
Non-OE	Metal pipe	>1
Non-OE	Razor wire	1
Non-OE	Wire pallet	1
Non-OE	Non-OE scrap	1
OE Scrap	OE scrap	>1
OE Scrap	40mm casing	>1
OE Scrap	40mm projectile	>1
OE Scrap	40mm casing (BOFERS)	12
Non-OE	Pipe (metal)	1
OE Scrap	40mm casing	14
OE Scrap	40mm projectile	4
OE Scrap	40mm casing	>1
OE Scrap	40mm casing	10
OE Scrap	40mm casing	25
OE Scrap	40mm casing	7
OE Scrap	40mm casing	10
OE Scrap	40mm projectile	2
Non-OE	Metal/aluminum car part	>20
OE Scrap	40mm casing (burial area)	>20
OE Scrap	40mm casing and 40mm casing debris	6
OE Scrap	40mm casing	20
Non-OE	Aluminum I-beam	1
Non-OE	Marsh matting	2
OE Scrap	40mm casing/casing fragment	12
OE Scrap	Small arms	>1
Non-OE	55-gallon barrels (fuel)	>1
Non-OE	Marsh matting	>1
OE Scrap	Ammunition can	2
OE Scrap	OE scrap	>1
OE Scrap	500-pound practice bomb	1
Non-OE	Marsh matting	1
OE Scrap	Burn pit (5-inch rocket motors)	>1
OE Scrap	Small arms (linked)	>1
OE Scrap	Ammunition cans	>1
Non-OE	Fuel cans	>1
OE Scrap	Cartridge actuated device	>1
OE Scrap	OE scrap	>1
Non-OE	Non-OE scrap	>1
OE Scrap	Training missile (possible sparrow) without nozzle	1
Non-OE	Matting	>1
Non-OE	Boxes	>1
Non-OE	Marsh matting	1
Non-OE	Pipe	>1

Table 1
MEC Scrap and Non-MEC Scrap

Type	Description	Quantity
OE Scrap	Small arms	>1
Non-OE	Barrels (fuel)	>1
OE Scrap	Aluminum	1
OE Scrap	8-inch projectile	>1
OE Scrap	OE scrap	>1
Non-OE	Non-OE scrap	>1
Non-OE	Marsh matting	4
Non-OE	Marsh matting	1
Non-OE	Automobile tire	1
OE Scrap	20mm ammunition can	2
OE Scrap	20mm projectile	4
Non-OE	Non-OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	Demolition wire	1
OE Scrap	Wire scrap	1
OE Scrap	Steel	1
OE Scrap	Steel plate	>1
OE Scrap	OE scrap	>1
OE Scrap	40mm casing	>20
OE Scrap	OE scrap	1
OE Scrap	40mm casing	>20
OE Scrap	OE scrap	>1
Non-OE	Non-OE scrap	>20
OE Scrap	40mm casing	12
OE Scrap	OE scrap	>20
OE Scrap	OE scrap	>20
OE Scrap	Small arms (burned)	>20
OE Scrap	OE scrap	>20
Non-OE	Automobile parts and other non-OE scrap	>20
Non-OE	Scrap	>20
OE Scrap	40mm casing (large burn pit)	>20
OE Scrap	Commo wire	>1
Non-OE	Automobile part	>1
Non-OE	Non-OE scrap	>1
OE Scrap	OE scrap	>20
Non-OE	Barrel, car frame, and other non-OE	>20
OE Scrap	Metal sheet (napalm dispenser?)	1
OE Scrap	Mk76	1
OE Scrap	2.36-inch rocket	1
OE Scrap	Ammunition box	>1
OE Scrap	Mk25 flare	>1
Non-OE	Construction debris	1
OE Scrap	OE scrap	>1
Non-OE	Heavy reinforced steel drums (2), barrel lids	>1
OE Scrap	Frag: 105mm projectile and 2.75-inch rocket warhead	>1
Non-OE	Non-OE scrap	>1

Table 1
MEC Scrap and Non-MEC Scrap

Type	Description	Quantity
OE Scrap	Firing wire	>1
Non-OE	Wire pallet	1
OE Scrap	M48 bomblet	2
OE Scrap	40mm casing	2
OE Scrap	OE scrap	>1
OE Scrap	M30 series submunition	1
OE Scrap	OE scrap	>1
OE Scrap	OE Scrap	>1
Non-OE	Non-OE scrap	>1
Non-OE	Car transmission	1
OE Scrap	OE scrap	>1
Non-OE	Fence post	>1
OE Scrap	Frag: 2.75-inch rocket motor parts/skin	>1
OE Scrap	OE scrap	>1
OE Scrap	2.75-inch rocket dispenser	>1
OE Scrap	5-inch rocket motor	>1
Non-OE	barrels (55 gallon)	1
OE Scrap	5-inch Zuni, small arms, jato bottles (trash pit)	1
OE Scrap	Mk103 nose fuse	1
OE Scrap	Metal plate	1
OE Scrap	20mm can	>1
Non-OE	Non-OE scrap	>1
Non-OE	No metallic contact	1
Non-OE	No metallic contact	1
Non-OE	Matting strip	1
OE Scrap	Small arms	>1
OE Scrap	5-inch Zuni rocket warhead	1
OE Scrap	Projectile (dummy round with M48 fuse)	1
OE Scrap	Nose adaptor for bomb (includes part of M904 fuse)	1
OE Scrap	2.75-inch practice rocket warhead (no fuse)	1
OE Scrap	105mm projectile - unfired (no rifling - possible base fuse)	1
OE Scrap	M904 bomb fuse (front end only)	1
OE Scrap	20mm brass casing	1
OE Scrap	40mm brass casing	1
OE Scrap	Frag	8
OE Scrap	20mm casing	2
OE Scrap	White phosphorus grenade body (MT)	1
OE Scrap	Steel bomb body	1
OE Scrap	Mk118 (dart) practice (partial)	1
OE Scrap	Rocket motor tube (steel)	1
OE Scrap	Frag	4
OE Scrap	Frag: 155mm projectile	1
OE Scrap	3-inch naval projectile	1
OE Scrap	M904 nose fuse	1
OE Scrap	2.75-inch rocket warhead	1
OE Scrap	40 mm Projectile	1

Table 1
MEC Scrap and Non-MEC Scrap

Type	Description	Quantity
OE Scrap	M103 bomb fuse	1
Non-OE	Automobile part	2
Non-OE	Aluminum strongback	1
OE Scrap	Frag: 40mm projectile	1
OE Scrap	40mm casing	1
Non-OE	Angle iron	1
OE Scrap	Mk25 marine marker	1
OE Scrap	Frag: projectile	1
OE Scrap	Frag: projectile	1
Non-OE	Car part (exhaust)	1
OE Scrap	Aluminum (fin assembly)	1
OE Scrap	40mm casing	1
OE Scrap	40mm casing	1
Non-OE	Automobile exhaust pipe	1
OE Scrap	Frag: projectile	2
OE Scrap	40mm casing	1
OE Scrap	Aluminum	1
OE Scrap	Frag	1
OE Scrap	Aluminum	1
OE Scrap	40mm casing	1
OE Scrap	Frag: projectile	1
OE Scrap	40mm casing	1
OE Scrap	40mm projectile without nose (practice)	1
OE Scrap	Rocket fin assembly (aluminum)	1
Non-OE	Jack handle	1
OE Scrap	40mm casing	1
OE Scrap	40mm casing	1
Non-OE	Metal bar	1
OE Scrap	40mm casing	1
Non-OE	Aluminum automobile part	1
Non-OE	Rod (steel)	1
Non-OE	Automobile part (steel)	1
Non-OE	Non-OE scrap	>1
OE Scrap	Missile fin (aluminum)	1
Non-OE	Fence post with wire attached	1
Non-OE	Automobile part	>1
Non-OE	Automobile part	>1
OE Scrap	Aluminum (molten)	1
Non-OE	Aluminum	1
Non-OE	Barrel remains	1
OE Scrap	A/C dispenser	1
Non-OE	Metal pipe with chain (possible strongback)	1
Non-OE	Automobile part	>1
OE Scrap	Smoke grenade	1
Non-OE	No metallic contact	1
Non-OE	No metallic contact	1

Table 1
MEC Scrap and Non-MEC Scrap

Type	Description	Quantity
Non-OE	No metallic contact	1
Non-OE	No metallic contact	1
Non-OE	Steel pipe	1
Non-OE	Steel pipe	1
Non-OE	Gauge pipe	2
Non-OE	Telephone pole anchor	1
Non-OE	Fence pipe	1
Non-OE	No metallic contact	1
OE Scrap	20mm casing	3
OE Scrap	40mm projectile	1
OE Scrap	Frag: projectile	1
OE Scrap	20mm projectile	1
OE Scrap	Rocket motor Venturi	1
Non-OE	Non-OE scrap	1
OE Scrap	Frag	1
OE Scrap	20mm projectile	1
OE Scrap	Frag: projectile	1
Non-OE	Non-OE scrap	1
OE Scrap	Projectile	1
OE Scrap	Rocket fuse	1
OE Scrap	Frag: projectile	1
Non-OE	Nail (large)	2
Non-OE	Wire	2
OE Scrap	Frag: 155mm projectile	1
Non-OE	3-inch pipe	1
Non-OE	Non-OE scrap	1
Non-OE	Base to fence gate	3
Non-OE	Tension wire	2
OE Scrap	Frag (aluminum)	1
OE Scrap	Frag	1
Non-OE	Pipe	3
Non-OE	Plow blade	1
Non-OE	Fence wire	2
Non-OE	Pipe	2
Non-OE	Pipe	1
Non-OE	Non-OE scrap	2
Non-OE	Pipe	2
OE Scrap	Frag: projectile	1
OE Scrap	Frag: projectile	1
OE Scrap	OE scrap	1
OE Scrap	Frag: bomb	1
Non-OE	Bolt (large)	1
Non-OE	Barbed wire	1
Non-OE	Barbed wire	1
Non-OE	Barbed wire	1
Non-OE	8-inch crescent wrench	1

Table 1
MEC Scrap and Non-MEC Scrap

Type	Description	Quantity
Non-OE	Metal rod	1
Non-OE	Aluminum can	1
OE Scrap	40mm practice projectile with dummy fuse	1
OE Scrap	Frag (aluminum)	1
Non-OE	Aluminum	1
Non-OE	Barbed wire	1
Non-OE	Fence pipe	1
Non-OE	Fence wire	1
Non-OE	Telephone pole anchor	1
Non-OE	Heavy gauge pipe	2
Non-OE	Heavy gauge pipe	2
Non-OE	Metal plate	1
Non-OE	Aluminum can	1
Non-OE	Aluminum can	1
Non-OE	Railroad spike	1
Non-OE	Aluminum can	1
Non-OE	Metal plate	1
Non-OE	Wire/chain link	1
Non-OE	Aluminum	1
Non-OE	No metallic contact	1
Non-OE	Horseshoe	1
OE Scrap	20mm ammunition link	2
OE Scrap	Frag: 20mm projectile	2
OE Scrap	Grenade canister	1
OE Scrap	20mm ammunition link	3
OE Scrap	Frag (metal)	1
OE Scrap	Ammunition can	1
Non-OE	Fence wire	1
Non-OE	No metallic contact	1
OE Scrap	Frag (metal)	1
OE Scrap	Frag (metal)	1
OE Scrap	Frag (metal)	1
Non-OE	Fence wire	1
OE Scrap	Projectile base	1
Non-OE	Metal link chain	1
OE Scrap	20mm projectile	2
Non-OE	Metal scrap (automobile part)	1
OE Scrap	Aluminum	2
Non-OE	Aluminum soda can	1
Non-OE	Barbed wire (buried)	1
Non-OE	Fence post	1
Non-OE	Barbed wire (buried)	1
Non-OE	Barbed wire	1
Non-OE	Barbed wire (buried)	1
Non-OE	Bolt	1
Non-OE	Barbed wire	1

Table 1
MEC Scrap and Non-MEC Scrap

Type	Description	Quantity
Non-OE	Aluminum automobile part	1
OE Scrap	OE scrap (steel)	1
OE Scrap	OE scrap (steel)	1
Non-OE	Non-OE scrap	1
OE Scrap	Frag: projectile	1
Non-OE	No metallic contact	1
OE Scrap	OE scrap	>1
Non-OE	Remnants of burn area	1
OE Scrap	25-pound frag bomb	1
OE Scrap	20mm casing	1
OE Scrap	Frag (steel)	1
OE Scrap	Frag (steel)	1
OE Scrap	Frag (steel)	1
OE Scrap	Frag (steel)	1
OE Scrap	20mm brass casing	1
OE Scrap	Aluminum from rocket motor tube	1
OE Scrap	Aluminum from M48 submunition trainer	1
OE Scrap	20mm projectile	1
OE Scrap	Frag: aluminum strip	1
OE Scrap	Frag (steel)	1
Non-OE	Air cooled engine part	2
Non-OE	Engine part	1
OE Scrap	Bomb skin (half)	1
OE Scrap	20mm casing	1
OE Scrap	20mm brass casing	1
Non-OE	Plastic piece	1
Non-OE	Automobile part	1
OE Scrap	20mm projectile	1
OE Scrap	Frag (steel)	1
OE Scrap	Aluminum part	1
OE Scrap	Windshield for 20mm projectile	1
OE Scrap	5.56 brass	1
OE Scrap	20mm projectile	1
OE Scrap	Fuse part	1
OE Scrap	Aluminum part	1
OE Scrap	20mm projectile	1
OE Scrap	Frag: aluminum piece	1
OE Scrap	20mm projectile	1
OE Scrap	Cartridge part	1
OE Scrap	Cartridge base	1
OE Scrap	Frag: steel skin from projectile	1
Non-OE	Steel car part	1
OE Scrap	Aluminum metal	1
OE Scrap	20mm projectile	1
OE Scrap	Brass casing	1
OE Scrap	Frag	5

Table 1
MEC Scrap and Non-MEC Scrap

Type	Description	Quantity
Non-OE	Car part	1
OE Scrap	Projectile base piece	1
OE Scrap	Mk13 day/night smoke/flare	1
OE Scrap	20mm casing	1
OE Scrap	M103 bomb fuse	1
OE Scrap	20mm projectile	1
OE Scrap	Frag (aluminum)	1
OE Scrap	Frag (steel)	2
OE Scrap	20mm projectile	1
OE Scrap	Frag (steel)	1
OE Scrap	20mm casing and link	1
OE Scrap	20mm brass casing	1
OE Scrap	20mm casing	1
OE Scrap	Aluminum spacer	1
OE Scrap	Frag: 20mm projectile	1
OE Scrap	Frag: 20mm projectile	1
OE Scrap	Mk344 fuse piece (bomb tail fuse)	1
OE Scrap	Frag	1
OE Scrap	M203 fuse piece	1
OE Scrap	20mm casing	1
OE Scrap	Frag	1
OE Scrap	20mm casing	1
OE Scrap	Fuse piece	1
OE Scrap	Smoke grenade (expended)	1
OE Scrap	Frag: bomb	1
OE Scrap	20mm projectile	1
OE Scrap	20mm brass casing with link	3
OE Scrap	20mm brass casing	3
OE Scrap	Missile skin (possible terrier)	1
OE Scrap	20mm projectile	1
OE Scrap	Frag: 40mm projectile	1
OE Scrap	20mm casing and link	1
OE Scrap	Aluminum fin piece	1
OE Scrap	Steel metal skin	1
OE Scrap	20mm casing	1
OE Scrap	Frag: aluminum strip	1
OE Scrap	20mm casing	1
OE Scrap	20mm casing	1
OE Scrap	Bomb fuse adapter	1
OE Scrap	20mm casing	1
OE Scrap	Frag	3
OE Scrap	20mm casing	2
OE Scrap	Frag (aluminum)	1
OE Scrap	20mm projectile	1
OE Scrap	Frag: 155mm projectile	1
OE Scrap	Cartridge actuated device	1

Table 1
MEC Scrap and Non-MEC Scrap

Type	Description	Quantity
OE Scrap	Frag	1
OE Scrap	Frag: 20mm case	1
OE Scrap	Aluminum fuse case	1
OE Scrap	OE scrap	1
OE Scrap	Frag: 40mm projectile	1
OE Scrap	Frag: 40mm projectile	1
OE Scrap	40mm case	1
OE Scrap	Frag	1
OE Scrap	Base	1
OE Scrap	Frag: 20mm case	1
OE Scrap	Frag: 20mm case	1
OE Scrap	Frag	1
OE Scrap	Aluminum flare case	1
OE Scrap	Aluminum flare case	1
OE Scrap	Frag: 20mm case	1
OE Scrap	Part of 2.75-inch warhead (electrical section)	1
OE Scrap	Banding material	1
OE Scrap	Part of 2.75-inch warhead (electrical section)	1
OE Scrap	20mm projectile (target practice)	1
OE Scrap	4-inch munitions adaptor	1
OE Scrap	Frag	1
OE Scrap	7.62mm brass case	1
OE Scrap	Frag (aluminum)	1
OE Scrap	Nose section (part of)	1
OE Scrap	Ammunition can	1
OE Scrap	20mm base	1
OE Scrap	20mm case (part of)	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
Non-OE	Steel car part	1
Non-OE	Car spring	1
OE Scrap	7.62mm cartridge	1
Non-OE	Barbed wire	1
OE Scrap	20mm projectile	1
OE Scrap	5.56mm cartridge (blank)	1
Non-OE	Metal ring	1
Non-OE	Aluminum soda can	1
Non-OE	Barbed wire	1
Non-OE	Barbed wire	1
Non-OE	Barbed wire	1

Table 1
MEC Scrap and Non-MEC Scrap

Type	Description	Quantity
Non-OE	Barbed wire	1
Non-OE	Stainless steel pipe	1
Non-OE	Chain link	1
Non-OE	Barbed wire	1
OE Scrap	20mm projectile target practice	1
OE Scrap	.50 caliber projectile	1
OE Scrap	Grenade fuse	1
OE Scrap	Frag: projectile	1
OE Scrap	30mm HEI with tracer	1
OE Scrap	Bomb tail piece (possible)	1
OE Scrap	20mm nose section (without fuse)	1
OE Scrap	20mm projectile body	1
Non-OE	Barbed wire	1
Non-OE	Barbed wire	1
OE Scrap	OE scrap	1
Non-OE	Non-OE scrap	1
OE Scrap	20mm nose piece	1
OE Scrap	20mm nose piece	1
OE Scrap	20mm TP	1
OE Scrap	Grenade fuse	1
OE Scrap	OE scrap	3
Non-OE	Nail	8
OE Scrap	20mm projectile body	1
OE Scrap	OE scrap	1
Non-OE	Electrical wiring	1
OE Scrap	20mm projectile body	1
OE Scrap	Frag (small)	2
OE Scrap	Frag (small)	1
OE Scrap	20mm projectile practice fuse	1
OE Scrap	Grenade fuse	1
Non-OE	Barbed wire spool	1
OE Scrap	Grenade fuse	1
OE Scrap	Grenade fuse	1
Non-OE	Bailing wire	1
OE Scrap	Partial aluminum rocket fuse	1
OE Scrap	Frag: projectile	1
Non-OE	Part of metal container	1
Non-OE	Aluminum can	1
Non-OE	Chain link	1
OE Scrap	Frag: projectile	1
Non-OE	Bailing wire	1
OE Scrap	Frag	2
OE Scrap	Bomb fin (partial)	1

Table 1
MEC Scrap and Non-MEC Scrap

Type	Description	Quantity
OE Scrap	Projectile body	1
Non-OE	Automobile part (stick shift)	1
OE Scrap	Frag: projectile	1
OE Scrap	Frag: bomb	1
OE Scrap	Grenade fuse	1
OE Scrap	Cartridge base	1
OE Scrap	Frag: projectile	1
OE Scrap	Grenade fuse	1
OE Scrap	20mm brass casing	1
OE Scrap	20mm projectile (no fuse)	1
OE Scrap	20mm projectile (target practice)	1
Non-OE	Chain link	1
Non-OE	Chain link	1
Non-OE	Bailing wire	1
Non-OE	Chain link	1
Non-OE	Chain link	1
OE Scrap	20mm projectile (target practice)	1
OE Scrap	20mm base part	1
Non-OE	Chain link	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	Slag (aluminum)	1
OE Scrap	2.36-inch rifle grenade - white phosphorus (expended)	1
OE Scrap	20mm brass casing	1
OE Scrap	Frag (aluminum)	2
OE Scrap	Pop flare (expended)	1
OE Scrap	Fuse component	1
OE Scrap	Nose fuse	1
OE Scrap	Frag (steel)	1
OE Scrap	Frag (steel)	1
OE Scrap	20mm casing	1
OE Scrap	Fuse part	1
OE Scrap	20mm brass casing	1
OE Scrap	Projectile piece	1
OE Scrap	Brass casing	1
OE Scrap	40mm projectile (drill)	1
OE Scrap	20mm brass casing	1
OE Scrap	Shell from M48 drill submunition (half of)	1

Table 1
MEC Scrap and Non-MEC Scrap

Type	Description	Quantity
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1
OE Scrap	OE scrap	1

Appendix A
Health and Safety Plan

HEALTH AND SAFETY PLAN
Installation Restoration Program Site 1
Explosive Ordnance Disposal Range
Former Marine Corps Air Station, El Toro, California

Environmental Remedial Action
Contract Number N62474-98-D-2076
Contract Task Order 0109

Document Control Number 7681
Revision 0

July 13, 2004

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U. S. Department of the Navy
Southwest Division
Naval Facilities Engineering Command
Environmental Division
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HEALTH AND SAFETY PLAN
Installation Restoration Program Site 1
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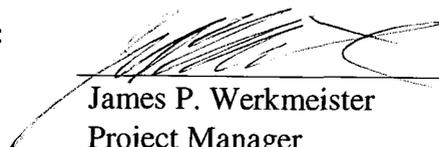
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Location: MCAS El Toro

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Acronyms and Abbreviations

ACGIH	American Conference of Government Industrial Hygiene
ANSI	American National Standards Institute
BNI	Bechtel National, Inc.
BRAC	Base Realignment and Closure
Cal/OSHA	California Occupational Safety and Health Administration
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CHEMTREC	Chemical Transportation Emergency Center
CIH	Certified Industrial Hygienist
CPR	cardiopulmonary resuscitation
CRC	contamination reduction corridor
CRZ	contamination reduction zone
CTO	Contract Task Order
dBA	Decibels, A-Scale
DHS	Department of Health Services
DON	U.S. Department of the Navy
EC	degrees Celsius
EF	degrees Fahrenheit
EFA	Engineering Field Activity
EM	Engineer Manual
EMS	Emergency Medical Services
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
ESS	Explosives Safety Submission
eV	electronvolt
EM	engineer manual
EZ	Exclusion Zone
FM	Factory Mutual Engineering Corporation
FS	Sulfur Trioxide Chlorosulfonic Acid
GFCI	ground fault circuit interrupters
GSA	General Services Administration
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	high-efficiency particulate air
HS	Health and Safety
HSM	health and safety manager
SHSP	health and safety officer
HSP	health and safety plan
INST	Instruction
IP	Ionization potential
IRP	Installation Restoration Program
JEG	Jacobs Engineering Group
kV	kilovolt
LEL	lower explosive limit

MCAS	Marine Corps Air Station
MCO	Marine Corps Order
MEC	Munitions and Explosives of Concern
mg/m	milligrams per cubic meter
MHR	maximum heart rate
MPH	Miles per hour
MSA	Mine Safety Appliance Company
MSDS	material safety data sheets
MSL	Mean Sea Level
NE	Not Established
NEC	National Electrical Code
NESC	National Electrical Safety Code
NIOSH	National Institute of Occupational Safety and Health
NOSSA	Naval Ordnance Safety and Security Activity
NTR	Navy Technical Representative
OE	Ordnance and Explosives
OPNAV	Operations Naval
OSHA	Occupational Safety and Health Administration
PAL	Provisional Action Level
PEL	Permissible exposure limit
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
QA/QC	quality assurance/quality control
RAC	Remedial Action Contract
RPM	Remedial Project Manager
SVOC	Semi-volatile Organic Compound
SWDIV	Southwest Division Naval Facilities Engineering Command
TLV	Threshold limit value
ug/L	micrograms per liter
UL	Underwriters Laboratories
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
VOC	Volatile Organic Compound
WBGT	wet bulb globe temperature

1.0 Introduction

Shaw Environmental, Inc. developed this project-specific health and safety plan (HSP) for the U.S. Department of the Navy (DON), Southwest Division Naval Facilities Engineering Command (SWDIV), Engineering Field Activity (EFA), Remedial Action Contract (RAC) No. N62474-98-D-2076, Contract Task Order (CTO) No. 109. This HSP addresses work to be performed at Installation Restoration Program (IRP) Site 1, former Explosive Ordnance Disposal (EOD) Range, located at the Marine Corps Air Station (MCAS), El Toro, California. The field activities include munitions and explosive of concern (MEC) scrap and non-MEC scrap removal, aquifer testing, groundwater treatability studies, and groundwater treatment.

This HSP establishes the policies and procedures that will protect workers and the public from potential hazards posed by site work. Shaw Environmental, Inc. considers safety the highest priority during work at a site containing potentially hazardous materials and has established a policy of minimizing exposure that must be upheld on all projects. Although this HSP focuses on the specific work activities planned, it must remain flexible because of the nature of the work. Conditions could change and unforeseen situations could arise that require deviations from the original plan. This flexibility allows modification by the Shaw Environmental, Inc. field supervisors and health and safety professionals to take into account changing site conditions, such as new data on chemical hazards, weather, and changes in the scope of work.

Changes to the HSP must be approved by the site health and safety specialist (SHSP), program health and safety manager (HSM), and project manager or site supervisor and must be recorded on the HSP Change Approval Form provided in Appendix A. The Navy Technical Representative (NTR) can acknowledge the change but is not required to sign the form. The HSM will forward a copy of the HSP Change Approval Form to the Contracting Officer.

This HSP takes into account the information currently available from discussions with the project management team and materials provided by the DON. The HSP was written in accordance with Occupational Safety and Health Administration (OSHA) requirements presented in Title 29, Code of Federal Regulations (CFR), Section 1910.120. All project activities will be conducted in a manner that minimizes the potential for injury, accident, or incident. All Shaw Environmental, Inc. employees, subcontractors, and visitors are required to read and sign the HSP prior to site entry. The HSP Acknowledgment Form is presented in Appendix B.

In addition to the HSP, an Explosives Safety Submission (ESS) will be prepared that addresses all intrusive work. The ESS addresses all MEC at Site 1 and was prepared in accordance with the DON Operations Naval (OPNAV) Instruction (INST) 8020.15/Marine Corps Order (MCO)

8020.13 (DON 2003) and DON Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8020.15 (DON 2004).

1.1 Regulations and Guidelines

This HSP and all site activities will be in compliance with the following regulations and guidelines:

- U.S. Department of Labor OSHA Standards, specifically:
 - 29 CFR 1910.134: Respiratory Protection
 - 29 CFR 1910.120: Hazardous Waste Operations and Emergency Response (HAZWOPER)
 - 29 CFR 1910.1200: Hazard Communication
 - 29 CFR 1926: Safety and Health Regulations for Construction
- California Code of Regulations (CCR), Title 8
- U.S. Environmental Protection Agency (EPA), *Standard Operating Safety Guides*, June 1992
- National Institute of Occupational Safety and Health (NIOSH)/OSHA/U.S. Coast Guard (USCG)/EPA, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, October 1985
- U.S. Army Corps of Engineers (USACE), *Safety and Health Requirements Manual*, Engineer Manual (EM) 385-1-1, September 1996
- Naval Facilities Engineering Command, *Navy/Marine Corps Installation Restoration Manual*, February 1997
- American National Standards Institute (ANSI), *Practice for Respiratory Protection*, Z88.2, 1992
- The Shaw Environmental, Inc., *HS Policies and Procedures Manual*, 1999 (available on site).

1.2 Site Description and Contaminant Characteristics

MCAS El Toro is located in a semi-urban, agricultural area of southern California, approximately 8 miles south of Santa Ana and 12 miles northeast of Laguna Beach (Figure 1). MCAS El Toro covers approximately 4,738 acres. Land use around the MCAS includes commercial, light industrial, and residential. MCAS El Toro closed on 2 July 1999, as part of the Base Realignment and Closure (BRAC) Act.

IRP Site 1 is located in the northeast portion of MCAS El Toro in the foothills of the Santa Ana Mountains (Figure 1). IRP Site 1 is situated within a tributary canyon of Borrego Canyon Wash at elevations ranging from approximately 610 to 760 feet above mean sea level (msl). IRP Site 1 includes the Northern EOD Range (approximately 737,250 square feet [16.9 acres]) and the Southern EOD Range (approximately 721,600 square feet [16.6 acres]), and an approximate 40-acre buffer zone, for a total of 73.7 acres (BNI 1995) (Figure 2).

A bermed retention pond is present in the northern portion of the site. Seasonal accumulations of rainwater were reported to have been observed in the retention pond. However, no ponding or accumulation contributing to surface water flow was observed (June 1999 to present) by Earth Tech. A review of existing site data indicated that the pond was constructed in 1980 to prevent sheet flow from flooding the IRP Site 1 area during precipitation events. The site has been characterized by fairly rapid groundwater recharge in response to storm events (JEG 1993).

Training for EOD and detonation of munitions has been conducted at IRP Site 1 since 1952 (BNI 1995). Use of the EOD Range has been discontinued with the closure of MCAS El Toro in July 1999. The majority of recent military EOD training took place at the Northern EOD Range and EOD training by the Orange County Sheriff Department and federal agencies took place at the Southern EOD Range (BNI 1995). Military ordnance used at the site included hand grenades, land mines, cluster bombs, smoke bombs, and rocket warheads. Civilian and commercial explosives, such as dynamic, plastic, and gelatinous explosives were also used at the site. Munitions were detonated in trenches and pits, which were continually filled with soil and then re-excavated.

In 1982, approximately 2,000 gallons of sulfur trioxide chlorosulfonic acid (FS smoke) were reportedly burned in trenches located in the northern portion of the site. It has been estimated that approximately 300,000 gallons of petroleum fuels were burned at IRP Site 1 during disposal activities from 1952 through 1993. These activities have a potential to contaminate the soil with ordnance and explosive (OE) items, explosives, perchlorate, fuel hydrocarbons, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and dioxins.

From January 2002 to April 2002, field investigation activities were performed at IRP Site 1 in support of the Ordnance and Explosives (OE) range evaluation (Earth Tech 2002). Four areas were investigated: Northern EOD Range, Southern EOD Range, Buffer Zone, and the Range Perimeter. For each of the areas, a surface survey was conducted, the area was geophysically surveyed, and then subsurface OE sampling was conducted. The evaluation report concluded that due to the potential for buried OE, elevated risk is present in the Northern EOD Range, with slightly elevated risk within the Southern EOD Range caused by potential for kick-outs. It was also determined that the site was adequately characterized and no additional OE evaluation is required.

During various investigations, perchlorate was identified at concentrations exceeding regulatory thresholds in groundwater beneath IRP Site 1. During the Perchlorate Verification Study in November 1999, perchlorate was detected in 3 of the 12 monitoring well samples (although only one exceeded the State and Federal Provisional Action Levels [PALs]). During January 2003, 16 piezometers were installed throughout IRP Site 1 and groundwater samples were collected from all the newly installed piezometers and 7 of the existing monitoring wells. Perchlorate was detected above the California Department of Health Services (DHS) action level of 4 µg/L in 11 out of the 16 piezometers and in 5 out of the 7 monitoring wells. Perchlorate was detected at a maximum concentration of 398 µg/L within the central portion of the site.

1.3 Scope of Work

The types of activities that will be occurring at IRP Site 1 include the following:

- OE scrap and non-OE scrap removal
- Aquifer testing
- Groundwater treatability study
- Groundwater treatment

The following tasks will be performed:

- Mobilization of personnel, equipment, and subcontractors for on-base activities
- OE scrap and non-OE scrap verification and off-site disposal
- Drilling and soil sampling
- Installation of groundwater monitoring and extraction wells
- Groundwater monitoring
- On-site bench-scale treatability studies
- Installation of temporary pilot-scale treatment systems (fencing, trenching, concrete pad)
- On-site treatment of contaminated water
- Demobilization.

These tasks are detailed in the hazard analyses presented in Appendix C.

1.4 Project Duration

The certification, demilitarization, and off-site disposal of recovered OE scrap and non-OE scrap will commence in mid-July 2004 and will take approximately 2-3 week. The aquifer testing,

groundwater treatability studies, and groundwater treatment activities will commence after the approval of the work plan (August 2004) and will take approximately 1 year or longer depending upon the number of groundwater treatment options evaluated.

2.0 Key Personnel and Management

Shaw Environmental, Inc. maintains a policy of providing its employees, subcontractors, and authorized visitors with information and procedures in order to protect them and the adjacent community from any adverse effects that could result from work at a job site involving potentially hazardous substances. All personnel involved with this project will follow the health and safety procedures set forth in this HSP. Visitors will not be given entry to the sites unless they read and agree to comply with this plan. The HSP Acknowledgment Form (Appendix B) will be signed by all who actively participate at the project sites.

2.1 Project Manager

The project manager, Mr. James Werkmeister, will communicate directly with the Navy Remedial Project Manager (RPM) and/or NTR and serve as the primary point of contact. The project manager's responsibilities include project scheduling, cost updating, overall project direction, and overseeing site safety. In addition, the project manager is responsible for determining the extent and level of input required for technical issues that arise throughout the project. The project manager's direct subordinate for site activities will be the site supervisor.

2.2 Program Health and Safety Manager

The HSM for the site is Mr. Fred Mlakar. Mr. Mlakar will be responsible for review and approval of the HSP and will supervise and direct the activities of the project SHSP. He has the authority to stop unsafe operations, remove unqualified personnel from the work area, and approve changes to the HSP.

The HSM is responsible for integrating all aspects of the HSP, from development through implementation. Duties of the HSM include assigning an SHSP to implement the HSP, advising the SHSP on all related health and safety issues, reviewing any site-specific plans for compliance and completeness, and establishing and monitoring all related health and safety procedures through site safety audits.

2.3 Site Health and Safety Specialist

The site SHSP is Mr. Doug Childers. The SHSP implements and enforces the project safety program and procedures at the project site is certified in first aid and cardiopulmonary resuscitation (CPR), and has many years of experience with hazardous waste and personal protective systems.

The SHSP will conduct the daily safety meetings and will interface as required with other site representatives. The SHSP performs duties such as confirming that personnel are fit for duty,

coordinating emergency medical care, conducting a daily site safety inspection, and inspecting health and safety equipment.

In addition, the SHSP is responsible for maintaining safety equipment, posting daily air monitoring results, providing site orientation safety training for all personnel actively involved in site work, and other site safety documentation. The SHSP is authorized to take the following actions as appropriate:

- Order the immediate shutdown of site activities in the case of a medical emergency or unsafe practice
- Ensure that protective clothing and equipment are properly stored, used, and maintained
- Ensure that the environmental and personnel monitoring operations are being conducted and in accordance with technical specifications and required procedures

Restrict visitors from areas of potential exposure to harmful substances.

A safety log will be kept for all Shaw Environmental, Inc. activities. This log will document daily safety meeting topics, training given, air monitoring information, first aid administered, visits of all outside personnel, and any incidents of a health and safety nature. The SHSP and/or site supervisor will investigate all accidents and prepare an accident investigation report that will be forwarded to the HSM and NTR. Project safety inspections will be conducted monthly by the site supervisor and project manager.

The SHSP is responsible for on-site implementation and enforcement of the site safety program and procedures. The SHSP will oversee any personnel monitoring and will decide when action levels have been reached that require more stringent personnel protection. The SHSP determines the protective equipment to be used for various site activities and enforces its use. The SHSP ensures that the protective equipment used for various site activities meets the requirements of the HSP. When conditions change, the SHSP coordinates with the HSM to modify the protection to ensure that employee protection is appropriate for the new conditions.

The following logs, reports, and records will be developed and maintained on site by the SHSP:

- Daily safety meetings
- Activity hazard analysis forms
- Training logs—site-specific and visitors
- Safety inspection logs
- Employee/visitor sign-in
- Ambient and personal air monitoring results

- Site HSP
- HSP Change Approval Form.

2.4 Site Supervisor/Technical Lead

The site supervisor/technical lead is Mr. Chris Johnson. The site supervisor/technical lead is responsible for all field activities and enforces safe work practices by all crew members. The site supervisor/technical lead watches for any effects on crew members, especially those symptoms possibly caused by heat stress or chemical exposure, and oversees the safety of any visitors who enter the site. The site supervisor/technical lead maintains communication with the project manager and NTR.

2.5 Field Staff

Field staff assigned to the project may include geologists, field chemists, field engineers, and sample technicians. These staff are responsible for the maintenance, inspection, and safe operation of their assigned equipment and instruments. The field staff will report any equipment malfunctions or necessary repairs to the site supervisor.

2.6 Employee Safety Responsibility

Although the employer is responsible for providing a safe and healthful work place, all employees are responsible for their own safety, as well as for the safety of those around them. All employees will use all equipment provided in a safe and responsible manner, as directed by the site supervisor. All personnel will follow the policies set forth in this HSP and in the *HS Policies and Procedures Manual*.

Each employee is responsible for reporting any injuries, incidents, and safety infractions to the site supervisor or the SHSP so that treatment can be obtained and/or corrective action taken, as appropriate.

3.0 Job Hazard Analysis

This section discusses chemical, physical, and environmental hazards to site workers. Table 1 lists each contaminant and includes information such as exposure limits and signs and symptoms of exposure. Section 3.2 discusses physical hazards, including those associated with equipment maintenance, use of heavy equipment, fire hazards, and electrical hazards. Section 3.3 discusses environmental hazards associated with the physical location of the sites and weather conditions, including hazards such as heat stress, noise, and flora and fauna contact. Section 3.4 discusses the risks and precautions associated with each task identified for this project. Section 3.5 describes the accident prevention plan.

Daily "tailgate" safety meetings will be held at the start and end of each shift. Prior to daily field activities, potential chemical, physical, and environmental hazards and preventative safety measures will be discussed. At the end of each day, lessons learned and feedback on safety issues will be discussed. Attendance is mandatory for all employees.

An activity hazard analysis has been developed for each planned activity and operation associated with each major phase of work. The hazard analyses identify the sequence of work, specific hazards, and the control measures to be implemented to minimize or eliminate each hazard. The analyses will be used to augment daily safety meetings intended to heighten safety and hazard awareness on the job. This pretask briefing will be documented and may be combined with the daily tailgate safety meeting.

3.1 Chemical Hazards

Based on the history of the site, suspected chemical contaminants are residual aluminum, barium, and lead particulates from OE detonations, mostly nonvolatile residues of diesel, gasoline and motor oil which were used to fuel burn pits, and combustion products such as poly aromatic hydrocarbons. Concentrations are unknown. Only the presence of perchlorate salts have been confirmed. Therefore, airborne dusts will be minimized by keeping soils wet, monitoring breathing zone air, and using personal protective equipment.

The hazards associated with these contaminants are presented on Table 1.

Hazard Communication Program — The purpose of a Hazard Communication or Employee Right-to-Know Program is to ensure that chemical hazards at each field project site are communicated to all project personnel and subcontractors, in accordance with 29 CFR 1926.59. A written hazard communication program has been established for Shaw Environmental, Inc. and includes the following:

- **Container Labeling** — Personnel will ensure that all drums and containers are labeled according to contents, including those from manufacturers and those generated on site. All incoming and outgoing labels will be checked for identity, hazard warning, and name and address of responsible party.
- **Material Safety Data Sheets (MSDS)** — An MSDS will be available on site for each hazardous chemical used or known to be on site. The MSDS will also be maintained with this HSP (Appendix D).
- **Employee Information and Training** — Training employees on chemical hazards is accomplished through formal safety training conducted annually and via informal safety meetings. Project-specific chemical hazards will be communicated to employees through an initial site orientation meeting and during daily safety meetings held at all field projects.

The written program is included in the *HS Policies and Procedures Manual*, which will be available on site for review by all employees. At a minimum, employees will be instructed on the following:

- Chemicals and hazards in the work area
- How to prevent exposure to hazardous chemicals
- What the company has done to prevent worker exposure to chemicals
- Procedures to follow if a worker is exposed to chemicals
- How to read and interpret labels and MSDSs for hazardous substances found on site
- Emergency spill procedures
- Proper storage and labeling procedures.

When any new hazardous material is introduced or discovered on site, employees will be given information about the material at the daily safety meeting. The site supervisor will be responsible for seeing that the MSDS for the new chemical or material is available on site.

3.2 Physical Hazards

Numerous physical hazards associated with this project could cause accidents and personal injury to the work force, as well as operational problems, if not identified and addressed. In order to minimize physical hazards, standard safety protocols will be followed at all times. Failure of an employee to follow safety protocols or continued neglect of these policies will result in disciplinary action.

All project personnel are familiar with the field activities that will be conducted at the site. They are trained to work safely under various field conditions. In addition, the site supervisor will observe the general work practices of each crew member and will enforce safe procedures to minimize physical hazards. In addition, hard hats, safety glasses, and safety boots will be required in all site areas. Hazards associated with munitions and explosives of concern (MEC) will be addressed in the Explosives Safety Submission (ESS).

3.2.1 Tripping, Slipping, and Falling Hazards

Personnel and subcontractors will be reminded daily to maintain sure footing on all surfaces. Safety harnesses will be required for any personnel working 6 feet above any surface, including man lifts. Use of handrails when climbing stairs will be enforced. Personnel will not work under any suspended loads or under any equipment such as buckets of loaders and excavators.

In order to minimize tripping hazards caused by debris, job supplies, and equipment, these materials will be removed daily from the work areas and stockpiled in the appropriate storage areas. This "housekeeping" effort will be enforced by the SHSP throughout the day.

3.2.2 Head and Back Injuries

At minimum, hard hats and safety glasses will be worn during the performance of all site activities. This will prevent minor injuries caused by bumping one's head while working around and under piping and other process-related structures. At the daily safety meeting, personnel will be instructed in proper lifting techniques and will be reminded not to lift heavy items without assistance.

3.2.3 Falling Objects

This project can be accomplished without any object, regardless of size, free falling to the ground. All items raised will be lowered slowly to the ground using a grapple, skip bucket, or other similar piece of equipment. No personnel will work under this equipment at any time. In addition, the SHSP will ensure that an adequate area is clear of personnel while the equipment is in operation.

3.2.4 Heavy Equipment and Traffic

The use of heavy equipment (in this case, drilling equipment) during the field activities presents the greatest potential for injury to personnel. To minimize these hazards, designated routes will be established for mobilization through the facility, and specific traffic patterns will be established. All trucks and heavy equipment will be observed by spotters during backing maneuvers.

Only qualified personnel will operate the equipment. Those crew members directly involved with "spotting" will be the only personnel allowed in the vicinity of the equipment. All others will remain a safe distance from these operations.

Personnel who need to approach operating equipment will observe the following protocols:

- Make eye contact with the operator (and spotter)
- Signal the operator to stop heavy equipment activity
- Approach the equipment and inform the operator of intentions.

All traffic rules will be followed. Company vehicles will yield to bikes and pedestrians. Work will proceed in a manner that poses the least interference with other base activities.

3.2.4.1 Site Preinspection of Equipment

All subcontractor equipment used on the project must be in safe working order. To maintain this policy, all equipment brought onto the project site will be inspected for structural integrity, smooth operational performance, and proper functioning of all critical safety devices in accordance with the manufacturer's specifications. This inspection will be performed by the site supervisor, the SHSP, and the operator.

Any equipment not conforming to the operational and safety requirements, as determined by the inspection, will not be put into service until all necessary repairs are made and meet the satisfaction of the inspectors.

3.2.4.2 Operator Qualifications

Only qualified operators familiar with the equipment to be used will be permitted to operate heavy equipment. Subcontractors will supply proof of their operator's capability and experience to operate the equipment in a safe manner. Shaw Environmental, Inc. reserves the right to remove from the project site any operator if there is any question or doubt concerning that operator's capabilities.

3.2.5 Electrical Hazards

In order to prevent accidents caused by electric shock, the project SHSP will inspect all portable electrical equipment on a monthly basis. The SHSP will shut down and lock out any equipment that is found to have frayed or loose connections until a qualified electrician can be contacted. The equipment will be de-energized and tested before any electrical work is done. All equipment will be properly grounded prior to and during all work. In addition, a ground fault circuit interrupter (GFCI) will be installed between the power source and tool for each outdoor circuit. If generators are used to supply power, they will contain GFCIs.

General electrical safety requirements include:

- All electrical wiring and equipment must be a type listed by Underwriter Laboratories (UL), Factory Mutual Engineering Corporation (FM), or other recognized testing or listing agency.
- All installations must comply with the National Electrical Safety Code (NESC), the National Electrical Code (NEC), or USCG regulations.
- Portable and semiportable tools and equipment must be grounded by a multiconductor cord having an identified grounding conductor and a multicontact polarized plug-in receptacle.
- Tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Double insulated tools must be distinctly marked and listed by UL or FM.
- Live parts of wiring or equipment must be guarded to prevent persons or objects from touching them.
- Electric wire or flexible cord passing through work areas must be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, projections, or pinching.
- All circuits must be protected from overload.
- Temporary power lines, switch boxes, receptacle boxes, metal cabinets, and enclosures around equipment must be marked to indicate the maximum operating voltage.
- Plugs and receptacles must be kept out of water unless of an approved submersible construction.
- All extension outlets must be equipped with GFCIs.
- Attachment plugs or other connectors must be equipped with a cord grip and be constructed to endure rough treatment.
- Extension cords or cables must not be fastened with staples, hung from nails, or suspended by bare wire.
- Flexible cords must be used only in continuous lengths without splice, with the exception of molded or vulcanized splices made by a qualified electrician.

3.2.6 Confined-Space Entry

A confined space is any enclosed area that has a limited means of egress and ventilation that is not adequate to remove a potentially toxic or flammable atmosphere or oxygen (O₂) deficiency. Examples of confined spaces include, but are not limited to, the following: tanks; boilers;

vessels; bins; manholes; tunnels; pipelines; underground utilities vaults; or any open-top space more than 4 feet in depth, such as pits, tubes, trenches, or vessels.

In the unlikely event that confined space entry becomes necessary, Procedure HS300 will be followed. No confined space entry is planned for this project.

3.2.7 Fire and Explosion Hazards

Atmospheric testing with a combustible gas indicator must be performed to determine the potential for a flammable atmosphere. A "hot work permit" must be issued to control the presence of equipment or operations producing open flames or sparks. Hot work permits and procedures are presented in Procedure HS314 - Hot Work in Hazardous Locations. A hot work permit must also be obtained from the base fire department. No hot work is planned for this project.

3.2.8 Overhead Electrical Hazards

Overhead power lines could present a hazard to equipment and personnel. Adequate clearance must be maintained to prevent equipment contact with power lines and to prevent arcing.

For lines rated 50 kilovolts (kV) or less, the minimum clearance between the lines and any part of the crane or load shall be 10 feet. For lines rated over 50 kV, the minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1 kV over 50 kV. Use of a crane or manlift is not planned for this project.

3.2.9 Excavation

Any excavation that is 4 feet or more in depth will be performed in accordance with EM 385-1-1 and HS Procedure HS307 - Excavation and Trenching. An excavation permit must be completed by a competent person before excavation commences. A competent person is a person who has been trained on soil classification procedures and the requirements for excavation in accordance with applicable regulations such as 29 CFR 1926, Subpart P, and 8 CCR 1540 and 1541. This permit will require daily inspection of the operation and adjacent areas. Specific situations addressed during these inspections will include possible cave-ins, indications of failure of protective systems (e.g., benching, sloping, or shoring), hazardous atmosphere, and other hazardous conditions. If the competent person finds evidence of any of these situations, exposed employees will be removed from the hazardous area until the necessary precautions have been taken to ensure their safety. In addition to the excavation permit, an Activity Notification Form for Holders of Annual Excavation Permits must be filed with the Cal/OSHA for any excavation 5 feet or greater in depth. Shaw Environmental, Inc. has an annual permit for excavations in the State of California. In addition, Underground Services Alert (Dig-Alert) must be notified before any excavation work begins, regardless of depth. No excavations are planned for this project.

3.2.10 Lockout/Tagout Procedures

Maintenance procedures will be performed only by fully qualified and trained individuals. Before maintenance begins, lockout/tagout procedures per Shaw Environmental, Inc. Procedure HS315 will be followed.

Lockout is the placement of a device that uses a positive means such as a lock to hold an energy or material isolating device or system ensuring that the equipment cannot be operated until the lockout device is removed. If a device cannot be locked out, a tagout system will be used. Tagout is the placement of a warning tag on energy or material isolating device indicating that the equipment controlled may not be operated until the tag is removed.

3.3 Environmental Hazards

Environmental hazards associated with the site will be discussed at the orientation meeting prior to start-up of field activities. Personnel will be apprised of symptoms of exposure to certain biological hazards and heat stress.

3.3.1 Weather and Heat Stress

With the possible combination of ambient factors such as high air temperature, high relative humidity, low air movement, high radiant heat, and protective clothing, the potential for heat stress is a concern. The potential exists for the following:

- Heat rash
- Heat cramps
- Heat exhaustion
- Heat stroke.

The initiation of heat stress monitoring will be required when employees are working in environments exceeding 90EF ambient air temperature. If employees are wearing impermeable clothing, this monitoring will begin at 78EF. There are two general types of monitoring that the health and safety representative can designate to be used: wet bulb globe temperature (WBGT) and physiological.

Wet Bulb Globe Temperature

- The WBGT index is the simplest and most suitable technique to measure the environmental factors which most nearly correlate with core body temperature and other physiological responses to heat. When WBGT exceeds 25.9EC (78EF), the work regimen in Table 1 and Figure 1 of the section "Heat Stress" in the latest edition of the American Conference of Governmental Industrial Hygiene (ACGIH) Threshold Limit Value Booklet should be followed.

Physiological

- Physiological monitoring can be used in lieu of or in addition to WBGT. It is anticipated that this monitoring can be self-performed once the health and safety representative demonstrates appropriate techniques to affected employees. Since individuals vary in their susceptibility to heat, this type of monitoring has its advantages. The two parameters that are to be monitored at the beginning of each rest period are:
 - Heart Rate – Each individual will count his/her radial (wrist) pulse as early as possible during each rest period. If the heart rate of any individual exceeds 75 percent of their calculated maximum heart rate ($MHR = 200 - \text{age}$) at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same. An individual is not permitted to return to work until his/her sustained heart rate is below 75 percent of their calculated maximum heart rate.
 - Temperature – Each individual will measure his/her oral temperature with a disposable thermometer for 1 minute as early as possible in the first rest period. If the temperature exceeds 99.6EF at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same.
- An individual is not permitted to return to work if his/her temperature exceeds 100.4EF.

Heat stroke, heat cramps, and heat exhaustion are addressed in detail during the 40-hour OSHA 29 CFR 1910.120 training course. In addition, this information will be discussed during the “tailgate” safety meeting at the start of each workday. Workers will be encouraged to increase consumption of water and electrolyte-containing beverages such as Gatorade™ during warm weather. Water and electrolyte-containing beverages will be provided on site and will be available for consumption during work breaks.

Shaw Environmental, Inc. personnel are experienced hazardous material workers and, through extensive field experience, have become acclimated to heat and protective equipment requirements, as well as adept at recognizing when heat stress presents a health concern. In addition, they have been trained to recognize the symptoms of heat stress. Even with this experience, heat stress, its symptoms, and the factors that affect a person’s ability to handle heat will be addressed during daily safety meetings. Procedure HS400 - Working in Hot Environments discusses the symptoms and causes of heat stress, as well as prevention and treatment, in further detail.

3.3.2 Cold Stress

Exposure to cold weather could occur during work conducted in the late fall. Symptoms of cold stress range from shivering to tissue damage to death. However, cold stress can be controlled. Controls include the following:

- Employee education on cold stress symptoms and controls
- Acclimatization
- Proper use of clothing
- Work-rest regimens.

Procedure HS401 – Cold Stress will be followed whenever there is a danger of cold stress. The site supervisor or SHSP will identify conditions that pose a cold stress danger based on the criteria presented in Table 2. This table is excerpted from the 1995 to 1996 threshold limit values established by the ACGIH and identifies conditions that result in various levels of cold stress danger.

Personnel working under conditions resulting in temperatures listed in Table 2 must be properly attired for cold weather. Clothing worn loosely and in layers provides maximum protection. In addition, clothing must be kept dry. Moisture in contact with the skin increases the effects of cold weather. Wet clothes must be exchanged for dry, and perspiration must be allowed to evaporate by opening neck, waist, wrist, and ankle fasteners.

3.3.3 Hearing Conservation Program

On projects where noise levels could exceed a time-weighted average of 85 decibels, A-scale (dBA), hearing protection will be made available to all exposed employees. In addition, sound level monitoring may be conducted on site. All personnel receive annual audiograms and are restricted from high noise exposure as warranted. Shaw Environmental, Inc.'s hearing conservation program complies with OSHA regulations set forth in 29 CFR 1910.95.

3.3.4 Biological Hazards

The following biological hazards could be encountered on site, although such encounters are not expected to pose a significant risk to site personnel:

- Animal Bites and Insect Stings – Animal bites and insect stings can cause localized swelling, itching, and minor pain that can be handled by first-aid treatment. However, in sensitized individuals, effects can be more serious, such as anaphylactic shock, which can lead to severe reactions in the circulatory, respiratory, and central nervous systems and, in some cases, even death. The SHSP will identify personnel with a known reaction to bites and stings at the safety orientation meeting. Attempts should not be made to capture any wild or semi wild animals such as cats or rats due to the possibility of a bite or parasitic infestation.

- **Poison Oak** – Poison oak causes discomfort, irritation, and inflammation of the skin. Personnel will be warned to prevent contact with unknown plants. Protective clothing worn by site personnel should reduce the potential for such exposure. Cleaning the skin thoroughly with soap and water after contact will also reduce risk of severe symptoms.
- **Animal and Bird Droppings** – Animal and bird droppings often contain mold, fungus, or bacteria that represent a significant respiratory hazard and can result in lung diseases and allergies. Personnel will be instructed not to touch visible droppings and to wear gloves and Tyvek™ suits, at minimum, when entering normally limited access areas, such as crawl spaces and high ceilings, that could be used as refuges or nesting areas.
- **Hanta Virus** – The Hanta virus is sometimes transmitted by deer mice found in the southwestern United States and causes respiratory distress, sometimes with fatal consequences. Transmission of the Hanta virus occurs via exposure to mouse droppings. For example, exposure to the Hanta virus is minimized by avoiding areas containing concentrations of mouse droppings. The virus can be inhaled in dust from areas where mice have nested or left droppings. Minimizing dust inhalation or avoiding these areas will lessen the risk of exposure. All work in such areas should be performed wearing full Level C protection, including, at a minimum, a high-efficiency particulate air (HEPA) air-purifying respirator. Good hygiene practices such as washing hands and face prior to eating and drinking will help minimize the potential for exposure to the Hanta virus.
 - Thorough washing of hands and face after removing personal protective equipment (PPE) will further minimize the potential for exposure.
- **Snakes** – Personnel must use extreme caution when walking through the site area and around the buildings. If a snake is encountered, slowly and quietly back away from it and inform all personnel of its location. Do not attempt to move or kill a snake because certain snakes are protected under State and Federal laws. In the event of a snakebite, do not try to move the affected individual. Wipe the skin because the venom will attack intact skin. Do not suck out the venom. Do not cut open the wound. Do not apply ice or ice packs. Do not use a tourniquet. Do not administer alcohol or medications. Call for medical assistance.

3.4 Task-Specific Hazard Analyses

Task-specific hazard analyses for this project are presented in Appendix C.

The hazard analyses are based on the best available information and are intended as a starting point for these tasks. Analyses will be revised as needed, depending on work requirements and conditions encountered. Any changes to the hazard analyses will be completed, approved, and documented on an HSP Change Approval Form (Appendix A).

Detailed descriptions of PPE required for each task and an overview of the air monitoring program and rationale are presented in Sections 5 and 7, respectively.

3.5 Accident Prevention

The primary goal of this HSP is accident prevention. This section outlines the accident prevention plan for this project.

3.5.1 Administrative Responsibilities

The project manager is ultimately responsible for the health and safety of site personnel. The project manager will provide the materials or equipment necessary to enhance and maintain safe site and work conditions.

The site supervisor has the responsibility and the authority to control day-to-day activities in the field. The site supervisor reports to the project manager. The site supervisor will observe employees for signs of heat stress, excessive fatigue, and obvious outward signs of chemical exposure. In addition, the site supervisor will ensure that equipment brought to the site is in proper working condition, inspected regularly, and operated in a safe manner. The site supervisor will use the project safety inspection forms to document site safety measures.

The SHSP reports to the HSM and is responsible for identifying unsafe conditions that could pose a hazard to personnel or the public. The SHSP will conduct regular safety inspections. Accident investigation will be performed by the SHSP, the site supervisor, or both.

3.5.2 Site-Specific Training

All field employees will have received at least 40 hours of OSHA HAZWOPER training and will be current with respect to required annual 8-hour refresher courses. All supervisors will have completed an additional 8-hour hazardous waste supervisors course. Prior to working on site, all site personnel will undergo a health and safety orientation during which the HSP and site conditions will be discussed. Prior to each shift, a daily safety meeting will be held to discuss health and safety issues from the previous day and for the current day. A safety meeting will also be held at the end of each shift, in accordance with DON requirements.

3.5.3 Subcontractors

All subcontractors are subject to the same training requirements as other field personnel. Subcontractors will be required to sign in daily and attend a daily meeting discussing operations and safety issues. Subcontractors report to the site supervisor.

3.5.4 Local Requirements

The project work will comply with any applicable local requirements such as noise control and traffic rules. Traffic control will be developed as needed and as described in the project-specific work plan.

3.5.5 Layout of Job Site

Upon arrival, the job site will be laid out as specified by the NTR. Subcontractors will be subject to the same controls as Shaw personnel. Work and support areas are described in Section 4.

3.5.6 Temporary Site Amenities

Temporary structures will be anchored to withstand winds and meet applicable State or local standards for anchoring mobile homes, as specified in EM 385-1-1 (04.A.03). Portable toilets complying with Cal/OSHA and EM 385-1-1 requirements will be made available. Potable water will be made available for hand washing.

3.5.7 Housekeeping

The project site will be kept in a neat and orderly fashion to prevent common injuries due to slips, trips, and falls and to maintain a professional work site. Personnel will not leave work areas in a disorderly condition. Accumulated trash will be removed at least weekly to minimize hazards caused by insects, bacteria, and decomposition. The site supervisor will be responsible for maintaining job cleanup standards and safe access and egress routes.

3.5.8 Emergency and Contingency Plan

Fire extinguishers (ABC type) in ready condition and with a current inspection record will be placed in every work area on the job site. The emergency contingency plan is presented in Section 8. A minimum 20-pound dry chemical fire extinguisher will be located at the entrance to the contamination reduction corridor (CRC) in the contamination reduction zone (CRZ) of each area. Each piece of heavy equipment will be equipped with a dry chemical fire extinguisher (either 2½- or 5-pound) mounted in easy reach.

3.5.9 Safety Inspections

The SHSP, site supervisor, and/or designee will perform regular safety inspections at least monthly. A report documenting results of the inspection and any corrective actions taken will be filed in the project files, and copies will be submitted to both the NTR and the HSM.

3.5.10 Accident Investigation

All injuries or occupational illnesses must be investigated and an Accident/Injury Report Form must be completed.

In the case of an injury that requires medical treatment, the following steps will be taken:

- Medical treatment will be obtained for employee as described in Section 8 and the HSM will be notified.
- The SHSP and site supervisor will investigate the incident and complete an Accident/Injury Report Form. This form will be faxed to the regional Health and Safety Department within 24 hours of incident occurrence.
- The regional Health and Safety Department will complete the Employer's Report of Injury and send it to the worker's compensation insurance company within 48 hours of an injury or within 24 hours of a lost-time injury or death. A claim for worker's compensation benefits will also be submitted.
- The NTR will be notified within 24 hours of the injury.
- A report will be obtained from the physician clearing the employee to resume regular duties, describing modified work acceptable, or removing the employee from work duty.

In the case of a fatal injury or where three or more persons are admitted to the hospital for an overnight stay, Cal/OSHA and other appropriate agencies will be notified within 8 hours and an in-depth accident investigation will be conducted in addition to the steps identified above.

3.5.11 Postaccident Testing

Alcohol and drug testing is required of employees immediately after accidents, as detailed in Procedure HS101 - Drug and Alcohol Testing. Reportable accidents that require testing include the following:

- Death of any person
- Bodily harm to any person resulting in one or more of the following:
 - Loss of consciousness
 - Necessity to carry the person from the scene
 - Necessity for medical treatment (beyond first aid or visit to emergency room)
 - Disability that prevents the discharge of normal duties or the pursuit of normal activities beyond the day of the accident.
- Explosion or fire not intentionally set.
- Estimated property damage to the property of the company, property of others, or both, exceeding \$500.

- Any event that is significantly serious in the judgment of the company to require testing.

4.0 Work and Support Areas

At each work location, a work zone will be established to limit access to the work area and to prevent the spread of contamination to the support areas. Work areas or zones will be designated as suggested by the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (NIOSH/OSHA/USCG/EPA, 1985). The work zones to be established for each site are described in detail in the following sections.

Upon entrance to each site, personnel will control access to site control work zones. Each work area will be divided into at least two zones: an exclusion or "hot" zone and a support zone. An intermediate contaminant reduction zone will be added if a modified Level D or higher level of protection becomes necessary. The expected work zone layout is presented in Figure 2.

4.1 Exclusion Zone

The exclusion zone (EZ) will consist of areas where inhalation, oral contact, or dermal contact with contaminants or where potential contact with UXO could occur. The zone, where possible, will extend 200 feet from the area in all directions. The exclusion zone perimeter can be indicated with barricade tape, usually red, or the entire area can be fenced to restrict entry to those individuals with the proper training, medical certification, and PPE.

4.2 Contamination Reduction Zone

If a modified Level D or higher level of protection becomes necessary, a CRZ or transition zone will be established between the exclusion zone and the support zone. In this area, personnel will begin the sequential decontamination process required to exit the exclusion zone. To prevent off-site migration of contamination and for personnel accountability, all personnel will enter and exit the exclusion zone through a corridor in the CRZ. The corridor is called the CRC. These zones are delineated with yellow barricade tape.

Both personnel and equipment decontamination will be performed in the CRC. Personnel decontamination will require removal of PPE and hand washing. Tools and materials used in this area will be moved to a decontamination station. If tools and materials are disposable, they will be placed in a container in the CRC.

4.3 Support Zone

The support zone will consist of the area outside of the EZ and CRZ where support equipment and sanitation facilities (i.e., toilets and drinking and washing water) are staged. Smoking, drinking, and eating will be allowed only in the support zone. An emergency eyewash station will be located in this area.

4.4 Access Controls

The SHSP and the site supervisor will establish the physical boundaries of each zone and will instruct all workers and visitors on the limits of the restricted areas. No one will be allowed to enter the restricted area without the required protective equipment for that area. The site supervisor will ensure compliance with all restricted area entry and exit procedures.

The site supervisor will also designate a decontamination point for personnel to exit from the contaminated area and enter into the clean area, where they can rest and drink.

4.5 Visitor Access

Visitors must check in immediately upon arrival at the site office. Only authorized visitors will be allowed access to contaminated areas. All visitors and subcontractors with access to contaminated areas must submit proof of 40-hour OSHA HAZWOPER training and current medical certification. Each visitor will be required to provide and wear the necessary protective equipment for use during the visits and will be escorted by project personnel. All visitors, subcontractors, and personnel will be required to sign an HSP Acknowledgment Form to certify that they have read, understand, and will comply with the HSP.

Failure to comply with this site entry procedure will result in denied entry to the exclusion zone or CRZ of the site. A visitor's log will be kept by the site supervisor or designee.

4.6 Buddy System

A buddy system will be implemented whenever conditions represent a physical or chemical risk to personnel. A buddy system requires that two or three people work as a team, each looking out for the other. Buddies must always be in one another's line of sight and should maintain verbal or visual communication.

5.0 Protective Equipment

This section describes the PPE and respiratory protection required for each type of task for this project. All personnel must wear appropriate protective equipment when activities involve exposure to hazards that cannot be adequately or feasibly controlled by engineering or administrative controls. Respiratory, skin, hand, and foot protection will be required when activities are known or suspected to result in chemical hazards, such as atmospheric contamination in excess of action levels due to dusts, mists, fumes, vapors, or gases. The following list briefly describes the EPA level categories:

- *Level A* — Used when the greatest level of skin, eye, and respiratory protection is needed and consists of a totally encapsulated suit with supplied breathing air.
- *Level B* — Used when the highest level of respiratory protection is needed but a lesser level (than Level A encapsulated suit) of skin protection is required.
- *Level C* — Used when criteria for using air-purifying respirators are met and a lesser level of skin protection is required.
- *Modified D* — Used in areas without respiratory hazards but skin protection from chemical contact is required.
- *Level D* — Used only as a work uniform and in areas without respiratory hazards.

UXO personnel performing work at this site will follow the SHSP and the ESS (Shaw 2004) approved for work under this task order. Exceptions to the SHSP are as follows for the UXO personnel:

- Hard hats may create an unsafe condition by falling off of the head of a UXO technician at a critical moment. During scrap segregation, decontamination, and demilitarization activities, UXO technicians will not wear hard hats.

5.1 Reassessment of Personal Protection Equipment

The level of protection listed in this section will be upgraded or downgraded based on action levels from direct-reading instruments, changes in site conditions, or findings from investigations. Changes in protection levels will require the completion of an HSP Change Approval Form (Appendix A), which must be approved and signed by the following site personnel:

- SHSP
- HSM
- Project manager or site supervisor.

If the level of protection is to be downgraded, personnel will continue to work in the original level of protection until the SHSP and the project manager or site supervisor have discussed air monitoring results and the rationale for the downgrade. After an agreement has been reached and the change has been recorded on the HSP Change Approval Form, PPE can be modified with approval from the HSM. The level of protection for any task can be upgraded at any time and documented. Table 3 defines the required PPE for each work zone.

5.2 Air-Purifying Respirators

If required, the air-purifying respirators for this project will be the full-face air purifying respirators for which the wearer has been fit-tested.

5.3 Respirator Cartridges

Crew members working in Level "C" will wear respirators equipped with air-purifying cartridges that are NIOSH-approved for protection against organic vapors. A particulate prefilter will also be used.

5.4 Cartridge Changes

If respirator use becomes necessary, a respirator cartridge change out schedule will be determined based on air monitoring data, the chemicals of concern, and the cartridge service life program supplied by the cartridge manufacturer.

5.5 Inspection and Cleaning

Respirators will be checked periodically by the SHSP or the HSM and inspected by the wearer before each use. All respirators and associated equipment will be decontaminated and hygienically cleaned after use.

5.6 Respiratory Protection Program

The respiratory protection program is described in detail in Procedure HS601 – Respiratory Protection Plan.

6.0 Decontamination Procedures

This section describes the procedures used to ensure that both personnel and equipment are free from contamination when leaving the work site. Step-by-step descriptions of decontamination procedures for EPA Levels D and C are provided.

UXO personnel performing work at this site during scrap segregation, decontamination, and demilitarization activities will not be wearing hard hats (Section 5), therefore, no decontamination of hard hats is necessary during these activities. Air monitoring instruments can be wrapped while being used in the exclusion zone to avoid contamination in very messy conditions. When conditions are relatively clean, instruments can be wiped down with a damp cloth in the transition zone.

6.1 Personnel Decontamination

Personnel will be decontaminated to ensure that any material they came into contact with in the hot zone is removed in the CRZ. Decontamination of personnel exiting the exclusion zone will include the following steps, as appropriate to the specific work area:

- Level "D"
 - Step 1 – Brush off boots.
 - Step 2 – Remove outer gloves and suit (if used).
 - Step 3 – Remove hardhat and wipe clean (non-UXO activities).
- Modified Level "D"
 - Step 1 – Remove and discard boot covers into a lined 55-gallon drum.
 - Step 2 – Scrub and remove outer gloves (if used).
 - Step 3 – Remove hardhat and wipe clean (non-UXO activities).
 - Step 4 – Remove and discard outer suit into a lined 55-gallon drum.
 - Step 5 – Remove and discard inner booties into a lined 55-gallon drum.
 - Step 6 – Discard inner gloves into a 55-gallon drum.
 - Step 7 – Depart transition zone in work clothes and boots.
 - Step 8 – Wash hands, face, and neck before breaks and lunch.
 - Step 9 – At the end of the day, check that all disposable PPE has been discarded in lined 55-gallon drums.

- Level "C"
 - **Step 1** – Scrub outer boots with water. Remove and stack boots for drying.
 - **Step 2** – Scrub and remove outer gloves (if used).
 - **Step 3** – Remove hardhat and wipe clean (non-UXO activities).
 - **Step 4** – Remove and discard outer suit into a lined 55-gallon drum.
 - **Step 5** – Remove and discard inner booties into a lined 55-gallon drum.
 - **Step 6** – Remove respirators (if used) and suitably store while on breaks and during lunch. At the end of the shift, discard the cartridges and then clean, disinfect, rinse, and air-dry the respirator.
 - **Step 7** – Discard inner gloves into a 55-gallon drum.
 - **Step 8** – Depart transition zone in work clothes and boots.
 - **Step 9** – Wash hands, face, and neck before breaks and lunch.
 - **Step 10** – At the end of the day, check that all disposable PPE has been discarded in lined 55-gallon drums.

6.2 Suspected Contamination

Any employee suspected of sustaining skin contact with chemical materials will wash the affected area with soap and water. The worker will proceed to the decontamination area, where exposed skin will be washed further. Here, the worker will remove clothing, wash again, don clean clothing, and be taken to the medical facility as necessary. For this project, contaminants should require only washing of the affected areas.

6.3 Personal Hygiene

Before any eating, smoking, or drinking, personnel will wash their hands, arms, neck, and face. Washing facilities with soap will be available in the support zone.

6.4 Equipment Decontamination

All equipment that has come into contact with contaminated soil will be water washed or pressure washed in a designated decontamination area prior to being removed from the site and the defined exclusion zone. Only the parts of the equipment that come in contact with contaminated soil will be decontaminated in a designated area. The area will usually consist of a "pad" or covered bermed area where water and other cleaning agents (usually trisodium phosphate or detergent) are collected after being used to clean the equipment. Tools and other small equipment will be water washed prior to being removed from the exclusion zone. (A detergent or other cleaning agent can be used to aid in the decontamination process.) The

cleaning liquids will be collected into drums or a tank. Decontamination will be conducted in the CRC of the CRZ that bridges the exclusion zone with the support zone.

6.5 Waste Handling

All liquids and disposable clothing will be treated as contaminated waste and will be disposed of properly. Contaminated clothing will be placed in a drum lined with a polyethylene bag. All waste containers will be properly labeled and stored in accordance with regulatory requirements and the base requirements. Contents of the containers will be submitted to a laboratory to determine regulatory-permitted disposal methods. Decontamination water will be contained and captured using submersible pumps and/or vacuum units. Shaw will arrange for the proper disposal of all decontamination fluids, contaminated debris and PPE, and water and soil in accordance with contract requirements. The base NTR will arrange for the signing of the appropriate waste manifests. In no case will any collection containers be allowed to remain on site for 90 days or more from the date that waste was placed into the containers (accumulation start date).

7.0 Air Monitoring

Ambient air monitoring will be conducted as necessary to determine airborne contamination levels. This will ensure that respiratory protection is adequate to protect personnel against chemicals encountered, as well as to verify that harmful levels of airborne contaminants do not leave the site. Personal sampling is not planned because of the low levels of contaminants and the type of contaminants at the sites.

7.1 Direct-Reading Instruments

Direct-reading instrumentation provides immediate values for specified contaminants. These techniques are useful as screening methods for evaluating the proper level of personal protection and for determining appropriate response actions in emergency situations. Direct-reading instruments and action levels to be used on this project are described in the following sections.

7.1.1 Photoionization Detector

A photoionization detector (PID) will be used to screen for the presence and concentration of organic vapors.

- Instrument – PID 10.2-electronvolt (eV) probe
- Action Level – 150 parts per million (ppm) in breathing zone, sustained for more than 5 minutes
- Action – Upgrade to Level C respiratory protection, contact HSM.

7.1.2 Explosimeter (Lower Explosive Limit/Oxygen)

A Gastech Model 1314 or Mine Safety Appliance Company (MSA) Model 260 explosimeter or equivalent will be used to screen for the presence of flammable vapors and O₂-deficient and O₂-enriched atmospheres. If flammable vapors are equal to or greater than 10 percent of the lower explosive limit (LEL), work will stop and the area will be allowed to ventilate. If O₂ levels are below 20.8 percent or above 22 percent, personnel will leave the area and the area will be ventilated.

- Instrument - Gastech Model 1314 or MSA Model 260
- Action Level – 10% (LEL <20.8% O₂ or >22% O₂)
- Action - Stop work, allow area to ventilate.

7.1.3 Mini Ram Dust Monitor

A direct-reading personal dust monitor will be used to monitor airborne particulate levels in workers' breathing zones.

- Instrument – Mini Ram personal dust monitor
- Action level 0.5 milligram per cubic meter (worker breathing zone) sustained for more than 5 minutes
- Action – increase dust suppression or upgrade to Level C respiratory protection; contact HSM.

7.2 Monitoring Strategy

Background levels will be measured with the PID before any work begins. Monitoring of groundwater sampling activities using the PID and dust monitor will begin by taking background readings at least once each hour during field activities or whenever odors are detected. The SHSP, in consultation with the HSM and with the concurrence of the NTR, will determine whether further actions and/or measurements are warranted to prevent or minimize potential exposure of project and base personnel.

7.3 Quality Assurance/Quality Control

Adherence to an appropriate quality assurance/quality control (QA/QC) plan is essential for a meaningful air sampling effort. The major concerns of a QA/QC plan are calibration of equipment and document control.

7.3.1 Calibration and Maintenance Procedures

All direct-reading instruments will be calibrated daily or before each use and records will be maintained detailing date, time, span gas or other standard, and the name of the person performing the calibration. The calibration gas for the PID is usually isobutylene. The calibration gas for the LEL is usually a methane/air or a hexane/air mixture. O₂ is calibrated against normal air in a clean environment. A low-O₂ calibration gas can be used for calibrating the response of the O₂ sensor. Often, 100 percent nitrogen is used to “zero” the O₂ sensor. For purposes of this plan, calibration of the explosimeter means a daily field check with known calibration gases. The reading on the instrument must be within 3 percent of the stated value of the gas. If it is not, formal calibration of the instrument must be performed in accordance with the manufacturer's calibration procedure. The dust monitor is calibrated by the manufacturer.

7.3.2 Documentation

Strict adherence to document and data control procedures is essential for good QA/QC. Data and calibration records must be accounted for and be retrievable at all times. The following types of documents are essential:

- Notes
- Maps
- Logbooks
- Data sheets
- Reports

8.0 Emergency Response

Before the start of field activities, the site supervisor will plan emergency exit routes and discuss them with all field personnel. Initial planning includes establishing emergency warning signals and evacuation routes in case of an emergency. The initial evacuation assembly areas are shown in Figure 2. If the SHSP should designate an alternate assembly area or evacuation route, then the SHSP, who will fax the locations to the HSM at the start of the project. These areas typically will be located upwind of project areas. As work progresses, the SHSP could alter the assembly areas depending on site and weather conditions. The SHSP will fax the location of any new assembly areas to the HSM. The site-specific emergency contingency plan will be discussed in detail at the site safety orientation meeting.

8.1 Emergency Services

Upon arrival at the site, the site supervisor will ensure that all personnel know the system for communication of emergency situations. This section provides clear and concise directions for local emergency services. A telephone or a cellular phone (if phone lines are not installed) will be used to summon emergency assistance. All personnel will know the location of the nearest land phone if a cellular phone is used. All personnel on this project will know how to use a portable fire extinguisher.

The following emergency equipment will be present on the site:

- Fire extinguisher (20-pound ABC dry chemical in CRZ and support trailer; 2½-pound dry chemical on each piece of heavy equipment)
- Industrial first-aid kit (located in the support trailer)
- Portable eyewashes, capable of supplying 15 minutes of water (in CRC)
- Self-contained breathing apparatus with at least one spare full air cylinder
- Air horn (in CRZ).

A spill station will be set up and will include all necessary and applicable spill containment materials and appropriate PPE for each task.

8.2 Site Communications

Successful communication between field teams and personnel in the various zones is essential. The following communication systems will be available during site activities:

- Check-ins to Building 795 and/or the Shaw Environmental, Inc. support trailer (if applicable) located on site
- Compressed air horn (signals emergency evacuation only)
- Hand signals, as agreed upon prior to the start of work activities; additional signals will be as specified in ANSI/American Society of Mechanical Engineers B30.5
- Telephones - at least one telephone or cellular phone in the support trailer.

All site personnel will become familiar with both task-specific and site wide standard and emergency communication signals at the orientation/training session held before the start of site work.

8.3 Medical Emergency Procedures

The procedures listed in the following sections outline the steps to be taken in case of accident.

8.3.1 Minor Injury

In the event of a minor injury, the following steps will be taken:

- Have qualified first-aid personnel treat injury.
- Contact task foreman or "buddy."
- Complete required incident report forms and notify the HSM.
- Record injury and include name of injured person, nature of injury, and treatment given.

8.3.2 Serious Injury

In the event of a medical emergency when actual or suspected serious injury occurs, the following steps will be taken:

- Survey scene and evaluate whether the area is safe for entry.
- Remove the exposed or injured person(s) from immediate danger.
- Render first aid if necessary. Decontaminate affected personnel after critical first aid is given.
- Obtain paramedic services or ambulance transport to local hospital. This procedure is to be followed even if there is no visible injury:
 - Call 911

- Identify location, request medical assistance, and provide name and telephone number.
- Request assistance from emergency medical service and/or additional assistance.
- Evacuate other personnel in the work area to a safe distance until the site supervisor determines whether it is safe for work to resume. If there is any doubt about the condition of the area, work will not begin until all hazard control issues are resolved.
- Complete required incident report forms and notify the HSM.
- Notify the NTR of the incident and complete accident reporting forms and associated documents.

8.3.3 Fatal Injury

If a fatal injury occurs, the following additional steps will be followed:

- Notify the immediate supervisor.
- Notify the HSM. Regional or Corporate Health and Safety personnel will initiate contact with Cal/OSHA and other appropriate agencies.
- Immediately notify the NTR.
- Stop all work activities on the project for 24 hours.
- Assist Cal/OSHA as directed.

Any personnel requiring emergency medical attention will be evacuated immediately from the exclusion zone and CRZ. Personnel are not to enter the area to attempt a rescue if their own lives would be threatened. The decision whether to decontaminate a victim before evacuation will be based on the type and severity of the illness or injury and the nature of the contaminant. For some emergency victims, immediate decontamination could be an essential part of life-saving first aid. For others, decontamination could aggravate the injury or delay life-saving treatment. If decontamination does not interfere with essential treatment, it should be performed.

If decontamination can be performed, the following steps will be taken:

- Wash external clothing and cut it away.
- Wrap victim in clean blanket or towel, if necessary.

If decontamination cannot be performed, the following steps will be taken:

- Wrap the victim in blankets or plastic to reduce contamination of other personnel.

- Alert emergency and off-site medical personnel to potential contamination; instruct them about specific decontamination procedures.
- Send along site personnel familiar with the incident.

8.3.4 First Aid

Only qualified personnel will provide first aid and stabilize an individual needing assistance. Life support techniques such as CPR and treatment of life-threatening problems such as airway obstruction and shock will be top priority. At least two persons certified in first-aid techniques and CPR will be within 5 minutes of the site at all times. The SHSP is current in first aid and CPR and will maintain a list of other site personnel certified in first aid and CPR. Professional medical assistance will be obtained at the earliest possible opportunity.

To provide first-line assistance to field personnel in the case of sickness or injury, the following items will be immediately available on site:

- First-aid kit
- Portable emergency eyewash
- Supply of clean water
- Blanket.

The location of the above items will be established before the start of work and will be discussed in detail at the site safety orientation meeting.

8.4 Spill Response Procedures

The potential for leaks of hazardous materials is expected to be low at the sites addressed in this HSP. If such spills do occur, it is believed, based on site investigations and analytical data, that only large amounts of such materials would pose a risk. However, because a spill could potentially occur, the appropriate spill response materials will be made available on site.

In case of a spill of contaminated or hazardous materials, the following steps will be taken:

- Determine that a spill has occurred.
- Notify the site supervisor.
- Identify protective clothing or equipment required to respond.
- Contain the spill.
- Notify the NTR.
- Notify the base environmental office.
- Neutralize and/or solidify any product.
- Transfer material into 55-gallon drums.
- Document the incident.

8.4.1 Release Prevention and Minimization Measures

In addition to training, the following procedures will be implemented to prevent and minimize releases of hazardous materials:

- Hazardous materials operations will not be conducted when the weather could cause significant risk to the surrounding area if a spill were to occur.
- All materials will be transferred in or over a bermed or “protected” area. A protected area is one that is covered with an impermeable material, such as polyethylene.
- Temporary storage tanks containing hazardous wastes or potentially hazardous wastes will be diked to contain potential releases.
- A supply of basic spill response materials and protective equipment will be maintained on site and will include the following:
 - Absorbent sheets, pillows, booms, or absorbent material
 - Open-top 55-gallon drums or other containers with lids
 - Brooms, shovels, and other tools such as squeegees.

8.4.2 Emergency Coordinator

The site supervisor will be the primary emergency coordinator for all spills on this project.

8.5 Earthquake Response

If an earthquake occurs during the course of site activities, the following steps are to be taken:

- Remain calm and do not panic.
- Stop working.
- If indoors, stay indoors away from windows and take cover under heavy furniture or inside walls if possible.
- If outdoors, stay away from power lines, power poles, and windows.
- If in a vehicle, stay in the vehicle until the earthquake is over.
- Do not use or do anything that could provide a source of ignition; e.g., smoking, cutting, or welding.

After the earthquake is over, the following steps are to be taken:

- Meet for a head count at a location designated by the site supervisor.
- Check for injuries. Do not move seriously injured personnel unless their current location poses the potential for further injury.

- Check vehicles, equipment, and buildings for any obvious damage.
- Check utility lines for damage. Switch off power, water, and gas until a utility official has inspected the building and determined it is safe.
- If driving, watch carefully for hazards created by the earthquake, such as undermined roads, weak bridges, or damaged overpasses.
- Prepare for aftershocks. Do not enter severely damaged buildings.

8.6 Fire or Explosion Response

In the event of a fire or explosion, the fire department will be summoned immediately and a head count and evacuation procedures will be conducted concurrently. Upon the arrival of the fire department, the site supervisor, project manager, or designee will advise the fire commander of the location, nature, and identification of the fire and any hazardous materials on site.

Upon approval of the site supervisor or SHSP, and if it can be done safely, site personnel can do the following:

- Use fire extinguishers available on site to control or extinguish small, localized fire.
- Remove or isolate flammable or other hazardous materials that could contribute to the fire.
- Begin containment and recovery of the spilled materials.

ABC-type dry chemical portable fire extinguishers will be provided at the work location and in the immediate location of any flammable materials on site.

8.7 Site Evacuation Procedures

Before the start of field activities, the Site Supervisor will determine emergency evacuation routes and discuss them with all field personnel. Initial planning includes establishing emergency warning signals and evacuation routes in case of an emergency. The initial evacuation assembly points and exclusion zone (EZ) are shown in Figure 2. These areas are usually located upwind of project areas. As work progresses, the SHSP may alter these assembly areas depending on site and weather conditions. The site-specific evacuation procedures will be discussed in detail at the daily safety tailgate meeting.

The authority to order personnel to evacuate the work area rests with the Site Supervisor and the SHSP. If site evacuation is required, a continuous, uninterrupted air horn or vehicle horn (backup) will be sounded for approximately 10 seconds. Personnel working in the EZ will immediately make their way to the assembly point for a head count.

The EZ, evacuation route, and emergency equipment locations are also included in Figure 2. This map will be posted at each entrance to the EZ. During an emergency, the evacuation routes noted on the map are to be followed. If conditions such as wind direction or physical hazards do not allow access to the prescribed evacuation routes, personnel are to evacuate by the safest route available.

8.8 Emergency and Hospital Information

A map to the hospital and emergency telephone numbers will be posted on site. The directions to the hospitals are summarized in Table 4 and illustrated in Figure 3. Emergency contact information is included in Table 5.

9.0 Training Requirements

Specific training requirements for the project are consistent with 29 CFR 1910.120(e) and EM 385-1-1, Section 28. Site-specific training will include the following information:

- Names of personnel and alternates responsible for site safety and health
- Safety, health, and other hazards present on the site
- Use of PPE, specific to the site
- Work practices by which personnel can minimize risks from hazards
- Safe use of engineering controls and equipment on site
- Medical surveillance requirements, including recognition of symptoms and signs that could indicate overexposure to hazards
- Decontamination procedures
- Emergency response plan
- Confined-space entry procedures
- Spill containment program.

All personnel will receive this training prior to working on the site.

9.1 Training Prerequisites

In accordance with 29 CFR 1910.120, personnel who enter an area covered under the specified regulation must have a minimum of 40 hours of training and 3 days of supervised field experience. All personnel who enter the exclusion zone or CRZ are required to have this training. Personnel will receive an 8-hour annual refresher course to maintain currency in HAZWOPER training, as prescribed by regulations. Furthermore, all supervisors will have completed an 8-hour Supervisors Health and Safety Management Course. Either the SHSP or the site supervisor will provide copies of personnel training certifications to the DON upon request. The SHSP will ensure that all training, fit test, and medical certification records are available on site at all times for project personnel and subcontractor employees.

9.2 Daily Safety Meetings

Daily "tailgate" safety meetings will be held at the start of each shift, prior to the day's field activities, and will address potential chemical, physical, and environmental hazards and preventive safety measures. At the end of the work shift, another meeting will be held to review

newly identified hazards and “lessons learned” during the workday. Hazard analysis briefings will be held before the start of a new task and will address task-specific risks and precautions. Attendance is mandatory and will be documented.

10.0 Medical Surveillance

No unique medical surveillance is expected to be needed during this project. All employees will have had physical examinations in accordance with 29 CFR 1910.120. Any employees who experience symptoms consistent with exposure to chemicals are to immediately report to the site superintendent or SHSP. The site supervisor or SHSP will immediately arrange for an examination by a local medical provider. Table 5 lists emergency phone numbers and contacts.

The medical surveillance program is discussed in greater detail in *HS Policies and Procedures Manual, HS 100*.

11.0 References

American National Standards Institute, 1992, Practice for Respiratory Protection, Z88.2, California Code of Regulations Title 8.

ANSI, see American National Standards Institute.

Bechtel National, Inc., 1995, Final Work Plan Phase II Remedial Investigation/Feasibility Study, Marine Corps Air Station, El Toro, California.

BNI, see Bechtel National, Inc.

Earth Tech, 2002, Preliminary Draft Technical Memorandum, Ordnance and Explosives Range Evaluation, IRP Site 1, Explosive Ordnance Disposal Range, Former Marine Corps Air Station, El Toro, California, October.

Department of Navy, Office of the Chief of Naval Operations, 2003, OPNAV Instruction 8020.15/MCO 8020.13, Explosives Safety Review, Oversight, and Verification of Response Actions Involving Military Munitions, Washington DC, October.

Department of Navy, Naval Ordnance Safety and Security Activity, 2004, *NOSSA Instruction 8020.15, Military Munitions Response Program Oversight*, Indian Head, MD, March.

DON, see Department of the Navy.

EPA, see U.S. Environmental Protection Agency.

Jacobs Engineering Group, Inc., 1993, Draft Phase I Remedial Investigation Technical Memorandum, Marine Corps Air Station, El Toro, California.

JEG, see Jacobs Engineering Group, Inc.

National Institute of Occupational Safety and Health/Occupational Safety and Health Administration/U.S. Coast Guard/U.S. Environmental Protection Agency, 1985, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, October.

Naval Facilities Engineering Command, 1997, Navy/Marine Corps Installation Restoration Manual, February.

NIOSH/OSHA/USCS/EPA, see National Institute of Occupational Safety and Health/Occupational Safety and Health Administration/U.S. Coast Guard/U.S. Environmental Protection Agency.

USACE, see U.S. Army Corps of Engineers.

U.S. Army Corps of Engineers, 1996, Safety and Health Requirements Manual, Engineer Manual (EM) 385-1-1.

U.S. Department of Labor Occupational Safety and Health Standards – 29 CFR 1910.134: Respiratory Protection; 29 CFR 1910.120: Hazardous Waste Operations and Emergency Responses; 29 CFR 1910.1200: Hazard Communication; 29 CFR 1926; Safety and Health Regulations for Construction.

U.S. Environmental Protection Agency, 1992, Standard Operating Safety Guides, June.

Title 8, California Code of Regulations

Threshold Limit Values for Chemicals Substances and Physical Agents, American Conference of Governmental Industrial Hygienists, 2003.

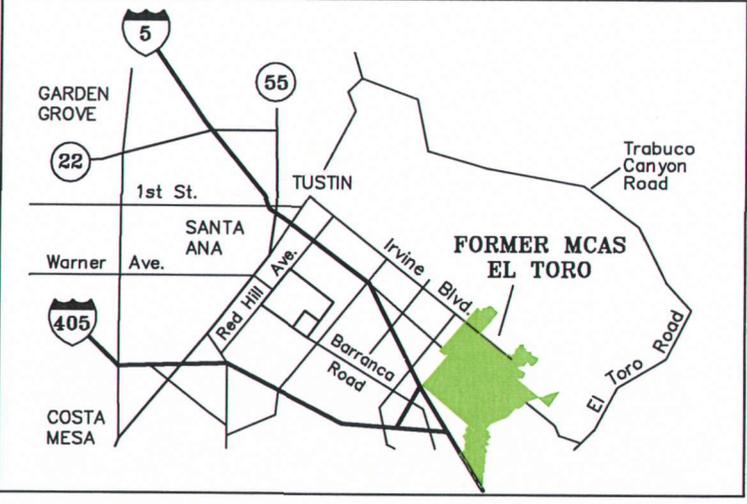
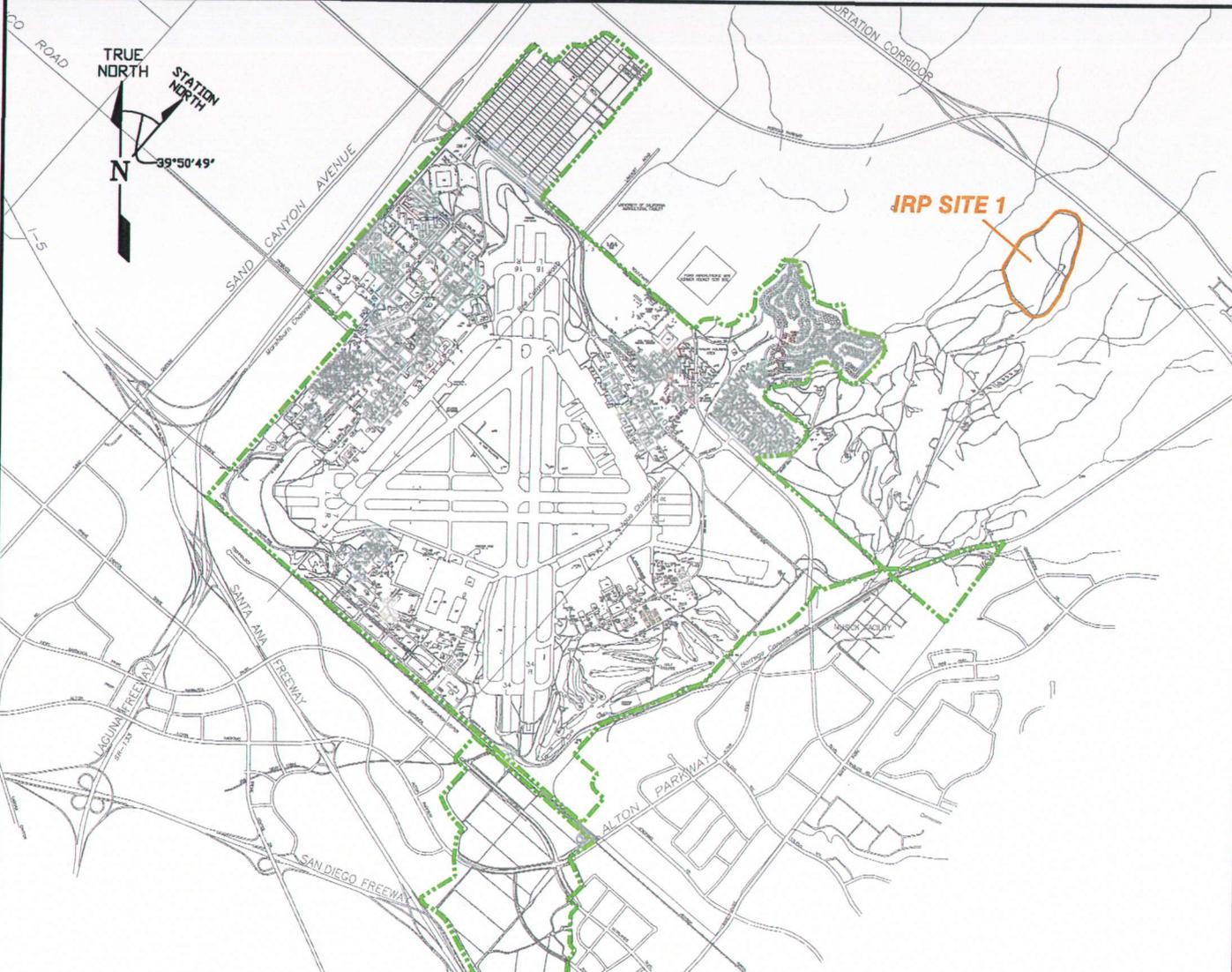
Figures

DRAWING NUMBER 100357-A1

APPROVED BY

CHECKED BY

DRAWN BY J. VASQUEZ 04/01/04



DRAWN BY



EFA WEST
 SOUTHWEST DIVISION
 NAVAL FACILITIES ENGINEERING COMMAND
 CTO 109

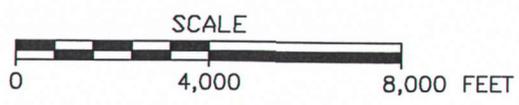


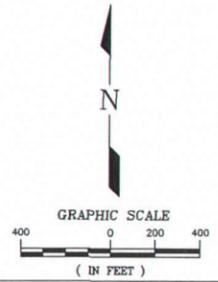
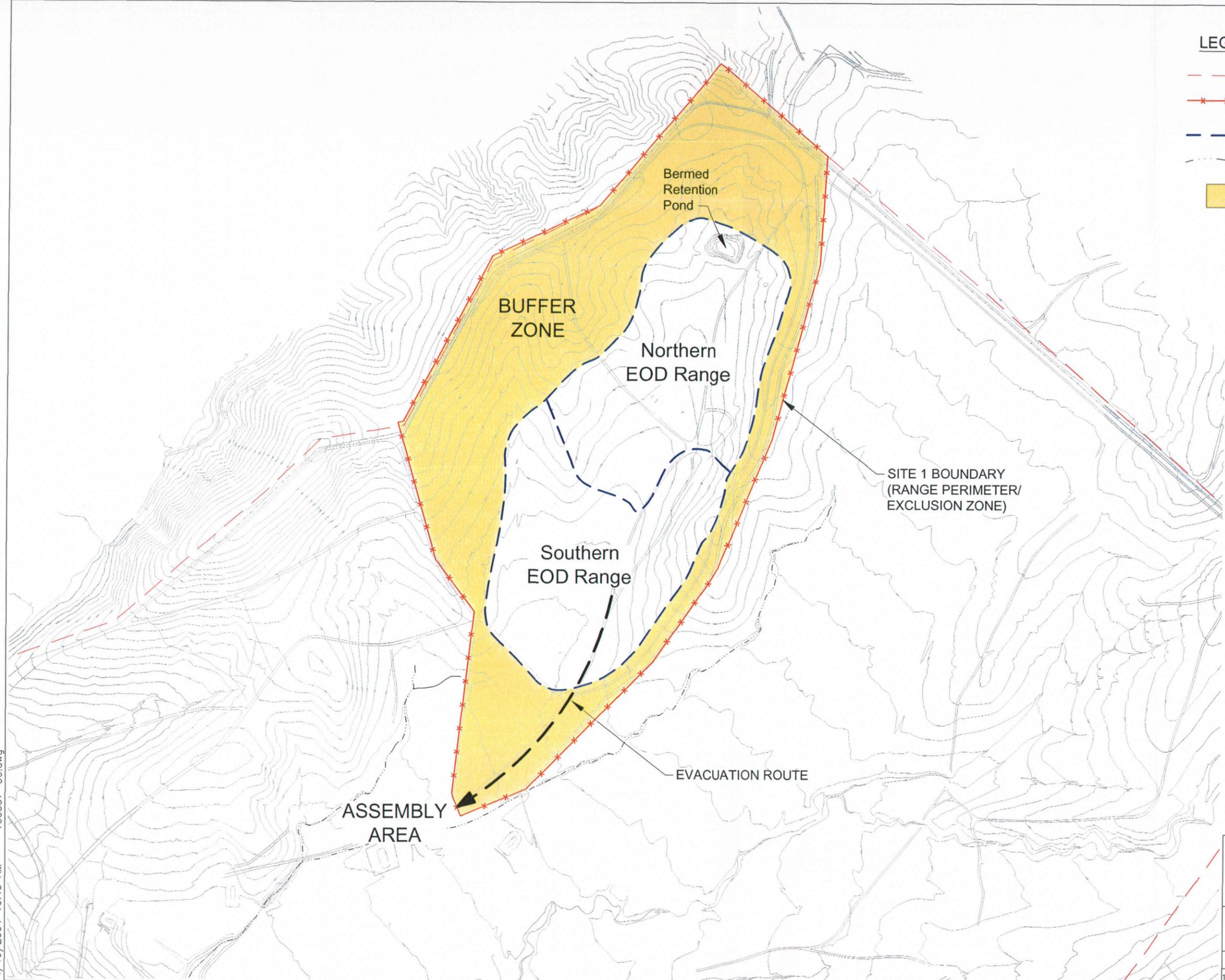
FIGURE 1
FACILITY LOCATION MAP
IRP SITE 1
 FORMER MARINE CORPS AIR STATION
 EL TORO, CALIFORNIA

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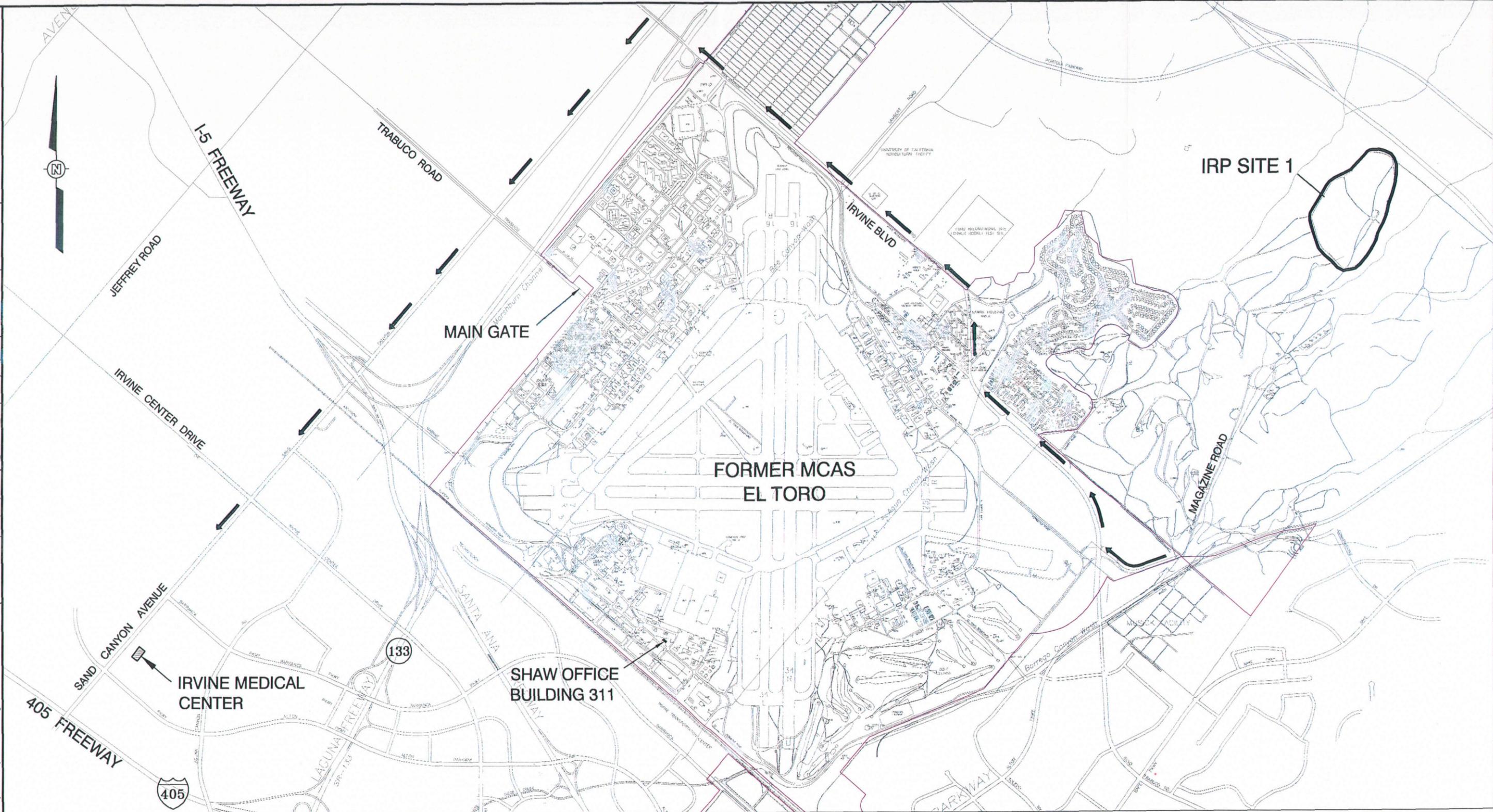
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LEGEND:

-  FORMER MCAS EL TORO BOUNDARY
-  SECURITY FENCE/ RANGE PERIMETER/ IRP SITE 1 BOUNDARY/EXCLUSION ZONE
-  EOD RANGE BOUNDARY
-  STREAM OR WASH
-  BUFFER ZONE



	SOUTHWEST DIVISION NAVAL FACILITIES ENGINEERING COMMAND	
	SITE PLAN SHOWING EXCLUSION ZONE AND EVACUATION ROUTE MAP - IRP SITE 1 FORMER MCAS EL TORO, CA	
FILE NO. 100357-06.DWG	FIGURE 2	DATE 4/19/04



HOSPITAL:
 IRVINE MEDICAL CENTER
 16200 SAND CANYON AVENUE
 IRVINE, CA

TELEPHONE:
 (949) 753-2000
 (949) 753-2250 (24-HOUR EMERGENCY)

DIRECTIONS:
 EXIT SITE 1 GOING SOUTH ON MAGAZINE ROAD. TURN RIGHT ONTO IRVINE BOULEVARD. TURN LEFT ONTO SAND CANYON AVENUE. HEAD WEST ON SAND CANYON. CONTINUE WEST UNDER INTERSTATE 5. THE HOSPITAL IS LOCATED ON YOUR LEFT AT 16200 SAND CANYON AVENUE.



EFA WEST
 SOUTHWEST DIVISION
 NAVAL FACILITIES ENGINEERING COMMAND
 CTO 109

FIGURE 3
HOSPITAL LOCATION
 FORMER MARINE CORPS AIR STATION
 EL TORO, CALIFORNIA

Tables

**Table 1
Hazards Assessment of Suspected Chemical Contaminants**

Chemical Name	Occupational Exposure Limits	IP (eV)	Route of Exposure	Odor Threshold (ppm)	Signs and Symptoms of over Exposure
Aluminum	TWA: 10 mg/m ³	NE	Inhalation, ingestion		Irritation of eye, skin, respiratory system
Barium	TWA: 0.5 mg/m ³	NE	Inhalation, ingestion	NE	Irritation to the skin and respiratory system, pneumonitis, respiratory nodulation,
Lead	TWA: 0.05 mg/m ³	NE	Inhalation, ingestion	NE	Weakness, insomnia pallor, malnutrition, abdominal pain, tremors, kidney disease
Poly aromatic hydrocarbons	NE	NE	Skin contact, ingestion, inhalation	NE	Eye, throat irritation, chronic exposure increases risk of cancer
Diesel fuel and Waste oil	TWA: 5 mg/m ³ (as oil mist)	NE	Inhalation, skin contact, ingestion	NE	Headache, dizziness, nausea, vomiting, respiratory tract irritation, aspiration, hypoxia, infection, pneumatocele formation, chronic lung dysfunction, irritation of hair follicles, and rash of acne pimples and spots.
Volatile petroleum hydrocarbon	TWA: 300 ppm (as gasoline)	NE	Inhalation, skin contact, ingestion	0.3	Acute toxicity includes anesthetic effects and mucous membrane irritation. Symptoms of acute exposure include headache, blurred vision, dizziness, and nausea. Skin contact with gasoline can produce immediate or delayed symptoms of dryness or irritation.
Perchlorate salts (confirmed)	NE		Inhalation, skin Contact, ingestion	NE	Moderate eye and skin irritation characterized by redness and/or rash, exposure to fumes may result in shortness of breath as well as irritation of the throat, if ingested may cause dizziness, discoloration, nausea, unconsciousness, and abdominal spasms

eV - electron volt
IP - ionization potential
mg/m³ - milligrams per cubic meter of air
NE - not established

PEL - permissible exposure limit
ppm - parts per million
TLV - threshold limit value
TWA - 8 hour time weight average

***Occupational exposure limits are taken from the lowest of either the Permissible Exposure Limits enforced by the California Division of Occupational Safety and Health (8 CCR 5155, Table AC-1) or from the most recent list of Threshold Limit Values published by the American Conference of Governmental Industrial Hygienists.**

Table 2
Cooling Power of Exposed Flesh Expressed as Equivalent Temperature

		Actual Temperature Reading (°F)											
		50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
Estimated Wind Speed (mph)		Equivalent Chill Temperature (°F)											
Calm		50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5		48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10		40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15		36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20		32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25		30	16	0	-15	-29	-44	-59	-74	-88	-102	-118	-133
30		28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35		27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40		26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect.)		LITTLE DANGER In <1 hour with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within 1 minute.				GREAT DANGER Flesh can freeze within 30 seconds.			
"Trench foot" and "immersion foot" can occur at any point on this chart.													

Developed by the U.S. Army Research Institute of Environmental Medicine, Natick, MA. Shaded areas denote the equivalent chill temperature requiring dry clothing to maintain core body temperature above 36°C (96.8 °F) per cold stress threshold limit value (TLV).

mph – miles per hour

**Table 3
Personal Protective Equipment**

Task	EPA Level	Respiratory Protection	Head	Hands	Body	Boots	Face	Eye	Hearing	Special Requirements
Exclusion Zone										
Mobilization and Site Preparation	D	None	Hard Hat	Leather or cotton work gloves, as needed	None, unless Tyvek™ coveralls to keep clean	Steel-toed boots	Not applicable	Safety glasses	Ear plugs when operating equipment	Not applicable
Ordnance Removal	See Explosives Safety Submission	See Explosives Safety Submission	See Explosives Safety Submission	See Explosives Safety Submission	See Explosives Safety Submission	Steel-toed boots with rubber boot covers	Not applicable	Safety glasses or goggles when splash hazard is present	Ear plugs required for drilling	Not applicable
Groundwater Monitoring and Treatment	Modified D	Not applicable, unless air monitoring indicates a need to upgrade	Hard Hat	Nitrile over 8-mil N-Dex™ gloves	Tyvek™ or PolyTyvek™ coveralls	Steel-toed boots with rubber boot covers when splash hazard is present	Not applicable	Safety glasses	Not required	Not applicable

*dBA – decibels, A-scale
EPA – U.S. Environmental Protection Agency*

Table 4
Directions to the Hospital

Hospital	Directions
Irvine Medical Center 16200 Sand Canyon Avenue Irvine, CA (949) 753-2000 (949) 753-2250	Exit Station from Magazine Road Gate at Irvine Blvd and then turn right onto Irvine Blvd. Proceed on Irvine Blvd to Sand Canyon and turn left. Continue on Sand Canyon. The Hospital is located on your left at 16200 Sand Canyon Avenue.

**Table 5
Emergency Information**

Emergency Contact	Location/Contact Phone Numbers
Hospital	Irvine Medical Center 16200 Sand Canyon Avenue Irvine, CA Phone: Switchboard: (949) 753-2000 24-hour Emergency: (949) 753-2250 Fax: (949) 753-2564
Fire Department/Police/EMS	Fire Department Emergency Dispatch Phone: (714) 538-3501 Station Fire Department Phone: (949) 551-4058 Irvine Police Department – Main Gate (949) 654-7863 (949) 795-2925 (Cell) Irvine Police Department – Base Patrol (949) 795-2924
Poison Control Center	(800) 876-4766
National Response Center	(800) 424-8802
Chemical Transportation Emergency Center (CHEMTREC)	(800) 424-9300
Shaw Environmental, Inc. Contacts	James Werkmeister Project Manager (949) 660-5467 Chris Johnson Site Supervisor/Technical Lead (949) 230-8580 Doug Childers Site Safety Officer (949) 230-8322 Fred Mlakar, C.I.H. (949) 660-5413 office (949) 981-1450 mobile
DON Contact	Gordon Brown (619) 532-0791
Caretaker Site Office	Ron Johnson (619) 572-1403
Naval Technical Representative (NTR)/Resident Officer in Charge of Construction (ROICC)	Scott Kehe (949) 726-2506

Appendix A
HSP Change Approval Form

HEALTH AND SAFETY PLAN CHANGE APPROVAL FORM

Date of Change: _____ Amendment No. _____

Project Name: _____ Project Number: _____

Section of HSP: _____ Page Number: _____

Change to read: _____

Reason for change: _____

Approvals:

Site Supervisor

Site Health & Safety Officer

Program Health & Safety Manager

Acknowledgment
(nonmandatory)

Navy Technical Representative

Appendix B
HSP Acknowledgment Form

Appendix C

Task-Specific Hazard Analyses

- Activity Hazard Analysis for Demilitarization of Ordnance Scrap Material
- Activity Hazard Analysis for Core Sampling with Drill Rig
- Activity Hazard Analysis for Vehicle Operation
- Activity Hazard Analysis Demobilization
- Activity Hazard Analysis Drilling / Soil Sampling Installation of Wells, and Groundwater Monitoring
- Activity Hazard Analysis Mobilization
- Activity Hazard Analysis Treatability Studies
- Activity Hazard Analysis Installation and Operation / Maintenance of Groundwater Treatment System

ACTIVITY HAZARD ANALYSIS FOR DEMILITARIZATION OF ORDNANCE SCRAP MATERIAL				
Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Demilitarization of ordnance scrap material	Slips, trips, falls	<ul style="list-style-type: none"> • Delineate work zones • Maintain housekeeping through out work shift • Ensure walkways are kept clear 	Level D with face shield, leather gloves	
	Bites/Stings from animals or insects	<ul style="list-style-type: none"> • Visually inspect work area and avoid placing hands and feet into concealed areas • Wear leather gloves to protect hands 	Level D with face shield, leather gloves	
	Electrical shock	<ul style="list-style-type: none"> • Inspect all power tools and extension cords for prior to each use. • Power tools and cords shall not be used in wet locations. • Power tools must be protected by GFCIs • Splicing, cutting, or repairing electrical wire is prohibited. 	12" or larger chop saw, generator, and and tools	
	Cut by, caught by sharp objects and/or flying metal debris	<ul style="list-style-type: none"> • Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use • Face shields must be worn when operating chop saw. 		
	High Noise Levels	<ul style="list-style-type: none"> • Use hearing protection when operating power tools 	Ear plugs	Sound Level Meter
	Fire hazard	<ul style="list-style-type: none"> • Keep work area and area around generator clear of brush. • Shut generator down when refueling • Fire watch required with fire extinguisher while chop saw is in operation. • Hot work permits will be required for each shift utilizing chop saw. 		

ACTIVITY HAZARD ANALYSIS FOR DEMILITARIZATION OF ORDNANCE SCRAP MATERIAL				
Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Demilitarization of ordnance scrap material (Continued)	Pinch Points associated with chop saw	<ul style="list-style-type: none"> • Keep guards in place during use • Ensure all workers are familiar with operation of chop saw prior to use. 		
	Exposure to Temperatures	<ul style="list-style-type: none"> • Utilize buddy system and ensure all workers are following procedures outlined in HS400 • Take breaks as required/rehydrate 		

ACTIVITY HAZARD ANALYSIS FOR CORE SAMPLING WITH DRILL RIG

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Core Sampling	Struck by/ Against Heavy Equipment, Flying Debris, Protruding Objects	<ul style="list-style-type: none"> • Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Barricade or enclose the drilling area • Require backup alarms on all heavy construction equipment • Restrict entry to the work area to authorized personnel during drilling activities • Wear hard hats, safety glasses with side shields, or splash/face shields and goggles, and steel-toe safety boots at all times • Understand and review hand signals 	Warning vests, Hard hat, Safety glasses, Goggles, Face shield, steel toe work boots, Tyvek coveralls	PID, Miniram dust monitor, Combustible gas meter,
	Sharp Objects	<ul style="list-style-type: none"> • Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use 	Leather gloves	
	Underground/ Overhead Utilities	<ul style="list-style-type: none"> • Identify all utilities around the site before work commences • Cease work immediately if unknown utility markers are uncovered • Use manual excavation within 3 feet of known utilities • Utility clearance shall conform with 29 CFR 1926.955 (high voltage >700 kv) 15 feet phase to ground clearance; 31 feet phase to phase clearance 		
	High Noise Levels	<ul style="list-style-type: none"> • Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA 	Ear plugs	Sound Level Meter

ACTIVITY HAZARD ANALYSIS FOR CORE SAMPLING WITH DRILL RIG				
Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Core Sampling (Continued)	Improper Work Procedures	<ul style="list-style-type: none"> • Driller and helper must be present during all active operations and TEST KILL SWITCH DURING EACH STARTUP • Driller helper and other site personnel must know location of emergency shutoff switch • Ensure jewelry is removed, loose clothing is buttoned • Unauthorized personnel must be kept clear of drilling rig. • Area of drilling operation must be cordoned off/barricaded • Inspect wire ropes daily • When hazardous conditions (including weather) are deemed present, operation must be shut down. • Set rig on stable, level ground; attach guy wires if necessary for stability • Use adequate blocking materials • Do not allow drillers to climb to mast while it is erected • Pipe, drill rods, casing, augers, and similar drilling tools should be orderly stacked on racks or sills to prevent spreading, rolling or sliding • Work areas, platforms, and walkways should be kept free of materials, debris, and obstructions such as ice, grease or oil that could cause a surface to become slick or otherwise hazardous. • Shut down drill rig to make repairs or adjustments to drill rig or to lubricate fittings. Release all pressure on the hydraulic systems, the drilling fluid system, and the air pressure systems of the drill rig prior to performing maintenance. • Before raising the mast, check for overhead obstructions 		PID, Miniram dust monitor, Combustible gas meter

ACTIVITY HAZARD ANALYSIS FOR CORE SAMPLING WITH DRILL RIG				
Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Core Sampling (Continued)	Handling Heavy Objects	<ul style="list-style-type: none"> • Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads 		
	Caught In/ Between Moving Parts	<ul style="list-style-type: none"> • Identify and understand parts of equipment which may cause crushing, pinching, rotating or similar injuries • Assure guards are in place to protect from these parts of equipment during operation • Provide and wear proper work gloves when the possibility of crush, pinch, or other injury may be caused by moving/stationary edges or objects • Maintain all equipment in a safe condition • Keep all guards in place during use • De-energize and lock-out machinery before maintenance or service 		
	Fire/ Explosion	<ul style="list-style-type: none"> • Test well-head atmosphere with combustible gas meter • Eliminate sources of ignition from the work area • Prohibit smoking • Provide ABC (or equivalent) fire extinguishers in all work areas, flammable storage areas, generator and compressor locations • Store flammable liquids in well ventilated areas • Prohibit storage, transfer of flammable liquids in plastic containers • Post "NO SMOKING" signs • Store combustible materials away from flammables • Store all compressed gas cylinders upright, caps in place when not in use • Separate Flammables and Oxidizers by 20 feet minimum 	Portable fire extinguishers	Combustible gas meter

ACTIVITY HAZARD ANALYSIS FOR CORE SAMPLING WITH DRILL RIG				
Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Core Sampling (Continued)	Slips, Trips, Falls	<ul style="list-style-type: none"> • Clear walkways, work areas of equipment, drilling overburden, debris and other materials • Mark, identify, or barricade other obstructions • Maintain 3 point contact when mounting/ dismounting heavy equipment 		
	Inhalation and Contact with Hazardous Substances	<ul style="list-style-type: none"> • Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Monitor breathing zone air to determine levels of contaminants 	Tyvek coveralls, nitrile gloves, latex or neoprene boots (see Section 5.0 HASP)	
	High/Low Ambient Temperature	<ul style="list-style-type: none"> • Monitor for Heat/Cold stress in accordance with Shaw Health and Safety Procedures # HS400, HS401 • Provide fluids to prevent worker dehydration • Follow work/rest schedule in Section 3.3.1/3.3.2 of the HASP 	Insulated Clothing (subject to ambient temperature)	Meteorological Equipment

ACTIVITY HAZARD ANALYSIS FOR VEHICLE OPERATION
ALWAYS EXPECT THE UNEXPECTED! ANTICIPATE AND ADJUST!

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Vehicle Operation	Backing	<ul style="list-style-type: none"> • Back into parking spaces upon arrival, whenever possible. • Walk around the vehicle before backing to identify any new conditions or obstructions. • Use a spotter when backing whenever possible. • Understand hand signals. • Sound horn prior to backing. • Check the rear-view and side mirrors prior to backing, remembering mirrors do not show everything. (Note: All vehicles, other than automobiles, must have small convex mirrors attached to the side mirrors.) • Back slowly in areas of obstructed vision. • Anticipate others who may be backing out into your pathway and adjust accordingly 	Seatbelt	
	Unfamiliar with the vehicle	<ul style="list-style-type: none"> • Familiarize yourself with the vehicle before moving. • Review the dashboard controls, steering radius, overhead and side clearances. • Properly adjust seat then mirrors. • Locate windshield wipers and lights. 	Seatbelt	
	Airbags (if equipped)	<ul style="list-style-type: none"> • Familiarize yourself with the vehicle airbag system. • Adjust seat so the driver is outside the inflation envelope of the airbag and still operate the pedals comfortably. • Vehicles equipped with airbag control switches (i.e. pickup trucks) must be turned on. 	Seatbelt	

ACTIVITY HAZARD ANALYSIS FOR VEHICLE OPERATION
ALWAYS EXPECT THE UNEXPECTED! ANTICIPATE AND ADJUST!

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Vehicle Operation (continued)	Speed	<ul style="list-style-type: none"> • Obey all posted speed limits. • Radar detectors are prohibited in all company owned, leased or rented vehicles. • Reduce travel speed during hazardous conditions (i.e. rain, fog, snow). • Identify if your vehicle has Anti-Lock Brakes (ABS). If it does, DO NOT pump the brakes to stop when the vehicle has begun to skid. Apply steady pressure to the brakes. If the vehicle does not have ALB, you will want to pump the brakes to stop during slippery conditions. 	Seatbelt	
	Distances/Spacing Tire Concept →	<ul style="list-style-type: none"> • Follow the 3 second rule. • Increase the 3 second rule as necessary during hazardous travel conditions. (<i>add one second for each hazard</i>) • Always leave yourself an "out" during travel. • When stopping, make sure that you leave enough distance between you and the car in front of you. You should be able to see the rear tires of the vehicle in front, when stopped. • Drive defensively. • When at a red light, and it turns green, use the "delayed start" technique, by counting to three before you take your foot off the brake. • DO NOT TAILGATE 	Seatbelt	
	Skids	<ul style="list-style-type: none"> • If the vehicle has begun to skid out of control, turn the steering wheel in the direction of the skid (<i>the direction you want the vehicle to go</i>) and re-adjust the wheel, as necessary. • Slow travel speeds during hazardous travel conditions. 	Seatbelt	

ACTIVITY HAZARD ANALYSIS FOR VEHICLE OPERATION
ALWAYS EXPECT THE UNEXPECTED! ANTICIPATE AND ADJUST!

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Vehicle Operation (continued)	Skids	<ul style="list-style-type: none"> • Use 4-wheel drive, if available, when driving vehicles off road, on steep inclines, muddy conditions, etc. • Do not take vehicles "off road" if they can not be operated safely. 		
	Blind Spots	<ul style="list-style-type: none"> • Become familiar with any blind spots associated with your vehicle. • Adjust mirrors properly. • Make sure you use your directional signals. • Always look over your shoulder to assure the lane is clear when changing lanes. • Be cautious when approaching other driver's blind spots. 		
	Cellular Phones	<ul style="list-style-type: none"> • Do not use handheld cellular phones while driving • Pull over to the side of the road when making a call. (The shoulder of a freeway or expressway is not an authorized or safe place to conduct phone calls. It is for emergencies only.) 		
	Accidents	<ul style="list-style-type: none"> • In the event of an accident: Stop; call for medical assistance; notify police; complete Vehicle Accident Report and submit to you supervisor. • If an Shaw employee is injured, the Health Resource forms, Return to Work, Medical Release and Treatment of Injury/Illness, must completed at the health clinic or Emergency Room. 	Seatbelt	
	Equipment failure	<ul style="list-style-type: none"> • Perform daily inspections of your vehicle. • Any vehicle with mechanical defects that may endanger the safety of the driver, passengers or the public shall not be used. 		

**ACTIVITY HAZARD ANALYSIS FOR VEHICLE OPERATION
ALWAYS EXPECT THE UNEXPECTED! ANTICIPATE AND ADJUST!**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Vehicle Operation (continued)	Equipment failure	<ul style="list-style-type: none"> • Ensure safety equipment is in the vehicle. Safety equipment should include a spare tire, jack, first-aid kit, fire extinguisher and flashlight. Flares and/or reflective triangles should be available in larger trucks. • Ensure the proper documentation is in the vehicle. Documentation should include an operations manual for the vehicle, insurance card, vehicle registration and Shaw Accident forms. 		
	Influenced by drug and alcohol	<ul style="list-style-type: none"> • NEVER DRIVE UNDER THE INFLUENCE OF DRUGS OR ALCOHOL. • Disciplinary action, including termination, will be taken against anyone who is convicted of or pleads no-contest to the charges of driving under the influence in accordance with Shaw Health and Safety Procedure HS800 • Project-assigned hourly employees are not permitted to operate company owned, leased or rented vehicles after 10:00 p.m. without written authorization from their supervisor. 	Seatbelt	
	Driver = Alertness Attitude Physical condition	<ul style="list-style-type: none"> • Do not operate any vehicle when abnormally tired, temporarily disabled or under the influence of drugs or alcohol. • Keep an even temper when driving. Do not let the actions of others affect your attitude. • No employee is authorized to operate a company vehicle (including rentals) after having been on-duty for a period of 16 hours. • No employee may drive for more than 12 hours in a single on-duty period. 	Seatbelt	

ACTIVITY HAZARD ANALYSIS FOR VEHICLE OPERATION
ALWAYS EXPECT THE UNEXPECTED! ANTICIPATE AND ADJUST!

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
	Vehicle Loading	<ul style="list-style-type: none"> • DO NOT OVERLOAD the vehicle • Secure all equipment within the body of the vehicle • Do not block side view mirrors with load • Do not transport DOT manifested hazardous materials without a commercial driver's license (CDL) • Dispatch all equipment and personnel with proper forms and identification 		
EQUIPMENT TO BE USED		INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS	
<ul style="list-style-type: none"> • Valid drivers license • Seatbelt • Vehicles equipped with passenger airbags • A spare tire and jack, • First-aid kit, fire extinguisher, and flashlight • Operations manual for the vehicle • Insurance card, vehicle registration and Shaw Accident forms. 		<ul style="list-style-type: none"> • Inspect vehicles daily ▪ Insure airbag switch is turned on (pickup trucks) 	<ul style="list-style-type: none"> • Review JSA with all site personnel • Review Shaw Health and Safety Procedure HS800 	

ACTIVITY HAZARD ANALYSIS FOR DEMOBILIZATION
ALWAYS EXPECT THE UNEXPECTED! ANTICIPATE AND ADJUST!

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Demob of personnel and equipment and decon of equipment	Slips/Trips/Falls	<ul style="list-style-type: none"> • Ensure proper footing on all uneven terrain • Delineate all debris • Ensure walkways are kept clear 	Level D modified	
	Bites/Stings from animals or insects	<ul style="list-style-type: none"> • Visually inspect work area and avoid placing hands and feet into concealed areas • Wear leather gloves to protect hands 		
	Handling Heavy Objects	<ul style="list-style-type: none"> • Observe proper lifting techniques • Obey sensible lifting limits (60 Lb. Max) • Use mechanical lifting equipment when possible • Avoid carrying heavy objects above shoulder level • Avoid twisting or actions that contribute to overexertion • Warm up muscles prior to manual lifting activities • Review lifting posture/techniques regularly at safety meetings. 		
	Sharp Objects	<ul style="list-style-type: none"> • Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects 		
	Exposure to Temperatures	Utilize buddy system and ensure all workers are following procedures outlined in HS400 Take breaks as required/rehydrate		

ACTIVITY HAZARD ANALYSIS FOR DRILLING / SOIL SAMPLING INSTALLATION OF WELLS AND GROUNDWATER MONITORING
ALWAYS EXPECT THE UNEXPECTED! ANTICIPATE AND ADJUST!

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Drilling / soil sampling installation of wells and groundwater monitoring	Slips/Trips/Falls	<ul style="list-style-type: none"> • Delineate work zones. • Evaluate fall hazards above 4 feet and use fall protection equipment.. • Maintain housekeeping through out work shift. • Ensure walkways are kept clear. 	Level C for drilling operations, Level D modified w/sample gloves for all other tasks. Drill Rig/hand and power tools.	
	Bites/Stings from animals or insects	<ul style="list-style-type: none"> • Visually inspect work area and avoid placing hands and feet into concealed areas. • Wear leather gloves to protect hands 		
	Handling Heavy Objects	<ul style="list-style-type: none"> • Observe proper lifting techniques • Obey sensible lifting limits (60 Lb. Max) • Use mechanical lifting equipment when possible. • Avoid carrying heavy objects above shoulder level. • Avoid twisting or actions that contribute to overexertion. • Warm up muscles prior to manual lifting activities. • Review lifting posture/techniques regularly at safety meetings. 		
	Sharp Objects	<ul style="list-style-type: none"> • Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand power tools in a safe condition. • Keep guards in place during use. 		
	High Noise Levels	<ul style="list-style-type: none"> • Use hearing protection during heavy equipment operation. 		

ACTIVITY HAZARD ANALYSIS FOR DRILLING / SOIL SAMPLING INSTALLATION OF WELLS AND GROUNDWATER MONITORING				
ALWAYS EXPECT THE UNEXPECTED! ANTICIPATE AND ADJUST!				
Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Drilling / soil sampling installation of wells and groundwater monitoring (continue)	Pinch Points/Struck by associated with backhoe operation	<ul style="list-style-type: none"> • Ensure all workers remain clear of drill while in operation. • Keep guards in place during use • Ensure all workers are familiar with all emergency shut offs on drill rig daily and prior to work activities • Refrain from wearing loose clothing that may come into contact with drill bit. 		
	Exposure to Temperatures	<ul style="list-style-type: none"> • Utilize buddy system and ensure all workers are following procedures outlined in HS400 • Take breaks as required/rehydrate 		
	UXO's	<ul style="list-style-type: none"> • Follow all safe work practices outlined in the Explosives Safety Submission and HS317 		

**ACTIVITY HAZARD ANALYSIS FOR MOBILIZATION
ALWAYS EXPECT THE UNEXPECTED! ANTICIPATE AND ADJUST!**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Mob of personnel/equipment and OE/Non OE scrap Removal	Slips/Trips/Falls	<ul style="list-style-type: none"> • Ensure proper footing on all uneven terrain. • Delineate all debris. • Evaluate fall hazards above 4 feet and use fall protection equipment. • Follow all safe work practices outlined in the Explosives Safety Submission and HS317. • Ensure walkways are kept clear. 	Level D modified	
	Bites/Stings from animals or insects	<ul style="list-style-type: none"> • Visually inspect work area and avoid placing hand and feet into concealed areas. • Wear leather gloves to protect hands. 		
	Handling Heavy Objects	<ul style="list-style-type: none"> • Observe proper lifting techniques. • Obey sensible lifting limits (60 Lb. Max). • Use mechanical lifting equipment when possible. • Avoid carrying heavy objects above shoulder level. • Avoid twisting or actions that contribute to overexertion. • Warm up muscles prior to manual lifting activities. • Review lifting posture/techniques regularly at safety meetings. 		
	Sharp Objects	<ul style="list-style-type: none"> • Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand power tools in a safe condition. • Keep guards in place during use. 		
	Exposure to Temperatures	<ul style="list-style-type: none"> • Utilize buddy system and ensure all workers are following procedures outlined in HS400 • Take breaks as required/rehydrate 		

ACTIVITY HAZARD ANALYSIS FOR MOBILIZATION
ALWAYS EXPECT THE UNEXPECTED! ANTICIPATE AND ADJUST!

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Mob of personnel/equipment and OE/Non OE scrap Removal (continued)	UXO's	<ul style="list-style-type: none">Follow safe work practices outlined in the Explosives Safety Submission and HS317.		

ACTIVITY HAZARD ANALYSIS FOR TREATABILITY
ALWAYS EXPECT THE UNEXPECTED! ANTICIPATE AND ADJUST!

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Treatability studies	Slips/Trips/Falls	<ul style="list-style-type: none"> • Ensure proper footing on all uneven terrain • Follow all safe work practices outlined in the Explosives Safety Submission and HS317 • Ensure walkways are kept clear placing hands and feet into concealed areas • Keep work area free of debris 	Level C/Level D modified as required	
	Bites/Stings from animals or insects	<ul style="list-style-type: none"> • Visually inspect work area and avoid • Wear leather gloves to protect hands 		
	Handling Heavy Objects	<ul style="list-style-type: none"> • Observe proper lifting techniques • Obey sensible lifting limits (60 Lb. Max) • Use mechanical lifting equipment when possible. • Avoid carrying heavy objects above shoulder level. • Avoid twisting or actions that contribute to overexertion. • Warm up muscles prior to manual lifting activities. • Review lifting posture/techniques regularly at safety meetings. 		
	Sharp Objects	<ul style="list-style-type: none"> • Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects 		
	Exposure to Temperatures	<ul style="list-style-type: none"> • Utilize buddy system and ensure all workers are following procedures outlined in HS400 • Take breaks as required/rehydrate 		

ACTIVITY HAZARD ANALYSIS FOR TREATABILITY
ALWAYS EXPECT THE UNEXPECTED! ANTICIPATE AND ADJUST!

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Treatability studies (continued)	Chemical handling and expose	<ul style="list-style-type: none"> • Follow safe work practices outlined in the • Safe Lab Work Practices outlined in the Amendment to this HSP. • Ensure all chemicals are stored properly in approved storage cabinets when not in use. 		

ACTIVITY HAZARD ANALYSIS FOR ANALYSIS INSTALLATION AND OPERATION / MAINTENANCE OF GROUNDWATER TREATMENT SYSTEM

ALWAYS EXPECT THE UNEXPECTED! ANTICIPATE AND ADJUST!

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Analysis installation and operation / maintenance of groundwater treatment system	Slips/Trips/Falls	<ul style="list-style-type: none"> • Ensure proper footing on all uneven terrain • Follow all safe work practices outlined in the Explosives Safety Submission and HS317. • Ensure walkways are kept clear placing hands and feet into concealed areas. • Keep work area free of debris. 	Level D modified Backhoe, power/hand tools	
	Bites/Stings from animals or insects	<ul style="list-style-type: none"> • Visually inspect work area and avoid placing hands and feet into concealed areas. • Wear leather gloves to protect hands 		
	Handling Heavy Objects	<ul style="list-style-type: none"> • Observe proper lifting techniques • Obey sensible lifting limits (60 Lb. Max) • Use mechanical lifting equipment when possible. • Avoid carrying heavy objects above shoulder level. • Avoid twisting or actions that contribute to overexertion. • Warm up muscles prior to manual lifting activities. • Review lifting posture/techniques regularly at safety meetings. 		
	Sharp Objects	<ul style="list-style-type: none"> • Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand power tools in a safe condition. • Keep guards in place during use. 		
	High Noise Levels	<ul style="list-style-type: none"> • Use hearing protection during heavy equipment operation. 		

ACTIVITY HAZARD ANALYSIS FOR ANALYSIS INSTALLATION AND OPERATION / MAINTENANCE OF GROUNDWATER TREATMENT SYSTEM

ALWAYS EXPECT THE UNEXPECTED! ANTICIPATE AND ADJUST!

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Analysis installation and operation / maintenance of groundwater treatment system (continued)	Pinch Points/Struck by associated with backhoe operation	<ul style="list-style-type: none"> • Ensure all workers remain clear of swing radius while backhoe is in operation • Keep guards in place during use • Ensure all ground workers maintain eye contact with backhoe operator 		
	Exposure to Temperatures	<ul style="list-style-type: none"> • Utilize buddy system and ensure all workers are following procedures outlined in HS400 • Take breaks as required/rehydrate 		
	UXO's	<ul style="list-style-type: none"> • Follow all safe work practices outlined in the Explosives Safety Submission and HS317 		
	Exposure to chemicals and/or hazardous atmospheres	<ul style="list-style-type: none"> • Wear required Personal Protective Equipment (PPE) Personal decon shall be monitored and enforced. 		
	Electrocution	<ul style="list-style-type: none"> • Only qualified electricians shall be allowed to hook up/repair electrical lines/circuits • All extension cords will be inspected daily for structural integrity, ground continuity, and damaged areas. • GFCI's will be used on all outdoor 120 volt circuits • Electrical lines and extension cords will be kept out of wet areas • Personnel must de-energize and lockout/tag out all circuits while maintaining or disconnecting equipment • All personnel must know the location of the main shut off switch 		

Appendix D
Material Safety Data Sheets

BELL FUELS -- LEAD-FREE GASOLINE; NO-LEAD GASOLINE - GASOLINE, UNLEADED
MATERIAL SAFETY DATA SHEET
NSN: 9130012084172
Manufacturer's CAGE: 8P539
Part No. Indicator: A
Part Number/Trade Name: LEAD-FREE GASOLINE; NO-LEAD GASOLINE

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General Information
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Item Name: GASOLINE, UNLEADED
Company's Name: BELL FUELS, INC
Company's Street: 4116 WEST PATERSON AVE
Company's City: CHICAGO
Company's State: IL
Company's Country: US
Company's Zip Code: 60646
Company's Emerg Ph #: 312-286-0200
Company's Info Ph #: 312-286-0200
Record No. For Safety Entry: 060
Tot Safety Entries This Stk#: 064
Status: SP
Date MSDS Prepared: 23FEB90
Safety Data Review Date: 21OCT94
Supply Item Manager: KY
MSDS Serial Number: BVHJT
Specification Number: VV-G-1690
Spec Type, Grade, Class: CIVGAS
Hazard Characteristic Code: F2
Unit Of Issue: DR
Unit Of Issue Container Qty: 55 GALLONS
Type Of Container: DRUM, 18 GAGE
Net Unit Weight: 325.2 LBS

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Ingredients/Identity Information
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Proprietary: NO
Ingredient: HYDROCARBONS, AROMATIC
Ingredient Sequence Number: 01
Percent: 15-35
NIOSH (RTECS) Number: 1008732HA
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: SATURATED HYDROCARBONS
Ingredient Sequence Number: 02
Percent: 60-75
NIOSH (RTECS) Number: 1006886SH
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: UNSATURATED HYDROCARBONS
Ingredient Sequence Number: 03
Percent: 1-15

NIOSH (RTECS) Number: 1006887UH
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: DYE AND OTHER ADDITIVES
Ingredient Sequence Number: 04
Percent: 0.02
NIOSH (RTECS) Number: 1003746AD
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

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Physical/Chemical Characteristics

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Appearance And Odor: BLUE OR CLEAR, TYPICAL HYDROCARBON ODOR.
Boiling Point: 90.0F,32.2C
Vapor Pressure (MM Hg/70 F): 414 @100C
Vapor Density (Air=1): 3-4
Specific Gravity: 0.71-0.77
Solubility In Water: NEGLIGIBLE.

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Fire and Explosion Hazard Data

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Flash Point: -50F,-46C
Flash Point Method: TCC
Lower Explosive Limit: 1.3
Upper Explosive Limit: 6
Extinguishing Media: ANY UL APPROVED CLASS B MEDIA SUCH AS FOAM, CARBON DIOXIDE, DRY CHEMICAL.
Special Fire Fighting Proc: NONE SPECIFIED BY MFG; HOWEVER USE APPROPRIATE PROTECTIVE EQPMT INCLUDING SELF-CONTAINED BREATHING APPARATUS.
Unusual Fire And Expl Hazrds: NONE SPECIFIED BY MFG; HOWEVER MATL IS HEAVIER THAN AIR AND WILL TRAVEL LONG DISTANCES & FLASHBACK. EXPLOSIVE MIXTURE FORMS W/GASOLINE & AIR.

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Reactivity Data

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Stability: YES
Cond To Avoid (Stability): NONE SPECIFIED BY MFG; HOWEVER AVOID OPEN FLAMES/HEAT/SPARKS/OTHER IGNITION SOURCES.
Materials To Avoid: OXIDIZERS.
Hazardous Decomp Products: NONE SPECIFIED BY MFG.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT.

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Health Hazard Data

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LD50-LC50 Mixture: UNKNOWN
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: ACUTE:EYE:IRRIT @ HIGH VAP LEVELS OR DIRECT CONTACT W/FLUID. SKIN:IRRIT ON PROLONG CONTACT W/LIQ, DERM RESULTING FROM DEFATTING NATURE OF LIQ. SYSTEMATIC:CNS EFFECTS (NARCOSIS) @ HIGH VAP LEVELS; MUC MEMBRANE IRRIT, PNEUMONIA. INGEST:GASTROINTESTINAL

DISTRUBANCES. CHRONIC:PERIPERAL NERVOUS SY EFFECTS, BLOOD ALTERATIONS

Carcinogenicity - NTP: NO

Carcinogenicity - IARC: YES

Carcinogenicity - OSHA: NO

Explanation Carcinogenicity: PER MSDS:NONE STATED; HOWEVER CONTAINS GASOLINE WHICH IS CONSIDERED BY IARC TO BE POTENTIAL CARCINOGEN.

Signs/Symptoms Of Overexp: EYE & SKIN IRRITATION. DERMATITIS. NARCOSIS. GI DISTURBANCES:NAUSEA, DIARRHEA, STOMACH PAINS.

Med Cond Aggravated By Exp: NONE SPECIFIED BY MFG.

THOROUGHLY WASH AREA W/SOAP & WATER. INHAL:REMOVE FROM CONTAMINATED AREA.

ADMINISTER ARTIFICIAL RESP IF NECESSARY. CALL PHYSICIAN. INGEST:GIVE A

VEGETABLE OIL TO RETARD ABSORPTION. DO NOT INDUCE VOMITING. CALL PHYSICIAN.

FATAL DOSE ADULT HUMAN APPROX 350G, CHILD APPROX 10-13G.

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Precautions for Safe Handling and Use
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Steps If Matl Released/Spill: KEEP PUBLIC AWAY. SHUT OFF SOURCE W/O RISK. ADVISE POLICE & NAT RESP CENTER 800-424-8802 IF SUBSTANCE HAS ENTERED A WATER COURSE OR SEWER. CONTAIN LIQ W/EARTH, SAND. RECOVER FREE LIQ BY PPUMPING OR W/SUITABLE ABSORBENT.

Neutralizing Agent: NONE SPECIFIED BY MFG.

Waste Disposal Method: UNDER MANY SPILL SITUATIONS LIQ CAN BE RECOVERED & RECLAIMED. WHERE SOLID ABSORBENTS ARE USED THEY SHOULD BE INCINERATED PER APPLICABLE STATE & LOCAL REGULATIONS.

Precautions-Handling/Storing: USE APPROPRIATE GROUNDING-DISPENSING PROCEDURES. STORE IN RELATIVELY COOL PLACE. DO NOT EXPOSE TO HEAT, OPEN FLAME OR OXIDANTS.

Other Precautions: NONE SPECIFIED BY MFG.

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Control Measures
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Respiratory Protection: FOR EXPOSURES IN EXCESS OF EXPOSURE LIMITS CHEMICAL CARTRIDGE RESPIRATOR OR AIR SUPPLIED EQUIPMENT.

Ventilation: LOCAL EXHAUST REQUIRED & EXPLOSION PROOF EQUIPMENT.

Protective Gloves: IMPERMEABLE GLOVES.

Eye Protection: NONE SPECIFIED HOWEVER SAF GLASSES/GOGG

Other Protective Equipment: NONE SPEICFIED BY MFG.

Work Hygienic Practices: WASH HANDS AFTER HANDLING & PRIOR TO EAT/DRINK/ SMOKE/USE OF TOILET FACILITIES. FOLLOW GOOD WORK HYGIENE PRACTICES.

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Transportation Data
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Trans Data Review Date: 94294

DOT PSN Code: GTN

DOT Proper Shipping Name: GASOLINE

DOT Class: 3

DOT ID Number: UN1203

DOT Pack Group: II

DOT Label: FLAMMABLE LIQUID

IMO PSN Code: HRV

IMO Proper Shipping Name: GASOLINE

IMO Regulations Page Number: 3141

IMO UN Number: 1203

IMO UN Class: 3.1

IMO Subsidiary Risk Label: -

IATA PSN Code: MUC

IATA UN ID Number: 1203

IATA Proper Shipping Name: GASOLINE
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MUC
AFI Prop. Shipping Name: GASOLINE
AFI Class: 3
AFI ID Number: UN1203
AFI Pack Group: II
AFI Basic Pac Ref: 7-7

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Disposal Data
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Label Data
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Label Required: YES
Technical Review Date: 21OCT94
Label Status: F
Common Name: LEAD-FREE GASOLINE; NO-LEAD GASOLINE
Signal Word: DANGER!
Acute Health Hazard-Moderate: X
Contact Hazard-Moderate: X
Fire Hazard-Severe: X
Reactivity Hazard-None: X
Special Hazard Precautions: ACUTE:EYE:IRRIT @ HIGH VAP LEVELS OR DIRECT CONTACT W/FLUID. SKIN:IRRIT ON PROLONG CONTACT W/LIQ, DERM RESULTING FROM DEFATTING NATURE OF LIQ. SYSTEMATIC:CNS EFFECTS (NARCOSIS) @ HIGH VAP LEVELS; MUC MEMBRANE IRRIT, PNEUMONIA. INGEST:GASTROINTESTINAL DISTURBANCES. CHRONIC:PERIPHERAL NERVOUS SYS EFFECTS, BLOOD ALTERATIONS. 1ST AID:EYE:FLUSH FOR @ LEAST 15MINS W/WATER. SKIN:THOROUGHLY WASH AREA W/ SOAP & WATER. INHAL:REMOVE FROM CONTAMINATED AREA. ADMINISTER ARTIFICIAL RESP IF NECESSARY. CALL PHYSICIAN. INGEST:GIVE A VEGETABLE OIL TO RETARD ABSORPTION. DO NOT INDUCE VOMITING. CALL PHYSICIAN. FATAL DOSE ADULT HUMAN APPROX 350G, CHILD APPROX 10-13G.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: BELL FUELS, INC
Label Street: 4116 WEST PATERSON AVE
Label City: CHICAGO
Label State: IL
Label Zip Code: 60646
Label Country: US
Label Emergency Number: 312-286-0200

CONOCO -- DIESEL FUEL NO. 2 - DIESEL FUEL
MATERIAL SAFETY DATA SHEET
NSN: 9140002865296
Manufacturer's CAGE: 15445
Part No. Indicator: A
Part Number/Trade Name: DIESEL FUEL NO. 2

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General Information
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Item Name: DIESEL FUEL
Company's Name: CONOCO INC
Company's Street: 600 N DAIRY ASHFORD RD RM 3012
Company's P. O. Box: 4784
Company's City: HOUSTON
Company's State: TX
Company's Country: US
Company's Zip Code: 77210-4784
Company's Emerg Ph #: 713-293-5550/800-424-9300
Company's Info Ph #: 713-293-5550
Record No. For Safety Entry: 029
Tot Safety Entries This Stk#: 093
Status: SMU
Date MSDS Prepared: 14AUG91
Safety Data Review Date: 24JUN92
Supply Item Manager: KY
MSDS Serial Number: BMZTT
Specification Number: VV-F-800
Spec Type, Grade, Class: GRADE DF-2
Hazard Characteristic Code: F4

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Ingredients/Identity Information
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Proprietary: NO
Ingredient: PETROLEUM MID-DISTILLATE (DIESEL MARINE FUEL)
Ingredient Sequence Number: 01
Percent: 100 %
NIOSH (RTECS) Number: 1004302PE
CAS Number: 68476-34-6
OSHA PEL: 5 MG/M3 AS OIL MIST
ACGIH TLV: 5 MG/M3 AS OIL MIST
Other Recommended Limit: NONE SPECIFIED

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Physical/Chemical Characteristics
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Appearance And Odor: CLEAR OR LIGHT YELLOW LIQUID, AROMATIC ODOR
Boiling Point: 350 - 680F
Melting Point: NOT GIVEN
Vapor Pressure (MM Hg/70 F): 1 MMHG
Vapor Density (Air=1): > 1
Specific Gravity: 0.85 - 0.93
Decomposition Temperature: NOT GIVEN
Evaporation Rate And Ref: NIL
Solubility In Water: INSOLUBLE
Percent Volatiles By Volume: NIL
Corrosion Rate (IPY): UNKNOWN

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Fire and Explosion Hazard Data

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Flash Point: 130F,54C
Flash Point Method: TCC
Lower Explosive Limit: 0.4 %
Upper Explosive Limit: 6 %
Extinguishing Media: WATER SPRAY, FOAM, DRY CHEMICAL CAARBON DIOXIDE
Special Fire Fighting Proc: USE WATER TO KEEP FIRE-EXPOSED CONTAINERS
COOL. IF LEAK OR SPILL HAS NOT IGNITIED, USE WATER SPRAY TO DISPERSE THE
VAPORS AND TO PROVIDE PROTECTION.
Unusual Fire And Expl Hazrds: PRODUCTS OF COMBUSTION MAY CONTAIN CARBON
MONOXIDE, CARBON DIOXIDE AND OTHER TOXIC MATERILS. DO NOT ENTER ENCLOSED OR
CONFINED SPACE WITHOUT PROPER PPE.
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Reactivity Data

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Stability: YES
Cond To Avoid (Stability): AVOID HEAT AND FLAME
Materials To Avoid: INCOMATIBLE WITH OXIDIZING MATERIALS.
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Health Hazard Data

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Precautions for Safe Handling and Use
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Control Measures

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Transportation Data
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Disposal Data

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Label Data
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Label Required: YES
Technical Review Date: 24JUN92
MFR Label Number: NONE
Label Status: G
Common Name: DIESEL FUEL NO. 2
Chronic Hazard: NO
Signal Word: CAUTION!
Acute Health Hazard-Slight: X
Contact Hazard-Slight: X
Fire Hazard-Slight: X
Reactivity Hazard-None: X
Special Hazard Precautions: STORE IN WELL VENTILATED AREEA. KEEP CONTAINER
TIGHTLY CLOSED. STORE IN ACCORDANCE WITH NATIONAL FIRE PROTECTION ASSN
REGULATIONS. FIRST AID: INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING,
GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. CALL A
PHYSICIAN. SKIN: FLUSH SKIN WITH WATER AFTER CONTACT. REMOVE CONTAMINATED
CLOTHING. EYES: IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES. CALL A
PHYSICIAN. INGESTION: DO NOT INDUCE VOMITING. IMMEDIATELY GIVE TWO GLASSES
OF WATER. NEVER GIVE ANYTHING TO IF UNCONCIOUS. CALL MD
Protect Eye: Y
Protect Skin: Y

Label Name: CONOCO INC
Label Street: 600 N DAIRY ASHFORD RD RM 3012
Label P.O. Box: 4784
Label City: HOUSTON
Label State: TX
Label Zip Code: 77210-4784
Label Country: US
Label Emergency Number: 713-293-5550/800-424-9300