FORA ESCA REMEDIATION PROGRAM

FINAL

Group 3

Remedial Investigation / Feasibility Study

Volume 1: Remedial Investigation

Del Rey Oaks / Monterey, Laguna Seca Parking, and Military Operations in Urban Terrain Site Munitions Response Areas

Former Fort Ord
Monterey County, California

July 31, 2012

Prepared for:

FORT ORD REUSE AUTHORITY

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Group 3 Remedial Investigation/Feasibility Study
Volume 1: Remedial Investigation
Former Fort Ord
Monterey County, California

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ACRONYMS AND ABBREVIATIONS

AAR	After-Action Report
ACES	Areas Covered by Environmental Services
AOC	Administrative Order on Consent
ARAR	applicable or relevant and appropriate requirement
Army	United States Department of the Army
ARTEP	Army Training and Evaluation Program
ASR	Archives Search Report
bgs	below ground surface
BO	biological opinion
BRA	Basewide Range Assessment
BRAC	Base Realignment and Closure
CBR	chemical, biological, and radiological
CEHND	United States Army Corps of Engineers, Huntsville Division
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMS	CMS Environmental, Inc.
COC	chemical of concern
CSM	Conceptual Site Model
CSUMB	California State University Monterey Bay
CTS	California tiger salamander
DMM	discarded military munitions
DOD	United States Department of Defense
DRO	Del Rey Oaks
DTSC	Department of Toxic Substances Control
EOD	Explosive Ordnance Disposal
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
ESCA RP	Environmental Services Cooperative Agreement Remediation Program
FFA	Federal Facility Agreement
FORA	Fort Ord Reuse Authority
FOSET	Finding of Suitability for Early Transfer
FS	Feasibility Study
ft	feet
FVF	Field Variance Form
GIS	Geographical Information System
GPS	Global Positioning System
HA	historical area
HC	hexachlorethane
HE	high explosive

HFA	Human Factors Applications, Inc.
HLA	Harding Lawson Associates
HMP	Habitat Management Plan
HTW	hazardous and toxic waste
IRP	Installation Restoration Program
lbs	pounds
LE	low explosive
MD	munitions debris
MEC	munitions and explosives of concern
mm	millimeter
MMRP	Military Munitions Response Program
MOUT	Military Operations in Urban Terrain
MR	Munitions Response
MRA	Munitions Response Area
MRS	Munitions Response Site
msl	mean sea level
NCP	National Contingency Plan
NERL	National Exposure Research Laboratory
NPL	National Priorities List
NRMA	natural resources management area
ODDS	Ordnance Detection and Discrimination Study
OE	ordnance and explosives
PA/SI	Preliminary Assessment/Site Inspection
PES	potential explosion site
QA	quality assurance
QA/QC	quality assurance/quality control
QC	quality control
RA	Risk Assessment
RAO	remedial action objective
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RWQCB	Regional Water Quality Control Board
SEDR	Summary of Existing Data Report
SS/GS	SiteStats/GridStats
SOP	standard operating procedure
TCRA	Time-Critical Removal Action

USA	USA Environmental, Inc.
USACE	United States Army Corps of Engineers
USAESCH	United States Army Engineering Support Center, Huntsville
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
UXB	UXB International, Inc.
UXO	unexploded ordnance
WWII	World War II

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GLOSSARY

Anomaly
Any item that is seen as a subsurface irregularity after geophysical investigation. This irregularity should deviate from the expected subsurface ferrous and nonferrous material at a site (i.e., pipes, power lines, etc.).

Anomaly Avoidance
Techniques employed by unexploded ordnance (UXO) personnel at sites with known or suspected munitions and explosives of concern (MEC) to avoid any potential surface MEC and any subsurface anomalies. This usually occurs at mixed hazard sites when hazardous, toxic, and radioactive waste investigations must occur prior to execution of an MEC removal action. Intrusive anomaly investigation is not authorized during ordnance avoidance operations.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980
CERCLA authorizes federal action to respond to the release or threatened release of hazardous substances into the environment or a release or threatened release of a pollutant or contaminant into the environment that may present an imminent or substantial danger to public health or welfare.

Construction Support
Assistance provided by DOD explosive ordnance disposal (EOD) or UXO-qualified personnel and/or by personnel trained and qualified for operations involving chemical agents (CA), regardless of configuration, during intrusive construction activities on property known or suspected to contain UXO, other munitions that may have experienced abnormal environments (e.g., DMM), munitions constituents in high enough concentrations to pose an explosive hazard, or CA, regardless of configuration, to ensure the safety of personnel or resources from any potential explosive or CA hazards.

Covenant Deferral Request
A letter along with a supporting information package known as a Covenant Deferral Request (CDR) is assembled by the Federal landholding to formally request deferral of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) covenant until all remediation has been accomplished prior to transfer. United States Environmental Protection Agency (EPA) requires that the information is: 1) of sufficient quality and quantity to support the request for deferral of the CERCLA Covenant; and 2) that it provides a basis for EPA to make its determination. This information is submitted to EPA in the form of a CDR.

Deferral period
The period of time that the CERCLA covenant warranting that all remedial action is complete before transfer, is deferred through the Early Transfer Authority.

Discarded Military Munitions (DMM)
Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include UXO, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations. (10 U.S.C. 2710[e][2])

Early Transfers
The transfer by deed of federal property by United States Department of Defense (DOD) to a nonfederal entity before all remedial actions on the property have been taken. Section 120 (h)(3)(C) of the CERCLA allows Federal agencies to transfer property before all necessary cleanup actions have been taken. This provision, known as early transfer authority, authorizes the deferral of the CERCLA covenant when the findings required by the statute can be made and the response action assurances required by the statute are given. The Governor of the state where the property is located must concur with the deferral request for property not listed on the National Priorities List (NPL). For NPL property, the deferral must be provided by the EPA with the concurrence of the Governor. Upon approval to defer the covenant, DOD may proceed with the early transfer.

ESCA RP Team
ARCADIS U.S., Inc. (formerly LFR Inc.), Weston Solutions, Inc., and Westcliffe Engineers, Inc.

Exclusion Zone
A safety zone established around a MEC work area. Only essential project personnel and authorized, escorted visitors are allowed within the exclusion zone. Examples of exclusion zones are safety zones around MEC intrusive activities and safety zones where MEC are intentionally detonated.

Explosive
A substance or a mixture of substances that is capable by chemical reaction of producing gas at such temperature, pressure, and speed as to cause damage to the surroundings. The term "explosive" includes all substances variously known as high explosives and propellants, together with igniters, primers, initiators, and pyrotechnics (e.g., illuminant, smoke, delay, decoy, flare, and incendiary compositions).

Feasibility Study (FS)
The primary objective of the FS is "to ensure appropriate remedial alternatives are being developed and evaluated and an appropriate remedy selected" (NCP 40 CFR 300.430[e]).

Geophysical Reacquisition
Geophysical Reacquisition involves utilizing both a positioning method (i.e., Global Positioning System [GPS], ultrasonic, or tape from corners) and geophysical instruments to reacquire and pinpoint anomaly locations selected by the geophysical processors. The geophysical instruments include the original instrument used for the digital survey of the grid and the analog instrument being utilized by the UXO teams for intrusive activities. The

intended result of this method is to pinpoint the location where the intrusive teams will find the subsurface item causing the anomaly.

Intrusive Activity
An activity that involves or results in the penetration of the ground surface at an area known or suspected to contain MEC. Intrusive activities can be of an investigative or removal action nature.

Mag and dig
Utilizing handheld geophysical instruments to detect anomalies and immediately investigating the anomalies (without using collection of digital data and post processing to determine which anomalies to dig) by manual digging or with the assistance of heavy equipment.

Material Documented as Safe (MDAS)
Material Potentially Presenting an Explosive Hazard (MPPEH) that has been assessed and documented as not presenting an explosive hazard and for which the chain of custody has been established and maintained. This material is no longer considered to be MPPEH.

Material Documented as an Explosive Hazard (MDEH)
MPPEH that cannot be documented as MDAS, that has been assessed and documented as to the maximum explosive hazards the material is known or suspected to present, and for which the chain of custody has been established and maintained. This material is no longer considered to be MPPEH.

Material Potentially Presenting an Explosive Hazard (MPPEH)
Material that, prior to determination of its explosives safety status, potentially contains explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or potentially contains a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization, or disposal operations). Excluded from MPPEH are munitions within DOD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.

Memorandum of Agreement (MOA)
"Memorandum of Agreement Among the Fort Ord Reuse Authority, Monterey County and Cities of Seaside, Monterey, Del Rey Oaks and Marina, California State University Monterey Bay, University of California Santa Cruz, Monterey Peninsula College, and the Department of Toxic Substances Control Concerning Monitoring and Reporting of Environmental Restrictions on the Former Fort Ord, Monterey County, California."

Military Munitions
All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the

control of the DOD, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives, and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components of the above. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, other than non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed. (10 U.S.C. 101[e][4][A through C]).

Military Munitions Response Program (MMRP)
Department of Defense-established program that manages the environmental, health and safety issues presented by munitions of explosives concern.

Minimum Separation Distance (MSD)
Minimum distance between a potential explosion site (PES) and personnel, assets, or structures, required to provide the appropriate level of protection from a detonation (either intentional or unintentional) at the PES.

Munitions and Explosives of Concern (MEC)
This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) UXO, as defined in 10 U.S.C. 101(e)(5)(A) through (C); (B) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710(e)(2); or (C) Munitions constituents (e.g., TNT, RDX), as defined in 10 U.S.C. 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

Munitions Constituents (MC)
Any materials originating from UXO, discarded military munitions, or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions (10 U.S.C. 2710).

Munitions Debris (MD)
Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.

Munitions Response Area (MRA)
Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples include former ranges and munitions burial areas. A munitions response area is comprised of one or more munitions response sites.

Munitions Response Site (MRS)
A discrete location within an MRA that is known to require a munitions response.

Ordnance and Explosives (OE)
See MEC.

Potential Explosion Site (PES)
The location of a quantity of ammunitions and explosives that will create a blast, fragment, thermal, or debris hazard in the event of an accidental explosion of its contents.

Quality Assurance (QA)
An integrated system of management activities involving planning, implementation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed to meet project requirements.

Quality Control (QC)
The overall system of operational techniques and activities that measures the attributes and performance of a process, item, or service against defined standards that are used to fulfill requirements for quality.

Record of Decision (ROD)
A ROD is the document used to record the remedial action decision made at a National Priorities List property. The ROD will be maintained in the project Administrative Record and project file.

Remedial Investigation (RI)
The RI is intended to "adequately characterize the site for the purpose of developing and evaluating an effective remedial alternative" (NCP, 40 CFR 300.430[d]). In addition, the RI provides information to assess the risks to human health, safety, and the environment that were identified during risk screening in the site investigation.

Remedial Actions
Those actions consistent with a permanent remedy taken instead of or in addition to removal actions in the event of a release or threatened release of a hazardous substance into the environment, to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health, welfare, or the environment. The term includes but is not limited to such actions at the location of the release as storage; confinement; perimeter protection using dikes, trenches, or ditches; clay cover; neutralization; cleanup of released hazardous substances and associated contaminated materials; recycling or reuse; diversion; destruction; segregation of reactive wastes; dredging or excavations; repair or replacement of leaking containers; collection of leachate and runoff; on-site treatment or incineration; provision of alternative water supplies; and any monitoring reasonably required to assure that such actions protect the public health, welfare, and the environment. The term includes the costs of permanent relocation of residents and businesses and community facilities where the President of the United States determines that, alone or in combination with other measures, such relocation is more cost-effective and environmentally preferable to the transportation, storage, treatment, destruction, or secure disposition off site of hazardous substances, or may otherwise be necessary to protect the public health or welfare. The term includes off-site transport and off-site storage, treatment, destruction, or secure disposition of hazardous substances and associated contaminated materials.

Response Action
Action taken instead of or in addition to a removal action to prevent or minimize the release of MEC so that it does not cause substantial danger to present or future public health or welfare or the environment.

Unexploded Ordnance (UXO)
Military munitions that (A) have been primed, fuzed, armed, or otherwise prepared for action; (B) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material; and (C) remain unexploded either by malfunction, design, or any other cause (10 U.S.C. 101[e][5][A] through [C]).

UXO-Qualified Personnel
Personnel who have performed successfully in military EOD positions, or are qualified to perform in the following Department of Labor, Service Contract Act, Directory of Occupations, contractor positions: UXO Technician II, UXO Technician III, UXO Safety Officer, UXO Quality Control Specialist, or Senior UXO Supervisor.

UXO Technicians
Personnel who are qualified for and filling Department of Labor, Service Contract Act, Directory of Occupations, contractor positions of UXO Technician I, UXO Technician II, and UXO Technician III.

1.0 INTRODUCTION

The former Fort Ord is located near Monterey Bay in northwestern Monterey County, California (Figure 1-1). Since 1917, portions of the former Fort Ord were used by the United States Department of the Army (Army) for maneuvers, target ranges, and other purposes. Military munitions were fired into, fired upon, or used on the facility. As a result, a wide variety of conventional munitions and explosives of concern (MEC), both unexploded ordnance (UXO) and discarded military munitions (DMM) items, have been encountered at sites throughout the former Fort Ord.

This Group 3 Remedial Investigation/Feasibility Study (RI/FS) Report ("the Group 3 RI/FS Report") was prepared by the Environmental Services Cooperative Agreement Remediation Program (ESCA RP) Team ("the ESCA RP Team") on behalf of the Fort Ord Reuse Authority (FORA) in compliance with an Administrative Order on Consent (AOC), which addresses cleanup of portions of the former Fort Ord in Monterey County, California. The ESCA RP Team consists of ARCADIS-U.S., Inc (formerly LFR Inc.), Weston Solutions, Inc., and Westcliffe Engineers, Inc.

The AOC was entered into voluntarily by the United States Environmental Protection Agency (EPA) Region 9, the Department of Toxic Substances Control (DTSC), FORA, and the United States Department of Justice Environment and Natural Resources Division (EPA Region 9 CERCLA Docket No. R9-2007-03). This AOC was issued under the authority vested in the President of the United States by Sections 104, 106, and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 United States Code (U.S.C.) §§ 9604, 9606, and 9622.

As described in the Summary of Existing Data Report (SEDR; ESCA RP Team 2008), Group 3 includes the Del Rey Oaks/Monterey (DRO/Monterey) Munitions Response Area (MRA), the Laguna Seca Parking MRA, the Military Operations in Urban Terrain (MOUT) Site MRA, and the Interim Action Ranges MRA (Figure 1-2). The Interim Action Ranges MRA has been removed from this Group 3 RI/FS report for further evaluation as agreed upon by FORA, the EPA, DTSC, and the Army. The Interim Action Ranges MRA will be presented in a separate RI/FS report.

This Group 3 RI/FS Report: 1) describes the nature and extent of MEC; 2) assesses explosives safety risk that may be present; and 3) develops, screens, and evaluates alternatives to reduce the potential explosives safety risk to current and future property owners and the general public. This Group 3 RI/FS report will be used by the Army in developing the Proposed Plan and making a decision on remedial actions. The report is based on the evaluation of work conducted for the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs according to the guidance provided in the Group 3 RI/FS Work Plan (ESCA RP Team 2009).

1.1 Objectives and Purpose

The RI/FS process as outlined in the EPA guidance (EPA 1988) represents the methodology that the Superfund program has established for characterizing the nature and extent of risk

posed by contaminated sites and for evaluating potential remedial options. The objectives of the Group 3 RI/FS are to:

- validate existing data;
- determine nature and extent of MEC;
- complete the Fort Ord Ordnance and Explosives Risk Assessment (RA) if explosives safety risk is present; and
- develop and evaluate an appropriate range of remedial action alternatives to support remedy selection if explosives safety risk is present.

The purposes of the Group 3 RI as defined under Task 4 of the AOC Scope of Work are to gather information necessary to describe the nature and extent of MEC, conduct baseline risk assessment, and develop preliminary remedial action objectives. The purposes of the Group 3 FS as defined under Task 5 of the AOC Scope of Work are to screen remedial technologies, develop remedial alternatives, identify applicable or relevant and appropriate requirements (ARARs), refine remedial action objectives, and conduct a detailed evaluation of remedial alternatives. In compliance with AOC paragraph 25, the Group 3 RI/FS was conducted in accordance with CERCLA, the National Contingency Plan (NCP), and applicable guidance, in addition to the Group 3 RI/FS Work Plan (ESCA RP Team 2009).

The Group 3 RI/FS will be used by the Army in developing the Proposed Plan and making a decision on remedial actions for the MRAs.

1.2 Former Fort Ord Military Munitions Response Program

This section summarizes the munitions response program related to MEC cleanup that was implemented at the former Fort Ord by the Army and the subsequent program that was implemented to continue MEC remediation in portions of the former Fort Ord by FORA.

1.2.1 Cleanup Program Under the Army

The former Fort Ord was placed on the National Priorities List (NPL) in 1990 primarily because of chemical contamination in soil and groundwater that resulted from past Army use. To oversee the cleanup of the base, the Army, EPA, DTSC, and Central Coast Regional Water Quality Control Board (RWQCB) entered into a Federal Facility Agreement (FFA). One of the purposes of the FFA was to ensure that the environmental impacts associated with past and present activities at the former Fort Ord were thoroughly investigated and appropriate remedial action taken as necessary to protect public health and the environment. In accordance with the FFA, the Army was designated as the lead agency under CERCLA for conducting environmental investigations, making cleanup decisions, and taking cleanup actions at the former Fort Ord. The EPA was designated as the lead regulatory agency for the cleanup, while the DTSC and RWQCB were designated as supporting agencies.

The Army has conducted a number of MEC survey and clearance activities, including geophysical surveys. The Army has conducted its activities pursuant to the President of the

United States' authority under CERCLA Section 104, as delegated to the Army in accordance with Executive Order 12580 and in compliance with CERCLA Section 120.

In November 1998, the Army agreed to evaluate MEC at the former Fort Ord and perform a basewide munitions response (MR) RI/FS consistent with CERCLA. The basewide MR RI/FS program addressed MEC hazards at the former Fort Ord and evaluated past removal actions as well as recommended future remedial actions deemed necessary to protect human health and the environment under future uses. In April 2000, an agreement was signed between the Army, EPA, and DTSC to evaluate MEC at the former Fort Ord subject to the provisions of the FFA. The signatories agreed that the FFA provided the appropriate framework and process to address the Army's MEC activities. The FFA established schedules for performing RIs and FSs, and required that remedial actions be completed expeditiously.

The basewide MR RI/FS program is described in the Draft Final Ordnance and Explosives RI/FS Work Plan (United States Army Corps of Engineers [USACE] 2000). Elements of the MR RI/FS program include a literature review, preparation of a Sampling and Analysis Plan for additional MEC characterization activities, evaluation of MEC work by previous contractors, performance of an Ordnance Detection and Discrimination Study (ODDS), identification of ARARs, evaluation of risks, and development of long-term risk management measures, a community relations plan, and a health and safety plan. The MR RI/FS program only addresses the physical risk from MEC. The potential for soil contamination from munitions constituents at the former Fort Ord is being addressed under the Army's Basewide Range Assessment (BRA) Program (Shaw/MACTEC 2009).

The Army's approach to categorizing areas within the former Fort Ord includes track groupings consisting of Track 0 through Track 3. Specifically, track definitions are as follows:

- Track 0: Areas that contain no evidence of MEC and have never been suspected of having been used for military munitions-related activities. In June 2002, the Army signed a Track 0 Record of Decision (ROD; Army 2002). The Track 0 ROD addresses selected land parcels, and also provides a Plug-In process to address future land parcels that are considered eligible for inclusion in the Track 0 process.
- Track 1: Sites where military munitions were suspected to have been used but, based on results, the sites fall into one of three categories: 1) sites with no evidence to indicate that military munitions were used; 2) sites used for training but military munitions used do not pose an explosive hazard; or 3) sites used for training but military munitions potentially remaining do not pose an unacceptable risk. In April 2005, the Army signed a Track 1 ROD (Army 2005). The Track 1 ROD addresses selected land parcels, and also provides a Plug-In process to address future land parcels that are considered eligible for inclusion in the Track 1 process.
- Track 2: Sites where MEC were present and MEC removal has been conducted.
- Track 3: Sites where MEC are known or suspected but investigations have not been initiated or completed.

In addition, to remain consistent with the federal Endangered Species Act (ESA), the Army has completed consultations with the United States Fish and Wildlife Service (USFWS) on the Army's predisposal actions, including cleanup of MEC. These consultations have resulted in the development of biological opinions (BOs) that include endangered species incidental take statements. These BOs allow impacts to, and incidental takes of, listed species during MEC cleanup activities, but require mitigation measures to be implemented during the MEC cleanup activities to reduce and minimize impacts to the protected species and their habitats.

1.2.2 Early Transfer Property and Environmental Services Cooperative Agreement

The transfer of a portion of the former Fort Ord, pursuant to CERCLA Section 120(h)(3)(C), was requested by FORA in a letter dated May 18, 2005. Under CERCLA Section 120(h)(3), the United States is required to provide a covenant in deeds conveying the property warranting that all remedial action necessary to protect human health and the environment has been taken before the date of transfer. For a federal facility listed on the NPL, CERCLA Section 120(h)(3)(C) allows the EPA administrator, with concurrence of the governor of the state, to defer the CERCLA covenant requirement. These types of transfers under CERCLA Section 120(h)(3)(C) are typically called "early transfers," in which the United States provides the warranty after transfer of the property when all of the response actions necessary to protect human health and the environment have been taken. The period between the transfer of title and the making of this final warranty is known as the "deferral period." Early transfers allow productive reuse of the property through access while final remediation work is being conducted. In addition, United States Department of Defense (DOD) and Army policy require that the military department proposing to transfer property prepare a Finding of Suitability for Early Transfer (FOSET).

The Army completed the final "Finding of Suitability for Early Transfer (FOSET), Former Fort Ord, California, Environmental Services Cooperative Agreement (ESCA) Parcels, and Non-ESCA Parcels (Operable Unit Carbon Tetrachloride Plume) (FOSET 5)" (Army 2007). The Army requested deferral of the CERCLA covenant and EPA approved, with the concurrence of the Governor of the State of California, the Covenant Deferral Request associated with the early transfer of the property.

On March 31, 2007, the Army and FORA entered into an ESCA to provide MEC remediation services during the deferral period, thereby allowing the Army to transfer approximately 3,340 acres of property and the responsibility of removing MEC to FORA as an Economic Development Conveyance. The former Fort Ord Property transferred under the ESCA is collectively referred to as the Areas Covered by Environmental Services (ACES). In accordance with the ESCA, FORA is responsible for addressing response actions for the property except for those responsibilities retained by the Army. The ESCA and the AOC identify the Army-retained conditions for which the Army assumes responsibility. If these conditions are encountered, FORA is required to notify the Army of their presence in accordance with the guidelines set forth in the ESCA. Included in the Army-retained conditions are:

- Radiological material

- Chemical or biological warfare agents
- Natural resource injuries or damages occurring as a result of contamination releases that have occurred due to Army ownership or activities except to the extent such injuries are a direct result of FORA's activities
- Unknown uninsured conditions, which include the management and cleanup of non-MEC-related hazardous and toxic wastes above insurance parameters
- Perchlorate contamination in soil or groundwater

To accomplish this effort, FORA entered into an agreement with the ESCA RP Team, to assist in the completion of the MEC remediation activities in accordance with the ESCA and the AOC. During the ESCA RP, FORA is responsible for administrative and management program elements, while the ESCA RP Team conducts the MEC remediation work under FORA oversight.

1.2.3 FORA ESCA Remediation Program

The primary objective of the ESCA RP is timely cleanup of the property in accordance with the ESCA and AOC. The potential for soil contamination from munitions constituents at the former Fort Ord is being addressed under the Army's BRA Program (Shaw/MACTEC 2009). As stated in FOSET 5, based on the BRA Program, no further action has been recommended for historical areas (HAs) within the Laguna Seca Parking, MOUT Site, and DRO/Monterey MRAs. In addition, Laguna Seca Parking and MOUT Site MRAs are part of Installation Restoration Program Site 39 at the former Fort Ord. Previous soil remediation activities were conducted as part of the Site 39 program, which has an existing ROD.

The SEDR was completed for the ACES as required under Task 2 of the AOC Scope of Work (ESCA RP Team 2008). In the SEDR, the ACES were combined into nine MRAs to facilitate the implementation of the AOC. The SEDR provided a site overview, evaluation of existing data, identification of data gaps, a conceptual site model (CSM) including an initial assessment of explosives safety risks, and proposed future use for each MRA. The SEDR also presented conclusions and recommendations for further actions and formed the basis for the RI planning efforts.

The nine MRAs were consolidated into four groups, according to similar pathway-to-closure characteristics (Figure 1-2). Group 1 consists of the Parker Flats and Seaside MRAs. Group 2 consists of the California State University Monterey Bay (CSUMB) Off-Campus and County North MRAs. Group 3 consists of the Interim Action Ranges, Laguna Seca Parking, MOUT Site, and DRO/Monterey MRAs. Group 4 consists of the Future East Garrison MRA (ESCA RP Team 2008). The Interim Action Ranges MRA has been removed from this Group 3 RI/FS report for further evaluation as agreed upon by FORA, the EPA, DTSC, and the Army. The Interim Action Ranges MRA will be presented in a separate RI/FS report.

1.2.4 Regulatory Pathway to Closure

A detailed regulatory pathway to closure for the Group 3 MRAs was developed and presented in the SEDR (ESCA RP Team 2008). The findings and conclusions presented in the SEDR were that the existing data were sufficient to proceed to the RI/FS. The pathway to closure began with the preparation of the Group 3 RI/FS Work Plan, which was finalized in November 2009 (ESCA RP Team 2009). The Interim Action Ranges MRA was included in the Group 3 RI/FS Work Plan; however, it is not presented in this RI/FS Report. The Interim Action Ranges MRA has been removed from this Group 3 RI/FS report for further evaluation as agreed upon by FORA, the EPA, DTSC, and the Army and as described in the Final Phase II Interim Action Work Plan for the Interim Action Ranges MRA (ESCA RP Team 2011). The Interim Action Ranges MRA will be presented in a separate RI/FS report. Therefore, this Group 3 RI/FS Report focuses on the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs, and has been prepared using existing data and information generated by the Army. Upon completion of the RI/FS Report, an Army Proposed Plan and ROD will be prepared to document remedial actions necessary to achieve regulatory closure under CERCLA. Following approval of the Army ROD, the remaining regulatory requirements will include the preparation of a Remedial Design/Remedial Action Work Plan and an Institutional Control Implementation Plan, execution of necessary remedial actions as appropriate, and preparation of a Remedial Action Completion Report to document that all requirements for closure have been met.

1.3 Report Organization

The Group 3 RI/FS Report is organized with the RI, RA, and FS in three volumes as follows.

Volume 1: Remedial Investigation

This volume provides the results of the Group 3 RI and includes the following components:

- **Section 1 – Introduction.** This section provides the purpose of the report and background information on the Army's military munitions response program (MMRP) and the FORA ESCA RP.
- **Section 2 – Background.** This section presents the Fort Ord military munitions-related history, physical setting, and background information on the basewide MR RI/FS.
- **Section 3 – Group 3 MRA Remedial Investigation Process.** This section describes the major decision points to be addressed during the RI and the process of validation of the data.
- **Sections 4 through 6 – Group 3 Remedial Investigation.** These sections provide the RI for DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs to include background, updates to the CSM presented in the SEDR, and the results and evaluation of the data collected during munitions response activities. The DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs are presented in Sections 4 through 6, respectively.

- **Section 7 – References.** This section provides a list of references for pertinent documents cited in the report.

Volume 2: Explosives Safety Risk Assessment

This volume provides the results of the Group 3 explosives safety risk assessment (RA), which describes the qualitative and quantitative factors potentially resulting in a receptor encountering an MEC item. The RA is then used to develop and evaluate remedial alternatives during the FS. The Group 3 RA includes the following components:

- **Section 1 – Introduction.** This section will provide the purpose and objectives of the RA.
- **Section 2 – Data and Data Usability.** This section provides an evaluation of the data and data usability to support a RA.
- **Sections 3 through 5** – **Group 3 Risk Assessment.** Sections 3 through 5 present the results of the RA for the individual MRAs: DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs, respectively. The findings are comprised of four different subsections. The first subsection, Reuse Areas and Future Land Use Receptors, identifies the selected receptors for the various reuse areas for the specific MRA. The second subsection presents the RA results comprised of the assumptions and results of risk analysis for each of the reuse areas of the MRA. Third, the uncertainties related to the data, input components, and future land use and associated receptors are presented. Lastly, conclusions are presented including a summary of the RA results.
- **Section 6 – References.** This section provides a list of references for pertinent documents cited in the report.

Volume 3: Feasibility Study

This volume provides the results of the Group 3 FS that identifies and selects preferred remedial alternatives to address potential after-action MEC risks. It presents the remedial alternative objectives (RAOs), identification of alternatives, screening of alternatives, and selection of alternatives. The FS also describes the proposed plan and ROD process. The Group 3 FS includes the following components:

- **Section 1 – Introduction.** This section describes the purpose and objectives of the FS and presents background information on the Group 3 RI/FS process.
- **Section 2 – Remedial Approach.** This section defines the reuse areas for which remedial alternatives are developed, and describes the RAOs, application of RA results, ARARs, land use control guidelines that will be applied in the development of remedial alternatives, and ongoing and future MEC-related activities at the former Fort Ord that are components of the Army's basewide efforts to promote MEC safety.
- **Section 3 – Identification of Applicable Response Actions.** This section identifies the range of applicable response actions for MEC risk management at the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs, such as no further action, land use controls, and additional MEC remediation.

- **Section 4 – Development of Remedial Alternatives.** This section presents long-term management measures specific to implementation and management of the remedial alternatives selected for the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs, and also includes a screening of response action components, development of remedial alternatives, and identification of potential ARARs associated with implementation.
- **Section 5 – Evaluation and Comparison of Remedial Alternatives.** This section presents an evaluation and comparison of remedial alternatives for each of the reuse areas in the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs.
- **Section 6 – Identification of the Preferred Remedial Alternative.** This section presents and summarizes the preferred remedial alternative for each reuse area.
- **Section 7 – Approval Process.** This section describes the approval process for documenting the preferred alternative(s) for implementation at each of the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRA reuse areas in the Proposed Plan and ROD.
- **Section 8 – References.** This section provides a list of references for pertinent documents cited in the report.

2.0 BACKGROUND

This section provides a summary of the general history, climate, groundwater conditions, and cultural resources of the former Fort Ord. This section also provides a description of the physical setting, hazardous and toxic waste (HTW) history and conditions, biological resources, structures and utilities, and land use that are specific to each of the Group 3 MRAs.

2.1 Fort Ord General History

Beginning with its founding in 1917, Fort Ord served primarily as a training and staging facility for cavalry and infantry troops and was known as the Camp Ord Military Reservation. In 1940, the 7th Infantry Division was activated at Fort Ord for training and eventually assigned to Korea in 1947. From 1947 to 1974, Fort Ord was a basic infantry training center, which included training for the 4th, 5th, and 6th Infantry Divisions. In 1974, the 7th Infantry Division was reactivated at Fort Ord and was eventually converted to a light infantry division in 1983, which operated and trained without heavy tanks, armor, or artillery (USACE 1993).

Fort Ord was selected in 1991 for Base Realignment and Closure (BRAC), but troop reallocation was not completed until 1993. The base was officially closed in September 1994. Although Army personnel still operate the base, no active Army divisions are stationed at the former Fort Ord.

2.2 Fort Ord Climate

The climate of the area of the former Fort Ord is characterized by warm, dry summers and cool, rainy winters. The Pacific Ocean is the principal influence on the climate at the former Fort Ord, and the source of fog and onshore winds that moderate temperature extremes. Daily ambient air temperatures typically range from 40 to 70 degrees Fahrenheit, but temperatures in the low 100 degrees Fahrenheit have occurred. Thick morning fog is common throughout the year. Winds are generally from the west. The average annual rainfall of 14 inches occurs almost entirely between November and April. Storm-water runoff is limited because the predominant soil is permeable sand.

2.3 Fort Ord Groundwater

The Salinas Groundwater Basin is the main hydrogeologic unit that underlies the former Fort Ord. The depth to groundwater is estimated to be greater than 100 ft below ground surface (bgs). There are no known drinking water wells within the boundaries of the MRAs. The occurrence of groundwater beneath the MRA is not expected to influence geophysical surveys conducted for MEC remediation activities.

2.4 Fort Ord Cultural Resources

According to archaeological records, the greater Monterey Peninsula was occupied by Native American groups, including the Ohlone (Costanoan) Indians (EA 1991). Monterey County has designated the southeastern margin of the former Fort Ord as an archaeologically

sensitive zone based on two known archaeological sites (EA 1991). The remaining portions of the former Fort Ord have been designated as having low or no archaeological sensitivity.

Actions to be taken at the Group 3 MRAs will be in compliance with the Programmatic Agreement among the Department of the Army, the Advisory Council on Historic Preservation, and the California State Historic Preservation Officer Regarding the Base Closure and Realignment Actions at Fort Ord, California.

2.5 DRO/Monterey MRA

The following sections provide a description of the physical setting, HTW history and conditions, biological resources, structures and utilities, and land use that are specific to the DRO/Monterey MRA.

2.5.1 Location and Description

The DRO/Monterey MRA is located in the southwestern portion of the former Fort Ord, along South Boundary Road (Figure 2-1). The DRO/Monterey MRA contains the following four USACE property transfer parcels: E29.1, L6.2, L20.13.1.2, and L20.13.3.1 (Figure 2-2). The DRO/Monterey MRA is contained within the jurisdictional boundaries of the City of Del Rey Oaks and the City of Monterey.

The DRO/Monterey MRA encompasses approximately 29 acres of undeveloped land (Parcels E29.1 and L6.2) and 5.245 acres of a portion of the existing South Boundary Road and associated right-of-way (Parcels L20.13.2 and L20.13.3.1.). To facilitate MEC investigations and removal activities, the area was designated as a Munitions Response Site (MRS). The MRS was identified through a review of Fort Ord records completed for the Revised Fort Ord Archive Search Report (ASR; USACE 1997a). The DRO/Monterey MRA is comprised of two non-contiguous portions of MRS-43 and a portion of the South Boundary Road, which is not located within the boundaries of an MRS (Figure 2-3). The DRO/Monterey MRA is bounded by MRS-15 DRO.1 along the northern side of South Boundary Road and by Track 1 sites to the northwest (no MRS designation) and southeast (formerly MRS-43A).

Access to the DRO/Monterey MRA is partially restricted by four-strand barbed-wire fencing, which is not complete around the entire MRA, allowing access to the MRA. South Boundary road is an active roadway with vehicle traffic on a daily basis. This is a major roadway of the FORA transportation network and is scheduled for upgrade and improvement in the FORA Capital Improvement Program. A number of dirt trails are located throughout the MRA.

2.5.2 Vegetation

Vegetation consists primarily of maritime chaparral in the DRO/Monterey MRA (Figure 2-4; USACE/Jones & Stokes 1992). The vegetation transitions from sparse vegetation adjacent to South Boundary Road to more dense vegetation to the southwest and northeast. A number of sampling and removal actions have been performed at MRS-43 that required vegetation removal. Vegetation removal was performed with both manual and mechanical methods. Past field activities have noted the presence of poison oak in the area.

2.5.3 Surface Water

Storm-water drainage from the MRA flows overland to a drainage swale, which runs parallel to South Boundary Road and ultimately flows to the southwest through park district property. The surface water from the site is ultimately discharged to Laguna Del Rey. There are no delineated wetlands reported to be present on the DRO/Monterey MRA. There are two aquatic features (i.e., vernal pools, ponds) located within approximately 100 feet (ft) of the MRA (Figure 2-4).

2.5.4 Topography and General Geology

The terrain of the DRO/Monterey MRA is hilly and sloping downward from the southwest to the northeast, while relatively flat along the roadway. The elevation ranges from approximately 100 to 260 ft above mean sea level (msl) with 0 to 30 percent slopes (Figure 2-5). The surface soils are characterized as eolian (sand dune) and terrace (river deposits), which consist of unconsolidated materials of the Aromas and Old Dune Sand formations. The primary soil types present in the DRO/Monterey MRA are Baywood Sand and Arnold-Santa Ynez Complex (Figure 2-5). Soil conditions at survey sites are predominantly weathered dune sand, which provides a relatively good environment for conducting geophysical surveys, including electromagnetic and magnetic surveys.

2.5.5 HTW History and Conditions

The BRA Program evaluated the potential presence of HTW chemicals of concern (COCs) within the former Fort Ord (Shaw/MACTEC 2006). The objectives of the BRA investigation activities were to identify which areas could be eliminated from consideration for potential COC remediation, and to identify areas that require additional investigation for potential chemical contamination or should be considered for remediation/habitat mapping related to COCs.

The investigation of MRS-43 included a literature review, site reconnaissance, and sampling for munitions constituents (MC) in an area where fragments from 37 millimeter (mm) projectiles were found. No explosive compounds were detected and no further action related to MC was recommended for the area under the BRA (Shaw/MACTEC 2006). As stated in the FOSET, based on the BRA, no further action has been recommended for this MRA (Army 2007).

2.5.6 Special-Status Biological Resources

The Habitat Management Plan (HMP) identifies the DRO/Monterey MRA as development and habitat reserve. Habitat reserve areas support plant and animal species that require implementation of mitigation measures identified in the HMP to ensure compliance with the ESA and to minimize impacts to listed species (USACE 1997b).

The Monterey spineflower is a threatened plant species and has been identified as having possible occurrence in the DRO/Monterey MRA.

It is possible the California tiger salamander (CTS) may be found in the DRO/Monterey MRA as the MRA is within the 2-kilometer distance from aquatic features that may provide breeding habitat for the CTS.

2.5.7 Structures and Utilities

The DRO/Monterey MRA contains no existing buildings or structures. The MRA is not currently served by major utilities.

2.5.8 Land Use

The Base Reuse Plan designations for this MRA are habitat management and business park/light industrial and office/Research & Development. The general development land use category encompasses infrastructure activities such as roadway and utility construction as well as commercial/retail, parks, and borderland activities. Roadway expansion and utility construction will constitute the development along a portion of South Boundary Road. Land reuse areas are identified in Volume 2 of this Group 3 RI/FS Report along with land use restrictions.

2.6 Laguna Seca Parking MRA

The following sections provide a description of the physical setting, HTW history and conditions, biological resources, structures and utilities, and land use that are specific to the Laguna Seca Parking MRA.

2.6.1 Location and Description

The Laguna Seca Parking MRA is located in the south-central portion of the former Fort Ord adjacent to the Laguna Seca Raceway (Figure 2-6). The MRA is bordered by Barloy Canyon Road and the historical impact area to the west, South Boundary Road and Laguna Seca Raceway to the south, and additional former Fort Ord property to the east and north (Figure 2-7). The MRA contains the following six USACE property transfer parcels: L20.3.1, L20.3.2, L20.5.1, L20.5.2, L20.5.3, and L20.5.4 (Figure 2-7).The Laguna Seca Parking MRA is wholly contained within the jurisdictional boundaries of Monterey County.

The Laguna Seca Parking MRA is approximately 276 acres. To facilitate MEC investigations and removal activities, the MRA was divided into four MRSs, whose boundaries generally correspond to the footprints of the six USACE parcels within the Laguna Seca Parking MRA. The four MRSs were designated as MRS-14A, MRS-29, MRS-30, and MRS-47 and are shown on Figure 2-8. The MRSs were identified through a review of Fort Ord records completed for the ASRs (USACE 1993, 1994, and 1997a). Known firing ranges and training sites within the boundaries of the MRA included the Wolf Hill Training Area and the Lookout Ridge Area (Figure 2-8).

Access into Laguna Seca Parking MRA is currently restricted by fencing, barricades, gates, and warning signs. Locked gates and barricades across South Boundary Road restrict access

to the MRA from the south. Barricades across Barloy Canyon Road at the intersection with Eucalyptus Road restrict access into the MRA from the north. The western side of the Laguna Seca Parking MRA, along Barloy Canyon Road, is bounded by barbed-wire fencing. The eastern boundary of the MRA is not restricted by fencing. Warning and no trespassing signs are posted on the gates, barriers, and fencing.

South Boundary Road and Barloy Canyon Road are not usually open to vehicle traffic; however, the roadways are opened to controlled vehicle traffic during events at the Laguna Seca Raceway. There are also several dirt roads and trails throughout the Laguna Seca Parking MRA (Figure 2-7).

2.6.2 Vegetation

The vegetation of the Laguna Seca Parking MRA consists primarily of grassland and maritime chaparral. Smaller areas of coast live oak woodland, coast live oak savanna, and coastal scrub are also present (Figure 2-9; USACE/Jones & Stokes 1992). The MRA is characterized as open grassland and dense vegetation. A number of sampling and removal actions have been performed at the Laguna Seca Parking MRA, which required vegetation removal. Vegetation removal has been performed with both manual and mechanical methods. During past field activities, the presence of poison oak was noted in the MRA.

2.6.3 Surface Water

Three aquatic features (i.e., vernal pools, ponds) are present within the MRA: two along the western boundary of Parcel L20.5.1 and one in the easternmost portion of Parcel L20.3.1, which extends beyond the boundary of the MRA (Figure 2-9). In addition, a number of aquatic features (i.e., vernal pools, ponds) are located within 1,600 ft (approximately 500 meters) of the Laguna Seca Parking MRA.

2.6.4 Topography and Geology

The terrain of the Laguna Seca Parking MRA varies from flat to very steep terrain with slopes ranging from 15 to 50 percent. The elevation ranges from approximately 470 ft above msl in the northern portion of the MRA to approximately 950 ft above msl in the southern portion of the MRA (Figure 2-10). The geology includes deposits of the Paso Robles Formation and sand and gravel deposits of the Aromas Sandstone. The primary soil types present in the Laguna Seca Parking MRA are Santa Ynez Fine Sandy Loam, Arnold-Santa Ynez Complex, and Arnold Loamy Sand (Figure 2-10). Surface soil conditions in the Laguna Seca Parking MRA are predominantly weathered dune sand, which provides a relatively good environment for conducting geophysical surveys, including electromagnetic and magnetic surveys.

2.6.5 HTW History and Conditions

The BRA Program evaluated the potential presence of HTW COCs within the former Fort Ord (Shaw/MACTEC 2006). The objectives of the BRA investigation activities were to identify which areas could be eliminated from consideration for potential COC remediation,

and to identify areas that require additional investigation for potential chemical contamination or should be considered for remediation/habitat mapping related to COCs.

As stated in the FOSET, based on the BRA, no further action has been recommended for this MRA (Army 2007). However, MRS-47 is also part of IRP Site 39 at the former Fort Ord. Previous soil remediation activities were conducted as part of the Site 39 program, which has an existing ROD.

2.6.6 Special-Status Biological Resources

The HMP identifies the Laguna Seca Parking MRA as development with reserve or development with restrictions. This is defined as lands slated for development that contain inholdings of reserve or require specific restrictions to protect biological resources values; management of reserve inholdings must match that for habitat reserves, while management in development areas must proceed with certain specific restrictions identified in the HMP. Nearby natural resources management area (NRMA) and habitat reserve areas support plant and animal species that require implementation of mitigation measures identified in the HMP to ensure compliance with the ESA and to minimize impacts to listed species.

Threatened or endangered plant species identified as having possible occurrence in the Laguna Seca Parking MRA include Monterey gilia (formerly sand gilia; endangered) and Monterey spineflower (threatened). A portion of the Laguna Seca Parking MRA has been designated as critical habitat for the Monterey spineflower by the USFWS (USFWS 2002).

It is possible the CTS may be found in the Laguna Seca Parking MRA as the MRA is within the 2-kilometer distance from an aquatic feature that may provide breeding habitat for the CTS.

2.6.7 Structures and Utilities

The Laguna Seca Parking MRA contains few structures (Figure 2-7). A field latrine on the western edge of the MRA, facility number 4B21, is 727 square ft, and it is unknown what year it was built or if it has lead-based paint or asbestos-containing material (Army 2007). The southwestern portion of the MRA (Parcels L20.3.1 and L20.3.2), which is used as an overflow parking lot for raceway events, contains structures related to raceway activities.

The Laguna Seca Parking MRA is not served by water, sewer, or storm drain utility systems. An overhead electrical line runs through the Laguna Seca Parking MRA along Barloy Canyon Road and South Boundary Road (Figure 2-7).

2.6.8 Land Use

The current uses for the Laguna Seca Parking MRA are associated with Laguna Seca Raceway events. These include parking, staging, and event-related roadway access along Barloy Canyon Road and South Boundary Road.

The Base Reuse Plan designation for this area is open space/recreation. The Habitat Management Plan indicates that the parcels would be used for overflow parking during major events at Laguna Seca. In addition, a roadway easement for a future bypass of Highway 68 is identified as a possible future use. Land reuse areas are identified in Volume 2 of this Group 3 RI/FS Report.

2.7 MOUT Site MRA

The following sections provide a description of the physical setting, HTW history and conditions, biological resources, structures and utilities, and land use that are specific to the MOUT Site MRA.

2.7.1 Location and Description

The MOUT Site MRA is located in the central portion of the former Fort Ord within the northeastern portion of the historical impact area (Figure 2-11). The MRA includes the MOUT training area, consisting of a mock city training area (Impossible City) currently used for tactical training of military, federal, and local law enforcement, and a portion of Barloy Canyon Road located along the eastern boundary of the historical impact area (Figure 2-12). The MOUT Site MRA contains the following two USACE property transfer parcels: F1.7.2 and L20.8 (Figure 2-12). The MOUT Site MRA is wholly contained within the jurisdictional boundaries of Monterey County.

The MOUT Site MRA is approximately 61 acres in size. To facilitate MEC investigation and removal activities, the MOUT training area (Parcel F1.7.2) was designated as MRS-28 (Figure 2-13). The Barloy Canyon Road portion of the MRA (Parcel L20.8) borders a former military training area to the east, and also a part of the eastern boundary of the historical impact area. The northern portion of Barloy Canyon Road passes through a former training site identified as MRS-27O (Figure 2-13).

The primary historical military use within MRS-28 was for infantry training in an urban setting. Historical maps indicate a history of close combat training (USACE 1997a). The historical use of MRS-27O and the unfenced area east of Barloy Canyon Road included bivouac, troop maneuver, and subcaliber artillery training (USACE 1997a).

Access to the MOUT Site MRA is currently restricted to the public by four-strand barbed-wire fencing with concertina along Eucalyptus Road to the north, and locked gates/barricades with concertina and warning signs across Barloy Canyon Road at the intersection with Eucalyptus Road. There is no fencing immediately surrounding the MOUT training area portion of the MRA; however, the MOUT training area is located within the historical impact area, which is surrounded by four-strand barbed-wire fencing (Figure 2-11).

2.7.2 Vegetation

The vegetation of the MOUT Site MRA consists primarily of inland coast live oak woodland and grassland with smaller areas of maritime chaparral (Figure 2-14; USACE/Jones & Stokes 1992). The MRA is characterized by dense vegetation except for the MOUT training area,

which is developed with training facilities and buildings. A number of sampling and removal actions have been performed at the MOUT training area that required vegetation removal. Given the terrain, the vegetation removal was performed predominantly through manual practices, although a significant portion of the MRA was burned during an accidental fire that occurred in July 2003. During past field activities, the presence of poison oak was noted in the area.

2.7.3 Surface Water

A number of aquatic features (i.e., vernal pools, ponds) are located within 800 ft (less than 300 meters) of the MOUT training area and the southern end of Barloy Canyon Road (Figure 2-14).

2.7.4 Topography and Geology

The terrain of the MOUT Site MRA is characterized as rugged terrain with slopes ranging from 15 to 50 percent. The elevation ranges from approximately 260 ft above msl to approximately 420 ft above msl in the MOUT training area and from approximately 200 ft above msl to approximately 480 ft above msl in the Barloy Canyon Road portion of the MRA (Figure 2-15). The geology includes alluvial fan and flood deposits of the Paso Robles Formation, and sand and gravel deposits of the Aromas Formation. The primary soil type present in the MOUT Site MRA is Arnold Loamy Sand (Figure 2-15). Surface soil conditions in the MOUT Site MRA are predominantly weathered dune sand, which provides a relatively good environment for conducting geophysical surveys, including electromagnetic and magnetic surveys.

2.7.5 HTW History and Conditions

The BRA Program evaluated the potential presence of HTW COCs within the former Fort Ord (Shaw/MACTEC 2006). The objectives of the BRA investigation activities were to identify which areas could be eliminated from consideration for potential COC remediation, and to identify areas that require additional investigation for potential chemical contamination or should be considered for remediation/habitat mapping related to COCs.

As stated in the FOSET, based on the BRA, no further action has been recommended for MRS-28 because the area was still in active use (Army 2007). However, MRS-28 is also part of IRP Site 39 at the former Fort Ord. Previous soil remediation activities were conducted as part of the Site 39 program, which has an existing ROD.

In 2003, four buildings at the MOUT training area (Parcel F1.7.2) were burned during the Eucalyptus Road Fire. Previous surveys showed that three of the four structures had asbestos-containing material. In 2004, the Army performed soil sampling within the footprints of the former buildings and adjacent areas to determine whether the soil contained asbestos or lead. No detectable asbestos was found to be present, and no further action was required. The soil did contain concentrations of lead, which was identified as requiring notification prior to transfer or lease (Shaw 2004).

2.7.6 Special-Status Biological Resources

The HMP identifies the MOUT Site MRA as development. Nearby NRMA and habitat reserve areas support plant and animal species that require implementation of mitigation measures identified in the HMP to ensure compliance with the ESA and to minimize impacts to listed species.

Threatened or endangered plant species identified as having possible occurrence in the MOUT Site MRA include Monterey gilia (formerly sand gilia; endangered) and Monterey spineflower (threatened; USFWS 2002). A portion of the MRA has been designated critical habitat for Monterey spineflower (USFWS 2002).

It is possible the CTS may be found in the MOUT Site MRA as the MRA is within the 2-kilometer distance from an aquatic feature that may provide breeding habitat for the CTS. One feature was identified as suitable breeding habitat and the other feature was identified as a known CTS breeding site in 2004 (USFWS 2005).

2.7.7 Structures and Utilities

The MOUT training area portion of the MRA (Parcel F1.7.2) includes 42 buildings and structures and a pistol range currently being used for tactical training of military, federal, and local law enforcement agencies (Figure 2-12). An observation tower, range support building, and field latrine are the only unused structures on the MRA and were related to previous military training by the Army. Detailed information concerning location, size, description of structures, presence of asbestos-containing material and/or lead-based paint, if evaluated, and year constructed is provided in Table 2-1.

The MOUT training area (Parcel F1.7.2) is not served by water, sewer, storm, gas, or electrical utility systems. A telephone line enters the MOUT training area at the northwestern boundary (Figure 2-12).

The Barloy Canyon Road portion of the MOUT Site MRA (Parcel L20.8) does not have utilities. East of the Barloy Canyon Road, an electrical line runs in a north to south direction. The electrical line crosses from the eastern side to the western side of Barloy Canyon Road approximately 1 mile south of the intersection with Eucalyptus Road (Figure 2-12).

2.7.8 Land Use

The MOUT Site MRA includes the MOUT training area (Parcel F1.7.2) and a portion of Barloy Canyon Road (Parcel L20.8). The MOUT training area consists of a mock city that is currently used for tactical training of military, federal, and local law enforcement agencies. To the east of the MOUT training area is Barloy Canyon Road, which is used as a controlled roadway to periodically access the Laguna Seca Raceway events.

The Base Reuse Plan designation is school/university. For the MOUT Site training area the intended reuse is law enforcement tactical training and for Barloy Canyon Road area the intended reuse is right-of-way.

The MOUT training area (Parcel F1.7.2) is expected to continue being used as a tactical training area for law enforcement agencies. The Barloy Canyon portion of the MOUT Site MRA is likely to be improved and opened as a transportation corridor. To facilitate reuse, infrastructure improvements, such as utilities and roadways, are required. Land reuse areas are identified in Volume 2 of this Group 3 RI/FS Report along with land use restrictions.

3.0 GROUP 3 MRA REMEDIAL INVESTIGATION PROCESS

The major decision points to be addressed during the RI are as follows:

- Is the site characterization data of known and sufficient quality to adequately characterize the nature and extent of MEC?
- Is the site characterization data of known and sufficient quality to support completion of an explosives safety risk assessment?

In order to answer these questions, the data that have been collected at the Group 3 MRAs must first be validated. Validation of the data consists of the following:

- A review of the site historical records, military history, and ASRs to determine the documented historical land use and known historical military practices;
- A review of munitions response program investigations and removal actions, which includes a review of the work plans and after-action reports to determine the investigation and removal action procedures utilized during the work;
- An evaluation of the equipment used during investigation and removal activities to determine if the equipment used was capable of detecting the types of munitions items that would be expected at the MRA based upon the documented historical use; and
- A review of the data contained in the after-action reports and a comparison of the data to information contained in the MMRP database to determine the completeness of the data set.

The results of the literature and investigation and removal action reviews are used to support the data analysis, which includes an evaluation of the literature review process and the sampling, assessment, and removal action processes based on information from standardized literature review and sampling review checklists. The results of the data analysis are then used to update the CSMs and make recommendations as to whether the data can be used to complete an RA and an FS.

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4.0 DRO/MONTEREY MRA REMEDIAL INVESTIGATION

The following sections present the results of the DRO/Monterey MRA RI. The RI was conducted in accordance with the RI process described in the Group 3 RI/FS Work Plan and summarized in Section 3.0 of this report.

The MEC and MD encountered within the DRO/Monterey MRA were consistent with the historical use of the area for weapons and troop training. The only MRS associated with the DRO/Monterey MRA was MRS-43. Several investigations and removal actions were conducted at MRS-43, which confirmed the historical use, defined the source, nature, and extent of MEC, and provided data for evaluation of the residual MEC risks at the DRO/Monterey MRA. The results of the RI indicate that the investigations and removal actions conducted within MRS-43, which encompasses the DRO/Monterey MRA, successfully detected, excavated, and recovered MEC to address the imminent safety hazard.

4.1 DRO/Monterey MRA Historical Records and Military History

Historical aerial photographs and facility training maps, the Army's ASRs, and historical military field manuals were reviewed to evaluate the types of training that were likely conducted on the DRO/Monterey MRA and the historical practices related to these types of training.

A review of the available historical aerial photographs and training maps indicated that the area encompassing the DRO/Monterey MRA was identified as an "Air Defense Training Area" in the 1980s, which was reportedly used as a dry-fire (non-firing) antiaircraft training area involving the setup of .30 caliber and .50 caliber antiaircraft weapons (Hall 2005 and Army 2006). No other training areas were identified in historical aerial photographs or training maps from other eras of operation. There was evidence that military training was conducted to the north and northeast of the MRA (northern side of South Boundary Road); however, the firing ranges were directed away from the MRA. An interview included in the 1997 ASR indicated that a portion of a ridge in the area of the DRO/Monterey MRA served as a backstop for rifle grenades and shoulder-launched projectiles from 1942 to 1944 and that firing positions were located along South Boundary Road (USACE 1997a). This information led to the designation of the area encompassing the DRO/Monterey MRA as MRS-43 and the recommendation for further investigation for military munitions. However, based on the review of historical aerial photographs and training facility maps, there was no indication that the area was used as a firing range.

The following sections provide the results of the historical records review.

4.1.1 Review of Aerial Photographs and Historical Training Maps

The following sections present a summary of the DRO/Monterey MRA military history and development by decade of operation that is based on the review of available historical training maps obtained from the Army's archives and a review of available aerial photographs and/or topographic maps. This information, along with the findings from the

ASRs (Section 4.1.2) and a review of MEC and MD data in the Army's MMRP database related to investigations and removal actions in the MRA, are collectively summarized in Section 4.1.3, which presents the identified historical military operations at this MRA.

4.1.1.1 Pre-1940s Era

Documentation related to the military use of the DRO/Monterey MRA prior to 1940 was limited to a topographic map from 1934 (Army 1933-34). This map included only roads and/or trails, right-of-ways, and topographical lines. There were no features indicating military use within the DRO/Monterey MRA. No other identifiable features or text were associated with the DRO/Monterey MRA.

4.1.1.2 1940s Era

Review of aerial photographs from 1941 and 1949 indicated that, with the exception of a linear clearing in the southeastern portion of the MRA along the southern side of South Boundary Road, the MRA was undeveloped. South Boundary Road was visible along the northeastern edge of the MRA. Several linear dirt roads and an irregularly-shaped barren plot of land were visible to the northeast of South Boundary Road in the 1941 aerial photograph. The 1949 aerial photograph, while still not showing training facilities on the barren plot of land, did show several linear trails within and around the area, indicating some kind of intentional activity. Training and/or facility maps were not available for the vicinity of the DRO/Monterey MRA in the 1940s.

4.1.1.3 1950s Era

Review of 1950s era training and facility maps provided no indication of specific military activity in the vicinity of the DRO/Monterey MRA. However, training areas were identified to the north and northeast of the MRA. Aerial photographs from the 1950s were not available for the vicinity of the DRO/Monterey MRA. The following bullets summarize the results of the review.

- A 1953 Training Areas map shows that the area encompassing the DRO/Monterey MRA was assigned to the 11th Infantry (Army 1954). The military reservation boundary was shown along the southern boundary of the MRA and South Boundary Road was shown along the northeastern edge of the MRA. There was no indication of training facilities on the DRO/Monterey MRA. Approximately 1,500 ft northeast of the MRA, there were two firing range safety fans labeled "AR Table VII Range" and "AR Table VIII Range" indicating automatic rifle ranges. The positioning of the two firing range safety fans indicated that firing would be to the east, away from the MRA (Army 1953).
- A 1956 Fort Ord Training Areas and Facilities map indicated the same information as the 1953 map; however, the area encompassing the MRA was no longer assigned to an infantry unit (Army 1956).
- A 1957 Fort Ord Training Areas and Facilities map indicated nearly the same information as the 1953 and 1956 maps; however, the positioning of the two automatic rifle ranges

have shifted to the northwest with "AR Table VIII Range" located north of the MRA and firing remaining to the east, away from the MRA (Army 1957).

4.1.1.4 1960s Era

Review of 1960s era training and facility maps indicated no military activity in the vicinity of the DRO/Monterey MRA. However, training areas were identified to the north and northeast of the MRA. Aerial photographs from the 1960s were not available for the vicinity of the DRO/Monterey MRA. The following bullets summarize the results of the review.

- A 1961 Training Facilities map indicated the same information as the 1950s maps (Army 1961).
- A 1964 Field Training Areas and Range map indicated changes north and northeast of the MRA (Army 1964). The label "AR Table VII" was changed to "rng 21 AR", though the label is not defined on the map. A firing range safety fan labeled "rng 41" was added to the map and located approximately 1,000 ft northeast of the MRA, though the label was not defined on the map.
- A 1968 Training Facilities map indicated no military activity within the DRO/Monterey MRA (Army 1968). The firing ranges to the north and northeast were still present, but labels were changed to "RNG 24 AR TBL VII", indicating an automatic rifle range associated with Range 24, and "RNG 25" for Range 25, which replaced "rng 41". Additional labels were provided on the map for Range 25 indicating "Machinegun - 10 Meter" and "Rifle - 25 Meter".

4.1.1.5 1970s Era

Review of 1970s era training and facility maps indicated no military activity in the vicinity of the DRO/Monterey MRA; however, military activity was visible in an aerial photograph. Training areas were identified to the north and northeast of the MRA. The following bullets summarize the results of the review.

- A 1971 Training Facilities map indicated the same information as the 1968 maps (Army 1971).
- A 1972 Training Facilities map indicated no military activity within the DRO/Monterey MRA (Army 1972). The firing range to the north of the MRA, previously identified as "RNG 24 AR TBL VII", was labeled "24" and "RNG 25" was no longer shown on the map.
- A 1978 aerial photograph shows numerous trails and clearings in the vicinity of the DRO/Monterey MRA that were not present in the aerial photographs of the 1940s; however, no facilities or structures were visible (Army 1978). Firing range 24 was visible north of the MRA. The irregularly shaped barren plot of land immediately north of the South Boundary Road in the 1940s aerial photograph was still present.

4.1.1.6 1980s Era

Review of 1980s era training and facility maps indicated that the DRO/Monterey MRA was identified as an "Air Defense Training Area" and military activity was visible in an aerial photograph. Training areas were also identified to the north and northeast of the MRA. The following bullets summarize the results of the review.

- A 1982 Training Area map indicated the letter "Q", indicated on the map legend as an "Air Defense Training Area", in the vicinity of the DRO/Monterey MRA (Army 1982a). No boundaries are discernible for the designated training area. Firing ranges 24 and 25 were identified to the north and northeast of the DRO/Monterey MRA, respectively. The map legend defined Range 24 as an "ARTEP Range Squad Defense" and Range 25 as an "Overhead Offensive Fire Course (2 Lanes) (Inactive)".
- A 1984 Training Facilities map indicated the letter "Q" within the vicinity of the DRO/Monterey MRA. The legend of this map did not provide a definition for "Q"; however, it is assumed that the "Q" still indicates an Air Defense Training Area. Range 24 remained the same as designated in the 1982 map. Range 25 moved closer to South Boundary Road and was located exactly in the area of the irregularly-shaped barren plot of land noted in the 1978 aerial photograph. Range 25, however, was no longer identified as "inactive" as designated in the 1982 map.
- A 1986 aerial photograph indicated the same features in the DRO/Monterey MRA as the 1978 aerial photograph.
- A 1987 Ranges and Training Overlay Area map indicated the same information within the DRO/Monterey MRA as the 1984 map (Army 1987). Annotation on the map indicated that Range 24 was a "Squad Defense Range". Range 25 moved to the northeast and retained its designation as an "Overhead Defensive Fire Course".

4.1.1.7 1990s Era

There were no available aerial photographs that cover the DRO/Monterey MRA during the 1990s. Review of 1990s era training and facility maps was limited to a 1991 map titled "Range and Field Training Area Sketch" and a 1992 Back Country Roads Map (Army 1991 and 1992, respectively). The 1991 Range and Field Training Area Sketch was identical to the 1982 training area map discussed in Section 4.1.1.6. The 1992 Back County Roads Map was a reproduction of a 1968 training area map with names added for the roads. The features on the 1992 map were the same as previously discussed in Section 4.1.1.4 for the 1968 training area map. No additional training areas were identified on either map. The base was officially closed in September 1994.

4.1.2 Review of Archives Search Reports

Three ASRs were completed for the former Fort Ord (USACE 1993, 1994, and 1997a). The purpose of the ASRs were to gather and review historical information to determine the types of munitions used at the former Fort Ord, identify possible disposal areas, identify previously unknown training areas, and recommend follow-up actions. The 1993 ASR was completed

based on a scope of work provided to the St. Louis Corps of Engineers by the Huntsville Corps of Engineers, and on archive search reports completed at other military installations. The 1993 ASR included historical research at various archives and record holding facilities, interviews with individuals familiar with the sites or its operation, and site visits (USACE 1993).

The 1994 ASR (Supplement 1) was performed in 1994 for the purpose of evaluating additional historical maps and information obtained from ongoing research (e.g., interviews, archive searches, and site visits) pursuant to the 1993 ASR (USACE 1994).

Guidance for conducting archives searches was developed in 1995. The 1995 guidance specified that ASRs include information on historical records, site visits, follow-up actions, prior documentation, and characterization and evaluation for potential MEC response sites (USACE 1995). As a result, the Army issued a subsequent report in 1997 that contained additional information and descriptions of the follow-up actions recommended as part of the 1993 and 1994 ASRs.

The 1997 ASR combined information obtained through the previous archive searches with the results of a Preliminary Assessment / Site Inspection (PA/SI) conducted by the USACE (USACE 1997a). The PA/SI consisted of interviews with individuals familiar with the MRSs, visits to previously established sites, reconnaissance of newly identified training areas, and the review of data collected during sampling or removal actions. The 1997 ASR was conducted in accordance with the USACE guidance (USACE 1995).

4.1.2.1 1993 Archives Search Report

The 1993 ASR did not identify military operations in the area of the DRO/Monterey MRA.

4.1.2.2 1994 Archives Search Report Supplement 1

The 1994 ASR did not identify military operations in the area of the DRO/Monterey MRA.

4.1.2.3 1997 Revised Archives Search Report

The 1997 ASR presented the findings of the PA/SI conducted by the USACE and established sites and newly identified training areas, which were designated as ordnance and explosives (OE) sites (USACE 1997a). The following information was reported for the OE site encompassing the DRO/Monterey MRA.

The area encompassing the DRO/Monterey MRA was designated as Site OE-43, South Boundary Area. Site OE-43 (hereafter referred to as MRS-43) was identified by former Fire Chief Fred Stephani who stated that a portion of the hillside located along the southwestern boundary was used as a backstop for rifle grenades and shoulder-launched projectiles from 1942 to 1944. Firing positions (trenches) were excavated along South Boundary Road and were directed from the southeast to the northwest at a diagonal to the hill. The firing positions were buried when use was discontinued. A controlled burn was conducted in the area in the

early 1940s to support training activities. Therefore, the 1997 ASR recommended that this area undergo random sampling as a part of an overall site investigation.

At the time of the 1997 ASR, the Army's contractor CMS Environmental, Inc. (CMS; which became USA Environmental Inc. [USA] in 1998) was cutting lanes of brush in MRS-43 to support an ordnance and explosives inspection. During surface and subsurface sweeps conducted by a UXO specialist as a safety measure for brush cutters, a piece of munitions debris described as "37mm black powder frag" was discovered at the northwest end of the site.

4.1.3 Review of Historical Military Training Practices

The following sections describe the practices typically associated with the identified types of training based on a review of historical field manuals, the munitions that may be expected as a result of the use of the area for these types of training, the review of the historical documents and maps referenced in the previous sections, and the list of the MEC and MD items identified during removal actions. The types of training identified in the DRO/Monterey MRA included rifle grenade training and 37mm projectile training. The typical activities associated with these types of training activities are discussed below.

4.1.3.1 Pre-World War II Training

Documentation of pre-World War II (WWII) training activities at the former Fort Ord was limited. No training maps were available from this time period. Footage from a 1938 film entitled "A Year on a Calvary Post, 1938 – 11th Calvary, Presidio, Monterey, CA, National Archives" from 1940 was reviewed; however, it did not contain definitive information regarding training in the vicinity of the DRO/Monterey MRA.

Based on the types of MEC and MD identified in the Army's MMRP database as being found within and near the MRA, training with 37mm projectiles occurred in the vicinity of the DRO/Monterey MRA prior to WWII, as discussed in Section 4.5.

4.1.3.2 1940s Training

According to the 1997ASR, the former Fire Chief Fred Stephani stated that a portion of the ridge within MRS-43 was used as a backstop for rifle grenades and shoulder-launched projectiles from 1942 to 1944.

Based on the types of MEC and MD identified in the Army's MMRP database as being found within and in the vicinity of the MRA, rifle grenade training occurred within the DRO/Monterey MRA during the 1940s, as discussed in Section 4.5.

4.1.4 Historical Land Use Summary

A review of the historical aerial photographs and training maps indicate that historical records for MRS-43 and the DRO/Monterey MRA were incomplete for the1940s. Based on the review of historical aerial photographs and training facility maps, there was no visible

indication that artillery training, including the use of 37mm projectiles, took place on portions of MRS-43 and the DRO/Monterey MRA. However, the Army's contractor conducting activities in support of ordnance and explosives inspection at MRS-43 found evidence of military training related to 37mm projectiles in a portion of MRS-43. In addition, a statement in the 1997 ASR indicated that the area of MRS-43 served as a backstop for rifle grenades and shoulder-launched projectiles from 1942 to 1944 and that firing positions were located along the South Boundary Road.

4.2 MEC Investigations and Removal Actions

The following sections describe the investigations and removal actions conducted by the Army in MRS-43, which encompasses the DRO/Monterey MRA. Table 4-1 contains a listing of the military munitions, both MEC and MD, found during the investigations and removal actions. The following bullets summarize the investigations and removal actions conducted in MRS-43.

- SiteStats/GridStats (SS/GS) investigation by USA in 1998 (USA 2001e)
- Grid sampling investigation by USA from December 1999 to March 2000 (USA 2001b)
- Removal action by USA in 2000 using analog geophysical instruments (USA 2001b)
- Post-removal action geophysical investigation by USA using digital geophysical instruments in 2000 (USA 2001b)

The quality of the MEC investigations and removal actions was evaluated as part of this RI. In order to evaluate the investigations and removal actions, the adequacy of the investigations and removal actions was assessed, the equipment used was evaluated for effectiveness based upon its implementation and maintenance records, and data records were reviewed for accuracy and consistency.

4.2.1 Investigation and Removal Action Approaches

Investigations and removal actions were performed by the Army's contractor, USA, in MRS-43, which encompasses the DRO/Monterey MRA, using multiple approaches, which included: SS/GS, grid sampling, a removal action using Schonstedt magnetometers, and a removal action by grid investigation using the G858 digital magnetometer, the cart-mounted EM61 instrument, and the EM61 Handheld (EM61-HH). The following sections describe the investigation and removal action activities conducted.

4.2.1.1 SiteStats/GridStats by USA using Schonstedt Magnetometers

In 1998, USA (formerly CMS) conducted a SS/GS sampling investigation in MRS-43 for the Army to determine the need for performing a MEC removal action (USA 2001e). The SS/GS program randomly selected grids and then randomly selected sampling locations within the grids to collect representative data for the site. Nineteen 100-ft by 200-ft grids in MRS-43 were identified for the SS/GS sampling investigation (Figure 4-1). The 19 grids were delineated in the field using GPS survey equipment and prepared for SS/GS sampling

operations by cutting brush. In accordance with the standard operating procedure (SOP), the grids were investigated until the statistical calculation results indicated the operator should stop (CMS 1997). Eighteen of the 100-ft by 200-ft grids in MRS-43 were investigated using the Schonstedt GA-52Cx magnetometer, in accordance with the SS/GS SOP. The nineteenth grid was not required to be investigated because the SS/GS statistical calculation requirement had been achieved. Based on the results of the SS/GS sampling investigation, three additional 100-ft by 200-ft grids were delineated in the field using GPS survey equipment to the north of MRS-43 and prepared for SS/GS sampling operations by cutting brush (Figure 4-1). Only one of these grids was investigated using the Schonstedt GA-52Cx magnetometer, in accordance with the SS/GS SOP, because no MEC or MD were found.

The MRS-43 SS/GS sampling investigation was conducted in part of the DRO/Monterey MRA. Within the boundaries of the DRO/Monterey MRA, five whole grids and one partial grid were located in Parcel E29.1, one partial grid was located in Parcel L6.2, and none of the grids were located in the roadway Parcels L20.13.3.1 and L20.13.1.2 (Figure 4-1).

The results of the SS/GS sampling investigation indicated that while MD (referred to as ordnance scrap in the final report) related to 37mm projectiles and smoke hand grenades was found in grids, no MEC (referred to as UXO items in the final report) was found within MRS-43. The SS/GS sampling investigation in MRS-43 was determined to be inconclusive by the USACE; therefore, a grid sampling investigation was recommended for MRS-43.

4.2.1.2 Grid Sampling by USA using Schonstedt Magnetometers

From December 1999 to March 2000, USA conducted a grid sampling investigation in MRS-43 for the Army to facilitate the identification of MD concentrations and to locate the boundaries of these areas (USA 2001b). The objective was to remove munitions from the sampling grids to a depth of 4 ft with deeper excavation as approved by USACE. Twelve 100-ft by 100-ft grids and seven 100-ft by 200-ft grids (established during the SS/GS sampling investigation) were identified in MRS-43 for the grid sampling investigation (Figure 4-1). The SS/GS grids were being reinvestigated as part of a confirmation/evaluation of the SS/GS methodology. The grids were delineated in the field using GPS survey equipment and prepared for grid sampling operations by cutting brush. The sampling investigation included the entire grid area and all anomalies encountered using Schonstedt GA-52Cx magnetometers were investigated. The sampling investigation was conducted in accordance with the USA/Parsons work plan (USA/Parsons 2000).

The MRS-43 grid sampling investigation was conducted in part of the DRO/Monterey MRA. The following grids were located within Parcel E29.1 of the DRO/Monterey MRA: four whole 100-ft by 100-ft grids, one partial 100-ft by 100-ft grid, two whole 100-ft by 200-ft SS/GS grids, and one partial 100-ft by 200-ft SS/GS grid. None of the grids for the sampling investigation were located in Parcel L6.2 or the roadway Parcels L20.13.3.1 and L20.13.1.2.

The result of the grid sampling investigation indicated that MEC and MD related to hand grenades (single burial pit with 23 MEC items) and 37mm projectiles were found in MRS-43 (USA 2001b). The MEC was not found within the boundaries of the DRO/Monterey MRA.

The MEC and MD finds resulted in the need to conduct a removal action in MRS-43 as outlined in a Notice of Intent prepared by the Army (Army 2000a).

4.2.1.3 Removal Action by USA using Schonstedt Magnetometers

Based on the investigation results and to support the proposed early transfer of property to the City of Del Rey Oaks, a MEC removal action was conducted in MRS-43 (Army 2000a) and USA 2001b). The limits of the removal action area were defined in the Army's Notice of Intent and were based on the types and distribution of items discovered during previous investigations and the threat to the public (Army 2000a). As a result, the northernmost half of MRS-43 was included in the removal action based on numerous MD finds (i.e., fragments of 37mm LE projectiles) and was expanded to the northwest based on the locations of MEC finds during the grid sampling investigation (i.e., one 37mm LE projectile and a burial pit containing 23 fragmentation hand grenades) in the northern corner of MRS-43 near South Boundary Road. The southernmost half of MRS-43 (eventually designated as MRS-43A) was not subject to the removal action since no MEC or MD was discovered during previous investigations.

During the removal action, if MEC or fragments of high explosive munitions were found, the delineated removal action area would be expanded by 100 to 200 ft (depending on the type of item or fragments of an item discovered) in all directions from a grid boundary. This process would be repeated until completing a grid with no MEC or fragments of high explosive munitions were found or the site boundary was encountered (Army 2000a). In addition, the removal action was not expanded to areas covered by South Boundary Road, since there was no imminent threat to the public. For MRS-43, the removal action area was not required to be expanded beyond the originally proposed area presented in the Notice of Intent.

In 2000, USA conducted the removal action in MRS-43 for the Army using Schonstedt GA-52Cx magnetometers. The removal action consisted of a total of 258 whole and partial 100-ft by 100-ft grids (Figure 4-2). The removal action included the entire grid area and all anomalies encountered using Schonstedt GA-52Cx magnetometers were investigated to a depth of 4 ft. The removal action was conducted in accordance with the USA/Parsons work plan (USA/Parsons 2000). The grids that had previously been investigated as part of the SS/GS sampling and the grid sampling in the northernmost half of MRS-34 were reinvestigated as part of this removal action.

The removal action conducted in the northernmost half of MRS-43 and the expansion area to the northwest included the entire DRO/Monterey MRA except for a narrow strip of land approximately 50-ft-wide along the northwestern edge of Parcel L6.2 (located outside the MRS-43 expansion area) and South Boundary Road Parcels L20.13.3.1 and L20.13.1.2.

During the removal action, two M2 ignition cartridges (DMM) and a quarter pound (lb) of TNT demolition charge (UXO) were found in the MRS-43 expansion area, which corresponds to Parcel L6.2. No MEC was found in the remainder of MRS-43 including Parcel E29.1 of the DRO/Monterey MRA. A total of 109 MD items were found throughout most of MRS-43 including Parcels L6.2 and E29.1 of the DRO/Monterey MRA.

4.2.1.4 Post-Removal Action Geophysical Investigation by USA using Digital Instruments

To further support the proposed early transfer of property to the City of Del Rey Oaks, a digital geophysical investigation was conducted in MRS-43 and in adjacent MRSs, designated as the Del Rey Oaks Group, by USA in 2000 using three types of digital geophysical instruments: the G858 magnetometer, the cart-mounted EM61, and the EM61-HH (USA 2001b). The geophysical investigation included the reinvestigation of SS/GS grids and the sampling grids in the removal action area (Figure 4-1). The specific digital geophysical instrument was selected depending on vegetation and terrain. During the geophysical investigation, neither MEC nor MD was found within the DRO/Monterey MRA. The following information describes the geophysical instrumentation used during the investigation.

G858 Digital Magnetometer

The portable G858 magnetometer was employed primarily in areas where terrain and vegetation precluded the use of the cart-mounted EM61. Of the 23 whole or partial 100-ft by 100-ft grids investigated with the G858 magnetometer in MRS-43, five whole and nine partial 100-ft by 100-ft grids were located within the DRO/Monterey MRA. One partial grid was within Parcel L6.2 while the remaining whole and partial grids were within Parcel E29.1. None of these grids were SS/GS grids or sampling grids. At the time these grids were investigated, the grids had only been surface swept and had not yet been subject to removal action efforts using Schonstedt GA-52Cx magnetometers, as described in Section 4.2.1.3 (USA 2001b).

Cart-mounted EM61 Instrument

The portable cart-mounted EM61 was employed primarily in areas of MRS-43 that did not have terrain or vegetation constraints. Of the grids in MRS-43, 154 100-ft by 100-ft grids and 10 sampling grids were investigated (USA 2001e). A number of these grids were located within Parcel E29.1 of the DRO/Monterey MRA. Only a few grids were located within Parcel L6.2.

EM61 Handheld Instrument

The EM61-HH was employed in the sampling grids. Two whole and two partial 100-ft by 100-ft grids were investigated using an EM61-HH. All but one partial grid were within Parcel E29.1; the partial grid was in L6.2 Parcel (USA 2001e).

4.2.2 Equipment Evaluation

This section describes results of a review of the geophysical instruments used during the investigations and removal actions performed within the DRO/Monterey MRA. Information used in this review included the ODDS (Parsons 2002), and the results presented in the Final After Action Report for the Del Rey Oaks Group, specifically the Geophysical Survey Quality Assurance Technical Analysis Technical Memorandum provided as Appendix P to the After-Action Report (USA 2001b).

4.2.2.1 Schonstedt Model GA-52Cx Magnetometer

The investigation for MEC within MRS-43, which encompasses the DRO/Monterey MRA, was performed by USA using Schonstedt GA-52Cx magnetometers. The Schonstedt GA-52Cx magnetometer is a handheld device that, when properly adjusted, will emit a distinctive tone when placed near a ferrous metal object. This instrument is a passive dual flux-gate magnetometer; a highly sensitive magnetic locator that detects ferrous (iron) metal objects; however, it cannot detect nonferrous metal objects (e.g., lead, brass, copper, aluminum). In general, magnetometers make passive measurements of the earth's natural magnetic field; ferrous metal objects (and rocks) are detected because they produce localized distortions (anomalies) in the magnetic field. The Schonstedt magnetometer actually detects slight differences in the magnetic field (the "gradient") by means of two sensors mounted a fixed distance apart within the instrument's staff. Because the magnetic response falls off (changes) greatly even over a short distance, a gradient magnetometer like the Schonstedt is especially sensitive to smaller, near-surface ferro-metal objects (Breiner 1973).

Schonstedt magnetometers will also respond to soil and rock containing ferrous minerals ("hot rocks"), as well as asphalt pavement containing enough ferrous mineralization to produce a Schonstedt response. The presence of "hot rocks" and asphalt pavement can mask the response from potential MEC items located near or below these items. Accordingly, it is recognized that the interpretation of the Schonstedt instrument response can be subjective. For deeper targets, the operator often must analyze a subtle change in the audio output and decide whether the instrument is responding to a potential MEC item or to pavement or soil minera1ization. Additionally, it can be difficult to determine the exact location of a more deeply buried object because the Schonstedt audio response may be dispersed over an area that is several ft wide.

The Schonstedt magnetometer is an analog device that does not record data. Typically, the location of a detected object is marked in the field by placement of a pin flag or promptly excavated to uncover the detected object. For that reason, Schonstedt surveys are sometimes called "mag and flag" or "mag and dig" surveys.

4.2.2.2 Geonics EM61

The Geonics EM61 time domain metal detector is capable of detecting both ferrous and nonferrous metallic objects while being less sensitive to cultural features such as fences, buildings, and power lines. The instruments typically utilize a transceiver coil 1-meter square but smaller versions are also available. The instrument is easy to use in open areas but is difficult to use in areas of thick vegetation or steep terrain. Two versions, the man-towed cart, and the handheld versions were used within the DRO/Monterey MRA. The EM61-HH was only used in areas that were part of the grid sampling investigation. The primary difference between the cart-mounted EM61 and the EM61-HH is that the effective sensing depth of the EM61-HH instrument is less than that of the cart-mounted EM61 and requires smaller survey lane spacing to achieve similar coverage.

4.2.2.3 Geometrics G858

The Geometrics G858 is a cesium vapor magnetometer, which detects only ferrous objects. The instrument is relatively light and compact and can be easily used in open areas. In areas of steep or uneven terrain, or areas of thick vegetation, the instruments are more difficult to use.

4.2.2.4 Del Rey Oaks Group Survey Procedures

A number of designated MRSs were surveyed as part of the Del Rey Oaks Group removal actions by USA in 2000 (USA 2001b).The majority of the DRO/Monterey MRA was located within MRS-43 of the Del Rey Oaks Group removal action area. The vegetation at Del Rey Oaks Group was characterized as central maritime chaparral and included oak trees, manzanita, and poison oak. The Del Rey Oaks Group was mechanically cleared of brush to facilitate the MEC removal action, although large oak trees were not removed. The terrain was mostly gentle slopes with some limited depressions. The cleared areas were divided into 100- by 100-ft grids and surveyed along a series of adjacent search lanes. The USA investigations utilized the Schonstedt GA-52Cx, EM61, and G858 instruments.

During the USA removal actions in MRS-43, the EM61 was used to survey the grids accessible to the cart-mounted instrument. If the grid was not accessible to the EM61 due to terrain or vegetation constraints, digital geophysics surveys were accomplished using the G858. The entire MRS-43 was investigated using the Schonstedt GA-52Cx magnetometer.

Schonstedt GA-52Cx survey procedures, as documented in the USA/Parsons work plan, were performed as follows: the handheld Schonstedt instrument, which resembles a “walking stick” in appearance, was swung from side to side as the operator walked down the centerline of 5-ft-wide search lanes (USA) and 3-ft-wide search lanes (Parsons) delineated by lengths of rope laid on the ground. Schonstedt responses indicative of potential MEC items (“hits”) were marked in the field with pin flags and the hit locations were excavated until a metal object was encountered or the instrument no longer showed a response.

Digital geophysical investigations procedures as described in the USA/Parsons work plan were performed as follows: surveys were performed on a 3-ft (Parsons) to 5-ft (USA) lane spacing and a sampling rate of 10 readings/second depending on the type of equipment. The data was then preprocessed, analyzed, and processed and individual anomalies were then selected for investigation (excavation) from this data. An EM61 was used in a 3-ft radius of the selected anomaly for reacquisition of the anomaly. If the anomaly could not be reacquired, a Schonstedt GA-52Cx was used to reacquire the anomaly.

Contractor Equipment Quality Assurance/Quality Control

Functional checks of the Schonstedt GA-52Cx and digital geophysical instruments (EM61 and G858) were performed daily. Additionally, quality control (QC) and quality assurance (QA) surveys were performed. QC procedures entailed a resurvey of at least 10 percent of each grid by a USA QC Officer and a Parsons QC officer. QA procedures generally entailed a second 10 percent resurvey by USACE personnel.

Evaluation of Instrument Detection Efficiency at the Del Rey Oaks Group

As part of the Del Rey Oaks Group removal action, a technical analysis of the performance of instruments used during the geophysical surveys was conducted. In addition to the technical analysis of the performance of instruments, the study also analyzed the survey teams and survey methods used to conduct the MEC removal actions (USA 2001b). The technical analysis included QA seeding with munitions debris and other target items. The seeds placed in the portion of the DRO/Monterey MRA were recovered during the removal action.

The results of the seeded test were evaluated by the USACE in the Technical Analysis Memorandum (USA 2001b, Appendix P). The evaluation identified only small data gap issues, and concluded that the Del Rey Oaks Group geophysical investigation successfully detected, excavated, and recovered the desired MEC items, that the specified objectives in the Del Rey Oaks Group work plan were met, and the imminent safety hazard had been removed.

4.2.3 Collection and Management of Field Data

Quality Assurance/Quality Control

The QA/QC procedures used by USA and Parsons during the field operations are described below. The results of the QA/QC review are used to support the "yes" response to Removal Evaluation Checklist Question 24 (Appendix D).

USA Field Operations QA/QC

QA/QC was performed by USA throughout the removal action, including daily operational checks and QC inspections, as documented in the Final After-Action Report for the Del Rey Oaks Group (USA 2001b). In accordance with the USA work plan, all instruments requiring maintenance and/or calibration were checked prior to the start of each workday, batteries were replaced as needed, and the instruments were checked against a known source. The USA QC specialist was responsible for ensuring that personnel performed operational checks and made appropriate log entries. The QC specialists performed random unscheduled checks of the various sites to ensure the personnel performed the work as specified in the work plan.

Analog QA/QC

The USA quality control audit of grids that were subjected to an analog survey using the Schonstedt magnetometer employed a four-step plan. The contractual pass/fail criterion for these audits is zero MEC items. USA also re-examined grids where MEC-like items or five or more uninvestigated anomalies were encountered. The following steps were taken for QC of Schonstedt-surveyed grids:

- Step One - 100 percent Schonstedt magnetometer survey of three grids. Grids 24AB, 31S, and 44F were selected by USA QC. The grids met the QC objective and QC procedures advanced to Step Two.

- Step Two - 30 percent Schonstedt magnetometer surveys of five grids. Grids 17C, 36X, 26R, 25F, and 8F. These five grids met the QC objective and QC procedures advanced to Step Three.
- Step Three - 20 percent Schonstedt magnetometer survey of five grids. Grids 14AC, 24AL 19N, 31D, and 05S. These five grids met the QC objective and QC procedures advanced to Step Four.
- Step Four - Schonstedt magnetometer survey of the remainder of the Schonstedt-surveyed grids at a 10 percent level. All Schonstedt-surveyed grids passed contractual QC (USA 2001b). Additional QC discussion is provided in the after-action report (USA 2001b).

Each grid that was investigated with the Schonstedt magnetometer also underwent a QA survey by the USACE OE Safety Specialist. All grids passed the U.S. Army Engineering Support Center, Huntsville (USAESCH) QA inspection standards and were accepted by the USACE. QA acceptance records are provided in the after-action report (USA 2001b).

Digital QA/QC

Grids that were digitally surveyed with the G858, EM61 or the EM61-HH digital geophysical instruments were also subjected to QC audits by USA. QC of these grids included placement of metal nails or tent pegs at the survey starting and ending points of each grid, to confirm data repeatability including positioning accuracy and the data reduction process. Additional QC was accomplished by performing a secondary geophysical survey using the same instrument as the initial survey. The pass-fail criteria for the second survey audits was zero MEC items encountered, zero MEC-like items encountered, and fewer than five anomalies. USA selected the grids to be surveyed, although the data collection was performed by Parsons' personnel. The QC grid surveying was performed using the following four-step plan:

- Step One - Resurvey 100 percent of three grids. If the grids passed the pass/fail criteria, the QC analysis moved on to Step Two.
- Step Two - Resurvey 30 percent of five grids. If the grids passed the pass/fail criteria, the QC analysis moved on to Step Three.
- Step Three - Resurvey 20 percent of five grids. If the grids passed the pass/fail criteria, the QC analysis moved on to Step Four.
- Step Four - Resurvey all remaining grids at a 10 percent level. There were no grid failures at the 10 percent level.

Quality Assurance provided by the USACE QA personnel included final QA inspections using a Schonstedt magnetometer, and seeding items. All grids passed the USACE QA inspections. Further information about the QA results is provided in the final after-action report (USA 2001b).

4.2.4 Completeness of Existing Records and Data Gaps

The completeness of existing records was evaluated. The records were reviewed to determine if there is enough defensible data to 1) assess whether or not the work was completed according to contractual requirements, 2) assess the adequacy of the removal actions, and 3) identify data gaps, if any, that may need to be filled to evaluate the adequacy of the response action.

The evaluation indicated that the removal actions were conducted in accordance with the work plan requirements and the existing records and data are complete. One minor issue regarding data quality has been identified. The contractors conducting the investigations and removal actions were not required to assign hazard codes to recovered items in the after-action reports. The hazard codes were assigned by the Army at a later date. In these cases, the Army assigned the highest hazard code for the specific type of item.

This issue does not affect data quantity or quality and the MMRP database can be used to complete the risk assessment for the DRO/Monterey MRA.

4.2.5 Accuracy of Site Boundaries

Site boundaries for the MRS encompassing the DRO/Monterey MRA were first presented as part of the 1997 ASR (USACE 1997a). These boundaries served to delineate the extent of the initial archive searches and associated interviews and site visits. Since that time, site boundaries have been modified based on results of MEC investigations and removal actions and MRA boundaries have been developed to support property transfer. The accuracy of site boundaries (i.e., the MRS boundaries) was evaluated using existing information to determine whether the establishment of site boundaries was appropriate based on historical information, removal action results and interpretation, and boundary surveying methods. An additional evaluation was conducted to compare the site boundaries used during investigation and removal actions with the MRA boundaries to identify possible discrepancies.

Based on a review of the historical information, investigation and removal action results and interpretations, and boundary surveying methods, the establishment of the MRS boundaries was appropriate and considered to be accurate.

The DRO/Monterey MRA boundaries are based on property transfer parcel boundaries as provided by the Army. A review of the DRO/Monterey MRA boundaries and the MRS boundaries indicates that investigations and removal actions were conducted across the entire MRS-43, which includes the DRO/Monterey MRA and several parcels located outside the boundaries of the MRA. Two small areas within the DRO/Monterey MRA that have not been part of investigations and removal actions and are located outside the boundaries of an MRS include the following:

- A narrow strip of land approximately 50 ft wide and 900 ft long (approximately one acre) on the northwestern boundary of the MRA. As shown on Figure 4-1, a portion of one SS/GS grid was located within this area. No MEC or MD items were recovered within this grid during the SS/GS investigations. As shown in Plates A1 and A2 in Appendix A,

the amount of recovered MD in the adjacent MRS-43 decreases in the westerly direction. Within approximately 100 ft from this strip of land there were two MEC finds: one find of 2 sticks of TNT and one find of a discarded M2 series ignition cartridge. On the other side of this strip of land is land transfer Parcel L6.1, which is a Track 1 Site.

- A narrow strip of land on the southern side of South Boundary Road to the east of Parcel E29.1 (parallel to the road). The road is on one side and the Track 1 Plug-In Site L4.1 (which includes MRS-43A) on the other side. Although no investigation or removal activities were conducted within the narrow strip of land on the southern side of South Boundary Road to the east of Parcel E29.1, several SS/GS sampling grids were located in MRS-43A, immediately adjacent to the south side of South Boundary Road (Figure 4-1). No MEC or MD items were found in the SS/GS grids located in the adjacent MRS-43A.

While these two small areas have not been part of a removal action, they are bounded by Track 1 Sites, a road, or an area of DRO/Monterey MRA in which very little MEC or debris was found. Therefore, it is expected that finding MEC in either of these two areas would not be very likely.

4.3 DRO/Monterey MRA Data

A summary of the MEC items recovered from the DRO/Monterey MRA during the removal actions described above is presented in Table 4-1. Table 4-1 also provides the associated MEC hazard classification scores. The MEC items found do not show a pattern of use. The MD, however, does show patterns. The expended 37mm projectiles are found almost exclusively in the higher southeastern elevations of the southeastern portion of the MRA (Plate A11). The other items, hand grenades, rifle grenades, trip flare, and hand grenade fuze, were all found in the lower part of the hill or near the western boundary along South Boundary Road (Plate A2).

4.4 Data Analysis

The results of the reviews of the historical records and investigation and removal actions were used to complete the data analysis. The data analysis process consists of answering a series of questions and the process is documented through the completion of a series of checklists. The checklists were developed to facilitate the analysis and validation of samples or data obtained during field investigation, grid sampling, and MEC removal activities in accordance with Task 4.1 of the AOC. Evaluation of the past munitions response activities is used to support completion of a risk assessment and feasibility study for the area.

Copies of checklists prepared for the DRO/Monterey MRA are provided as Appendix D. This section presents a summary of the results of the checklist evaluations for the literature review and the removal action review. An evaluation checklist for the sampling performed at the DRO/Monterey MRA is not provided because a removal action was completed on the MRA.

4.4.1 Literature Review Evaluation Summary

As determined during the review of historical film footage, aerial photographs and training facility maps, there was no evidence that any portion of the DRO/Monterey MRA was used as an artillery range. However, the Army's subcontractors conducting MEC sampling and removal activities at the DRO/Monterey MRA found MD indicating that 37mm projectiles and rifle grenades were fired into the DRO/Monterey MRA hillside.

4.4.2 Removal Action Review Evaluation Summary

This section describes the analysis of results of the military munitions investigations and removal actions.

4.4.2.1 Types of Munitions Removed

The MEC items found during MEC investigation and removal actions conducted at the DRO/Monterey MRA by the Army's subcontractors were as follows: two sticks of TNT; two M2 fire starters; one yellow smoke rifle grenade; one M1, HC 10 lb smoke pot; and one practice 40mm M781 projectile. The MD found included: MKI low explosive 37mm projectiles; one AP-T M51 series 37mm projectile; Practice M11 Antitank rifle grenades; smoke hand grenades (M18 or HC, AN-M8); one M228 hand grenade fuze; one M49A1 surface trip flare; and some unknown fragments.

4.4.2.2 Removal Action Boundaries

The establishment of the DRO/Monterey MRA boundary is based upon the property transfer boundaries. Removal actions were conducted across the entire MRA with the exception of the western-most 50 ft of the MRA and the south side of the road east of parcel E29.1 (Figure 4-2). The limits of investigation were defined in the removal contractor's scope of work and not on defined areas of military munitions use. The scope included the investigation of three parcels previously identified as OE sites and designated for early transfer to the City of Del Rey Oaks.

4.4.2.3 Investigation and Removal Action Design

This section summarizes the information contained in removal checklist questions 15 through 17 (Appendix D). Initial sampling (GS/SS sampling of 18 100x200-ft grids, sampling to 4 ft on 12 100x100-ft grids) was conducted at MRS-43 within the DRO/Monterey MRA to determine if further action (removal) was necessary.

Based on the results of the initial sampling, MEC removal areas were delineated and recommended for non-time-critical removal in "Notice of Intent, Removal Action in Sites OE-15DRO.2 and OE-43, Former Fort Ord, California," dated March 9, 2000 (Army 2000a). Subsequently, a geophysical investigation was conducted in the defined non-time critical removal area. This work was conducted to support early transfer according to the Final Site

OE-15 Del Rey Oaks Group Geophysical Work Plan, which was reviewed and approved by the regulatory agencies (USA/Parsons 2000).

The objective of the MEC removal was to remove all detected MEC to a depth of 4 ft bgs. The DRO/Monterey MRA was subjected to a removal-to-depth action with the exception of a strip of land approximately 50 ft wide along the entire western edge of the MRA outside the boundary of MSR-43, and the south side of South Boundary Road east of Parcel E29.1. According to the April 24, 2001 Geophysical Sampling, Investigation & Removal, Inland Range Contract, Former Fort Ord, Site Del Rey Oaks Group, After-Action Report (USA 2001b), all anomalies encountered, even those below 4 ft, were actively pursued during 4-ft removal operations. Anomalies identified as a result of the Schonstedt investigation were intrusively investigated until the geophysical instrument no longer showed a response. Anomalies identified using the digital equipment (i.e., EM61) were investigated until the source of the anomaly was resolved. If an anomaly was detected below 4 ft bgs, permission from the USACE UXO Safety Specialist was obtained prior to continuing the investigation (USA 2001b). Based on the statements in the USA report, all anomalies detected within the DRO/Monterey MRA were investigated and all detected military munitions were removed.

4.4.2.4 Sampling and Removal Methods

Removal actions were performed throughout the DRO/Monterey MRA with the exception of a strip of land that was not within the MRS measuring approximately 50 ft wide and located along the entire western edge of the MRA, and the south side of South Boundary Road east of Parcel E29.1. All anomalies were investigated or resolved, and all detected MEC items were removed or destroyed.

A removal effort using the analog Schonstedt Model GA-52Cx was conducted over the entire MRS-43 (original MRS boundary and western expansion).

Following the analog removal, digital geophysical surveys (MEC removal), using the cart mounted EM61 geophysical instrument, were completed in all areas of the DRO/Monterey MRA that were accessible to the instrument. In areas that were inaccessible to the EM61 because of the terrain or vegetation, digital geophysical surveys were completed using the EM61-HH (handheld) or the G858 digital geophysical instruments. Digital surveys were conducted over the majority of MRS-43.

The Geonics EM61 is capable of detecting both ferrous and nonferrous metallic objects while being less sensitive to cultural features such as fences, buildings, and power lines. Use of the instrument is most efficient in open areas, becoming more difficult to use in areas of steep terrain and dense vegetation. The Geometrics G858 only detects ferrous objects and is easily used in open areas. In areas of steep or uneven terrain, or areas of thick vegetation, the instrument is more difficult to use.

The Schonstedt Model GA-52Cx, Geonics EM61, and Geometrics G858 were evaluated as part of a Geophysical Survey Quality Assurance Technical Analysis and also as part of the DRO/Monterey MRA removal actions. The results of the evaluation indicate that the instruments are capable of detecting the types of MEC potentially present at the site. The

report also stated that based on the QA analysis, the contractor achieved the desired data quality for the whole site with the exception of a very small number of missed items. The Schonstedt Model GA-52Cx is less effective for detecting the smaller (less than 2 lbs) or more deeply buried (greater than 2 ft) objects.

4.4.3 Results of Removal Evaluation

The results of the above analysis present evidence to support that the existing data is usable for defining the nature and extent of contamination and for use in completing an explosives safety RA and FS.

4.5 Conceptual Site Models

The results of the data evaluation were used to update the CSM that was developed during the preliminary site characterization phase of work as documented in the SEDR (ESCA RP Team 2008). In general, the original understanding, drawn from the findings of the SEDR, that a portion of the DRO/Monterey MRA was primarily used as a weapons and troop training area appears consistent with the information provided in the historical training maps. In addition, items associated with troop maneuvers were found primarily in the vicinity of South Boundary Road. The types of munitions found during the removal actions at the DRO/Monterey MRA are discussed in the following sections.

The spatial distribution of the MEC and MD items reported in the MMRP database for the DRO/Monterey MRA are shown on Plates A1, A2, and A3 in Appendix A.

4.5.1 Smoke Hand Grenades

M18 series and HC AN-M8 smoke grenades (MD) were found in the DRO/Monterey MRA, with the highest concentration in parcel E29.1, which is mostly flat (Plate A2). These smoke grenades are used as ground-to-ground or ground-to-air signaling devices, target or landing zone marking devices, or screening devices for unit movements (Army 1977c and 2000b). According to the MMRP database, all of the items were found within the top 6 inches of soil. Smoke hand grenades are non-penetrating and would be expected in the top few inches of soil.

4.5.2 Smoke Pot

One 10 lb smoke pot (MEC) was found in the DRO/Monterey MRA (Plate A3). M1 HC screening smoke pots are used to produce screening smoke for training exercises and demonstrations (Army 1982b). The smoke pot was found on the northern side of South Boundary Road north of Parcel E29.1.

According to the MMRP database, this item was found at 6 inches bgs. Smoke pots are non-penetrating items and would be expected to be found at or near the surface unless buried or covered by natural erosion processes.

4.5.3 Rifle Grenade Training

General information on the use of pyrotechnic items, including smoke grenades, was obtained from Army field and technical manuals (Army 1977b and 1987a). Rifle grenades are designed to be fired from rifles by a launcher that is attached to the gun muzzle. A special blank cartridge, issued with the grenade is required to complete the launching.

Range configuration information for practice rifle grenade training was obtained from the manual entitled "Policies and Procedures for Firing Ammunition for Training, Target Practice, and Combat" (Army 1983). Technical information for recent rifle grenade training was obtained from TM 43-0001-29 (Army 1987b). According to the 1983 policies and procedures manual, live rifle grenades were fired behind a protective barrier equivalent to a screen of sandbags 0.5-meter thick or reinforced concrete walls 0.16-meter thick. Sandbags could have been used in a practice training area. The maximum range for the M11 series rifle grenade was 150 meters. According to the information in the American Arsenal (Hogg 2001), the depth to which the launcher was inserted into the rifle stabilizer tube determined the range attained by the fired grenade. Therefore, targets would likely be placed at various distances to practice firing at different ranges.

The M11 series antitank practice grenade was an inert loaded dummy grenade similar in shape and weight to the M9 series high explosive (HE) antitank grenade. No explosive charge was associated with this practice item. The later M11 series differed from the M9 series in that the fins could be replaced in case they were damaged or worn out. Practice rifle grenades were inert; therefore, no MEC other than possible blanks used to fire the rifle grenade would be expected (Army 1977c and 1987b).

Pyrotechnics were generally used for signaling and ground smoke. The M23A1 was used only for signaling. The M22, M22A2, and M19 WP were used for both signaling and smoke screens. The grenades were fired from a rifle equipped with a grenade launcher and functioned on impact. At impact, a firing pin would strike a primer producing a flame, which ignited a starter mixture charge, which in turn, ignited a smoke mixture charge (Army 1977c and 1987b).

One M23 series smoke, yellow stream rifle grenade was found as MEC on the northern side of South Boundary Road north of parcel L29.1 as well as thirteen practice M11antitank rifle grenades (MD only; Plate A2). Smoke rifle grenades are used to create smoke for screening and signaling. The practice M11 antitank rifle grenade was the practice version for the M9 rifle grenade. The items were located in the northern 1/3 of the DRO/Monterey MRA, a mostly flat area, within the top 7 inches of soil with the exception of one practice rifle grenade that was found at a depth of 12 inches.

4.5.4 Flare

One M49 series surface trip flare (MD) was found in the DRO/Monterey MRA. It could have been used in the 1950s and during later decades for training (Plate A3). The M49 series trip flares give warning of infiltrating troops by illuminating the field of the advancing enemy (Army 1977b). The depth of the trip flare was recorded in the MMRP database as 2 inches.

The M49 series trip flare functions by burning in the location where it is emplaced, with no movement of the flare when ignited and is a non-penetrating item and would be expected in the top few inches of soil unless buried or covered by natural erosion processes.

4.5.5 Projectiles

Thirty-nine low explosive MK I 37mm projectiles (MD), one expended AP-T M51 series 37mm projectile (MD) one expended unknown model of 37mm projectile (MD) and one practice M781 40mm projectile (MEC), were found at DRO/Monterey MRA. The projectiles were found predominantly on the higher portions of the hillsides in Parcel L6.2 and E29.1 (Plate A2).

The low explosive 37mm projectile was used during WWI against personnel and material and the AP-T 51 was a solid steel shot with a tracer element used for target practice. Items recovered from DRO/Monterey MRA were predominantly found within 3 inches bgs. Dual instrumentation was used over the majority of this MRA making it unlikely that deeper 37mm projectiles would be expected in this area.

The single discarded 40mm projectile does not indicate a pattern of use with the DRO/ Monterey MRA.

37mm projectiles may have been fired at or near the MRA from M1916 guns or M3A1 light antitank weapons. The M1916 gun, with an M5 Subcaliber mount (which used 37mm munitions) was used for training in the firing of the 75mm Howitzer M1A1. The M3A1 light antitank weapon may have been used to fire the type of 37mm projectiles removed from the site. The M3A1 was capable of firing high explosive, antipersonnel, and canister projectiles, and had a maximum range of 12,800 yards when firing a high explosive projectile (Hogg 2001).

4.5.6 Hand Grenade Fuze

Although no specific practice hand grenade training areas are identified on the available 1950s training maps, review of the removal action data indicate one expended practice M228 hand grenade fuze (MD) was found approximately 90 ft south of South Boundary Road in the center of parcel L29.1 on the flat ground at a depth of 6 inches (Plate A2). This single grenade fuze does not indicate a pattern of use as a hand grenade training area.

4.6 DRO/Monterey MRA Conclusions and Recommendations

The following section presents conclusions and recommendations for the DRO/Monterey MRA based on the review and analysis of the data associated with historical information and sampling and removal data (Plates A1 through A3; Figures 4-1 and 4-2).

4.6.1 DRO/Monterey MRA Conclusions

Based on the results of the literature review, sampling results, and removal action (munitions response), the site appears to have been impacted during training with the 37mm prior to WWII. This is consistent with the historical use as a weapons and troop training area as indicated in the SEDR (ESCA RP Team 2008). The area remains undeveloped with habitat reuse for USACE Parcel number L6.2 and development reuse for the remainder of the MRA.

The following conclusions have been made regarding the removal adequacy and data quality of the removal actions:

- Removal actions were conducted across the entire MRA with the exception of the western-most 50 ft of the MRA and the south side of the road east of parcel E29.1. The western-most area is not inside of an MRS and both areas are bounded by Track 1 land, a road, or an area of DRO/Monterey MRA in which very little MEC or MD was found. Therefore, it is expected that finding MEC in either of these two areas would not be very likely.
- Some of the items found may have the potential to penetrate deeper than the depth of detection.
- The MEC and MD encountered are consistent with the site's documented historical use of these items.
- The property transfer parcel boundaries represent the limits of the MRA, and may not reflect the limits of MEC in the area.
- The investigation for the DRO/Monterey MRA is sufficient to confirm the type of military munitions used in the vicinity of the MRA.
- The DRO/Monterey MRA removal data are usable for preparation of a MEC risk assessment.

4.6.2 DRO/Monterey MRA Recommendations

Review of the available literature, removal results, and equipment performance results indicate that the Del Rey Oaks geophysical investigation conducted in the DRO/Monterey MRA successfully detected, excavated and recovered the UXO items, removing the associated imminent safety hazard, which is consistent with the Army's finding for other associated removal operations conducted in this area. However, it is possible for residual MEC to remain in the DRO/Monterey MRA. Therefore it is appropriate to perform an RA and an FS.

5.0 LAGUNA SECA PARKING MRA REMEDIAL INVESTIGATION

The following sections present the results of the Laguna Seca Parking MRA RI. The RI was conducted in accordance with the RI process described in the Group 3 RI/FS Work Plan and summarized in Section 3.0 of this report.

The MEC and MD encountered within the Laguna Seca Parking MRA were consistent with the historical use of the area for weapons and troop training. Four MRSs were identified in the Laguna Seca Parking MRA: MRS-14A, MRS-29, MRS-30, and MRS-47. The data resulting from investigation and removal actions indicates that various types of troop training operations occurred throughout the MRA. Review of the available literature, removal results, and equipment performance results indicate that the investigation and removal actions conducted in the Laguna Seca Parking MRA successfully detected, excavated, and recovered MEC to address the imminent safety hazard.

5.1 Laguna Seca Parking MRA Historical Records and Military History

Historical aerial photographs, historical facility training maps, the Army's ARSs, and historical military field manuals were reviewed to evaluate the types of training that were likely conducted in the Laguna Seca Parking MRA and the historical practices related to these types of training. The following sections provide the results of the ESCA RP Team's historical records review.

Though no training maps were available for the Laguna Seca Parking MRA area in the 1940s, recovered MEC and MD suggest that 37mm training, 75mm training, and mortar training occurred in the vicinity of the Laguna Seca Parking MRA prior to WWII. Historical aerial photographs and training maps indicated artillery training beginning in the 1950s along with the establishment of the Lookout Ridge and Wolf Hill training areas. Training maps indicate aviation training in MRS-14A beginning in 1968, with the addition of helipads and an aircraft rappelling training area in the 1980s. The 1993 ASR reported mortar practice and subcaliber artillery training from approximately 1972 through 1992 in MRS-14A. In addition, the blank small arms ammunition, pyrotechnics, smoke-producing items, and practice and smoke hand grenades recovered throughout the MRA indicate that the area was used for troop training in basic maneuvers. It was recommended in the 1993 ASR that MRA-14A be cleared along with the inland impact area based on future land use. At the time of the 1997 ASR, additional removal actions at MRS-14A were in progress and removal actions at MRS-47 were pending recommendations. The 1997 ASR stated that recommendations for MRS-29 and MRS-30 were for removal actions to be completed in the remaining areas of each MRS.

5.1.1 Review of Aerial Photographs and Historical Training Maps

The following sections present the military history and development by decade of operation within the area of the Laguna Seca Parking MRA based on a review of available historical training maps obtained from the Army's archives and a review of available aerial photographs and/or topographic maps from each decade. The information is referenced to the identified MRSs within the Laguna Seca Parking MRA, where possible. This information,

along with the findings from the ASRs, investigations, and removal actions, are collectively summarized in Section 5.1.3, which presents the likely historical operations at this MRA.

5.1.1.1 Pre-1940s Era

Documentation of military use of the Laguna Seca Parking MRA prior to 1940 was limited to a topographic map from 1934 (Army 1933-34). This map included only roads/trails, right-of-ways, and topographical lines. The only features that could indicate military use of the Laguna Seca Parking MRA were the labels "Wolf Hill" in MRS 47, "Lassiter Δ #20" (triangle most likely indicates a survey benchmark) in MRS 14A, and "60 Δ Glucklin" (triangles most likely indicated survey benchmarks) in MRS-29. No other identifiable features or text were associated with the Laguna Seca Parking MRA.

5.1.1.2 1940s Era

Review of aerial photographs from 1941 and 1949 indicated that the Laguna Seca Parking MRA contains numerous well-used roads and trails. Training and topographic maps were not available for the vicinity of the Laguna Seca Parking MRA in the 1940s. The following bullets summarize the results of the review.

- A 1941 aerial photograph indicated the presence of a well-defined trail or road along the western boundary of the MRA in the location of Barloy Canyon Road. A trail also existed along the eastern boundary of the MRA. A clearing was visible in the area where "60 Glucklin" appeared in the 1934 topographic map. In addition, there was a major trail or road that encircled the area identified as "Wolf Hill" (MRS-47) in the 1934 topographic map. There was no indication of buildings or weapons placement.
- A 1949 aerial photograph indicated clearings at the southern end of the MRA. The clearing visible in the 1941 aerial photograph where "60 Glucklin" appeared in the 1934 topographic map was better defined. There was also a major trail extending in a north south direction through the center of the MRA. There was no indication of buildings or weapons placement.

5.1.1.3 1950s Era

Review of the 1950s era training and facility maps indicated increased military activity within the Laguna Seca Parking MRA. Aerial photographs were not available for the vicinity of the Laguna Seca Parking MRA in the 1950s. The following bullets summarize the results of the review.

- A 1953 training areas and facilities map labeled the area in the center of MRS-14A as the "Lookout Ridge Training Area" (Army 1953). A mortar position was shown along the western boundary of MRS-14A immediately south of the training area. The map was labeled "Wolf Hill Tng Area" in MRS-47. Skyline Road, Pilarcitos Canyon Road, and Barloy Canyon Road were labeled in the southeastern, eastern, and western portions of the MRA, respectively. Hash marks on the map indicated that MRS-14A and MRS-29 were assigned to the Division Artillery and MRS-30 and MRS-47 were assigned to the

2nd Infantry. Two square features labeled "Arty Positions" (artillery positions) were located in the vicinity, one southwest of MRS-29 and one to the west of MRS-14A.

- A 1956 training areas and facilities map indicated the same features and labels as the 1953 map with a few exceptions (Army 1956). A rectangle labeled "Demonstration Area" was shown in the northeastern corner of MRS-47 and extended across the northern half of MRS-30. Hash marks on the map indicated that the entire MRA was assigned to "Div Arty" (Division Artillery). A large rectangle covering the southern half of the Laguna Seca Parking MRA and extending to the south was labeled "Survey Tng Area" (survey training area). The mortar position and two "Arty Positions" (artillery positions) observed on the 1953 map were not present on this map or subsequent maps.
- A 1956 aerial photograph provided coverage of the western half of the Laguna Seca Parking MRA. A trail and some clearings were visible in the "Wolf Hill" area located in MRS-47. Roads and trails were also visible throughout the MRA, including Barloy Canyon Road.
- A 1957 training areas and facilities map contained the same basic information as the 1953 and 1956 maps, except that the area of MRS-14A and MRS-29 were assigned to the 1st Brigade. The area of MRS-30 and MRS-47 were part of the impact area and not assigned a Brigade (Army 1957). The "Survey Tng Area" and the "Demonstration Area" were not present on this map.

5.1.1.4 1960s Era

Review of the 1960s era training and facilities maps indicated military activity in the Laguna Seca Parking MRA. Available aerial photographs did not provide coverage for the Laguna Seca Parking MRA. The following bullets summarize the results of the review.

- A 1961 training facilities map indicated "M.81" in the lower portion of MRS-14A (Army 1961). The northeastern portion of MRA-14A was within a trapezoid labeled "HUMRO TEST" (Human Resource Research Organization testing area), indicating that the area was used for a soldier psychology project, likely without the use of ordnance (Shaw 2003b). The Wolf Hill Training area and the Lookout Ridge Training Area were still shown on the map.
- A 1964 training areas and range map indicated that MRS-14A and MRS-29 were assigned to the 1st Brigade, and MRS-30 and MRS-47 were located within the Impact Area and appear to be assigned to G-3 Training (Army 1964).
- A 1968 training facilities map indicated the same training assignments as the 1964 map, with the addition of an airplane symbol in the middle of MRS-14A indicating an Aviation Training Area (Army 1968).

5.1.1.5 1970s Era

Review of 1970s era documentation included training maps and aerial photographs. The following summarizes the results of the review.

- The 1971 Training Facilities Plan Map (USACE 1971) is the same as the 1968 Training Facilities Map with the exception that MRSs-14A, -30, -47, and a portion of MRS-29 are included in an area marked off as restricted air space. The airplane symbol seen on the 1968 map in the middle of MRS-14A remains.
- The 1972 Training Areas and Range Map indicates three changes from the 1971 map. The airplane symbol seen on the 1968 and 1971 maps in MRS-14A was no longer shown. The western section of MRS-47 is labeled as a demolition area (indicated by the number 31 within the M area). A circle symbol is also shown in the central portion of MRS-47; however, it is not clear from the legend what this symbol corresponds to.
- The 1978 aerial photograph covers the very southwest corner of MRS-14A, all of MRS-30, and all of MRS-47. The areas visible in the 1978 aerial appear to have a similar level of use for roads and trails as in the 1956 aerial. Only MRS-47 shows evidence of new activity: roads with adjacent clearings.

5.1.1.6 1980s Era

Review of 1980s era documentation included a training map and an aerial photograph. The following summarizes the results of the review.

- The 1982 Training Facilities Map (Army 1982a) is similar to the 1971 map, with the following additions: Heli pad (emergency evac) was shown within MRS-47, MRS-14A, and MRS-29 were labeled with the letter "P"; however, a legend including the corresponding meaning of "P" was not found. Range 31 shown in the western portion of MRS-47 is labeled as Platoon Attack Course. An Aircraft Rappelling Area is shown in the central eastern portion of MRS-14A.
- The 1984 Training Facilities Map (USACE 1984) shows the majority of MRSs -29 and -14A within Training Area P, however, the legend does not indicate use for this training area. The southernmost portions of MRSs -29 and -14A are excluded from Training Area P, and appear to be within the Laguna Seca Recreation Area. MRSs -47 and -30 remain within Impact Area M. The western portion of MRS-47 is labeled RNG 31 (ARTEP Platoon Attack Course).
- The 1986 aerial photograph indicates a structure, field range latrines, at the northwest boundary of MRS-47. There is a new clearing at the northern border of MRS-30.
- The 1987 Ranges and Training Area Overlay (Army 1987b) showed the majority of MRSs-14A and -29 within Training Area P. The southernmost portions of MRSs-14A and -29 were excluded from Training Area P as observed on the 1984 map. The northeastern portion of MRS-14A was labeled as an Aircraft Rappelling training site.

5.1.1.7 1990s Era

There are no available aerial photographs that cover the Laguna Seca Parking MRA during the 1990s.

Review of 1990s era training and facility maps was limited to a 1991 map titled "Range and Field Training Area Sketch" (Army 1991) and a 1992 Back Country Roads Map (Army 1992). The 1991 Range and Field Training Area Sketch was identical to the 1982 training area map discussed in section 5.1.1.6. The Back County Roads Map was a reproduction of a 1968 training area map with names added for the roads. MRSs-14A and -29 were indicated for use by the 1st Brigade. MRS-14A was shown to have a Helicopter Pad centrally located. MRSs-30 and -47 were within the Impact Area, and were indicated for use for G-3 Training. Barloy Canyon Road, Pilarcitos Road, Lookout Ridge, and Skyline Road were all labeled. The base was officially closed in September 1994.

5.1.2 Review of Archives Search Reports

Three ASRs were completed for the former Fort Ord (USACE 1993, 1994, and 1997a). The purpose of the ASR was to gather and review historical information to determine the types of munitions used at the site, identify possible disposal areas, identify previously unknown training areas, and recommend follow-up actions. Guidance for conducting archives searches did not exist until 1995 (USACE 1995). The 1993 ASR was completed based on the Scope of Work provided to the St. Louis Corps of Engineers by the Huntsville Corps of Engineers, and on archive search reports completed at other military installations. The archives search included a PA/SI consisting of interviews with individuals familiar with the sites, visits to previously established sites, reconnaissance of newly identified training areas, and reviewing data collected during sampling or removal actions. The 1995 guidance specified that the ASR include information on historical records, site visits, follow-up actions, prior documentation, and characterization and evaluation for potential MEC response sites (USACE 1995). As a result, the Army issued two subsequent reports in 1994 and 1997 that contained additional information and descriptions of the follow-up actions recommended as part of the 1993 ASR.

The ASR Supplement 1 was performed in 1994 for the purpose of evaluating additional historical maps and information obtained from ongoing research (e.g., interviews, archive searches, and site visits) and remediation activities pursuant to the basic ASR for Fort Ord (USACE 1994). The 1997 Revised ASR combined information obtained through the previous archive searches with the results of a PA/SI conducted by the USACE (USACE 1997a). The PA/SI consisted of interviews with individuals familiar with the MRSs, visits to previously established sites, reconnaissance of newly identified training areas, and the review of data collected during sampling or removal actions. The 1997 Revised ASR was conducted in accordance with the USACE guidance (USACE 1995).

5.1.2.1 1993 Archives Search Report

The ASR (USACE 1993) initially divided the former Fort Ord into sites based upon previous uses identified on historical training maps and made recommendations on whether further action appeared warranted for the sites. The following information was reported in the 1993 ASR for the sites identified within the boundaries of the Laguna Seca Parking MRA.

A portion of the Laguna Seca Parking MRA corresponding to MRS-14A was included in Site 14 of the 1993 ASR, also called Pilarcitos Canyon and Lookout Ridge. Site 14 was located at the vicinity grids of FR 1250 and FR 1251 on the ASR maps. The site was described as

containing 7" and 8" Naval gun projectiles. A 1953 training area and facilities map showed a mortar position and a subcaliber artillery training area P-5 within Site 14. Range P-5 was used for subcaliber artillery and mortar practice from approximately 1972 through 1992. It was recommended in the ASR that the area be cleared along with the inland impact area based on future land use.

No other portions of Laguna Seca Parking MRA (i.e., MRSs -29, -30, and -47) were discussed in the 1993 ASR; however, these MRSs are discussed in Section 5.1.1.3.

5.1.2.2 1994 Archives Search Report Supplement 1

No munitions response sites were identified within the Laguna Seca Parking MRA in the 1994 ASR. The Laguna Seca Parking MRA was not identified in the 1994 ASR Supplement 1.

5.1.2.3 1997 Revised Archives Search Report

The Revised ASR (USACE 1997a) presented information included in the 1993 Archive Search Report, the 1994 Archive Search Report Supplement 1, and the findings of the PA/SI conducted by the USACE. The following information was reported for the sites located within the boundaries of the Laguna Seca Parking MRA.

The area previously defined in the 1993 ASR as Site 14 is further divided into subsites, Sites OE 14A through 14E, in the 1997 ASR. Site OE 14A, Lookout Ridge II, or LOR2 (now MRS-14A), is identified in the Revised ASR as a 166-acre parcel. A removal action by the Army's contractor, Human Factors Applications, Inc. (HFA), was conducted in 1994 on 50 acres of the site to a depth of 3 ft. The Army's contractor, UXB International, Inc. (UXB), determined that Site OE 14A was 193 acres, of which 10% was randomly sampled to a depth of 4 ft. The recommendation for Site OE 14A stated that the area was undergoing removal actions during the time of the investigation.

Site OE 14D, 14 West, included the northern tip of what is now MRS-14A. The Revised ASR states that this area contained Range P-5. The revised report cites an interview with Mr. Roy Durham, former Range Control Officer, where Mr. Durham stated that Range P-5 was used for subcaliber artillery training and mortar practice from 1972 through 1992. Further site investigation was recommended for Site OE 14D.

Site OE 29, the Laguna Seca Bus Turn Around (now MRS-29) is located at the southeast end of MRS-14A. The area is 26 acres in size and has undergone sampling of 69 grids to a depth of 4 ft by UXB. The removal action was conducted by the Army's contractor CMS on the 2-acre bus turn around portion of the site. The Final Report for Ordnance and Explosives Removal Action recommendation was for complete removal action on the remainder of the site.

Site OE 30, Laguna Seca Turn 11 (now MRS-30), is located at the southwestern end of MRS-14A. The ASR states that this area is 5.9 acres in size and has undergone a 4-ft removal

action by the Army's contractor UXB. The Revised ASR states that removal actions have been completed.

Site OE 47, Wolf Hill (now MRS-47), located west of MRS-30, is stated to be 75 acres in size, with boundaries determined by the BRAC parcelization. Several actions were reported for Site OE 47 in the Revised ASR. The first investigation included a sampling of grids carried out by the Army's contractor HFA. A controlled burn was implemented in 1994 to facilitate a removal action performed in 1995 by the Army's contractor UXB. Sampling was performed by CMS in 1995 to 1996, which was followed by a removal action over 74.16 acres from February 1997 to July 1997. The 1997 Revised ASR stated that recommendations will be based on the results of final removal actions.

5.1.3 Review of Historical Military Training Practices

The following sections discuss the typical operations and/or training activities that may be expected to have occurred in the Laguna Seca Parking MRA. This analysis is based upon a review of historical field manuals, the list of the MEC and MD items identified during removal actions, and the review of the historical documents and maps referenced in the previous sections.

Unless otherwise stated, the date ranges provided in the following discussion were referenced from the Army technical manuals for each type of MEC and MD, as listed in Table 5-1 of this report. In addition, some of the following discussions of training practices are based upon information contained in the book "The American Arsenal" (Hogg 2001), mortars, and an analysis of the MEC and MD identified during the sampling and removal actions in this area. For further information on the location of MEC and MD items recovered please refer to Plates B1 through B6 in Appendix B.

5.1.3.1 Pre-World War II Training

Prior to WWII there is very little documentation available regarding the training practices employed at the Laguna Seca Parking MRA. There is no mention of pre-WWII activities in this MRA from any of the ASRs; however, the area is covered by a 1934 topographic map that includes minor details for three of the four MR sites. Two of the map notations—"Lassiter 20" in MRS-14A and "60 Glucklin" in MRS-29—are accompanied by the small triangles that denote survey benchmarks on later maps. The third notation is the first known use of the term "Wolf Hill" to describe the area inside MRS-47. There is no indication on the map as to the presence and/or types of training that may have occurred on Wolf Hill. MRS-29 is located outside of the boundary of the Camp Ord Military Reservation on the Army historical map dated 1933-1934 (Army 1933-1934). A training facilities map dated 1953 indicates that MRS-29 was assigned to the Division Artillery. No other maps are available for the time period between 1934 and 1953; therefore, it is unknown whether MRS-29 was used for training prior to WWII.

Footage from a film entitled "A Year on a Calvary Post, 1938 – 11th Calvary, Presidio, Monterey, CA, National Archives" from 1940 was reviewed; however, the film did not

contain definitive information regarding training practices in the Laguna Seca Parking MRA. No training maps are available from this time period.

37mm Training

Five 37mm MK I LE (MD) projectiles available for use prior to WWII were encountered on MRS-14A (Plate B1). Based on the distribution of the 37mm MK I LE, it appears that 37mm training occurred in the vicinity of the Laguna Seca Parking MRA prior to WWII. The M1916 37mm gun was used to fire the 37mm MK I LE. It was widely used as both a direct and indirect fire weapon during WW I. The 37mm Mk I LE was primarily used in training with the M1916 weapon (Canfield 2000).

3-inch Mortar Training

Sixteen 3-inch Practice "Stokes" Trench Mortars (MEC and MD) were removed from MRS-47 and a MK VI trench mortar fuze was encountered in MRS-14A (Plate B1). The 3-inch Stokes and the MK VI fuze were available prior to WWII.

The Stokes mortar was developed by the British during WWI for use in trench warfare. The mortar fired its projectile at a high angle so that it fell almost straight down on the enemy. One advantage offered by the mortar was that troops were able to fire it from battlefield trenches without exposing the mortar crew to direct enemy fire. The mortar was also lighter making it more mobile than other artillery pieces. Early models of the weapon had a maximum range of up to 800 yards (Canfield 2000). The Stokes mortar projectiles were initially unstabilized (i.e., had no tail fins) and fell to the target with a tumbling motion (end-over-end). Despite this, the mortar was accurate at short range. Unstabilized mortars used an "all ways" fuze, which was designed to detonate regardless of the velocity or angle of the tumbling projectile (Canfield 2000).

75mm Training

MK I shrapnel 75mm projectiles (MEC) were removed from MRS-47 (Plate B1). The MK I shrapnel was available for use prior to WWII. Pre-WWII gun models available to U.S. Army forces that may have been used to fire these projectiles include the Model 1897, 1897A2, 1897A4 (French), M1916 (American), and the M1917 (British). The French-made M1897 was used in WWI and was considered the standard for light field artillery. The maximum range for the standard M1897 was 9,200 yards; however, gun carriage modifications increased the maximum range to 13,870 yards (Hogg 2001). The M1916 and M1917 guns are, respectively, the American and British manufactured versions of the M1897 gun.

5.1.3.2 1940-90s Training

1950-60s era maps indicate a "Lookout Ridge Training Area" and "Wolf Hill Training Area" in MRS-14A and MRS-47, respectively (Figure 2-8). The 1953 map shows a mortar position adjacent on the western boundary of the Lookout Ridge Training Area. The southern portion of the MRA is within the "Survey Training Area," which includes a "Demonstration Area" in the northern half of MRS-30 on the 1956 Training Map.

Basic Maneuvers

As a training and maneuver area, the site would have been used for squad, platoon, company, and battalion level maneuvers. Training operations would include the use of blank small arms ammunition, pyrotechnics (i.e., simulators and illumination projectiles), and smoke-producing items (i.e., signals, flares, and grenades).

Based on the MEC and MD found in the MRA (mine, smoke, practice grenade, flare, signal, and simulator) this area was likely used for various training activities from the 1940s until all maneuver elements were off the installation (Plates B2 through B6).

No specific hand grenade training areas are identified on the training facilities maps for this area; however, several hand grenade and associated fuze models were removed from the Laguna Seca Parking MRA (MK II practice, AN-M8 HC smoke, M18 smoke, and M48 smoke). This training likely occurred as a part of the basic maneuver training.

37mm Training

The following 37mm cartridges and projectiles (MEC and MD) were encountered in the Laguna Seca Parking MRA: M74, M51 series, M59, and M80 AP-T; and 37mm M63 MOD1 TP (Plate B4). Most of these items were found in MRS-47.

A 1940s map shows an Austin Antitank Range near the southeastern portion of the Impact Area. It is possible that the M3 gun, which could have fired the M51, M63, and M74 projectiles, would have been used at the Austin Antitank Range. Based on the 7,500 to 12,800 meter maximum range for the M3 gun, it is possible that a firing point would be located within the Impact Area. (Hogg 2001). The M74 and the M59 would have been used with the M1A2 37mm anti-aircraft gun. The M80 was used with the 37mm automatic gun, which is a plane to plane and plane to ground gun. (Hogg 2001).

57mm Training

On the 1956 map, there is a range labeled “Mortar Range No 1 (60, 81 MM & 57 RR)” in the vicinity of Range 48. According to the Policies and Procedures for Firing Ammunition for Training, Target Practice, and Combat, the range to impact for 57mm recoilless rifles is 250 to 4,600 meters (Army 1983). Although the distance to the Laguna Seca Parking MRA is more than 4,600 meters from any of the above listed ranges. It is possible that the two 57mm projectiles found in the Laguna Seca Parking MRA were fired from the northwest portion of the Impact Area.

60mm and 81mm Mortar Training

Mortar training is believed to have occurred in the vicinity of Laguna Seca Parking MRA during the 1940s through the early 1970s. Practice mortar training was indicated on 1950s-era Training Facilities Maps (i.e., the Mortar Position in MRS-14A). Mortar MEC and MD was encountered during removal actions in MRS-47, including 81mm M43 series high explosive

(HE), 81mm M43 series Practice, and 81mm M68 training items. In addition, a few 60mm Practice M50 series mortar MD were recovered from MRS-47.

Mortars, including the 81mm model, provide infantry units with artillery-like fire support when artillery either is not available, or cannot be moved forward fast enough. The 81mm mortar M1 was developed in the 1930s and improved on the earlier Stokes mortar design. The 81mm mortar projectile included tail fins, which provided stability to the projectile in flight and improved projectile ballistics and functioning (Hogg 2001). Fins also assured that the mortar projectile would strike fuze-end first. Mortar projectiles, fired from the M1, found in MRS-47 include the high explosive M43, illumination M301, and the training M68 (Plate B3). Maximum range of the M43 is approximately 3,290 yards. Projectile range could be varied by changing the number of propellant charges and/or adjusting the mortar elevation. Maximum range of the M301 illumination projectile is approximately 2,200 yards and the illumination candle which it ejects burns for approximately 60 seconds. The M68 projectile is an inert non-fuzed training device. The M68 contains a percussion primer and when dropped in the mortar is propelled in a fashion similar to the M43. However, the M68 does not include propellant charges or contain explosive filler. Maximum range of the M68 is 310 yards. The 60mm mortar is an easily portable weapon ideally suited for firing distances that fall between the range of the 81mm mortar and the hand grenade. Three MD items from the 60mm M50 series practice mortar projectiles were found in MRS-47 (Plate B3). The M50 Series practice projectile simulates the weight and ballistic performance of the M49 HE projectile. The M50 utilizes the point detonating fuze and contains a black powder spotting charge.

4.2-Inch Mortar Training

Evidence of 4.2-inch Mortar Training was identified to the north of MRS-47 during previous surface removal actions (MACTEC 2007). Four 4.2-inch M3 series HE Mortars (MEC) were found in MRS-47 and were likely related to the mortar training to the north (Plate B3). Documentation including training facilities maps, range control records, and range regulation standard operating procedures from the 1970s, 1980s, and 1990s indicate that 4.2-inch mortars were allowed on the Impact Area ranges (MACTEC 2007).

5.1.4 Historical Land Use Summary

The initial use of the majority of the Laguna Seca Parking MRA began in approximately 1917 when the U.S. Government purchased more than 15,000 acres of land and designated it as an artillery range (Cozzens 1922). Cavalry and artillery troops stationed at the Presidio of Monterey, along with infantry troops stationed at the Presidio of San Francisco, conducted training activities within the Impact Area. Although no training maps from this time period have been found, pre-WWII-era military munitions have been removed during response actions within the Impact Area.

Based on training facilities maps and MEC and MD removed, it appears that the MRS-47 portion of the MRA was an impact area prior to WWII and into the 1970s.

The remainder of the MRA (MRS-14A, -29 and -30) appears to have been used for basic maneuvers with occasional impact by various projectiles. There does not appear to be a pattern of use as an impact area for MRSs-14A, -29, or -30.

5.2 MEC Investigations and Removal Actions

The quality of the MEC investigation and removal actions was evaluated as part of this RI. In order to evaluate the actions, the adequacy of the removal action was assessed; the equipment used was evaluated for effectiveness based upon its implementation and maintenance records; and data records were reviewed for accuracy and consistency.

The following describes the MR investigations and removal operations conducted by the Army at the Laguna Seca Parking MRA. Table 5-1 presents a listing of the military munitions, both MEC and MD found during the MR investigations, as described below.

MRS-14A:

- Removal action to support proposed Laguna Seca Raceway parking on 50 acres from June 6, 1994 to June 20, 1994 (Figure 5-1; HFA 1994)
- Grid sampling on 86 grids (10 % of 193 acres) July 19, 1994 to May 15, 1995 (Figure 5-1; UXB 1995a)
- 4-ft Removal action in northernmost tip of MRS-14A, included in Site OE 14D, from 1995 to 1997 (USA 2001a) 4-ft Removal action on approximately 98 acres (427 grids) and 1-ft removal action on approximately 95 acres (384 grids) from June 1997 to April 1998 (Figure 5-2; USA 2001c)

MRS-29:

- Random sampling – converted to 100 % removal action that was 53 % completed (69 grids) from June to August 1995 (Figure 5-3; UXB 1995b)
- 4-ft Removal action on approximately 26 acres (125 grids, including grids previously cleared by UXB), from July 1997 to July 1998 (Figure 5-3; USA 2000a)

MRS-30:

- 4-ft Removal action on 5.9 acres (25 full and 10 partial grids) from June to August 1995 (Figure 5-4; UXB 1995c)
- 30 ft to 40 ft of fill material were placed over most of MRS-30 in support of construction activities associated with the expansion of Laguna Seca Raceway Turn 11 (Army 2007)

MRS-47:

- Prescribed burn in 1994 in support of munitions investigations (USACE 1997a and USA 2000b)
- Sampling investigation at three grids in January 1994 (HFA 1994)
- 3-ft Removal action roads and trails southern and western perimeter on 39 grids in July 1994 (Figure 5-5; UXB 1995d)

- 100 % 4-ft Sampling investigation at 32 Grids from July to September 1996 (Figure 5-5; USA 2000b)
- 4-ft Removal action on 79 Acres (358 grids) from February to June 1997 (Figure 5-6; USA 2000b)

The After-Action Report (AAR) reported that six 100-ft by 100-ft grids (two complete grids and portions of four grids) were not cleared during the removal action at MRS-14A because of accessibility issues (i.e., steep grade, dense brush, or deep ravine; USA 2001c). During the removal actions, one burial pit containing MEC related to troop training was encountered in MRS-14A.

5.2.1 Investigation and Removal Action Approach

Investigation and removal operations were performed by a variety of contractors including HFA, USA (formerly CMS), and UXB. The work performed by these contractors was conducted between 1994 and 1998 as discussed in the following sections. Initial actions and sampling actions are briefly summarized below as they were not the final action taken within those areas. The final actions conducted on each MRS are discussed in sections 5.2.1.2 through 5.2.1.5. The Army's contractor, USA, conducted work on MRSs-14A, -29, and -47 under the same work plan; therefore elements of the removal approach common to all three MRSs are discussed in more detail in section 5.2.1.6.

5.2.1.1 Initial Actions, Sampling, and Removals

The initial actions listed in section 5.2 are not discussed in detail as the areas covered by them were all followed by removal actions. Those initial actions were:

MRS-14A:

- Removal action to support proposed Laguna Seca Raceway parking on 50 acres from June 6, 1994 to June 20, 1994 (HFA 1994). Depth of clearance was 3 ft (USACE 1997a). The QC/Safety Officer conducted sweeps of 10% of the project grids and observed UXO personnel to determine that their techniques were proper and they were following prescribed safety procedures. Each magnetometer was tested each morning and field tested after lunch. The only significant MEC located was one 37mm projectile with base fuze (HFA 1994).
- Grid sampling on 86 grids (10 % of 193 acres) July 19, 1994 to May 15, 1995 (UXB 1995a). 100-ft x 100-ft grids were staked out to cover at least 10% of the total area of the site. No two grids were closer than 200 ft. Brush was cleared and a visual reconnaissance was conducted on the surface. A subsurface geophysical investigation was accomplished to a depth of 4 ft using United States Army Corps of Engineers, Huntsville Division (CEHND) furnished Schonstedt magnetometers. Models GA-52C and GA-72CV were used prior to October 1994 and model GA-52CX was used after October 1994. Every magnetic anomaly found was marked and excavated. No evidence of gun projectiles or heavy fragment contamination was found. A minimum of 10% of each grid was checked by UXB QC specialists to ensure that MEC removal was done properly. After the QC

check, the CEHND Safety Specialist performed a QA check of the site prior to accepting it.

MRS-29:

- Random sampling – Converted to 100 % removal action that was 53 % completed (69 grids) from June to August 1995 (UXB 1995b). 100-ft x 100-ft grids were staked out to cover at least 10% of the total area of the site. No two grids were closer than 200 ft. Brush was cleared where needed and a visual reconnaissance was conducted on the surface. A subsurface geophysical investigation was accomplished to a depth of 4 ft using CEHND-furnished Schonstedt magnetometers, model Ga-52CX. Every magnetic anomaly found was marked and excavated. A minimum of 10% of each grid was checked by UXB QC specialists to ensure that MEC removal was done properly. After the QC check, the CEHND Safety Specialist performed a QA check of the site prior to accepting it.

MRS-47:

- Prescribed burn – 1994. Vegetation was cleared to facilitate access to the area (USACE 1997a and USA 2000b).
- Sampling - January 1994. HFA sampled three grids in the Wolf Hill area and discovered one 81mm HE mortar and two 37mm projectiles. HFA reported that the site was thereafter declared contaminated with MEC and ceased sampling in the region (HFA 1994).
- 3-ft Removal action – July 1994 to July 1995. UXB performed clearance work on 39 grids around the southern and western perimeter of the Wolf Hill area. This action was confined to the unimproved roads and fire-break locations within the MRS. During this removal action, two live 75mm HE projectiles were located (UXB 1995d).
- 4-ft Sampling investigation - July to September 1996. USA performed a sampling investigation on 32 grids in the Wolf Hill area and recovered thirteen UXO items (37mm AP-T M51 series [4], 75mm HE MKI [1], 81mm mortar HE M43 series [4], 81mm mortar practice M43 series [1], and 4.2” mortar HE M3 series [3]). The majority of the items recovered were believed to have impacted the site after being fired (UXO) rather than being abandoned or buried at the site (DMM). In addition, a cache of 176 blasting caps was found buried in the area (USA 2000b).

5.2.1.2 MRS-14A USA (formerly CMS) Removal Actions

MRS-14A is situated on sloping terrain consisting of grassland with some areas of trees, brush, and poison oak. Most vegetation clearance in this site was accomplished using mechanical brush cutting methods between April 10 and June 10, 1997. Following installation of operating grids, a manual brush team was mobilized on September 10, 1997 to cut the vegetation in areas inaccessible to the mechanical vegetation clearing team (USA 2001c).

Operating grids in Site OE 14D, which included the northern tip of MRS-14A, were surveyed by CMS from September 12, 1995 to October 18, 1995. CMS began survey operations to establish operating grids in Site OE-14A on May 14, 1997. The boundaries of these sites had been established during a previous contractor's (UXB) sampling activities, and are based on the BRAC parcel boundary and are not based on sampling or archive information. Operating area boundaries and corner coordinates for the 811 operating grids in Site OE 14A and 10 operating grids in Site OE 14D were located using GPS survey equipment (USA 2001a, 2001c).

The 4-ft removal action at the northernmost tip of MRS-14A, included in Site OE 14D, was performed from September 26, 1996 through January 28, 1997. Over 326 100-ft by 100-ft grids and partial grids were completed, of which eight full and two partial grids were located within the current boundary of MRS-14A. One MEC item was discovered in the portion of Site OE 14D within the boundaries of MRS-14A and one MEC item was found outside MRS-14A, but inside the Laguna Seca Parking MRA. Both items were removed in accordance with the work plan (CMS 1995). Grid sampling was performed at Site OE14D prior to the start of the removal action; however, no sampling grids were located within MRS-14A (USA 2001a).

MEC removal operations at Site OE 14A began June 11, 1997 and concluded April 9, 1998. The removal operation was conducted on 427 grids that were MEC-cleared to a depth of 4 ft and 384 grids that were MEC-cleared to a depth of 1 ft. Six heavily vegetated grids situated on very steep terrain were never cleared of vegetation after it was determined by the USACE OE Safety Representative that vegetation removal on those grids would be unduly hazardous (USA 2001c). These six grids (two complete grids and portions of four grids) and a paved ditch along Lookout Ridge Road were not cleared during the MEC removal operations (USA 2001c).

The removal operation at Site OE 14A encountered 137 MEC items including electric blasting caps, smoke grenades and assorted pyrotechnics, expended 37mm, 57mm, and 75mm projectiles, and training 81mm mortars. All MEC items discovered were removed in accordance with the work plan. All removal operations on this site were performed in accordance with procedures specified in the CMS Work Plan. (USA 2001c).

5.2.1.3 MRS-29 USA (formerly CMS) Removal Actions

The Army's previous contractor, UXB, performed MEC removal on MRS-29 until their contract ended in August 1995. The GPS had not been used in establishing the UXB operating grids and there was uncertainty as to the location of these grids. When CMS began operations on the former Fort Ord, the CMS survey team marked the boundary of MRS-29 using GPS. Approximately 2.34 acres in the northwest corner of UXB's site was deleted from CMS's MRS-29 and absorbed into MRS-14A, bringing the total acreage for MRS-29 to 20.7 acres. By November 20, 1996 CMS' operating grids in MRS-29 were located using the GPS and marked on the ground (USA 2000a).

The site is situated on steep terrain with dense vegetation. Most of the vegetation removal was accomplished using manual brush clearance methods between February 18 and March 11, 1998 (USA 2000a).

MEC removal on MRS-29 began June 26, 1997 and by July 10, 1997 the 4-ft removal effort was conducted on the two acres originally slated for 4-ft removal. Upon authorization from the Directorate of Environmental and Natural Resources, MEC removal was then performed to a depth of 4-ft over the remaining acres in MRS-29, which had originally been scheduled for a surface removal. Areas previously cleared by UXB were included in this MEC removal effort since there was uncertainty at the time as to the exact location of these areas and whether these areas had been subject to quality control or quality assurance. These operations commenced February 5, 1998 and were completed July 15, 1998. A total of 125 100-ft by 100-ft grids and partial grids were cleared by CMS in MRS-29. No MEC items were found during this removal action. All removal operations on this site were performed in accordance with procedures specified in the CMS Work Plan (USA 2000a).

5.2.1.4 MRS-30 UXB International Removal Actions

In support of the expansion of Laguna Seca Raceway and the associated realignment of South Boundary road, a removal action was conducted to a depth of 4 ft on the entire 5.9 acres of MRS-30 (UXB 1995c). Brush clearing and MEC clearance began June 12, 1995. The operations were complete August 9, 1995.

The entire area was divided into 100-ft by 100-ft grids; 25 total 100-ft square grids and 10 partial grids. Grids requiring brush cutting or thinning were visually checked by a UXO Supervisor before and during the selected vegetation pruning. Grids were divided into 5-ft-wide search lanes. Every magnetic anomaly found was marked and excavated. Two live MEC items were found; one 75mm MK-1 HE projectile (located 2 ft bgs), and one 81mm M301 illumination mortar cartridge (located 1 ft bgs). Both items were detonated in place (UXB 1995c).

QC checks were performed on each grid after all UXO operations were complete. UXB QC specialists checked a minimum of 10% of each grid to ensure that MEC removal was done properly. After this QC check, the CEHND Safety Specialist performed a QA check of the site prior to accepting it. The Final Report stated that UXB recommends, and the CEHND concurs, that no further work is required in this area (UXB 1995c).

Following the munitions response action, 30 ft to 40 ft of fill material were placed over most of MRS-30 in support of construction activities associated with the expansion of Laguna Seca Raceway Turn 11 (Army 2007).

5.2.1.5 MRS-47 USA (formerly CMS) Removal Action

From February 10 to June 6, 1997, a removal action was conducted to a depth of 4 ft on the entire 79 acres of MRS-47 (USA 2000b).

Brush cutting and removal on MRS-47 began on February 10, 1997. Initial brush clearing operations were accomplished with manual labor using hand tools to cut 3-ft-wide lanes through the brush. The brush was very dense and manual removal methods proved to be expensive and time-consuming. Approval was received from the USAESCH to incorporate the use of a mechanical rotary brush clearing machine (brush-hog). This brush-hog was used

to clear approximately 30% of the site with good results (USA 2000b). Bestor Engineers Inc. completed the boundary survey for the MRS-47 (Wolf Hill Parcel) and installed survey monuments. CMS used this information to develop a project base map for MRS-47. Operating area boundaries and corner coordinates for 358 operating grids were established using GPS survey equipment (USA 2000b).

MRS-47 (Wolf Hill) removal operations were conducted in accordance with the work plan. This removal action was performed over the entire site to a depth of 4 ft using Schonstedt GA-52Cx magnetometers. MEC found included 81mm mortars, 37mm projectiles, 3 inch Stokes mortars, 75mm projectiles, 60mm mortars, smoke-filled hand grenades, two unfired HE 40mm cartridges, a variety of pyrotechnic items, a 4.2" projectile, a 20mm projectile, a 57mm projectile, a 2.36 inch rocket, and various fuzes for grenades, mines, and projectiles. Depths were not recorded for all MEC found at MRS-47 because recording the depth became a requirement effective on April 1, 1997. MEC, for which depths were recorded, was mostly found within 1 foot of the surface with approximately 20% found at 2 ft, and one 3 inch Stokes mortar found at 3 ft bgs. One burial pit containing approximately 70 expended rifle smoke grenades was uncovered by the backhoe team during this operation (USA 2000b).

Upon completion of the MEC Removal Operations the brush teams returned to Site OE-47 (Wolf Hill), performing brush chipping operations to aide in the restoration of habitat. These operations were completed on June 26, 1997 (USA 2000b).

5.2.1.6 USA Removal Operations

Following are the elements of the removal approach that were used by USA on removal operations conducted at MRS-14A, MRS-29, and MRS-47 performed under the same work plan.

According to project documentation, search and removal operations consisted of those activities required to thoroughly investigate each operating grid to locate both surface and sub-surface MEC. UXO Teams were composed of a UXO Supervisor and up to six UXO Specialists. UXO teams performed all search operations and operated under the direct supervision of a UXO Supervisor. Schonstedt (Model GA-52Cx) magnetometers were used to detect sub-surface metallic anomalies and/or MEC within individual grids (USA 2000a, 2000b, 2001a).

Each work area was divided into individual operating grids. Each operating grid was comprised of a parcel of land approximately 100 ft square. These divisions were initially plotted on topographic or planimetric maps and subsequently transferred to the actual terrain using Trimble-GPS receivers. Operating Grids for removal activities were established and marked using the same procedures as those used to establish sampling grids with the exception that the grids completely covered the operating area (USA 2000a, 2000b, 2001a).

After individual 5-ft search lanes were established, the UXO Supervisor directed personnel to begin searching each lane using a Schonstedt Model GA-52Cx magnetometer. UXO Technicians started at one end of each lane and moved forward toward the opposing base line. During the forward movement the technician moved the magnetometer back and forth

from one side of the lane to the other. Both the forward movement and the swing of the magnetometer was performed at a pace which ensured the entire lane is searched and that the instrument was able to appropriately respond to sub-surface anomalies. Whenever a subsurface anomaly or metallic surface object was encountered, the technician halted and investigated the anomaly at that time. Only in sites where the team was performing less than a 4-f t removal would the anomaly be flagged and left in place if below the removal depth. Throughout this operation the UXO Supervisor closely monitored individual performance to ensure these procedures were performed with due diligence and attention to detail (USA 2000a, 2000b, 2001a).

5.2.2 Equipment Evaluation

This section describes results of a review of the geophysical instruments used during the final removal actions performed within the Laguna Seca Parking MRA.

5.2.2.1 Schonstedt Model GA-52Cx Magnetometer

The Schonstedt GA-52Cx Magnetometer was utilized by CMS, and later by their successor, USA, for the following actions: removal action at MRS-14A from 1997 to 1998, removal action at MRS-29 from 1997 to 1998, removal action at MRS-30 in 1995, and for the removal action at MRS-47 in 1997.

The Schonstedt GA-52Cx is a handheld device that, when properly adjusted, will emit a distinctive tone when placed near a ferrous metal object; the volume and pitch of this tone can provide an experienced operator with qualitative information about the nature of the detected object (e.g., size, location, burial depth). These instruments are passive dual flux-gate magnetometers – a highly sensitive magnetic locator that detects ferrous (iron) metal objects; however, they cannot detect nonferrous metal objects (e.g., lead, brass, copper, aluminum). In general, magnetometers make passive measurements of the earth's natural magnetic field; ferrous metal objects (and rocks) are detected because they produce localized distortions (anomalies) in the magnetic field. The Schonstedt magnetometer actually detects slight differences in the magnetic field (the "gradient") by means of two sensors mounted a fixed distance apart within the instruments' staff. Because the magnetic response changes greatly even over a short distance, a gradient magnetometer like the Schonstedt is especially sensitive to smaller, near-surface ferro-metal objects (Breiner 1973; USA 2000a, 2000b, 2001a).

Schonstedt magnetometers will also respond to soil and rock containing ferrous minerals (often referred to as "hot rocks"), as well as asphalt pavement containing enough ferrous mineralization to produce a Schonstedt response. The presence of "hot rocks" and asphalt pavement can mask the response from potential MEC items located near or below these items. Accordingly, it is recognized that the interpretation of the Schonstedt instrument response can be subjective. For deeper targets, the operator often must analyze a subtle change in the audio output and decide whether the instrument is responding to a potential MEC item or to pavement or soil minera1ization. Additionally, it can be difficult to determine the exact location of a more deeply buried object because the Schonstedt audio response may be dispersed over an area that is several ft wide (USA 2000a, 2000b, 2001a).

The Schonstedt magnetometer is an analog device that does not record any data. Typically, the location of a detected object is marked in the field by the placement of a pin flag or promptly excavated to uncover the detected object. For that reason, Schonstedt surveys are sometimes called "mag and flag" or "mag and dig" surveys (USA 2000a, 2000b, 2001a).

5.2.2.2 Evaluation of Instrument Detection Efficiency at Laguna Seca Parking MRA

Parsons previously conducted an ODDS at the former Fort Ord to evaluate the detection efficiency of a variety of detection technologies and systems, including the Schonstedt GA-52Cv and GA-52Cx (Parsons 2002). The detection efficiency of the Schonstedt GA-52Cx was also tested during the Del Rey Oaks (DRO) removal action (USA 2001b). These two data sources are described below.

As part of the ODDS, seeded tests were performed to evaluate the ability of the Schonstedts to detect MEC items buried at various depths. The seeded test was conducted with multiple lane widths, including the 5-ft width, which is the width used during the Laguna Seca Parking MRA removal actions described in this report. The ODDS seeded test evaluated instrument performance based on two different search radii, 1.6 ft and 3.3 ft. If the distance between the location identified by the instrument and the actual location of an item was equal to or less than the search radius, the item was considered detected by the instrument.

During the DRO removal action, 55 lots of items were seeded in the DRO Group sites prior to the removal action. Twenty-one of these items were seeded in areas where the Schonstedt GA-52Cx was subsequently used to perform the removal. Nine of these items were similar to items found within the Laguna Seca Parking MRA and have been included in this evaluation. Locations which contained multiple seeded items were not included in this analysis.

The ODDS report included the percent of items detected (Pd) in the seeded test for each instrument. However, this Pd should not be directly translated to the Pd at an actual site. For any detection equipment, the Pd depends on the depth distribution of items. If all the items are shallow, the Pd will be high, but if all the items are deep, the Pd will be low. The depth distribution of seeded items in the ODDS was designed to test and compare the detection capabilities of different detection instruments, not to represent a typical site. According to the ODDS Work Plan (Parsons 2002), items were seeded at three different depths, at the limit of detection, 6-12 inches shallower than the limit of detection and 6-12 inches deeper than the limit of detection. The limit of detection was based on the ODDS static, free air tests conducted prior to the seeded tests and described in the ODDS report (Parsons 2002).

Table 5-2 lists the ODDS and DRO seeded items which are of the same type as items that were found at the Laguna Seca MRA. The final column in the table indicates whether these items were detected with the Schonstedt GA-52Cx during the ODDS seeded test using 5-foot lane widths and a 1.6-foot search radius, or recovered during the Schonstedt GA-52Cx removal action.

In order to accommodate the different depth distributions at DRO and the ODDS seeded test site and at the Laguna Seca MRA, this evaluation considers types of MEC items separately to determine each MEC type's Pd. Based on the data provided in Table 5-2, the Pd for six depth

intervals (0-6, 7-12, 13-24, 25-36, 37-48, and greater than 48 inches) were calculated. These Pds are shown in Table 5-3. The Pd values in Table 5-3 are based on a small number of each seeded MEC type in each depth interval. This small sample size increases the uncertainty of these Pd values. However, the Pd vs. depth relationship makes sense, starting at 100% near surface and continuously dropping to 0% at deeper depths. This reasonable relationship provides confidence that these Pd values are generally valid.

The results of the ODDS were presented in Parsons Final ODDS Report (Parsons 2002). As presented in the ODDS, the statistical tests performed on the results suggested that there is no significant difference between the detection capabilities of the three different Schonstedt models tested (GA-52C, GA-52Cv, and GA-52Cx).

Based upon the results of the ODDS, the following limitations of the Schonstedt Model GA-72Cv and GA-52Cx magnetometer survey at Laguna Seca Parking MRA include:

- The Schonstedt is unable to detect nonferrous metal MEC items.
- The Schonstedt is subject to interference from asphalt pavement. South Boundary and Barloy Canyon Roads make up a portion of the Laguna Seca Parking MRA boundary. The presence of the asphalt along these boundaries may have interfered with the effectiveness of the removal action within those areas.
- The effectiveness of a Schonstedt survey depends on the skill of the instrument operator, particularly the thoroughness of their coverage when swinging the instrument within the survey lane. Unlike surveys with digital instruments, where positioning data are also obtained, there is no digitally documented verification that the Schonstedt operator has achieved complete coverage during the survey. Therefore, the QA/QC process must be relied upon to verify the Schonstedt operator achieved complete coverage within the survey lanes. Considering the survey procedures and QC and QA processes described above, and the Army's acceptance of the removal actions' coverage, the data is considered to be sufficient.
- The detection capability of the Schonstedt magnetometer is greater for larger, shallow buried items and decreases as items are more deeply buried and smaller in size.

Despite these limitations, use of the Schonstedt at the Laguna Seca Parking MRA should be considered effective for the following reasons:

- After removing the source of each of these anomalies, the UXO technicians rechecked the location.
- The majority of the MEC items removed during sampling and removal actions were non–penetrating. Penetrating items were found in MRS-47; however, the majority of the items were found within the top 12 inches.
- Documented QC and QA procedures involved equipment functional checks and independent resurveying of portions of each grid, providing assurance that the Laguna Seca Parking MRA MEC surveys were performed in a thorough and appropriate manner.

5.2.2.3 Laguna Seca Parking MRA Survey Procedures

The Laguna Seca Parking MRA is comprised of designated munitions response sites that were surveyed by UXB or USA. The northernmost tip of MRS-14A within Site OE 14D was surveyed by USA from September 12 to October 18, 1995. The remainder of MRS-14A and all of MRS-29, MRS-30, and MRS-47 were surveyed by UXB (June 12 to August 9, 1997) or USA (February 1997 to April 1998). The vegetation at Laguna Seca Parking MRA consists primarily of grassland and maritime chaparral with smaller areas of coast live oak woodland, coast live oak savanna, and coastal scrub (USACE/Jones and Stokes 1992 AR BW-1938). A prescribed burn was conducted in 1994 to facilitate the MEC investigation activities in MRS-47. In addition, the Laguna Seca Parking MRA was manually and mechanically cleared of brush to facilitate the MEC surveys. The terrain ranges from flat to steep. The cleared areas were divided into 100- by 100-ft grids and surveyed along a series of adjacent search lanes. The UXB and USA investigations utilized the Schonstedt GA52Cx.

Schonstedt GA-52Cx survey procedures, as documented in the USA work plans, were performed as follows: the handheld Schonstedt instrument was swung from side to side as the operator walked down the 5-ft-wide search lanes delineated by lengths of nylon rope/twine laid on the ground. Schonstedt responses indicative of potential MEC items ("hits") were investigated immediately. Only where the team was performing less than a 4-ft removal would the anomaly be marked in the field with a pin flag and left in place if below the removal depth. MRS-14A was the only MRS where a less than 4-ft removal action occurred. The After-Action Report states that all encountered MEC was removed and that all removed MEC was located within the prescribed removal depths (USA 2001c).

Contractor Equipment Quality Assurance/Quality Control

USA (formerly CMS) conducted the removal actions at MRSs-14A, -29, and -47 (USA 2000a, 2000b, 2001a, 2001b). Throughout operations, CMS performed daily operational checks and QC inspections of its work. These inspections consisted of both informal inspections of operational activities and formal inspections of work-in-progress and work completed. Procedures for quality control are specified in the CMS Work Plan. All grids in MRS-14A passed a 10% QC survey. Two grids (18X and 18Y) initially failed the QC survey due to an excess number of anomalies found and were reinvestigated prior to passing a second QC survey (USA 2001c). All grids in MRS-29 passed their initial QC inspection (USA 2000a). For MRS-47, one deficiency report was written during informal QC inspections. However, the report was for working in the vicinity of poison oak without proper protection. One grid (13J) failed QC inspection when a 37mm AP-T projectile was found and was reinvestigated prior to passing a second QC survey (USA 2000b).

Following CMS' QC surveys, each grid received a QA inspection by a USACE OE Safety Specialist. Every grid in MRSs-14A, - 29, and -47 passed the QA inspection and was accepted by the Corps of Engineers.

UXB conducted the removal action at MRS-30. QC checks were performed on each grid after all UXO operations were complete. UXB QC specialists checked a minimum of 10% of each

grid to ensure that MEC removal was done properly. After this QC check, the area was QA-inspected and accepted by the CEHND Safety Specialist (UXB 1995c).

5.2.3 Collection and Management of Field Data

Quality Assurance/Quality Control

The QA/QC procedures used by UXB and USA during the field operations are described below. The results of the QA/QC review are used to support the "yes" response to Removal Evaluation Checklist Question 24 (Appendix D).

UXB International Field Operations QA/QC

MRS-30 - The Senior UXO Supervisor's handwritten journals and the Field Team Lead's handwritten journals were available for review for date ranges of final removal action. The After-Action Report stated that QC checks were performed on each grid after all UXO operations were complete. UXB QC specialists checked a minimum of 10% of each grid to ensure that MEC removal was done properly. No QC logs were available for review for the date range during which the final action occurred. Grid sheets, however, were available for grids where MEC or ordnance scrap was found.

After QC checks, the CEHND Safety Specialist performed a QA check of the site prior to accepting it (UXB 1995c). No QA acceptance forms were available for review.

CMS/USA Environmental Field Operations QA/QC

Throughout operations at MRS-14A, -29, and -47, CMS performed daily operational checks and QC inspections of its work. These inspections consisted of both informal inspections of operational activities and formal inspections of work-in-progress and work completed. Procedures for QC are specified in the CMS Work Plan and described in Appendix F of each AAR (see references below).

MRS-14A - All grids in MRS-14A passed a 10% QC survey. Two grids (18X and 18Y), initially failed the QC survey due to an excess number of anomalies found and were reinvestigated prior to passing a second QC survey. Following CMS' QC surveys each grid received a QA Inspection by a USACE MEC Safety Specialist. Every grid in MRS-14A passed the initial QA inspection and was accepted by the Corps of Engineers. Grid sheets were available for grids where MEC or ordnance scrap was found. All initial and subsequent QC survey records are included in the AAR for Site OE 14D and Site OE 14A as Appendix K in the respective reports and USACE QA inspections/acceptance records are included in the AAR for each site as Appendix L in the respective reports (USA 2001a and 2001c).

MRS-29 - All grids in MRS-29 passed the initial QC inspection. Following CMS' QC inspection each grid passed a QA Inspection by a USACE MEC Safety Specialist and was accepted by the Corps of Engineers. Since no MEC items were found during the final removal operation, the grid sheets reflected found expended items. All initial and subsequent

QC survey records are included in the AAR as Appendix K and QA inspections/acceptance records are included in the AAR report as Appendix L (USA 2000a).

MRS-47 - One deficiency report was written during informal QC inspections for the work performed in Site OE-47 (Wolf Hill). That deficiency report concerned a sweep team working in the vicinity of poison oak without protection on April 7, 1997. The deficiency was corrected and no further action was required. On March 31, 1997 grid 13J failed QC inspection when a 37mm AP-T projectile was found. That grid was re-swept by the team, re-inspected, and passed QC inspection on April 7, 1997. All grids in Site OE-47 (Wolf Hill) were QC inspected and the results of these inspections are included in the AAR as Appendix K. Following CMS' QC inspection each grid passed a QA Inspection by a USACE Safety Specialist and all grids were accepted by the Corps of Engineers. Grid sheets were available for review for the grids that contained MEC or ordnance scrap. All initial and subsequent QC survey records are included in the AAR as Appendix K and QA inspections/acceptance records are included in the AAR report as Appendix L (USA 2000b).

5.2.4 Completeness of Existing Records and Data Gaps

The completeness of existing records and the identified data gaps were evaluated. The records were reviewed to determine if there is enough defensible data to 1) assess whether or not the work was completed according to contractual requirements, 2) make recommendations on the adequacy of the removal actions, and 3) identify data gaps, if any, that may need to be filled to evaluate the adequacy of the response action.

In general, the majority of existing records and data were complete and the removal actions were conducted in accordance with the work plan requirements. The review of the Laguna Seca Parking MRA boundaries and the removal action areas identified in the reports indicates that a removal action was actually conducted to depth, not 4-ft bgs across the entire MRA with the exception of portions of MRS-14A. Within MRS-14A, a 1-ft removal action was conducted on the slopes of MRS-14A, six grids (two complete grids and portions of four grids) were not cleared due to accessibility issues (steep grade, dense brush, or deep ravine), and a paved ditch along Lookout Ridge Road was not surveyed.

5.2.5 Accuracy of MEC Investigations and Removal Actions Site Boundaries

Site boundaries are based on property transfer boundaries for the Laguna Seca Parking MRA as provided by the Army.

5.3 Laguna Seca Parking MRA Data

The Laguna Seca Parking MRA was used to conduct various types of training. The data resulting from sampling and removal actions indicates that training operations in the vicinity included the use of various projectiles, mortar, rockets, missiles, grenades, and miscellaneous flares, signals, and simulators. Table 5-1 presents a summary of the MEC items recovered from the Laguna Seca Parking MRA during the removal actions described above. Table 5-1 also provides the associated MEC hazard classification scores.

Locations of MEC and MD found at the Laguna Seca Parking MRA are shown on Plates B1 through B-6.

5.4 Data Analysis

The results of the reviews of the historical records and investigation and removal actions were used to complete the data analysis. The data analysis process consists of answering a series of questions and the process is documented through the completion of a series of checklists. The checklists were developed to facilitate the analysis and validation of samples or data obtained during field investigation, grid sampling, and MEC removal activities in accordance with Task 4.1 of the AOC. Evaluation of the past munitions response activities is used to support completion of a risk assessment and feasibility study for the area.

Copies of checklists prepared for the Laguna Seca Parking MRA are provided as Appendix D. This section presents a summary of the results of the checklist evaluations for the literature review and the removal action review. An evaluation checklist for the sampling performed at the Laguna Seca Parking MRA is not provided because removal actions were completed across the entire MRA.

5.4.1 Literature Review Evaluation Summary

As determined during the review of historical aerial photographs and training facility maps, and through interviews conducted during the development of the ASR, there is evidence that the Laguna Seca Parking MRA was in the vicinity of a Mortar Range and had a potential for containing 37mm Projectiles. There was sufficient evidence to warrant MEC sampling within the Laguna Seca Parking MRA.

5.4.2 Removal Action Review Evaluation Summary

This section describes the analysis of results of the military munitions investigations and removal actions.

5.4.2.1 Type of Training and Military Munitions Removed

The projected MEC items (projectiles and mortars) were found on the northwest slope of MRS-47; the slope that faces the inland ranges. The MD projectiles and mortars were found throughout MRS-47 and mostly on the northwest slope of MRS-14A. It appears that the western portions of the MRA received fire from the inland ranges. Items used in troop training (e.g., hand grenades and fuzes), show a different pattern. MEC and MD hand grenades and fuzes were found on the east slope of MRS-47 (away from the inland ranges), in the northern portion of MRS-14A, and in the southeastern portion of MRS-29. Signals and simulators (MEC and MD) were mostly found on the west slopes of MRS-14A and in MRS-29 (Plate B-5). The items found indicate that troop training may have occurred throughout the MRA.

5.4.2.2 Removal Action Site Boundaries

The establishment of the Laguna Seca Parking MRA boundary is based upon the property transfer boundary and removal actions were conducted across the entire MRA with the exception of six inaccessible grids (two complete grids and portions of four grids) on the eastern slope of MRS-14A and a paved ditch along Lookout Ridge Road.

5.4.2.3 Investigation and Removal Action Design

This section describes the Laguna Seca Parking MRA based on the results of the military munitions investigations. The historical information related to the removal results as summarized in checklist questions 1 through 14 are not discussed in detail in this section. This information is presented in Section 5.5 and on Plates B1 through B6. There is a discussion regarding sampling equipment, methods, and quality control measures used during prior sampling and removal efforts. This section also summarizes the information contained in removal checklist questions 15 through 17 (Appendix D).

The boundary of the Laguna Seca Parking MRA is primarily based on boundaries of property transfer. The limits of investigation were defined in the removal contractor's scope of work and not on defined areas of military munitions use. Initial sampling was conducted at MRS-14A and MRS-47 within the Laguna Seca Parking MRA to determine if further action (removal) was necessary.

Based on the results of the sampling, a series of MEC removal actions were conducted in the four MRSs within the Laguna Seca Parking MRA. The removal actions were conducted in accordance with USA (included in an appendix of each final AAR) and UXB work plans and in coordination with regulatory agencies.

The objective of the MEC removal was to remove all detected MEC from each MRS to a depth of 4-ft bgs, and to a depth of 1-ft on the slopes of MRS 14A. The majority of the Laguna Seca Parking MRA was subjected to removal action with the exception of six grids (two complete grids and portions of four grids) on the steep eastern slope of MRS-14A and a paved ditch along Lookout Ridge Road. According to the work plan, the approach was to clear the area of brush, divide the area into 100-ft square grids, mark off 5-ft wide lanes within the grids, and walk the lanes using Schonstedt GA-52Cx survey procedures to detect MEC. Based on the statements in the USA and UXB reports, all anomalies detected within the Laguna Seca Parking MRA were investigated and all military munitions encountered during MEC removal were removed.

5.4.2.4 Sampling and Removal Action Methods /Data Management

Removal actions were performed throughout the Laguna Seca Parking MRA with the exception of six inaccessible grids (two complete grids and portions of four grids) on the eastern slope of MRS-14A and a paved ditch along Lookout Ridge Road. All anomalies were investigated or resolved, and all detected MEC items were removed or destroyed. The following points only address removal actions.

- The Schonstedt Model GA-52Cx was used by both UXB and USA.
- The Schonstedt Model GA-52Cx Geonics EM61 has been evaluated as part of several studies conducted on the Former Fort Ord: Geophysical Survey Quality Assurance Technical Analysis, as part of the DRO/Monterey MRA removal actions, at MOCO.2 and the ODDS Study.
- The Schonstedt Model GA-52Cx is less effective for detecting the smaller (less than 2 lbs) or more deeply buried (greater than 2 ft) objects. The results of the evaluation indicate that some projectiles found have the capability of penetrating below the depth of detection.
- Some locations of MEC items found within MRS-47 were incorrectly attributed in the UXB (UXB 1995d) and USA (USA 2000b) after-action reports. A review of the available report maps and field grid sheets from the three contractors that worked in the area—HFA, UXB, and CMS/USA—indicates that the site boundaries and MRS numbering convention were inconsistent between actions. The mistakes in data attribution are believed to have been a result of this inconsistency.
- The USA After-Action Report for MRS-47 (USA 2000b) contains a photograph (Appendix D, Photograph 5) of an item cited as having been located within Grid 18H. However, no grid sheet could be located in the OE Removal AAR that showed the location of the item. The item does appear in the Army's MMRP database; however, the date associated with the find falls within the date range of the USA Sampling Action completed the previous year. It is likely that this item was found as cited in the OE Removal AAR, but that it was found as part of the preceding sampling action and not as part of the removal action discussed in the AAR.
- The AARs indicated that QC/QA was done in all areas, with three deficiencies noted and corrective actions taken.

5.4.3 Results of Removal Evaluation

The results of the above analysis present evidence to support that the existing data is usable for defining the nature and extent of contamination and for use in completing an explosives safety RA and FS.

5.5 Conceptual Site Model

The results of the ESCA RP Team's RI were used to update the CSMs that were developed during the preliminary site characterization phase of work documented in the SEDR (ESCA RP Team 2008).

In general, the original conclusion within the SEDR that the Laguna Seca Parking MRA was used as a weapons and troop training area appears to be consistent with the data reviewed for this RI report. A review of the historical training maps and results of sampling and removal operations indicates that the majority of the MRA was used for basic maneuvers. In addition, there appears to be a WWII - 1970s impact area in the vicinity of MRS-47 and occasional stray impact by various projectiles occurred on the remainder of the MRA.

Although MEC and MD items were found throughout the MRA, the areas with the highest concentrations of recovered items were located along the northwest facing slopes of MRS-14A and MRS-47; both face toward the Impact Area. The following sections discuss the types of munitions recovered in the Laguna Seca Parking MRA.

5.5.1 Basic Maneuvers

Smoke Pots

One 2.5 lb smoke pot (MEC) was found in the Laguna Seca Parking MRA (Plate B5). Smoke pots (M1 HC) are used to produce a smoke screen for training exercises and demonstrations (Army 1982b). The smoke pot was found along the western edge of MRS-14A at a depth of 20 inches bgs. Smoke pots are non-penetrating items and would be expected to be found at or near the surface. It is anticipated that items found at depths greater than a few inches may have been buried, either in pits, or through disturbance of soil.

Smoke Hand Grenades

Three types of smoke hand grenades were found in the Laguna Seca Parking MRA. The majority of items recovered were M18 series grenades concentrated along the western boundary of MRS-14A (15 MD, 2 MEC), with a few additional M18, M48, and AN-M8 items (MEC and MD) located in other areas of MRSs-14A, -29, and -47 (Plate B5). These smoke grenades were used as ground-to-ground or ground-to-air signaling devices, target or landing zone marking devices or screening devices for unit movements (Army 1977c and 2000b). According to the MMRP database, almost all of the items were found within the top six inches of soil. Smoke hand grenades are non-penetrating and would be expected in the top few inches of soil. It is suspected that the items found at depths greater than a few inches may have been buried, either in pits, or through disturbance of soil.

Smoke Rifle Grenades

General information on the use of pyrotechnic items, including smoke grenades, was obtained from Army field and technical manuals (Army 1977c and 1987a). Rifle grenades are designed to be fired from rifles by a launcher attached to the gun muzzle. A special blank cartridge, issued with the grenade, is required to complete the launching.

Two types of rifle smoke grenades were located within the Laguna Seca Parking MRA: the M22 series and the M23 series (Plate B5). The majority of rifle smoke grenades retrieved were concentrated in the northwestern portion of MRS-47 within 48 inches bgs. Based on the distribution of the MEC and MD found, it appears that the rifle smoke grenades were used for training within the Laguna Seca Parking MRA in the Wolf Hill Training Area (MRS-47).

The M22 and M22A2 rifle grenades can be used for both signaling and laying of smoke screens. The M23A1 is used only for signaling. The M22 grenades are fired from a rifle equipped with a grenade launcher and function on impact. At impact, a firing pin strikes a primer producing a flame, which ignites a starter mixture charge, which in turn ignites a smoke mixture charge. The M23 does not have an impact fuze and does not function on

impact, as it is a smoke streamer. Instead, when the grenade cartridge is fired to launch the grenade, fire from the cartridge ignites the fuze, which causes the filler to burn and the grenade then emits a stream of smoke along its trajectory. Unlike the M22 series, this grenade does not have a safety pin. It is possible that the Laguna Seca Parking MRA was used for practice signaling or laying smoke screens. A total of 91 M22 series items (84 MD and 7 MEC) were identified throughout the MRA, with a large majority of items occurring in the northwestern portion of MRS-47 (Plate B5). A total of 6 M23 (MEC) series rifle grenades were found in the MRA; the majority was located in the northwestern portion of MRS-14A (Plate B5). Therefore, it is possible that both the Wolf Hill (MRS-47) and Lookout Ridge (MRS-14A) training areas were used for practice of signaling and/or laying smoke screens in support of basic combat training.

Simulators

Three types of simulators were found within the Laguna Seca Parking MRA: the M115A2 ground burst projectile simulator, the M74 series airburst projectile simulator, and the M27A1B1 airburst projectile simulator. The M74 airburst projectile simulator was the most common simulator found, with most items recovered within MRS-29 on the ground surface (Plate B5). Simulators used in the Laguna Seca Parking MRA were probably used for demonstration purposes or in conjunction with other training activities in support of basic combat training.

Simulators are non-penetrating items and would be expected to be found at or near the surface. Although a few items were found at greater depth, it is anticipated that such items may have been buried, either in pits or through disturbance of soil.

Flares

Two types of flares were found within the Laguna Seca Parking MRA: the M49 surface trip flare (5 MEC and 2 MD) and the M48 parachute trip flare (3 MD). The M49 flare was the most commonly encountered flare, with a majority of items recovered in the northwestern portion of MRS-14A within 12 inches bgs. The M48 parachute flares encountered were also located along the northwestern facing slope of MRS-14A.

The M49 series trip flares give warning of infiltrating troops by illuminating the field of the advancing enemy (Army 1977b). The M49 series trip flare functions by burning in the location where it is emplaced with no movement of the flare when ignited. It is also a non-penetrating item and would be expected in the top few inches of soil. It is anticipated that items found at depths greater than a few inches may have been buried, either in pits, or through disturbance of soil.

Signals

Signals found within the Laguna Seca Parking MRA (Plate B5) include: M17 series, M125, M126, M131, and AN-M43 illumination signals in addition to M62 series and M128A1 series smoke signals. The signals were used for various purposes including daytime or night time location signaling, distress signaling, and surface-to-air signaling (Army 1977b). The

majority of signals found were the M125 series illumination signals located at the ground surface.

The signals identified within the Laguna Seca Parking MRA are non-penetrating items and would be expected to be within the top few inches of soil. It is anticipated that items found at depths greater than a few inches may have been buried, either in pits, or through disturbance of the soil.

Hand Grenades

No specific hand grenade training areas are identified on training facilities maps within the Laguna Seca Parking MRA. However, review of the removal action data from this area indicates that MK II practice hand grenades (2 MD and 1 MEC) and several types of hand grenade fuzes were found within the MRA (Plate B2). The MK II practice grenades were found in MRSs-14A and -29 within 6 inches bgs and the majority of identified fuzes were found in MRSs-14A, -29, and -47 at or within a few inches of the ground surface.

Grenade fuze models identified include: M228, M218E1, M213, M204 series, and the M205 series (the M205 is the only series of fuze authorized for use with the M30 practice grenade [Army 1969]). The majority of hand grenade fuzes were located within MRS-29 and were the M228 fuzes.

Based on the number of grenade fuzes found, it appears that training in the use of practice hand grenades occurred in the Laguna Seca Parking MRA. A description of the hand grenades found during the removal and the areas where they appear to have been used is provided below.

MK II Practice Hand Grenades

The MK II practice hand grenade used the M205 or the M10A3 fuze on earlier models, and was designated to train personnel to arm and throw hand grenades. It was identical to the MK II fragmentation hand grenade, except for a filling hole in the base and a cork stopper to close the hole after the black powder strips had been inserted. The black powder strips provided noise and smoke without fragments upon functioning. It was functioned when a soldier removed the safety pin from the safety lever and threw the grenade allowing the safety lever to fly free, releasing the spring-loaded striker to strike the primer. The primer ignited the delay element in the fuze, which burned for a period of 4.0 and 5.0 seconds before igniting the black powder strips forcing the cork out of the hole in the base and causing spotting charge (Navy 1947). These could be caused to function by incidental contact by movement, i.e., stepping on, picking up, or kicking the grenade. The safety lever is made of thin metal and if exposed to the elements for long periods of time, will deteriorate to eventually allow the safety pin to break free. This will allow the functioning sequence mentioned above to take place. If caused to function, the type of injury that could be sustained would be burns from the black powder spotting charge. The functioning fuze is not designed to have sufficient force to fragment the grenade itself (Army 2006). The one MK II practice hand grenade MEC found was in the northern portion of MRS-14A at three inches bgs.

The MK II practice hand grenade is a non-penetrating item and would be expected to be found at or near the surface. It is suspected that MK II practice grenades found at depths greater than 6 inches were either buried through disturbance of soil or in burial pits.

M6 Electric Blasting Caps

Blasting caps are used for detonating high explosives. The two types of blasting caps are electric and non-electric. Electric blasting caps are used for more precise command detonation. Blasting caps are rated in power, according to the size of their main charge. Military grade blasting caps are designed to ensure positive detonation of less sensitive military explosives. The blasting cap is encased in an aluminum tube only 0.24 inch wide and 2.35 inches long. Electric caps have two lead wires protruding from them. The wires can be various lengths and colors but the most common are 12-ft-long brown wires. Older caps were packaged in boxes with the lead wires accordion folded and secured with a small band of paper. Later versions had the blasting cap secured in a thin cardboard tube 5 inches long with the lead wires wrapped around the outside of the tube (Army 1994).

There were only two locations where electric blasting caps were found; one location was in the northwest side of MRS-47 (176 items found together) and one location was on the northwest side of MRS-14A (9 items found together at 48 inches; Plate B6).

5.5.2 Projectiles

A variety of projectiles, practice and HE, were found within the Laguna Seca Parking MRA. The majority of the recovered projectiles were located along the northwest facing slopes of MRSs-47 and -14A and on the hilltop areas of MRS-47.

The spatial distribution, depth, and anticipated firing range for the projectiles found in this MRA are discussed in the following paragraphs. In general, the anticipated firing range and spatial arrangement of the projectiles found supports a firing point to the west, northwest, or north of the Laguna Seca Parking MRA. A review of the Impact Area ranges to the west and north of the Laguna Seca area shows that there are known ranges within firing distance from which these projectiles may have originated.

37mm

The following models of 37mm projectiles and associated fuzes were found within the Laguna Seca area:

- MK I LE (5 MD in MRS-14A)
- M63 MOD1 target practice (5 MD total; 1 in MRS-14A, 1 in MRS-29, 3 in MRS-47)
- M51 series armor piercing tracer (43 MD total; 1 in MRS-14A, 42 in MRS-47; 4 MEC in MRS-47)
- M74 armor piercing tracer (1 MD in MRS-14A)
- M59 armor piercing tracer (3 MD in MRS-47)

- M80 armor piercing tracer (1 MD in MRS-30)
- 37mm armor piercing tracer of unknown model (1 MD in MRS-30)
- 37mm high explosive cartridge of unknown model (2 MEC in MRS-47)
- M58 base detonating practice fuze (1 MD in MRS-14A)

The majority of these projectiles were recovered from northwest facing slopes and hilltop areas of MRS-47 at or within a few inches of the ground surface. The anticipated firing range for the 37mm projectiles recovered from this area is between 14,500 and 38,500 ft.

57mm

The following models of 57mm projectiles were found within the Laguna Seca area:

- M306 series target practice (1 MD in MRS-47)
- M307 high explosive antitank (1 MEC in MRS-47)
- M70 armor piercing tracer (12 MD total; 11 in MRS-14A, 1 in MRS-47)
- 57mm armor piercing tracer of unknown model (2 MD total; 1 in MRS-29, 1 in MRS-30)

The majority of these items were found along the northwest facing slopes of Lookout Ridge in MRS-14A within the top 24 inches of soil. The anticipated firing range for the 57mm projectiles recovered from this area is between 14,500 and 27,800 ft.

75mm

The following models of 75mm projectiles and associated fuzes were found within the Laguna Seca area:

- MK I HE (7 MEC in MRS-47)
- 75mm HE of unknown model (1 MEC in MRS-30)
- M1907 combination fuze (4 MD total; 1 in MRS-30, 3 in MRS-47)

The majority of these projectiles were recovered from the hilltop areas of MRS-47 at or within a few inches of the ground surface. The anticipated firing range for the 37mm projectiles recovered from this area is between 26,500 and 29,000 ft.

5.5.3 Mortars

Four types of mortar shells were recovered from the Laguna Seca Parking MRA. The majority of the MEC and MD items found were located in the northwestern portion of MRS-47 which is adjacent to an area known as “Mortar Alley” in the Impact Area.

The spatial distribution and depth for the mortars recovered from this MRA are discussed in the following paragraphs. Firing range information is provided in the following discussions;

however, mortars are designed to have variable ranges based upon the angle of fire and number of charges used and, as such, it may be difficult to determine an original firing point for the projectiles.

3-inch

The following models of 3-inch mortar shells and associated fuzes were found within the Laguna Seca area:

- MK I practice "Stokes" trench mortar (2 MD and 14 MEC in MRS-47)
- MK VI point detonating fuze (1 MD in MRS-14A)

As discussed in section 5.1.3.1, the 3-inch "Stokes" mortars were in use prior to WWII. The majority of shells were recovered from the lower elevation areas of the northwest facing slopes in MRS-47 within 12 inches of the ground surface. The anticipated firing range for these mortars is approximately 2,250 ft.

60mm

The following models of 60mm mortar shells and associated items were found within the Laguna Seca Parking MRA:

- M50 series practice mortar (3 MD in MRS-47)
- 60mm propellant wafers (1 MEC in MRS-14A)

The 60mm mortar shells identified were found on the west facing slope near the crest of Wolf Hill in the southern portion of MRS-47 at or within a few inches of the ground surface. The maximum firing range for these mortars is approximately 5,900 ft; however, the firing distance of a mortar shell is dependent upon the angle of fire and is therefore highly variable.

81mm

The following 81mm mortars were found within the Laguna Seca area:

- M43 series HE mortars (22 MEC in MRS-47)
- M43 series practice mortars (1 MEC in MRS-47)
- M68 training mortars (3 MD in MRS-14A)

The majority of the 81mm mortars were recovered from lower elevations along the northwest facing slopes of MRS-47 within 12 inches bgs. The anticipated firing range for these mortars is approximately 12,000 ft.

4.2-inch

The following models of 4.2-inch mortar shells and associated fuzes were found within the Laguna Seca area:

- M3 series high explosive mortar, (4 MEC in MRS-47)
- M48 series point detonating fuze (1 MEC in MRS-47)

The M3 mortar shells were recovered from the hillside of the north facing slopes in MRS-47 at or within a few inches of the ground surface. The anticipated firing range for these mortars is approximately 15,000 ft.

5.5.4 Miscellaneous Items

The following items were also found within the Laguna Seca Parking MRA:

- M600 chemical mine fuze (1 MEC in MRS-47)
- M10 series combination mine fuzes (2 MD in MRS-14A)
- M10 practice mines (1 MD in MRS-14A)
- M57 igniter tube (1 MEC in MRS-14A)
- M301 81mm illumination mortar (1 MEC in MRS-47)
- M210 20mm HE incendiary cartridge (1 MEC in MRS-47)
- M781 40mm practice cartridge (1 MEC in MRS-14A)
- M677 40mm HE tracer (1 MEC in MRS-47)
- M381 40mm HE projectile (1 MEC in MRS-47)
- M181 series 14.5mm subcaliber practice projectile (1 MEC in MRS-14A and 1 outside MRS-14A, but inside the Laguna Seca Parking MRA boundary)
- M385 40mm practice projectile (1 MEC in MRS-47)
- M680 40mm smoke projectiles (4 MD in MRS-14A)
- M339 76mm AP tracer (1 MD in MRS-14A)
- M6 2.36-inch HEAT rocket (1 MEC in MRS-47)

Because very few of the above listed items were found during the removal actions conducted within the Laguna Seca Parking MRA, it appears that there was no pattern of use to indicate training with these items in this area. It is not expected that additional items of the types listed above would remain in the Laguna Seca Parking MRA.

5.6 Laguna Seca Parking MRA Conclusions and Recommendations

The following section presents conclusions and recommendations for the Laguna Seca Parking MRA based on the review and analysis of the data associated with historical information and sampling and removal data (Plates B1 through B6; Figures 5-1 through 5-6).

5.6.1 Laguna Seca Parking MRA Conclusions

Based on the results of the literature review, sampling results, and removal action (munitions response), the site appears to have been used for various type of training in the vicinity of known firing ranges. This is consistent with the historical use indicated in the SEDR (ESCA RP Team 2008). The current uses for the Laguna Seca Parking MRA are associated with Laguna Seca Raceway events. These include parking, staging, and event-related roadway access along Barloy Canyon Road and South Boundary Road.

The following conclusions have been made regarding the removal adequacy and data quality of the removal actions:

- Removal actions were conducted across the entire MRA to a depth of 4 ft with the exception of the western and eastern slopes of MRS-14A, which had a 1-ft removal action. Six grids (two complete grids and portions of four grids) in MRS-14A did not receive a removal action due to terrain-related inaccessibility. In addition, no removal actions were performed at the paved ditch along Lookout Ridge Road.
- Some of the items found may have the potential to penetrate deeper than the depth of detection.
- The majority of MEC and MD encountered are consistent with its documented historical use. Some items were likely the result of the area being at the edge of the Inland Range complex.
- The property transfer parcel boundaries represent the limits of the MRA, and may not reflect the limits of MEC in the area.
- The investigation for the Laguna Seca Parking MRA is sufficient to confirm the type of military munitions used in the vicinity of the MRA.
- The Laguna Seca Parking MRA removal data are usable for preparation of a MEC risk assessment.

5.6.2 Laguna Seca Parking MRA Recommendations

Review of the available literature, removal results, and equipment performance results indicate that the removal actions conducted in the Laguna Seca Parking MRA successfully detected, excavated, and recovered the desired UXO items and that the imminent safety hazard had been removed. However, it is possible for residual MEC to remain in portions of the Laguna Seca Parking MRA; therefore, a risk assessment and feasibility study should be performed.

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6.0 MOUT SITE MRA REMEDIAL INVESTIGATION

The following sections present the results of the MOUT Site MRA RI. The RI was conducted in accordance with the RI process described in the Group 3 RI/FS Work Plan and summarized in Section 3.0 of this report.

The MRA includes two areas: the MOUT training area consisting of Impossible City, which is a mock city training area that is currently used for tactical training of military, federal, and local law enforcement agencies; and a portion of Barloy Canyon Road located along the eastern boundary of the historical impact area (Figure 2-11). The MOUT training area portion of the MRA is expected to continue being used as a tactical training area for law enforcement agencies. The Barloy Canyon Road portion of the MRA is likely to be improved and opened as a transportation corridor.

The MEC and MD encountered within the MOUT Site MRA were consistent with the historical use of the area for weapons and troop training. The MRA consists of two MRSs: MRS-28, the MOUT training area, and MRS-27O, which was a training site located across the northern portion of Barloy Canyon Road. The removal action conducted in MRS-28 and MRS-27O and the investigations performed in MRS-28 confirmed the historical use, defined the source, nature, and extent of MEC, and provided data for evaluation of the residual MEC risks at the MOUT Site MRA. Review of the available literature, removal results, and equipment performance results indicate that the investigations and removal actions conducted in the MOUT Site MRA detected, excavated, and recovered MEC to address the safety hazard.

6.1 MOUT Site MRA Historical Records and Military History

Historical aerial photographs and facility training maps, the Army's ASRs, and historical military field manuals were reviewed to evaluate the types of training that were likely conducted on the MOUT Site MRA and the historical practices related to these types of training.

Review of the MEC and MD items listed in the Army's MMRP database suggests hand grenade training and troop training in the MOUT Site MRA began in the 1940s, though historical maps were not available for that time period, hand grenade training in MRS-28 and combat course training along Barloy Canyon Road are shown in maps from as early as 1953. Training facility maps show features that indicate increased activity in the 1960s and 1970s including a rocket launcher range, close combat course range, squad tactics range, and night defense fire range. A bivouac training area and grenade training area are also identified. Training maps from the 1980s indicate the addition of training areas and several range fans including combat pistol training, a subcaliber firing range, and several other unspecified ranges. The 1994 ASR Supplement 1 stated that ordnance and torpedoes had been removed from the MOUT training area and that the area was being used for EOD training. The 1997 ASR added that MRS-28 included a mock city (Impossible City) used for infantry training including use of small arms ammunition, HE hand grenades, 40mm HE grenades, and bazookas. The 1997 ASR recommended site investigation to confirm the potential for MEC.

Despite the close of Fort Ord in 1994, the MOUT training area continued to be used in the 2000s for tactical training of military, federal, and local law enforcement agencies.

The following sections provide the details of the historical records review.

6.1.1 Review of Aerial Photographs and Historical Training Maps

The following sections present a summary of the MOUT Site MRA military history and development by decade of operation that is based on the review of historical training maps obtained from the Army's archives and a review of available aerial photographs and/or topographic maps. This information, along with the findings from the ASRs (Section 6.1.2) and a review of MEC and MD data in the Army's MMRP database related to investigations and removal actions in the MRA, are collectively summarized in Section 6.1.3, which presents the identified historical military operations at this MRA.

6.1.1.1 Pre-1940s Era

Documentation related to the military use of the MOUT Site MRA prior to 1940 was limited to a topographic map from 1934 (Army 1933-34). This map included only roads and/or trails, right-of-ways, and topographical lines. There were no features indicating military use within the MOUT Site MRA. The Barloy Canyon Road portion of the MRA is visible on the map, though is not labeled. No other identifiable features or text were associated with the MOUT Site MRA.

6.1.1.2 1940s Era

A review of the 1941 and 1949 aerial photographs indicated that the MOUT training area portion of the MRA contained numerous well-used roads and trails. The following summarizes the results of the review for the MRA.

- The 1941 aerial photograph shows numerous trails and/or roads; however, no manmade clearings or buildings were present. Barloy Canyon Road is visible.
- The 1949 aerial photograph shows Barloy Canyon Road and several other major roads, secondary roads, trails, and large clearings (e.g., in the center and along the northern boundary of the MOUT training area portion of the MRA); however, the resolution of the photograph does not allow discernment of any structures.

6.1.1.3 1950s Era

Review of 1950s era documentation, which included training maps and aerial photographs, indicates training areas within MRS-28 portion of the MOUT Site MRA. The following summarizes the results of the review.

- The available 1951 aerial photographs do not include the MOUT Site MRA.
- The 1956 aerial photograph shows two small roads leading to clearings branching from the intersection of two major roads in the northern section of the MOUT training area. In

the center of MRS-28 there are rectangular shapes which suggest structures; however the resolution of the photograph does not allow the outlines of buildings to be clearly visible. A road running along the western border of the MRS is identified as Impossible Canyon Road. Only a small southern portion of the Barloy Canyon Road portion of the MRA is included in the photograph.

- The 1953, 1956, and 1957 Training Areas Maps indicate a Hand Grenade Training Area in the northern portion of MRS-28. A range fan labeled "Combat in Cities No. 2" begins in the center and extends throughout the southern half of the MRS. Barloy Canyon Road borders a ~800' section of a Close Combat Course range fan. The range is located in the southern portion of the road included in the MRA.
- The 1953 training map indicates that MRS-28 is assigned to the 2nd Infantry. The 1956 and 1957 maps do not include designation of the MRS to a specific unit. The 1953, 1956, and 1957 training maps all show that the area immediately to the east of Barloy Canyon Road is assigned to the Division Artillery.

6.1.1.4 1960s Era

Review of 1960s era documentation, which included training maps, a backcountry road map and aerial photographs, indicates more activities within the MOUT training area of the MOUT Site MRA. The following summarizes the results of the review for the MRA.

- The available 1966 aerial photographs do not include the MOUT Site MRA.
- The 1961 Training Facilities Map shows a rocket launcher range with the firing point in the center of MRS-28 and the range fan covering the south east portion of the MRS. Another range, located to the south east of the MRS, is labeled "Close Combat Course" and has a fan that includes the southeastern portion of the MRS. The MRS is not shown as assigned to a specific unit. The area to the east of Parcel L20.8, Barloy Canyon Road, is labeled as "Biv Area G," indicating a bivouac training area.
- The 1964 Training Facility Map shows the outlines of the same range fans as the 1961 map, though the areas are labeled with the numbers "26" and "25." These numbers are not defined within the legends of the map. The area bordered on the west by Barloy Canyon Road is assigned to the 1st Brigade.
- The 1968 Backcountry Road Map states the same information contained on the 1961 Training Facilities Map. However, the 1968 map labels the range fan located in the middle of MRS-28 as a 3.5-inch rocket launcher firing range. As in the 1968 Training Facilities Map, the area to the west of Barloy Canyon Road is assigned to the 1st Brigade.

6.1.1.5 1970s Era

The 1970s era training maps and aerial photographs of the MOUT Site MRA were reviewed. The following summarizes the results of the review.

- The 1971 Training Facility Map indicates two range fans. A close combat course includes the southwestern corner of the MOUT training area. A range labeled "Quick Kill Live

Fire Grenade Confidence Course" extends through the southern half of the area. MRS-28 is assigned to G3 Training, while the area bordered on the west by Barloy Canyon Road is assigned to the 1st Brigade.

- The 1972 Training Facilities Map no longer shows the two range fans present in the 1961 through 1971 Training Facilities Maps. Instead, there are two different range fans with different orientations: Range 35 (Squad Tactics Range) in the southeast portion of MRS-28 and Range 35A (Night Defense Fire Range) with the firing point originating in the centre of the MRS and extending to the southwest. The MOUT training area portion of the MRA is located within the Inland Ranges. The area immediately to the east of Barloy Canyon Road is labeled with the letter "N," though is not defined as a range in the map legends.
- The available 1978 aerial photograph covers the middle and southern portions of the MOUT training area. There are three large clearings within the training area and two clearings partially within the MRS-28 border; however no details of those clearings are discernible from the photograph. Several roads can be seen throughout the middle and southern half of this MRS.

6.1.1.6 1980s Era

The 1980s era training and facility maps and aerial photograph of the MOUT Site MRA were reviewed. The following summarizes the results of the review.

- The 1982 Training Areas Map indicates a helipad located in the southern half of MRS-28. A 6 lane combat pistol range is located at the southernmost end of the MRS. The MRS is located within the Inland Range Impact Area. The southern portion of Barloy Canyon Road (Parcel L20.8) borders an area labeled as "14.5 Sub-Cal Sabot Indirect Fire Range" to the east. The northern portion of the road borders a training site; however the type of training is not specified. The central section borders an area to the east labeled as "1," though this is not defined in the map legends.
- The 1984 Training Facilities Map shows two range fans titled Ranges 35 and 35A, however in a different location and orientation than the 1970s era Training Facilities Maps. The firing point for each range is located in the southern half of the MOUT training area and both range fans are oriented toward the southwest. Range 35 is noted as inactive. Range 35A is listed as a combat pistol range with 6 lanes.
- The 1986 aerial photograph reveals two very large clearings and numerous structures. The clearing in the northern portion of the MOUT training area is roughly 600 ft in diameter with well over 20 structures. There are also structures in the surrounding vegetated areas. The clearing in the southern portion of the training area is approximately 1,000 ft long and ranges between 150 and 300 ft wide. There is one building, approximately 100 ft by 60 ft in size, in this southern clearing that can be clearly identified. This building does not appear to have a roof, though walls can be seen. Clearings noted previously are also seen in this photograph. Additionally, a clearing that has the appearance of a range fan can be seen in the far southwest portion of MRS-28. This clearing corresponds with Range 35 on the 1984 Training Facilities Map. The same

roads visible in previous photos can be seen in the area located to the east of Parcel L20.8, the Barloy Canyon Road portion of the MRA.

- The 1987 Ranges and Training Area Overlay shows Ranges 35 (MOUT Assault Course) and 35A (Combat Pistol Range, 6 lanes) fans within the southeast portion of MRS-28. The positioning of the two ranges does not correspond with previous maps. The northeastern portion of the MRS is dedicated to "MOUT collective training area". The MOUT training area portion of the MRA is assigned to the inland ranges impact area. The area east of the Barloy Canyon Road portion of the MRA is designated as a training site, though the type of training is not specified.

6.1.1.7 1990s Era

Review of 1990s era documentation included a 1991 Range and Field Training Area Sketch and a 1992 Back County Roads Map. No aerial photograph is available for the 1990s. The following summarizes the results of the review.

- The 1991 Range and Field Training Area Sketch is identical to the 1987 training area map discussed in section 6.1.1.6.
- The 1992 Back County Roads Map was a reproduction of a 1968 training area map with names added for the roads. The features on the map were the same as previously discussed in Section 6.1.1.4 for the 1968 training area map. There is no indication on this map of the MOUT training activity noted on the 1987 Ranges and Training Area Overlay or the structures seen in the 1986 aerial photograph. No additional training areas were identified in MRS-28 on either map. The base was officially closed in September 1994.

6.1.1.8 2000s Era

Although Fort Ord was closed in 1994, the MOUT training area continued to be used as a training area consisting of a mock city for tactical training of military, federal, and local law enforcement agencies. Review of 2000s era documentation included three aerial photographs from 2000, 2003, and 2007. The following summarizes the results of the review.

- Details of the southwest portion of the MOUT training area are not visible in the 2000 photo. In the 2003 and 2007 aerial photos, the southwest portion of MRS-28 appears to have a firing point and range fan and at least three structures, one of which may be bleachers facing in the direction of the range fan. The range appears to have fallen into disuse as more and more vegetation encroaches into the 275-ft-long cleared area over the time span of the photographs.
- The resolution of the 2000 photograph allows clearings to be visible, but no discernible structures in the southeastern portion of MRS-28. The 2003 aerial photograph indicates the roofless building noted in the 1986 aerial photograph along with several smaller structures. The roofless building is identified as a tire building. A tire building allows live ammunition to be fired indoors as the tires absorb the bullets rather than the bullets

bouncing off walls made of concrete or splintering on walls made of wood. The roofless aspect allows the use of concussion grenades as well. South of the tire building, structures are visible including a 3-story, 30-ft by 50-ft building, two walls of different heights, and several open structures consisting of scaffolding and walls.

- In the center of the MOUT training area, a 50-ft by 80-ft building can be seen with smaller structures nearby in the 2003 photograph. By 2007, the smaller structures are gone; however, the larger building remains.
- In the northern portion of the MOUT training area, approximately 34 structures within the mock village are visible. Individual structures cannot be seen in the 2000 aerial photograph due to low resolution; however structures can be clearly seen in the 2003 and 2007 photographs. The village appears to be in the same state (i.e., number of buildings and maintenance of the roads and vegetation) from 2003 to 2007.
- No development is visible along either side of Parcel L20.8, Barloy Canyon Road, in the three aerial photographs.

6.1.2 Review of Archives Search Reports

Three ASRs were completed for the former Fort Ord (USACE 1993, 1994, and 1997a). The purpose of the ASRs were to gather and review historical information to determine the types of munitions used at the former Fort Ord, identify possible disposal areas, identify previously unknown training areas, and recommend follow-up actions. The 1993 ASR was completed based on a scope of work provided to the St. Louis Corps of Engineers by the Huntsville Corps of Engineers, and on archive search reports completed at other military installations. The 1993 ASR included historical research at various archives and record holding facilities, interviews with individuals familiar with the sites or its operation, and site visits (USACE 1993).

The 1994 ASR (Supplement 1) was performed in 1994 for the purpose of evaluating additional historical maps and information obtained from ongoing research (e.g., interviews, archive searches, and site visits) pursuant to the 1993 ASR (USACE 1994).

Guidance for conducting archives searches was developed in 1995 (USACE 1995). The 1995 guidance specified that ASRs include information on historical records, site visits, follow-up actions, prior documentation, and characterization and evaluation for potential MEC response sites. As a result, the Army issued a subsequent report in 1997 that contained additional information and descriptions of the follow-up actions recommended as part of the 1993 and 1994 ASRs.

The 1997 ASR combined information obtained through the previous archive searches with the results of a PA/SI conducted by the USACE (USACE 1997a). The PA/SI consisted of interviews with individuals familiar with the MRSs, visits to previously established sites, reconnaissance of newly identified training areas, and the review of data collected during sampling or removal actions. The 1997 ASR was conducted in accordance with the USACE guidance (USACE 1995).

6.1.2.1 1993 Archives Search Report

No MRSs were identified within the boundaries of the MOUT training area portion of the MOUT Site MRA in the 1993 ASR. In addition, the MOUT Site MRA was not identified in the 1993 ASR.

An area to the east of the southern end of Barloy Canyon Road was identified in the 1993 ASR as part of Site OE-14, which encompassed Pilarcitos Canyon and Lookout Ridge.

6.1.2.2 1994 Archives Search Report Supplement 1

The MOUT training area ("Site 28, MOUT Site") was identified in the 1994 ASR. During a telephone interview, an Explosive Ordnance Disposal (EOD) soldier stated that a significant amount of ordnance, including torpedoes, had been removed from the area in and around the MOUT training area, and that this area was also used as an EOD training area. Live-fire training facilities on the site were in use by law enforcement agencies at the time of the 1994 ASR. The 1994 ASR recommended further research of Site 28 and stated that no signs of ordnance were observed during a site visit. The 1994 ASR also recommended that no further action was necessary if the area was going to continue under the control of the federal government.

Two sites along the east side of Barloy Canyon Road were included in the 1994 ASR. Site 25, a firing point at the top of a hill, was described as having small arms munitions lying about and mortar subcaliber projectiles in nearby valleys. A hilltop defined as Site 26 was stated to have hundreds of small arms cartridge cases and the remains of a booby-trap simulator. The 1994 ASR recommended removal actions for both of the areas.

6.1.2.3 1997 Revised Archives Search Report

The 1997 ASR presented information included in the 1993 and 1994 ASRs and the findings of the PA/SI conducted by the USACE (USACE 1997a).The following information was reported for the MOUT training area ("Site OE 28") located within the boundaries of the MOUT Site MRA.

The 1997 ASR stated the same information gathered from a phone interview with an EOD soldier as presented in the 1994 ASR. In addition, the 1997 ASR noted that the Site OE 28 included Impossible City, which was a mock city used for training infantry to operate within an urban center. Several buildings in Impossible City were used for live-fire with small arms ammunition. The Tire House, a building within Impossible City constructed out of sand-filled tires, was used for live fire with small arms ammunition and the use of HE hand grenades. The 1997 ASR also stated that 40mm HE grenades and bazooka projectiles were fired into Wildcat Canyon located south of Impossible City. The 1997 ASR recommended a site investigation to confirm the potential for MEC. The 1997 ASR also referred to the Harding Lawson Associates (HLA) Site 39 report for information on the investigation history.

The 1997 ASR restated the same information included in the 1994 ASR; however, the area defined as Site 14 in the 1993 ASR is further divided into five subsites in the revised report,

Sites OE 14A through 14E. The southern portion of the east side of the roadway was included in Site OE 14D. The discussion of Site OE 14D, east of Barloy Canyon Road, included descriptions of Site 25 (firing point) and Site 26 (hilltop), which are located within Range P-5. The Revised ASR sites an interview with Mr. Roy Durham, former Range Control Officer, where Mr. Durham stated that Range P-5 was used for subcaliber artillery training and mortar practice from 1972 through 1992. This ASR recommended further investigation for Site OE 14D.

6.1.3 Review of Historical Military Training Practices

The sections below describe the operations typically associated with these identified types of training based upon a review of historical field manuals and the munitions that may be expected as a result of the use of the area for these types of training.

6.1.3.1 Pre-WWII Training

Apart from the survey plat maps, topographic maps, and 1941 aerial photograph discussed in Section 5.1.1, little documentation of pre-WWII training activities at the former Fort Ord is available. As previously mentioned, no training maps are available from this time period. Footage from a film entitled "A Year on a Calvary Post, 1938 – 11th Calvary, Presidio, Monterey, CA, National Archives" from 1940 was reviewed; however, it did not contain definitive information regarding training practices in the MOUT Site MRA. Therefore, the following discussion of training practices is based upon an analysis of the MEC and MD identified during sampling and removal actions in this area and information contained in the book "The American Arsenal" (Hogg 2001).

6.1.3.2 1940s Training

There are no specific training areas apparent on the 1949 aerial photograph; however, there are numerous well-used trails, several major roads, and large clearings in the center of the MOUT training area portion of the MRA.

Although no specific hand grenade training areas are identified on 1940s aerials, a review of the Army's MMRP database shows MK II practice hand grenades, M21 practice hand grenades, M205 series practice hand grenade fuzes, and an M10 series hand grenade fuze were found within the MRA, indicating that hand grenade training may have occurred within the MOUT training area during the 1940s. M48 parachute trip flares were also found, indicating troop training may have also occurred in the 1940s.

6.1.3.3 1950s Training (may include 1960 through 1980s MEC)

1953 and 1956 Training Areas Maps show a hand grenade training area in the northern portion of MRS-28 and a "combat in cities No. 2" in the center of the MRS. In addition to the practice grenades and fuzes, as well as parachute trip flares mentioned in the 1940s training above that were used in the 1950s, practice M228 hand grenade fuzes were found. The MRS was assigned to the 2nd Infantry.

Practice M29 series 3.5-inch rockets were also found within the MRS. The historical training maps, beginning in 1957, show a firing point in the mid-section of the MOUT training area and the range fan includes the central and southern portion of the MRS.

6.1.3.4 1960s and 1970s Training

The 1961 Training Facilities Map shows a range fan for a rocket launcher with the firing point in the center of MRS-28 and the range fan directed to the south and covering the southeastern portion of the MRS. Another range, located to the south east of the MRS, is labeled "Close Combat Course" and has a fan that includes the southern portion of the MRS. The 1968 Training Facilities Map labels the firing point and range fan located in the middle of the MRS as "3.5" rocket launcher firing".

On 1970s Training Facilities Maps there are two different range fans with different orientations: Range 35 (Squad Attack Range with two lanes) and Range 35A (Quick Kill and Night Defense Range; Figure 2-1717). A portion of the Range 35 fan covered the southeast portion of MRS-28 and was used for squad tactics. The Range 35A firing point, originating in the center of the MRS, was aimed toward the southwest, and used for night defense fire.

- Range 35 Squad Attack Range with Two Lanes: Actual lanes ranging between 10 to 50 meters wide were designed to test and train squads in different methods of attack on different targets. Training would have mainly occurred with weapons designed to be used in transit: small arms blanks, practice grenades, smoke producing items, simulators, and flares.
- Range 35A Quick Kill and Night Defense Range: Night operations would have included training with flares and booby trap simulators, small arms and possibly smoke grenades. The use of foxholes would be expected during night training. Quick kill could have included ambush training with small arms, practice grenades and practice claymore mines and possible subcaliber rockets. The teams would have practice firing all of their ammunition at once and then quickly retreating.
- Squad Tactics: This relates to a variety of Infantry Squad training, which could include a small arms "non-firing" range. Practice grenades and flares would be associated with this type of training.

In addition to the practice hand grenade fuzes mentioned above, M228 practice hand grenade fuzes and M204 series hand grenade fuzes were found at the MRA.

6.1.3.5 1980s and Early 1990s Training

The 1987 Ranges and Training Area Overlay continues to shows Ranges 35 (now listed as MOUT Assault Course) and 35A (now listed as Combat Pistol Range, 6 lanes) fans within the southeast portion of MRS-28. In later aerial photographs, the southwest portion of the MRS appears to have a firing point and range fan, and at least five structures, one of which is a bleachers stand facing in the direction of the range fan.

The MOUT complex in the north of MRS-28 and surrounding structures can be seen on 1980s (and later) aerial photographs. The northeastern portion of the MRS is dedicated to "MOUT collective training area" in the 1987 Ranges and Training Area Overlay.

The MOUT complex in the south consisted of a roofless tire building, three buildings (2 of which were roofless) and two walls of different heights. The roofless "tire house" building allowed live ammunition to be fired indoors, as the tires absorb the bullets rather than the bullets bouncing off walls made of concrete or splintering on walls made of wood. The roofless aspect allowed the use of concussion grenades. Practice M69 hand grenades, the M18 series smoke hand grenade, M48 smoke hand grenades, M125 series, M126 series, and an M187 illumination ground signal were found at the MRA. All of which could be used for infantry training in an urban setting (MOUT training).

In the 1992 Back County Roads Map, Range 35, (in the southern portion of Parcel MRS-28) is again listed as used for 3.5" Rocket Launcher Firing. Intersecting the Range 35 range fan in the southern portion of the MRA was the Range 34 range fan. Range 34 was temporarily used as a Close Combat Course.

Although Fort Ord was closed in the early 1990s, MRS-28 continued to be used as a training area consisting of a mock city that is used for tactical training of military, federal, and local law enforcement agencies.

6.1.4 Historical Land Use Summary

A review of the historical aerial photographs and training maps available indicate that MRS-28 of the MOUT Site MRA was used for MOUT activities as early as the 1950s and continues into the 2000s. Also in the 1950s, the northern area of the MRS was used for hand grenade training. In the 1960s, a firing point for a rocket launcher range was positioned in the center of the MRS and directed south. Also in the 1960s, a close combat course included the southern portion of the MRS. In the 1970s, the southern portion of the MRS was used for squad tactics and night defense fire. In the 1980s, the southwest portion of the MRS was used as a pistol range, the southeastern area for MOUT assault course, and the northern portion of the MRS for MOUT activities. There is little documentation for the 1990s. However, the pistol range in the southwest is shown as falling into disrepair beginning in the 2003 aerial photograph, the MOUT assault course in the southeast is still apparent, and the MOUT village in the north is well maintained.

6.2 MEC Investigations and Removal Actions

As detailed in Section 6.1, the MOUT Site MRA consists of two MRSs: MRS-27O, which was a training site located across the northern portion of Barloy Canyon Road, and MRS-28, which was related to the MOUT training facility. The southern portion of Barloy Canyon Road is bordered by MRS-14D to the east. Though the roadway is not within the MRS, the sampling and removal actions performed in MRS-14D are included in the following discussions. The following sections describe the investigations and removal actions conducted by the Army and ESCA RP Team within areas encompassing both portions of the MOUT Site MRA and the area to the east of Barloy Canyon Road. Table 6-1 contains a

listing of the military munitions, both MEC and MD, found during the investigations and removal actions conducted in the MOUT Site MRA as described in Section 6.2.1. The following bullets summarize the investigations and removal actions conducted in these two MRSs and MRS-14D to the east of Barloy Canyon Road.

- Grid Sampling investigation in MRS-28 by USA in 1998 (USA 2001d)
- SS/GS Sampling investigation in MRS-28 by USA in 1998 (USA 2001d)
- TCRA (Visual Surface) in the Eucalyptus Fire Area, which encompassed MRS-27O, MRS-28, and most of Barloy Canyon Road, in 2003 (Shaw 2005)
- Field verification survey in MRS-28 by the ESCA RP Team in 2012 (Field Variance Form (FVF) Number G3WP-001; Appendix E)
- Grid Sampling and 4-ft Removal Action in MRS-14D to the east of the southern portion of Barloy Canyon Road from 1995 to 1997 (USA 2001a)

The quality of the investigations and removal actions performed within the MOUT Site MRA was evaluated as part of this RI. In order to evaluate quality, the adequacy of the investigation and removal actions were assessed; the equipment used was evaluated for effectiveness based upon its implementation and maintenance records; and data records were reviewed for accuracy and consistency.

6.2.1 Investigation and Removal Action Approaches

The investigations and removal actions conducted by the Army and the ESCA RP Team within areas encompassing both portions of the MOUT Site MRA and the area adjacent to Barloy Canyon Road included the following:

- MRS-28 (MOUT site, Parcel F1.7.2)
  - Military Munitions Reconnaissance, a 4-ft Grid Sampling of 16 Grids, a SS/GS Sampling of 13 100-ft by 200-ft Grids, and a TCRA (Visual Surface); and
  - Instrument-aided field verification survey in twenty-four 100-ft by 100-ft whole and partial grids along the southwestern border of the MOUT training facility area.
- A portion of Barloy Canyon Road and areas immediately adjacent to the road on the west side were investigated as part of the TCRA (surface reconnaissance) following the 2003 Eucalyptus Fire.
- MRS-27O (Barloy Road, Parcel L20.8): Military Munitions Reconnaissance and site inspection and TCRA (Visual Surface).
- MRS-14D (east of the southern portion of Barloy Canyon Road): 100 % Grid Sampling over 35 100-ft by 100-ft grids and 4-ft Removal Action over 377 100-ft by 100-ft grids and partial grids.

6.2.1.1 Grid Sampling in MRS-28 using Schonstedt Magnetometers

From March to September 1998, USA conducted a grid sampling investigation in MRS-28 for the Army to determine the need for performing a MEC removal action (USA 2001d).The grid sampling was conducted in sixteen 100-ft by 100-ft grids to a depth of 4 ft bgs in the northeastern and southern portions of MRS-28 (Figure 6-1). The grids were surveyed and staked in the field using GPS technology and prepared for grid sampling by manually cutting brush. Five grids were positioned in the northeastern portion of the MRS and 11 grids were positioned in the southern portion of the MRS (Figure 6-1). The sampling investigation included the entire grid area and the anomalies encountered using Schonstedt GA-52Cx magnetometers were investigated to a depth of 4 ft bgs. The sampling investigation was conducted in accordance with the CMS work plan (CMS 1997).

As shown in Figure 6-1, the boundaries of MRS-28 were modified since this investigation; therefore, 13 of the 16 grids were located within the current boundaries of MRS-28, which corresponds to the MOUT training area portion of the MOUT Site MRA.

In the northeastern portion of MRS-28, five MEC items (two practice hand grenades, two smoke hand grenades, and one hand grenade fuze) were found in the three grids contained within the current boundaries of the MOUT training area portion of the MOUT Site MRA. The majority of the MD items found in these grids were also related to practice hand grenades, smoke hand grenades, and hand grenade fuzes. In the southern portion of MRS-28, two MEC items (one civilian blast simulator and one practice hand grenade fuze) were found in two of the 11 grids that were wholly or partially contained within the current boundaries of the MOUT training area portion of the MOUT Site MRA. The majority of the MD items found in these grids were related to 40mm cartridge cases, practice 3.5-inch rockets, practice 2.36-inch rockets, and practice hand grenade fuzes.

6.2.1.2 SS/GS Sampling in MRS-28 using Schonstedt Magnetometers

From March to September 1998, USA conducted a SS/GS sampling investigation in the central portion of MRS-28 for the Army to determine the need for performing a MEC removal action (USA 2001d). The SS/GS computer program randomly selected grids and then randomly selected sampling locations within the grids to collect representative data for the site. A total of fourteen 100-ft by 200-ft grids in the central portion of MRS-28 were surveyed and staked in the field using GPS technology and prepared for SS/GS sampling by manually cutting brush. In accordance with the SOP, the grids were investigated using the Schonstedt GA-52Cx magnetometer until the statistical calculation results indicated the operator should stop (CMS 1997). The SS/GS program was satisfied that no further sampling was necessary after thirteen of the fourteen 100-ft by 200-ft grids were sampled.

In the central portion of MRS-28, 58 MEC items (one 3.5-inch rocket, one ground burst simulator, one ignition cartridge, 16 mine fuzes, and 40 hand grenade fuzes) were found in the grids contained within the current boundaries of the MOUT training area portion of the MOUT Site MRA. The 40 hand grenade fuzes were found in a single “pit” and the 16 mine fuzes were found in one location. The majority of the MD items found in these grids were

related to practice hand grenades, smoke hand grenades, hand grenade fuzes, practice 3.5-inch rockets, practice 2.36-inch rockets, trip flares, and illumination signals.

6.2.1.3 TCRA (Visual Surface) and Military Munitions Reconnaissance

From approximately November to December 2003, a visual surface TCRA and military munitions reconnaissance was conducted for the Army by Shaw Environmental, Inc. (Shaw) to remove MEC following an accidental fire in the area (Shaw 2005). MD (greater than 2 inches in size) was also removed. The accidental fire started in the MOUT training facility in July 2003 and burned approximately 644 acres in the east-central portion of the former Fort Ord. The burned area where the TCRA was conducted is shown in Figure 6-2. The MOUT Site MRA was included in the TCRA with the exception of a small area consisting of approximately ten 100-ft by 100-ft whole and partial grids along the northwestern border of MOUT training facility (MRS-28) and the southern third of Barloy Canyon Road along the eastern side of the road. The grids were surveyed and staked in the field using GPS technology. The general procedure was to sweep across a designated area with technicians and sweepers in a line with a separation distance of 4 feet, which was later revised to 8 feet under a field variance. The work was conducted in accordance with an approved work plan (Shaw 2003).

MEC items found were practice hand grenade fuzes and a flash artillery simulator next to the road by the MOUT site Parcel L20.8, and a rifle illumination ground signal and a 40mm practice cartridge were found next to the road at the south end of the road. MEC items found in the MOUT training site, Parcel F1.7.2, included practice hand grenades, smoke hand grenades, hand grenade fuzes (practice and non-practice), one MK II fragmentation hand grenade, 40mm projectiles (illumination parachute, smoke, and practice), antitank rifle grenades, a surface trip flare, and ground illumination flares. Schonstedt magnetometers were not used in the MOUT Site MRA to assist in the visual inspection (Shaw 2005). The AAR did not contain a recommendation.

6.2.1.4 Field Verification Survey in MRS-28 using Schonstedt Magnetometers

In February 2012, an instrument-aided field verification survey was conducted by the ESCA RP Team in MRS-28 along the southwestern border of the MOUT training facility area including the area not previously investigated in the TCRA. The survey was performed to verify that MEC was not present on the surface in twenty-four 100-ft by 100-ft whole and partial grids (Figure 6-2). The grids were surveyed and staked in the field using GPS technology. The general procedure was to establish individual search lanes approximately 3 to 5 feet wide and search each lane using a Schonstedt Model GA-52Cx magnetometer. Surface anomalies were investigated to determine if the anomaly was MEC, MD, or non-military munitions items, such as wire, construction debris, or rebar (i.e. other debris). MEC items encountered were surveyed with a GPS unit and handled in accordance with the proper handling procedures. One MEC item, a M18 smoke hand grenade, was found during the survey. Approximately 220 lbs of other debris (i.e., metal scrap) was recovered during the survey. Subsurface anomalies were detected during the field verification survey, though investigation of the anomalies was not required under the work plan. Grids where subsurface anomalies were identified were documented as containing subsurface anomalies (Figure E-1

of Appendix E). The field verification survey was conducted in accordance with the Final Group 3 RI/FS Work Plan and Field Variance Form (FVF) No. G3WP-001 (ESCA RP 2009 and Appendix E, respectively).

6.2.1.5 Grid Sampling in MRS-14D (east of Barloy Canyon Road) using Schonstedt Magnetometers

From August through November 1995, CMS (currently known as USA) performed grid sampling to a depth of 4 ft over 35 100-ft by 100-ft grids and partial grids in Site OE-14D (MRS-14D) using Schonstedt GA-52Cx magnetometers (USA 2001a). The general procedure for sampling involved sweeping the magnetometer back and forth while moving forward down 5-ft search lanes. Near surface anomalies were investigated using hand tools, while deeper anomalies were excavated using a backhoe (CMS 1995).

The area sampled was approximately 10%, or 8 acres, of the site. One sampling grid was located partially within the roadway parcel L20.8. At the time of the sampling, there was no requirement for collection of information regarding ordnance scrap, other scrap, and small arms ammunition collected during sampling operations. The recovered MEC totaled 1,588 items, which equated to a MEC density of about 210 items per acre. The recovered MEC included 22mm and 14.5mm subcaliber projectiles, 3-inch practice trench mortars, and pyrotechnics. Given the results of the sampling activity, CMS performed removal over the entire Site OE-14D. The sampling area was extended into grids to the north and south of Site OE-14D to determine the limits of contamination, though MEC removal was not deemed necessary in these areas (USA 2001a).

6.2.1.6 Removal Action in MRS-14D (east of Barloy Canyon Road) using Schonstedt Magnetometers

A 4-ft removal action was performed over the entire area of Site OE-14 D (MRS-14D) to the east of the southern portion of Barloy Canyon Road by CMS (currently known as USA) from September 1995 through January 1997 (USA 2001a). The same technique was used as during sampling operations as described in 6.2.1.4 (CMS 1995). The removal operations took place over 377 100-ft by 100-ft grids and partial grids, including the grids previously sampled in 1995, using Schonstedt GA-52Cx magnetometers. A deep ravine running roughly parallel with Barloy Canyon Road 200 feet to the east was excluded from the removal operations due to limited safe access.

The removal operations recovered 42,272 MEC and MD items including 22mm and 14.5mm subcaliber practice projectiles, 3-inch practice trench mortars (Stokes), rifle grenades, hand grenades, and pyrotechnics. Two MEC items were recovered within the MOUT Site MRA along the east side of Barloy Canyon Road in Parcel L20.8. The AAR recommended further removal actions in grids where MEC was found due to the expected penetration depth of some of the items. The grids recommended for removal actions were located within the boundaries of MRS-14D, though were outside of the MOUT Site MRA (USA 2001a).

6.2.2 Equipment Evaluation

This section describes results of a review of the geophysical instruments used during the investigations and removal action performed within the MOUT Site MRA and MRS-14D to the east of Barloy Canyon Road.

6.2.2.1 Schonstedt Model GA-52Cx Magnetometer

The investigations for MEC within MRS-28 (the MOUT training area) of the MOUT Site MRA and in MRS-14D to the east of Barloy Canyon Road performed by USA and the ESCA RP Team included using Schonstedt Model GA-52Cx magnetometers. The Schonstedt GA-52Cx magnetometer is a handheld device that, when properly adjusted, will emit a distinctive tone when placed near a ferrous metal object. This instrument is a passive dual flux-gate magnetometer a highly sensitive magnetic locator that detects ferrous (iron) metal objects; however, it cannot detect nonferrous metal objects (e.g., lead, brass, copper, aluminum). In general, magnetometers make passive measurements of the earth's natural magnetic field; ferrous metal objects (and rocks) are detected because they produce localized distortions (anomalies) in the magnetic field. The Schonstedt magnetometer actually detects slight differences in the magnetic field (the "gradient") by means of two sensors mounted a fixed distance apart within the instrument's staff. Because the magnetic response falls off (changes) greatly even over a short distance, a gradient magnetometer like the Schonstedt is especially sensitive to smaller, near-surface ferro-metal objects (Breiner 1973).

The Schonstedt magnetometers will also respond to soil and rock containing ferrous minerals ("hot rocks"), as well as asphalt pavement containing enough ferrous mineralization to produce a Schonstedt response. The presence of "hot rocks" and asphalt pavement can mask the response from potential MEC items located near or below these items. Accordingly, it is recognized that the interpretation of the Schonstedt instrument response can be subjective. For deeper targets, the operator often must analyze a subtle change in the audio output and decide whether the instrument is responding to a potential MEC item or to pavement or soil minera1ization. Additionally, it can be difficult to determine the exact location of a more deeply buried object because the Schonstedt audio response may be dispersed over an area that is several ft wide.

The Schonstedt magnetometer is an analog device that does not record data. Typically, the location of a detected object is marked in the field by placement of a pin flag or promptly excavated to uncover the detected object. For that reason, Schonstedt surveys are sometimes called "mag and flag" or "mag and dig" surveys.

6.2.2.2 Evaluation of Instrument Detection Efficiency at MOUT Site MRA

Parsons previously conducted an ODDS at the former Fort Ord to evaluate the detection efficiency of a variety of detection technologies and systems, including the Schonstedt GA-52Cv and GA-52Cx (Parsons 2002). The detection efficiency of the Schonstedt GA-52Cx was also tested during the DRO removal action (USA 2001b). These two data sources are described below.

As part of the ODDS, seeded tests were performed to evaluate the ability of the Schonstedt magnetometers to detect MEC items buried at various depths. The seeded test was conducted with multiple lane widths, including the 5-ft width, which is the width used during the MOUT Site MRA removal actions described in this report. The ODDS seeded test evaluated instrument performance based on two different search radii, 1.6 ft and 3.3 ft. If the distance between the location identified by the instrument and the actual location of an item was equal to or less than the search radius, the item was considered detected by the instrument.

During the DRO removal action, 55 lots of items were seeded in the DRO Group sites prior to the removal action. Twenty-one of these items were seeded in areas where the Schonstedt GA-52Cx was subsequently used to perform the removal. Five of these items were similar to items found within the MOUT Site MRA and have been included in this evaluation. Locations which contained multiple seeded items were not included in this analysis.

The ODDS report included the Pd in the seeded test for each instrument. However, this Pd should not be directly translated to the Pd at an actual site. For any detection equipment, the Pd depends on the depth distribution of items. If all the items are shallow, the Pd will be high, but if all the items are deep, the Pd will be low. The depth distribution of seeded items in the ODDS was designed to test and compare the detection capabilities of different detection instruments, not to represent a typical site. According to the ODDS Work Plan (Parsons 2002), items were seeded at three different depths, at the limit of detection, 6-12 inches shallower than the limit of detection and 6-12 inches deeper than the limit of detection. The limit of detection was based on the ODDS static, free air tests conducted prior to the seeded tests and described in the ODDS report (Parsons 2002).

Table 6-2 lists the ODDS and DRO seeded items which are of the same type as items that were found at the MOUT Site MRA. The final column in the table indicates whether these items were detected with the Schonstedt GA-52Cx during the ODDS seeded test using 5-foot lane widths and a 1.6-foot search radius, or recovered during the Schonstedt GA-52Cx removal action.

In order to accommodate the different depth distributions at DRO and the ODDS seeded test site and at the MOUT Site MRA, this evaluation considers types of MEC items separately to determine each MEC type's Pd. Based on the data provided in Table 6-2, the Pd for six depth intervals (0-6, 7-12, 13-24, 25-36, 37-48, and greater than 48 inches) were calculated. These Pds are shown in Table 6-3. The Pd values in Table 6-3 are based on small number of each seeded MEC type in each depth interval. This small sample size increases the uncertainty of these Pd values. However, the Pd vs. depth relationship makes sense, starting at 100% near surface and continuously dropping to 0% at deeper depths. This reasonable relationship provides confidence that these Pd values are generally valid.

The results of the ODDS were presented in Parsons Final ODDS Report (Parsons 2002). As presented in the ODDS, the statistical tests performed on the results suggested that there is no significant difference between the detection capabilities of the three different Schonstedt models tested (GA-52C, GA-52Cv, and GA-52Cx).

Based upon the results of the ODDS, the following limitations of the Schonstedt Model GA-52Cv and GA-52Cx magnetometer survey at MOUT Site MRA include:

- The Schonstedt is unable to detect nonferrous metal MEC items.
- The effectiveness of a Schonstedt survey depends on the skill of the instrument operator, particularly the thoroughness of their coverage when swinging the instrument within the survey lane. Unlike surveys with digital instruments, where positioning data are also obtained, there is no way to check or document the actual coverage of a Schonstedt survey.
- The detection capability of the Schonstedt magnetometer is greater for larger, shallow buried items and decreases as items are more deeply buried and smaller in size.

Despite these limitations, use of the Schonstedt at the MOUT Site MRA should be considered effective for the following reasons:

- The MEC items removed during sampling and removal actions were found within the top 12 inches.

6.2.2.3 Survey Procedures

USA conducted the SS/GS sampling investigation of the MOUT Training Area (MRS-28) portion of the MOUT Site MRA in accordance with the procedures described in the work plans (CMS 1995 and 1997). SS/GS statistically calculated the number of grids and the percentage of anomalies at a site that required sampling. It estimated the number of military munitions at a given site or grid and was used to assess whether a site had been characterized adequately. This program was designed so there were equal chances of finding military munitions and munitions debris. Excavation of anomalies identified with a magnetometer was performed in accordance with direction of the program; generally 32 to 40% of the flagged anomalies were investigated using this technique (CMS 1995). The SS/GS program was satisfied that no further sampling was necessary in MRS-28 after 13 of the 14 100-ft by 200-ft grids were sampled.

The same instrument procedure for the Schonstedt Model GA-52Cx was used for the SS/GS sampling and the grid sampling investigations at MRS-28 and the grid sampling and 4-ft removal actions in MRS-14D performed by USA. According to the work plans, instrument operators swung Schonstedt Model GA-52Cx magnetometers from side to side while walking down a maximum 5-ft-wide search lane delineated by lengths of rope laid on the ground (CMS 1995 and 1997). Schonstedt responses indicative of potential MEC items were marked in the field with pin flags and the location was excavated until a metal object was encountered. The objects found were mapped and catalogued. For the SS/GS sampling, in accordance with SS/GS protocol, some of the pin flag locations were not investigated.

Shaw performed the TCRA (Visual Surface) in accordance with their work plan (Shaw 2003). Initially, the individuals conducting the visual surface sweep were spaced 4 ft apart and the lane width was 50 ft. After approval of a field variance, the individuals conducting the visual surface sweep were spaced approximately 8 ft apart and the lane width was 100 ft.

No instruments were used during the visual surface sweep. MD was collected in buckets and reported by weight per grid and MEC locations were surveyed by GPS.

The field verification survey performed by the ESCA RP Team was conducted in accordance with the approved work plan and FVF No. G3WP-001 (ESCA RP 2009 and Appendix E, respectively). The analog instrument-aided field verification survey was conducted with the Schonstedt Model GA-52Cx magnetometer for established individual search lanes approximately 3- to 5-ft wide in twenty-four 100-ft by 100-ft whole and partial grids within MRS-28. In accordance with the approved work plan and the FVF, UXO Technicians started at one end of each lane and moved forward toward the opposing base line. During the forward movement, the UXO Technicians moved the magnetometer back and forth from one side of the lane to the other. Both forward movement and the swing of the magnetometer were performed at a pace that ensured that the entire land was searched and the instrument was able to appropriately respond to surface anomalies. MD was collected and reported by weight and grid and MEC locations were surveyed by GPS.

Contractor Equipment Quality Assurance/Quality Control

CMS and USA performed daily operational checks and QC inspections of their work (USA 2001a and 2001d). The procedures for operational checks and QC inspections were specified in the work plans (CMS 1995 and 1997). The operational checks and QC inspection records were presented as appendices to the AARs; however, the AAR did not indicate the type of equipment used for the investigations (USA 2001a and 2001d). The daily operations journals and inspection records were reviewed and generally the first entry of the day indicated: "…radio, mag & equip check" or "...check detector". There were a few pages that stated "…check Schonstedts." No particular details were provided on the types and results of those checks.

Portions of the work plan were provided in an appendix to the AARs. The work plan provided requirements for daily equipment maintenance and tests. The work plan stated that 5-ft search lanes were established and that Schonstedt GA-52Cx magnetometer was to be used. Additionally, the work plan stated that "All QC activities are performed and documented in accordance with applicable professional and technical standards, USACE requirements and specific project goals and objectives. All site activities are monitored and documented for precision, accuracy and completeness."

The ESCA RP Team performed operational checks and QC inspection during the field verification survey. Procedures for operational checks and QC inspections were specified in the work plan (ESCA RP Team 2011). QC inspections were documented in the Contractor Daily QC reports (Appendix E).

6.2.3 Collection and Management of Field Data

The QA/QC procedures used during the field operations are described below. The results of the QA/QC review are used to support the "yes" response to Removal Evaluation Checklist Question 24 (Appendix D).

CMS/USA Field Operations QA/QC

The grids sampled in the MOUT Site MRA were not subject to formal QC/QA inspections because of the nature of the sampling procedures. CMS performed daily operational checks and QC inspections, as documented in the AARs for MRS -28 and MRS-14D (USA 2001a and 2001d). The USA QC specialist was responsible for ensuring that personnel performed operational checks and made appropriate log entries. The QC specialists performed random unscheduled checks of the various sites to ensure the personnel performed the work as specified in the work plan.

Because of the nature of SS/GS sampling, the AAR indicated that QA and QC checks of SS/GS operations were limited to inspections of operational activities and documentation. No deficiency reports were written during inspections of the work done in MRS-28 of the MOUT Site MRA (USA 2001d).

Shaw Field Operations QA/QC

QC inspection was performed by the Shaw UXO Quality Control Specialist and included the following activities:

- Each grid was walked at least once with a coverage of 10 to 20 percent
- Field activities were observed to verify conformance to required procedures
- Field documentation was reviewed
- Data from the Geographical Information System (GIS) was verified against field conditions

There were no variances or non-conformances issued during the TCRA. In addition, almost all grids (greater than 99.9%) were passed on initial QC inspection. This percentage included grids outside of the MOUT Site MRA where QC inspection was also performed. Three grids were re-swept due to QC inspections, and then passed by QC (Shaw 2005).

QA was provided by the USACE and consisted of monitoring field practices, reviewing and observing field ground control and GPS procedures, examining data files and anomaly maps, and physically walking each grid with a coverage of at least 10 percent. All grids passed QA inspections (Shaw 2005).

ESCA RP Team Operations QC

- Each grid was inspected with a coverage of 10 percent
- Field activities were observed to verify conformance to required procedures
- Field documentation was reviewed

There were no non-conformances issued during the instrument-aided field verification.

6.2.4 Completeness of Existing Records and Data Gaps

The completeness of existing records was evaluated. The records were reviewed to determine if there is enough defensible data to 1) assess whether or not the work was completed according to contractual requirements, 2) assess the adequacy of investigations and removal actions, and 3) identify data gaps, if any, that may need to be filled to evaluate the adequacy of the response action.

The visual surface removal performed by the Army and the ESCA RP Team covered the entire MRA. The 4-ft sampling and the SS/GS operation covered a very small percentage of the total MRA. Therefore, a large portion of the MRA has not undergone a subsurface investigation.

The recommendation of the AAR for SS/GS and sampling operations (USA 2001d) was that further site characterization was needed in the northern central portion of MRS-28 to ascertain the extent of MEC removal operations necessary to support current and future reuse of the property. The TCRA (visual surface) and field verification survey were conducted following the SS/GS and sampling actions. The AAR recommended future MEC removal operations in the southern portion of the site.

6.2.5 Accuracy of Site Boundaries

Site boundaries are based on property transfer boundaries for the MOUT Site MRA as provided by the Army. The site boundaries have changed over time. Both the 4-ft sampling and the SS/SG operation investigated grids are no longer within the current MOUT Site MRA boundary.

6.3 MOUT Site MRA Data

The MOUT training area (MRS-28) of the MOUT Site MRA was used for weapons and troop training. The portion of Barloy Canyon Road included in the MRA, Parcel L20.8, was used as a transportation corridor providing access for military personnel and the conveyance of supplies to training areas and extended through a training site used for bivouac and troop maneuvers (MRS-27O). The data resulting from investigations and removal actions in and around MRS-28 and Parcel L20.8 indicate that training operations in these areas include the use of rockets, grenades, small arms, and miscellaneous flares, signals, and simulators. Table 6-1 includes a summary of the MEC items recovered from the MOUT Site MRA during the investigation and removal actions described in Section 6.2. Table 6-1 also provides the associated MEC hazard classification scores. Locations of MEC and MD found at the MOUT Site MRA and surrounding areas are shown on Plates C1 through C4 in Appendix C.

6.4 Data Analysis

The results of the reviews of historical records and investigations and removal actions were used to complete the data analysis. The data analysis process consisted of answering a series of questions as documented through the completion of a series of checklists. The checklists

were developed to facilitate the analysis and validation of data obtained during investigations and removal actions in accordance with Task 4.1 of the AOC. Evaluation of the munitions response activities was used to support completion of a RA and FS for the MRA.

Copies of checklists prepared for the MOUT Site MRA are provided as Appendix D. This section presents a summary of the results of the checklist evaluations for the literature review and the sampling (grid sampling and SS/GS) investigation, TCRA (visual surface) review, and field verification survey review. Grid sampling and removal actions performed in MRS-14D were not within the MOUT Site MRA and are, therefore, not included in the data analysis.

6.4.1 Literature Review Evaluation Summary

As determined during the review of historical aerial photographs and training facility maps, Parcel F1.7.2 of the MOUT Site MRA was used for MOUT activities as early as the 1950s and continues into the 2000s. In the 1950s, the northern area of the parcel was used for hand grenade training. In the 1960s, a firing point for a rocket launcher range was positioned in the center of the parcel and directed south. Also in the 1960s, a close combat course included the southern portion of the MRA. In the 1970s, the southern portion of the parcel was used for squad tactics and night defense fire. In the 1980s, the southwest portion of the MRA was used as a pistol range and the southeastern area used for MOUT assault course.

6.4.2 Removal Action Review Evaluation Summary

This section describes the analysis of results of the sampling investigations and removal actions.

6.4.2.1 Type of Munitions Removed

The types of MEC and MD removed from the MOUT Site MRA included:

- hand grenades (practice, smoke, and fragmentation), hand grenade fuzes, and a rifle grenade (Plate C1)
- rockets (2.36-inch practice and 3.5-inch practice; Plate C2)
- flares (parachute trip), signals (ground illumination and rifle parachute), simulators, and 40mm projectiles (cluster white star and parachute star; Plate C3)
- miscellaneous items, such as pyrotechnic ash, projectiles (50mm Japanese mortar and 81mm illumination mortar), cartridge cases, an ignition cartridge, mine fuzes, and a dummy rocket fuze (Plate C4)

6.4.2.2 Investigation and Removal Action Boundaries

The establishment of the MOUT Site MRA boundaries is based upon the property transfer boundaries for Parcels F1.7.2 (MOUT training area) and L20.8 (Barloy Canyon Road). The SS/GS sampling (central area) and the grid sampling investigations (northern and southern

areas) did not constitute full coverage of the MRA (Figure 6-1). The TCRA (visual surface) and field verification survey collectively covered the entire surface of the MRA (Figure 6-2).

6.4.2.3 Investigation and Removal Action Design

This section summarizes the information contained in removal checklist questions 15 through 17 (Appendix D). The grid sampling and SS/GS investigations were conducted with the objective of determining the necessity of MEC removal actions in MRS-28. The TCRA (visual surface) was conducted after an accidental fire that started in the MOUT training area and burned approximately 644 acres. The fire removed surface vegetation, which provided access for military munitions response activities.

6.4.2.4 Investigation and Removal Action Methods and Data Management

SS/GS Sampling Investigation

- Anomalies were investigated and MEC and MD items removed until the SS/GS computer program was satisfied that no further sampling was necessary after 13 of the 14 100-ft by 200-ft grids were completed.
- The Schonstedt Model GA-52Cx magnetometer was to be used during the SS/GS investigation according to the work plan; however, the instrument used was not stated in the AAR (USA 2001d).
- The Schonstedt Model GA-52Cx magnetometer was evaluated as part of two studies conducted on the Former Fort Ord including the Geophysical Survey Quality Assurance Technical Analysis, as part of the Del Rey Oaks Group removal action (USA 2001b) and the ODDS (Parsons 2002). The Schonstedt is especially sensitive to smaller, near-surface ferro-metal objects, though determining the exact location of a more deeply buried object can be more difficult (Breiner 1973).
- The AAR indicated that no QA/QC was required in SS/GS grids other than inspections of operational activities and documentation because of the implementation procedures for conducting SS/GS sampling.

SS/GS sampling methodology was used at MRS-28. Generally, 32 to 40 percent of the flagged anomalies were investigated using the SS/GS methodology according to the work plan (CMS 1995). No specific percentage was stated in the AAR (USA 2001d); however, it was stated that 731 samples were collected consistent with SS/GS procedures. The SS/GS methodology was reviewed by the EPA's Federal Facilities Restoration and Reuse Office. The Technical Support Center, EPA National Exposure Research Laboratory (NERL) in Las Vegas, Nevada also provided statistical assistance in reviewing the SS/GS methodology (NERL 2000). Several problems were identified as a result of the review. The primary conclusions were: (1) the statistical procedures were vague and not well documented, (2) that conclusions about homogeneity were not consistent, (3) that the stopping rules were faulty, and (4) that the process was not able to identify military munitions clusters at a site. Although these problems were identified, the information obtained during SS/GS sampling was

determined to be useful in identifying the presence of and type of military munitions at a site (Army 2006).

Grid Sampling Investigation

- The entire area within 13 100-ft by 100-ft grids was investigated.
- Surface and subsurface anomalies were investigated to a depth of 4 ft.
- The Schonstedt Model GA-52Cx magnetometer was to be used according to the work plan; however, the instrument used was not stated in the AAR (USA 2001d).
- The Schonstedt Model GA-52Cx magnetometer was evaluated as part of two studies conducted on the Former Fort Ord to include the Geophysical Survey Quality Assurance Technical Analysis, as part of the Del Rey Oaks Group removal actions (USA 2001b) and the ODDS (Parsons 2002). The Schonstedt Model GA-52Cx magnetometer was less effective for detecting the smaller or more deeply buried objects.
- Throughout sampling operations at MRS-28, CMS performed daily operational checks and QC inspections of its work. No deficiency reports were written during inspections of the work completed in MRS-28 (USA 2001d).

TCRA (Visual Surface)

The AAR stated that the visual surface removal was conducted in compliance with the work plan (Shaw 2005). QC inspection was performed to ensure coverage of 10 to 20 percent; field activities were observed to verify conformance to required procedures; field documentation was reviewed; and data from the GIS and verification was compared with field conditions.

There were no variances or non-conformances issued during the removal action. In addition, almost all grids (greater than 99.9%) were passed on initial QC inspection. This percentage includes grids outside of the MOUT Site MRA where QC inspection was also performed. Three grids were re-swept due to QC inspections, and then passed by QC (Shaw 2005).

QA was provided by the USACE and consisted of monitoring field practices, reviewing and observing field ground control and GPS procedures, examining data files and anomaly maps, and physically walking each grid with coverage of at least 10 percent. All grids passed QA inspections (Shaw 2005).

Instrument-Aided Field Verification Survey

The instrument-aided field verification survey was conducted in compliance with the approved work plans (ESCA RP 2009 and Appendix E). QC inspection was performed to ensure coverage of 10 percent of the survey area, field activities were observed to verify conformance to required procedures, field documentation was reviewed, and data from the GIS and verification was compared with field conditions.

There were no non-conformances issued during the instrument-aided field verification survey. In addition, grids were passed on initial QC inspection (Appendix E).

6.4.3 Results of Removal Evaluation

The results of the above analysis present evidence to support that the existing data are usable for defining the nature and extent of MEC and for use in completing an explosives safety RA and FS.

6.5 Conceptual Site Model

The results of the MOUT Site MRA RI were used to update the CSM that was developed for the SEDR (ESCA RP Team 2008). The initial conclusion in the SEDR was that the MRS-28 portion of the MOUT Site MRA was used as a troop training area, which is consistent with the data reviewed for this RI. A review of the historical training maps identified that hand grenade training, close combat training, squad tactics training, night defense fire training, pistol training, and rocket launcher training were also conducted in and near MRS-28.

The conclusion stated in the SEDR for the Barloy Canyon Road portion of the MRA was that artillery training occurred to the east and the west of the roadway. Bivouac and troop maneuver training also occurred along the portion of the road that passes through MRS-27O. This conclusion is consistent with the information reviewed as part of the RI process.

6.5.1 Simulators

A variety of simulators (all MEC, no MD) were found within Parcel F1.7.2 of the MOUT Site MRA and included: one M74 series airburst projectile simulator, one M117 explosive booby trap simulator (flash), one M110 flash artillery simulator, one M116A1 hand grenade simulator, one M115A2 ground burst projectile simulator, and two civilian M15 blast stinger simulators (Plate C3). The simulators were not located in the same area: two were in the northern portion of the parcel, three in the central portion, and two in the southern portion of the parcel. The small number of simulators found plus the lack of documented simulator MD suggests that simulators were not used as a regular part of the training that occurred at the parcel.

Three simulators (MEC) were found along Parcel L20.8 (Barloy Canyon Road) of the MOUT Site MRA (Plate C3). All three simulators were located within 200 ft of Barloy Canyon Road.

Simulators are non-penetrating items and would be expected to be found at or near the surface, as were the simulators found at the MOUT Site MRA.

6.5.2 Signals and Flares

Signals (1 MEC and 17 MD) were found in Parcel F1.7.2 of the MOUT Site MRA (Plate C3), and included: a M17 series ground rifle parachute signal, and several M125, M126, and M187 illumination signals. Most of the signals were found in the northern portion of the parcel. The signals were used for various purposes including daytime or night time signaling, distress signaling, and surface-to-air signaling (Army 1977b). One signal (MD) was found

just to the east of Parcel L20.8 (Barloy Canyon Road) of the MOUT Site MRA (Plate C3) and one signal (MEC) was found approximately 300 ft to the east of the roadway.

The signals identified within the MOUT Site MRA are non-penetrating items and would be expected in the top few inches of soil. Most of the signals found at the MOUT Site MRA were encountered within 2 inches of the surface, although two M126 series ground illumination signals found in the southern portion of Parcel F1.7.2 were 12 inches bgs. It is anticipated that items found at depths greater than a few inches may have been buried by soldiers or through disturbance of soil.

Flares (1 MEC and 2 MD) were found in Parcel F1.7.2 of the MOUT Site MRA (Plate C3). One M49 surface trip flare (MEC) was found on the surface in the northern portion of the parcel. Two M48 parachute trip flares (MD) were found at 3 inches and 4 inches bgs in the central portion of the parcel. Two flares (MEC) were found along the northern portion of Parcel L20.8 (Barloy Canyon Road) of the MOUT Site MRA (Plate C3). The M49 series trip flares give warning of infiltrating troops by illuminating the field of the advancing enemy (Army 1977b). The M49 series trip flare functions by burning in the location where it is emplaced, with no movement of the flare when ignited. The M49 series trip flare is a non-penetrating item and would be expected in the top few inches of soil. In general, these items were recorded in the MMRP database as being found on the ground surface. Because M48 series flares deploy parachutes, it is a non-penetrating item and would be expected to be found on or near the surface.

6.5.3 Rockets

Historical training maps of the former Fort Ord showed a range fan located in the southern area of the MRS-28 portion of the MOUT Site MRA starting in the late 1950s. The 1961 historical training map labeled this range fan as “Rocket Launcher”. The naming of the range fan changed throughout the decades, but the range fan was still on the maps by the late 1990s. MEC and MD items were found during investigations and removal actions (Plate C2).

6.5.3.1 2.36-inch Practice Rockets

Eight M7 2.36-inch practice rockets (MD) were found in Parcel F1.7.2 of the MOUT Site MRA (Plate C2). Six of the eight practice rocket MD items were found within 3 inches of the surface, one was found at 6 inches bgs, and one was found at 13 inches bgs. One was found in the central area of Parcel F1.7.2, five were clustered together in the southern portion of Parcel F1.7.2, and two were found along the southwestern border of Parcel F1.7.2. No 2.36-inch practice rockets (MEC or MD) were found along Parcel L20.8 (Barloy Canyon Road) of the MOUT Site MRA (Plate C2). The 2.36-inch rocket has a penetration depth in sand of 0.4 ft according to the report from United States Army Engineer Division, Huntsville, titled Penetration of Projectiles into Earth – An Analysis of UXO Clearance Depths at Ft. Ord (USAEDH 1997). The firing point of the rocket launcher range shown on historical training maps from 1961 to 1971 does not coincide with the locations of the eight rockets. The rocket found in the central portion of Parcel F1.7.2 ranges from approximately 100 ft to 350 ft north of the range firing point, depending upon the historical training map. The cluster of five rockets in the southern portion of the parcel is located on the far western side of the range fan,

sometimes inside the fan and sometimes outside the fan, depending on the historical training map. The two rockets found along the southwestern border of the parcel are to the west of the range fan. The 2.36-inch rockets were found in either a sampling grid or a SS/GS grid and were below the ground surface. Therefore, 2.36-inch rockets may remain below the ground surface where intrusive investigations or removal actions have not been conducted.

6.5.3.2 3.5-inch Practice Rockets

One hundred and ten 3.5-inch practice rockets (one MEC and 109 MD) were found in Parcel F1.7.2 of the MOUT Site MRA. With the exception of three MD items found in the middle portion of the parcel, the practice rockets were found in the southern portion of the parcel, in proximity to where the historical training maps positioned the rocket launcher range fan. Rockets were found on the surface and to a depth of 48 inches bgs. In the southeastern portion of the parcel, 78 rockets (MD) were found in one area: 6 were at 12 inches, 5 at 24 inches, 62 were at 36 inches, and 5 were at 48 inches bgs. In addition, the AAR contained a picture with the caption: "This photograph shows the UXO Team working around the facilities built in the MOUT training area. The hill to the left of the team was (sic) made by bull dozing (sic) up dirt and practice 3.5" rockets" (USA 2001d). No 3.5-inch practice rockets (MEC or MD) were found along Parcel L20.8 (Barloy Canyon Road) of the MOUT Site MRA (Plate C2). Based on review of the data, 3.5-inch practice rocket items may remain in the MOUT Site MRA.

6.5.4 Hand Grenade Training

Two hand grenade training areas were identified on historical training facilities maps within the boundaries of Parcel F7.2.1 of the MOUT Site MRA. No hand grenade training was identified along Parcel L20.8 (Barloy Canyon Road) of the MOUT Site MRA. The earliest training map (dated 1953), showed a hand grenade training area in the northernmost portion of Parcel F7.2.1. That designation was on the historical maps until 1961, when that area was no longer designated for hand grenade training. The earliest historical training map also showed a HE grenade training area just outside the MRA boundaries of Parcel F7.2.1, directly west of the central portion of the parcel. Over the years, the position of the hand grenade training area varied, and it was also called a grenade assault course. However, it remained on the maps into the 1990s, and it was always located outside the central portion of the parcel.

A review of the investigation and removal action data indicated that hand grenades were found in Parcel F7.2.1 of the MOUT Site MRA that were available for use from 1915 to the 1990s. The hand grenades found included the MK II practice, M21 practice, M30 practice, M62 practice, M69 practice, M18 smoke, M48 smoke, and one M67 fragmentation (Plate C1).

The M67 fragmentation grenade (MEC) was found on the western boundary of the central portion of Parcel F7.2.1. This location is consistent with the HE hand grenade training that occurred to the west of the parcel. It was found on the surface.

Review of the investigation and removal action data indicated that most of the hand grenades were found in the northern portion of MRS-28 (Plate C1). Some hand grenades were found in the central portion of the MRS and very few were found in the southern portion. Numerous live and expended grenade fuzes (MEC and MD) were also found. Grenade fuze models found included M10 series, M204 series, M205 series, and M228 found throughout the MRS.

The number and variety of practice grenades and grenade fuzes found indicate that training in the use of hand grenades occurred in MRS-28 (Plate C1). It appears that practice hand grenade training occurred in the 1950s and continued into the 1990s. No hand grenades (MEC or MD) were found along Parcel L20.8 (Barloy Canyon Road) of the MOUT Site MRA (Plate C1). Descriptions of the hand grenades found at the greatest frequency during the investigations and removal actions in the MOUT Site MRA and the areas where they appear to have been used is provided in the following sections.

6.5.4.1 MK II Practice Hand Grenade

The MK II practice hand grenade used the M205 or the M10A3 fuzes on earlier models, and was designated to train personnel to arm and throw hand grenades. It was identical to the MK II fragmentation hand grenade, except for a filling hole in the base and a cork stopper to close the hole after the black powder strips had been inserted. The black powder strips provide noise and smoke without fragments upon functioning. It was functioned when a soldier removed the safety pin from the safety lever and threw the grenade allowing the safety lever to fly free, releasing the spring-loaded striker to strike the primer. The primer ignited the delay element in the fuze, which burned for a period of 4 to 5 seconds before igniting the black powder strips forcing the cork out of the hole in the base and causing spotting charge (Navy 1947). Release of the striker could be caused by incidental contact by movement, i.e., stepping on, picking up, or kicking the grenade. The safety lever was made of thin metal and if exposed to the elements for long periods of time, could deteriorate to eventually allow the safety pin to break free. This would allow the functioning sequence mentioned above to take place.

The MK II practice hand grenade was the most commonly found practice hand grenade (2 MEC and 38 MD) at MRS-28 of the MOUT Site MRA, mostly in the northern portion. M10 series fuzes used in the early models of the MK II practice hand grenades and M205 series were found in the MOUT Site MRA.

The MK II practice hand grenade is a non-penetrating item and would be expected to be found at or near the surface. The majority of the MKII practice grenade MD was found at 12-13 inches bgs. It is suspected that MK II practice grenades found at depths greater than 6 inches were either buried through disturbance of soil or in burial pits.

6.5.4.2 Smoke Hand Grenades

M18 (8 MEC and 11 MD) and M48 smoke grenades (6 MEC) were found in the MOUT Site MRA, with the highest concentration of these items found in the northern portion of the MRS-28, however M18 MD was also found along the northwestern border and in the center of the MRS. No smoke grenades were found in the southern portion of MRS-28. These smoke grenades are used as ground-to-ground or ground-to-air signaling devices, target or

landing zone marking devices or screening devices for unit movements (Army 1977c and 2000b). According to the MMRP database, almost all of the items were found within the top two inches of soil. Smoke hand grenades are non-penetrating and would be expected in the top few inches of soil. It is suspected that the items found at depths greater than a few inches may have been buried, either in pits, or through disturbance of soil.

6.5.5 Miscellaneous Items

Miscellaneous MEC and MD were found in the MOUT Site MRA that do not show a pattern of use including (Plates C3 and C4):

- Ash, Pyrotechnic (1 MEC)
- Cartridge, ignition, M2 series (1 MEC)
- Cartridge case, 40mm (projectile removed/case intact; 13 MD and no MEC)
- Fuze, mine, combination, M10 series (16 MEC)
- Fuze, rocket, dummy, M405 (12 MD @ 8")
- Grenade, rifle, antitank, M9 series (1 MEC)
- Projectile, 14.5mm, subcaliber, practice, M181 series (2 MEC)
- Projectile, 22mm, subcaliber, practice, M744 (2 MEC)
- Projectile, 40mm, parachute, illumination, M583 series (1 MEC @ 12")
- Projectile, 40mm, parachute, star, M662 (3 MD @ 12")
- Projectile, 40mm, cluster, white star M585 (1 MD @ 1")
- Projectile, 50mm, Mortar, Type 89, Japanese NI (1 MD @ 6")
- Projectile, 81mm, Mortar, illumination, M301 series (1 MD @ 6")

6.6 MOUT Site MRA Conclusions and Recommendations

The following section presents conclusions and recommendations for the MOUT Site MRA based on the review and analysis of the data associated with historical information and sampling and removal data (Plates C1 through C4; Figures 6-1 and 6-2).

6.6.1 MOUT Site MRA Conclusions

Based on the results of the literature review, sampling results, removal actions, and field verification survey, the MOUT Site MRA appears to have been used for MOUT training, practice hand grenade training, pistol training, and contained a firing point and range fan for a rocket range. This is consistent with the historical use indicated in the SEDR (ESCA RP Team 2008). The site is currently developed for use as a MOUT training facility and still has the remnants of the pistol range. Most of the area remains undeveloped and continued MOUT and pistol training is planned for the area.

The following conclusions have been made regarding the removal adequacy and data quality of the munitions response actions:

- The visual surface removal and field verification survey, in combination, covered the entire surface of the MRA. The 4-ft sampling and the SS/GS operation covered a very small percentage of the total MRA. Therefore, a large portion of the MRA has not undergone a subsurface investigation.
- The recommendation of the AAR for SS/GS and sampling operations (USA 2001d) was that further site characterization was needed in the northern central portion of MRS-28 to ascertain the extent of MEC removal operations necessary to support current and future re-use of the property. The TCRA (visual surface) and field verification survey were conducted following the SS/GS and sampling actions. The AAR recommended future MEC removal operations in the southern portion of the site.
- The majority of MEC and MD encountered are consistent with its documented historical use. Some items were likely the result of the area being at the edge of the Inland Range complex.
- The property transfer parcel boundaries represent the limits of the MRA, and may not reflect the limits of MEC in the area.
- The investigation for the MOUT Site MRA is sufficient to confirm the type of military munitions used in the vicinity of the MRA.
- The MOUT Site MRA removal data are usable for preparation of a MEC risk assessment.

6.6.2 MOUT Site MRA Recommendations

Review of the available literature, removal results, and equipment performance results indicate that the sampling and removal actions conducted in the MOUT Site MRA detected, excavated, and recovered many MEC items. It is possible for residual MEC to remain in the MOUT Site MRA; therefore, a risk assessment and feasibility study should be performed.

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Table 2-1
MOUT Site MRA – Existing Structures and Buildings

USACE Parcel Number	Facility Number	Area (square footage)	Description	Asbestos-Containing Material	Lead-Based Paint	Year Built
F1.7.2	628	1,659	MOUT Range	no ACM	NO	1986
F1.7.2	627	2,214	MOUT Range	no ACM	NO	1986
F1.7.2	829	200	Observation Tower	no ACM	YES	1969
F1.7.2	826	200	Combat Pistol Range	no ACM	YES	1969
F1.7.2	R9521	172	Field Range Latrines	unknown	NO	1984
F1.7.2	624A	5,106	MOUT Range	unknown	unknown	unknown
F1.7.2	623	1,383	MOUT Range	no ACM	NO	1986
F1.7.2	622	18,701	MOUT Range	no ACM	NO	1986
F1.7.2	621B	724	Field Range Latrines	no ACM	NO	1986
F1.7.2	624	2,027	Helipad	unknown	NO	1990
F1.7.2	613	3,868	Range Support Building	unknown	NO	1986
F1.7.2	601	2,436	MOUT Range	no ACM	NO	1986
F1.7.2	632	516	Range Support Building	unknown	unknown	unknown
F1.7.2	610B	2,023	MOUT Range	no ACM	NO	1986
F1.7.2	615	1,430	MOUT Range	no ACM	NO	1986
F1.7.2	609A	2,085	MOUT Range	no ACM	NO	1986
F1.7.2	633	1,010	Covered Training Area	unknown	unknown	unknown
F1.7.2	610A	2,120	MOUT Range	no ACM	NO	1986
F1.7.2	608A	3,039	MOUT Range	no ACM	NO	1986
F1.7.2	609B	2,310	MOUT Range	no ACM	NO	1986
F1.7.2	617	2,407	MOUT Range	no ACM	NO	1986
F1.7.2	619D	992	MOUT Range	no ACM	NO	1986
F1.7.2	620D	520	MOUT Range	no ACM	NO	1986
F1.7.2	611A	1,834	MOUT Range	no ACM	NO	1986
F1.7.2	612	508	MOUT Range	no ACM	NO	1986
F1.7.2	618	725	MOUT Range	no ACM	NO	1986
F1.7.2	620C	615	MOUT Range	no ACM	NO	1986
F1.7.2	619C	1,014	MOUT Range	no ACM	NO	1986
F1.7.2	621A	1,038	Field Range Latrines	no ACM	NO	1986
F1.7.2	605	3,567	MOUT Range	no ACM	NO	1986
F1.7.2	611B	1,855	MOUT Range	no ACM	NO	1986

Table 2-1
MOUT Site MRA – Existing Structures and Buildings

USACE Parcel Number	Facility Number	Area (square footage)	Description	Asbestos-Containing Material	Lead-Based Paint	Year Built
F1.7.2	607A	3,044	MOUT Range	no ACM	NO	1986
F1.7.2	608B	3,297	MOUT Range	no ACM	NO	1986
F1.7.2	606	3,694	MOUT Range	no ACM	NO	1986
F1.7.2	604B	2,541	MOUT Range	no ACM	NO	1986
F1.7.2	619B	1,046	MOUT Range	no ACM	NO	1986
F1.7.2	607B	2,782	MOUT Range	no ACM	NO	1986
F1.7.2	604A	2,540	MOUT Range	no ACM	NO	1986
F1.7.2	620B	398	MOUT Range	no ACM	NO	1986
F1.7.2	603	2,222	MOUT Range	no ACM	NO	1986
F1.7.2	620A	478	MOUT Range	no ACM	NO	1986
F1.7.2	619A	925	MOUT Range	no ACM	NO	1986
F1.7.2	616	975	MOUT Range	no ACM	NO	1986
F1.7.2	614	3,822	MOUT Range	no ACM	NO	1986

Table 4-1

Summary of Del Rey Oaks/Monterey MRA MEC and MD by Item Description

Item Description	MEC			MD	
	Risk Code	# of Records	# of Items	# of Records	# of Items
Cartridge, 40mm, practice, M781	1	1	1		
Cartridge, ignition, M2 series	1	1	2		
Charge, 0.25lbs, demolition, TNT*	2	1	0		
Flare, surface, trip, M49 series				1	1
FRAGMENT, UNKNOWN*				3	0
FRAGMENTS, UNKNOWN*				2	0
Fuze, grenade, hand, practice, M228				1	1
Grenade, hand, smoke, HC, AN-M8				2	2
Grenade, hand, smoke, M18 series				7	7
Grenade, rifle, antitank, practice, M11 series				12	13
Grenade, rifle, smoke, M23 series	1	1	1		
Pot, 10lb, smoke, HC, screening, M1	1	1	1		
PROJECTILE, 37mm (Model Unknown)*				1	0
Projectile, 37mm, armor piercing tracer, M51 series				1	1
Projectile, 37mm, low explosive, MK I*				39	0

Notes:

Items have been described with the Final Model Descriptions provided in the Army's MMRP database. Items with a Final Model Description of "Null" are described with the Original OE Nomenclature provided in the MMRP database.

* MMRP database identified item as MEC or MD with a quantity of zero.

# of Records indicates the number of locations where MEC or MD were found.

Table 5-1

Summary of Laguna Seca Parking MRA MEC and MD by Item Description

Item Description	MEC			MD	
	Risk Code	# of Records	# of Items	# of Records	# of Items
20MM DUMMY ROUNDS (Model Unknown)				1	2
37mm APT (Model Unknown)				1	1
Projectile, 37mm, armor piercing tracer, M80				1	1
57mm APT (Model Unknown)				1	1
57mm APTP (Model Unknown)				1	1
81mm TAIL FIN (OE Scrap)				1	1
81mm MORTAR TAIL BOOM (OE Scrap)				1	1
81mm, ILLUMINATION, MORTAR ROUND (Model Unknown)**	NS	1	1		
ASSORTED OE SCRAP, TO INCLUDE, 40mm CART, RIFLE GRENADE BOOMS (OE Scrap)*				1	0
Cap, blasting, electric, M6	1	2	185		
CARTRIDGE CASE, 105mm (Model Unknown)				1	1
Cartridge, 37mm, high explosive (model unknown)	3	1	2		
Cartridge, 20mm, high explosive incendiary, M210	3	1	1		
Cartridge, 40mm, practice, M781	1	1	1		
Flare, parachute, trip, M48				1	3
Flare, surface, trip, M49 series	1	5	5	2	2
Fuze, grenade (model unknown)				1	1
Fuze, grenade, hand, practice, M205 series	1	5	12		
Fuze, grenade, hand, M213	1	2	2	5	7
Fuze, grenade, hand, practice, M228	1	1	1	4	102
Fuze, grenade, hand, M218E1				1	1
Fuze, grenade, hand, M204 series	1	1	1	1	1
Fuze, grenade (model unknown)				1	1
Fuze, chemical, mine, antitank, M600	NS	1	1		
Fuze, mine, combination, M10 series				2	2
Fuze, trench mortar, point detonating, MK VI				1	1
Fuze, projectile, base detonating, practice, M58 w/o Booster				1	1
Fuze, projectile, point detonating, M48 series				1	1

Table 5-1

Summary of Laguna Seca Parking MRA MEC and MD by Item Description

Item Description	MEC			MD	
	Risk Code	# of Records	# of Items	# of Records	# of Items
Fuze, projectile, combination, M1907				4	4
Grenade, hand, practice, MK II***	1	1	1	3	2
Grenade, hand, practice, M69				1	1
Grenade, hand, smoke, M48				1	1
Grenade, hand, smoke, HC, AN-M8	1	3	4		
Grenade, hand, smoke, M18 series	1	2	4	18	30
GRENADE, RIFLE, M31 (OE Scrap)				1	1
Grenade, rifle, smoke, M22 series	1	4	7	10	84
Grenade, rifle, smoke, M23 series	1	2	6		
Mine, antitank, practice, M10				1	1
MINE, AT, M21 (OE Scrap)				1	1
Pot, 2.5lb, smoke, HC, screening, M1	1	1	1		
Primer, igniter tube, M57	1	1	1		
projectile, 3inch, stokes mortar, prac, MK I	1	14	14	2	2
Projectile, 4.2inch, mortar, high explosive, M3 series	3	4	4		
Projectile, 14.5mm, subcaliber, practice, M181 series	1	2	2		
Projectile, 37mm, armor piercing tracer, M51 series	NS	4	4	43	43
Projectile, 37mm, armor piercing tracer, M59				3	3
Projectile, 37mm, armor piercing tracer, M74				1	1
Projectile, 37mm, low explosive, MK I				5	5
Projectile, 37mm, target practice, M63 MOD1				5	5
PROJECTILE, 37mm (Model Unknown)	NS	1	1		
Projectile, 40mm, smoke, M680 series				1	4
Projectile, 40mm, high explosive, M381	3	1	1		
Projectile, 40mm, high explosive tracer, M677	3	1	1		
PROJECTILE, 40mm, ILLUMINATION (Model Unknown)				2	3
Projectile, 40mm, practice, M385	NS	1	1		
Projectile, 57mm, armor piercing tracer, M70				12	12
Projectile, 57mm, high explosive antitank, M307	3	1	1		

Table 5-1

Summary of Laguna Seca Parking MRA MEC and MD by Item Description

Item Description	MEC			MD	
	Risk Code	# of Records	# of Items	# of Records	# of Items
Projectile, 57mm, target practice, M306 series				1	1
Projectile, 60mm, mortar, practice, M50 series				2	3
Projectile, 75mm, high explosive, MK I	3	7	7		
Projectile, 75mm, high explosive (model unknown)	3	1	1		
Projectile, 76mm, armor piercing tracer, M339				1	1
Projectile, 81mm, mortar, illumination, M301 series	2	1	1		
Projectile, 81mm, mortar, high explosive, M43 series	3	22	22		
Projectile, 81mm, mortar, practice, M43 series	2	1	1		
Projectile, 81mm, mortar, training, M68				1	3
Projectile, 81mm, mortar (model unknown)	3	1	1		
Propellant, 60mm, wafers, mortar	1	1	1		
Ash, Pyrotechnic	999	1	5		
RIFLE FLARE (Model Unknown)				1	1
RIFLE GRENADE FLARE (Model Unknown)				1	1
Rocket, 2.36inch, high explosive antitank, M6	3	1	1		
ROCKET, 66mm, HEAT, M72 (SCRAP) (OE Scrap)				1	1
Signal, ground, rifle, parachute, M17 series				1	1
Signal, illumination, ground (model unknown)				1	1
Signal, illumination, AN-M43 series	1	1	9		
Signal, illumination, ground, M125 series	2	2	6	10	43
Signal, illumination, ground, M131				1	2
Signal, illumination, ground, M126 series	2	6	6	9	9
Signal, smoke, ground, parachute, M128A1 series				1	1
Signal, smoke, ground, M62 series	1	2	2		
SIGNALS, ILLUMINATION, GROUND, GREEN STAR, PARACHUTES (Model Unknown)				1	1
Simulator, projectile, airburst, M27A1B1				1	1
Simulator, projectile, airburst, M74 series				2	31
Simulator, projectile, ground burst, M115A2	2	2	2		
SMOKE GRENADE (Model Unkown)				1	1

Table 5-1

Summary of Laguna Seca Parking MRA MEC and MD by Item Description

Item Description	MEC			MD	
	Risk Code	# of Records	# of Items	# of Records	# of Items
TUBE, FLASH, CARTRIDGE CASE, ARTILLERY (Model Unknown)				1	23

Notes:

Items have been described with the Final Model Descriptions provided in the Army's MMRP database. Items with a Final Model Description of "Null" are described with the Original OE Nomenclature provided in the MMRP database.

* MMRP database identified item as MEC or MD with a quantity of zero.

**No Model Description is listed in the Army's MMRP database for this item. The item description provided is the Original OE Nomenclature stated in the MMRP database.

*** MMRP database identified one record for item as MD with a quantity of zero.

# of Records indicates the number of locations where MEC or MD were found.

Risk code 999 was assigned to items in the MMRP when the exact item could not be identified.

NS indicates that no risk code was specified in the Army's MMRP database.

Table 5-2
Laguna Seca Parking MRA - ODDS and DRO Study Seeded Items

Item ID [1]	Depth bgs (inches)	Item Description	Detected
OEI121	2	Grenade, Hand, MK-2, Practice	Yes
OEI015	6	Grenade, Hand, MK-2, Practice	Yes
OEI017	6	Grenade, Hand, MK-2, Practice	Yes
DRO 01 26O	6	Grenade, Hand, M68	Yes
OEI120	7	Grenade, Hand, MK-2, Practice	Yes
DRO 01 26O	9	Grenade, Hand, M68	Yes
OEI118	10	Grenade, Hand, MK-2, Practice	No
OEI119	11	Grenade, Hand, MK-2, Practice	No
DRO 01 26U	12	Grenade, Hand, MKII	Yes
OEI016	12	Grenade, Hand, MK-2, Practice	No
OEI018	12	Grenade, Hand, MK-2, Practice	No
OEI107	12	Grenade, Rifle, AT, Practice, M9	Yes
OEI028	12	Grenade, Rifle, AT, Practice, M9	Yes
OEI108	15	Grenade, Rifle, AT, Practice, M9	Yes
OEI109	24	Grenade, Rifle, AT, Practice, M9	No
OEI029	24	Grenade, Rifle, AT, Practice, M9	No
OEI030	36	Grenade, Rifle, AT, Practice, M9	No
OEI056	24	Illumination, 81mm, Mortar	Yes
OEI053	36	Illumination, 81mm, Mortar	No
OEI061	36	Illumination, 81mm, Mortar	No
OEI054	40	Illumination, 81mm, Mortar	Yes
OEI060	40	Illumination, 81mm, Mortar	No
OEI062	57	Illumination, 81mm, Mortar	No
OEI113	3	Rocket, 2.36-inch, Practice, M7 Series	Yes
DRO 01 38G	12	Rocket, 2.36-inch	Yes
OEI031	12	Rocket, 2.36-inch, Practice, M7 Series	Yes
OEI111	19	Rocket, 2.36-inch, Practice, M7 Series	Yes
OEI110	23	Rocket, 2.36-inch, Practice, M7 Series	No
OEI112	23	Rocket, 2.36-inch, Practice, M7 Series	No
DRO 01 43F	24	Rocket, 2.36-inch	Yes
OEI035	24	Rocket, 2.36-inch, Practice, M7 Series	Yes
DRO 01 43F	36	Rocket, 2.36-inch	No
OEI033	36	Rocket, 2.36-inch, Practice, M7 Series	No
OEI160	5	Projectile, 3-inch, Stokes Mortar	Yes
DRO 01 32K	12	Projectile, 3-inch, Stokes Mortar	Yes
OEI157	13	Projectile, 3-inch, Stokes Mortar	Yes
OEI161	15	Projectile, 3-inch, Stokes Mortar	Yes

Table 5-2
Laguna Seca Parking MRA - ODDS and DRO Study Seeded Items

Item ID [1]	Depth bgs (inches)	Item Description	Detected
DRO 01 33I	22	Projectile, 3-inch, Stokes Mortar	Yes
OEI164	27	Projectile, 3-inch, Stokes Mortar	Yes
OEI162	33	Projectile, 3-inch, Stokes Mortar	Yes
OEI163	34	Projectile, 3-inch, Stokes Mortar	Yes
OEI159	37	Projectile, 3-inch, Stokes Mortar	No
OEI068	40	Projectile, 3-inch, Stokes Mortar	No
OEI069	48	Projectile, 3-inch, Stokes Mortar	No
OEI072	48	Projectile, 3-inch, Stokes Mortar	No
OEI070	55	Projectile, 3-inch, Stokes Mortar	No
OEI158	56	Projectile, 3-inch, Stokes Mortar	No
OEI071	60	Projectile, 3-inch, Stokes Mortar	No
OEI073	60	Projectile, 3-inch, Stokes Mortar	No
OEI074	61	Projectile, 3-inch, Stokes Mortar	No
OEI147	3	Projectile, 37mm, AP-T, M-51	Yes
DRO 01 33I	6	Projectile, 37mm	Yes
DRO 01 46G	6	Projectile, 37mm	Yes
OEI149	10	Projectile, 37mm, AP-T, M-51	No
OEI148	13	Projectile, 37mm, AP-T, M-51	No
OE43 23I	18	Projectile, 37mm	No
DRO 01 38G	18	Projectile, 37mm	No
DRO 01 46G	18	Projectile, 37mm	Yes
OEI063	18	Projectile, 37mm, AP-T, M-51	No
OEI150	21	Projectile, 37mm, AP-T, M-51	No
OEI146	25	Projectile, 37mm, AP-T, M-51	No
OEI064	30	Projectile, 37mm, AP-T, M-51	No
OEI155	8	Projectile, 75mm, Shrapnel, MK I, Cases Only	Yes
OEI154	8	Projectile, 75mm, Shrapnel, MK I, Cases Only	Yes
OEI151	9	Projectile, 75mm, Shrapnel, MK I, Cases Only	Yes
OEI152	16	Projectile, 75mm, Shrapnel, MK I, Cases Only	Yes
OEI067	30	Projectile, 75mm, Shrapnel, MK I, Cases Only	No
OEI156	32	Projectile, 75mm, Shrapnel, MK I, Cases Only	No
OEI153	34	Projectile, 75mm, Shrapnel, MK I, Cases Only	No
OEI065	40	Projectile, 75mm, Shrapnel, MK I, Cases Only	No
OEI055	18	Projectile, 81mm, Mortar, M43	Yes
OEI052	24	Projectile, 81mm, Mortar, M43	No
OEI057	36	Projectile, 81mm, Mortar, M43	No
OEI058	48	Projectile, 81mm, Mortar, M43	No

Table 5-2
Laguna Seca Parking MRA - ODDS and DRO Study Seeded Items

Item ID [1]	Depth bgs (inches)	Item Description	Detected
OEI059	54	Projectile, 81mm, Mortar, M43	No
OEI022	6	Signals, Illumination, M125, M126, M127	Yes
OEI019	6	Signals, Illumination, M125, M126, M127	Yes
DRO 01 26U	6	Signals, Illumination, M125, M126, M127	No
OEI023	12	Signals, Illumination, M125, M126, M127	Yes
OEI020	12	Signals, Illumination, M125, M126, M127	Yes
OEI021	18	Signals, Illumination, M125, M126, M127	Yes
OEI024	18	Signals, Illumination, M125, M126, M127	No

Notes:

bgs = below ground surface
mm = millimeter
AP-T = armor piercing tracer
AT = antitank
Yes = item detected during geophysical survey using Schonstedt GA-52/Cx magnetometers.
No = item not detected during geophysical survey using Schonstedt GA-52/Cx magnetometers.

1. = Item identification numbers beginning with "OE" indicate seeded items from the Ordnance Detection and Discrimination Study (ODDS) completed by Parsons (Parsons 2002). Item identification numbers beginning with "DRO" indicate seeded items from the Del Rey Oaks removal action performed by USA, Inc. (USA 2001b).

Table 5-3
Laguna Seca Parking MRA Estimated Percent Detection

MEC Type	Maximum Penetration Depth bgs [1] (inches)	Pd for Depth Interval bgs [2] (inches)					
		0-6	7-12	13-24	25-36	37-48	>48
Hand Grenade	NP	100% (4)	43% (7)	--	--	--	--
Rifle Grenade	1.2	100% [3]	100% (2)	33% (3)	0% (1)	--	--
Illumination, 81mm, Mortar	NP	100% [3]	100% [3]	100% (1)	0% (2)	50% (2)	0% (1)
Rocket, 2.36-inch	4.8	100% (1)	100% (2)	60% (5)	0% (2)	--	--
Projectile, 3-inch, Stokes Mortar	39.6	100% (1)	100% (1)	100% (3)	100% (3)	0% (4)	0% (5)
Projectile, 37mm	46.8	100% (3)	0% (1)	17% (6)	0% (2)	--	--
Projectile, 75mm, Shrapnel, MK I, Cases Only	58.8	100% [3]	100% (3)	100% (1)	0% (3)	0% (1)	--
Projectile, 81mm, Mortar, M43	32.4	100% [4]	100% [4]	50% (2)	0% (1)	0% (1)	0% (1)
Signals, Illumination, M125, M126, M127	NP	67% (3)	100% (2)	50% (2)	--	--	--

Notes:

MEC = munitions and explosives of concern
Pd = percent detection
bgs = below ground surface
mm = millimeter
AP-T = armor piercing tracer
- - = not applicable or not evaluated
NP = non-penetrating (items expected on the surface only)

1. = maximum penetration depths are from the penetration study conducted as part of the Phase II Engineering Evaluation/Cost Analysis (USACE 1998).
2. = number of items seeded in the depth interval is included in parentheses.
3. = 100% Pd is assumed in depth intervals with no seed items when the next deeper depth interval has 100% Pd.
4. = 100% Pd is assumed in depth intervals with no seed items when the next deeper depth interval has 100% Pd at 18 inches.

Source data provided in Section 5.2.2.2, Table 5-2 of the Group 3 Remedial Investigation (Volume 1).

Table 6-1

Summary of MOUT Site MRA MEC and MD by Item Description

Item Description	MEC			MD	
	Risk Code	# of Records	# of Items	# of Records	# of Items
3.5" FRAG (OE Scrap)*				2	0
Ash, Pyrotechnic	999	1	1		
Cartridge case, 40mm (projectile removed/case intact)				5	13
Cartridge, ignition, M2 series	1	1	1		
CIVILIAN, TEAR GAS, GRENADE (Model Unknown)				1	1
Flare, parachute, trip, M48				2	2
Flare, surface, trip, M49 series	1	1	1		
FRAGMENT, UNKNOWN*				3	0
Fuze, grenade, hand, M10 series	1	1	40		
Fuze, grenade, hand, M204 series	1	6	7	2	21
Fuze, grenade, hand, practice, M205 series	2	2	3	2	2
Fuze, grenade, hand, practice, M228	1	1	1	10	15
Fuze, mine, combination, M10 series	1	1	16		
Fuze, rocket, dummy, M405				1	12
GRENADE FUZE, EXPENDED (OE Scrap)				1	1
Grenade, hand, fragmentation, M67	3	1	1		
Grenade, hand, practice, M30				1	1
Grenade, hand, practice, M69	1	1	1	2	4
Grenade, hand, practice, MK II	1	2	2	9	38
Grenade, hand, practice, M21	1	4	4		
Grenade, hand, practice, M62	1	1	1		
Grenade, hand, smoke, M18 series	1	5	8	8	11
Grenade, hand, smoke, M48	1	4	6		
Grenade, rifle, antitank, M9 series	3	1	1		
Projectile, 50mm, Mortar, Type89, Japanese NI				1	1
Projectile, 14.5mm, subcaliber, practice, M181 series	1	2	2		
Projectile, 22mm, subcaliber, practice, M744	1	2	2		
Projectile, 40mm, cluster, white star, M585				1	1

Table 6-1

Summary of MOUT Site MRA MEC and MD by Item Description

Item Description	MEC			MD	
	Risk Code	# of Records	# of Items	# of Records	# of Items
Projectile, 40mm, parachute, illumination, M583 series	1	1	1		
Projectile, 40mm, parachute, star, M662				1	3
Projectile, 81mm, mortar, illumination, M301 series				1	1
Rocket, 2.36inch, practice, M7				9	8
Rocket, 3.5inch, practice, M29 series	NS	1	1	44	109
ROCKET, 66mm, HEAT, M72 (LAUNCHER ONLY) (OE Scrap)				1	1
Signal, ground, rifle, parachute, M17 series				1	1
Signal, illumination, ground, M126 series				2	2
Signal, illumination, ground, M125 series	2	1	1	5	6
Signal, illumination, M187				1	8
Simulator, blast, stinger, civilian, M15	2	2	2		
Simulator, flash artillery, M110	1	1	1		
Simulator, explosive boobytrap, flash, M117	1	1	1		
Simulator, grenade, hand, M116A1	2	1	1		
Simulator, projectile, airburst, M74 series	1	1	1		
Simulator, projectile, ground burst, M115A2	2	1	1		

Notes:

Items have been described with the Final Model Descriptions provided in the Army's MMRP database. Items with a Final Model Description of "Null" are described with the Original OE Nomenclature provided in the MMRP database.

* MMRP database identified item as MEC or MD with a quantity of zero.

# of Records indicates the number of locations where MEC or MD were found.

Risk code 999 was assigned to items in the MMRP when the exact item could not be identified.

NS indicates that no risk code was specified in the Army's MMRP database.

Table 6-2
MOUT Site MRA - ODDS and DRO Study Seeded Items

Item ID [1]	Depth bgs (inches)	Item Description	Detected
OEI121	2	Grenade, Hand, MK-2, Practice	Yes
OEI015	6	Grenade, Hand, MK-2, Practice	Yes
OEI017	6	Grenade, Hand, MK-2, Practice	Yes
DRO 01 26O	6	Grenade, Hand, M68	Yes
OEI120	7	Grenade, Hand, MK-2, Practice	Yes
DRO 01 26O	9	Grenade, Hand, M68	Yes
OEI118	10	Grenade, Hand, MK-2, Practice	No
OEI119	11	Grenade, Hand, MK-2, Practice	No
DRO 01 26U	12	Grenade, Hand, MKII	Yes
OEI016	12	Grenade, Hand, MK-2, Practice	No
OEI018	12	Grenade, Hand, MK-2, Practice	No
OEI107	12	Grenade, Rifle, AT, Practice, M9	Yes
OEI028	12	Grenade, Rifle, AT, Practice, M9	Yes
OEI108	15	Grenade, Rifle, AT, Practice, M9	Yes
OEI109	24	Grenade, Rifle, AT, Practice, M9	No
OEI029	24	Grenade, Rifle, AT, Practice, M9	No
OEI030	36	Grenade, Rifle, AT, Practice, M9	No
OEI091	3	Projectile, 22mm, Sub-caliber, Practice, M744	Yes
OEI094	5	Projectile, 22mm, Sub-caliber, Practice, M744	Yes
OEI097	9	Projectile, 22mm, Sub-caliber, Practice, M744	No
OEI098	9	Projectile, 22mm, Sub-caliber, Practice, M744	Yes
OEI089	10	Projectile, 22mm, Sub-caliber, Practice, M744	No
OEI090	11	Projectile, 22mm, Sub-caliber, Practice, M744	No
OEI092	14	Projectile, 22mm, Sub-caliber, Practice, M744	No
OEI096	16	Projectile, 22mm, Sub-caliber, Practice, M744	No
OEI037	18	Projectile, 22mm, Sub-caliber, Practice, M744	Yes
OEI040	18	Projectile, 22mm, Sub-caliber, Practice, M744	No
OEI099	19	Projectile, 22mm, Sub-caliber, Practice, M744	No
OEI038	24	Projectile, 22mm, Sub-caliber, Practice, M744	No
OEI039	36	Projectile, 22mm, Sub-caliber, Practice, M744	No
OEI042	36	Projectile, 22mm, Sub-caliber, Practice, M744	No
OEI117	11	Rocket, 3.5-inch, Practice, M29A2	Yes
OEI034	12	Rocket, 3.5-inch, Practice, M29A2	Yes
OEI115	14	Rocket, 3.5-inch, Practice, M29A2	Yes
OEI116	16	Rocket, 3.5-inch, Practice, M29A2	Yes
OEI114	24	Rocket, 3.5-inch, Practice, M29A2	No
OEI032	24	Rocket, 3.5-inch, Practice, M29A2	No
OEI036	36	Rocket, 3.5-inch, Practice, M29A2	No

Table 6-2
MOUT Site MRA - ODDS and DRO Study Seeded Items

Item ID [1]	Depth bgs (inches)	Item Description	Detected
OEI022	6	Signals, Illumination, M125, M126, M127	Yes
OEI019	6	Signals, Illumination, M125, M126, M127	Yes
DRO 01 26U	6	Signals, Illumination, M125, M126, M127	No
OEI023	12	Signals, Illumination, M125, M126, M127	Yes
OEI020	12	Signals, Illumination, M125, M126, M127	Yes
OEI021	18	Signals, Illumination, M125, M126, M127	Yes
OEI024	18	Signals, Illumination, M125, M126, M127	No

Notes:

bgs = below ground surface
mm = millimeter
AT = antitank
Yes = item detected during geophysical survey using Schonstedt GA-52/Cx magnetometers.
No = item not detected during geophysical survey using Schonstedt GA-52/Cx magnetometers.

1 = Item identification numbers beginning with "OE" indicate seeded items from the Ordnance Detection and Discrimination Study (ODDS) completed by Parsons (Parsons 2002). Item identification numbers beginning with "DRO" indicate seeded items from the Del Rey Oaks removal action performed by USA, Inc. (USA 2001b).

Table 6-3
MOUT Site MRA Estimated Percent Detection

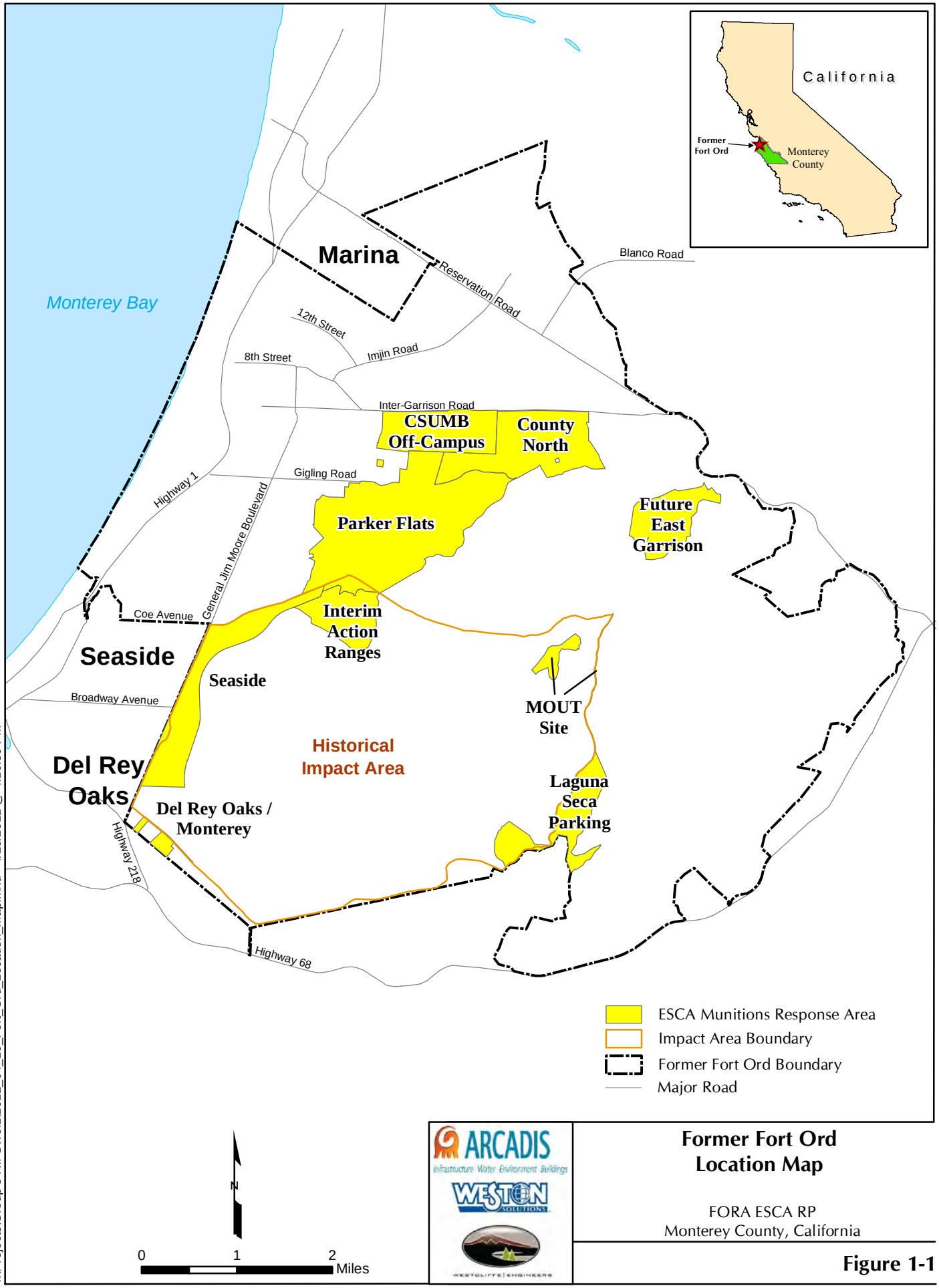
MEC Type	Maximum Penetrating Depth bgs [1] (inches)	Pd for Depth Interval bgs [2] (inches)					
		0-6	7-12	13-24	25-36	37-48	>48
Hand Grenade	NP	100% (4)	43% (7)	--	--	--	--
Rifle Grenade	1.2	100% [3]	100% (2)	33% (3)	0% (1)	--	--
Projectile, 22mm, Sub-caliber, Practice, M744	22.8	100% (2)	25% (4)	17% (6)	0% (2)	--	--
Rocket, 3.5-inch, Practice, M29A2	9.6	100% [3]	100% (2)	50% (4)	0% (1)	--	--
Signals, Illumination, M125, M126, M127	NP	67% (3)	100% (2)	50% (2)	--	--	--

Notes:

MEC = munitions and explosives of concern
Pd = percent detection
bgs = below ground surface
mm = millimeter
- - = not applicable or not evaluated
NP = non-penetrating (items expected on the surface only)

1. = maximum penetration depths are from the penetration study conducted as part of the Phase II Engineering Evaluation/Cost Analysis (USACE 1998).
2. = number of items seeded in the depth interval is included in parentheses.
3. = 100% Pd is assumed in depth intervals with no seed items when the next deeper depth interval has 100% Pd.

Source data provided in Section 6.2.2.2, Table 6-2 of the Group 3 Remedial Investigation (Volume 1).



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Former Fort Ord Location Map

FORA ESCA RP
Monterey County, California

Figure 1-1

CSUMB Off-Campus MRA

County North MRA

Parker Flats MRA

Future East Garrison MRA

Interim Action Ranges MRA

Seaside MRA

MOUT Site MRA

Laguna Seca Parking MRA

Del Rey Oaks/ Monterey MRA

Legend

Former Fort Ord Boundary

Group 1 MRAs

Seaside MRA
Parker Flats MRA

Group 2 MRAs

CSUMB Off-Campus MRA
County North MRA

Group 3 MRAs

MOUT Site MRA
Del Rey Oaks/Monterey MRA
Laguna Seca Parking MRA

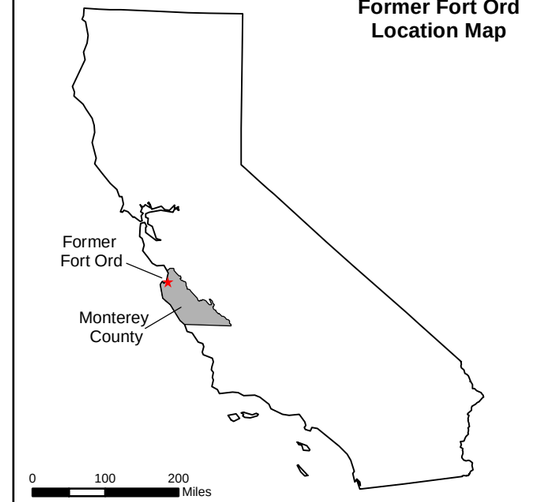
Interim Action Ranges MRA

Group 4 MRA

Future East Garrison MRA

NOTE:
Only the MOUT Site, Laguna Seca Parking, and Del Rey Oaks/ Monterey MRAs are included in this Group 3 RI/FS report.

Former Fort Ord Location Map



N

0 3,000 6,000 Feet

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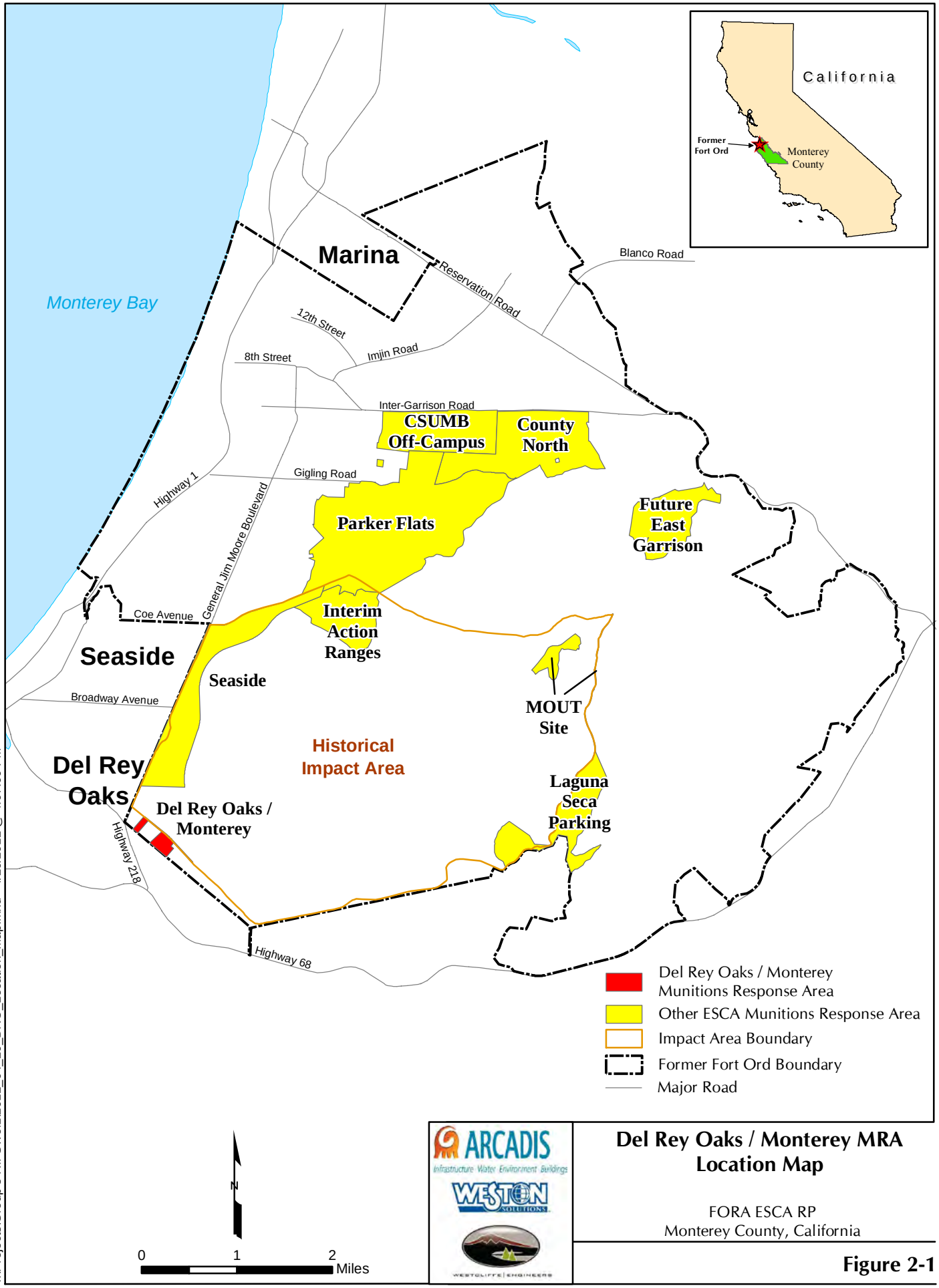
ESCA Munitions Response Area Groups

FORA ESCA RP
Monterey County, California

Figure 1-2

T:\Projects\Group 3 RIFS\Vol1\2012_05_18_MRA_Groups.mxd 5/18/2012 @ 3:26:02 PM



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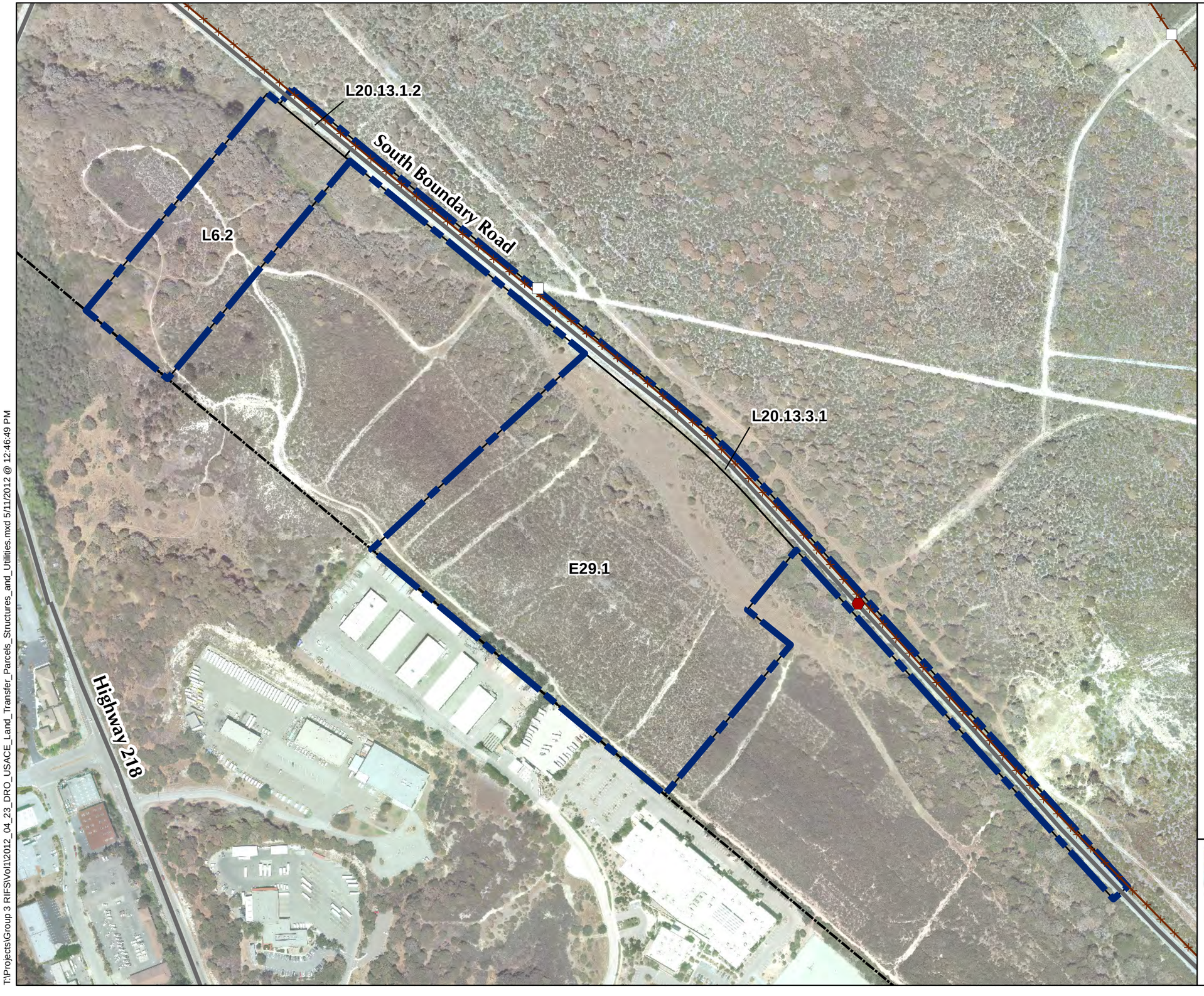
Del Rey Oaks / Monterey MRA Location Map

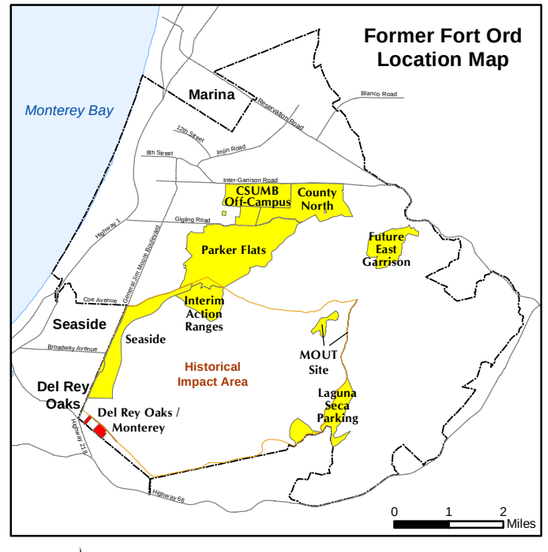
FORA ESCA RP
Monterey County, California

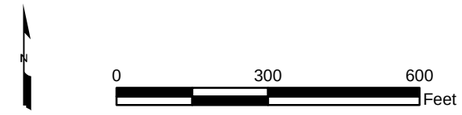
Figure 2-1



Legend

- E29.1 — USACE Parcel
- Gate
- Entry Forbidden Sign
- Fence
- Munitions Response Area
- Major Road
- Former Fort Ord Boundary





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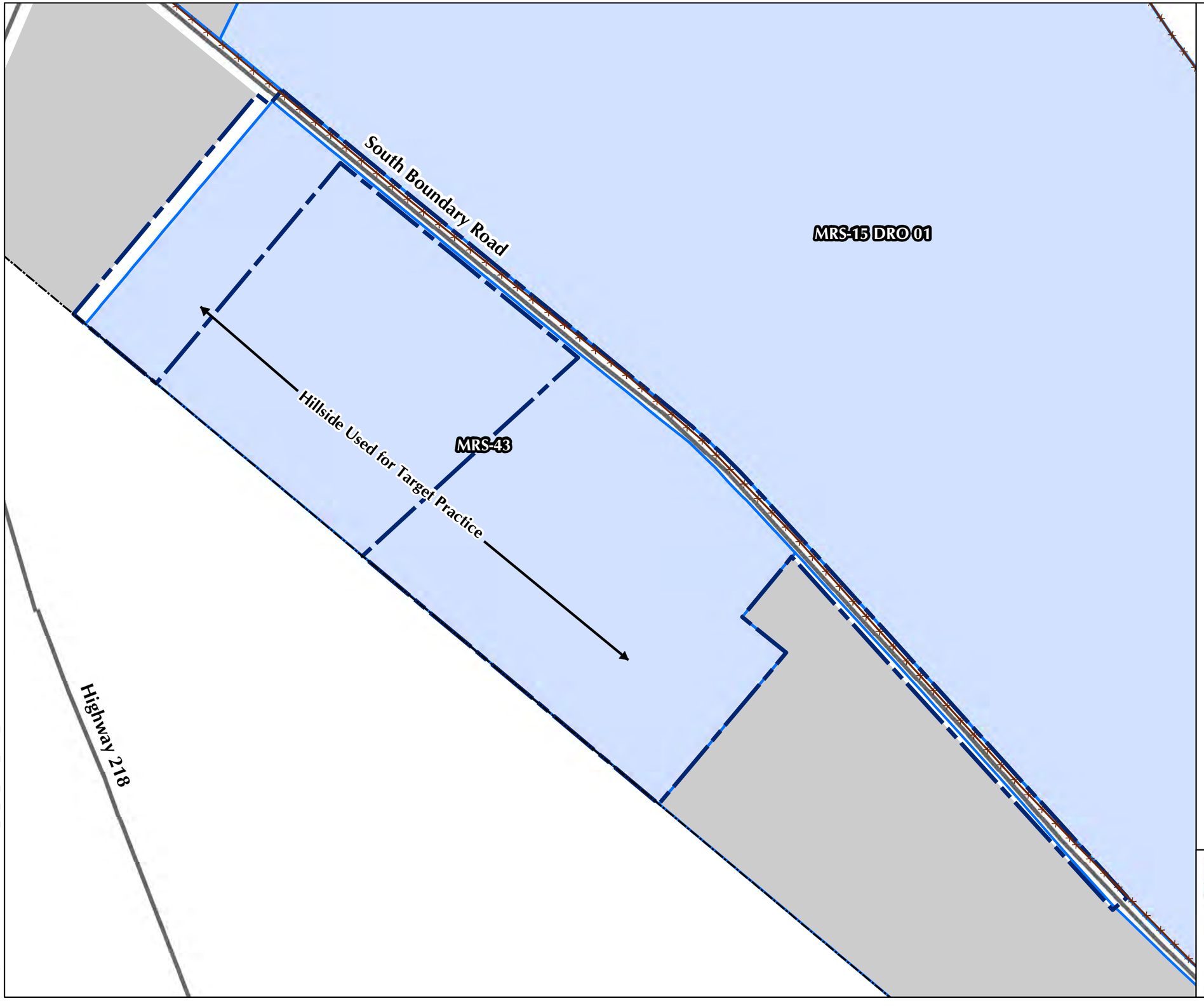
Del Rey Oaks / Monterey MRA
USACE Land Transfer Parcels, Structure, and Utilities

FORA ESCA RP
Monterey County, California

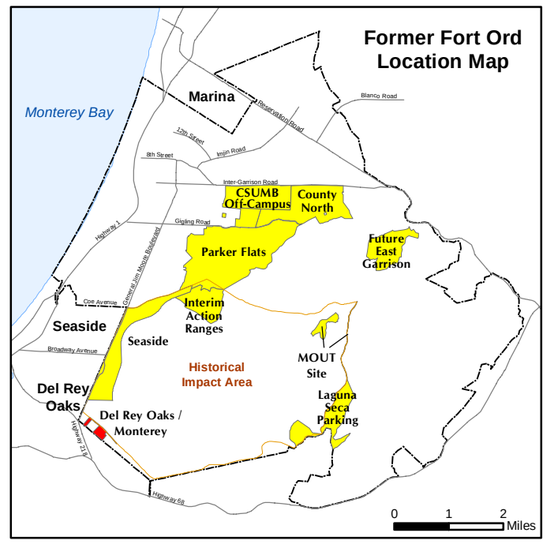
Figure 2-2

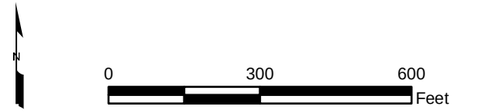
T:\Projects\Group 3 RIFS\Vol1\2012_04_23_DRO_USACE_Land_Transfer_Parcels_Structures_and_Utilities.mxd 5/11/2012 @ 12:46:49 PM



Legend

- MRS-43 — Munitions Response Site
- Track 1 Site
- Munitions Response Area
- Major Road
- Fence
- Former Fort Ord Boundary





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Del Rey Oaks / Monterey MRA Munitions Response Site Boundaries

FORA ESCA RP
Monterey County, California

Figure 2-3

T:\Projects\Group 3 RIFS\Vol1\2012_04_23_DRO_MRS_Boundaries.mxd - 4/23/2012 @ 2:13:57 PM

L20.13.1.2

South Boundary Road

L6.2

L20.13.3.1

E29.1

Highway 218

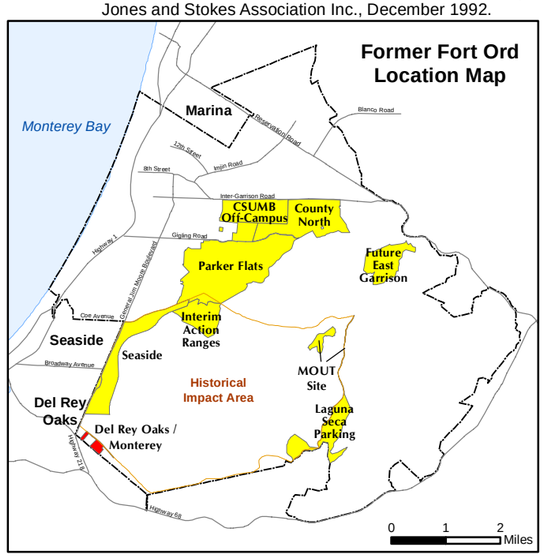
Legend

- Munitions Response Area
- Major Road
- Former Fort Ord Boundary
- E29.1 USACE Parcel

Vegetation Type

- Maritime Chaparral*
- Aquatic Feature*

*Source: Flora and Fauna Baseline Study of Fort Ord, California, Jones and Stokes Association Inc., December 1992.



N

0 300 600 Feet

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Del Rey Oaks / Monterey MRA Generalized Vegetation Communities

FORA ESCA RP
Monterey County, California

Figure 2-4

T:\Projects\Group 3 RIFS\Vol1\2012_04_23_DRO_Generalized_Veg_Communities.mxd 5/7/2012 @ 4:38:54 PM

South Boundary Road

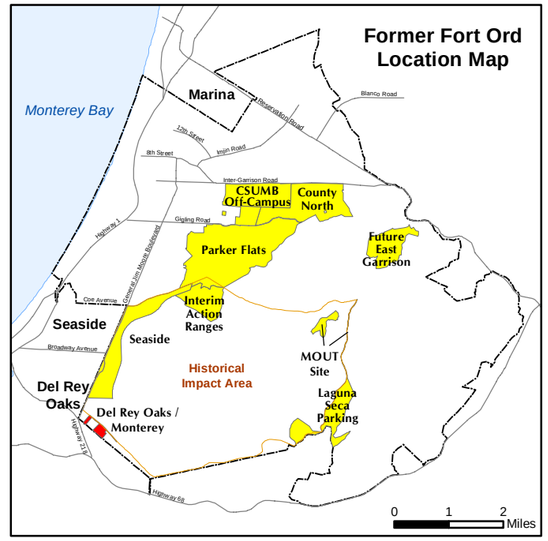
Highway 218

Legend

- 540 — Topography - 5 Ft
- Munitions Response Area
- Major Road
- Former Fort Ord Boundary

Soil Type

- Arnold-Santa Ynez Complex
- Baywood Sand, 2 to 15 Percent Slopes
- Arnold Loamy Sand, 15 to 50 Percent Slopes
- Santa Ynez Fine Sandy Loam, 15 to 30 Percent Slopes
- Rindge Muck



N

0 300 600 Feet

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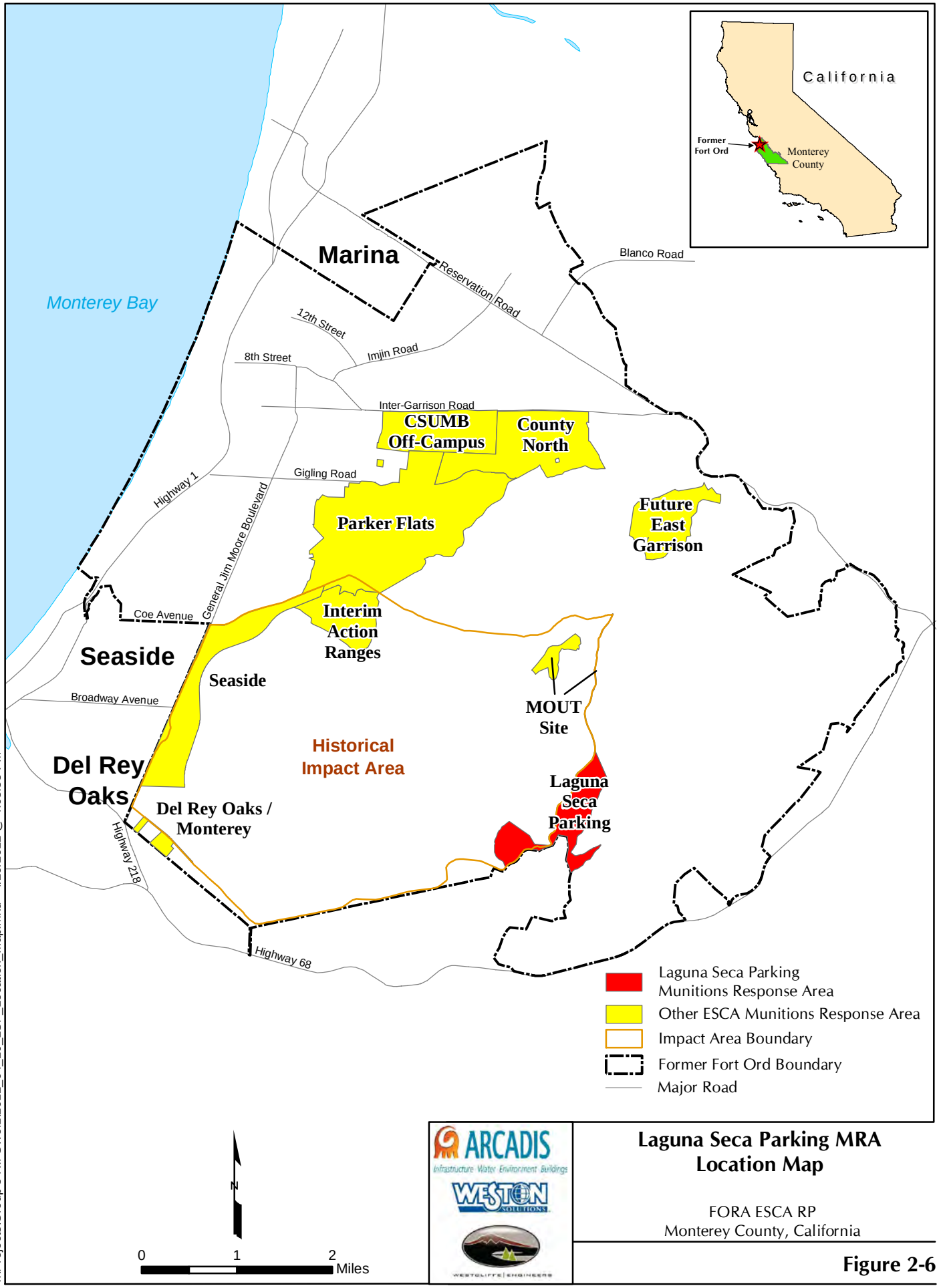
Del Rey Oaks / Monterey MRA Topography and Soil Type

FORA ESCA RP
Monterey County, California

Figure 2-5

T:\Projects\Group 3 RIFS\Vol1\2012_04_23_DRO_Topography_and_Soil_Type.mxd 5/7/2012 @ 4:39:38 PM



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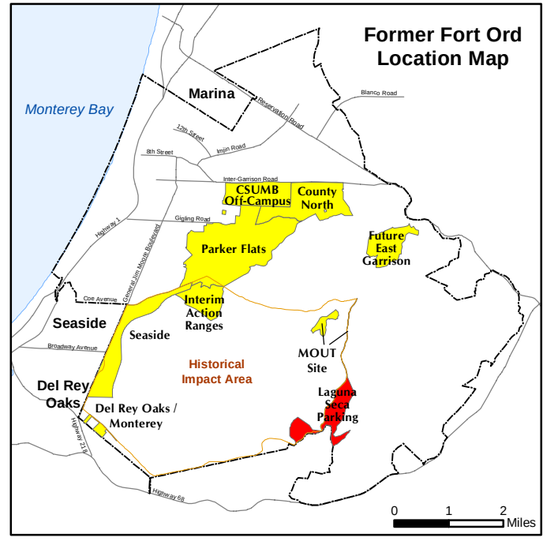
Laguna Seca Parking MRA Location Map

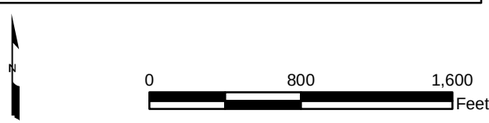
FORA ESCA RP
Monterey County, California

Figure 2-6

Legend

- E23.1 — USACE Parcel
- Gate
- Sign
- R9211 — Structure
- Electrical Line
- Fence
- Munitions Response Area
- Major Road
- Former Fort Ord Boundary





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Laguna Seca Parking MRA USACE Land Transfer Parcels, Structures, and Utilities

FORA ESCA RP
Monterey County, California

Figure 2-7

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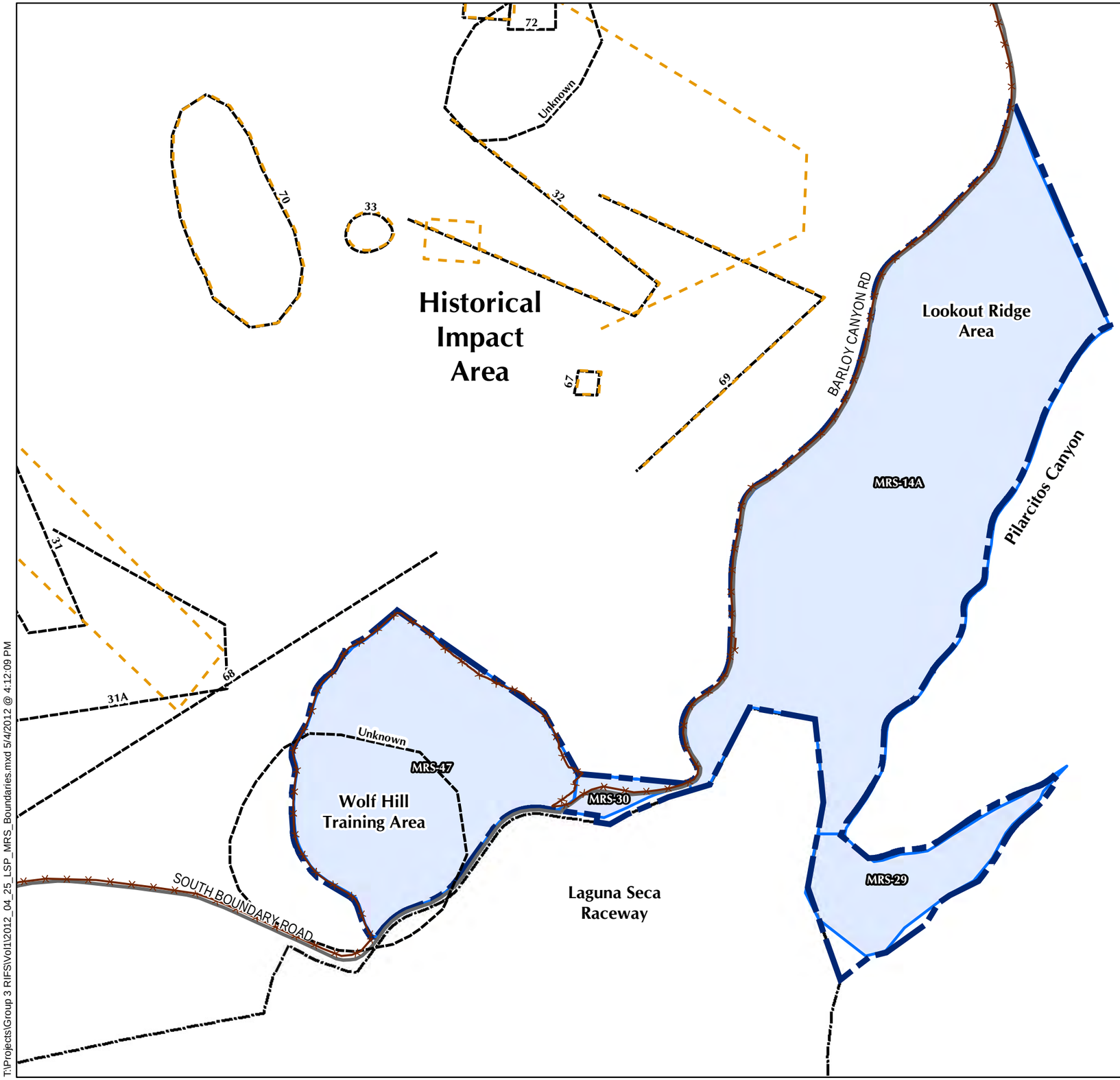
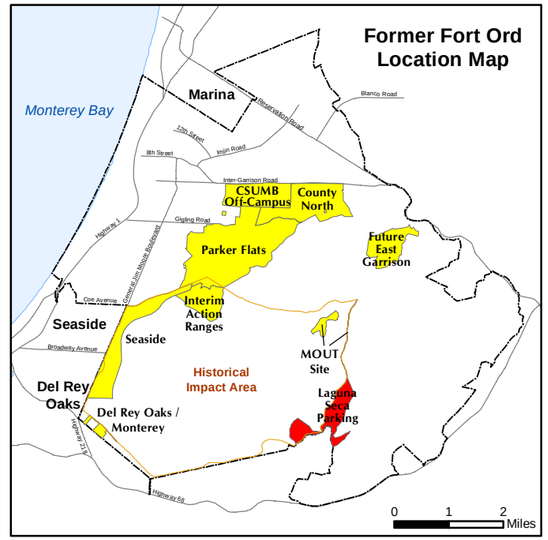
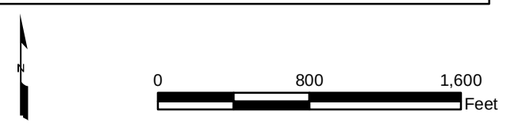


Legend

- MRS-14A — Munitions Response Site
- 67 — Firing Range
- Historical Range
- Fence
- Munitions Response Area
- Major Road
- Former Fort Ord Boundary





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Laguna Seca Parking MRA
Munitions Response Site Boundaries

FORA ESCA RP
Monterey County, California

Figure 2-8

T:\Projects\Group 3 RIFS\Vol1\2012_04_25_LSP_MRS_Boundaries.mxd 5/4/2012 @ 4:12:09 PM

BARLOY CANYON RD

Pilarcitos Canyon

L20.5.1

L20.3.1

L20.5.2

L20.5.4

L20.3.2

L20.5.3

SOUTH BOUNDARY ROAD

Laguna Seca Raceway

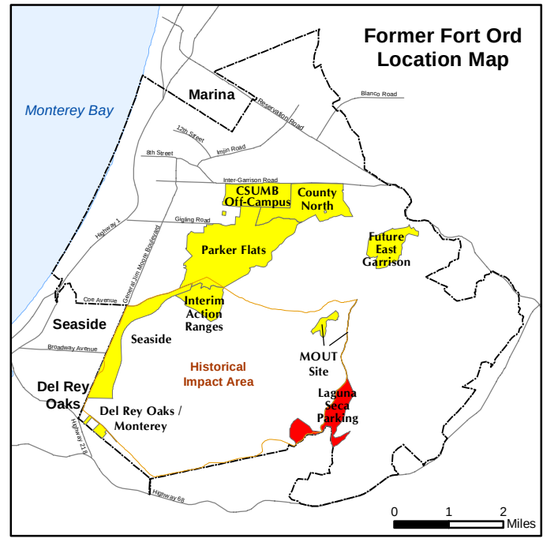
Legend

- Munitions Response Area
- Major Road
- Former Fort Ord Boundary
- L20.5.1 USACE Parcel

Vegetation Type

- Grassland*
- Maritime Chaparral*
- Inland Coast Live Oak Woodland*
- Coast Live Oak Savanna*
- Coastal Scrub*
- Ice Plant Mats*
- Valley Needlegrass Grassland (10-30%)*
- Aquatic Feature*
- Developed / Disturbed*

*Source: Flora and Fauna Baseline Study of Fort Ord, California, Jones and Stokes Association Inc., December 1992.



N

0 800 1,600 Feet

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Laguna Seca Parking MRA Generalized Vegetation Communities

FORA ESCA RP
Monterey County, California

Figure 2-9

T:\Projects\Group 3 RIFS\Vol1\2012_04_25_LSP_Generalized_Veg_Communities.mxd 5/4/2012 @ 4:14:33 PM

BARLOY CANYON RD

Pilarcitos Canyon

SOUTH BOUNDARY ROAD

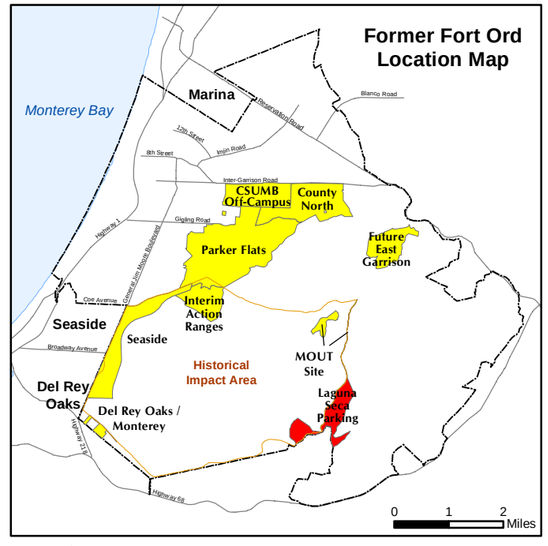
Laguna Seca Raceway

Legend

- Environmental Well
- 540 Topography - 5 Ft
- Munitions Response Area
- Major Road
- Former Fort Ord Boundary

Soil Type

- Santa Ynez Fine Sandy Loam, 15 to 30 Percent Slopes
- Arnold-Santa Ynez Complex
- Xerorthents, Dissected
- Arnold-San Andreas Complex
- Baywood Sand, 2 to 15 Percent Slopes
- Rock Outcrop, Xerorthent Association
- Saturated Soil



N

0 800 1,600 Feet

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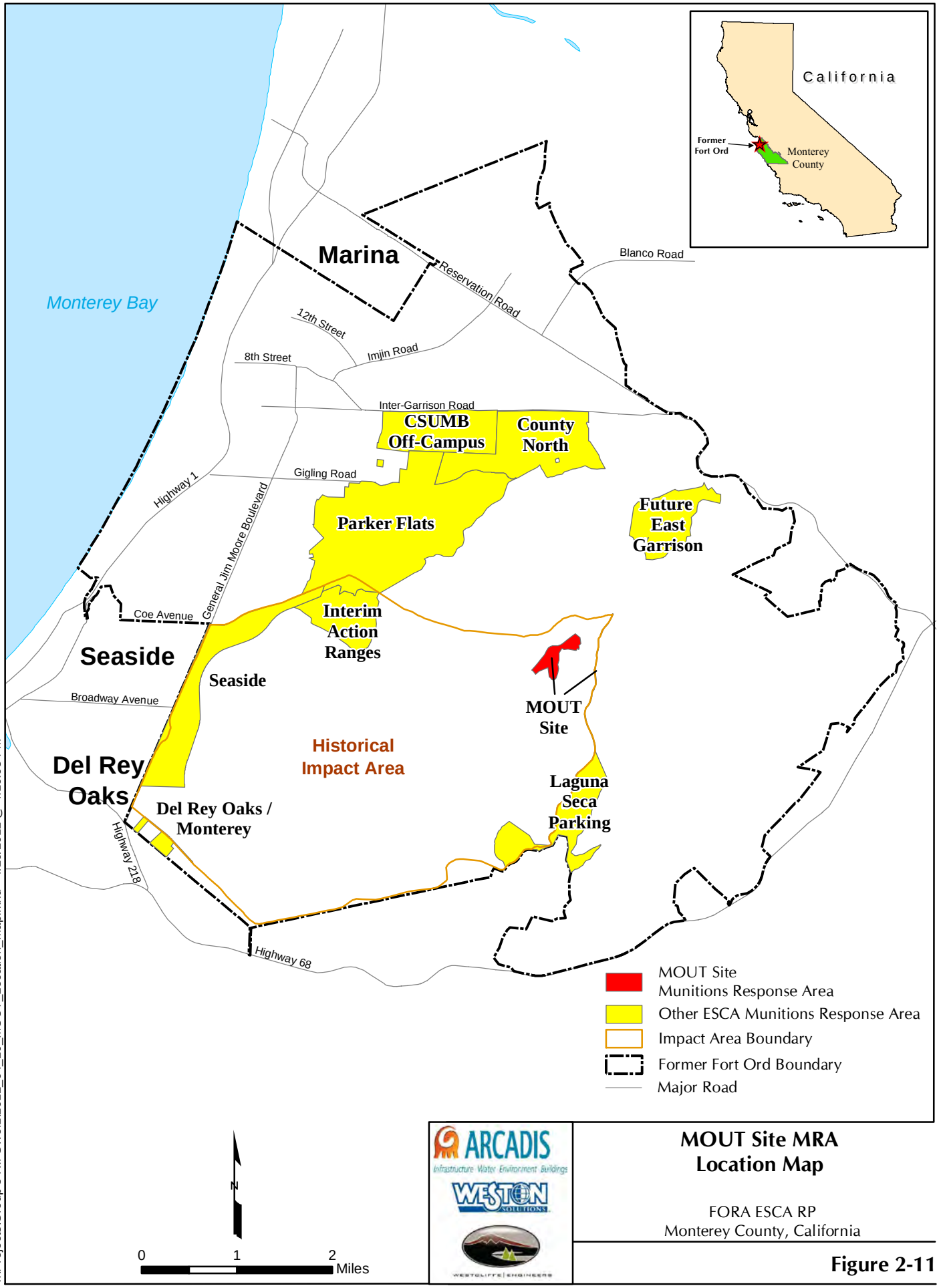
Laguna Seca Parking MRA
Topography and Soil Type

FORA ESCA RP
Monterey County, California

Figure 2-10

T:\Projects\Group 3 RIFS\Vol1\2012_04_25_LSP_Topography_and_Soil_Type.mxd 5/4/2012 @ 4:17:58 PM



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MOUT Site MRA Location Map

FORA ESCA RP
Monterey County, California

Figure 2-11

T:\Projects\Group 3 RIFS\Vol1\2012_04_25_MOUT_USACE_Land_Transfer_Parcels_Structures_and_Utilities.mxd 5/11/2012 @ 12:47:10 PM

EUCALYPTUS RD

BARLOY CANYON RD

L20.8

F1.7.2

R9350

R9411

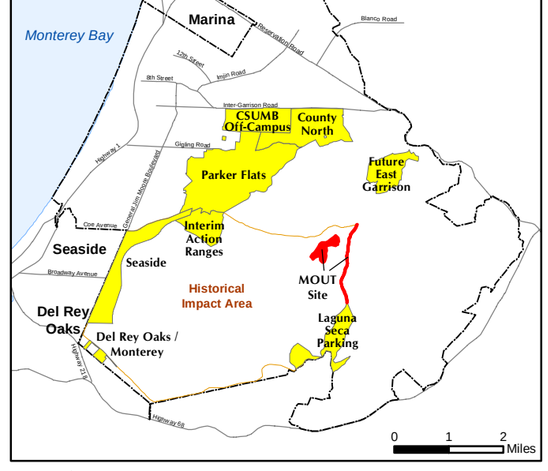
R9521

0 250 500 1,000 Feet

Legend

- L20.8 — USACE Parcel
- Gate
- Sign
- R9211 — Structure
- Electrical Line
- Telephone Line
- Water Line
- Fence
- Munitions Response Area
- Major Road
- Former Fort Ord Boundary

Former Fort Ord Location Map



N

0 800 1,600 Feet

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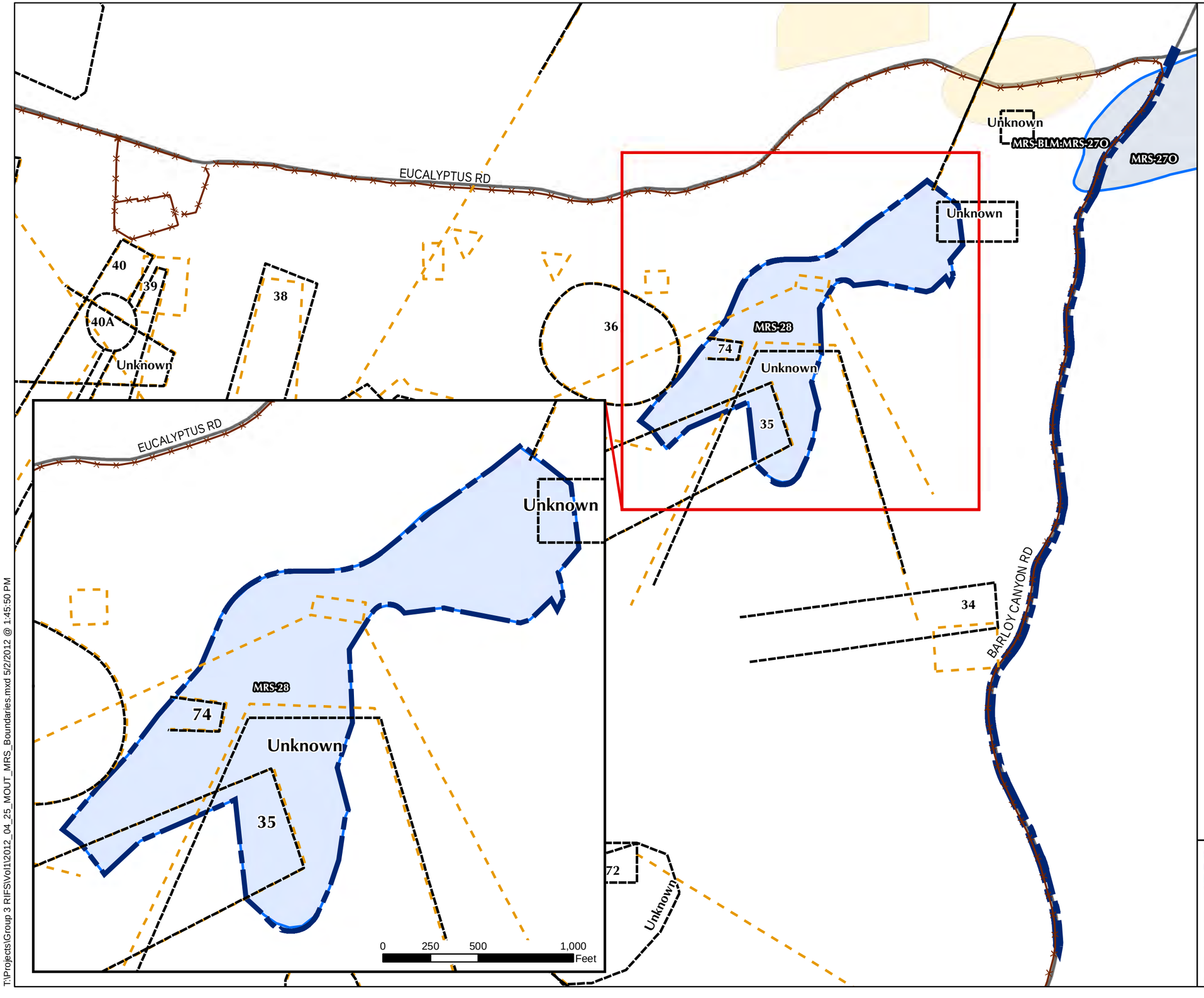
MOUT Site MRA
USACE Land Transfer Parcels, Structures, and Utilities

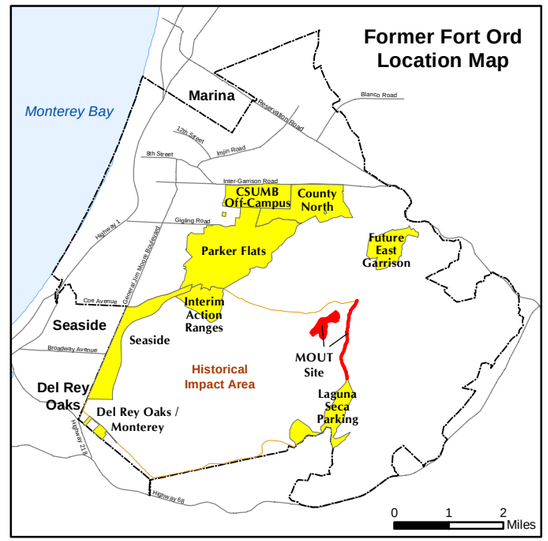
FORA ESCA RP
Monterey County, California

Figure 2-12



Legend

- MRS-28 — Munitions Response Site
- 36 — Firing Range
- Historical Range
- Fence
- Munitions Response Area
- Major Road
- Training Sites



N

0 800 1,600
Feet

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MOUT Site MRA
Munitions Response Site Boundaries

FORA ESCA RP
Monterey County, California

Figure 2-13

T:\Projects\Group 3 RIFS\Vol1\2012_04_25_MOUT_MRS_Boundaries.mxd 5/2/2012 @ 1:45:50 PM

EUCALYPTUS RD

F1.7.2

L20.8

BARLOY CANYON RD

0 800 1,600 Feet

0 250 500 1,000 Feet

Legend

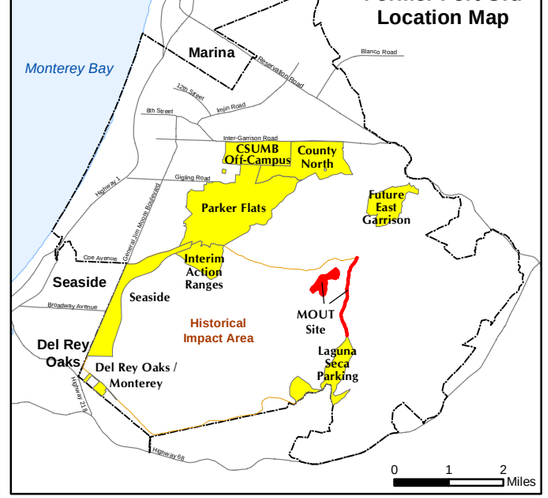
- Munitions Response Area
- Major Road
- F1.7.2 — USACE Parcel

Vegetation Type

- Grassland*
- Maritime Chaparral*
- Inland Coast Live Oak Woodland*
- Coast Live Oak Savanna*
- Ice Plant Mats*
- Aquatic Feature*
- Developed / Disturbed*

*Source: Flora and Fauna Baseline Study of Fort Ord, California, Jones and Stokes Association Inc., December 1992.

Former Fort Ord Location Map



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MOUT Site MRA
Generalized Vegetation Communities

FORA ESCA RP
Monterey County, California

Figure 2-14

T:\Projects\Group 3 RIFS\Vol1\2012_05_03_MOUT_Generalized_Veg_Communities.mxd 5/4/2012 @ 12:31:32 PM

EUCALYPTUS RD

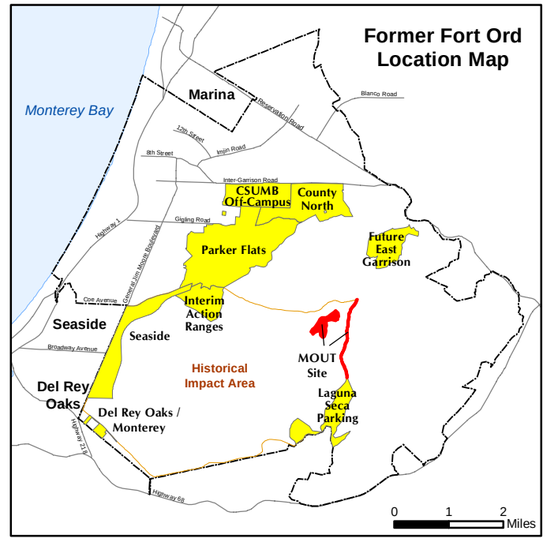
BARLOY CANYON RD

Legend

- Abandoned Well
- 540 Topography - 5 Ft
- Munitions Response Area
- Major Road

Soil Type

- Arnold-Santa Ynez Complex
- Xerorthents, Dissected
- Arnold Loamy Sand, 15 to 50 Percent Slopes
- Arnold Loamy Sand, 9 to 15 Percent Slopes
- Baywood Sand, 2 to 15 Percent Slopes
- Santa Ynez Fine Sandy Loam, 15 to 30 Percent Slopes
- Aquic Xerofluvents
- Saturated Soil



N

0 800 1,600 Feet

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MOUT Site MRA
Topography and Soil Type

FORA ESCA RP
Monterey County, California

Figure 2-15

T:\Projects\Group 3 RIFS\Vol1\2012_05_03_MOUT_Topography_and_Soil_Type.mxd 5/4/2012 @ 12:27:43 PM

South Boundary Road

MRS-15 DRO 01

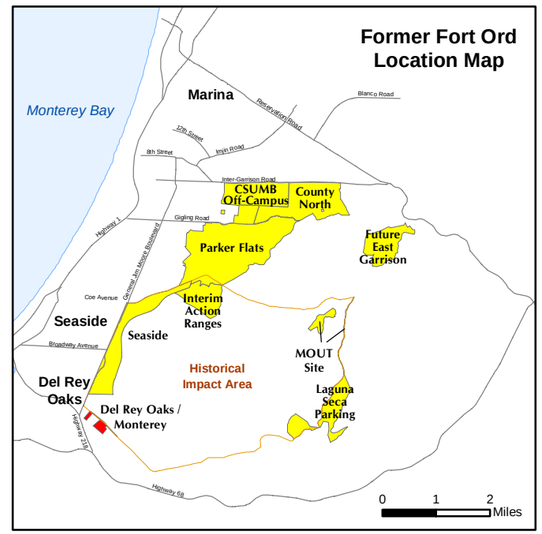
MRS-43

MRS-43A

Highway 218

Legend

- SS/GS Sampling Grid (1998)
- Grid Sampling (1999-2000)
- Munitions Response Area
- Major Road
- MRS-43 — Munitions Response Site



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0 300 600 Feet

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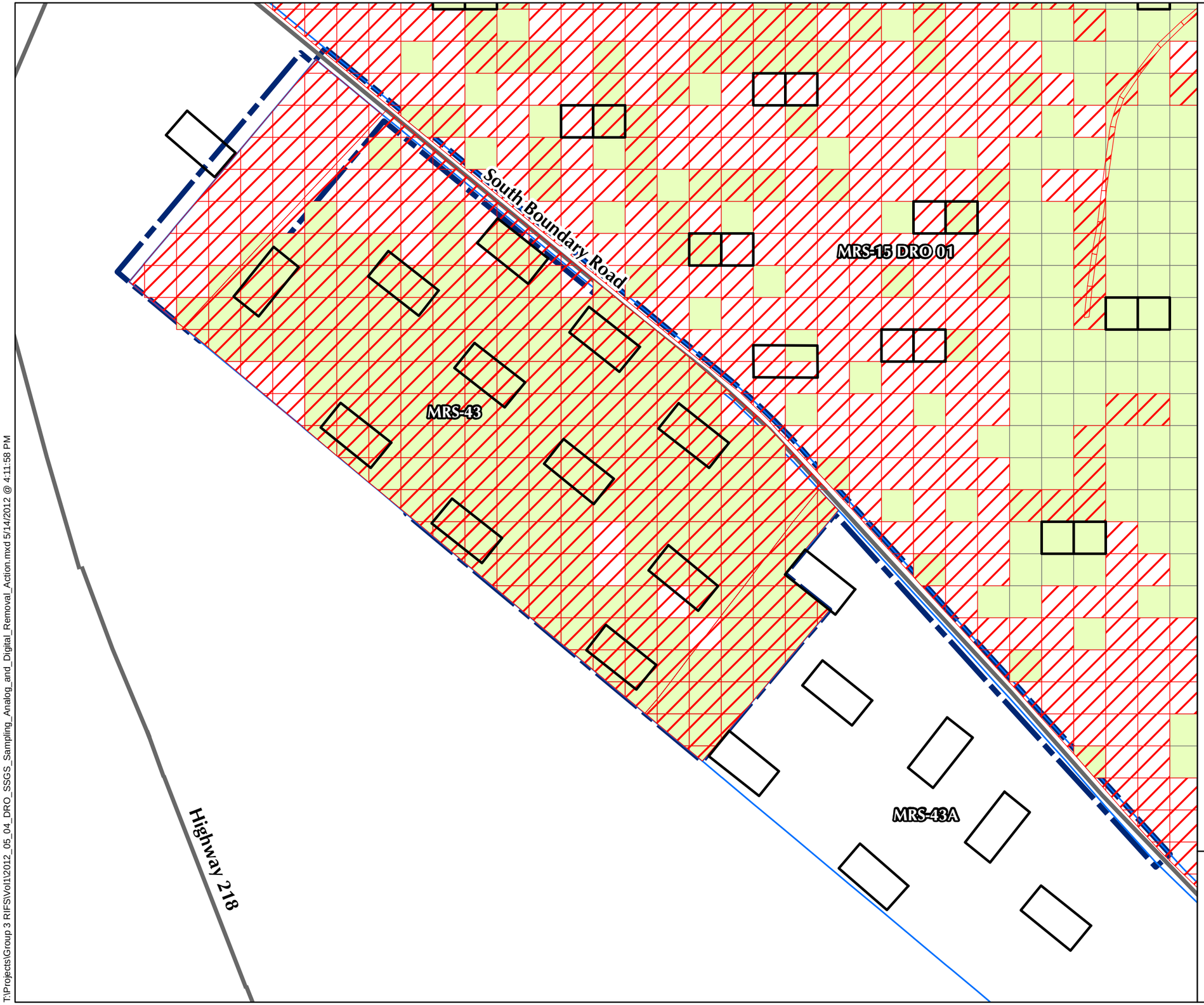
Del Rey Oaks / Monterey MRA 1998 SS/GS Sampling and 1999-2000 Grid Sampling Investigations

FORA ESCA RP
Monterey County, California

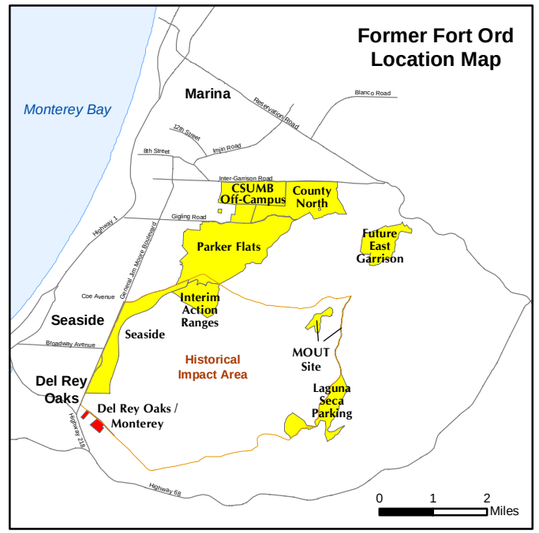
Figure 4-1

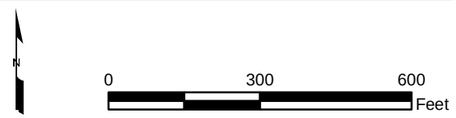
T:\Projects\Group 3 RIFS\Vol1\2012_05_04_DRO_SSGS_and_Grid_Sampling.mxd 5/11/2012 @ 3:43:43 PM



Legend

- Analog Removal Action (2000)
- SS/GS Sampling Grid (1998)
- Digital Removal Action (2000)
- Munitions Response Area
- Major Road
- MRS-43 — Munitions Response Site





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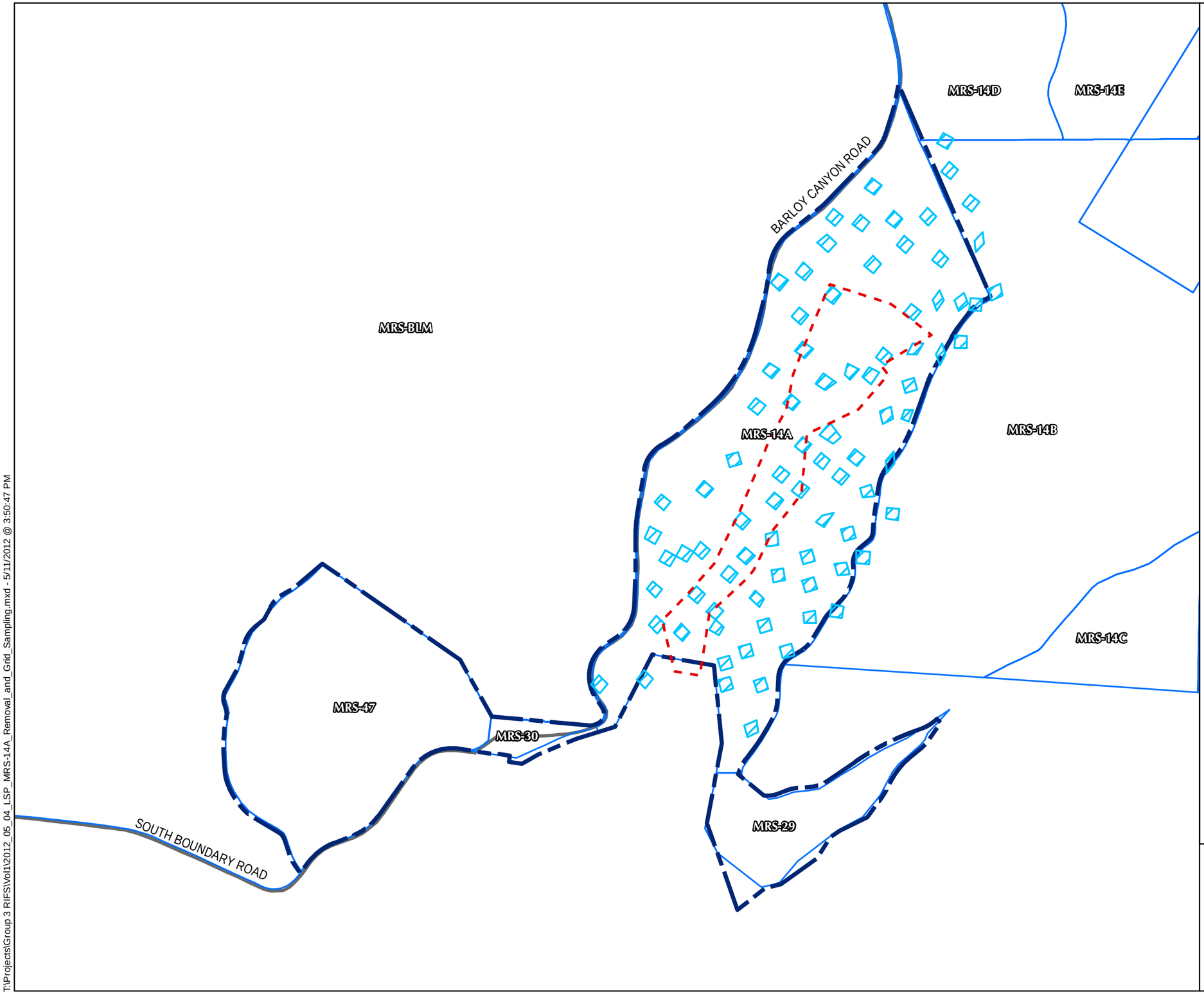
Del Rey Oaks / Monterey MRA 2000 Analog Removal Action, 1998 SS/GS Sampling, and 2000 Digital Removal Action

FORA ESCA RP
Monterey County, California

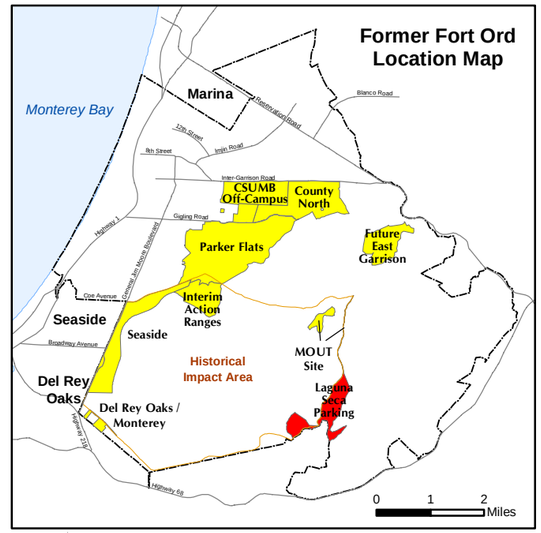
Figure 4-2

T:\Projects\Group 3 RIFS\Vol1\2012_05_04_DRO_SSGS_Sampling_Analog_and_Digital_Removal_Action.mxd 5/14/2012 @ 4:11:58 PM



Legend

- Removal Action (1994)
- MRS-14A Grid Sampling (1994-1995)
- Munitions Response Area
- Major Road
- MRS-47 — Munitions Response Site



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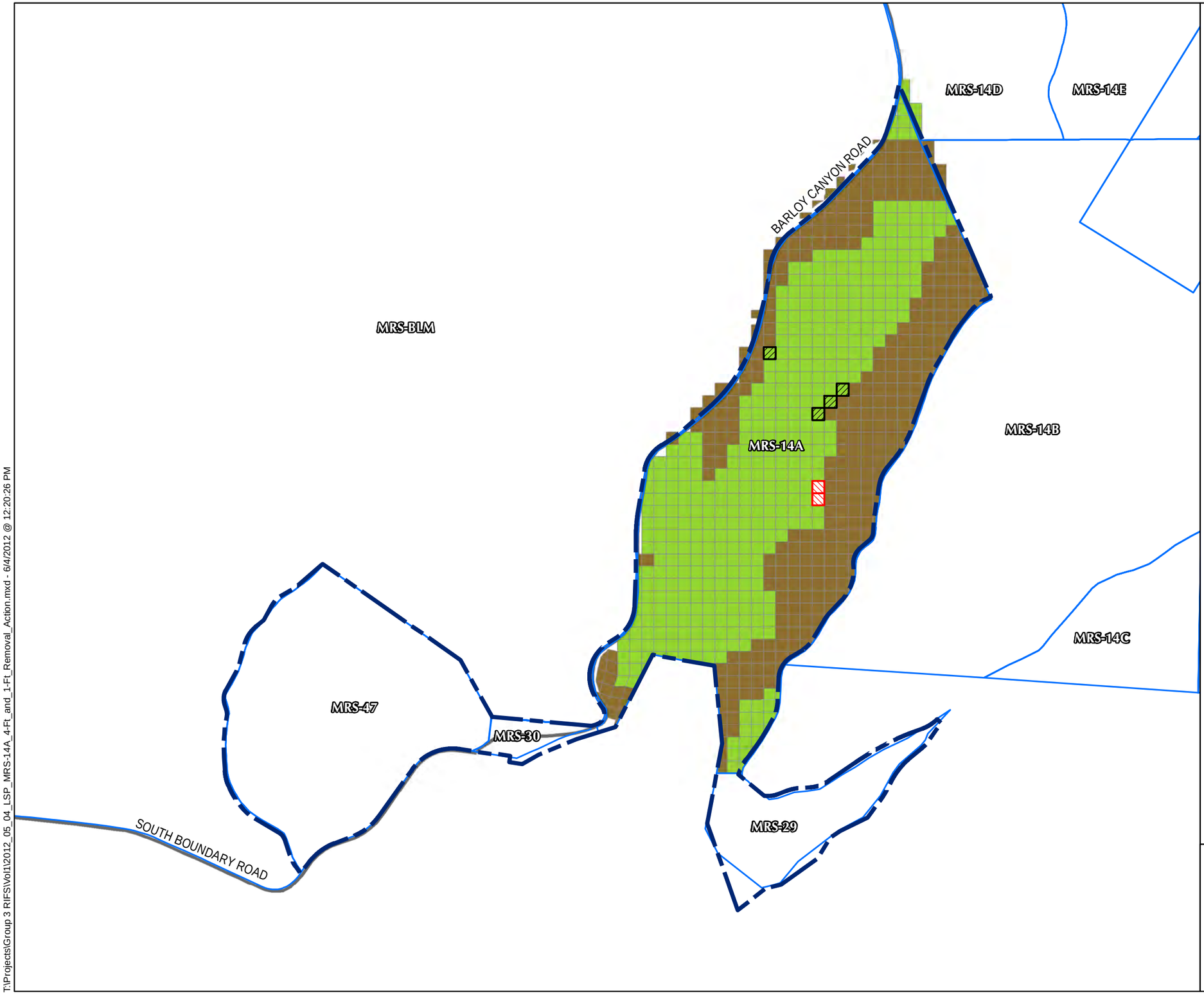
Laguna Seca Parking MRA
MRS-14A
1994 Removal Action and 1994-1995 Grid Sampling

FORA ESCA RP
Monterey County, California

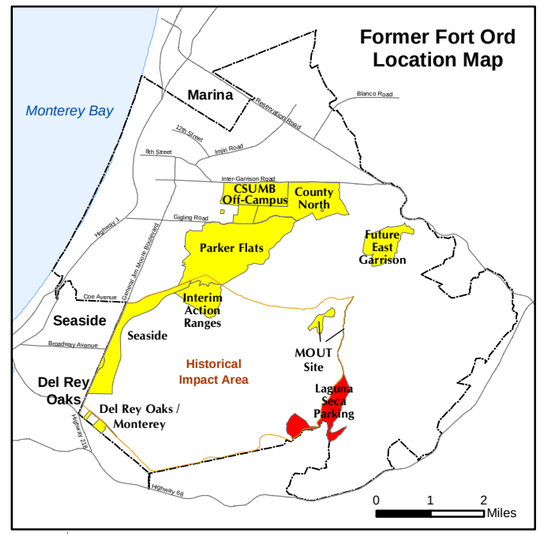
Figure 5-1

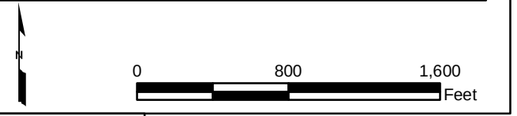
T:\Projects\Group 3 RIFS\Vol1\2012_05_04_LSP_MRS-14A_Removal_and_Grid_Sampling.mxd - 5/11/2012 @ 3:50:47 PM



Legend

- Portion of MRA Where Removal Action Was Partially Completed
- Portion of MRA Where Removal Action Was Not Conducted
- MRS-14A 4-Ft Removal Action (1996-1998)
- MRS-14A 1-Ft Removal Action (1997-1998)
- Munitions Response Area
- Major Road
- MRS-47 — Munitions Response Site





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Laguna Seca Parking MRA
MRS-14A
1996-1998 4-Ft and 1997-1998 1-Ft Removal Action

FORA ESCA RP
Monterey County, California

Figure 5-2

T:\Projects\Group 3 RIFS\Vol1\2012_05_04_LSP_MRS-14A_4-Ft_and_1-Ft_Removal_Action.mxd - 6/4/2012 @ 12:20:26 PM

MRS-14D

MRS-14E

BARLOY CANYON ROAD

MRS-BLM

MRS-14A

MRS-14B

MRS-14C

MRS-47

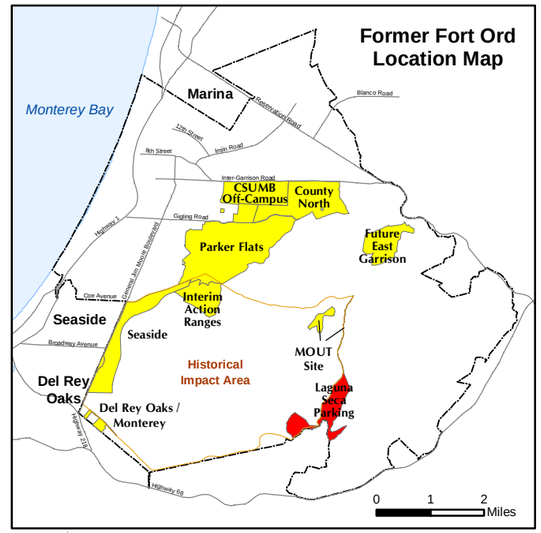
MRS-30

MRS-29

SOUTH BOUNDARY ROAD

Legend

- MRS-29 UXB 4-Ft Removal Action (1995)
- MRS-29 USA 4-Ft Removal Action (1997-1998)
- Munitions Response Area
- Major Road
- MRS-47 — Munitions Response Site



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Laguna Seca Parking MRA
MRS-29
1995 and 1997-1998 4-Ft Removal Actions

FORA ESCA RP
Monterey County, California

Figure 5-3

T:\Projects\Group 3 RIFS\Vol1\2012_05_04_LSP_MRS-29_4-Ft_Removal_Action.mxd - 5/7/2012 @ 4:46:26 PM

MRS-14D

MRS-14E

BARLOY CANYON ROAD

MRS-BLM

MRS-14A

MRS-14B

MRS-14C

MRS-47

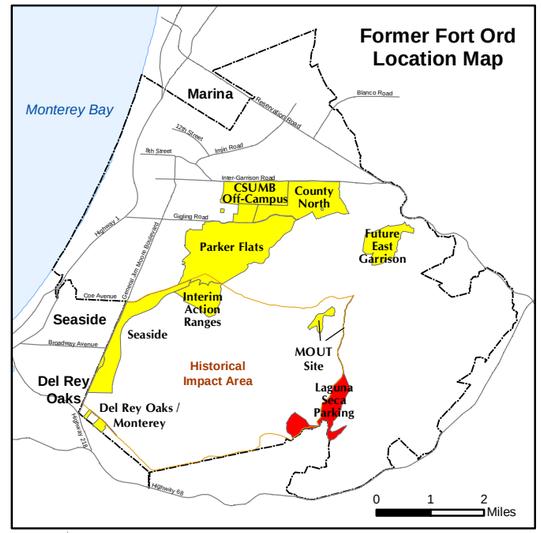
MRS-30

MRS-29

SOUTH BOUNDARY ROAD

Legend

- MRS-30 4-Ft Removal Action (1995)
- Munitions Response Area
- Major Road
- MRS-47 — Munitions Response Site



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Laguna Seca Parking MRA
MRS-30
1995 4-Ft Removal Action

FORA ESCA RP
Monterey County, California

Figure 5-4

T:\Projects\Group 3 RIFS\Vol1\2012_05_04_LSP_MRS-30_4-Ft_Removal_Action.mxd - 5/11/2012 @ 3:58:13 PM

MRS-14D

MRS-14E

BARLOY CANYON ROAD

MRS-BLM

MRS-14A

MRS-14B

MRS-14C

MRS-47

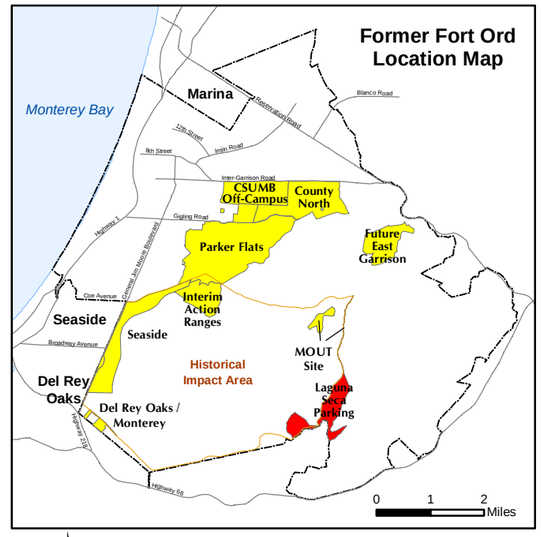
MRS-30

MRS-29

SOUTH BOUNDARY ROAD

Legend

- MRS-47 3-Ft Removal Action (1994-1995)
- MRS-47 Grid Sampling (1996)
- Munitions Response Area
- Major Road
- MRS-47 Munitions Response Site



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0 800 1,600 Feet

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Laguna Seca Parking MRA
MRS-47
1994-1995 3-Ft Removal Action and 1996 Grid Sampling Investigation

FORA ESCA RP
Monterey County, California

Figure 5-5

T:\Projects\Group 3 RIFS\Vol1\2012_05_07_LSP_MRS-47_3-Ft_Removal_and_Grid_Sampling.mxd - 5/11/2012 @ 4:06:48 PM

MRS-14D

MRS-14E

BARLOY CANYON ROAD

MRS-BLM

MRS-14A

MRS-14B

MRS-14C

MRS-47

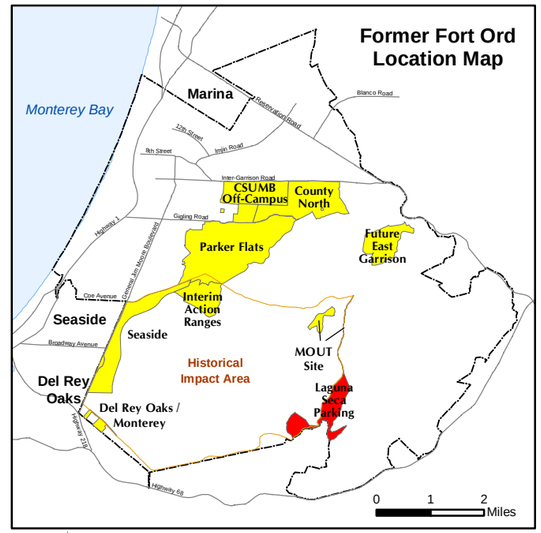
MRS-30

MRS-29

SOUTH BOUNDARY ROAD

Legend

- MRS-47 4-Ft Removal Action (1997)
- Munitions Response Area
- Major Road
- MRS-47 — Munitions Response Site



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0 800 1,600 Feet

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Laguna Seca Parking MRA
MRS-47
1997 4-Ft Removal Action

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Monterey County, California

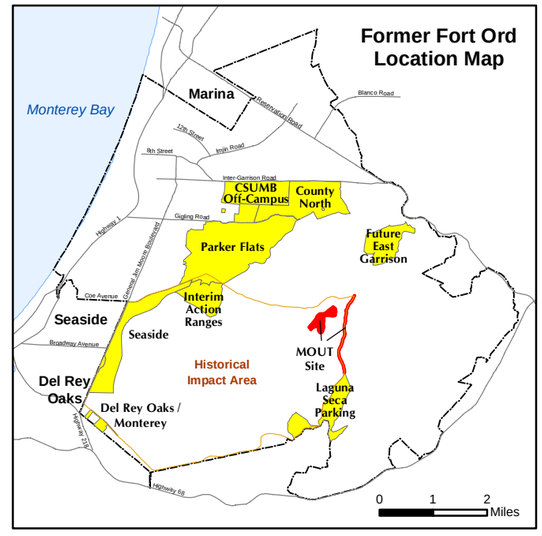
Figure 5-6

T:\Projects\Group 3 RIFS\Vol1\2012_05_07_LSP_MRS-47_4-Ft_Removal_Action.mxd - 5/11/2012 @ 4:02:05 PM

MRS-16
MRS-58
MRS-10A
MRS-27I
MRS-10B
MRS-27J:MRS-10A
MRS-27J
MRS-BLM:MRS-27J
MRS-BLM:MRS-27O
MRS-27O
EUCALYPTUS ROAD (EAST)
MRS-35
MRS-28
BARLOY CANYON ROAD
MRS-BLM
MRS-25
MRS-26
MRS-14D
MRS-14E
MRS-14A

Legend

- Former Munitions Response Site
- 4-Ft Sampling Grid (1998)
- USA SS/GS Sampling Grid (1998)
- CMS SS/GS Sampling Grid (1995)
- MRS-28 — Munitions Response Site
- Munitions Response Area
- Major Road



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MOUT Site MRA
1995 and 1998 SS/GS Sampling and 1998 Grid Sampling Investigations

FORA ESCA RP
Monterey County, California

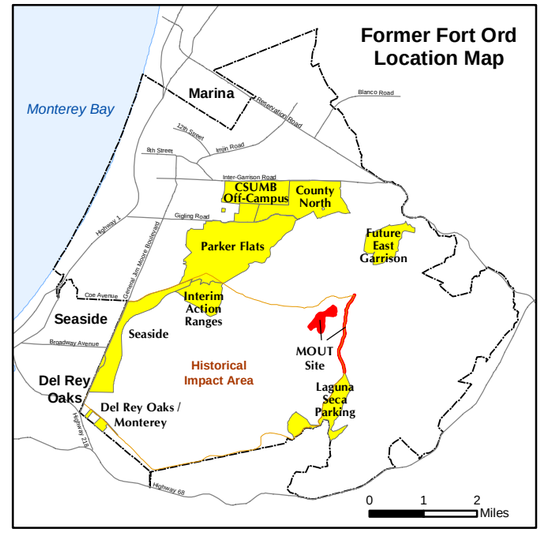
Figure 6-1

T:\Projects\Group 3 RIFS\Vol1\2012_05_07_MOUT_4-Ft_and SSGS_Sampling.mxd 5/11/2012 @ 4:12:04 PM

MRS-16
MRS-58
MRS-10A
MRS-27I
MRS-10B
MRS-27J;MRS-10A
MRS-27J
MRS-BLM;MRS-27J
MRS-BLM;MRS-27O
MRS-27O
EUCALYPTUS ROAD (EAST)
MRS-35
MRS-28
BARLOY CANYON ROAD
MRS-BLM
MRS-25
MRS-26
MRS-14D
MRS-14E
MRS-14A

Legend

- 4-Ft Removal Action (1995-1997)
- Military Munitions Reconnaissance
- Visual Surface TCRA (2003)
- Instrument-Aided Field Verification Survey (2012)
- MRS-28 — Munitions Response Site
- Munitions Response Area
- Major Road



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MOUT Site MRA
2012 Field Verification Survey, 2003 Visual Surface TCRA, and 1995-1997 4-ft Removal Action

FORA ESCA RP
Monterey County, California

Figure 6-2

T:\Projects\Group 3 RIFS\Vol1\2012_05_07_MOUT_Visual_TCRA_and_4-Ft_Removal_Action.mxd 7/2/2012 @ 12:03:43 PM

APPENDIX A

DRO/Monterey MRA MEC and MD Spatial Distribution Plates

MRS-15 DRO 01A

MRS-BLM

HIGHWAY 218

GENERAL JIM MOORE BOULEVARD

SOUTH BOUNDARY ROAD

MRS-15 DRO 01

MRS-43

MRS-43A

MRS-15 DRO 02

Legend

Pre-WWII Models - MEC

Projectile, 37 mm, Low Explosive (MK I)

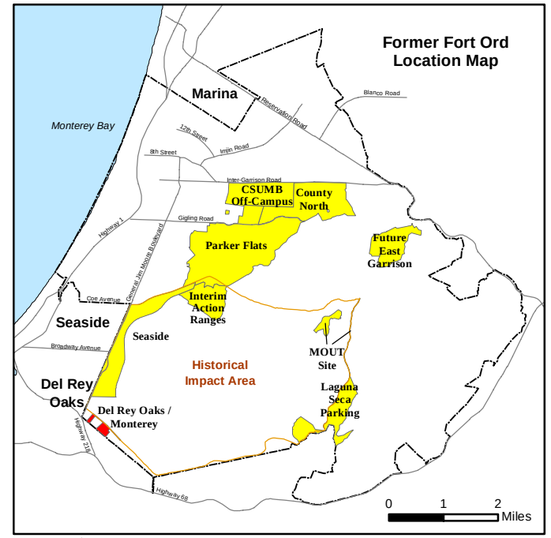
Pre-WWII Models - MD

Projectile, 37 mm, Low Explosive (MK I)

Munitions Response Area

MRS-43 Munitions Response Site

Major Roads



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0 450 900 Feet

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Del Rey Oaks / Monterey MRA
Remedial Investigation
Army Historical MEC and MD
Pre-WWII Projectiles

FORA ESCA RP
Monterey County, California

Plate A1

T:\Projects\Group 3 RIFS\Vol1\Plates\2012_05_10_DRO_Pre-WWII.mxd - 5/11/2012 @ 11:01:17 AM

MRS-15 DRO 01A

MRS-BLM

HIGHWAY 218

GENERAL JIM MOORE BOULEVARD

SOUTH BOUNDARY ROAD

MRS-15 DRO 01

MRS-43

MRS-43A

MRS-15 DRO 02

Legend

Projectiles - MEC

- 40 mm (M781)

Projectiles - MD

- 37 mm (M51, Model Unknown)

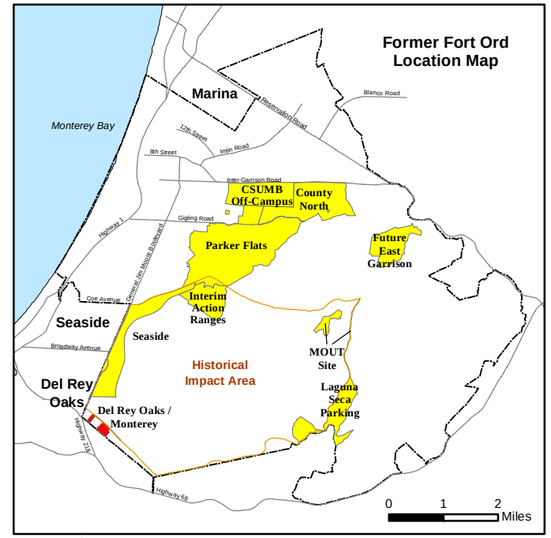
Grenades - MEC

- Fuze (M228)
- Hand Grenade, Smoke (M18)
- Rifle (M23)

Grenades - MD

- Fuze (M228)
- Hand Grenade, Smoke (AN-M8, M18)
- Rifle (M11)

- Munitions Response Area
- MRS-43 Munitions Response Site
- Major Roads



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0 450 900 Feet

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Del Rey Oaks / Monterey MRA
Remedial Investigation
Army Historical MEC and MD
Projectiles and Grenades

FORA ESCA RP
Monterey County, California

Plate A2

T:\Projects\Group 3 RIFS\Vol1\Plates\2012_05_10_DRO_Projectiles_and_Grenades.mxd - 5/11/2012 @ 11:19:40 AM

MRS-15 DRO 01A

MRS-BLM

HIGHWAY 218

GENERAL JIM MOORE BOULEVARD

SOUTH BOUNDARY ROAD

MRS-15 DRO 01

MRS-43

MRS-43A

MRS-15 DRO 02

Legend

Pyrotechnics - MEC

- Cartridge, Ignition (M2)
- Smoke Pot (M1)

Pyrotechnics - MD

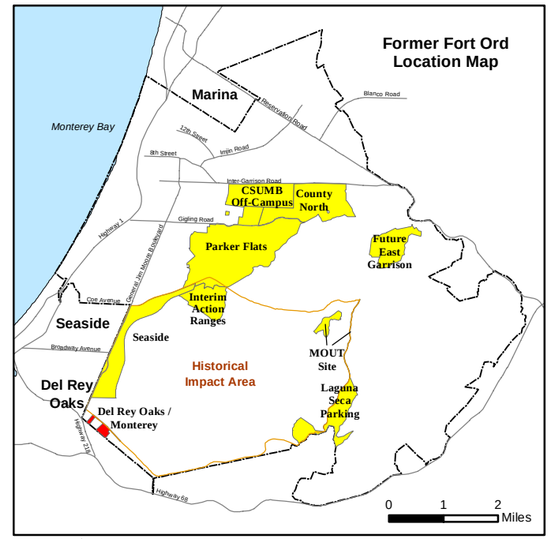
- Flare (M49)

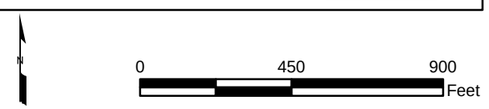
Miscellaneous - MEC

- Demolition Charge (TNT)

Miscellaneous - MD

- Miscellaneous Fragments
- Munitions Response Area
- MRS-43 Munitions Response Site
- Major Roads





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Del Rey Oaks / Monterey MRA
Remedial Investigation
Army Historical MEC and MD
Pyrotechnics and Miscellaneous

FORA ESCA RP
Monterey County, California

Plate A3

T:\Projects\Group 3 RIFS\Vol1\Plates\2012_05_10_DRO_Pyrotechnics_and_Miscellaneous.mxd - 5/11/2012 @ 11:16:23 AM

APPENDIX B

Laguna Seca Parking MRA MEC and MD Spatial Distribution Plates

MRS-BLM

MRS-14D

MRS-14E

BARLOY CANYON RD

MRS-14A

MRS-14B

MRS-14C

MRS-47

MRS-30

MRS-47

MRS-29

SOUTH BOUNDARY ROAD

Legend

Portion of MRA Where Removal Action Was Partially Completed

Portion of MRA Where Removal Action Was Not Conducted

Pre WWII Models - MEC

- Projectile, 37 mm, Low Explosive (MK I)
- Projectile, 3-inch, Trench Mortar, Practice (MK I [Stokes])
- Projectile, 75 mm, High Explosive (MK I)

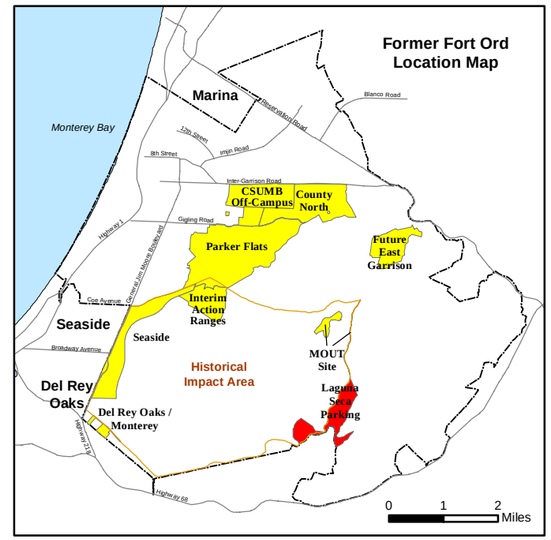
Pre WWII Models - MD

- Fuze, Trench Mortar, Point Detonating (MK VI)
- Projectile, 37 mm, Low Explosive (MK I)
- Projectile, 3-inch, Trench Mortar, Practice (MK I [Stokes])

Munitions Response Area

MRS-47 Munitions Response Site

Major Roads



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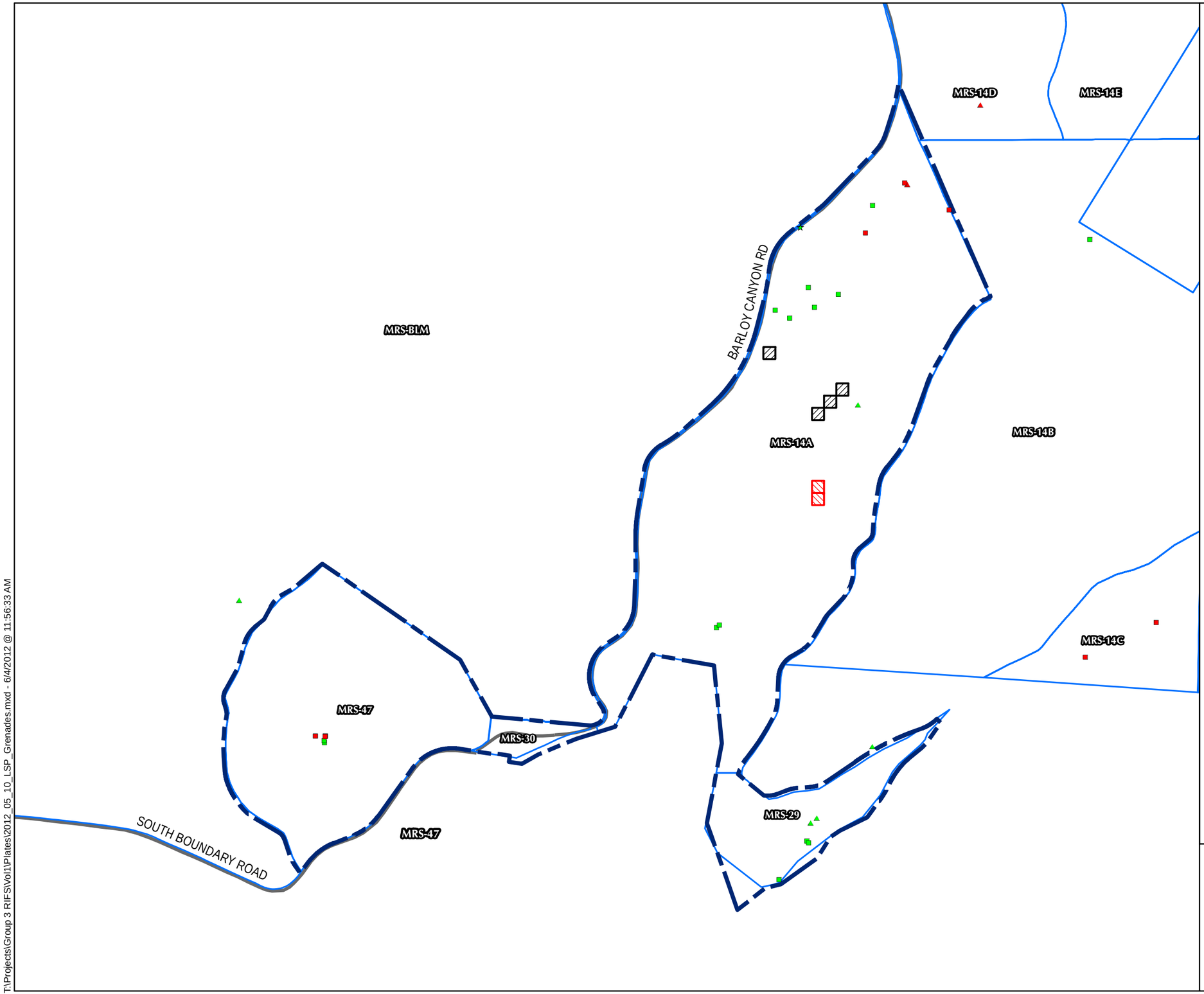
Laguna Seca Parking MRA
Remedial Investigation
Army Historical MEC and MD
Pre-WWII

FORA ESCA RP
Monterey County, California

Plate B1

T:\Projects\Group 3 RIFS\Vol1\Plates\2012_05_10_LSP_Pre-WWII.mxd - 6/4/2012 @ 11:51:34 AM



Legend

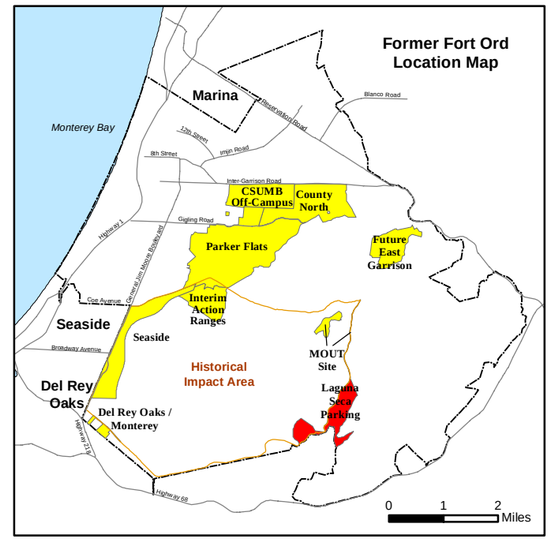
- Portion of MRA Where Removal Action Was Partially Completed
- Portion of MRA Where Removal Action Was Not Conducted

Grenades - MEC

- Fuze (M204, M205, M213, M228)
- Hand (MK II)

Grenades - MD

- Fuze (M204, M213, M218E1, M228, Model Unknown)
- Hand (M69, MK II)
- Rifle (Model Unknown)
- Munitions Response Area
- MRS-47 Munitions Response Site
- Major Roads



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WESTON SOLUTIONS

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Laguna Seca Parking MRA
Remedial Investigation
Army Historical MEC and MD Grenades

FORA ESCA RP
Monterey County, California

Plate B2

T:\Projects\Group 3 RIFS\Vol1\Plates\2012_05_10_LSP_Grenades.mxd - 6/4/2012 @ 11:56:33 AM

MRS-BLM

MRS-14D

MRS-14E

BARLOY CANYON RD

MRS-14A

MRS-14B

MRS-14C

MRS-47

MRS-30

MRS-47

MRS-29

SOUTH BOUNDARY ROAD

Legend

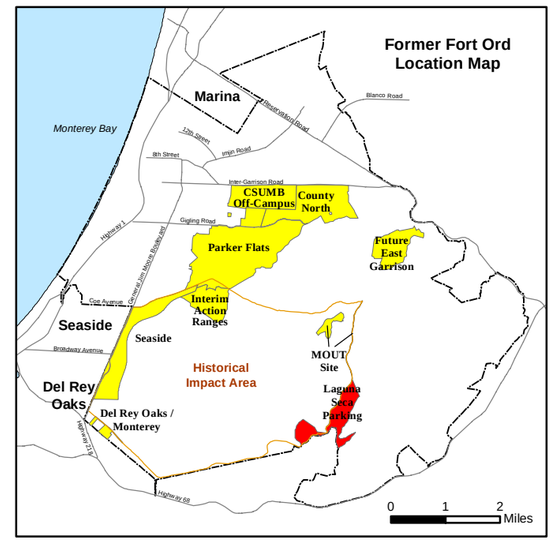
- Portion of MRA Where Removal Action Was Partially Completed
- Portion of MRA Where Removal Action Was Not Conducted

Mortars - MEC

- Projectile, 4.2-inch, Mortar, High Explosive (M3)
- Projectile, 81 mm, Mortar, High Explosive (M43)
- Projectile, 81 mm, Mortar, Practice (M43)
- Projectile, 81 mm, Mortar, Training (M68)
- Projectile, 81 mm, Mortar (Model Unknown)
- Propellant, 60 mm, Wafers, Mortar

Mortars - MD

- Projectile, 60 mm, Mortar, Practice (M50)
- Projectile, 81 mm, Mortar, High Explosive (M43)
- Projectile, 81 mm, Mortar, Practice (M43)
- Projectile, 81 mm, Mortar, Training (M68)
- Projectile, 81 mm, Mortar, Components
- Munitions Response Area
- MRS-47 Munitions Response Site
- Major Roads



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WESTON SOLUTIONS

WESTCLIFFE | ENGINEERS

Laguna Seca Parking MRA Remedial Investigation Army Historical MEC and MD Mortars

FORA ESCA RP
Monterey County, California

Plate B3

T:\Projects\Group 3 RIFS\Vol1\Plates\2012_05_10_LSP_Mortars.mxd - 6/4/2012 @ 12:00:12 PM

MRS-BLM

MRS-14D

MRS-14E

BARLOY CANYON RD

MRS-14A

MRS-14B

MRS-14C

MRS-47

MRS-30

MRS-47

MRS-29

SOUTH BOUNDARY ROAD

Legend

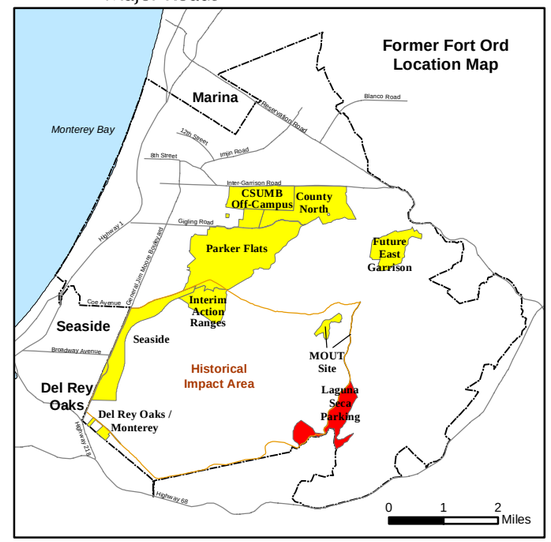
- Portion of MRA Where Removal Action Was Partially Completed
- Portion of MRA Where Removal Action Was Not Conducted

Projectiles - MEC

- 20 mm (M210)
- 37 mm (M51, Model Unknown)
- 40 mm (M781, M381, M385, M677)
- 57 mm (M307)
- 75 mm (Model Unknown)
- 14.5mm, subcaliber, practice (M181)

Projectiles - MD

- 20 mm (Model Unknown)
- 37 mm (M51, M59, M74, M63 MOD1, M80, Model Unknown)
- 57 mm (M70, M306, Model Unknown)
- 76 mm (M339)
- 105 mm, Cartridge Case (Model Unknown)
- Fuze (M48, M58 w/o Booster, M1907)
- Munitions Response Area
- MRS-47 Munitions Response Site
- Major Roads



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Laguna Seca Parking MRA
Remedial Investigation
Army Historical MEC and MD Projectiles

FORA ESCA RP
Monterey County, California

Plate B4

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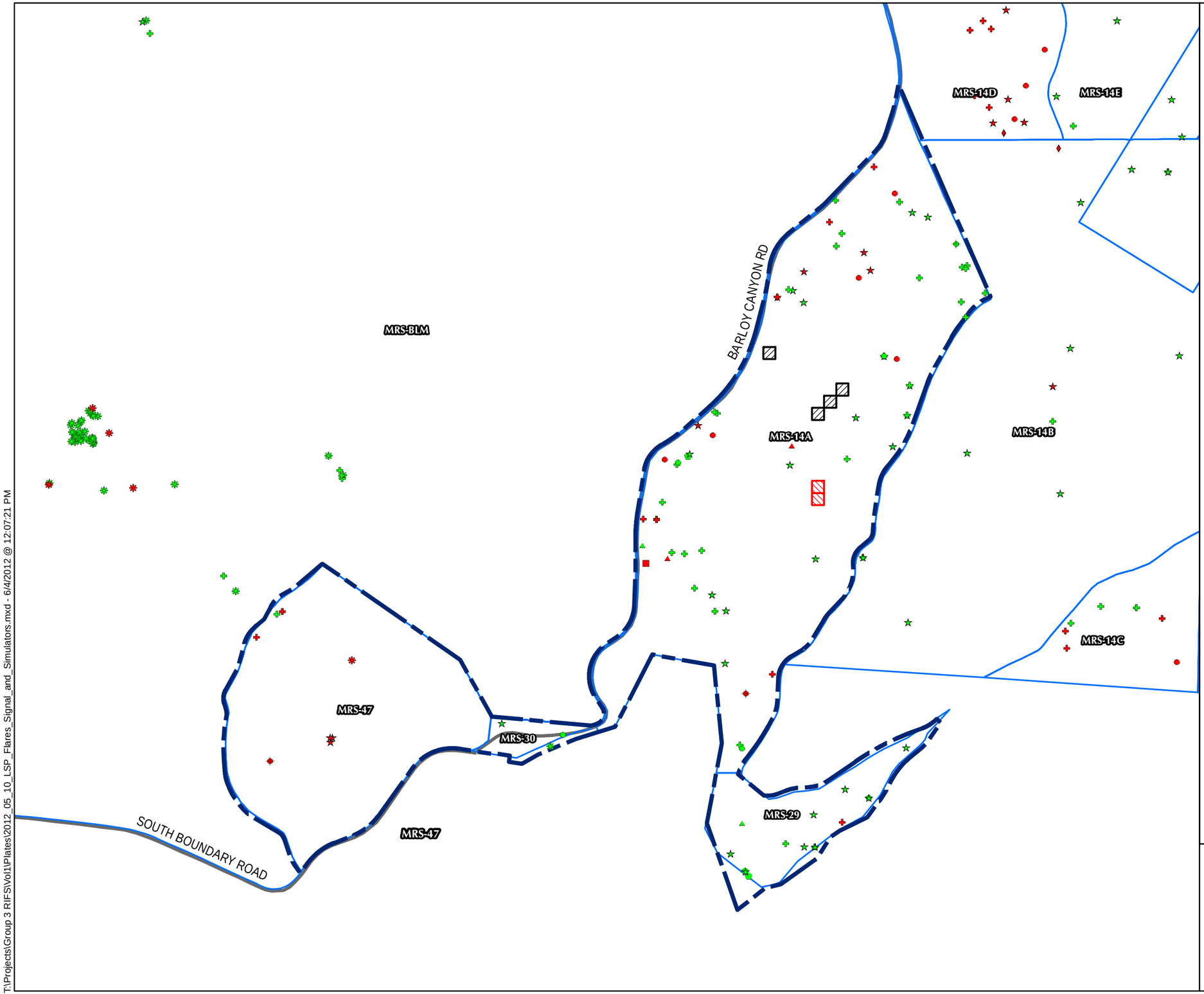


Legend

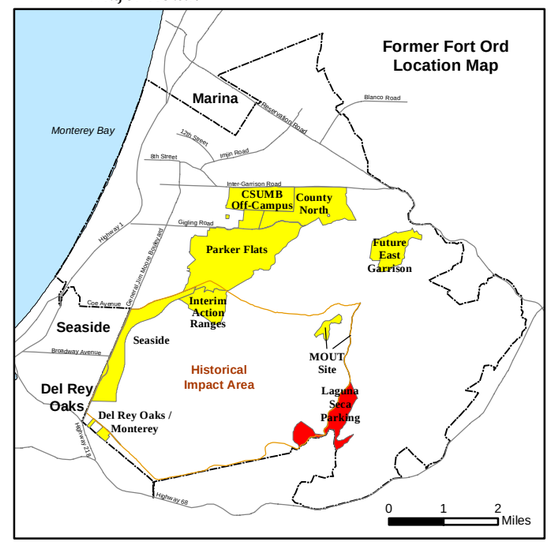
- Portion of MRA Where Removal Action Was Partially Completed
- Portion of MRA Where Removal Action Was Not Conducted

Flares, Signals, and Simulators - MEC

- Ash, Pyrotechnic
- Illumination (M301)
- Signal, Flare (M49)
- Signal, Illumination (M17, M125, M126, AN-M43)
- Signal, Smoke (M62)
- Simulator (M115A2)
- Smoke, Grenade (M18, M23, AN-M8)
- Smoke, Pot (M1)

Flares, Signals, and Simulators - MD

- Illumination (M301, Model Unknown)
- Signal, Flare (M48, M49, Model Unknown)
- Signal, Illumination (M17, M125, M126, M131, Model Unknown)
- Signal, Smoke (M128A1)
- Simulator (M27A1B1, M74)
- Smoke, Grenade (M18, M22, M48, Model Unknown)
- Smoke, Projectiles (M680, Model Unknown)
- Munitions Response Area
- MRS-47 Munitions Response Site
- Major Roads



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Laguna Seca Parking MRA
Remedial Investigation
Army Historical MEC and MD
Flares, Signals, and Simulators

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Monterey County, California

Plate B5

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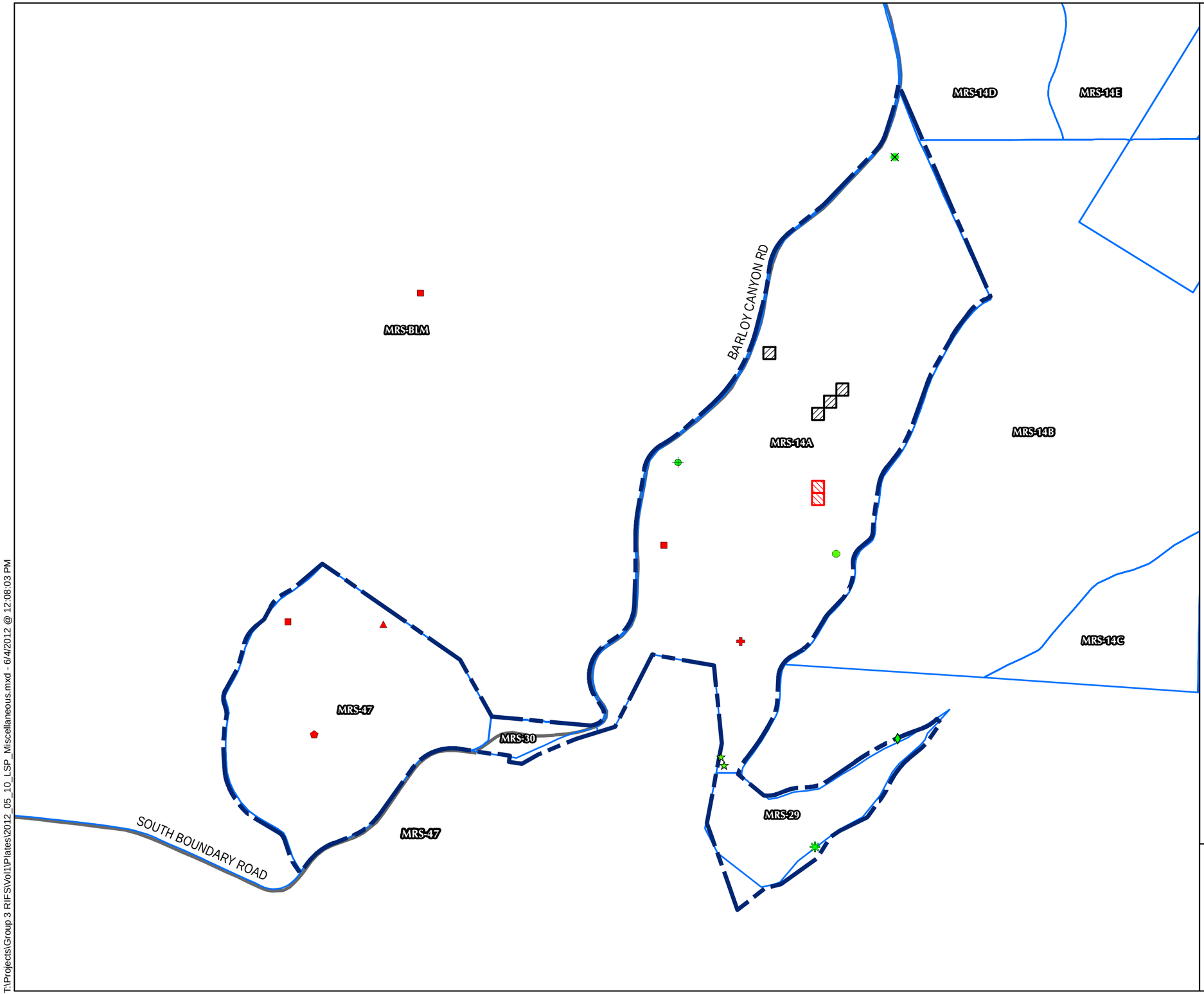


Legend

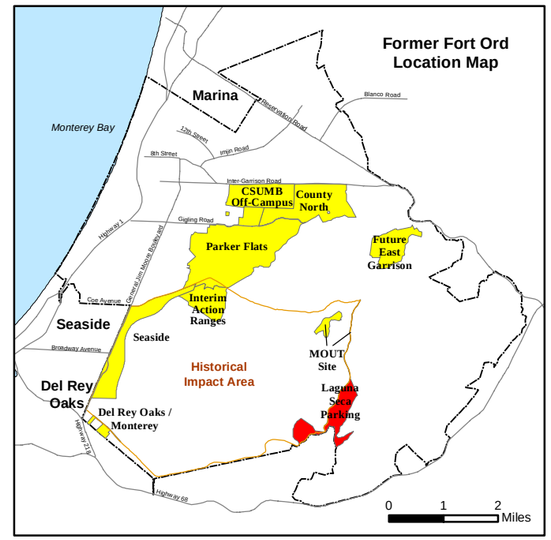
- Portion of MRA Where Removal Action Was Partially Completed
- Portion of MRA Where Removal Action Was Not Conducted

Miscellaneous Items - MEC

- Cap, Blasting, Electric (M6)
- Fuze, Chemical, Mine, Antitank (M600)
- Primer, Igniter Tube (M57)
- Rocket, 2.36-inch, High Explosive Antitank (M6)

Miscellaneous Items - MD

- Fuze, Mine, Combination (M10)
- Mine, Antitank, Practice (M10)
- Mine, Antitank (M21)
- Rocket, 66 mm, High Explosive Antitank (M72)
- Tube, Flash, Cartridge (Model Unknown)
- Miscellaneous Fragments
- Munitions Response Area
- MRS-47 Munitions Response Site
- Major Roads



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Laguna Seca Parking MRA
Remedial Investigation
Army Historical MEC and MD
Miscellaneous Items

FORA ESCA RP
Monterey County, California

Plate B6

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APPENDIX C

MOUT Site MRA MEC and MD Spatial Distribution Plates

MRS-10B
MRS-21
MRS-58
MRS-10A
MRS-27I
MRS-27J:MRS-10A
MRS-27J
MRS-16
MRS-BLM:MRS-27J
MRS-65
MRS-BLM:MRS-27O
MRS-27O
MRS-27K
EUCALYPTUS RD
MRS-35
MRS-12
MRS-28
MRS-27P
BARLOY CANYON RD
MRS-BLM
MRS-25
MRS-26
MRS-27T
MRS-14D
MRS-14E
MRS-27V
MRS-14A

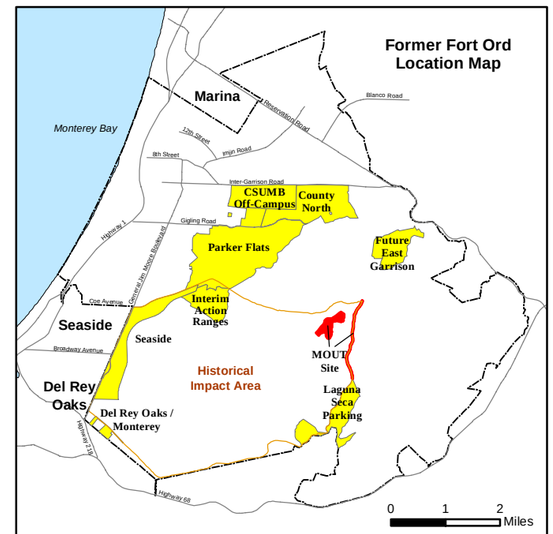
Legend

Grenades - MEC

- Fuze (M10, M204, M205, M228)
- Hand Grenade, Fragmentation (M67)
- Hand Grenade, Practice (M21, M62, M69, MK II)
- Hand Grenade, Smoke (M18, M48)
- Rifle Grenade (M9)

Grenades - MD

- Fuze (M204, M205, M228, Model Unknown)
- Hand Grenade, Fragmentation (M67)
- Hand Grenade, Practice (M30, M69, MK II)
- Hand Grenade, Smoke (M18, M48)
- Hand Grenade, Tear Gas (Civilian)
- Munitions Response Area
- MRS-28 Munitions Response Site
- Major Roads



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MOUT Site MRA
Remedial Investigation
Army Historical MEC and MD Grenades

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Monterey County, California

Plate C1

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MRS-10B
MRS-21
MRS-58
MRS-10A
MRS-27I
MRS-27J:MRS-10A
MRS-27J
MRS-16
MRS-BLM:MRS-27J
MRS-65
MRS-27O
MRS-BLM:MRS-27O
MRS-27K
EUCALYPTUS RD
MRS-35
MRS-12
MRS-28
MRS-27P
BARLOY CANYON RD
MRS-BLM
MRS-25
MRS-26
MRS-27T
MRS-14D
MRS-14E
MRS-27V
MRS-14A

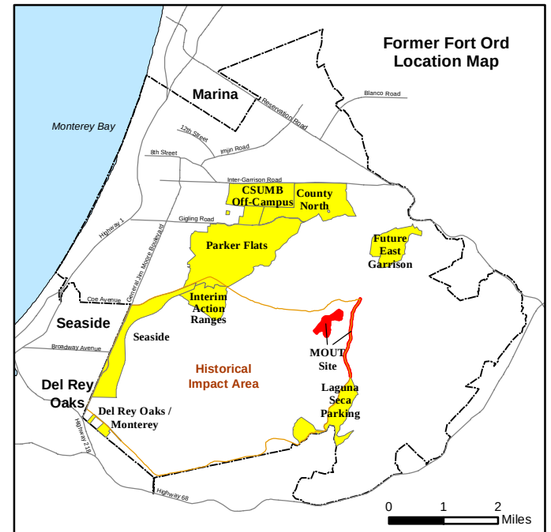
Legend

Rockets - MEC

- 3.5-inch, Practice (M29)

Rockets - MD

- 2.36-inch, Practice (M7)
- 3.5-inch, Practice (M29)
- 66mm, HEAT (Launcher Only)
- Munitions Response Area
- MRS-28 Munitions Response Site
- Major Roads



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MOUT Site MRA
Remedial Investigation
Army Historical MEC and MD Rockets

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Plate C2

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MRS-10B
MRS-21
MRS-58
MRS-10A
MRS-27I
MRS-27J:MRS-10A
MRS-27J
MRS-16
MRS-BLM:MRS-27J
MRS-65
MRS-BLM:MRS-27O
MRS-27O
MRS-27K
EUCALYPTUS RD
MRS-35
MRS-12
MRS-28
MRS-27P
BARLOY CANYON RD
MRS-BLM
MRS-25
MRS-26
MRS-27T
MRS-14D
MRS-14E
MRS-27V
MRS-14A

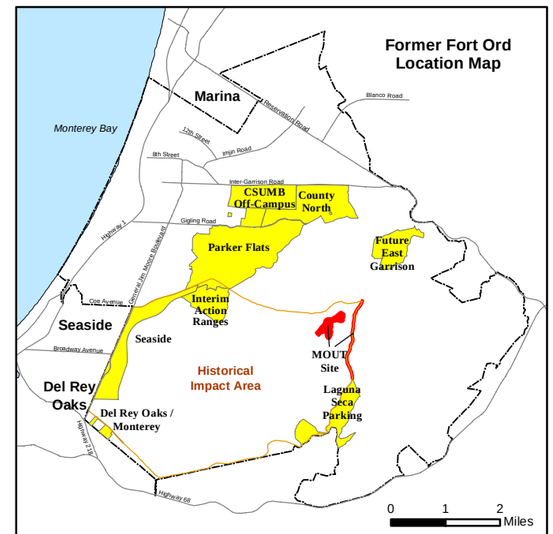
Legend

Flares, Signals, and Simulators - MEC

- 40 mm, Projectiles (M583, M585, M662)
- Flare (M48, M49)
- Signal (M17, M125, M126)
- Simulator (M15, M74, M110, M117, M116A1, M115A2)

Flares, Signals, and Simulators - MD

- 40 mm, Projectiles (M583, M585, M662)
- Flare (M48, M49)
- Signal (M17, M125, M126, M187)
- Simulator (M74, M117, M116A1)
- Munitions Response Area
- MRS-28 Munitions Response Site
- Major Roads



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MOUT Site MRA
Remedial Investigation
Army Historical MEC and MD
Flares, Signals, and Simlators

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Monterey County, California

Plate C3

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MRS-10B
MRS-21
MRS-58
MRS-10A
MRS-27I
MRS-16
MRS-27J:MRS-10A
MRS-27J
MRS-BLM:MRS-27J
MRS-65
MRS-27O
MRS-BLM:MRS-27O
EUCALYPTUS RD
MRS-27K
MRS-35
MRS-12
MRS-28
MRS-27P
BARLOY CANYON RD
MRS-BLM
MRS-27T
MRS-25
MRS-26
MRS-14D
MRS-14E
MRS-27V
MRS-14A

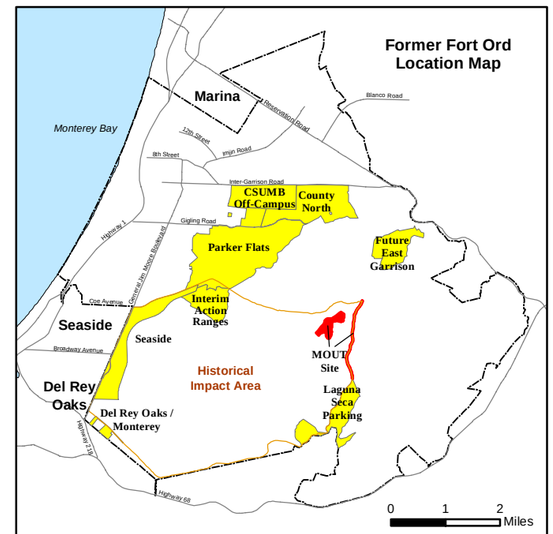
Legend

Miscellaneous Items - MEC

- Ash, Pyrotechnic
- Cartridge Case, 40 mm (Projectile Removed/Case Intact)
- Cartridge, Ignition (M2)
- Fuze, Mine, Combination (M10)
- Projectile, 14.5mm, subcaliber, practice (M181)
- Projectile, 22 mm, Subcaliber, Practice (M744)
- Projectile, 50 mm, Mortar, Type 89 (Japanese NI)
- Projectile, 81 mm, Mortar, Illumination (M301)

Miscellaneous Items - MD

- Cartridge Case, 40 mm (Projectile Removed/Case Intact)
- Cartridge, Ignition (M2)
- Fuze, Rocket, Dummy (M405)
- Projectile, 22 mm, Subcaliber, Practice (M744)
- Projectile, 50 mm, Mortar, Type 89 (Japanese NI)
- Projectile, 81 mm, Mortar, Illumination (M301)
- Miscellaneous Fragments
- Munitions Response Area
- MRS-28 Munitions Response Site
- Major Roads



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MOUT Site MRA
Remedial Investigation
Army Historical MEC and MD
Miscellaneous Items

FORA ESCA RP
Monterey County, California

Plate C4

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APPENDIX D

Evaluation of Previous Work Checklists

Appendix D
Munitions Response Activity Evaluation Checklists for MRS-43, DRO/Monterey MRA
Part 1: Literature Review

	Yes	No	Inconclusive
TYPE OF TRAINING AND MILITARY MUNITIONS EXPECTED			
1. Is there evidence that the site was used as an impact area (i.e., fired military munitions such as mortars, projectiles, rifle grenades, or other launched ordnance)?	X		

Sources reviewed and comments:

According to the 1997 Revised Archives Search Report (USACE 1997a), a portion of the ridge was used as a backstop for rifle grenades and shoulder launched projectiles from 1942 - 1944.

2. Is there historical evidence that training involved use of High Explosive (HE) or Low Explosive (LE) items?	X		

Sources reviewed and comments:

According to the 1997 Revised Archives Search Report (USACE 1997a) a portion of the ridge was used as a backstop for rifle grenades and shoulder launched projectiles from 1942 - 1944. Aerial photographs & historical training maps do not indicate use of HE or LE.

3. Is there historical evidence that training involved use of pyrotechnic and/or smoke-producing items (e.g., simulators, flares, smoke grenades) but not explosives?		X	

Sources reviewed and comments:
There is nothing in the 1997 Revised Archives Search Report (USACE 1997a) nor the historical training maps and aerial photographs to indicate the use of pyrotechnic and/or smoke-producing items.

DEVELOPMENT AND USE OF SURROUNDING AREA			
4. Does subsequent development or use of the area indicate that military munitions would have been used at the site?		X	

Sources reviewed and comments:

The area has not been subsequently developed or used (2000 aerial photograph).

5. Does use of area surrounding the site indicate that military munitions would have been used at the site?			X

Sources reviewed and comments:

Training maps indicate surrounding areas were used for bazooka, illumination mortar, rifle grenade, mine, 75mm/37 mm gun, and possibly hand grenade training in the 1940s; small arms and possibly 3.5 inch rocket, and hand grenade training in the 1950s; small arms training and army training and evaluation program from 1960s through base closure (Shaw 2007). It is possible that any military munitions associated with the above listed training could have been used at or discarded at MRS-43.

Appendix D
Munitions Response Activity Evaluation Checklists for MRS-43, DRO/Monterey MRA
Part 1: Literature Review

	Yes	No	Inconclusive
ESTABLISHMENT OF SITE BOUNDARIES			
6. Is there evidence of training areas on aerial photographs that could be used to establish site boundaries?		X	

Sources reviewed and comments:

There is no evidence of training areas on the aerial photographs for the MRS-43 area (aerial photos 1941, 1949, 1978, 1986, 2000).

7. Is there evidence of training on historical training maps that could be used to establish boundaries?		X	

Sources reviewed and comments:

There is no evidence of training on histsorical training maps for the MRS-43 area (Army 1934, 1953, 1956, 1957, 1961, 1964, 1968, 1971, 1972, 1982, 1984, 1987, 1991, 1992).

8. Should current boundaries be revised?		X	

Sources reviewed and comments:

No indication based on the literature review that the boundaries should be revised.

RESULTS OF LITERATURE EVALUATION			
9. Does the literature review provide sufficient evidence to warrant further investigation?	X		

Sources reviewed and comments:

Review of literature including the 1997 Archives Search Report (USACE1997a) provided sufficient evidence to warrant further investigation which was previously conducted by the Army. For more informaiton see the DRO/Monterey MRA removal evaluation checklist.

Appendix D
Munitions Response Activity Evaluation Checklists for MRS-43, DRO/Monterey MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive
HISTORICAL INFORMATION			
1. Is there evidence that the site was used as an impact area (i.e., fired military munitions such as mortars, projectiles, rifle grenades, or other launched ordnance)?	X		

Sources reviewed and comments:

The After Action Report and the MMRP database indicated that thirty-nine low explosive MK I 37mm projectiles (MD), one expended AP-T M51 series 37mm projectile (MD), one expended unknown model of 37mm projectile (MD) were found at DRO/Monterey MRA. The projectiles were found predominantly on the higher portions of the hillsides in Parcel L6.2 and E29.1 (Plate A2).
References:

MMRP Database, USA 2001a

2. Is there evidence that training involved use of explosive items?	X		

Sources reviewed and comments:

The 37mm LE items (listed in Question #1) and the 2 blocks of TNT found in the central portion of parcel L6.2 indicate that training involved the use of explosive items. However, the isolated TNT blocks does not show a pattern of use.
References:

MMRP Database, USA 2001a

3. Is there evidence that training involved use of pyrotechnic and/or smoke-producing items (e.g., simulators, flares, smoke grenades) but not explosives?			X

Sources reviewed and comments:

The After Action Report and the MMRP database indicate that several M18 and HC AN M8 smoke grenades (MD), one 10 lb smoke pot (MEC) and one M49A1 surface trip flare (MD) were found in the DRO/Monterey MRA, with the highest concentration in parcel E29.1, which is mostly flat (Plate A2).
References:

MMRP Database, USA 2001a

REMOVAL RESULTS			
4. Was removal performed within the appropriate area?	X		

Sources reviewed and comments:

Appendix D
Munitions Response Activity Evaluation Checklists for MRS-43, DRO/Monterey MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive

The After Action Report indicates that the removal was performed within the appropriate area as indicated on the After Action Report maps. The Report also notes that DRO Group boundary as surveyed by Central Coast Survey do not precisely coincide with the FORA or county boundaries. The boundary line for the MRS and the removal are approximately 50 ft east of the boundary line of the MRA.
References:

USA 2001a

5. Were the type(s) of items found consistent with the type of training identified for the site?	X		

Sources reviewed and comments:

The 1997 Revised Archives Search Report (USACE 1997) indicates the area was used as a backstop for rifle grenades and shoulder-launched projectiles from 1942 to 1944. The after action report and MMRP database indicates practice rifle grenade training occured in the area which is consistent with the type of training identified in the 1997 Revised Archives Search Report.
References:

MMRP Database, USA 2001a

6. Were the type(s) of items found consistent with the era(s) in which training was identified?	X		

Sources reviewed and comments:

The practice rifle grenades (MD) found were available for use during the time that the 1997 Revised Archives Search Report (USACE 1997a) indicates they would have been used for training.
References:

MMRP Database, Army training and facilities maps, USACE 1997a

7. Was High Explosive (HE) fragmentation found?		X	

Sources reviewed and comments:

No, however approximately 3.5 lbs of unknown fragments were found within the DRO/Monterey MRA.
References:

MMRP Database, USA 2001a

8. Were HEs found?	X		

Sources reviewed and comments:

2 blocks of TNT were found in the central portion of parcel L6.2. However, these 2 blocks of TNT do not indicate a pattern of use.

Appendix D
Munitions Response Activity Evaluation Checklists for MRS-43, DRO/Monterey MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive

References:

MMRP Database, USA 2001a

9. Were Low Explosives (LEs) found?	X		

Sources reviewed and comments:

Two M2 series ignition cartridges (MEC) were found together in parcel L6.2 by the roadway. MD from 37mm MK I LE projectiles were found in parcels L6.2 and E29.1.
References:

MMRP Database, USA 2001a

10. Were pyrotechnics found?	X		

Sources reviewed and comments:
One M49A1 surface trip flare (MD) was found in the central portion of parcel E29.1. However, this one flare does not indicate a pattern of use.
References:

MMRP Database, USA 2001a

11. Were smoke-producing items found?	X		

Sources reviewed and comments:

The After Action Report and the MMRP database indicate that several M18 and HC AN M8 smoke grenades (MD), one 10 lb smoke pot (MEC) were found in the DRO/Monterey MRA, with the highest concentration in parcel E29.1, which is mostly flat (Plate A2). However, these items do not indicate a pattern of use.
References:

MMRP Database, USA 2001a

12. Were explosive items found (e.g., rocket motors with explosive components, fuzes with explosive components)?	X		

Sources reviewed and comments:

Two M2 series ignition cartridges (MEC) were found together in parcel L6.2 by the roadway and 2 blocks of TNT were found in the central portion of parcel L6.2.
References:

MMRP Database, USA 2001a

Appendix D
Munitions Response Activity Evaluation Checklists for MRS-43, DRO/Monterey MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive
13. Do items found in the area indicate training would have included use of training items with energetic components?	X		

Sources reviewed and comments:

References:

MMRP Database, USA 2001a

	Yes	No	Inconclusive
14. Were items found in a localized area (possibly the remnants of a cleanup action)?		X	

Sources reviewed and comments:

References:

USA 2001a

SITE INVESTIGATION DESIGN

	Yes	No	Inconclusive
15. Was the site divided into subareas to focus on areas of common usage, similar topography and vegetation, and/or other unique site features?		X	

Sources reviewed and comments:

The site was not divided into sectors based on site usage or site features. The site boundaries were identifed based on reuse plans rather than historical range usage information.
References:

USA 2001a

	Yes	No	Inconclusive
16. Should the site be divided into subareas based on the above features?		X	

Sources reviewed and comments:

The final removal action was designed to clear the entire parcel, so no subdivision of the parcel is necesary.
References:

USA 2001a

Appendix D
Munitions Response Activity Evaluation Checklists for MRS-43, DRO/Monterey MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive
17. Should current site boundaries be revised based on sampling results?		X	

Sources reviewed and comments:

Current site boundaries are based on existing parcel boundaries and should not be modified.
References:

USA 2001a

EQUIPMENT REVIEW

	Yes	No	Inconclusive
18. Was equipment used capable of detecting items suspected at the site at the maximum expected depth?	X		

Sources reviewed and comments:

A removal effort using the analog Schonstedt Model GA-52Cx was conducted over the entire MRS-43 (original MRS boundary and western expansion). All of the MEC and MD found in MRS-43 were found with the Schonstedt Model GA-52Cx.
Following the analog removal, dDigital geophysical surveys (MEC removal), using the cart mounted EM61 geophysical instrument, were completed in all areas of the DRO/Monterey MRA that were accessible to the instrument. In areas that were inaccessible to the EM61 because of the terrain or vegetation, digital geophysical surveys were completed using the EM61-HH (handheld) or the G858 digital geophysical instruments. Digital surveys were conducted over the majority of MRS-43 and no additional MEC or MD was found.
The Schonstedt Model GA-52Cx, Geonics EM61, and Geometrics G858 were evaluated as part of a Geophysical Survey Quality Assurance Technical Analysis and also as part of the DRO/Monterey MRA removal actions. The results of the evaluation indicate that the instruments are capable of detecting the types of MEC potentially present at the site. The report also stated that based on the QA analysis, the contractor achieved the desired data quality for the whole site with the exception of a very small number of missed items, which were missed outside of the DRO/Monterey MRA. The Schonstedt Model GA-52Cx is less effective for detecting the smaller (less than 2 lbs) or more deeply buried (greater than 2 ft) objects.The types of items that might be expected at MRS-43 are detectable using the Schonstedt 52Cx and the EM-61 based on the results of the ODDS; however, detection capabilities below about a foot drop off. QA associated with all instruments was met.
References:

Parsons 2001, Shaw 2007, USA 2001a, USAEDH 1997

	Yes	No	Inconclusive
19. Was equipment used capable of detecting the types of items (e.g., non-ferrous) suspected at the site?	X		

Sources reviewed and comments:

The types of items that might be expected at MRS-43 are detectable using the Schonstedt 52Cx and the EM-61 based on the results of the ODDS. QA associated with all instruments was met. The Schonstedt GA-52CX, G-858, EM61-Mk2, and EM61-HH were correctly employed in the correct sequence.

Appendix D
Munitions Response Activity Evaluation Checklists for MRS-43, DRO/Monterey MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive

References:

Parsons 2001, USA 2001a

20. Do the results of the Ordnance Detection and Discrimination Study (ODDS) indicate that items suspected at the site would have been detected by the instrument used at the time of investigation?	X		

Sources reviewed and comments:

Instruments employed represent the state of the art for this application. Surveys conducted as part of the USACE QA program show that a 37mm projectile (1.75 lbs), while readily detected six inches below ground surface (bgs), is difficult to detect and may be undetectable at 18 inches bgs or deeper (Shaw 2007)
Results of the ODDS seeded test indicate the items suspected at the the site (practice hand grenades, fuzes, practice rifle grenades, practice smoke grenades, illumination signals, and 37 mm projectiles) and used in the ODDS study were, with the exception of an illumination signal, detectable in the top 6 inches using a Schonstedt 52CX. However, the detection rates drop between 6 inches and 1 foot bgs and then to zero for some items below 2 ft. The ODDS seeded test indicated that the suspected items were detectable using the EM61 and G-858 instruments.
As part of the Del Rey Oaks Group removal action, a technical analysis of the performance of instruments used during the geophysical surveys was conducted. In addition to the technical analysis of the performance of instruments, the study also analyzed the survey teams and survey methods used to conduct the MEC removal actions (USA 2001a). The technical analysis included QA seeding with munitions debris and other target items. The seeds placed in the portion of the DRO/Monterey MRA were recovered during the removal action.
The results of the seeded test were evaluated by the USACE in the Technical Analysis Memorandum (USA 2001a, Appendix P). The evaluation identified only small data gap issues, and concluded that the Del Rey Oaks Group geophysical investigation successfully detected, excavated, and recovered the desired MEC items, that the specified objectives in the Del Rey Oaks Group work plan were met, and the imminent safety hazard had been removed

References:

Parsons 2001, USA 2001a, Shaw 2007

21. Do results of the investigation indicate that suspected items could be detected with a high level of confidence at observed and expected depth ranges?	X		

Sources reviewed and comments:

	Yes	No	Inconclusive

Although not directly comparable to the DRO/Monterey MRA, results of the ODDS suggest that the equipment used should be able to detect ferrous MEC to a depth of 2 ft bgs. The results of the Technical Analysis (referenced in Question 20) indicate that all of the items seeded in the DRO/Monterey MRA were located during the removal action. The Schonstedt, Geonics EM61, and Geometrics G-858 were evaluated as part of a Geophysical Survey Quality Assurance Technical Analysis and also as part of the Del Rey Oaks MRA removal actions. The results of the evaluation indicate that the instruments are capable of detecting the types of MEC potentially present at the site. All grids passed the U.S. Army Engineering Support Center, Huntsville QA inspection standards and were accepted by the USACE. QA acceptance records are provided in the after action report (USA 2001a).

References:

USA 2001a, Shaw 2007, Parsons 2001

22. Were all the instruments used to evaluate the site maintained and calibrated in accordance with associated work plan and manufacturers' specifications?	X		

Sources reviewed and comments:

The Final Del Rey Oaks Geophysical Work Plan (USA 2001a) details calibration requirements for the insturments utilized for the project. All OE sampling was performed in accordance with procedures specified in the USA Work Plan. All instruments requiring maintenance and/or calibration were checked prior to the start of each workday, batteries were replaced as needed, and instruments were checked against a known source. The USA Quality Control (QC) specialist was responsible for ensuring that personnel perform operational checks and made appropriate log entries. The QC specialists performed random unscheduled checks of the various sites to ensure the personnel performed the work as specified in the work plan.

References:

USA 2001a, Shaw 2007

DATA PROCESSING AND DATA MANAGEMENT

23. Was the appropriate data processing scheme used for the site, and how were the data processed?	X		

Sources reviewed and comments:

All data were processed according to the approved work plan for the site.

References:

USA 2001a, Shaw 2007

24. Have the field data been collected and managed in accordance with quality control standards established for the project?	X		

Sources reviewed and comments:

Appendix D
Munitions Response Activity Evaluation Checklists for MRS-43, DRO/Monterey MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive

The data was collected and maintained according to the Project work plans and QA/QC procedures as documented in the USA After Action Report. All Schonstedt-surveyed grids passed contractual QC. Overall, digital data collection, processing, and delivery was in accordance with programmatic and site specific work plans, including project DQOs .The Geophysical Survey Quality Assurance Technical Analysis concluded that the Contractor achieved the desired data quality for the whole site with the exception of a very small number of missed items, which were missed outside of the DRO/Monterey MRA.

References:

USA 2001a, Shaw 2007

Appendix D
Munitions Response Activity Evaluation Checklists for MRS-43, DRO/Monterey MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive
RESULTS OF REMOVAL EVALUATION			
A. Can the data be used to perform a risk assessment?	X		

Comments:

Review of the available data indicates that the data can be used for performance of risk assessment.
References:

B. Can the data be used to perform a feasability study?	X		

Comments:

Review of available data indicates that the data can be used to prepare the feasibility study.
References:

Appendix D
Munitions Response Activity Evaluation Checklists for Laguna Seca Parking MRA
Part 1: Literature Review

	Yes	No	Inconclusive
TYPE OF TRAINING AND MILITARY MUNITIONS EXPECTED			
1. Is there evidence that the site was used as an impact area (i.e., fired military munitions such as mortars, projectiles, rifle grenades, or other launched ordnance)?	X		

Sources reviewed and comments:

MRS 14A - Archives Search Report (ASR) Army 1993: "This area contains 7" and 8" Naval gun rounds, which obviously overshot the impact area."
MRS-30 - 1997 ASR, Army 1997: a 75mm HE projectile was found (date not provided).
MRS-47 - 1997 ASR, Army 1997: a live 81mm HE mortar was discovered (date not provided). In 1995, 2 live 75mm HE projectiles were blown in place.
1964 Training Map shows MRSs-14A, -30, -47 as either in or adjacent to the Impact Area

2. Is there historical evidence that training involved use of High Explosive (HE) or Low Explosive (LE) items?	X		

Sources reviewed and comments:

MRS-14A - Archives Search Report (ASR) Army 1993: A 1957 map show a mortar position in this area; a 1956 map shows a subcaliber training area P-5 in this same area. According to Mr. Roy Durham, Range P-5 was used from approximately 1972 through 1992 for subcaliber artillery and mortar practice.
MRS-30 - 1997 ASR, Army 1997: a 75mm HE projectile was found (date not provided).
MRS-47 - 1997 ASR, Army 1997: a live 81mm HE mortar was discovered (date not provided). In 1995, 2 live 75mm HE projectiles were blown in place.

3. Is there historical evidence that training involved use of pyrotechnic and/or smoke-producing items (e.g., simulators, flares, smoke grenades) but not explosives?		X	

Sources reviewed and comments:
There is nothing in the 1993, 1994, or 1997 ASRs (USACE 1993, 1994, 1997a) nor the historical training maps and aerial photographs to indicate the use of pyrotechnic and/or smoke-producing items.

DEVELOPMENT AND USE OF SURROUNDING AREA			
4. Does subsequent development or use of the area indicate that military munitions would have been used at the site?		X	

Sources reviewed and comments:

The area has been subsequently developed as a vehicle race track.

5. Does use of area surrounding the site indicate that military munitions would have been used at the site?	X		

Sources reviewed and comments:

Training maps indicate artillery positions to the west and south of the MRA in the 1950s; range fans to the east from 1960s through base closure. It is possible that any military munitions associated with the above listed training could have been used at or discarded at the MRA.

Appendix D
Munitions Response Activity Evaluation Checklists for Laguna Seca Parking MRA
Part 1: Literature Review

	Yes	No	Inconclusive

ESTABLISHMENT OF SITE BOUNDARIES

6. Is there evidence of training areas on aerial photographs that could be used to establish site boundaries?		X	

Sources reviewed and comments:

There is no evidence of training areas on the aerial photographs for the MRA (aerial photos 1941, 1949, 1956, 1978, 1986, 2000, 2003).

7. Is there evidence of training on historical training maps that could be used to establish boundaries?		X	

Sources reviewed and comments:

There are names of several training areas on historical training maps for the MRA, however training aeas are not outlined (Army 1953, 1956, 1957, 1961, 1964, 1968, 1971, 1972, 1982, 1984, 1987, 1991, 1992).

8. Should current boundaries be revised?		X	

Sources reviewed and comments:

No indication based on the literature review that the boundaries should be revised.

RESULTS OF LITERATURE EVALUATION

9. Does the literature review provide sufficient evidence to warrant further investigation?	X		

Sources reviewed and comments:

Review of literature including the 1997 Archives Search Report (USACE1997a), aerial photographs, and historical training maps does provides enough information to make a determination about the necessity for further investigation.

Appendix D
Munitions Response Activity Evaluation Checklists for Laguna Seca Parking MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive
HISTORICAL INFORMATION			
1. Is there evidence that the site was used as an impact area (i.e., fired military munitions such as mortars, projectiles, rifle grenades, or other launched ordnance)?	X		

Sources reviewed and comments:

MRS 14A - The After Action Reports and MMRP Database indicate that practice items: 37 mm TP-T projectiles, 57mm AP-T projectiles and 76mm AP-T projectiles were found and they are not explosive by design. No evidence of 7" or 8" naval rounds indicated in the ASR was found on this site. Additionally, a previous contractor located one 37mm projectile with a base fuze.
MRS 29 - The After Action Reports and MMRP Database indicate that no UXO items were found during the removal action. A previous contractor found one 37mm TP M63 Mod1 projectile MD, one 20mm (model unknown) MD, and one 57mm armor piercing tracer (model unknown) MD.
MRS 30 - The After Action Reports and MMRP Database indicate that 2 expended 37mm AP-T M80 projectiles, one expended 57mm AP-T M70 projectile, and one "live" 75mm HE Mark 1 projectile were found.
MRS 47 - The After Action Reports and MMRP database indicate 81mm mortars, 37mm projectiles, Stokes mortars, 75mm projectiles, and 60mm mortars were discovered. Previous contractor found one 81mm HE mortar, two 37mm HE projectiles, and 7 live HE projectiles. The AAR states: "All these items were located in attitudes that suggested that they had impacted the site after being fired rather than being abandoned or buried."
References:

HFA 1994, USA 2000a, USA 2000b, USA 2001b, UXB 1995a, UXB 1995b, UXB 1995c, UXB 1995d, MMRP Database

2. Is there evidence that training involved use of explosive items?	X		

Sources reviewed and comments:

The MRS 47 After Action Report and MMRP Database indicate 81mm mortars, 37mm projectiles, Stokes mortars, 75mm projectiles, and 60mm mortars were discovered. Previous contractor found one 81mm HE mortar, two 37mm HE projectiles, and 7 live HE projectiles.
References:

HFA 1994, USA 2000b, UXB 1995d, MMRP Database

3. Is there evidence that training involved use of pyrotechnic and/or smoke-producing items (e.g., simulators, flares, smoke grenades) but not explosives?	X		

Appendix D
Munitions Response Activity Evaluation Checklists for Laguna Seca Parking MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive

Sources reviewed and comments:

The MMRP Database and after action reports indicate:
Three types of simulators were found within the Laguna Seca Parking MRA: the M115A2 ground burst projectile simulator, the M74 series airburst projectile simulator, and the M27A1B1 airburst projectile simulator. The M74 airburst projectile simulator was the most common simulator found, with most items recovered within MRS-29 on the ground surface (Plate B5).
Two types of flares were found within the Laguna Seca Parking MRA: the M49 surface trip flare (5 MEC and ~~1~~ 2 MD) and the M48 parachute trip flare (3 MD). The M49 flare was the most commonly encountered flare, with a majority of items recovered in the northwestern portion of MRS-14A within 12 inches bgs. The M48 parachute flares encountered were also located along the northwestern facing slope of MRS-14A.
Signals found within the Laguna Seca Parking MRA (Plate B5) include: M17 series, M125, M126, M131, and AN-M43 illumination signals in addition to M62 series and M128A1 series smoke signals.
References:

MMRP Database

REMOVAL RESULTS

4. Was removal performed within the appropriate area?	X		

Sources reviewed and comments:

The establishment of the Laguna Seca Parking MRA boundary is based upon the property transfer boundary and removal actions were conducted across the entire MRA with the exception of six inaccessible grids on the eastern slope of MRS-14A and a paved ditch along Lookout Ridge Road.
References:

USA 2000a, USA 2000b, USA 2001b, UXB 1995c

5. Were the type(s) of items found consistent with the type of training identified for the site?	X		

Sources reviewed and comments:

MRSs-14A, -29 and -30 appear to have been used for basic maneuvers the north west slope of MRS-14A and MRS 29 appear to have had an incidental impact from projectiles. There does not appear to be a pattern of use as an impact area for MRSs-14A, -29 or -30.
MRS-47 - Based on training facilities maps and MEC and MD removed, it appears that the MRS-47 portion of the MRA was an impact area prior to WWII and into the 1970s.
References:

The MMRP database and historical training maps (Army 1953, 1956, 1957, 1961, 1964, 1968, 1971, 1972, 1982, 1984).

6. Were the type(s) of items found consistent with the era(s) in which training was identified?	X		

Sources reviewed and comments:

Appendix D
Munitions Response Activity Evaluation Checklists for Laguna Seca Parking MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive

The majority of the items found were consistent with training in this area occurring from the 1920s through the 1980s.
References:

MMRP and various Fort Ord Training maps

7. Was High Explosive (HE) fragmentation found?		X	

Sources reviewed and comments:

The MMRP database does not indicate any high explosive fragmentation was found.
References:

MMRP Database

8. Were HEs found?	X		

Sources reviewed and comments:

MRS 30: Projectile, 75mm, high explosive (model unknown)
MRS 47: 37mm HE cartridge, 40mm HE projectiles, 57mm HE antitank M307 projectile, 75mm HE MK1 projectiles, 81mm HE M43 series projectiles, 2.36" HE antitank M6 rocket, 4.2" HE M3 series projectiles
References:

MMRP Database

9. Were Low Explosives (LEs) found?		X	

Sources reviewed and comments:

The MMRP database does not indicate any LEs were found.
References:

MMRP Database

10. Were pyrotechnics found?	X		

Appendix D
Munitions Response Activity Evaluation Checklists for Laguna Seca Parking MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive

Sources reviewed and comments:

MRS-14A: illumination signals, surface trip flares
MRS-47: illuminaiton signals,
References:

MMRP Database

11. Were smoke-producing items found?	X		

Sources reviewed and comments:

MRS-14A: a smoke ground signal and smoke hand grenades
MRS-29: a rifle smoke grenade
MRR-47: a smoke ground signal and smoke hand grenades
References:

MMRP Database

12. Were explosive items found (e.g., rocket motors with explosive components, fuzes with explosive components)?	X		

Sources reviewed and comments:

Explosive items were found in MRS-30 and 47.
References:

MMRP Database

13. Do items found in the area indicate training would have included use of training items with energetic components?	X		

Sources reviewed and comments:

Items with energetic components were found in MRS-30 and 47.

Appendix D
Munitions Response Activity Evaluation Checklists for Laguna Seca Parking MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive
References:			
MMRP Database			
14. Were items found in a localized area (possibly the remnants of a cleanup action)?			X
Sources reviewed and comments:			
Burial pits were found in the Laguna Seca Parking MRA, however, not enough to provide any direct conclusions.			
References:			
MMRP Database			
SITE INVESTIGATION DESIGN			
15. Was the site divided into subareas to focus on areas of common usage, similar topography and vegetation, and/or other unique site features?	X		
Sources reviewed and comments:			
Yes - the MRA was divided into MRSs 14A, -29, -30, and -47.			
References:			
USACE 1997a			
16. Should the site be divided into subareas based on the above features?		X	
Sources reviewed and comments:			
Sources reviewed and comments: the MRA was divided into MRSs 14A, -29, -30, and -47 as presented in the 1997 Revised ASR (USACE 1997a) and remains that way for land transfer parcels			
References:			
USACE 1997a			
17. Should current site boundaries be revised based on sampling results?		X	

Appendix D
Munitions Response Activity Evaluation Checklists for Laguna Seca Parking MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive

Sources reviewed and comments:

Current site boundaries are based on existing parcel boundaries and should not be modified.
References:

ESCA RP TEAM 2008

EQUIPMENT REVIEW

18. Was equipment used capable of detecting items suspected at the site at the maximum expected depth?			X

Sources reviewed and comments:

The equipment used for removal actions in the Laguna Seca Parking MRA was the Schnostedt GA-52Cx. The Schonstedt Model GA-52Cx is less effective for detecting the smaller (less than 2 lbs) or more deeply buried (greater than 2 ft) objects. The results of the evaluation indicate that some projectiles found have the capability of penetrating below the depth of detection. It is, however, expected that these items would not be expected to penetrate to their maximum calculated depth, but to be mostly in the top 12 inches where they have been found at the site.

References:

USAEDH 1997, Parsons 2001, MMRP Database

19. Was equipment used capable of detecting the types of items (e.g., non-ferrous) suspected at the site?	X		

Sources reviewed and comments:
The Schonstedt GA-52Cx is effective at detecting ferrous items. The majority of the items found at the Laguna Seca Parking MRA contained ferrous material. Items that would be more difficult to detect using a Schonstedt GA-52Cx include grenade fuzes, signal and flares (they contain little ferrous material) and smaller potentially deeper penetrating items. Individual grenade fuzes, signals, flares and small projectiles were all detected within the Laguna Seca Parking MRA at maximum depths of 12, 12, 24 and 36 inches, respectively.
References:

MMRP Database

20. Do the results of the Ordnance Detection and Discrimination Study (ODDS) indicate that items suspected at the site would have been detected by the instrument used at the time of investigation?			X

Sources reviewed and comments:
The results of the seeded test indicate that the items suspected at the site, and used in the ODDS study, were detectable in the top 6 inches (100%); however detection rates decrease depending on the size and depth of the item. The results of the removal actions at the Laguna Seca MRA indicate it is possible to detect suspected munitions below 2 feet.

	Yes	No	Inconclusive

References:

MMRP Database, Parsons 2001, USAEDH 1997

21. Do results of the investigation indicate that suspected items could be detected with a high level of confidence at observed and expected depth ranges?			X

Sources reviewed and comments:

The Laguna Seca Parking MRA data indicated that 80% of the penetrating type UXO items were detected in the top 12 inches, 15% between 1 and 2 feet and 5% between 2 and 3 feet.

References:

MMRP Database, Parsons 2001, USAEDH 1997

22. Were all the instruments used to evaluate the site maintained and calibrated in accordance with associated work plan and manufacturers' specifications?	X		

Sources reviewed and comments:

After Action Reports

References:

USA 2000a, USA 2000b, USA 2001b, UXB 1995c

DATA PROCESSING AND DATA MANAGEMENT

23. Was the appropriate data processing scheme used for the site, and how were the data processed?	NA		

Sources reviewed and comments:

NA

References:

24. Have the field data been collected and managed in accordance with quality control standards established for the project?	X		

Sources reviewed and comments:

The data was collected and maintained according to the work plans and QA/QC procedures as documented in the After Action Reports. The after action reports indicated that QC/QA was done in all areas, with three deficiencies noted and corrective actions taken.

Appendix D
Munitions Response Activity Evaluation Checklists for Laguna Seca Parking MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive

References:

USA 2000a, USA 2000b, USA 2001b, UXB 1995c

RESULTS OF REMOVAL EVALUATION

A. Can the data be used to perform a risk assessment?	X		

Comments:

Review of the available data indicates that the data can be used for performance of risk assessment.
References:

B. Can the data be used to perform a feasability study?	X		

Comments:

Review of available data indicates that the data can be used to prepare the feasibility study.
References:

Appendix D
Munitions Response Activity Evaluation Checklists for MOUT Site MRA
Part 1: Literature Review

	Yes	No	Inconclusive

TYPE OF TRAINING AND MILITARY MUNITIONS EXPECTED

1. Is there evidence that the site was used as an impact area (i.e., fired military munitions such as mortars, projectiles, rifle grenades, or other launched ordnance)?	X		

Sources reviewed and comments:
1997 Revised Archives Search Report (ASR) (USACE 1997a): ..."reports of 40mm HE grenades and bazooka rounds fired into Wildcat Canyon, somewhere south of Impossible city." While aerial photographs and historical training maps do not indicate this area was used as an impact area, it was at one time part of the inland ranges prior to the building of the MOUT facility.

2. Is there historical evidence that training involved use of High Explosive (HE) or Low Explosive (LE) items?	X		

Sources reviewed and comments:

Revised ASR (USACE 1997a): ..."the use of HE hang grenades was authorized at the Tire House, ... reports of 40mm HE grenades and bazooka rounds fired into Wildcat Canyon, somewhere south of Impossible city." Aerial photographs & historical training maps do not indicate use of HE or LE, However, the 1961 and 1992 Training Maps show a rocket launcher range fan with the firing point in the mid-section of the MRA.

3. Is there historical evidence that training involved use of pyrotechnic and/or smoke-producing items (e.g., simulators, flares, smoke grenades) but not explosives?	X		

Sources reviewed and comments:

ASR, Supplement 1(USACE 1994), Revised ASR (USACE 1997a), the historical training maps, and aerial photographs indicate this area was used for training infantry to operate within an urban center. The use of pyrotechnic and/or smoke-producing items would have been included in that training.

DEVELOPMENT AND USE OF SURROUNDING AREA

4. Does subsequent development or use of the area indicate that military munitions would have been used at the site?	X		

Sources reviewed and comments:

The area continues to be used as a MOUT site (ESCA RP Team 2008).

5. Does use of area surrounding the site indicate that military munitions would have been used at the site?	X		

Sources reviewed and comments:

Training maps indicate surrounding areas were used for hand grenade training from the earliest training map available (1953) to the latest training map available 1992; 1956/1957 training maps indicated that rifle grenade training occurred just north east of the site.

Appendix D
Munitions Response Activity Evaluation Checklists for MOUT Site MRA
Part 1: Literature Review

	Yes	No	Inconclusive

ESTABLISHMENT OF SITE BOUNDARIES

	Yes	No	Inconclusive
6. Is there evidence of training areas on aerial photographs that could be used to establish site boundaries?	X		

Sources reviewed and comments:
Beginning with the 1949 aerial photograph, roads and clearings can be seen in the central and northern portions of the MRA. By 1978 clearnings and roads are also apparent in the southern area of the MRA. By 1986, the range fan at the southwest of the MRA, the tire house at the southeast of the MRA and the MOUT at the northern end of the MRA are plainly seen (aerial photos 1949, 1978, 1986).

	Yes	No	Inconclusive
7. Is there evidence of training on historical training maps that could be used to establish boundaries?		X	

Sources reviewed and comments:

The historical training maps do not provide consistent indications of where training occurred. The site is more defined by being contained within a valley (Army 1934, 1953, 1956, 1957, 1961, 1964, 1968, 1971, 1972, 1984, 1987, 1992).

	Yes	No	Inconclusive
8. Should current boundaries be revised?		X	

Sources reviewed and comments:

No indication based on the literature review that the boundaries should be revised.

RESULTS OF LITERATURE EVALUATION

	Yes	No	Inconclusive
9. Does the literature review provide sufficient evidence to warrant further investigation?	X		

Sources reviewed and comments:

Review of literature including the 1993/1997 ASRs (USACE 1993, 1997a), aerial photographs, and historical training maps provide sufficient evidence to warrant further investigation.

Appendix D
Munitions Response Activity Evaluation Checklists for MOUT Site MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive
HISTORICAL INFORMATION			
1. Is there evidence that the site was used as an impact area (i.e., fired military munitions such as mortars, projectiles, rifle grenades, or other launched ordnance)?	X		

Sources reviewed and comments:

The After Action Reports (Shaw 2005, USA 2001c) and the MMRP database indicate that 2.36" and 3.5" Practice Rockets were used within the within the parcel F7.2.1 portion of the MOUT Site MRA.
References:

MMRP Database, Shaw 2005, USA 2001c

2. Is there evidence that training involved use of explosive items?	X		

Sources reviewed and comments:

The After Action Reports (Shaw 2005, USA 2001c) and the MMRP database indicate that explosives items were not likely used but may have been discarded within the MOUT Site MRA.
References:

MMRP Database, Shaw 2005, USA 2001c

3. Is there evidence that training involved use of pyrotechnic and/or smoke-producing items (e.g., simulators, flares, smoke grenades) but not explosives?	X		

Sources reviewed and comments:

Appendix D
Munitions Response Activity Evaluation Checklists for MOUT Site MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive

According to the After Action Reports, the MMRP data base, and data collected during the MOUT Site MRA Field Verification Survey:
A variety of simulators (MEC, MD items were not cataloged) were found within Parcel F1.7.2 of the MOUT Site MRA and included: one M74 airburst projectile simulator, one M117 explosive booby trap simulator (flash), one M110 flash artillery simulator, one M116A1 hand grenade simulator, one M115A2 ground burst projectile simulator, and two of the civilian M15 blast stinger simulators (Plate C3). The simulators were not located in the same area: two were in the northern portion of the parcel, two in the central portion, and two in the southern portion of the parcel.
No simulators (MEC or MD) were found along Parcel L20.8 (Barloy Canyon Road) of the MOUT Site MRA (Plate C3).
Flares (1 MEC and 2 MD) were found in Parcel F1.7.2 of the MOUT Site MRA (Plate C3). One M49 surface trip flare (MEC) was found on the surface in the northern portion of the parcel. Two M48 parachute trip flares (MD) were found at 3 inches and 4 inches bgs in the central portion of the parcel. No flares (MEC or MD) were found along Parcel L20.8 (Barloy Canyon Road) of the MOUT Site MRA (Plate C3).
M18 (8 MEC and 11 MD) and M48 smoke grenades (6 MEC) were found in the MOUT Site MRA, with the highest concentration of these items found in the northern portion of the MRS-28, however M18 MD was also found along the northwestern border and in the center of the MRS. No smoke grenades were found in the southern portion of MRS-28.

References:

MMRP Database, Shaw 2005, USA 2001c, MOUT Site MRA Field Verification Survey (Appendix E)

REMOVAL RESULTS

4. Was removal performed within the appropriate area?	X		

Sources reviewed and comments:

The After Action Report (Shaw 2005) for the TCRA indicates three of the grids lie outside of the current MOUT Site MRA boundary. Data from those 3 grids was not included in the MOUT Site MRA RI.
References:

Shaw 2005

5. Were the type(s) of items found consistent with the type of training identified for the site?	X		

Sources reviewed and comments:

The types of items found were consistent with the type of training identified for the site and the nearby areas.
References:

MMRP Database, Fort Ord Training and Facility maps 1953 through 1992, MOUT Site MRA Field Verification Survey (Appendix E)

6. Were the type(s) of items found consistent with the era(s) in which training was identified?	X		

Appendix D
Munitions Response Activity Evaluation Checklists for MOUT Site MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive

Sources reviewed and comments:

Items found were consistent with training in this area occurring from the 1950s through the 1980s.
References:

Fort Ord Training and Facility maps 1953 through 1992

7. Was High Explosive (HE) fragmentation found?			X

Sources reviewed and comments:

With the exception of one piece of mortar debris, the MMRP Database does not list any HE fragmentation. However, MD items were only documented during sampling actions and not during the visual surface removal. No HE fragmentation was found during the MOUT Site MRA Field Verification Survey.
References:

MMRP Database, Shaw 2005, USA 2001c, MOUT Site MRA Field Verification Survey (Appendix E)

8. Were HEs found?	X		

Sources reviewed and comments:

According to the MMRP Database, one M67 Fragmentation Hand Grenade was found in the F7.2.1 portion of the MRA. This location is consistent with the HE hand grenade training that occurred to the west of the parcel. It was found on the surface.
References:
MMRP Database, Shaw 2005, USA 2001c, MOUT Site MRA Field Verification Survey (Appendix E)

9. Were Low Explosives (LEs) found?	X		

Sources reviewed and comments:

According to the MMRP Database practice hand grenades which are designated as LE were found in F7.2.1.
References:

MMRP Database, Shaw 2005, USA 2001c, MOUT Site MRA Field Verification Survey (Appendix E)

Appendix D
Munitions Response Activity Evaluation Checklists for MOUT Site MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive
10. Were pyrotechnics found?	X		

Sources reviewed and comments:

According to the After Action Reports, the MMRP database, and data collected during the MOUT Site MRA Field Verification Survey:
Signals (1 MEC and 17 MD) were found in Parcel F1.7.2 of the MOUT Site MRA (Plate C3). No signals (MEC or MD) were found along Parcel L20.8 (Barloy Canyon Road) of the MOUT Site MRA (Plate C3).
References:

MMRP Database, Shaw 2005, USA 2001c, MOUT Site MRA Field Verification Survey (Appendix E)

11. Were smoke-producing items found?	X		

Sources reviewed and comments:

Yes, see answer to question #3.
References:

MMRP Database, Shaw 2005, USA 2001c, MOUT Site MRA Field Verification Survey (Appendix E)

12. Were explosive items found (e.g., rocket motors with explosive components, fuzes with explosive components)?	X		

Sources reviewed and comments:
Yes. According to the MMRP Database and data collected during the MOUT Site MRA Field Verification Survey, 3.5in Practice Rockets (1 MEC and 109 MD), eight 2.36in M7 Practice Rockets (MD), and a variety of grenade fuzes were found in the MRA.
References:

MMRP Database, Shaw 2005, USA 2001c, MOUT Site MRA Field Verification Survey (Appendix E)

13. Do items found in the area indicate training would have included use of training items with energetic components?	X		

Sources reviewed and comments:

Items found indicate training utilizing practice hand grenades, simulators mainly within the F7.2.1 portion of the MRA.

Appendix D
Munitions Response Activity Evaluation Checklists for MOUT Site MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive

References:

MMRP Database, Shaw 2005, USA 2001c, MOUT Site MRA Field Verification Survey (Appendix E)

14. Were items found in a localized area (possibly the remnants of a cleanup action)?		X	

Sources reviewed and comments:

References:

MMRP Database, Shaw 2005, USA 2001c, MOUT Site MRA Field Verification Survey (Appendix E)

SITE INVESTIGATION DESIGN

15. Was the site divided into subareas to focus on areas of common usage, similar topography and vegetation, and/or other unique site features?		X	

Sources reviewed and comments:

The site was not divided into sectors based on site usage or site features. The site boundaries were identified based on reuse plans rather than historical range usage information.

References:

ESCA RP Team 2008

16. Should the site be divided into subareas based on the above features?		X	

Sources reviewed and comments:

The sampling and removal action operations conducted on the MOUT Site MRA do not indicate the need to divide the MRA into sub areas. A 4-ft 100% Grid Sampling of 16 Grids, and a SS/GS Sampling of 13 100-ft by 200-ft Grids was performed prior to the TCRA (Visual Surface) and Field Verification Survey conducted over the MRA.

References:

Shaw 2005, USA 2001c, MOUT Site MRA Field Verification Survey (Appendix E)

17. Should current site boundaries be revised based on sampling results?		X	

Sources reviewed and comments:

Current site boundaries are based on existing parcel boundaries and should not be modified.

Appendix D
Munitions Response Activity Evaluation Checklists for MOUT Site MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive

References:

ESCA RP Team 2008

EQUIPMENT REVIEW

18. Was equipment used capable of detecting items suspected at the site at the maximum expected depth?	X		

Sources reviewed and comments:

Sampling Actions: The items discovered at the site are mostly related to non-penetrating items - with the exception of Practice Rockets and a few pyrotechnic items which are not expected to penetrate below the depth of detection.
Time Critical Removal Action (Visual Surface): Shaw performed the TCRA (Visual Surface) in accordance with their work plan (Shaw 2003). No instruments were used during the visual surface sweep.
The field verification survey was conducted in accordance with the Final Group 3 RI/FS Work Plan and the Final Phase II Interim Action Work Plan.
References:

USAEDH 1997, Shaw 2005, USA 2001c, ESCA RP 2009 and 2011

19. Was equipment used capable of detecting the types of items (e.g., non-ferrous) suspected at the site?	X		

Sources reviewed and comments:

The majority of the items found within the MOUT Site MRA contain ferrous metal. The Schonstedt Model GA-52Cx used for sampling actions at the MOUT Site MRA only detects ferrous metals. The items that would be more difficult to detect using the Schonstedt GA-52Cx include grenade fuzes (containing little ferrous metal).
References:

Shaw 2005, USA 2001c, MOUT Site MRA Field Verification Survey (Appendix E)

20. Do the results of the Ordnance Detection and Discrimination Study (ODDS) indicate that items suspected at the site would have been detected by the instrument used at the time of investigation?	X		

Sources reviewed and comments:

The Schonstedt Model GA-52Cx magnetometer was used during the sampling actions conducted in the MOUT Site MRA. This instrument was evaluated as part of the ODDS and
the instrument is capable of detecting the type of MEC items expected at this site.
References:

MMRP Database, Parsons 2001, Shaw 2005, USA 2001c, MOUT Site MRA Field Verification Survey (Appendix E)

Appendix D
Munitions Response Activity Evaluation Checklists for MOUT Site MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive
21. Do results of the investigation indicate that suspected items could be detected with a high level of confidence at observed and expected depth ranges?	X		

Appendix D
Munitions Response Activity Evaluation Checklists for MOUT Site MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive

Sources reviewed and comments:

Although not directly comparable to the MOUT Site MRA, results of the ODDS suggest that the equipment used should be able to detect ferrous MEC at the depths expected in the MOUT Site MRA.

References:

MMRP Database, Parsons 2001, Shaw 2005, USA 2001c, MOUT Site MRA Field Verification Survey (Appendix E)

22. Were all the instruments used to evaluate the site maintained and calibrated in accordance with associated work plan and manufacturers' specifications?	X		

Sources reviewed and comments:

Shaw 2005, USA 2001c, MOUT Site MRA Field Verification Survey (Appendix E)

References:

DATA PROCESSING AND DATA MANAGEMENT

23. Was the appropriate data processing scheme used for the site, and how were the data processed?			NA

Sources reviewed and comments:

References:

24. Have the field data been collected and managed in accordance with quality control standards established for the project?	X		

Sources reviewed and comments:

Appendix D
Munitions Response Activity Evaluation Checklists for MOUT Site MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive

The grids sampled for the MOUT Site MRA were not subject to formal QC/QA inspections because of the nature of the sampling procedures. CMS performed daily operational checks and QC inspections, as documented in the AAR for MRS -28 (USA 2001c). The USA QC specialist was responsible for ensuring that personnel performed operational checks and made appropriate log entries. The QC specialists performed random unscheduled checks of the various sites to ensure the personnel performed the work as specified in the work plan.

Because of the nature of SS/GS sampling, the AAR indicated that QA and QC checks of SS/GS operations were limited to inspections of operational activities and documentation. No deficiency reports were written during inspections of the work done in MRS-28 of the MOUT Site MRA (USA 2001c).

QC inspection was performed by the Shaw UXOQCS and included the following activities:
• Each grid was walked at least once with a coverage of 10 to 20 percent
• Field activities were observed to verify conformance to required procedures
• Field documentation was reviewed
• Data from the Geographical Information System (GIS) was verified against field conditions

There were no variances or non-conformances issued during the TCRA. In addition, almost all grids (greater than 99.9%) were passed on initial QC inspection. This percentage included grids outside of the MOUT Site MRA where QC inspection was also performed. Three grids were re-swept due to QC inspections, and then passed by QC (Shaw 2005).

QA was provided by the USACE and consisted of monitoring field practices, reviewing and observing field ground control and GPS procedures, examining data files and anomaly maps, and physically walking each grid with a coverage of at least 10 percent. All grids passed QA inspections (Shaw 2005).

The ESCA RP Team performed operational checks and an analog check of 10% of the field verification survey area.

References:

Shaw 2005, USA 2001c

RESULTS OF REMOVAL EVALUATION

A. Can the data be used to perform a risk assessment?	X		

Comments:

Review of the available data indicates that the data can be used for performance of risk assessment.
References:

NA

B. Can the data be used to perform a feasibility study?	X		

Appendix D
Munitions Response Activity Evaluation Checklists for MOUT Site MRA
Part 2: Removal Evaluation

	Yes	No	Inconclusive

Comments:

Review of available data indicates that the data can be used to prepare the feasibility study.

References:

NA

APPENDIX E

MOUT Site MRA Field Verification Survey

Field Variance Form No. G3WP-001

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FIELD VARIANCE FORM

DATE:	24-JAN-12	**PROJECT NAME:**	Military Operations in Urban Terrain (MOUT) Site Munitions Response Area	**PROJECT LOCATION:**	MOUT Training Area (MRS-28)
APPLICABLE DOCUMENT / SECTION:	Final Group 3 Remedial Investigation/Feasibility Study Work Plan, Former Fort Ord, dated November 13, 2009, Section 5.3 Task 3 Field Investigation				
SUBJECT:	Field Verification of Surface Conditions in the Southwestern Portion of the MOUT Training Area (MRS-28)				

FIELD CHANGE CONDITION:

The munitions and explosives of concern (MEC) investigations and removal actions conducted by the Army within the MOUT training area (MRS-28) of the MOUT Site Munitions Response Area (MRA) included a 4-foot grid sampling investigation of sixteen 100-foot by 100-foot grids using Schonstedt magnetometers, a Site Stats/Grid Stats (SS/GS) sampling investigation of thirteen 100-foot by 200-foot grids using Schonstedt magnetometers, a Visual Surface Time Critical Removal Action (TCRA), and a military munitions reconnaissance, as shown in Figure 1.

The 4-foot grid sampling investigation and the SS/GS sampling investigation were conducted by the Army to determine the need for performing a MEC removal action. The Visual Surface TCRA was conducted by the Army to remove MEC, as well as munitions debris (MD) greater than 2 inches in size, from the ground surface following an accidental fire in the area. The TCRA included the entire MOUT training area (MRS-28) with the exception of a small area along the southwestern border, as shown in Figure 1. The MEC and MD found in the vicinity of the small area consisted of practice hand grenade fuzes, practice hand grenades, 40 millimeter cartridge cases, 2.36- and 3.5-inch practice rockets, and illumination signals.

Based on the MEC investigation and removal actions, the Finding of Suitability for Early Transfer (FOSET) indicated that the intended use of the MOUT training area (MRS-28) for tactical training of military, federal, and local law enforcement was protective of human health and the environment with the implementation of land use controls. The FOSET also included a finding that MEC was not expected to remain on the surface at the MOUT training area (MRS-28).

During development of the Group 3 Remedial Investigation/Feasibility Study (RI/FS) report, it was identified that the small area along the southwestern border of the MOUT training area (MRS-28) was not part of the TCRA. In consultation with the regulatory agencies and the Army, it was determined that the most effective approach for the MOUT training area (MRS-28) was to verify that MEC are not present on the surface in the small area along the southwestern border, as indicated in the FOSET, at which point the area can be re-evaluated in the Group 3 RI/FS report.

Therefore, an instrument-aided field verification site walk is recommended to verify that MEC are not present on the surface in the small area along the southwestern border of the MOUT training area (MRS-28). The field verification area is identified in Figure 2 and consists of twenty-four 100-foot by 100-foot whole and partial grids.

RECOMMENDED APPROACH / CHANGE:

The objective of the instrument-aided field verification is to verify that MEC are not present on the surface in the small area along the southwestern border of the MOUT training area (MRS-28) of the MOUT Site MRA. Preparatory inspections were performed to determine the site preparation measures, such as the placement of boundary and grid corner stakes and presence of vegetation and other material that would interfere with the field verification operations. The individuals who participated in the inspections included the Senior UXO Supervisor (SUXOS), UXO Safety Officer (UXOSO), Remediation Project Manager, Technical Project Manager, and representatives of the regulatory agencies and the Army.

The recommended instrument-aided field verification will include the following activities:

- Site preparation
  - Placement of boundary and grid corner stakes (to establish the field verification area)
  - Vegetation cutting
- Analog instrument-aided field verification survey
- Documentation

The field verification will be conducted in accordance with previously agreed upon procedures as described below, which have been established in Environmental Services Cooperative Agreement Remediation Program (ESCA RP) work plans, and the attached Site Safety and Health Plan (Attachment A).

Site Preparation

Site preparation field activities (i.e., vegetation cutting) will be performed by non-unexploded-ordnance- (UXO-) certified workers. These activities do not involve intrusive tasks; however, UXO escorts will be assigned to work with these field crews. Only personnel qualified as UXO Technician II (at a minimum) will escort personnel who are not directly involved in UXO-related operations, but have activities to perform within exclusion areas.

Establishing Site Boundary

Before vegetation cutting activities begin, a survey control point will be established by a registered land surveyor before boundaries for the verification area are established with survey markers. The survey markers will consist of stakes, flags, or paint markings (hereafter "stakes") and will assist the brush-cutting crews to guide the extent of vegetation cutting activities. The boundaries will be staked in the field based on the coordinates as reported in the Army's Geographic Information System (GIS) and associated databases. In all cases, personnel installing the boundary and grid corner stakes will be UXO Technicians who will use the surveyed control point to establish the boundary and grid corners. In addition, the UXO Technicians will check the area using a Schonstedt GA-52/Cx before intrusive activities are conducted, such as placing survey stakes. Limited tree branch removal and/or vegetation cutting may occur during this phase to allow for survey sight lines.

Boundary staking work on the MRA will be based on monuments established in the field by registered land surveyors. The coordinate system to be used for control points and other survey activities is North American Datum (NAD) 83 California State Plane Zone IV U.S. survey feet.

Vegetation Cutting

Vegetation cutting will be conducted to facilitate the field verification operations. Vegetation will be cut to the extent practicable while preserving trees; however, the limbs of the trees may be trimmed to maximize the ground surface available for the field verification. The vegetation debris will be chipped on site or removed from the work areas.

Subcontracted brush-cutting teams (normally consisting of two to six laborers) will work with a UXO Technician II for MEC avoidance and conduct vegetation cutting utilizing manual and mechanical cutting equipment. Vegetation-cutting activities will be conducted in accordance with the Standard Operating Procedure (SOP) for Mechanical Vegetation Cutting and the SOP for Chipping Operations (Attachment B).

Manual vegetation cutting will be conducted under the direction of the SUXOS. UXO Technician II personnel assisted by analog

instruments will survey accessible portions of the work areas ahead of the brush-cutting crews to identify MEC items that may be present on the surface or within the vegetation. A magnetometer is used to aid in searching the vegetation for surface MEC before cutting vegetation. The amount of vegetation cutting required depends on the terrain and the amount of access required for conducting work and maintaining safety. Surface MEC encountered by the brush-cutting team will be marked by a UXO Technician II. The MEC items will be left in place and the SUXOS will be notified to coordinate safe removal of the MEC item.

Manual vegetation cutting will be conducted using power chippers, powered weed cutters, DR™ trimmers, chainsaws, and a variety of similar hand tools and equipment. Each brush-cutting team will have a leader or foreman who will ensure that personnel engaged in vegetation cutting activities are wearing personal protective equipment (PPE) and accessories appropriate for the equipment being operated (e.g., chainsaw chaps).

Mechanical vegetation cutting will be conducted under the direction of the SUXOS. Mechanical vegetation cutting may be accomplished using Bobcat-style skip loaders or excavators that have been equipped with vegetation-cutting heads. Vegetation-cutting support equipment may include skip loaders to remove cut brush from the work area for chipping. If a consolidated chipping operation is conducted, excavators or loaders may be used to feed the chipping or grinding equipment and spread or load chips. Once cut, the vegetation piles will be removed from the work areas or chipped to avoid interference with field activities.

Analog Instrument-Aided Field Verification Survey

Work areas will be verified using Schonstedt magnetometers. This task will be completed following vegetation cutting. UXO Teams for analog surveys are normally composed of a UXO Team Leader and up to six UXO Technicians. UXO Teams will operate under the direct supervision of a SUXOS. A UXOSO will closely monitor the safety of the UXO Teams.

The UXO Team Leader will direct personnel to establish individual search lanes approximately 3 to 5 feet wide and to search each lane using a Schonstedt Model GA-52/Cx magnetometer. UXO Technicians will start at one end of each lane and move forward toward the opposing base line. During the forward movement, the UXO Technician will move the magnetometer back and forth from one side of the lane to the other. Both forward movement and the swing of the magnetometer are performed at a pace that ensures that the entire lane is searched and that the instrument is able to appropriately respond to surface anomalies. Whenever a metallic anomaly is encountered, the UXO Technician will halt and investigate the anomaly as described in the following paragraphs. Throughout this operation, the UXO Team Leader will closely monitor individual performance to ensure that these procedures are being performed with due diligence and attention to detail.

Each surface anomaly will be investigated to determine if the anomaly is MEC, MD, or a non-military munitions item, such as wire, construction debris, or rebar (i.e., other debris). Subsurface anomalies will not be investigated during this operation; however, the grid will be documented on appropriate forms as containing subsurface anomalies. MEC items encountered will be immediately reported to the SUXOS, surveyed with a global positioning system (GPS) unit for documentation purposes, and handled in accordance with the proper handling procedures. If the anomaly is a MEC item or MD that can be identified, the type of munitions and approximate weight of the item will be recorded. If the anomaly yields a non-military munitions item or fragments or pieces of MEC items that are not intact and cannot be positively identified, then the approximate total weight will be recorded, but the type of MEC item(s) will not be recorded.

The UXO Teams will be provided with the appropriate forms to record relevant data related to the field verification. Annotations will be recorded for MEC and MD that can be positively identified and grids with the presence of subsurface anomalies. Annotations will include site name, instrument used, easting and northing coordinates (in local NAD 1983 State Plane Coordinates, California Zone IV, U.S. survey feet), grid number, description, weight, and subsequent actions taken.

The MEC items encountered will be initially classified as materials potentially presenting an explosive hazard (MPPEH) until the items are fully inspected and can be identified as MEC, MD, or metal scrap. MD and metal scrap will be transported from the area and stored until it can be disposed of by a foundry and/or recycler, where it will be processed through a smelter, shredder, or furnace prior to resale or release. The MD and metal scrap will be inspected by a SUXOS and a UXO Quality Control Specialist to verify that it is free from explosives.

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Documentation

The results of the instrument-aided field verification survey will be incorporated into the Group 3 RI/FS report to support the final remedial action decision making process.

IMPACT ON PRESENT AND COMPLETED WORK:

No impact to present or completed work.

REQUESTED BY: Kristie Reimer, ESCA Remediation Program Manager (ARCADIS)

[ ] CLARIFICATION/FOR INFORMATION ONLY [ ] MINOR CHANGE [X] MAJOR CHANGE

ESCA RP TEAM APPROVALS: G. CLARK, L. TEMPLE, B. MOE

COMMENTS

ACKNOWLEDGED BY:	**GREG CLARK** **ESCA RP UXO SAFETY OFFICER (WESTON)**	**SIGNATURE**	**DATE** 1/24/12
ACKNOWLEDGED BY:	**BRUCE MOE** **ESCA RP SENIOR UXO SUPERVISOR (WESTON)**	**SIGNATURE**	**DATE** 1/24/12
ACKNOWLEDGED BY:	**LINDA TEMPLE** **ESCA RP REMEDIATION PROJECT MANAGER (WESTON)**	**SIGNATURE**	**DATE** 1/24/12

FORA APPROVAL:

COMMENTS

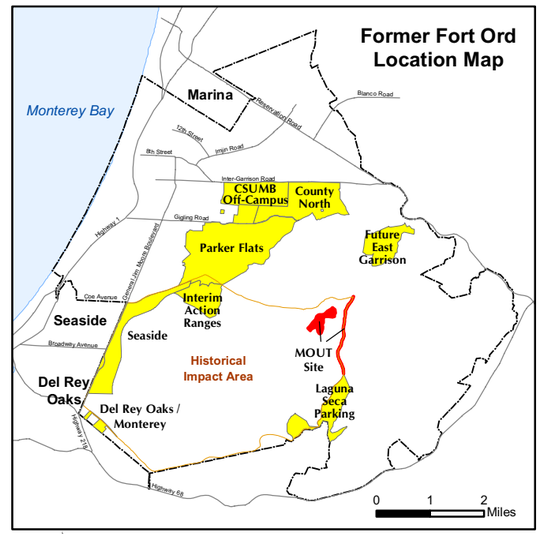
[X] **APPROVED** [ ] **REJECTED**	**STAN COOK** **FORA ESCA PROGRAM MANAGER**	**SIGNATURE**	**DATE** 1/24/12

ATTACHMENTS:
Figure 1 – MOUT Site MRA, MOUT Training Area (MRS-28), MEC Investigation and Removal Actions
Figure 2 – MOUT Site MRA, MOUT Training Area (MRS-28), Field Verification Area
Attachment A – Site Safety and Health Plan
Attachment B – Standard Operating Procedures for Vegetation Cutting and Chipping

MRS-58
MRS-10A
MRS-27I
MRS-10B
MRS-27J
MRS-27O
MRS-27K
MRS
MRS-12
EUCALYPTUS ROAD (EAST)
MRS-28
BARLOY CANYON ROAD
MRS-27P
MRS-BLM
MRS-25
MRS-26
MRS-27T
MRS-14D
MRS-14E
MRS-27V

Legend

- 4-ft Sampling Grid
- SS/GS Sampling Grid
- Visual Surface TCRA
- Military Munitions Reconnaissance
- Area Not Part of an MEC Investigation or Removal Action
- Munitions Response Site
- Major Road
- MRA Boundary



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0 800 1,600 Feet

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MOUT Site MRA
MOUT Training Area (MRS-28)
MEC Investigation and Removal Actions

FORA ESCA RP
Monterey County, California

Figure 1

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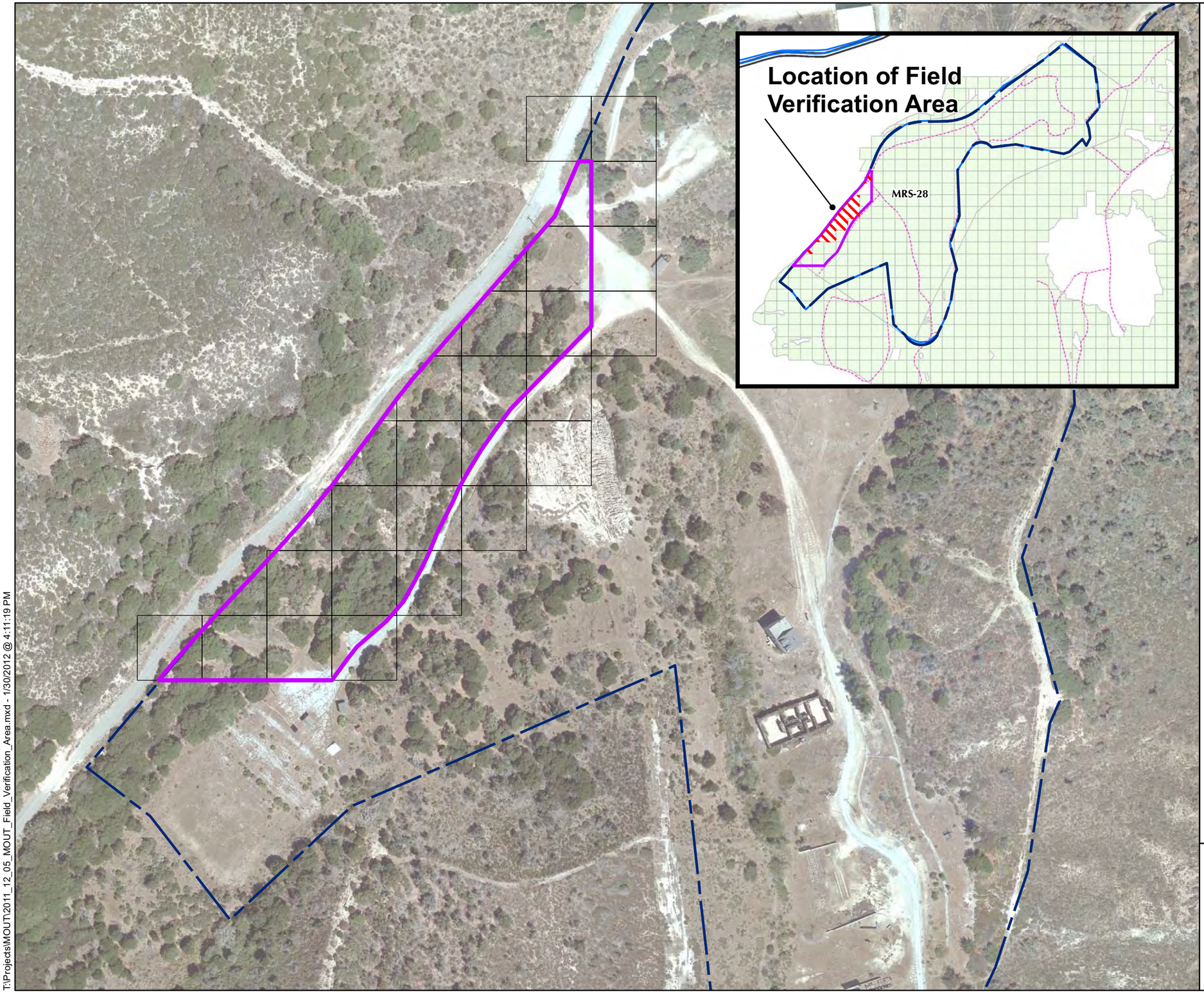
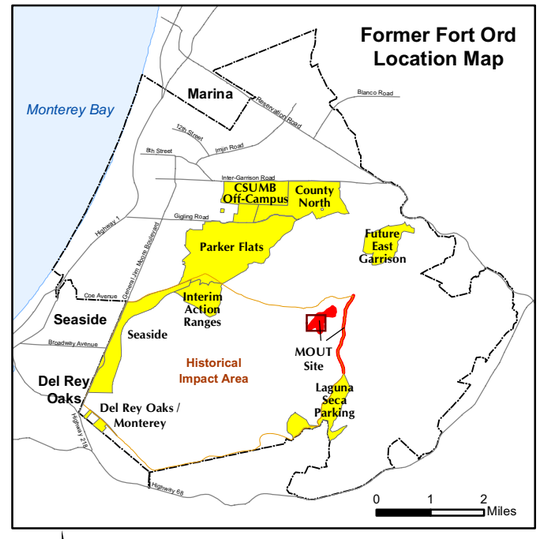
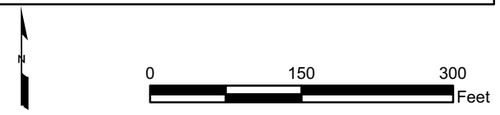


Legend

- Instrument-Aided Surface Field Verification Area
- 100-Foot Grid
- Visual Surface TCRA
- Military Munitions Reconnaissance
- Munitions Response Site
- MRA Boundary
- Area Not Part of an MEC Investigation or Removal Action





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MOUT Site MRA
MOUT Training Area (MRS-28)
Field Verification Area

FORA ESCA RP
Monterey County, California

Figure 2

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ATTACHMENT A

Site Safety and Health Plan

FORA ESCA REMEDIATION PROGRAM

Site Safety and Health Plan

Military Operations in Urban Terrain Site Munitions Response Area

Former Fort Ord
Monterey County, California

December 12, 2011

Prepared for:

FORT ORD REUSE AUTHORITY

902 2nd Avenue, Suite A
Marina, California 93933

Prepared Under:

Environmental Services Cooperative Agreement
No. W9128F-07-2-01621
and
FORA Remediation Services Agreement (3/30/07)

Prepared by:

ARCADIS

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APPENDIX

A Site Compliance Checklist
B Standard Operating Procedures

ACRONYMS AND ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
CFR	Code of Federal Regulations
CPR	cardiopulmonary resuscitation
EOD	Explosive Ordnance Disposal
ESCA RP	Environmental Services Cooperative Agreement Remediation Program
EZ	exclusion zone
FLD	field operating procedure
FORA	Fort Ord Reuse Authority
GPS	Global Positioning System
HAZWOPER	Hazardous Waste Operations and Emergency Response
MRA	Munitions Response Area
MEC	munitions and explosives of concern
MSD	minimum separation distance
MSDS	material safety data sheet
MOUT	Military Operations in Urban Terrain
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
OSIC	On Scene Incident Commander
PHSM	Project Health and Safety Manager
POM	Presidio of Monterey
PPE	personal protective equipment
RMSF	Rocky Mountain Spotted Fever
RPM	Remediation Project Manager
SOP	standard operating procedure
SSHP	Site Safety and Health Plan
SUXOS	Senior Unexploded Ordnance Supervisor
TLV	threshold limit value
UXO	unexploded ordnance
UXOSO	UXO Safety Officer

WESTON	Weston Solutions, Inc.
WP	white phosphorus

1.0 INTRODUCTION

The purpose of this Site Safety and Health Plan (SSHP; also referred to as "the plan") is to establish general guidelines and procedures to ensure protection of the Environmental Services Cooperative Agreement Remediation Program (ESCA RP) Team, subcontractor personnel, and the public while performing operations at the Military Operations in Urban Terrain (MOUT) Site Munitions Response Area (MRA) of the former Fort Ord. The SSHP assigns responsibilities, establishes procedures, and develops contingencies that may arise while operations are performed.

The provisions of this SSHP are mandatory for all on-site activities undertaken by the ESCA RP Team and its subcontractors. All site activities will comply with applicable federal and California requirements. As site conditions change, this plan may need to be modified. Such modifications will be submitted as SSHP addenda and will be numbered sequentially. All SSHP addenda must be reviewed and approved by the Project Health and Safety Manager (PHSM). All ESCA RP Team personnel and subcontractors must read and understand this SSHP and sign a Plan Acceptance Form/Site Visitors Log prior to the start of work at the site.

1.1 Site Compliance Checklist

The Site Compliance Checklist presented in Appendix A of this SSHP will be used by the Unexploded Ordnance Safety Officer (UXOSO) to conduct the project's safety audit.

2.0 PROJECT TEAM RESPONSIBILITIES

Ensuring the safe and healthful conduct of site operations is the responsibility of everyone assigned to the site. The ESCA RP Team and subcontract personnel involved in site activities are responsible for the following:

- Complying with this SSHP and all other required safety and health guidelines
- Taking all necessary precautions to prevent injury to themselves and to their fellow employees
- Continually being alert to any potentially harmful situation and immediately informing the UXOSO of any such identified conditions
- Performing only those tasks that they have been trained to perform and believe they can do safely
- Preventing spillage and splashing of materials to the greatest extent possible
- Practicing good housekeeping by keeping the work area neat, clean, and orderly
- Immediately reporting all injuries, no matter how minor, to the UXOSO
- Maintaining site equipment in good working order and reporting defective equipment to the UXOSO
- Properly inspecting and correctly using the personal protective equipment (PPE)

2.1 Employee Safety Responsibilities

All operations and personnel having the potential for exposure to site hazards are subject to the requirements of this SSHP. Work will not be performed in a manner that conflicts with the safety, health, or environmental precautions outlined in this plan. All site personnel, including any ESCA RP Team subcontractors, who have the potential for exposure to site hazards, are subject to the requirements of this SSHP. Personnel violating safety procedures are subject to dismissal/removal from the project site. Roles and responsibilities for site personnel are summarized in the following subsections.

The following sections describe the roles and responsibilities of the key Weston Solutions, Inc. (WESTON) team members that will be responsible for field activities.

2.2 Remediation Project Manager

Ms. Linda Temple will serve as the Remediation Project Manager (RPM) for the activities covered under this work plan. She has overall responsibility for the management and completion of the project, which includes resource allocation, financial reporting, schedule control, and review and approval of deliverables.

2.3 Project Health and Safety Manager

The PHSM for this project is Mr. Mike Stuart. The PHSM has the following responsibilities.

- Review and final approval of the SSHP.
- Ensure that the SSHP complies with all federal, state, and local health and safety requirements.
- If necessary, modify specific aspects of the SSHP to adjust for on-site changes that will affect safety.
- Evaluate and authorize any changes to the SSHP.
- Implementation and oversight of the Health and Safety Program.
- Assist in acting as liaison with government officials regarding health and safety-related issues.
- Maintain frequent communication with the UXOSO regarding site activities and implementation of the SSHP. Assist in training site personnel in the site-specific hazards.
- Ensure that both the site and site personnel comply with the Health and Safety Program and all other applicable plans.

2.4 Senior UXO Supervisor

Mr. Bruce Moe will serve as the Senior Unexploded Ordnance Supervisor (SUXOS) and will manage field operations in accordance with project requirements. The SUXOS is responsible for coordinating and supervising all site activities.

2.5 Unexploded Ordnance Safety Officer

The UXOSO will be responsible for implementing the SSHP and ensuring that all project personnel follow the requirements of the SSHP. In addition to overall site safety, the UXOSO will also be responsible for enforcing unexploded ordnance (UXO) safety as it applies to munitions and explosives of concern (MEC) operations.

The UXOSO will be responsible for conducting the morning safety meeting for all site personnel to discuss the day's activities, associated hazards, and MEC safety. He will also be required to report any incidents that occur on site to the PHSM. He will be required to implement safety corrective actions through training and reinforced awareness.

The UXOSO for this project is Mr. Greg Clark. The UXOSO has the following responsibilities.

- Implementation and oversight of the Health and Safety Program.
- Assist in acting as liaison with government officials regarding health and safety-related issues.
- If necessary, modify specific aspects of the SSHP to adjust for on-site changes that will affect safety.
- Ensure that both the site and site personnel comply with the Health and Safety Program and all other applicable plans.

2.6 Subcontractors

Qualified subcontractors and associate personnel may be brought on site for specialty services that may include, but are not limited to: surveying, and vegetation removal. These subcontractors will be under the ultimate direction of the SUXOS and are required to adhere to all aspects of the SSHP.

3.0 UNKNOWN FILLER

In the event munitions suspected of containing unknown filler are encountered, field activities should be conducted in accordance with the Standard Operating Procedure (SOP) for MEC with Unknown Filler presented in Appendix B of this Site Safety and Health Plan.

4.0 FIELD ACTIVITIES

The fieldwork will generally consist of mobilization, site preparation, verification site walk, MEC operations, and demobilization. These major activities can be summarized as follows:

Activity 1: Preliminary Activities

This task includes the mobilization of personnel, equipment, and supplies to the project site.

Activity 2: Site Preparation Activities

This task includes site surveying to delineate work areas and vegetation cutting.

Activity 3: Verification Site Walk Activities

This includes a surface analog survey. The first step will be the implementation of the Instrument Verification Strip. Man-portable analog systems will be utilized.

Activity 4: MEC Operations

This task includes MEC safety escort activities, removal of surface MEC anomalies, and destruction/disposal of MEC and scrap materials.

UXO Technicians II will inspect work areas prior to performing survey or clearing operations for hazardous MEC items as well as escort any visitors during work activities.

The UXOSO coordinates access control and security on site during all MEC operations. Except for low risk MEC escort activities, only essential personnel will be allowed in the work zone. The work zone is the work site, and encompasses an area large enough to prevent personnel injuries from fragmentation resulting from unintentional or intentional detonations.

During on-site operations, the SUXOS will order operations to cease if nonessential personnel are observed within the operating area. To ensure safety, site controls include the following:

- Eating, drinking, and smoking are prohibited except in designated areas.
- Hazardous MEC operations cease if nonessential personnel are present.
- The SUXOS, UXOSO, or their designee escorts authorized site visitors.
- All personnel entering the site, including visitors, will wear the proper PPE and sign in and out on the Site Visitors Log.
- The UXOSO maintains the Site Visitors Log to ensure accurate accountability of personnel on site.

The UXOSO provides a SSHP/MEC safety briefing to all personnel entering the site to inform them of potential site hazards. All personnel must acknowledge this briefing by signing the SSHP Plan Acceptance Form/Site Visitors Log.

In case of an emergency, personnel exit the site and move to a designated safe area. The UXOSO will determine the designated safe area that is located upwind of the site outside of the fragmentation area. The SUXOS will notify the site manager if an emergency warrants site evacuation.

Activity 5: Demobilization Activities

This task includes the restoration of work areas and the demobilization of all remaining equipment and other items from the project site after project completion.

5.0 HAZARD ANALYSIS AND RISK ASSESSMENT

Safety, biological, and physical hazards will present a risk to workers at former Fort Ord sites. The level of risk is dependent upon the type of work being done. The paragraphs that follow describe the safety, biological, and physical hazards associated with planned activities.

5.1 Safety Hazards

The major safety hazard for operations performed at former Fort Ord sites is the unintended detonation of ordnance. Other anticipated safety hazards include slip hazards and power tool use. Procedures to minimize these hazards are presented below.

5.1.1 MEC

Ordnance and ordnance-related items will be encountered at the former Fort Ord. Personnel must be alert for MEC and munitions debris. All field personnel must observe the following general safety precautions:

- DO NOT touch or move any potential MEC until positive identification has been determined, regardless of the markings or apparent condition.
- DO NOT visit an ordnance site if an electrical storm is occurring or approaching. If a storm approaches during a site visit, leave the site immediately and seek appropriate shelter.
- DO NOT walk across an area where the ground cannot be seen. If dead vegetation or animals are observed, leave the area immediately due to potential contamination by chemical agent.
- DO NOT drive vehicles into areas suspected of MEC. Use clearly marked lanes.
- DO NOT rely on color code for positive identification of MEC or their contents.
- SMOKING will only be allowed in smoking areas designated by the SUXOS during the morning Tailgate Safety Briefing.
- Approach ordnance items from the side.
- Prohibit unnecessary personnel from visiting the site.
- Always assume MEC contain a live charge until it can be ascertained otherwise.

The following precautions are applicable to personnel performing MEC recovery and demolition operations.

- All MEC will be identified independently by two (2) UXO Technicians.
- All MEC operations will use the "Buddy" system.
- Demolition operations will at a minimum conform to TM 60A-1-1-31.
- DO NOT dismantle, strip, or handle any MEC unnecessarily.

- Avoid inhalation and skin contact with smoke, fumes, dust, and vapors of detonations and residue from MEC.
- DO NOT attempt to extinguish burning explosives or any fire, which might involve explosive materials.
- DO NOT manipulate external features of MEC unless specifically called for in an Explosive Ordnance Disposal (EOD) procedure.
- Incorporate appropriate property and personnel protective measures for shock and fragmentation when conducting MEC operations.
- DO NOT subject MEC to rough handling or transportation. Sand bag, chock, and block appropriately.
- Carry explosives in an appropriate container.
- Hand carry no more than two items (one in each hand) at a time and then only as required by the operation being performed.
- Destroy shaped charge munitions by crushing the cone to prevent formation of the explosive jet.
- Dispose of white phosphorus (WP) munitions in accordance with the direction of the UXOSO.
- DO NOT transport damaged WP munitions unless fully submerged in water.
- Avoid unnecessary movement of armed or damaged MEC.
- Avoid the forward portions of munitions employing proximity fusing.
- Assume unknown fuzes contain cocked strikers or anti-disturbance features.

5.1.2 Slip, Trip, and Fall Hazards

Slip, trip, and fall hazards may be encountered at the site, including holes, pits, ditches, steep grades, and uneven grades. Personnel should use caution when traversing the site.

5.1.3 Power Tools

By their very nature, power tools have great capability for inflicting serious injury upon site personnel if they are not used and maintained properly. To control the hazards associated with power tool operation, the requirements outlined in EM 385-1-1 and the safe work practices listed below are observed when using power tools:

- Operations are conducted by authorized personnel familiar with the tool, its operation, and safety precautions. Power tools must be operated in accordance with the owner's manual.
- Power tools are inspected prior to use, and defective equipment is removed from service until repaired

- Power tools designed to accommodate guards have such guards properly in place prior to use.
- Loose fitting clothing or long hair is not permitted around moving parts.
- Hands, feet, etc., are kept away from all moving parts.
- Maintenance and/or adjustments to equipment are not to be conducted while the equipment is in operation.
- An adequate operating area is provided, allowing sufficient clearance and access for operation.
- Personnel use required protective equipment, such as gloves, chaps, and steel-toed boots when using chainsaws.

5.2 Biological Hazards

Biological hazards that are usually found on site include ticks, spiders, poisonous snakes, vermin, and hazardous plants. Depending on the season and weather, the hazards at the former Fort Ord will vary. For instance, during cold weather many animals and insects are not active and most plants are dormant. The project may continue through several seasons, and the risks and hazards will change with the seasons. Employee awareness and the safe work practices outlined in the following paragraphs should reduce the risk associated with these hazards.

5.2.1 Hazardous Plants

A number of hazardous plants may be encountered during field operations. The ailments associated with these plants range from mild hay fever to contact dermatitis. Plants that present the greatest risk to site workers are those that produce allergic reactions and tissue injury.

Plants That Cause Skin and Tissue Injury

Contact with sharp leaves and thorns is of special concern to site personnel. This concern stems from the fact that punctures, cuts, and even minor scrapes caused by accidental contact may result in skin lesions and the introduction of fungi or bacteria through the skin. This is especially important in light of the fact that the warm moist environment created inside protective clothing is ideal for the propagation of fungal and bacterial infection. Personnel receiving any of the injuries listed above, even minor scrapes, will report immediately to the UXOSO for continued observation and care. Keeping the skin covered as much as possible (i.e., long pants and long-sleeved shirts) in areas where these plants are known to exist will limit much of the potential exposure.

Plants That Cause an Allergic Reaction

The poisonous plants of greatest concern are poison ivy, poison oak, and poison sumac (Figure 1). Contact with the poisonous sap of these plants produces a severe rash characterized by redness, blisters, swelling, and intense burning and itching. The victim also may develop a high fever and may be very ill. Ordinarily, the rash begins within a few hours after exposure, but it may be delayed for 24 to 48 hours.

The most distinctive features of poison ivy and poison oak are their leaves, which are composed of three leaflets each. In certain seasons, both plants also have greenish-white flowers and berries that grow in clusters. Poison sumac is a tall shrub or small tree with 6 to 12 leaflets arranged in pairs with a single leaflet at the end. This plant grows in wooded, swampy areas. The reaction associated with exposure to these plants will generally cause the following signs and symptoms:

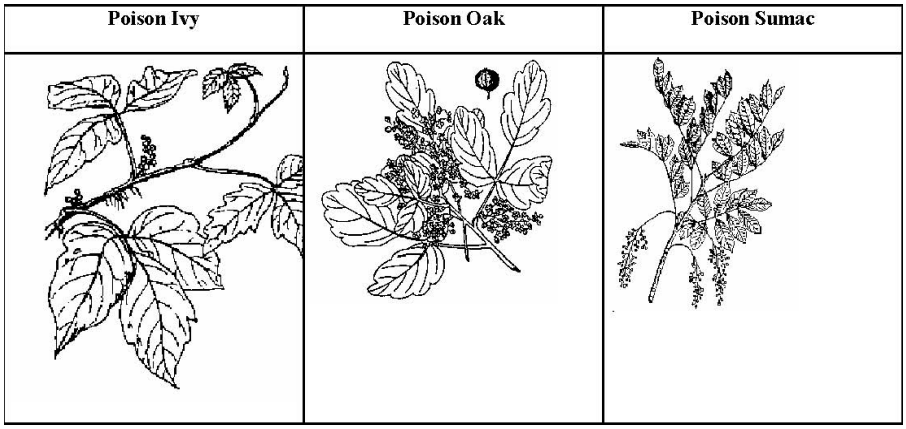
- Blistering at the site of contact, usually occurring within 12 to 48 hours after contact
- Reddening, swelling, itching, and burning at the site of contact
- Pain, if the reaction is severe
- Conjunctivitis, asthma, and other allergic reactions if the person is extremely sensitive to the poisonous plant toxin

If the rash is scratched, secondary infections can occur. Preventive measures that are effective for most site personnel include:

- Avoid contact with any poisonous plants on site, and keep a steady watch to identify, report, and mark poisonous plants found on site
- Wash hands, face, or other exposed areas at the beginning of each break period and at the end of each workday
- Avoid contact with, and wash on a daily basis, contaminated tools, equipment, and clothing
- Barrier creams, detoxification/wash solutions and orally administered desensitization may prove effective and should be tried to find the best preventive solution

Keeping the skin covered as much as possible (i.e., long pants and long-sleeved shirts) in areas where these plants are known to exist will limit much of the potential exposure.

Figure 1
Poison Ivy / Poison Oak / Poison Sumac



5.2.2 Tick Bites

The Center for Disease Control has noted the increase of Lyme Disease and Rocky Mountain Spotted Fever (RMSF), which are caused by bites from infected ticks that live in and near wooded areas, tall grass, and brush. Ticks are small, ranging from the size of a comma up to about one quarter inch and are sometimes difficult to see (Figure 2). The tick season extends from spring through summer. When embedded in the skin, they may look like a freckle.

Figure 2
Tick

Lyme disease has been documented in 43 states and along the northern California coast and, more specifically, Monterey County. It is caused by deer ticks and lone star ticks that have become infected with spirochetes. Female deer ticks are about one quarter inch in size and are black and brick red in color. Male deer ticks are smaller and completely black. Lone star ticks are larger and chestnut brown in color.

RMSF has occurred in 36 states. It is caused by Rocky Mountain Wood Ticks and Dog Ticks that have become infected with rickettsia. Both are black in color.

The first symptoms of either disease are flu-like chills, fever, headache, dizziness, fatigue, stiff neck, and bone pain. If immediately treated by a physician, most individuals recover fully in a short period of time. If not treated, more serious symptoms can occur.

If you believe a tick has bitten you, or if any of the signs and symptoms noted above appear, contact the UXOSO, who will authorize you to visit a physician for an examination and possible treatment.

Protective Measures

Standard field gear (work boots, socks, and light-colored coveralls) provides good protection against tick bites, particularly if the joints are taped. However, even when wearing field gear, the following precautions will be taken when working in areas that might be infested with ticks:

- When in the field, check yourself often for ticks, particularly on your lower legs and areas covered with hair
- Spray outer clothing, particularly your pant legs and socks, BUT NOT YOUR SKIN, with an insect repellant that contains permethrin or permanone
- When walking in wooded areas, wear a hard hat and avoid contact with bushes, tall grass, or brush as much as possible
- If you find a tick, remove it by pulling on it gently with tweezers or tick removal tool. Do not squeeze the tick's body. Grasp it where the mouthparts enter the skin and tug gently, but firmly, until it releases its hold on the skin
- If the tick resists, cover the tick with salad oil/Vaseline for about 15 minutes to asphyxiate it, then remove it with tweezers or tick removal tool
- DO NOT use matches, a lit cigarette, or nail polish or any other type of chemical to "coax" the tick out
- Be sure to remove all parts of the tick's body and store in a sealed plastic baggie with a wet cotton ball enclosed as well in order to preserve the tick for possible future testing.
- Disinfect the skin area (but not the tick) with alcohol or a similar antiseptic after removal
- For several days to several weeks after removal of the tick, look for the signs of the onset of Lyme disease, such as a rash that looks like a bulls-eye or an expanding red circle surrounding a light area, frequently seen with a small welt in the center
- Also look for the signs of the onset of RMSF, such as an inflammation, which is visible in the form of a rash comprising many red spots under the skin, which appears 3 to 10 days after the tick bite

5.2.3 Insects

Contact with stinging insects may result in site personnel experiencing adverse health effects that range from being mildly uncomfortable to being life threatening. Therefore, stinging insects present a serious hazard to site personnel and extreme caution must be exercised

whenever site and weather conditions increase the risk of encountering stinging insects. Poisonous insects and insect-like creatures that may be encountered at the former Fort Ord include the following:

- Bees ("Killer" bees, honeybees, bumblebees, wasps, hornets, and wingless wasps)
- Scorpions
- Fire ants

Bees

Personnel should be very cautious of "killer" bees. They have the appearance of the typical honeybee; however, they are very aggressive. These Africanized honeybees defend their colonies much more vigorously than typical bees. The colonies are easily disturbed (sometimes just by being nearby). When they do sting, many more bees may participate, so there is a danger of receiving more stings. This can make them life threatening, especially to people allergic to stings, or with limited capacity to escape (the young, old, and handicapped).

Scorpions

The scorpions commonly found in California have the capacity to inflict a painful sting; however, they are not considered to pose a danger to humans. Stings by these scorpions can be managed by washing the wound with soap and water and by application of an ice pack for a few minutes. Medical attention is usually not needed unless the victim is displaying signs of an allergic reaction (rash, severe swelling, shortness of breath).

Fire Ants

Fire ants are aggressive, reddish-brown to black ants that are 1/8 inch to 1/4 inch long. They construct nests, which are often visible as dome-shaped mounds of soil, sometimes as large as 3 feet across and 1 1/2 feet in height. In sandy soils, mounds are flatter and less visible. Fire ants usually build mounds in sunny, open areas such as lawns, pastures, cultivated fields, and meadows, but they are not restricted to these areas. Mounds or nests may be located in rotting logs, around trees and stumps, under pavement and buildings, and occasionally indoors.

Fire ants use their stingers to immobilize or kill prey and to defend ant mounds from disturbance by larger animals, such as humans. Any disturbance sends hundreds of workers out to attack anything that moves. The ant grabs its victim with its mandibles (mouthparts) and then inserts its stinger. The process of stinging releases a chemical, which alerts other ants, inducing them to sting. In addition, one ant can sting several times without letting go with its mandibles.

Once stung, humans experience a sharp pain that lasts a couple of minutes, then after a while the sting starts itching and a welt appears. Fire ant venom contains alkaloids and a relatively small amount of protein. The alkaloids kill skin cells; this attracts white blood cells, which form a pustule within a few hours of being stung. The fluid in the pustule is sterile, but if the

pustule is broken, the wound may become infected. The protein in the venom can cause allergic reactions that may require medical attention.

Some of the factors related to stinging insects that increases the risk associated with accidental contact are:

- The nests for these insects are frequently found in remote wooded or grassy areas and hidden in cavities.
- The nests can be situated in trees, rocks, bushes or in the ground, and are usually difficult to see.
- Accidental contact with these insects is highly probable, especially during warm weather conditions when the insects are most active.
- If a site worker accidentally disturbs a nest, the worker may be inflicted with multiple stings, causing extreme pain and swelling, which can leave the worker incapacitated and in need of medical attention.
- Some people are hypersensitive to the toxins injected by a sting and, when stung, experience a violent and immediate allergic reaction resulting in a life-threatening condition known as anaphylactic shock.
- Anaphylactic shock manifests itself very rapidly and is characterized by extreme swelling of the body, eyes, face, mouth, and respiratory passages.
- The hypersensitivity needed to cause anaphylactic shock can, in some people, accumulate over time and exposure; therefore, even if someone has been stung previously and not experienced an allergic reaction, there is no guarantee that they will not have an allergic reaction if they are stung again.

With these things in mind, and with the high probability of contact with stinging insects, all site personnel will comply with the following safe work practices:

- If a worker knows that he/she is hypersensitive to bee, wasp, or hornet stings, he/she must inform the UXOSO of this condition prior to participation in site activities.
- All site personnel will be watchful for the presence of stinging insects and their nests, and will advise the UXOSO if a stinging insect nest is located or suspected in the area.
- Any nests located on site will be flagged off, and site personnel will be notified of its presence.
- If stung, site personnel will immediately seek shelter and stay there even if some bees come in with you (there are more outside the building or car). Do not jump in water (bees will still be in the area when you come up). Once safe, remove stingers from your skin, it does not matter how you do it, but do it as quickly as possible to reduce the amount of venom they inject. Obtain first aid treatment and contact the UXOSO who will observe for signs of allergic reaction.
- Site personnel with a known hypersensitivity to stinging insects will keep required emergency medication on or near their person at all times.

5.2.4 Snakes

Snakes like to sun themselves on rocks during the day. Therefore, when site activities are conducted, extreme caution must be exercised around areas where snakes might be found (i.e., rocks, bushes, logs, or in holes, crevices, or abandoned pipes). The rattlesnake is the only type of snake in California that is dangerous to humans.

Western Rattlesnake

This is the only rattlesnake that can be encountered in Northern California. Its venom, which it uses to immobilize its prey and defend itself, contains both neurotoxins and hemotoxins. Neurotoxins affect the nervous system and hemotoxins affect the bloodstream. Its size can vary between 1.25 and 5.25 feet, and it can be identified by brownish blotches down the midline of the back; generally edged with dark brown or black.

The Western Rattlesnake is a biological hazard that may be encountered by field personnel. General information on this hazard is included in ESCA-wide Qualified Biologist Memo No. 2 on rattlesnake handling. This snake is typically most active between April and October and may be encountered in a variety of habitats and work sites. The occurrence of these animals is mainly determined by food availability and the need to regulate their body temperature (snakes are cold-blooded animals). The potential for encountering a rattlesnake in the open is increased when warm conditions follow a cool period. During these periods, they may be "sunning" on warm substrates to increase body temperature. Accordingly, the animals may be encountered on dark and heat-conductive materials such as rocks, asphalt, metal objects (including pipelines), dirt roads, etc. During extended warm periods, the animals may need to cool their bodies by seeking shade. During these periods, snakes may be encountered under tarps or wooden pallets, under metal or wooden sheds, in 2- to 3-foot-high brush and tall grasses, in pipe ends, or stretched out underneath the bottoms of pipes, trenches, in rock crevices and, in some cases, even under vehicles. Personnel should assume that these snakes may be encountered in any of these locations at all times.

During site field activities where there is an elevated potential for encountering a rattlesnake (e.g., when working in vegetation that is not sparse enough to see the ground between, or too thick to see the ground and leaf litter below), field personnel are to wear recommended PPE such as:

- Snake chaps that are either half or full leg length
- Double-layered pants (e.g., work pants under coveralls)

If field personnel observe a rattlesnake, they should immediately avoid (i.e., step away from) the animal until it leaves the area. Rattlesnakes are typically not aggressive and will usually avoid humans when possible. Striking distance is typically limited to several feet, so it is usually not necessary to retreat more than 8 to 10 feet from which location the movement of the snake may be observed. Work activity in the location where a snake is observed is not to be resumed until field personnel determine that the snake has left the immediate work area.

Treatment

A snake bite is usually characterized by extreme pain and swelling at the site of the bite, the presence of one or more puncture wounds created by the fangs, and a general skin discoloration. The manifestations of the bite include general weakness, rapid pulse, nausea and vomiting, shortness of breath, dimness of vision, tingling or numbness of the tongue, mouth or scalp, and shock.

Physical reactions are aggravated by acute fear, anxiety, the amount of venom injected, the speed of absorption of venom into the victim's circulation, the size of the victim, protection provided by clothing (including shoes and gloves), the amount of time before anti-venom therapy, and location of the bite.

First Aid

The rules to follow for a snake bite are:

- DO NOT cut "Xs" over the bite area, as this will intensify the effect of the venom.
- DO NOT apply suction to the wound since this has a minimal effect in removing venom.
- DO NOT apply a tourniquet since this will concentrate the venom and increase the amount of tissue damage in the immediate area.
- DO NOT use cold compresses, ice, dry ice, chemical ice packs, spray refrigerants, or other methods of cold therapy.
- If possible, try to get a good look at the snake so it can be identified for proper selection of anti-venom.
- DO NOT allow the victim to run for help since running increases the heart rate and will increase the spread of the venom throughout the body.
- Reassure and keep the victim calm, quiet, and immobile. Do not delay evacuation.
- Have the victim hold the affected extremity lower than the body while waiting for medical assistance.
- Transport the victim to medical attention immediately.

Identification Features

Nonpoisonous snakes are often erroneously identified as poisonous. The following features in Table 1 will assist in properly identifying a snake as poisonous or nonpoisonous.

Table 1
Snake Identification Features

Feature	Poisonous	Nonpoisonous
Eye Pupils	Elliptical or cat-like	Round
Sensing Pits	Pit between the eyelids and nostrils	No pit between the eyelids and nostrils
Teeth	Two enlarged teeth (fangs) in front of the upper jaw	All teeth are approximately the same size
Scales	Form a single row on the underside and below the tail	Arranged in a double row on the underside of the tail
Head	Head much wider than the neck	Head slightly wider than the neck
Tail	Single anal plate	Divided anal plate

5.2.5 Spiders

A large variety of spiders may be encountered during site activities. Extreme caution must be used when lifting logs and debris, since spiders are typically found in these areas.

While most spider bites merely cause localized pain, swelling, reddening, and, in some cases, tissue damage, there are a few spiders that, due to the severity of the physiological effects caused by their venom, are dangerous. The UXOSO will brief site personnel as to the identification and avoidance of these dangerous spiders. These species include the black widow and the brown or violin spiders.

The black widow is a coal-black bulbous spider 3/4 to 1 1/2 inches in length, with a bright red hourglass on the underside of the abdomen (Figure 3). The black widow is usually found in dark, moist locations, especially under rocks, rotting logs, and may even be found in outdoor toilets where they inhabit the underside of the seat. Victims of a black widow bite may exhibit the following signs or symptoms:

- Sensation of pinprick or minor burning at the time of the bite
- Appearance of small punctures (but sometimes none are visible)
- After 15 to 60 minutes, intense pain is felt at the site of the bite, which spreads quickly and is followed by profuse sweating, rigid abdominal muscles, muscle spasms, breathing difficulty, slurred speech, poor coordination, dilated pupils, and generalized swelling of face and extremities

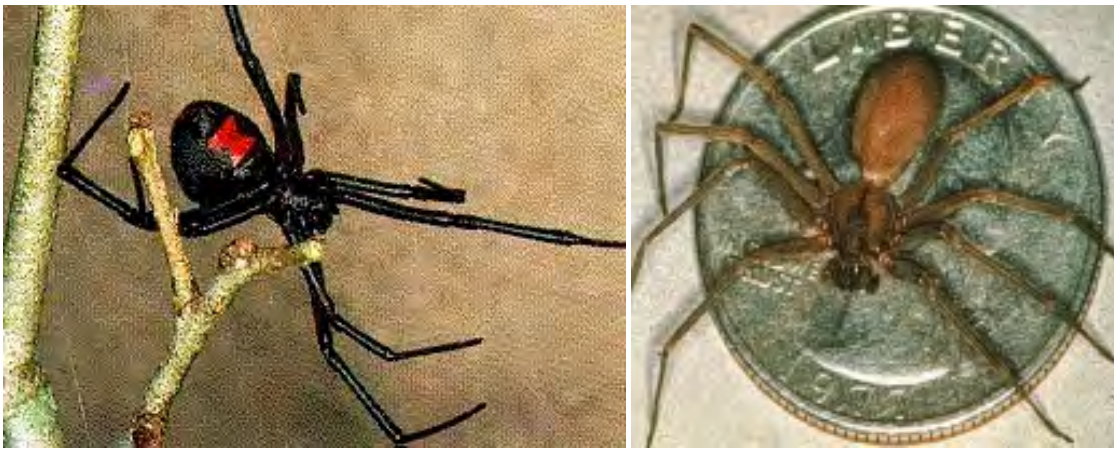
The brown or violin spider is brownish to tan in color, rather flat, and 1/2 to 5/8 inch long (Figure 3). However, unlike the typical species, the ones encountered at the former Fort Ord do not have a violin or “fiddle” shaped mark on the top of the head. There are three varieties of brown spider found in the United States that present a problem to site personnel. These are the brown recluse, the desert violin, and the Arizona violin. The brown recluse spider has not

been reported at or near the project area (Vetter 1999). These spiders may be found in a variety of locations including trees, rocks, or in dark locations. Victims of a brown or violin spider bite may exhibit the following signs or symptoms:

- Blistering at the site of the bite, followed by a local burning at the site 30 to 60 minutes after the bite
- Formation of a large, red, swollen, pustulating lesion with a bull's-eye appearance
- Systemic effects may include a generalized rash, joint pain, chills, fever, nausea, and vomiting
- Pain may become severe after 8 hours, with the onset of tissue necrosis

There is no effective first aid treatment for either of these bites. Except for very young, very old, or weak victims, spider bites are not considered to be life threatening. However, medical treatment must be sought to reduce the extent of damage caused by the injected toxins.

Figure 3
Spiders



First aid should include:

- If possible, catch the spider to confirm its identity. Even if the body is crushed, save it for identification
- Clean the bitten area with soap and water or rubbing alcohol
- To relieve pain, place an ice pack over the bite
- Keep the victim quiet and monitor breathing
- Seek immediate medical attention

5.2.6 Rats, Mice, and Bats

Rats, mice, and bats may be found at the site. These animals may carry rabies and should be avoided. In addition, Hantavirus is also a concern when coming in contact with these animals.

Hantavirus is a disease spread primarily from infected rodent droppings. Hantavirus results from intimate contact with rodents, such as may occur in agricultural areas with dense human and rodent populations or during soil excavation. Hantavirus is not transferred from person to person. The overwhelming evidence is that spread is from rodent to humans through contact with infected rodent secretions or airborne transmission by infected dust particles.

Preventive measures should focus on cleaning all cuts and scratches with soap and water, followed by rinsing with hydrogen peroxide. Put liquid skin on the affected areas. The best preventive measure is to avoid all rodent nests during geophysical surveys. If rodent nests are discovered, field team members should be apprised of their locations and avoid working adjacent to the nests. If work must be performed at that location, a 10 percent bleach solution will be sprayed on the nest and adjacent areas to kill the virus. If work must be performed at a location where rodent infestation is evident, PPE should be worn in accordance with the SOP for Hantavirus Exposure Protection presented in Appendix B of this SSHP. The PPE ensemble will include:

- Half-face air purifying respirator with high efficiency particulate air filter cartridges (N/P/R99, 100) and non-vented goggles or high filtration dust mask with non-vented goggles
- Tyvek coveralls
- Tyvek boot covers or rubber boots
- Polyvinyl chloride or latex gloves

5.2.7 Mountain Lions

Mountain Lions may be present at the site. These animals may cause a threat to field personnel and should be avoided. Safety measures when a mountain lion is observed in the immediate work area or field personnel are approached by a mountain lion will be discussed during daily health and safety meetings. All field personnel regardless of work area or field activities are to adhere to the following measures.

- No personnel should conduct fieldwork (i.e., outside of a vehicle) unless accompanied by another person
- Avoid work activities when mountain lions are most active (dawn, dusk, and night)
- If a mountain lion is encountered personnel should immediately stop work
- DO NOT approach a mountain lion.
- When Safe, return to the vehicle and immediately report the incident to the WESTON UXOSO and the ARCADIS Field Operations Manger, and return to the office or trailer for further instructions. The incident should also be reported to the ARCADIS Senior Qualified Biologist, Project Manager, and/or Program Manager, and to the WESTON Remediation Project Manger.
- Personnel are not to return to an area of a mountain lion encounter without approval.

If a mountain lion approaches field personnel the following steps should be taken:

- Give the mountain lion a clear escape path – most mountain lions avoid confirmation
- Stand tall
- Face the animal and adopt a stance that makes the body outline appear to the animal to be as large as possible, such as raising arms, waving arms slowly, and opening a jacket
- Speak firmly in a loud voice and/or make loud noises
- Fight back if attacked
- Do not run
- Do not crouch down or bend over

5.2.8 Bloodborne Pathogens

Bloodborne pathogens enter the human body and blood circulation system through punctures, cuts, or abrasions of the skin or mucous membranes. They are not transmitted through ingestion (swallowing), through the lungs (breathing), or by contact with whole, healthy skin. Examples of bloodborne pathogens are Human Immunodeficiency Virus, Hepatitis B, Malaria, Syphilis, and West Nile Virus. However, under the principle of universal precautions, all blood should be considered infectious, and all skin and mucous membranes should be considered to have possible points of entry for pathogens.

Potential bloodborne pathogen exposures that employees might face include:

- Contact with contaminated medical equipment or medical waste or sharp instruments
- Medical emergency response operations such as administering first aid or cardiopulmonary resuscitation (CPR)
- Contact with human wastes such as domestic sewage

5.3 Physical Hazards

Physical hazards that exist at the former Fort Ord include noise, heat and cold stress, and fire hazards. Procedures to protect workers from these hazards are presented below.

5.3.1 Noise Induced Hearing Loss

Planned activities will involve the use of heavy equipment, such as backhoes and generators. The unprotected exposure of site workers to this noise during activities can result in noise-induced hearing loss. Personnel working at this site will be enrolled in a hearing conservation program. The UXOSO will verify that each site worker has received hearing conservation training that entails proper use of hearing protectors. Additionally, the UXOSO will ensure that either earmuffs or disposable foam earplugs are made available to, and used by, all personnel near operating heavy equipment, or other sources of high intensity noise. Hearing

protection is required any time the noise level reaches 85 dbA or greater. Double protection is required any time noise levels exceed 104 dbA.

Noise monitoring will be accomplished by field determination. If a person speaking in a normal voice cannot be heard at a minimum 3-foot distance, then hearing protection will be required.

5.3.2 Heat Stress

Heat stress is one of the most common (and potentially serious) illnesses that affect site workers. When site personnel are engaged in operations in hot environments, a number of physiological responses can occur that may seriously affect the health and safety of the workers. These effects can be eliminated or controlled through the use of a comprehensive heat stress prevention and monitoring program.

Individuals vary in their susceptibility and degree of response to stress induced by increased body heat. Heat stress can result in health effects ranging from transient heat fatigue to serious illness or death. Heat stress is caused by a number of interacting factors, including environmental condition, clothing, workload, and the individual characteristics of the worker. Because heat stress is probably one of the most common (and potentially serious) illnesses at MEC sites, regular monitoring and other preventive precautions are vital. Factors that may predispose a worker to heat stress include:

- Lack of physical fitness
- Lack of acclimatization to hot environments
- Degree of hydration
- Obesity
- Current health (i.e., having an infection, chronic disease, diarrhea, etc.)
- Alcohol or drug use
- The worker's age and sex

The amount and type of PPE worn influence the worker's heat tolerance. PPE adds weight and bulk, severely reduces the body's access to normal heat exchange mechanisms (evaporation, convection, and radiation), and increases energy expenditure. Therefore, when selecting PPE, each item's benefit should be carefully evaluated in relation to its potential for increasing the risk of heat stress. Once PPE is selected, the safe duration of work/rest periods should be determined based on:

- Anticipated work rate
- Ambient temperature and other environmental factors
- Type of protective ensemble
- Individual worker characteristics and fitness

Sweating does not cool the body unless moisture is removed from the body. The use of PPE reduces the body's ability to eliminate large quantities of heat because the evaporation of sweat is decreased. The body's effort to maintain an acceptable temperature may become impaired and this may cause heat stress. Increased body temperature and physical discomfort also promote irritability and a decreased attention to the performance of hazardous tasks. At the former Fort Ord sites, Level D PPE will be utilized, thus providing minimal increase in the potential for heat stress. Level D PPE is defined as standard work clothes with long pants, hard-hat (when overhead hazard is present), and safety boots (when working around heavy equipment).

Early Symptoms of Heat Stress

The early symptoms used to recognize heat-related illnesses include:

- Decline in task performance
- Lack of coordination
- Decline in alertness
- Unsteady walk
- Excessive fatigue
- Muscle cramps
- Dizziness

Heat Stress Disorders

The following paragraphs outline the major heat-related illnesses that may result from exposure to high heat environments, which include heat rash, fainting, heat cramps, heat exhaustion, and heat stroke (Table 2). For the purpose of this program, reference to “liquids” will indicate the use of water or an electrolyte replacement solution.

Heat Rash

Heat rash is caused by continuous exposure to heat and humid air and is aggravated by wet, chafing clothing. This condition can decrease a worker’s ability to tolerate hot environments. Symptoms include a mild red rash, especially in areas of the body that sweat heavily. Treatment of heat rash entails decreasing the amount of time in protective gear and using baby powder to absorb moisture and decrease chafing. Maintain good personal hygiene standards and change into dry clothes as needed.

Heat Cramps

Heat cramps are caused by a profuse rate of perspiration that is not balanced by adequate fluid and electrolyte intake. The occurrence of heat-related cramps is often an indication that excessive water and electrolyte loss has occurred, which can further develop into heat exhaustion or heat stroke. Symptoms include acute, painful spasms of voluntary muscles such

as the back, abdomen, and extremities. Treatment involves moving the victim to a cool area and loosening restrictive clothing. Stretch and massage affected muscles to increase blood flow to the area. Have the patient drink one to two cups of liquids immediately, with fluid intake repeated every 20 minutes thereafter. Consult with a physician if the condition does not improve. If available, an electrolyte replacement solution should be consumed.

Heat Exhaustion

Heat exhaustion occurs due to the large fluid and salt loss from profuse sweating. It is a state of very definite weakness or exhaustion caused by increased stress on various organs to meet increased demands to cool the body from excessive loss of fluids. This condition leads to inadequate blood supply and cardiac insufficiency. Heat exhaustion is less dangerous than heat stroke, but nonetheless must be treated. If allowed to go untreated, heat exhaustion can quickly develop into heat stroke. Symptoms include: pale and moist skin, profuse perspiration, and extreme weakness. Body temperature is basically normal or slightly elevated. The worker's pulse is weak and rapid, and breathing is often shallow. The individual may have a headache or experience nausea. Treatment for heat exhaustion involves removing the individual to a cool, air-conditioned place, loosening the victim's clothing, and elevating the victim's feet. Consult a physician, especially in severe cases. Have patient drink one to two cups of liquids immediately, and repeat every 20 minutes thereafter. Total liquid consumption should be about one to two gallons per day. If the signs and symptoms of heat exhaustion do not subside, or become more severe, medical attention will be required.

Heat Stroke

Heat stroke is an acute and dangerous reaction to heat stress caused by failure of the heat-regulating mechanisms of the body. The failure of the individual's temperature control system causes the perspiration system to stop working correctly. When this occurs, the body core temperature rises very rapidly to a point (+105°F) where brain damage and death will result if the person is not cooled quickly. The victim's skin is hot and often dry. Other symptoms include confusion, extremely high body temperature, rapid respiratory and pulse rate, delirium, convulsions, and unconsciousness or coma.

Cool the victim immediately. If the body temperature is not brought down quickly, permanent brain damage or death may result. The victim should be moved to a shady area; he should lie down and keep head elevated. Cool the victim by either sponging or immersing the victim in very cool water to reduce the core temperature to a safe level (<102°F). If conscious, give the victim cool liquids to drink. Observe the victim and obtain immediate medical help. Do not give the victim caffeinated or alcoholic beverages. Heat stroke is considered a medical emergency. Medical help should be summoned immediately. **Early recognition and treatment of heat stroke are the only means of preventing brain damage or death.**

Preventive Measures

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat exhaustion, that person may become predisposed to additional heat injuries. In

order to avoid heat-related illnesses, proper preventive measures will be implemented whenever environmental conditions dictate the need, normally whenever the temperature reaches at least 75°F. These preventive measures represent the minimal steps to be taken and will include the following procedures:

- The UXOSO will examine each site worker prior to the start of daily operations, and periodically throughout the day, to determine the individual's susceptibility to heat-induced stress. Evidence of extreme dehydration may require the UXOSO to restrict the worker's activities until such time as the worker is fit for duty. Personnel identified as being at high risk (obese, using diuretics, etc.) for heat stress who are allowed to participate in site operations will be monitored frequently by the UXOSO.
- Site workers will be trained to recognize and treat heat-related illnesses. This training will include recognizing the signs and symptoms of heat stress disorders and knowing proper treatment.
- In order to maintain workers' body fluids at normal levels, workers will be encouraged to drink, as a minimum, approximately 16 ounces of liquids prior to start of work in the morning, after lunch, and prior to leaving the site at the conclusion of the day's activities. Disposable four (4) to twelve (12) ounce cups and liquids will be provided on site. Liquids to be provided will include water and an electrolyte replacement solution, with the intake of each being equally divided. Liquids containing caffeine are to be avoided.
- When ambient conditions and site workload requirements dictate, as determined by the UXOSO, workers will be required to drink a minimum of 16 to 32 ounces of liquids during each rest cycle. The normal thirst mechanism is not sensitive enough to ensure that enough water will be ingested to replace lost sweat. When heavy sweating occurs, workers will be encouraged to drink even though they may not be thirsty.
- A shelter or shaded area will be provided where workers may be protected from direct sunlight during rest periods.
- Monitoring of ambient or physiological heat stress indices will be conducted to allow prevention and early detection of heat-induced stress. Monitoring will be conducted in accordance with applicable paragraphs of this SSHP.
- Site workers will be given time to acclimatize to site work conditions, temperature, protective equipment, and workload. Acclimatization is the adaptive process that results in a decrease of the physiological response produced by the application of a constant environmental stress. On initial exposure to a hot environment, there is an impaired ability to work and evidence of physiological strain. If the exposure is repeated on several successive days, there is a gradual return of the ability to work and a decrease in physiological strain. Acclimatization usually takes two to six days of continued work in hot environments, and allows the worker's body to become adjusted to this level and type of work. This process involves a gradual increase in the workload over the required period, the length of which depends upon the nature of the work performed, the ambient temperatures, and the individual's susceptibility to heat stress. The results of acclimatization include: subjective discomfort practically disappears; body temperature and heart rate are lower; there is a more stable blood pressure; and the sweat is more profuse and dilute.

- Work schedules will be adjusted as follows:
  - Modify work/rest schedules according to monitoring requirements
  - Mandate work slowdowns as needed
  - Rotate personnel: alternate job functions to minimize over-stress or overexertion at one task
  - Add additional personnel to work teams
  - Perform work during cooler hours of the day if possible
- Workers will be encouraged to achieve and maintain an optimum level of physical fitness. Increased physical fitness will allow workers to better tolerate and respond to hot environments and heavy workloads. In comparison to an unfit person, a fit person will have: less physiological strain, a lower heart rate and body temperature, and a more efficient sweating mechanism.
- Alcohol should not be consumed in a hot environment because the loss of body fluids increases the risk of heat stress.

Heat Stress Monitoring

Heat stress prevention is important because, once a person suffers from heat stroke or heat exhaustion, that person may be more likely to have additional heat-related illnesses (Table 3).

The following steps to prevent heat stress should be followed:

- Provide air conditioned shelter or shaded areas to protect personnel during rest periods
- Urge workers to drink water to keep their body fluids at normal levels
- Adjust work schedules according to monitoring requirements and perform work during cooler hours of the day
- Provide accurate verbal and written instructions, frequent training programs, and other information about heat stress and strain
- Permit self-limitation of exposures and encourage co-worker observation to detect signs and symptoms of heat strain in others
- Counsel and monitor those who take medications that may compromise normal cardiovascular, blood pressure, body temperature regulation, renal, or sweat gland functions; and those who abuse or are recovering from the abuse of alcohol or other intoxicants
- Encourage healthy lifestyles, ideal body weight, and electrolyte balance
- Adjust expectations of those returning to work after absence from hot exposure situations and encourage consumption of salty foods (with approval of physician if on a salt-restricted diet)
- Ensure workers have current medical screening to identify those susceptible to systemic heat injury

Table 2
Signs and Symptoms of Heat Stress

Illness	Cause	Signs and Symptoms
Heat Rash	May result from continuous exposure to heat or humid air	Red rash on skin, intense itching and inflammation
Heat Cramps	Caused by heavy sweating with inadequate electrolyte replacement	Muscle spasms; pain in the hands, feet, and abdomen
Heat Exhaustion	Occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration	Pale, cool, moist skin; heavy sweating; dizziness; nausea; fainting
Heat Stroke	Most serious form of heat stress; temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur; competent medical help must be obtained	Red, hot, usually dry skin; lack of or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma

Table 3
Suggested Frequency for Monitoring Fit and Acclimatized Workers [a]

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

Reference: NIOSH/OSHA/USCG/EPA 1985.

a. For work levels of 250 kilocalories/hour.

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

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

For temperatures above 70°F (21°C), heat stress monitoring will be initiated for workers wearing semi-permeable or impermeable clothing. The monitoring will be as follows:

Heart rate: Count the radial pulse during a 30-second period as early as possible in the rest period.

- If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same.
- If the heart rate still exceeds 110 beats per minute at the next rest period, shorten the following work cycle by one-third.

5.3.3 Cold-related Illnesses

If work on this project is conducted in the winter months, thermal injury due to cold exposure can become a problem for field personnel. Work will cease under unusually hazardous conditions (e.g., wind-chill less than 0°F, or wind-chill less than 10°F with precipitation). Systemic cold exposure is referred to as hypothermia. Local cold exposure is generally labeled frostbite. Recognition of the symptoms of cold-related illness will be discussed during the health and safety briefing conducted prior to the onset of site activities. Refer to the 2000 American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents and Biological Exposure Indices for additional information on cold stress prevention, monitoring, and protective measures.

Hypothermia

Hypothermia is a life-threatening condition in which the core body temperature falls below 95°F. Hypothermia can occur at temperatures above freezing, particularly when the skin or clothing becomes wet. During exposure to cold, maximum shivering occurs when the core temperature falls to 95°F (Table 4). As hypothermia progresses, depression of the central nervous system becomes increasingly more severe. This accounts for the progressive signs and symptoms ranging from sluggishness and slurred speech to disorientation and eventually unconsciousness. The ability to sustain metabolic rate and to reduce skin blood flow is diminished by fatigue. Thus, fatigue increases the risk of severe hypothermia by decreasing metabolic heat. Additionally, because blood flow through the skin is reduced to conserve heat, the skin and underlying tissues become more susceptible to frostbite.

Table 4
Progressive Clinical Symptoms of Hypothermia

Core Temperature (°F)	Clinical Signs
95°	Maximum shivering
87° - 89°	Consciousness clouded; blood pressure becomes difficult to obtain; pupils dilated
84° - 86°	Progressive loss of consciousness; muscular rigidity; respiratory rate decreases
79°	Victim rarely conscious
70° - 72°	Maximum risk of ventricular fibrillation

Preventing Cold-related Illnesses

Educate worker to recognize the symptoms of hypothermia:

- Ensure the availability of an enclosed, heated environment within the vehicles. The nearest heated environment will be the interior of the vehicles at the site
- Ensure the availability of dry changes of clothes
- Record temperature readings
- Ensure the availability of warm beverages, preferably noncaffeinated

Cold Weather Monitoring and Hypothermia

Hypothermia is defined as a decrease in the body core temperature below 96°F (36°C). The following symptoms appear (in the order listed) as the body loses heat faster than it can be produced:

- Voluntary exercise to stay warm
- Involuntary exercise to stay warm (shivering)
- Loss of judgment and reasoning abilities
- Feelings of apathy, listlessness, and indifference
- Loss of control of the hands

The following steps should be taken to prevent hypothermia:

- Educate workers to recognize the symptoms of frostbite and hypothermia
- Identify and limit known risk factors
- Ensure the availability of dry changes of clothes

- Develop a capability for temperature recording at the site
- Ensure the availability of warm drinks

Monitoring the oral temperature on the job site can also be used to defend against hypothermia. This should be done at the supervisor's discretion based on changes in the worker's performance or mental status, or when the wind-chill is less than 20°F (-7°C), or a wind-chill is less than 30°F (-2°C) with precipitation. Any worker developing moderate hypothermia, defined as a core temperature of 92° (34°C), may not return to work for 48 hours.

5.3.4 Fire Hazards

Fires and explosions may arise spontaneously.

Fire Protection

The following safe work practices are to be used to protect against fires:

- Flammable/combustible liquid storage areas have at least one 4A:20:B:C fire extinguisher located within 25 to 75 feet.
- All vehicles used in the transport of explosives are equipped with two fire extinguishers of not less than 2A:10B:C or higher, with one fire extinguisher mounted/placed inside the cab of the vehicle and one mounted outside, by the driver's side door, if possible
- At least one portable fire extinguisher having a rating of not less than 4A:20B:C will be located at each work site

5.3.5 Ionization Radiation

No radiological hazards are anticipated during operations at the former Fort Ord. If any radioactive sources are encountered by the ESCA RP Team personnel or their subcontractors, work at that location will be stopped and the PHSM will be contacted to provide guidance on proper protective measures.

5.4 Chemical Hazards

Non-Chemical-Warfare-Material chemical hazards, such as lead-contaminated soils or lead-based paint, may be anticipated at former small arms ranges. Should contaminated soils be encountered, the PHSM will be contacted to provide guidance on appropriate safety precautions.

Chemical Warfare Munitions

Chemical Munitions, Chemical Warfare Material, or Radiological Contamination is not anticipated to be encountered during operations on the former Fort Ord; however, should personnel encounter a suspected toxic chemical munitions, Chemical Warfare Material, or

any situation where radiological contamination could become a concern, all personnel will immediately withdraw upwind to a safe location outside of the fragmentation zone of the type of ordnance located and contact the UXOSO who will notify local law enforcement, which will, in turn, contact the Military EOD.

The site will be secured with two UXO Technicians (minimum of one UXO Technician II and one UXO Technician I) until the arrival of the Military EOD. The ESCA RP Team will assist the Military EOD as directed. Decontamination station setup and operation will be performed by fire department hazardous response personnel.

Ordnance Fillers

In the event of locating a Livens Projector, 4-inch Stokes, or a 4.2-inch mortar and positive identification of the filler remains unknown, the item will be left in place awaiting disposition by Military EOD who will identify the filler prior to final disposition. Activities related to ordnance with unknown fillers will be conducted in accordance with the SOP for MEC with Unknown Filler presented in Appendix B of this SSHP.

5.5 Hazard Analysis

The ESCA RP Team has analyzed the scope of work tasking to determine the work risk hazards associated with each task. The tasks consist of direct tasks and implied tasks, or sub tasks, to accomplish the work. Table 7, located at the end of this SSHP, presents each activity, the associated hazards, and the control measures planned to prevent accidents.

6.0 MEDICAL MONITORING

Personnel engaged in field activities must be enrolled in a medical surveillance program as required by 29 CFR Part 1910.120(f). Doctors on Duty, 1513 Fremont Avenue, Seaside , CA 93955, (831) 372-6700, is used to provide the medical examinations for WESTON personnel. WorkCare Northern California, 1320 Harbor Bay Parkway, Suite 115, Alameda, CA 94502, (510) 748-6900 / (800) 455-6155, provides medical surveillance and records management for ARCADIS personnel. The content of the examination must be designed to determine each individual's fitness for duty, including ability to work while wearing protective equipment (e.g., respirator, impermeable clothing, etc.).

Personnel performing on-site field activities on this project must present to the UXOSO a physician's certification of completion of a comprehensive medical monitoring examination within the 12 months prior to the beginning of field activities. Additionally, the UXOSO will ensure that workers remain current in their medical monitoring throughout the duration of the project.

7.0 TRAINING

All personnel performing field activities with the potential for disturbing MEC or hazardous waste at the former Fort Ord must have completed hazardous waste operations and

emergency response (HAZWOPER) health and safety training in accordance with the provisions of 29 CFR 1910.120(e)(3) and must be current in their refresher training (if applicable). Site supervisors responsible for personnel engaged in field activities must have attended a site management training as required by OSHA in 29 CFR 1910.120(e)(4). At least one member of each field team must be current in first aid and CPR training. Copies of training certificates will be provided to the UXOSO.

Exceptions to the HAZWOPER requirements will be reviewed and determined by the UXOSO. There may be field personnel (either subcontractors or ESCA RP Team employees) who are required for certain field activities, but who have not received 40-hour HAZWOPER training or are not current (i.e., have not taken the 8-hour refresher within the prior 12-month period) with respect to the 40-hour HAZWOPER training; they may perform fieldwork at the site if the following conditions are adhered to:

1) They have proof from a Medical Physician that identifies their fitness to perform field services. They do not have to meet medical monitoring requirements.
2) They are in compliance with all other provisions in the applicable SSHP.
3) They have submitted a signed acknowledgement that they have read and understand the applicable SSHP.
4) The specific work to be performed is defined in advance.
5) The period during which they will perform the work is limited and specified in advance.
6) They will conduct fieldwork only under the direct supervision of and accompanied in the field by an ARCADIS or WESTON employee who is current on the 40-hour HAZWOPER training.
7) They have received UXO Recognition Training in advance of the field effort.
8) They have received ARCADIS Environmental Awareness Training.
9) The operation does not involve employee exposure or the reasonable possibility for employee exposure to safety or health hazards.

7.1 Site-Specific Training

In addition to the HAZWOPER training and 8-hour refresher training, site-specific training will be conducted. The UXOSO is responsible for developing a site-specific occupational hazard training that will be provided to all ESCA RP Team personnel and subcontractors prior to the start of field operations, as required. This training will cover the following topics:

- Names of personnel responsible for site safety and health
- Safe work practices
- Site history
- Safety, health, and other hazards at site
- Work zones and other locations
- Emergency procedures, evacuation routes, emergency phone numbers

- PPE for anticipated task
- Safe use of engineering controls and equipment on the site
- Bloodborne pathogens
- Ordnance recognition and reporting
- Prohibitions in areas and zones, including:
  - Site layout
  - Procedures for entry and exit of work areas and zones

In addition, site-specific training may include Lead Awareness Training.

7.2 Tailgate Safety Meetings

The SUXOS will conduct tailgate safety briefings for field personnel. This training must as a minimum cover the following topics:

- Tasks to be performed
- Hazards that may be encountered, including their effects, how to recognize symptoms or monitor them, or danger signals
- Emergency procedures (emergency equipment, emergency communications, and route to hospital)
- Rallying points and safe refuge areas

7.3 Supervisor Meetings

Weekly meetings will be held for all supervisors. The agenda will include the past week's operations, safety issues/problems, corrective actions required or taken, and the upcoming week's activities.

7.4 Training Documentation

The UXOSO will maintain copies of training certificates (HAZWOPER, EOD School Certificate, and CPR/first aid) for personnel participating in field operations. The UXOSO will document site-specific initial training, lead awareness training, tailgate training/subjects, and any other special or additional training.

7.5 Hazard Communication Training

All project work will be conducted in accordance with standard policies for hazard communication. Copies of material safety data sheets (MSDSs) for any hazardous chemicals brought on site will be maintained at the field office. Employees who are exposed to hazardous chemicals brought to the site must receive training on:

- The physical and health hazards of the chemicals in the work area
- Methods and observations that may be used to detect the presence or release of the hazardous chemicals in the work area
- The measures workers can take to protect themselves from these hazards

7.6 Bloodborne Pathogens Training

Personnel working on this project will be provided with bloodborne pathogen training review. This training will be given initially at the same time as the site-specific training. The topics covered in the training will include the following:

- An overview of the Bloodborne Pathogen Standard
- Epidemiology and symptoms of bloodborne diseases
- Modes of transmission of bloodborne pathogens
- Discussion of Exposure Control
- Tasks that may involve exposure to blood and other potentially infectious materials
- Review of the methods that will prevent or reduce exposure
- Selection and use of PPE
- Information on the post-exposure evaluation and follow-up program

7.7 Visitor Training

All visitors to the site will be given a health and safety briefing prior to gaining access to the site. Following this briefing, visitors will be asked to sign the SSHP Plan Acceptance Form/Site Visitors Log. The UXOSO will also ensure that visitors have applicable health and safety equipment, medical surveillance, and training for the activities/areas they will be visiting. Should questions arise as to whether or not specific training or equipment is needed, the PHSM will be contacted.

7.8 Ergonomic Training

An Industrial Training Program will be implemented and documented in accordance with OSHA and the California Code of Regulations.

8.0 PERSONAL PROTECTION EQUIPMENT

PPE required at the site will be at a level necessary to protect personnel. No contamination is anticipated; therefore, a level D ensemble will be worn.

8.1 Level D Protection Ensemble

The minimum level of protection for all personnel at this site is level D. A level D ensemble consists of:

- Short- or long-sleeved coveralls or work clothing
- Kevlar chaps (when operating chainsaw)
- Leather work boots (steel toe if a foot hazard exists [vegetation cutting/clearing])
- Safety glasses or goggles when an eye hazard exists (vegetation cutting/clearing operations)
- Hard hat, when a head hazard exists (vegetation cutting/clearing and around heavy equipment)
- Work gloves, leather or rubber as appropriate
- Hearing protection when working around heavy equipment or powered hand tools
- Respirator when clearing/grubbing rodent nests
- Sun block and insect repellant as needed
- Demolition operations PPE
- Reflective safety vest usage

8.2 Upgrading PPE

The level of protection is based on what is known about the site. Protection levels may change as site conditions change. The UXOSO monitors site conditions and provides information to the PHSM and RPM as necessary. The UXOSO may increase the levels of protection when necessary but cannot downgrade them without approval from the PHSM. Should contaminated soils be encountered, the PHSM will be contacted to provide guidance on appropriate safety precautions.

9.0 SITE CONTROL

The UXOSO will coordinate access control and security on site. Due to the hazardous nature of MEC, only authorized personnel will be allowed in the exclusion zone (EZ). The EZ is the work site, encompassing an area large enough to prevent personnel injuries as a result of MEC operations. The boundary of the EZ will be appropriately identified. During intrusive operations, the boundary will be established by the UXOSO based on minimum separation distance (MSD). The MSD is the minimum separation distance for unrelated personnel given unintentional detonation of conventional ordnance items. The MSD for all unrelated personnel for an unintentional detonation will be determined by the greatest distance: 200 feet or the K50 distance. During intrusive operations, only essential trained personnel are allowed in the EZ.

Visitors must check-in at the field office to gain access to work sites. The UXOSO or a designee will escort visitors to and from work sites. During all operations on site, the field supervisors can cease operations if unescorted personnel are observed within the operating area. During work hours, ESCA RP Team personnel provide security at the site. Equipment is secured at the end of the workday.

Representatives from regulatory agencies are permitted to enter the site at any time during business hours or any other reasonable time with an escort. Regulatory agencies will be allowed to perform their oversight functions during MEC operations, and are considered essential personnel. Site controls to ensure their safety are included in Table 7.

In the case of an emergency, personnel will exit the site and move to the designated safe area. The safe area will be located upwind of the site. The UXOSO will determine the severity of the emergency. If the emergency warrants site evacuation, the UXOSO or SUXOS will notify the applicable police and/or fire departments.

10.0 DECONTAMINATION AND PERSONNEL HYGIENE

In general, no hazardous, toxic, or radiological waste materials are anticipated; thus decontamination for constituents will not be required. Site sanitation will be established and maintained in compliance with 29 CFR 1926.51 and EM 385-1-1, Section 2.

10.1 Potable Water

An adequate supply of drinkable water will be provided on site during work activities.

10.2 Toilet Facilities

As the former Fort Ord work sites are not provided with a sanitary sewer system, temporary toilet facilities will be used (Table 5). Each temporary toilet will be naturally lighted, ventilated, and lockable from the inside.

Table 5
Minimum Number of Facilities

Number of Employees	Number of Facilities
20 or fewer employees	One toilet with seat
More than 20, less than 200 employees	One toilet with seat and one urinal per 40 employees
More than 200 employees	One toilet with seat and one urinal per 50 employees

10.3 Washing Facilities

Washing facilities in the EZ will consist of water containers, buckets, soap, hand sanitizer, and drying towels. Workers exiting the EZ must wash hands and face prior to eating, drinking, or smoking.

11.0 ENVIRONMENTAL AND PERSONAL MONITORING

Exposure to hazardous airborne substances is anticipated only in areas where lead hazards may exist (i.e., small arms ranges, or during structure demolition). Should contaminated soils be encountered, the PHSM will be contacted to provide guidance on appropriate safety precautions.

12.0 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

The frequency and severity of emergency situations can be dramatically reduced through proper implementation of the SSHP. However, if an emergency does occur, quick, decisive action will be required since delays in minutes can create or escalate life-threatening situations. In an emergency situation, site personnel involved in emergency response and rescue must be prepared to respond immediately and all required equipment must be on hand, in proper working order, and ready to use. To ensure rapid, effective response to a site emergency, the procedures and contingency plans outlined in this section will be implemented prior to and during the conduct of any site activities involving exposure to safety and health hazards.

12.1 Identifying Potential Emergencies

Contingency plans for responding to the potential emergency situations have been developed and are presented below. Potential emergencies that may occur include:

- Injury or illness
- Fire/explosion
- Inclement weather

12.2 Emergency Response Responsibilities

In the event of an emergency, the UXOSO will assume the responsibility of being the On Scene Incident Commander (OSIC). The alternate person to assume this role, in the event that the UXOSO is unavailable or incapacitated, will be the SUXOS. The OSIC will have the responsibility of directing all on-site and off-site response personnel. Upon arrival of First Responders (i.e., fire department) and upon determination that no ordnance or explosives hazard exists, the role of OSIC will be turned over to the senior responding member of the fire department.

12.3 On-Site Emergency Response Services

WESTON personnel will provide first aid treatment for minor injuries up to the limits of their qualifications and training. At least one person per team will be First Aid and CPR certified. If necessary, the OSIC will contact medical personnel to determine if additional treatment is required. If further treatment is required, the fire department providing fire services to the former Fort Ord will be notified and the injured person will be transported to the Community Hospital of the Monterey Peninsula. If transport by the WestMed ambulance is required, an escort will meet the ambulance at the corner of Barloy Canyon Road and Eucalyptus Road and guide them to the accident site.

12.4 Off-Site Emergency Response Services

Off-site emergency response services may include local fire and law enforcement personnel. Emergency phone numbers for off-site response organizations are presented in Table 6.

Table 6
Emergency Contacts

Emergency Contact	Telephone Number
MEDEVAC, Cal Star	(800) 252-5050
Community Hospital of the Monterey Peninsula	(831) 624-5311
WestMed	(831) 655-4040
Presidio of Monterey (POM) Fire Department	(831) 242-7851 / 7852
POM Police	(831) 242-7853
Military EOD – 60th Civilian Engineer Squadron	(707) 424-2040
Monterey County Regional Fire District	(831) 455-1828
Monterey County Sheriff	(831) 755-3801
WESTON UXOSO – Greg Clark	(831) 240-1391
WESTON RPM – Linda Temple	(831) 384-3221
Poison Control	(800) 222-1222

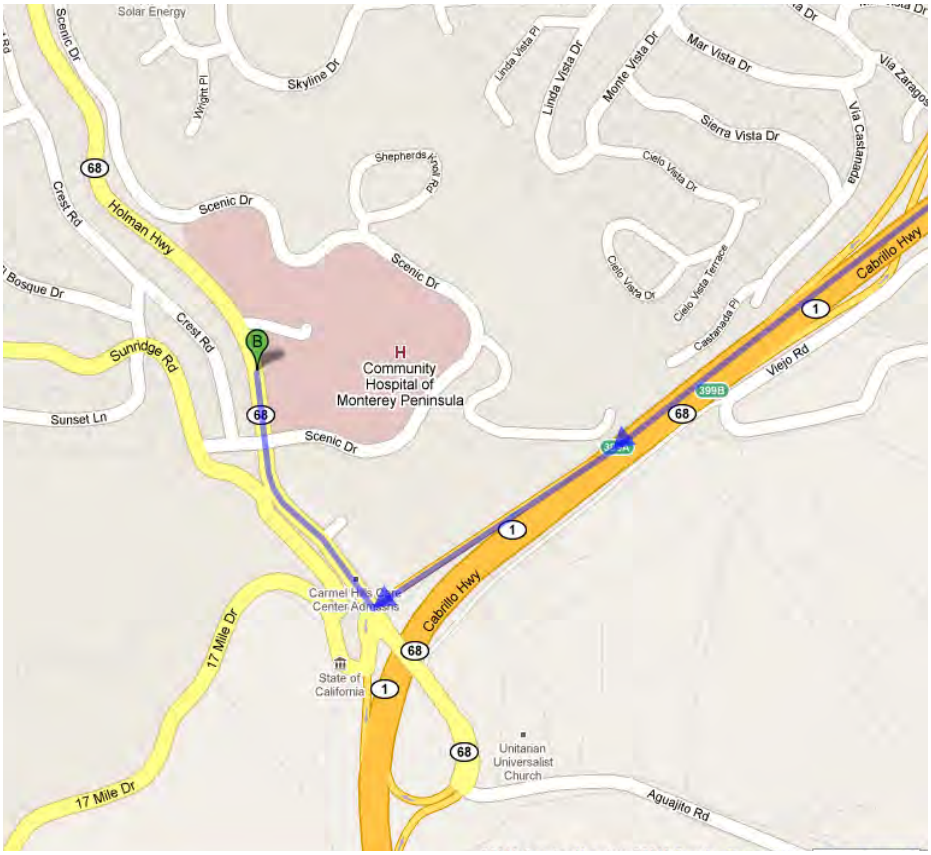
12.5 Route to Hospital

The evacuation route map to the Community Hospital of the Monterey Peninsula from the former Fort Ord is presented below (Figure 4). The map will be kept in all vehicles. Directions for evacuation are printed with the map below.

Directions to: Community Hospital of Monterey Peninsula
23625 Holman Highway, Monterey, California 93940
(831) 624-5311

1. From Barloy Canyon Road, head west on Eucalyptus Road to Parker Flats Cutoff
2. Turn right on Parker Flats Cutoff
3. Continue North to Giggling Road
4. Turn left on Giggling Road heading west to General Jim Moore Blvd
5. Turn right on General Jim Moore Blvd heading north to Lightfighter Drive
6. Turn left on Lightfigher Drive heading west
7. Merge onto CA- 1 South.
8. Take exit 399A for CA-68 West toward Pacific Grove/Pebble Beach.
9. Turn right at CA-68 West.
10. The hospital will be on the right.

Figure 4
Route to Hospital



12.6 Emergency Response Training

All site personnel will receive specialized training that will be given by the UXOSO prior to initiating site activities involving safety and health hazards. The content of this training will include the items listed below and will be documented using the site Training Log.

- Emergency chain-of-command
- Communication methods and signals
- Emergency equipment and PPE
- Removing injured personnel from the site
- Emergency contacts, phone numbers, and hospital route

12.7 Emergency Equipment

During intrusive operations, the UXOSO will maintain emergency equipment containing the following: an eyewash station, first-aid kit, a fire extinguisher, a portable cellular telephone, and a radio. Copies of pertinent figures including emergency phone numbers and maps to emergency facilities will be included with this equipment.

For non-intrusive operations, such as geophysical surveying, a first-aid kit, fire extinguisher, and radio will be provided.

12.7.1 Fire Extinguishers

Portable fire extinguishers approved by a nationally recognized testing laboratory, and labeled to identify the labeling organization and the fire test and performance standard, will be provided at each individual job site. Extinguishers will be fully charged and in operable condition.

A dry-chemical type 4A:20B:C extinguisher will be available at each work site. Each vehicle will be equipped with at least a 2A:10B:C fire extinguisher.

12.7.2 First-Aid Equipment

First aid kits will be the 16-unit first aid kits and comply with American National Standards Institute Z308.1. A kit will be located in each field team vehicle and at the field office. Kits will be inspected on a weekly basis and missing components replaced immediately.

12.8 Communication Devices

Site communication devices will include portable, handheld two-way radios for communication between teams and the field office. Cellular telephones will be used to communicate with off-site individuals and organizations. Radios will be distributed to the SUXOS, the UXOSO, and to each field team supervisor.

12.9 General Emergency Procedures

Emergency response procedures include all steps to be taken for notifying, evaluating, reacting to, documenting, and following up on a given emergency situation. To ensure all necessary elements are covered, the procedural steps outlined in this paragraph will be implemented for each emergency, regardless of its nature.

12.9.1 Notification

Once the OSIC has been informed of an emergency, the OSIC will alert site personnel to the presence of the emergency by radio. This will be done to:

- Notify personnel and to get their attention
- Stop all work activity as required
- Lower noise levels in order to speed and simplify communication
- Initiate emergency or evacuation procedures

If on-site ESCA RP Team personnel or off-site emergency personnel are to enter the site in response to the emergency, the OSIC will, to the extent possible, notify the response personnel about the nature of the emergency, to include:

- What happened and when it happened
- Where on site the emergency situation occurred
- Who is involved and, if possible, the cause of the emergency
- The extent of damage and what hazards may be involved
- What actions should be taken

12.9.2 Assessing the Emergency

Available information related to the emergency and the on-site response capabilities should be evaluated and the information listed below obtained to the extent possible:

- What happened:
  - Type of incident
- Casualties involved:
  - Victims (number, location, and condition)
  - Treatment required
  - Missing personnel
- Cause of incident
- Extent of damage to equipment and terrain
- What could happen from this point:
  - Potential for fire or explosion
  - Location of all personnel in relation to hazardous areas
  - Potential for emergency affecting the general public or the environment
- What can be done to remedy the situation:
  - Equipment and personnel needed for rescue and hazard mitigation
  - Number of uninjured personnel available for response
  - Resources available on site
  - Resources available from off-site response groups and agencies
  - Time needed for off-site response resources to reach the site
  - Hazards involved in rescue and response

12.9.3 Rescue and Response Actions

Based on the information collected during the emergency assessment, the general actions listed below will be taken, with some actions being conducted concurrently. No one will attempt emergency response/rescue until the situation has been assessed and the appropriate response outlined by the OSIC.

- Enforce the Buddy System:
  - Allow no one to enter a hazardous area without a partner
  - Personnel in the EZ should be in line-of-sight or in communication with the OSIC or his designee
- Survey Casualties:
  - Locate all victims and assess their condition
  - Determine resources needed for stabilization and transport
- Assess Existing and Potential Hazards and Determine:
  - Whether and how to respond
  - The need for evacuation of site personnel and off-site population
  - The resources needed for evacuation and response
- Contact the required off-site/on-site personnel or facilities, such as ambulance, fire department, police, etc.
- Allocate on-site personnel and equipment to rescue and initiate incident response operations
- Assist in bringing the hazardous situation under complete or temporary control and use measures to prevent the spread of the emergency, i.e., control fire, secure site, etc.
- Remove or assist victims from the area
- Stabilize:
  - Administer any medical procedures that are necessary before the victims can be moved
  - Stabilize or permanently fix the hazardous condition
  - Attend to what caused the emergency and anything damaged or endangered by the emergency
  - Transport using either on-site or off-site assets
- Casualty Logging-Record: who, time, destination, and condition upon transport
- Evacuate:
  - Move site personnel to the rally point, a safe distance upwind of the incident
  - Monitor the incident for significant changes; the hazards may diminish, permitting personnel to re-enter the site, or hazards may increase and require public evacuation

- Casualty Tracking-Record: disposition, condition, and location

12.9.4 Post Emergency Follow Up

Before normal site activities can resume, the site and personnel must be prepared and equipped to handle another emergency. It is also imperative that all federal, state, and local regulatory agencies be notified of the emergency. Therefore, the following activities must be conducted prior to resumption of site activities:

- Notify all appropriate governmental agencies as required (i.e., OSHA must be notified if there have been any fatalities or three or more personnel hospitalized)
- Restock and clean all equipment and supplies utilized or damaged in the emergency
- UXOSO should conduct an accident investigation to determine the cause of the emergency and what preventive measures could be taken to ensure the emergency does not occur again
- Review and revise, as needed, the SSHP to reflect the new procedures

12.10 Contingency Plans

The following paragraphs contain emergency specific contingency plans. These plans outline the procedures for mitigating potential emergency situations. Any changes to these plans must be approved by the PHSM.

12.10.1 Injury or Illness

In the event of an emergency involving personal injury or illness, immediate response will be key in preventing further harm and providing comfort to the affected party. When personnel are injured or overcome by illness, the following procedure will be followed:

- Upon notification of the occurrence and nature of the injury/illness, the OSIC will, if deemed necessary, summon emergency personnel
- The OSIC or SUXOS will assess the severity of the injury/illness and direct personnel to provide CPR/first aid as needed
- If immediate life support is not required, or once the victim is stabilized, and, if required, transport victim to the appropriate medical facility for further attention

12.10.2 Fire and Explosion

Small Fire

A small fire is defined as a fire that can be extinguished with a 4A:20B:C type fire extinguisher. In the event of a small fire, site personnel will take the following actions:

- All unnecessary personnel will be evacuated from the immediate area to an upwind location
- Extinguish the fire using portable fire extinguishers or by smothering from an upwind location
- Request emergency response assistance (ambulance, fire, police) as needed
- Do not attempt to extinguish a fire, even a small one, involving explosives
- Notify the UXOSO, SUXOS, and RPM

Large Fires

In the event of a large fire (or small fire that cannot be extinguished), the following actions will be taken:

- All unnecessary personnel will be evacuated from the site to an upwind location
- The local Fire Department and/or other emergency response services (police, ambulance, hospital, etc.) will be notified as needed by the OSIC
- OSIC will meet Fire Department and direct them to location of fire
- After the Fire Department has arrived, OSIC will notify the Project Manager and RPM

Explosion

In the event of an explosion, all nonessential personnel will evacuate and help secure the site; the OSIC will request the required support equipment and personnel. It is essential that the site be evacuated and no one is allowed to re-enter, except to possibly save a life, until at least 30 minutes, or longer if necessary, after the explosion. The OSIC will determine what actions are appropriate.

12.10.3 Chemical Spills

A spill kit will be maintained at the site in case a chemical being used at the site (such as oil or gasoline) is spilled. The kit will include spill absorbers (spill socks, pads, and pillows) and disposable bags. Approximately 18 gallons of spilled oil, coolants, fuels, or water can be absorbed using the contents of the kit.

All spills will be immediately reported to the UXOSO.

13.0 LOGS, REPORTS, AND RECORD KEEPING

13.1 Logbook

The SUXOS will keep a log recording the following aspects related to safety at the site:

- Training (initial site specific training, tailgate meetings, etc.)

- Site visitors
- Safety issues or problems encountered
- Accidents
- Emergencies

13.2 Safety Logs

The UXOSO will maintain a daily safety log of all safety-related activities. The following information will be maintained in the safety log:

- Date and recorder of log
- Tailgate safety briefing (time conducted, material discussed, etc.)
- Weather conditions
- Significant site events relating to safety
- Accidents
- Stop-work events related to safety
- Safety inspections

13.3 Training Logs

The UXOSO will maintain a training log documenting the following information:

- Date of training
- Type of training (initial, tailgate briefing, visitor)
- Workers or visitors attending training
- Signature of UXOSO

13.4 Record Keeping

The UXOSO will establish and maintain a filing system on site for health and safety records, reports, and information concerning individual training, medical surveillance, etc. Sections in this filing system will include:

- Training Records - Certificates for training required by 29 CFR1910.120 (40-hour initial HAZWOPER, 8-hour refresher, and supervisory training) will be maintained at the site. Additionally, documentation of CPR and First Aid training will be available at the site
- Medical Monitoring - Documentation of current enrollment (within last 12 months) in a medical monitoring program will be available for each employee working at the site. Documentation will consist of the employee's Health Status Report that is written and signed by the examining physician

- Accident Reports - Copies of any accident/incident reports and follow-up reports
- Plan Acceptance Forms/Site Visitors Log - Copies of the Plan Acceptance Forms/Site Visitors Log documenting that employees have read and understand the SSHP will be maintained at the site

13.5 Accident Reporting

If an injury occurs on site, the UXOSO is responsible for completing a WESTON accident report form. The UXOSO must submit a copy of this form to the PHSM within 24 hours of the injury. All accidents/incidents must be investigated by the UXOSO. The purpose of the investigation is to determine the causal factors that led to the accident/incident and to establish corrective actions to prevent recurrence.

14.0 STANDARD OPERATING PROCEDURES, ENGINEERING CONTROLS, AND SAFE WORK PRACTICES

14.1 General Safety

The following are standard practices for work on the former Fort Ord:

- Eating, drinking, chewing tobacco, smoking, and carrying matches or lighters are prohibited in a contaminated or potentially contaminated area or where the possibility of contamination transfer exists
- Field crew members should be alert to all potentially dangerous situations (i.e., presence of strong, irritating, unusual, or nauseating odors)
- Field crew members will be familiar with the physical characteristics of a site during intrusive investigations, including:
  - Wind direction in relation to nearby buildings
  - Accessibility to associates, equipment, vehicles, communication
  - Hot zone (areas of known or suspected contamination)
  - Site access
  - Nearest water sources
- Protective equipment as specified in this SSHP will be used by workers while on the former Fort Ord
- Use of heavy equipment on site (i.e., trucks and bobcats) presents additional hazards for site workers. For example, the vision of a backhoe operator is limited, so all field crew members should stay clear when backhoe is operating
- Wearing PPE can result in an impairment of the ability to operate site equipment. All field crew members should pay specific attention to decreased performance capabilities resulting from the use of PPE, such as poor tactile skills when wearing certain types of gloves. Prior knowledge of limitations imposed by the use of such equipment and

clothing will allow the worker to assess the decrease in his or her capability to perform field operations in a safe manner

- Wearing of jewelry, such as loose bracelets and necklaces, is prohibited in order to avoid its entanglement in site machinery

15.0 PROCEDURES AND PROGRAMS

15.1 HEARING CONSERVATION PROGRAM

The purpose of this Hearing Conservation Program is to provide protection for employees from adverse health effects associated with occupational exposure to noise. The program consists of annual audiometric testing of workers, annual employee training, selection and use of hearing protection, and noise monitoring. All employees and subcontractors must comply with this program.

Audiometric Testing Program

Audiometric testing will be made available to all employees whose exposures equal or exceed an 8-hour time-weighted average of 85 decibels. Audiometric tests will be performed by a licensed or certified audiologist, otolaryngologist, or physician who is certified by the Council of Accreditation in Occupational Hearing Conservation. Each employee assigned to noisy operations must receive a baseline audiogram prior to assignment and yearly testing thereafter for as long as that employee is exposed to excessive noise levels (8-hour time-weighted average of 85 decibels or greater). Each employee's annual audiogram is compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift has occurred. (A standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hertz in either ear.) This comparison should be done by a physician.

If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift has occurred, the employee will be informed of this fact in writing, within 21 days of the determination. The following steps are taken by the UXOSO when a standard threshold shift occurs:

- Employees not using hearing protectors will be fitted with hearing protectors, trained in their use and care, and required to use them
- Employees already using hearing protectors will be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary
- The employee will be referred for a clinical audiological evaluation or an otological examination, as appropriate, if additional testing is necessary
- The employee is informed of the need for an otological examination if a medical pathology of the ear that is unrelated to the use of hearing protectors is suspected

Audiometric tests will be pure tone, air conduction, hearing threshold examinations, with test frequencies including at a minimum 500, 1000, 2000, 3000, 4000, and 6000 Hertz. Tests at each frequency will be taken separately for each ear. Audiometric tests will be conducted with audiometers (including microprocessor audiometers) that meet the specifications of, and are maintained and used in accordance with American National Standard Specification for Audiometers S3.6-1969. The functional operation of the audiometer will be checked before each day's use by testing a person with known, stable hearing thresholds, and by listening to the audiometer's output to make sure that the output is free from distorted or unwanted sounds. Audiometer calibration will be checked acoustically at least annually in accordance with OSHA requirement 29 CFR 1910.95, Appendix E.

Hearing Protectors

The UXOSO will make hearing protectors available to all ESCA RP Team and subcontract employees exposed to an 8-hour time-weighted average of 85 decibels or greater. Hearing protection for this project will consist of earmuffs or foam fitting earplugs. The selection of hearing protector will be based upon noise attenuation requirements for the task and worker comfort.

Employee Training

The UXOSO will develop a hearing conservation training program for all employees assigned to noisy work. This training will be a component of the initial site safety training. As a minimum the training will consist of:

- The effects of noise on hearing
- The purpose of hearing protectors; the advantages, disadvantages, and attenuation of various types; and instructions on selection, fitting, use, and care
- The purpose of audiometric testing, and an explanation of the test procedures

Noise Monitoring

When operations are anticipated to exceed the 8-hour time-weighted average of 85 decibels, the UXOSO will implement a noise monitoring program. The monitoring will be used to:

- Verify that appropriate hearing protection is being used by employees
- Identify the boundaries of the noise hazard area in accordance with Section 05.C.07 of EM 385-1-1
- Instruments used to measure employee noise exposure will be calibrated to ensure accuracy

15.2 Hazard Communication Program

The OSHA Hazard Communications Standard (29 CFR 1910.1200) was promulgated to ensure that all chemicals would be evaluated and information regarding the associated

chemical hazards would be communicated appropriately. The goal of the standard is to reduce the number of chemically related occupational illnesses and injuries.

In order to comply with the OSHA Hazard Communication Standard, this written program has been established for work at the former Fort Ord. All ESCA RP Team and subcontractor personnel working at the former Fort Ord are included in this program.

Hazardous Chemical Inventory List

Hazardous chemicals used at the former Fort Ord include industrial chemicals such as fuels, oils, and greases. The UXOSO will maintain an inventory of hazardous chemicals brought onto the former Fort Ord.

Material Safety Data Sheets

MSDSs are prepared by manufacturers or producers to provide specific information on the safety precautions and health effects of a particular chemical or mixture. The MSDS contains at a minimum the following information:

- Chemical and common names
- Physical and chemical characteristics
- Physical hazards
- Health hazards
- Primary routes of entry
- Exposure limits
- Carcinogenic potential
- Handling and protective precautions
- Control measures
- Emergency and first aid procedures
- Date of MSDS preparation
- Name and address of manufacturer

When chemicals are ordered, the SUXOS or his designee will specify on the purchase order that chemicals are not to be shipped without corresponding MSDSs. When chemicals and MSDSs arrive, they will be reviewed for completeness by the UXOSO or his designee. Should any MSDS be incomplete, a letter or facsimile will be sent immediately to the manufacturer requesting the additional information. The ESCA RP Team or its subcontractors will not accept any shipped chemical materials to the former Fort Ord without an MSDS.

A complete file of MSDSs for all hazardous chemicals to which an employee of the ESCA RP Team may be exposed will be kept in labeled files on site. In the event that an MSDS is missing, the employee should immediately contact the UXOSO or PHSM.

MSDSs at this site will be reviewed during periodic audits by the PHSM or designee. Should there be an MSDS that has not been updated within the past year, a new MSDS will be requested.

Labels and Other Forms of Warning

The Hazard Communication Standard requires that hazardous chemicals be labeled by manufacturers. The label must contain the following:

- Chemical identity
- Appropriate warnings
- Name and address of manufacturer, importer, or other responsible party.

If the labels are incomplete or missing, ESCA RP Team personnel will refuse the shipment.

When chemicals are transferred from the manufacturer's containers to secondary containers, the UXOSO will ensure that the containers are labeled with the identity of the chemicals and appropriate hazard warnings. Labels for secondary containers can be obtained from the UXOSO.

The entire labeling procedure will be reviewed at least annually and changed as necessary.

Employee Information and Training

Prior to starting work, the ESCA RP Team and its subcontractors' employees will attend a site-specific safety and health training course. This course will include Hazard Communication Training to review the contents of this program and learn the hazards associated with each listed hazardous chemical. The training will be performed by the UXOSO. The format will be classroom training.

Training Topics

The site training will include:

- An overview of the requirements of the Hazard Communication Standard
- The labeling system and how to use it
- How to review MSDSs and where they are kept
- Chemicals present in work operations
- Physical and health effects of hazardous chemicals

- Methods and observation techniques used to determine the presence or release of hazardous chemicals in the area
- PPE and work practices to reduce or prevent exposure to chemicals
- Steps to be taken to prevent or reduce exposure to chemicals
- Safety-emergency procedures to follow if exposure occurs
- Location and availability of written program and MSDSs
- Equipment training (Table 8)

Following the training session(s), each employee will sign and date the training record. Additional training may be provided by the UXOSO, with the introduction of each new hazardous chemical. Records of additional training will be maintained.

On-Site Contractors and Visitors

WESTON understands that at times other persons may be on the work site. New contractors, subcontractors, and visitors will be required to attend site health and safety training to familiarize them with the contents of this document and the specific hazards associated with the former Fort Ord. New contractors, subcontractors, and visitors will be provided with the following information:

- Hazardous chemicals to which the contractor's employees or visitors may be exposed
- Precautions necessary to protect employees during normal operating conditions and foreseeable emergencies
- Labeling system used in the work place

It is the responsibility of the UXOSO to ensure that all MSDSs of chemicals to which the contractor's employees or visitors may be exposed are made available at a central location in the work place along with an example of the labeling system in use. Visitors and subcontractors will be informed of the availability of this information and its location.

Program Review

This written hazard communications program for the ESCA RP Team will be reviewed by the PHSM at least annually and updated as necessary.

16.0 REFERENCES

National Institute for Occupational Safety and Health, Occupational Safety and Health Administration, U.S. Coast Guard, and U.S. Environmental Protection Agency (NIOSH/OSHA/USCG/EPA). 1985. Occupation Safety and Health Guidance Manual for Hazardous Waste Site Activities. October.

Vetter, Rick. 1999. Identifying and Misidentifying the Brown Recluse Spider, Dermatology Online Journal 5(2):7, http://dermatology.cdlib.org/DOJvol5num2/special/recluse.html (accessed 12/3/07).

Table 7
Hazard Analysis

Activity	Hazards	Hazard Control
Mobilization of personnel, equipment, and supplies to the project site, Site Preparations, Verification Site Walk, and Demobilization	***Chemical Hazards*** **-** Non-intrusive activities; therefore, the risk level of exposure to site contaminants during this activity is low. Focus on hazard awareness and change of conditions.	No intrusive measures allowed during this activity. Wear appropriate PPE for skin protection and to prevent dermal contact. Avoid liquid pools and stained areas if possible. An initial visual survey will be conducted to confirm the levels of protection are correct for the activity.
	Physical Hazards **-** Slips, trips, falls, tools, terrain, or vegetation; uneven walking surfaces; weather hazards, such as snow and ice; and poor visibility.	The work area will be visually inspected. Housekeeping - Slip, trip, and fall hazards will be either removed or marked and barricaded. Materials will be stored to prevent intrusion into the work areas. Work areas will be kept organized; and ice, snow, and mud will be cleared from steps to reduce slip hazards. Work to be completed in adequate natural light or assure sufficient illumination is maintained. Site personnel will conduct an initial walkover, and the "buddy system" will be implemented. Fall protection (railing or Fall Arrest Systems) will be installed if work is to be conducted at a level higher than 6 feet. See field operating procedure (FLD) 02, FLD 11, FLD 12, and FLD 39.
	Manual lifting	Use proper lifting techniques such as keeping straight back, lifting with legs; avoid twisting back; use mechanical equipment or get help from others whenever possible. Heavy loads will be split into smaller loads and/or assistance sought. The path of travel should be cleared prior to the lift. See FLD 10.
	Fire	Flammable liquids will be stored in safety containers and flammable storage cabinets. . Properly rated fire extinguishers will be placed within 50 feet of the fuel storage area, and in field vehicles. See FLD 31 and 32.
	Hands or fingers caught between objects; abrasions and lacerations.	Personnel will be made aware of the hazard and asked to coordinate carefully the handling and placement of heavy objects. Materials and objects being handled will be inspected for rough or sharp edges, and appropriate precautions will be taken to avoid contact. Personnel will wear work gloves and avoid placing hands between objects.

Table 7
Hazard Analysis

Activity	Hazards	Hazard Control
Mobilization of personnel, equipment, and supplies to the project site, Site Preparations, Verification Site Walk, and Demobilization (continued)	Hand tools, manual and power.	Tools will be inspected prior to use. Damaged tools will be tagged out of service until repair can be performed by a qualified person. Use tools properly and for their intended purpose. All power circuits used for hand tools will be protected by a ground fault circuit interrupter. All personnel will be trained on the proper use of all power tools. Lockout/ tagout procedures will be implemented per FLD 42 and 29 Occupational Safety and Health Administration (OSHA) 1910. Also see FLD 38.
	Caught in/between/struck by or against an object.	Workers will stay out of the swing area of all equipment and will not walk, work or stand near equipment being loaded or unloaded. No personnel will ride on the equipment unless seats are provided. See FLDs 20, 23, and 24. Materials and objects will be inspected for rough or sharp edges, and appropriate precautions will be taken to avoid contact. Personnel will wear work gloves and avoid placing hands between objects. Backup alarms will be in operable condition. Unnecessary backing will be avoided. Safety toe footwear will be required. Tools will be properly used.
	Inclement weather, heat/cold stress	Workers will be briefed and cognizant of heat and cold stress symptoms. Electrolyte/fluids replacement will be available to workers. Work rest periods will be established according to ACGIH, National Institute for Occupational Safety and Health (NIOSH) guidelines, and FLDs 05 and 06. Personnel will be monitored. Salt will be applied to walkway and roadway surfaces where ice is a problem. As determined by the UXOSO, operations are to cease during severe weather conditions, see FLD 02 – Inclement Weather.
	Traffic	Work areas will be clearly barricaded using existing gates and appropriate signs displayed. Traffic will be rerouted as necessary. Persons working in traffic area, near roadways or directing traffic will wear high visibility (reflective) vests. Posted speed limit of 15 miles per hour. See FLD 20.
	Biological **-** Possibility of stinging and biting insects, poisonous snakes; possibility of exposure to poison ivy, sumac.	Use appropriate insect repellants. Training to avoid poisonous plants and avoid contact. Adhere to WESTON Bloodborne Pathogens Exposure Control Plan— First Aid Procedures FLD 43.
	Radiation **-** Potential sun burn/sun poisoning hazard on bright, sunny days.	Use sunblock as appropriate. Avoid direct exposure to sun for long periods of time. There is no known source of radioactive material at this site.

Table 8
Equipment and Training Requirements

Task/Activity	Equipment	Inspection	Training
Preliminary Activities: Mobilization of personnel, equipment, and supplies to the project site, area security upgrades	equipment to be brought by subcontractor	Subcontractors will be required to conduct daily inspections and necessary maintenance for the equipment. Follow WESTON Inspection requirements per WESTON Health & Safety Program.	Equipment will be operated by qualified operators. An initial site-specific training will be conducted. Daily safety meetings will be conducted before beginning the work. Safe work practices and good housekeeping will be followed. Personnel will be informed of the contaminants and chemicals at the site and availability of Material Safety Data Sheet (MSDS).
Site Preparation Activities: Site surveying to delineate work areas and clearing of brush and small vegetation less than 4 inches in diameter in work areas	Survey equipment to be brought by subcontractor Weed whackers and Schonstedt GA52/72	Subcontractors will be required to conduct daily inspections and necessary maintenance for the equipment. Follow WESTON Inspection requirements per WESTON Health & Safety Program. Weed whacker operators will wear face mask, leg protection, hand protection, American National Standards Institute-approved footwear, and hearing protection. All equipment will be properly stored, inspected, maintained, and/or calibrated on a daily basis.	Workers involved in the clearing operation will be qualified and conduct activities in accordance with OSHA 29 CFR-1910.266 and U.S. ACE EM 385-1-1 Section 31. Daily safety meetings will be conducted before beginning the work to stress the importance of conducting all activities in a safe manner. Safe work practices and good housekeeping will be followed. Personnel will be informed of the contaminants and chemicals at the site and availability of MSDSs. Schonstedts will be operated by qualified operators with 40-hr training with 8-hr refresher course.
MEC Operations: mag & flag operations, removal of potential MEC anomalies, and destruction/ disposal of UXO and scrap materials	Hand tools Schonstedt GA52/72	All equipment will be properly stored, inspected, maintained, and/or calibrated on a daily basis.	Daily safety meetings will be conducted before beginning the work to stress the importance of conducting all activities in a safe manner. Safe work practices and good housekeeping will be followed. Personnel will be informed of the contaminants and chemicals at the site and availability of MSDSs. Schonstedts will be operated by qualified operators with 40-hr training with 8-hr refresher course.

Table 8
Equipment and Training Requirements

Task/Activity	Equipment	Inspection	Training
Demobilization Activities: Restoration of work areas and the demobilization of all remaining equipment and other items from the project site after project completion	Hand tools	All equipment will be properly stored, inspected, maintained, and/or calibrated on a daily basis.	Daily safety meetings will be conducted before beginning the work to stress the importance of conducting all activities in a safe manner. Safe work practices and good housekeeping will be followed. Personnel will be informed of the contaminants and chemicals at the site and availability of MSDSs.

APPENDIX A

Site Compliance Checklist

SITE COMPLIANCE CHECKLIST

	In Compliance?		
	Yes	No	N/A
1. SITE SAFETY AND HEALTH PLAN (SSHP)			
• Corporate Safety and Health Program (CSHP) available upon request.			
• Relevant CSHP Attachments, Programs, and Standard Operating Procedures (SOPs) on site and being followed.			
• Approved Work Plan on site, and SSHP Review Form signed by all site personnel.			
• Work Plan being followed in compliance with Data Item Descriptions (DIDs).			
2. HAZARD ASSESSMENT			
• Personal protective equipment (PPE) selected and provided for initial entry if potential for exposure above permissible exposure limits (PELs) exists.			
• A task hazard assessment has been conducted to identify the hazards associated with each task.			
• A certificate of task hazard assessment has been completed, which identifies the appropriate PPE and mitigation to be used to protect personnel from task hazards.			
3. SITE CONTROL			
• Site control plan is being implemented (i.e., buddy system, communication, site security, etc.).			
• Exclusion, contamination reduction, or support zones established and posted as per SSHP.			
• Site personnel following the standing orders for each zone.			
4. TRAINING PROGRAM			
• All personnel have received the required 40-hour Occupational Safety and Health Administration (OSHA) HAZWOPER training (or its equivalent), 8-hour refreshers, and supervisors course, if applicable.			
• Personnel have received three-day supervised training and the Three-Day Training form has been signed by all personnel.			
• Copies of all training certificates are on site.			
• Emergency response personnel have been designated and trained to handle anticipated emergencies.			
• Employees informed of potential risks and hazards identified for each task they are to perform.			
• Employees notified of chemical, physical, biological, and toxicological properties of identified or suspected contaminants.			
• Hazard Communication Training has been given to personnel who work with products containing hazardous substances, to include a review of the relevant Minimum Separation Distances.			
• Site personnel given OSHA required, hazard-specific training, such as PPE, Hearing Conservation, etc., and training forms completed.			

	In Compliance?		
	Yes	No	N/A
• At least two site personnel are trained in First Aid/CPR.			
5. MEDICAL SURVEILLANCE			
• Medical surveillance provided, as a minimum, to personnel who: are exposed at or above the PEL/threshold limit value (TLV), use respirators, or are a member of the emergency response team.			
• Provisions made for medical surveillance of personnel who receive a documented, unprotected over-exposure or develop signs and symptoms of exposure.			
• Site-specific medical tests, as required by the SSHP, have been conducted prior to site personnel participating in site activities where exposure can occur.			
• Physician's statement retained in employees' records on site.			
• Personnel with potential occupational exposure to blood or other potentially infectious body fluids have been given the opportunity to be vaccinated against Hepatitis B Virus (HBV), and personnel who decline have signed the HBV Vaccination Declination Form.			
6. ENGINEERING CONTROLS, EQUIPMENT, WORK PRACTICES, AND PPE			
• Engineering controls and safe work practices (SWPs) being used whenever feasible.			
• Equipment required by the work practices (WP) is on site, inspected, and in proper working order.			
• PPE has been selected according to the limitations of the PPE, site hazards, and the level and type of hazard.			
• Self-contained breathing apparatus (SCBA) or positive pressure supplied air line, including an emergency escape respirator, provided when known or potential immediately dangerous to life or health (IDLH) conditions exist.			
• All PPE is being inspected, used, cleaned, stored, and maintained in accordance with (IAW) the SSHP.			
• Respiratory protection being issued only to personnel who have been trained and medically approved to use respiratory protective equipment.			
• Personnel using respirators have been tested for the respirator being used.			
7. MONITORING			
• Monitoring equipment being calibrated, operated, and maintained IAW manufacturer's requirements, and calibration, monitoring, and maintenance records available.			
• Monitoring being conducted IAW the WP to:			
• Identify potential IDLH or explosive conditions.			
• Assess personal exposures to chemical and physical hazards.			
• Evaluate exposures when a change in tasks or location occurs.			
• Assess exposures when previously unidentified materials/hazards are identified.			
• High-risk workers monitored initially and all workers monitored if levels indicate the need.			
• Work area and perimeter monitoring being conducted IAW the WP.			

	In Compliance?		
	Yes	No	N/A
• Site monitoring log being completed for all personnel and area monitoring.			
8. HANDLING DRUMS AND CONTAINERS			
• Drums and containers used on site meet Department of Transportation (DOT), OSHA, and Environmental Protection Agency (EPA) regulations.			
• Drums and containers found on site are being inspected prior to being moved or handled.			
• All unlabeled drums and containers being handled as hazardous waste until identified as nonhazardous.			
• Drum and container movement being minimized.			
• Drums/containers opened IAW approved methods listed in the WP.			
• Drum sampling performed IAW the approved sampling plan to classify contaminants in drums/containers prior to bulking, temporary storage, and shipping.			
• Staging of drums and containers being conducted IAW the WP, and staging areas provided with adequate ingress/egress.			
• DOT salvage drums and adequate spill response materials available, and written spill containment program available.			
• Materials are assessed for compatibility prior to being bulked together.			
• Shock-sensitive waste being identified and handled appropriately.			
• Lab packs are opened by properly trained personnel.			
• Tanks and vaults containing hazardous substances handled IAW the WP and confined space procedures, if needed, are being used for entry.			
• Drums and containers being transported off site by a licensed hazardous waste hauler.			
9. DECONTAMINATION PROGRAM			
• Site workers properly trained and complying with the written decontamination procedures.			
• All potentially contaminated equipment, clothing, and PPE are being properly decontaminated.			
• All decontamination solutions are being containerized into approved storage containers at the end of each day.			
• Decontamination procedures evaluated for effectiveness.			
• On-site showers and change houses comply with 29 CFR 199.141.			
10. EMERGENCY RESPONSE			
• Written emergency response plan incorporated in the WP.			
• Written procedures for reporting incidents to local, state, and federal agencies.			
• Emergency response plan rehearsed and amended as needed.			

	In Compliance?		
	Yes	No	N/A
• First aid, burn, and eye wash kits available on site and in each vehicle, with a blood-borne pathogen control kit located with each first aid kit.			
• Adequate type, number, and size fire extinguishers appropriately located on site and inspected weekly.			
• Flammable storage areas properly posted.			
• Employee alarm system IAW the WP and practiced.			
11. ILLUMINATION			
• Adequate light levels provided in all office, storage, and work locations.			
12. SANITATION AND HOUSEKEEPING			
• Adequate supply of potable water available from labeled containers or outlets.			
• Non-potable water sources appropriately labeled, and no open or potential cross connection to potable sources exists.			
• Appropriate type and adequate number of toilets available.			
• Personnel wash facilities provided and located near site, but away from exposure potentials.			
• Shower/change facilities located away from exposure potentials and designed to comply with the requirements of 29 CFR 1910.141.			
• Site being maintained in a neat and orderly fashion, free of trash and debris.			
• Adequate number of trash cans with lids are located on site and emptied regularly.			

REMARKS, OBSERVATIONS, AND RECOMMENDATIONS

Signature of Auditor: Date:

APPENDIX B

Standard Operating Procedures

STANDARD OPERATING PROCEDURE FOR HANTAVIRUS EXPOSURE PROTECTION

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) along with FLD 43 is to provide the minimum procedures and safety and health requirements applicable to the conduct of operations involving potential exposure to Hantavirus.

2.0 SCOPE

To establish a policy to protect personnel engaged in activities at the former Fort Ord from potential exposure to Muerto Canyon Virus (MCV). Hantavirus Pulmonary Syndrome (HPS) is a respiratory disease, which is caused by a type of Hantavirus. The particular Hantavirus responsible for HPS is the MCV.

3.0 BACKGROUND

There have been confirmed cases of fatal Hantavirus infection in California in recent years. As a result, this SOP has been developed to provide guidance to personnel whose occupational activities might expose them to sources of this virus.

4.0 METHOD OF TRANSMISSION

MCV is transmitted to humans through the inhalation of aerosolized excreta (feces, urine, and saliva) and contaminated dust from rodents and their nests. This includes rats, deer mice, brush mice, and western chipmunks. Some sites where personnel will be working are infested with significant numbers of rat nests that may be encountered during the conduct of activities.

5.0 SYMPTOMS OF MCV

Workers infected with MCV develop febrile or respiratory illness within 45 days of their exposure. The initial symptoms are flu-like and may progress to life-threatening respiratory distress. Besides supportive measures, there are no proven therapeutic agents available at this time for MCV. Workers showing symptoms should seek medical attention immediately. The physician should be informed that MCV is a potential occupational risk and a blood sample should be drawn for comparison with the baseline serum sample. The blood samples should be forwarded to the California State Department of Health for transfer to the Center of Disease Control for testing. The required storage for drawn serum of -20° C may be

impractical for extended periods in many locations. The serum will aid in diagnosis by clarifying baseline status, but it is not essential.

5.1 Medical Program

All employees working at the former Fort Ord have baseline blood serum samples drawn during the conduct of their pre-employment physical. The examination also includes a medical and occupational history review, blood and urine tests for contaminants of interest, electrocardiogram, pulmonary function tests, chest x-ray, and general physical examination including hearing and vision.

6.0 SPECIALIZED TRAINING

Specialized training regarding MCV is conducted during site-specific training for personnel who will be employed at the site. It includes use of protective equipment, safe and effective use and application of functional tools and equipment, work procedures and practices, medical surveillance requirements, recognition of symptoms and signs of exposure, physical nature of possible sources of exposure, and appropriate first aid.

7.0 EXPOSURE PREVENTION

The following procedures will be used to minimize exposure to MCV.

7.1 Indoor Work Areas

It is not anticipated that employees will be working in "indoor work areas" where there is a potential for exposure to MCV. If this should occur, or if additional buildings or housing to support operations are acquired that have been closed up or vacant for long periods of time, the following procedures will apply:

- Open building and air it out for at least 30 minutes prior to cleanup
- Spray the indoor area with a household disinfectant
- Wait 30 minutes prior to completion of cleanup

7.2 Field Latrines

The Army field latrines located throughout the former Fort Ord are considered to be contaminated with MCV. These latrines will be entered only as necessary to determine if munitions and explosives of concern (MEC) are located within the structure prior to demolition and removal. Field toilet facilities will consist of port-a-johns, strategically located within the work sites.

7.3 Outdoor Work Areas

Rat nests exist in varying numbers throughout the installation. It is expected that these are the prime threat of exposure for employees. When encountered during the course of brush clearing activities, the rat nests are cordoned off with engineer's tape and avoided. During brush clearing in close proximity to the nests, care is exercised to avoid disturbing the nests or creating dust clouds from them. The presence of these nests is recorded on grid sheets by the team leaders. During the conduct of geophysical and MEC activities, cordoned-off rat nests are avoided and the engineer's tape left in place.

7.4 Excavation Team Operations

After all brush cutting and geophysical and MEC activities in the grid are complete, the unexploded ordnance (UXO) excavation team disinfects, searches, and clears the areas beneath the nests.

7.5 Decontamination Method

MCV is easily killed in the environment with common disinfectant solutions such as household bleach/water solution (50/50 for Equipment and Nests, 10% for Personnel) or rubbing alcohol. These solutions and direct sunlight will kill the virus in less than 1 hour.

7.5.1 Decontamination Equipment

The below-listed equipment may be used for nest decontamination and destruction:

- Backhoe
- Backpack fire pumps
- 5-gallon water containers, buckets, and brushes
- Plastic storage and disposal bags
- Drop cloth
- Bleach/water and alcohol
- Rakes and pitchforks
- Other search and clearance equipment normally carried by teams

8.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Level C is the PPE required for personnel engaged in activities where a possibility of exposure to MCV exists. The UXO Safety Officer, in conjunction with the certified industrial hygienist, will make any applicable changes. Level C items include:

- Half-face, air-purifying respirator with high-efficiency particulate (HEPA) filter cartridges (N/P/R 99,100) and non-vented goggles or high-filtration dust mask with non-vented goggles
- Coveralls with hood (disposable if possible); rubber or plastic gloves; rubber boots or disposable shoe covers
- Wrist and ankles will be sealed with tape
- Hard hats will be worn in vicinity of earth moving equipment (backhoe)

Prior to donning a mask/respirator, the wearer must be clean-shaven in the areas of the face that help to create an air-tight seal between the face and the mask/respirator.

9.0 PROCEDURES FOR CLEARING RODENT NESTING AREAS

The below-listed procedures are used by the excavation team when disinfecting, searching, and clearing nests:

- All members of the team dress in prescribed PPE listed in Section 8.0.
- If the backhoe is to be used, the operator positions the backhoe in such a manner as to access nest(s) from the upwind side.
- The nest is drenched with bleach/water solution.
- Nest materials are swept clear of the next location with the backhoe or the rakes and pitchforks, with care being taken not to spread the materials over too large an area.
- The nest is checked with a magnetometer. If no anomalies are detected, the team continues to the next area; if an anomaly is detected, the team proceeds to the next step.
- Contacts are excavated as necessary, leaving materials dislodged.
- Spray again with bleach/water solution. Drench all materials and original nest site.

Be Prepared for Rodents or Snakes to Flee the Nest as Activities Progress.

The decision to use the backhoe or rakes and hand tools to clear nests is at the team leader's discretion, based on consideration for:

- Access to the nests with the backhoe
- Nest size, quantity, and location
- Environmental affect likely to be incurred through maneuvering the backhoe in and out of position (i.e., tire ruts, impressions, and outrigger disturbance of topsoils)

10.0 FIELD SANITATION

Upon completion of work in a potential MCV contamination area, team personnel process themselves through the team field sanitation station. Waste materials are placed in plastic bags with disinfectant solution that will completely wet the item disposed of. The plastic bag is then placed in trash receptacles for disposal as ordinary waste. Non-waste materials (coveralls, gloves, etc.) are placed in plastic bags with disinfectant solution, which will completely wet the items. Upon return to the support compound, the items are then processed for ordinary laundering.

11.0 RESPIRATOR FIT TESTING, INSPECTION, AND MAINTENANCE

Employees required to wear a respirator must be fitted properly and tested for a face seal prior to use of the respirator in a contaminated area. Manufacturers provide fitting instructions and use limitations on their product packaging. The following points should be considered for respirator inspection and maintenance:

- The wearer of a respirator will inspect it prior to its use.
- Supervisory personnel will periodically spot check respirators for fit and condition.
- Respirators not discarded after use will be cleaned after use, according to the manufacturer's instructions, by the user.
- Respirators not discarded after one use will be stored in a suitable container away from areas of contamination.
- Inspection and maintenance of respirators will be documented in the team leader's notebook.

STANDARD OPERATING PROCEDURE FOR MEC WITH UNKNOWN FILLER

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide the step-by-step procedures and safety and health requirements applicable in the event ordnance items are discovered and the filler cannot be positively determined at the former Fort Ord.

A Chemical Warfare Material (CWM) Risk Assessment has been completed for the former Fort Ord. The results indicated that the probability of encountering CWM munitions is "unlikely" while the probability of encountering CWM Chemical Identification Sets is "seldom."

2.0 SCOPE

This SOP applies to all personnel involved in the conduct of munitions and explosives of concern (MEC) clearance on the former Fort Ord.

3.0 REGULATORY REFERENCES

- AR 385-61, The Army Chemical Agent Safety Program
- AR 385-64, U.S. Army Explosives Safety Program
- DA Pam 385-61, Toxic Chemical Agent Safety Standards
- DA Pam 385-64, Ammunition and Explosives Safety Standards
- AR 50-6, Chemical Surety
- AR 190-11, Physical Security of Arms, Ammunition, and Explosives, 12 February 1998
- EP 75-1-3, Recovered Chemical Warfare Materiel (RCWM) Response Process

4.0 RESPONSIBILITIES

4.1 Remediation Project Manager (RPM)

The RPM is responsible for ensuring availability of resources required to safely implement this SOP.

4.2 Senior Unexploded Ordnance Supervisor (SUXOS)

The SUXOS is responsible for incorporating this SOP in plans, procedures, and training and ensuring that all personnel conducting MEC operations are familiar with and comply with this SOP.

4.3 UXO Safety Officer (UXOSO)

The UXOSO ensures that all operations pertaining to MEC clearance are being conducted in a safe manner and in accordance with the appropriate work plans and this SOP. The UXOSO conducts safety audits of the operations and ensures that all personnel are properly trained and utilizing the appropriate personal protective equipment (PPE).

4.4 UXO Team Leader

The UXO Team Leader is responsible for supervision of the team conducting the clearance operation. The UXO Team Leader is required to conduct training of personnel involved in MEC operations to ensure that every member of the MEC team thoroughly understands this SOP.

5.0 OPERATIONS

5.1 General

There are three ordnance items of concern that require positive identification of the filler prior to any disposition, the Livens Projector, the 4-inch Stokes mortar, and the 4.2-inch mortar.

- Visual recognition of the Livens Projector, 4.2-inch mortar, and the 4-inch Stokes is necessary and requires training on recognition features to ensure everyone uses the same techniques. The 4-inch Stokes mortar of concern is 19.56 (19/16) inches in length, measured from the end of the tail boom to the top of the threaded fuze well. 4-inch Stokes mortars of lesser lengths contain known fillers and will be treated as any other MEC item.
- All Livens Projectors and all 4.2-inch mortars are common in dimensions and have different fillers. These ordnance items along with the 19.56-inch-long, 4-inch Stokes will be treated as MEC with unknown fillers.
- Upon recognition/identification of a Livens Projector, a 4.2-inch mortar, or a 4-inch Stokes by any UXO team member conducting a MEC clearance operation, the team member will immediately notify the Team Leader who will measure the item. If the measurements indicate a possible CWM-filled Stokes, or if the item recognized/identified is a 4.2-inch mortar or a Livens Projector, the Team Leader will notify the SUXOS and the UXOSO.

- The UXO team and any other teams in the area will evacuate the area, proceeding at least 200 feet upwind, and await the UXOSO and the SUXOS.
- Upon arrival of the UXOSO, the UXO Team Leader will accompany her/him to the location of the suspect item.
- In the event the UXOSO and SUXOS determine that the item contains a known filler other than CWM, it shall be disposed of in accordance with the work plan.
- Upon verification by the UXOSO and SUXOS of an MEC item with an unknown filler, the exact location will be recorded using a Global Positioning System unit and backfilled with excavated material. The UXO Team Leader will evacuate to the safe area upwind, and the UXOSO and SUXOS will notify the RPM who will notify the Fort Ord Reuse Authority (FORA) who will notify the Presidio of Monterey Police who will notify the Technical Escort Unit (TEU). Following the property transfer from the Army to FORA, FORA will notify the local law enforcement agency who will notify the local Explosive Ordnance Disposal (EOD) unit assigned to the region. In addition, when FORA notifies the local law enforcement agency, they will also notify the Presidio of Monterey Police Department and the local BRAC Fort Ord Field office.
- In the event TEU or the EOD unit positively identifies the filler as CWM, or the filler remains unknown, TEU or the EOD unit will make the determination for and conduct a safe disposal of the item.
- In the event TEU or the EOD unit positively identifies the filler as non-CWM, they will release the item to WESTON for disposal in accordance with the work plan.

6.0 SAFETY

6.1 General

At no time will a Livens Projector, a 4.2-inch mortar, or a 4-inch Stokes mortar measuring 19.56 inches in length (fuzed or unfuzed) be moved prior to disposition determination by TEU.

6.2 PPE

Standard PPE for field MEC operations will be utilized in accordance with the work plan.

ATTACHMENT B

Standard Operating Procedures for Vegetation Cutting and Chipping

STANDARD OPERATING PROCEDURE FOR MECHANICAL VEGETATION CUTTING

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) together with FLD 47 is to provide the minimum procedures and safety and health requirements applicable to the conduct of mechanical vegetation cutting operations.

2.0 SCOPE

All personnel performing operations utilizing mechanical equipment for vegetation cutting will conform to this SOP. This SOP is not a stand-alone document, and all personnel will become familiar with associated documents and/or manuals related to this operation.

3.0 REGULATORY REFERENCES

- Weston Solutions, Inc., Corporate Safety and Health Program
- OSHA General Industry Standards, 29 CFR 1910
- OSHA Construction Standards, 29 CFR 1926
- USACE EM 385-1-1, Safety and Health Requirements Manual
- AR 385-10, Army Safety Program
- Operator's Manual and Manufacturer's Recommendations

4.0 RESPONSIBILITIES

4.1 Remediation Project Manager (RPM)

The RPM is responsible for ensuring availability of resources required to safely implement this SOP.

4.2 Senior Unexploded Ordnance Supervisor (SUXOS)

The SUXOS is responsible for incorporating this SOP in plans, procedures, and training.

4.3 UXO Safety Officer (UXOSO)

The UXOSO ensures that all mechanical vegetation cutting operations are being conducted in a safe manner in accordance with the work plan and this SOP.

4.4 Mechanical Vegetation Cutting Team Leader

The team leader is responsible for the daily maintenance, upkeep, and repair of the machine and certification of operator personnel.

4.5 UXO Escort/Ground Safety Observer

The UXO Escort/Ground Safety Observer ensures that personnel and equipment remain within the site, and marks any munitions and explosives of concern (MEC) encountered and reports their location to the SUXOS.

4.6 Team Members

The team members are responsible for the proper and safe operation and maintenance of all equipment, such as weed eaters and chainsaws, and walking behind brush hogs.

5.0 MECHANICAL VEGETATION CUTTING OPERATIONS

Vegetation cutting operations will be consistent with the operator's manual and terrain features, and permits the Ground Safety Observer to perform those duties as directed to include a visual search/survey of the area(s) to be worked in.

- Personnel will not enter within 50 feet of an operating piece of equipment. If, at any time, personnel enter closer than 50 feet, the operator will immediately stop, return the engine to idle speed, and disengage power to all attachments.
- A communications check with the team personnel prior to operations commencing will be conducted. Hand signals are devised and used as a secondary means of communication. All team personnel must know these hand signals prior to operations commencing.
- The direction and manner in which the vegetation is to be removed will be directed by the team leader. Prior to cutting operations commencing, a visual search/survey is conducted to determine the hazards that may be encountered, including MEC, terrain slope, vegetation, wildlife, and environmental concerns. The team leader will also determine the personal protective equipment (PPE) requirements based on the identified hazards.
- The Ground Safety Observer precedes the equipment and performs a visual search for MEC, ordnance scrap, rats' nests, surface debris, and any other obstruction/object that may pose a hazard to team personnel. Hazardous items, impassable terrain, or vegetation

that may affect operations will be marked and team personnel notified. The operator shall follow a route selected by the Ground Safety Observer while operations are ongoing.

- Team personnel will ensure that a 6-inch ground clearance is maintained during cutting operations. Those areas marked as hazards are to be avoided.
- MEC or MEC-related items encountered are marked and avoided. Notification of these items will be made to the SUXOS.

5.1 Safety

Safety is paramount. All personnel will observe those safety precautions/warnings that apply, or may apply, to vegetation cutting operations. Those listed below are general in nature and personnel will need to review applicable publications for more specific safety precautions/warnings. Distances are the minimum required.

- Maintain 200 feet from essential non-UXO personnel; UXO personnel engaged in intrusive work; and other mechanical equipment (e.g., backhoe).
- Maintain 50 feet between equipment and team personnel.
- Distances may be increased by the UXOSO, as determined by site history, MEC items encountered, terrain features, and other factors that may apply.
- Use equipment safety features (e.g., guards).
- Safety precautions/warnings found in the operator's manual(s)/manufacturer's publication(s) will be observed.
- Maintain 6 inches of ground clearance during cutting operations.
- Communications will be maintained between the Team Leader/UXO Escort, operator, and Ground Safety Observer at all times.
- Maintain site control.
- Observe safety precautions for items encountered or suspected.
- Ensure PPE is serviceable and worn/used in a proper manner.

6.0 PERSONAL PROTECTIVE EQUIPMENT

Level D PPE will be required for personnel engaged in mechanical vegetation cutting. Clothing includes, but is not limited to:

- Coveralls or work clothing as prescribed
- Work gloves, leather or canvas as appropriate
- Safety glasses
- Face shields when appropriate

- Hard hats when working within 100 feet of equipment
- Hearing protection, noise attenuators or ear plugs when within 50 feet of equipment
- Dust mask, as required by wind conditions and/or the presence of airborne particulate matter
- Other PPE as needed (e.g., face shield, Kevlar chaps, etc.)

7.0 TRAINING

All personnel who work on a mechanical vegetation cutting crew will be qualified and certified through machine-specific, site-specific, and on-the-job training. This training will consist of:

- Mechanical operations and maintenance of the vegetation cutting equipment
- Features of the equipment and its operational limits and characteristics
- Safety parameters relevant to mechanical operations

STANDARD OPERATING PROCEDURE FOR CHIPPING OPERATIONS

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to the conduct of chipping operations in areas that are considered environmentally sensitive.

2.0 SCOPE

This SOP applies to all personnel involved in the conduct of chipping operations either using a disk-type or rotary-drum-type chipper.

3.0 REGULATORY REFERENCES

- Weston Corporate Safety and Health Program (FLD47)
- OSHA General Industry Standards, 29 CFR 1910
- OSHA Construction Standards, 29 CFR 1926
- USACE EM 385-1-1, Safety and Health Requirements Manual
- AR 385-10, Army Safety Program
- Operators Manual and Manufacturers Recommendations

4.0 RESPONSIBILITIES

4.1 Remediation Project Manager (RPM)

The RPM is responsible for ensuring availability of resources required to safely implement this SOP.

4.2 Senior Unexploded Ordnance Supervisor (SUXOS)

The SUXOS is responsible for incorporating this SOP in plans, procedures, and training.

4.3 UXO Safety Officer (UXOSO)

The UXOSO ensures that all chipping operations are being conducted in a safe manner, in accordance with the appropriate work plans, FLD 47, and this SOP.

4.4 Chipper Team Leader

The chipper team leader is responsible for the daily maintenance, upkeep, and repair of the machine, and certification of operator personnel.

4.5 Qualified Biologist

The Qualified Biologist will identify locations where mulch is not to be spread, to avoid affecting the re-establishment of Habitat Management Plan annual plants.

5.0 CHIPPING OPERATIONS

5.1 General

Chipping is required whenever vegetation removal is being conducted in the Habitat Management Area. In addition, it may be necessary to conduct chipping to improve ground visibility and safety.

5.2 Chipper Operation

The chipper will be manned by brush feeders (laborers). When feeding material into the chipper, feeders must exercise care not to place hands, or any other parts of the body, or loose clothing on the feed table when the chipper is in operation. Care will be taken not to reach past the "SAFE" point established on the feed table/chute. This point varies between chipping machines and will be identified to all personnel.

- A push stick of material consumable by the chipper will be available, one on either side of the chipper, for pushing material into the chipper when it is necessary to probe beyond the safe point.
- Brush draggers will be employed to drag brush to the feeders. The draggers will trim the brush as necessary to fit it into the chipper, and pass it to the feeders.
- Limbs and wood stock 3 inches or greater in diameter need not be chipped. These items can be left in the field as a source of habitat for bugs, salamanders, and other creatures.
- The chipper team leader must oversee the operation with regard to safety, work progress, weather/wind conditions, materials being chipped, and other factors that affect the operation.
- Poison oak will not be chipped by itself. If it is entangled within brush, it will be chipped based on the team leaders' discretion.
- Any time the chipper is operated while disconnected from the team vehicle, the chipper's wheels will be blocked or chocked to prevent it from rolling.
- Fluid levels and gauges will be checked periodically and at every break.

5.3 Chipped Mulch

Mulch will, in most locations, be spread over the area from which the original brush material was cut and be limited to 3 inches in depth. Mulch will not be spread any closer than 5 feet from the roadsides whenever possible. Mulch will not be spread in certain locations where sensitive annual plant habitat occurs, as identified by the Qualified Biologist.

5.4 Field Sanitation

The team decontamination station will be located at least 50 feet upwind of the chipping operation. If the team vehicle is attached to the chipper, the team equipment in the pickup bed will be covered with a tarp or plastic sheet material.

5.5 Hearing Conservation

The first day, the noise level will be measured using an appropriate measuring device(s). Readings will be taken at the machine, as well as in the vicinity of the machine, and noise attenuation devices selected and issued. Directives of FLD 01 will be adhered to at all times.

6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Modified Level D PPE will be required for personnel engaged in chipping operations to include:

- Coveralls – appropriately taped at ankles and openings
- Surgical/inner gloves
- Leather or canvas work/outer gloves
- Leather gauntlets
- Work boots – leather or suitable material
- Tyvek hood when in poison oak
- Hard hats
- Hearing protection • brush feeders will wear noise attenuating helmets or ear plugs, both will be worn if uninterrupted work period extends beyond 45 minutes
- Brush draggers will wear noise attenuating helmets or ear plugs
- Eye protection • all personnel will wear safety glasses, brush feeders will also wear face shields/screens
- Disposable dust masks - at any time that dust is being generated, disposable dust masks will be worn

No one will approach within 35 feet of an operating chipper without the appropriate PPE and hearing protection.

7.0 TRAINING

All personnel who work on a chipping crew will be qualified and certified through machine-specific, site-specific, and on-the-job training. This training will consist of:

- Mechanical operations and maintenance of the chipper
- Features of the chipper and its operational limits and characteristics
- Safety parameters relevant to chipping operations

MOUT Site MRA Field Verification Survey Results

Table E-1 MOUT SIte MRA Field Verification Survey Data

Project Site Name	Area Of Concern Name	Search Area Type	Grid ID	Field Team Name	Is Burial Pit	Item #	Item Count	Northing	Easting	Log Date	Logged By	Is MEC	Item Category	Item Type	MEC Condition	Depth (inches)	Weight (lbs)	Item Current Status	Requires Further Action	Hole Cleared	UXO QC Completed	QC Final	OE Model ID
MOUT	BLM Parcel H / MOUT	Grid	B3H8F8	ORD6	FALSE	601	1	2119537.29	5753285.3	2/15/2012 15:05	Andrew Caldwell	TRUE	DMM (standard)	gren, hand, smoke, M18	Live	0.00	1.00	Stored in Magazine #765	TRUE	FALSE	FALSE	FALSE	142
MOUT	BLM Parcel H / MOUT	Grid	B3H8B5	ORD6	FALSE	601	1	NA	NA	2/16/2012 15:07	Andrew Caldwell	FALSE	MD (standard)	rocket, 2.36inch, prac, M7	Inert	0.00	3.50	Stockpiled	FALSE	FALSE	FALSE	FALSE	353
MOUT	BLM Parcel H / MOUT	Grid	B3H8B6	ORD6	FALSE	601	1	NA	NA	2/16/2012 15:08	Andrew Caldwell	FALSE	MD (standard)	rocket, 2.36inch, prac, M7	Inert	0.00	3.50	Stockpiled	FALSE	FALSE	FALSE	FALSE	353
MOUT	BLM Parcel H / MOUT	Grid	B3H8G0	ORD6	FALSE	601	1	NA	NA	2/15/2012 15:02	Andrew Caldwell	FALSE	MD (standard)	fuze, gren, hnd, pra, M205	Inert	0.00	0.10	Stockpiled	FALSE	FALSE	FALSE	FALSE	78
MOUT	BLM Parcel H / MOUT	Grid	B3H8G9	ORD6	FALSE	601	1	NA	NA	2/15/2012 15:00	Andrew Caldwell	FALSE	MD (standard)	sig, illum, grnd, M125	Inert	0.00	1.50	Stockpiled	FALSE	FALSE	FALSE	FALSE	389
MOUT	BLM Parcel H / MOUT	Grid	B3H8H0	ORD6	FALSE	602	1	NA	NA	2/15/2012 14:59	Andrew Caldwell	FALSE	MD (standard)	fuze, gren, hand, prac, M228	Inert	0.00	1.50	Stockpiled	FALSE	FALSE	FALSE	FALSE	89
MOUT	BLM Parcel H / MOUT	Grid	B3H8H0	ORD6	FALSE	601	1	NA	NA	2/15/2012 14:57	Andrew Caldwell	FALSE	MD (standard)	fuze, gren, hnd, pra, M205	Inert	0.00	0.10	Stockpiled	FALSE	FALSE	FALSE	FALSE	78

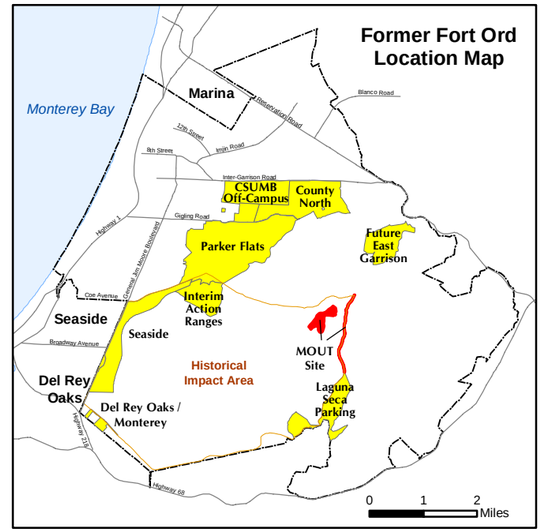
Notes:
lb = pounds
MEC = munitions and explosives of concern
DMM = discarded military munitions
MD = munitions debris
UXO = unexploded ordnance
QC = quality control
NA = not applicable

EUCALYPTUS RD (EAST)

MRS-28

Legend

- Subsurface Anomalies Detected in Grid
- Military Munitions Reconnaissance
- Visual Surface TCRA (2003)
- Instrument-Aided Field Verification Survey (2012)
- MRS-28 — Munitions Response Site
- Munitions Response Area
- Major Road



N

0 300 600 Feet

ARCADIS
Infrastructure Water Environment Buildings

WESTON SOLUTIONS

WESTCLIFFE ENGINEERS

MOUT Site MRA
2012 Field Verification Survey, Grids Containing Detected Subsurface Anomalies

FORA ESCA RP
Monterey County, California

Figure E-1

T:\Projects\Group 3 RIFS\Vol1\2012_07_02_MOUT_2012_Field_Verification_Survey_Detections.mxd 7/2/2012 @ 1:24:37 PM

M18 smoke hand grenade (quantity 1) found at surface in MOUT Site MRA grid B3H8F8 on February 15, 2012.

Daily Report

Date: 15 February 2012 Contract Number:

Delivery Order Number: Location: FT ORD

Weather Conditions: Cloudy and cool, winds 5-10.

I. Work Summary:

Two teams excavated geophysical anomalies in IAR Range 44.

Sifting operations continued with the sifting of material that was scraped from lay down area and sift plant location.

One team of technicians began the near surface clearance at the MOUT site.

Equipment comments:

II. Instructions Received:

III. Safety Comments: All personnel attended the daily safety brief.

IV. UXO Summary **Items below found during today's operations.**

Type		
Rocket, 35mm, subcal, practice, M73		Range 44
Rocket, 66mm, HEAT, M72 series (warhead only)		Range 44
Grenade, hand, smoke, M18 series		MOUT Site

b. Demolition Supplies Used:

Electric blasting caps			

Explosive boosters			
Detonation cord			
Det perforators			
V. Personnel/Equipment Utilization:			
a. Personnel On-site			
SENIOR UXO SUPERVISOR (Bruce Moe)	**SUXOS**	10	
SITE SAFETY OFFFICER (Greg Clark)	**SAFETY**	10	
QUALITY CONTROL OFFICER (Don Kean)	**QC**	10	
1. Matt Lauchner	IAR dig team R44	10	
2. Eric Gonzalez	MOUT	10	
3. Bob Smith	IAR dig team R44	10	
4. Butch Adams	IAR dig team R44	10	
5. Clark Sorenson	IAR dig team R44	10	
6. Joe Remington	IAR dig team R44	10	
7. Bill Raasch	IAR dig team R44	10	
8. Steve Hendricks	SICK	10	
9. Wilson Behling	MOUT	10	
10. Karl Christiansen	IAR dig team R44	10	
11. Drew Caldwell	MOUT	10	
12. Jack Kristensen	VACATION	10	

b. Equipment	totals	hours
GATOR / ARGO	2	0
WESTON PICKUP TRUCKS	8	80
WHITE METAL DETECTORS	4	0
SCHONSTEDTS METAL DETECTORS	22	60
HAND HELD RADIOS	16	120
GPS (TRIMBLE)	2	20
PDA's	7	20
EM-61 (hand held)	4	30
VI. Comments/Concerns:		
VII. Signature(s) Project Manager Linda Temple Senior UXO Supervisor Bruce Moe		

Daily Report

Date: 16 February 2012 Contract Number:

Delivery Order Number: Location: FT ORD

Weather Conditions: Partly sunny most of the day, temps in the high 60's.

I. Work Summary:

Two teams excavated geophysical anomalies in IAR Range 44.

One team of technicians completed the near surface clearance at the MOUT site.

Two technicians collected DGM data in IAR Range 47 (data gaps and polygon).

Equipment comments: Moved sift plant off range 47, cleaning up all sift gear for demobilization.

II. Instructions Received:

III. Safety Comments: All personnel attended the daily safety brief.

IV. UXO Summary **Items below found during today's operations.**

Type		
Rocket, 35mm, subcal, practice, M73		Range 44

b. Demolition Supplies Used:

Electric blasting caps			

Explosive boosters			
Detonation cord			
Det perforators			
V. Personnel/Equipment Utilization:			
a. Personnel On-site			
SENIOR UXO SUPERVISOR (Bruce Moe)	**SUXOS**	10	
SITE SAFETY OFFFICER (Greg Clark)	**SAFETY**	10	
QUALITY CONTROL OFFICER (Don Kean)	**QC**	10	
1. Matt Lauchner	IAR dig team R44	10	
2. Eric Gonzalez	MOUT	10	
3. Bob Smith	IAR dig team R44	10	
4. Butch Adams	IAR dig team R44	10	
5. Clark Sorenson	IAR dig team R44	10	
6. Joe Remington	DGM Data collection Range 47	10	
7. Bill Raasch			
8. Steve Hendricks	DGM Data collection Range 47	10	
9. Wilson Behling	MOUT	10	
10. Karl Christiansen	IAR dig team R44	10	
11. Drew Caldwell	MOUT	10	
12. Jack Kristensen	IAR dig team R44	10	

b. Equipment	totals	hours
GATOR / ARGO	2	0
WESTON PICKUP TRUCKS	8	80
WHITE METAL DETECTORS	4	0
SCHONSTEDTS METAL DETECTORS	22	60
HAND HELD RADIOS	16	120
GPS (TRIMBLE)	2	20
PDA's	7	30
EM-61 (hand held)	4	30
VI. Comments/Concerns:		
VII. Signature(s) Project Manager Linda Temple Senior UXO Supervisor Bruce Moe		

UXO QUALITY CONTROL REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

	DATE	Feb 23 2012
ESCA No. W9128F-07-2-01621	TITLE AND LOCATION: Future East Garrison MRA/ Seaside MRA/ IAR MRA	13135.004.001- QC 819

CONTRACTOR: Weston Solutions, Inc.	UXOQCS: Donald Kean

EQUIPMENT USED	WEATHER	MAX TEMP (F)	MIN TEMP (F)	PRECIP (IN)
SCHONSTEDT, EM-61	SUNNY/CLOUDY			0.00

WORK PERFORMED TODAY

Future East Garrison

No QC operations were conducted today

IAR MRA

Observed teams investigating DGM targets in IAR R44

Seaside RQA

No QC operations were conducted in Seaside.

Mout

Conducted analog QC operations today in the Mout

Donald Kean UXOQCS

2/23/2012
DATE

APPENDIX F

Response to Comments on Draft Group 3 RI/FS

Response to Comments
Draft Group 3 Remedial Investigation / Feasibility Study, dated April 8, 2010
Review Comments provided by Judy Huang of the EPA, dated June 7, 2010

No.	Comment Type / Report Section	Comment/Response
1	General Comment	**Comment:** The report identified Land Use Controls as the preferred remedial alternative for both the Del Rey Oaks/Monterey and the Laguna Seca Parking Munitions Response areas based on previous investigations and removal activities occurred at these two munitions response areas. However, portions of these two munitions response areas had either not been investigated or only had surface/near surface clearance. Therefore these areas may still have MEC both on the surface and in the subsurface and warrant access controls above and beyond what is proposed for the rest of the Del Rey Oaks/Monterey and Laguna Seca Parking Munitions Response areas. Please provide additional access controls for these areas. **Response:** This comment was clarified through a conversation between the EPA, FORA, and the ESCA RP Team during the monthly regulatory meeting on August 19, 2010. The EPA indicated that additional land use controls need to be implemented for areas of the DRO/Monterey MRA and Laguna Seca Parking MRA that have not undergone investigation or where only surface/near-surface clearance has been performed to ensure that future land owners are aware of the potential MEC risks in these areas. In response to this comment, the following requirements will be implemented: · Intrusive activities conducted in the DRO/Monterey MRA and/or the Laguna Seca Parking MRA will require active construction support. The deed amendments will be modified to indicate this requirement. The text describing these requirements has been added to the appropriate sections of Volume 3.
2	General Comment, Vol. 1	**Comment:** The Fort Ord Reuse Authority (FORA) Draft Group 3 Remedial Investigation/Feasibility Study, Del Rey Oaks/Monterey, Laguna Seca Parking, and Military Operations in Urban Terrain Site Munitions Response Areas (MRAs), Former Fort Ord, Monterey, California, dated April 8, 2010 (hereinafter referred to as the Draft Group 3 RI/FS), contains a number of questionable entries concerning munitions and explosives of concern (MEC) employed on the MRAs. Examples of these entries include: · There is no statement as to whether the use dates presented for a particular munitions item are the dates when the item was used by the military worldwide, the dates the item was used at the former Fort Ord, or the dates the item was employed at the specific location under discussion.

Response to Comments
Draft Group 3 Remedial Investigation / Feasibility Study, dated April 8, 2010
Review Comments provided by Judy Huang of the EPA, dated June 7, 2010

No.	Comment Type / Report Section	Comment/Response
		· The dates specified for the use of a particular munition are not consistent. For example, Volume 1:Remedial Investigation, Section 5.1.3.2 (1940-90s Training) states in the "60mm and 81mm Mortar Training" subsection, that, "The M68 was used between 1942 and 1957 and the M43 HE was used in the 1960s." However, Section 5.5.3, Mortars, states in the 81mm subsection that, "The following 81mm mortars were found within the Laguna Seca area: o M43 series HE mortars (22 MEC in MRS-47) o M43 series practice mortars (1 MEC in MRS-47) o M68 training mortars (3 MD in MRS-14A) The 81mm mortars found in this area were available for use beginning in the mid-1940s." These statements may be correct if they only refer to the dates of use for these cartridges on this specific site. However, if this is intended to reflect the universal military use period for these items, or the use period at the former Fort Ord, they are in conflict. This is further complicated by the statements in Army Field Manual (FM) 23-90, "81-MM Mortar," dated February 1972, where these 81mm cartridges are listed as authorized for use at the date of publication of the FM. · The Draft Group 3 RI/FS refers to the 4.2-inch mortar as a "Stokes" mortar. This is technically incorrect and may result in some confusion as to precisely what weapon and associated munitions is intended. While it is true that the 4.2-inch mortar was developed using the design data from the 4-inch Stokes mortar of World War I, the original nomenclature assigned to the first 4.2-inch mortar employed by the U.S. Army in 1928 was "4.2-inch Chemical Mortar." The term "Stokes" should not be associated with the 4.2-inch mortar to avoid confusion with the 4-inch Stokes Mortar and its related munitions. Please review the cited date of use time period and item nomenclature issues and correct them as necessary. **Response:** The dates associated with munitions use in Sections 4, 5, and 6 of the Group 3 Remedial Investigation (Volume 1) have been reviewed. Dates indicating the time period during which specific munitions were in use or available for use are not critical to the conclusions presented in the report; therefore, these dates have been removed.

Response to Comments
Draft Group 3 Remedial Investigation / Feasibility Study, dated April 8, 2010
Review Comments provided by Judy Huang of the EPA, dated June 7, 2010

No.	Comment Type / Report Section	Comment/Response
		The nomenclature used for 4.2-inch mortars has been revised to remove usage of the term "Stokes" from the descriptions throughout the report.
3	General Comment, Vol. 1	**Comment:** The use of the term "round" in the Draft Group 3 RI/FS appears to include both fired munitions that were fired into or on the site (incorrect usage) as well as complete cartridges that have not been fired (correct usage). An example of this incorrect usage may be found in Section 6.1.2.2 on page 6-7 of Volume 1. The following definitions referring to the term "round" are found in Army Regulation (AR) 310-25, Dictionary of United States Army Terms: "Round See round of ammunition. Round of ammunition A round of ammunition comprises all the components necessary to fire the weapon once. In general, these components are primer, propellant, container or holder for propellant (cartridge case or bag), and projectile – with fuze and booster if necessary – for the proper functioning of the projectile." While AR 310-25 has been superseded, the superseding document contains no definitions, and it is reasonable to assume that this long-standing definition has not changed in the last six years. The Navy currently defines "complete round of ammunition" in the same manner as AR 310-25 identified a "round of ammunition." The incorrect use of the term "round" may cause the reader to mistakenly believe that a fuze, propellant increments, and an ignition cartridge (or cartridge case with primer and propellant) were all present in the items described, which is very likely not the case. An artillery, small arms, rocket, or mortar projectile that has been fired, or one which has been separated from its cartridge case/propellant for demilitarization, should not be referred to as a "round." Please review the use of the term "round" throughout the Draft RI/FS and replace it with the term "projectile" or other appropriate terms as necessary to better express the identity of the munitions items described. (Note: This request should not be interpreted as a request to correct the cited usage in historical documents attached to the Draft RI/FS or used as references therein.)

Response to Comments
Draft Group 3 Remedial Investigation / Feasibility Study, dated April 8, 2010
Review Comments provided by Judy Huang of the EPA, dated June 7, 2010

No.	Comment Type / Report Section	Comment/Response
		Response: The use of the term "round" has been reviewed throughout the Group 3 RI/FS. In instances where the term referred to munitions that have been fired, the term "round" has been replaced with the term "projectile." References where the term was correctly used, according to the AR 310-25 definition, remain unchanged.
4	General Comment, Vol. 2	**Comment:** The Risk Assessment (RA) (Volume 2 of the Draft RI/FS) assigns an Overall MEC Risk of "A" (Lowest Risk) to the entire DRO/Monterey MRA. This is somewhat questionable, in that two sections of the site (see Section 4.2.5 of Volume 1) have not undergone an investigation or a removal action. The "A" designation is acceptable for the major portion of the MRA. However, it is questionable that these two uninvestigated sections have a low likelihood of any MEC presence. This is because the determination is not founded on definitive data, but is based on an assumption that the characterization of the adjacent areas applies to these areas. It would therefore appear that an appropriate investigation of these two areas should be conducted prior to the acceptance of their designation as lowest risk areas, or that the risk for these areas should be revised to reflect the uncertain level of MEC contamination. A similar issue exists for the six uninvestigated grids in the Laguna Seca Parking Area (see Section 5.2.4 of Volume 1). At a minimum, these grids should be assigned the same or higher risk levels assigned to the 1-foot removal action sector due to the potential for contact with undetected surface and subsurface MEC. Please revise the RA and any other appropriate portions of the Draft RI/FS to address these concerns. **Response:** The following text has been added to the end of Sections 3.8.1 and 4.8.1 (Depth Below Ground Surface Uncertainties sections in Volume 2 for the DRO/Monterey MRA and Laguna Seca Parking MRA, respectively): ***"Therefore, to address the uncertainty in these areas, additional measures will be considered for this MRA, or portion of the MRA during the FS."***
5	General Comment, Vol. 3	**Comment:** The Feasibility Study (FS) (Volume 3 of the Draft RI/FS) uses the term "UXO-qualified personnel" a significant number of times without defining the term. Please revise the Volume 3 Glossary to include a definition of the term "UXO-qualified personnel."

Response to Comments
Draft Group 3 Remedial Investigation / Feasibility Study, dated April 8, 2010
Review Comments provided by Judy Huang of the EPA, dated June 7, 2010

No.	Comment Type / Report Section	Comment/Response
		Response: The Department of Defense Ammunition and Explosives Safety Standards definition for "UXO-Qualified Personnel" has been added to the glossary.
1	Specific Comment, Vol. 1, Glossary, Pages xii through xiv	**Comment:** The Glossary contains a number of munitions related definitions that do not match those found in the Department of Defense Ammunition and Explosives Safety Standards (DoD 6055.09-STD). The variant definitions include: • Explosive • Material Potentially Presenting an Explosive Hazard (MPPEH) • Minimum Separation Distance (MSD) Please review the definitions of the cited terms and correct them as necessary. In addition, please add the definition of the term "UXO-Qualified Personnel" to the Glossary. It is used in the definition of "Construction Support" in the Glossary without being defined there or elsewhere in Volume 1. **Response:** The glossary has been updated to include the Department of Defense Ammunition and Explosives Safety Standards definitions for "Explosive," "Material Potentially Presenting an Explosive Hazard (MPPEH)," "Minimum Separation Distance (MSD)" and "UXO-Qualified Personnel."
2	Specific Comment, Vol. 1, Section 4.1.4, Historical Land Use Summary, Page 4-6	**Comment:** This section states that, "In addition, the Army's contractor conducting activities in support of ordnance and explosives inspection at MRS-43 found evidence of military training related to 37mm projectiles. Based on the review of historical aerial photographs and training facility maps, there was no evidence that portions of MRS-43 and the DRO/Monterey MRA were used as an artillery range." These statements require further explanation. The version of TM 9-1300-200, Ammunition General, that was current at the time of the closing of the former Fort Ord defines Artillery Ammunition as: "Artillery ammunition is designed for use in guns, howitzers, mortars and recoilless rifles ranging from 37 millimeters through 280 millimeters." Based upon this definition and the statements that the Army contractor found "…evidence of military training related to 37mm projectiles" and the statement that "there was no evidence that portions of MRS-43 and the DRO/Monterey MRA were used as an artillery range," an expanded explanation of what the noted "military training related to 37mm

Response to Comments
Draft Group 3 Remedial Investigation / Feasibility Study, dated April 8, 2010
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No.	Comment Type / Report Section	Comment/Response
		projectiles" actually involved. Please revise the cited section to include a discussion of the type of training involving "37mm projectiles" that was conducted at the noted location. **Response:** The intention of the cited text was to communicate that evidence of artillery training, including training related to 37mm projectiles, was not visible in the historical aerial photographs and training facility maps available for MRS-43. The text mistakenly implied that training, excluding artillery training, involving 37mm projectiles was evident. The text has been revised as follows to eliminate this implication: "In addition, the Army's contractor conducting activities in support of ordnance and explosives inspection at MRS-43 found evidence of military training related to 37mm projectiles. ***However***, ~~B~~***b***ased on the review of historical aerial photographs and training facility maps, there was no ***visible indication*** ~~evidence~~ that ***artillery training, including the use of 37mm projectiles, took place on*** portions of MRS-43 and the DRO/Monterey MRA ~~were used as an artillery range~~."
3	Specific Comment, Vol. 1, Section 4.4.2.3, Investigation and Removal Action Design, Page 4-18	**Comment:** The last sentence in the last paragraph of this section indicates that, "Based on the statements in the USA report, all anomalies detected within the DRO/Monterey MRA were investigated and all military munitions removed." This statement may give the impression that all military munitions were removed from the DRO/Monterey MRA, which may not be the actual situation. A better description of what was accomplished by the investigations noted would be that all <u>detected</u> military munitions were removed, as it is later stated in the Draft RI/FS that some residual MEC may still be present in the MRA. Please revise the cited section to restructure the definitive statement that "…all military munitions were removed…" **Response:** The cited sentence has been revised as follows: "Based on the statements in the USA report, all anomalies detected within the DRO/Monterey MRA were investigated and all ***detected*** military munitions ***were*** removed."
4	Specific Comment, Vol. 1, Section 4.5.5, Projectiles,	**Comment:** The last paragraph in this section states that, "The M1916 gun, with an M5 Subcaliber mount for the 37mm munitions was used for training in the firing of the 75mm Howitzer M1A1. The M1916 gun and its recoil mechanism were fastened to the 37mm Subcaliber Mount, M5, and used for training in the handling and firing of the 75mm Howitzer M1A1." These

Response to Comments
Draft Group 3 Remedial Investigation / Feasibility Study, dated April 8, 2010
Review Comments provided by Judy Huang of the EPA, dated June 7, 2010

No.	Comment Type / Report Section	Comment/Response
	Page 4-21	two sentences are redundant and seem to indicate that the M5 Subcaliber mount was used to mount the 37mm munitions to the 75mm Howitzer. Please revise the cited sentences to eliminate the redundancy and to ensure that it is clear that the 37mm gun, and not the 37mm munitions, is mounted to the 75mm Howitzer. **Response:** To clarify that 37mm munitions were used in the M1916 gun and to eliminate redundancy, the cited text has been revised as follows: "The M1916 gun, with an M5 Subcaliber mount ***(which used*** ~~for the~~ 37mm munitions***)*** was used for training in the firing of the 75mm Howitzer M1A1. ~~The M1916 gun and its recoil mechanism were fastened to the 37mm Subcaliber Mount, M5, and used for training in the handling and firing of the 75mm Howitzer M1A1.~~"
5	Specific Comment, Vol. 1, Section 5.1.1.3, 1950s Era, Page 5-2	**Comment:** The first bullet in this section indicates that, "Hash marks on the map indicated that MRS-14A and MRS-29 were assigned to the Artillery Division and MRS-30 and MRS-47 were assigned to the 2nd Infantry." The use of the term "Artillery Division" is somewhat confusing, as no such unit existed in the U.S. Army at the time under discussion. However, each Army Division had an organization of regimental size referred to as "Division Artillery," and this term is used in the following (second) bullet in this section. Please review the use of the term "Artillery Division" and correct it as necessary. **Response:** The cited text has been revised as follows: "Hash marks on the map indicated that MRS-14A and MRS-29 were assigned to the ***Division*** Artillery ~~Division~~ and MRS-30 and MRS-47 were assigned to the 2nd Infantry."
6	Specific Comment, Vol. 1, Section 5.1.2.3, 1997 Revised Archives Search Report, Page 5-6	**Comment:** The fourth paragraph in this section states that, "Site OE 30, Laguna Seca Turn 11 (now MRS-30), is located at the southwest end of MRS-14A. The ASR states that this area is 5.9 acres in size and has undergone a 4-ft removal action by the Army's contractor UXB. The Revised ASR recommended that removal actions be completed." This is somewhat confusing. If the noted 4-foot removal was conducted, but not completed, please so state. If it was completed, please expand the section to explain the purpose of the sentence that reads, "The Revised ASR recommended that removal actions be completed."

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		Response: The cited paragraph presented incorrect information. The text has been corrected to accurately reflect the results presented in the 1997 Revised Archives Search Report as follows: "Site OE 30, Laguna Seca Turn 11 (now MRS-30), is located at the southwestern end of MRS-14A. The ASR states that this area is 5.9 acres in size and has undergone a 4-ft removal action by the Army's contractor UXB. The Revised ASR ~~recommended~~ ***states*** that removal actions ~~be~~ ***have been*** completed."
7	Specific Comment, Vol. 1, Section 5.1.3.1, Pre-World War II Training, Page 5-7	**Comment:** The first paragraph in this section indicates that, "MRS-29 appears to be located outside of the installation." Please expand this paragraph to clarify the intent of this statement (i.e., Does this indicate that MRS-29 was outside of the installation boundary prior to World War II, that it is unsure as to whether it was inside or outside of the boundary during this period, or that it has always been outside the installation boundary?). **Response:** The cited text has been expanded to provide more information regarding training in MRS-29 prior to World War II: "MRS-29 ~~appears to be~~ ***is*** located outside of the ~~installation~~ ***boundary of the Camp Ord Military Reservation on the Army historical map dated 1933-1934 (Army 1933-1934)***. ***A training facilities map dated 1953 indicates that MRS-29 was assigned to the Division Artillery. No other maps are available for the time period between 1934 and 1953; therefore, it is unknown whether MRS-29 was used for training prior to WWII."***
8	Specific Comment, Vol. 1, Section 5.2.2.2, Evaluation of Instrument Detection Efficiency at Laguna Seca Parking MRA, Page 5-18	**Comment:** The third bullet of the second paragraph on this page states that, "Unlike surveys with digital instruments, where positioning data are also obtained, there is no way to check or document the actual coverage of a Schonstedt survey." This appears to be an absolute statement that is not totally correct. Please review the noted statement and revise it to better express the type of information gathered from an analog survey and to eliminate the inference that it cannot be effectively documented as to the area covered. **Response:** The cited bullet has been revised as follows: "Unlike surveys with digital instruments, where positioning data are also obtained, there is no ***digitally documented verification that the***

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		~~way to check or document the actual coverage of a~~ Schonstedt ***operator has achieved complete coverage during the*** survey. ***Therefore, the QA/QC process was relied upon to verify the Schonstedt operator achieved complete coverage within the survey lanes***. Considering the survey procedures and QC and QA processes described above, and the Army's acceptance of the removal actions' coverage, the data is considered to be sufficient."
9	Specific Comment, Vol. 1, Section 5.4.2.2, Removal Action Site Boundaries, Page 5-22	**Comment:** This section notes that, "The establishment of the Laguna Seca Parking MRA boundary is based upon the property transfer boundary and removal actions were conducted across the entire MRA with the exception of six inaccessible grids on the eastern slope of MRS-14A and a paved ditch along Lookout Ridge Road." However, the paved ditch is not mentioned in the conclusions listed in Section 5.6.1, Laguna Seca Parking MRA Conclusions. Please revise the two cited sections to make the listed uninvestigated areas consistent. **Response:** The first bullet of Section 5.6.1 has been revised as follows: · "Removal actions were conducted across the entire MRA to a depth of 4 ft with the exception of the western and eastern slopes of MRS-14A, which had a 1-ft removal action. Six grids in MRS-14A did not receive a removal action due to terrain-related inaccessibility. ***In addition, no removal actions were performed at the paved ditch along Lookout Ridge Road.***"
10	Specific Comment, Vol. 1, Section 5.5.1, Basic Maneuvers, Page 5-25	**Comment:** The third paragraph of the Smoke Rifle Grenades subsection notes that, "The M22 and M22A2 rifle grenades can be used for both signaling and laying of smoke screens. The M23A1 is used only for signaling. The grenades are fired from a rifle equipped with a grenade launcher and function on impact. At impact, a firing pin strikes a primer producing a flame, which ignites a starter mixture charge, which in turn ignites a smoke mixture charge." While the cited information is correct for the M22 series, it is incorrect for the M23 series. The M23 does not have an impact fuze and does not function on impact, as it is a smoke streamer. Instead, when the grenade cartridge is fired to launch the grenade, fire from the cartridge ignites the fuze, which causes the filler to burn and the grenade then emits a stream of smoke along its trajectory. Unlike the M22 series, this grenade does not have a safety pin. Please revise the cited paragraph to reflect this information.

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		Response: The cited text has been revised as follows to correctly convey how the M23 series rifle grenade functions: "The M22 and M22A2 rifle grenades can be used for both signaling and laying of smoke screens. The M23A1 is used only for signaling. The ***M22*** grenades are fired from a rifle equipped with a grenade launcher and function on impact. At impact, a firing pin strikes a primer producing a flame, which ignites a starter mixture charge, which in turn ignites a smoke mixture charge. ***The M23 grenade does not have an impact fuze and does not function on impact, as it is a smoke streamer. Instead, when the grenade cartridge is fired to launch the grenade, fire from the cartridge ignites the fuze, which causes the filler to burn and the grenade then emits a stream of smoke along its trajectory. Unlike the M22 series, this grenade does not have a safety pin.***"
11	Specific Comment, Vol. 1, Section 5.5.1, Basic Maneuvers, Page 5-27	**Comment:** The second paragraph of the Hand Grenades subsection notes that, "Grenade fuze models identified include: M228, M218E1, M213, M204 series, and the M205 series (the only fuzes authorized for use with the M30 practice grenade [Army 1969])." The construction of this sentence makes it unclear as to whether all of the listed fuzes are the "…only fuzes authorized for use with the M30 practice grenade…" or if it is intended to state that the M205 series of fuzes are the only ones authorized for use with that grenade. Please revise the noted verbiage to correct this ambiguity. **Response:** The cited text has been revised as follows to specify that the M205 series fuze is the only series authorized for use with the M30 practice grenade: "Grenade fuze models identified include: M228, M218E1, M213, M204 series, and the M205 series (the ***M205 is the*** only ~~fuzes~~ ***series of fuze*** authorized for use with the M30 practice grenade [Army 1969]). The majority of hand grenade fuzes were located within MRS-29 and were the M228 fuzes."
12	Specific Comment, Vol.1, Appendix A, Plate A3, DRO / Monterey MRA Remedial Investigation	**Comment:** This plate lists a TNT charge as a pyrotechnic and lists an item as "Smoke (M1)." The noted TNT charge is a demolition material made up of explosives in a protective container, and it is not a pyrotechnic. The munitions item described as "Smoke (M1)" is difficult to identify without additional nomenclature (e.g., is it a projectile, a grenade, or a smoke pot?). Please correct this.

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	Army Historical MEC and MD Pyrotechnics	**Response:** Plate A3 has been revised to identify the TNT charge as a "Demolition Charge (TNT)." The legend has been modified to categorize this item as "Miscellaneous-MEC" rather than as "Pyrotechnic-MEC." The M1 item description has been expanded to read "Smoke Pot (M1)" to provide more information about the item.
13	Specific Comment, Vol. 3, Glossary, Pages x and xii	**Comment:** The Glossary contains two munitions-related definitions that do not match those found in the Department of Defense Ammunition and Explosives Safety Standards (DoD 6055.09-STD). The variant definitions are: • Explosive • Minimum Separation Distance (MSD) Please review the definitions of the cited terms and correct them as necessary. In addition, please add the definition of the term "UXO-Qualified Personnel" to the Glossary, as it is used a number of times in Volume 3 without being defined therein. **Response:** The glossary has been revised to include the Department of Defense Ammunition and Explosives Safety Standards definitions for the terms "Explosive" and "Minimum Separation Distance (MSD)." In addition, the definition for "UXO-Qualified Personnel" has been added to the glossary.

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1	General Comment, Vol. 1, p.2-4, Section 2.5.8 Land Use (DRO / Monterey MRA) and Vol. 2 Risk Assessment, Section 3.6 Descriptions of Reuse Areas (DRO / Monterey MRA Reuse Areas and Future Land Use Receptors)	**Comment:** The information provided in these sections is not incorrect, but it appears slightly different from the reuse category designations in the 1997 Fort Ord Base Reuse Plan (as updated). The Base Reuse Plan designations for the areas included in the DRO/Monterey MRA are "habitat management" and "business park/light industrial and office/R&D." Under CERCLA, the goal of the Army's environmental cleanup program is to support the designated reuse of the former Fort Ord, which is documented in the Base Reuse Plan, and the scope of the ESCA includes environmental services that support the Base Reuse Plan. Please update these sections. The current land use restrictions should also be noted. Same comment applies to discussions of the Laguna Seca Parking and MOUT Site MRAs. **Response:** The reuse categories for the DRO/Monterey MRA stated in Volume 1 Remedial Investigation, Section 2.5.8, Volume 2 Risk Assessment, Section 3.6.1, and Volume 3 Feasibility Study, Section 2.3.3.1, have been changed to “habitat management” and “business park/light industrial and office/ Research & Development” in accordance with the Base Reuse Plan. The reuse categories for the Laguna Seca Parking MRA stated in Volume 1 Remedial Investigation, Section 2.6.8, Volume 2 Risk Assessment, Section 4.6.1, and Volume 3 Feasibility Study, Section 2.3.3.2, have been changed to “open space/recreation” in accordance with the Base Reuse Plan. The reuse categories for the MOUT Site MRA stated in Volume 1 Remedial Investigation, Section 2.7.8, Volume 2 Risk Assessment, Section 5.6.1, and Volume 3 Feasibility Study, Section 2.3.3.3, have been changed to “school/university” in accordance with the Base Reuse Plan.
2	General Comment, Vol. 1, p.6-14, Section 6.2.2 Equipment Evaluation (MOUT Site MRA)	**Comment:** This section provides a general discussion of Schonstedt magnetometers used during the previous munitions and explosives of concern (MEC) investigations at the MOUT Site MRA. Please also provide information about the evaluation of detection efficiency of the instrument. **Response:** Information about the evaluation of detection efficiency of the Schonstedt has been added as Section 6.2.2.2, Evaluation of Instrument Detection Efficiency at MOUT Site MRA.

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3	General Comment, Vol. 1, Tables 4-1, 5-1, and 6-1	**Comment:** These tables list the MEC and munitions debris (MD) items found during previous MEC investigations at the MRAs. These tables show columns titled "Original OE Nomenclature." It should be noted that the MEC data in the Army's MMRP database has been reviewed through a 100 percent check of all available grid records to identify discrepancies between the after-action reports and the grid records, if any. Discrepancies were researched and appropriate corrections were made in the MMRP database. Ten percent of the data was further reviewed including a comparison of the data set with the data set reported in the contractor's after-action reports. Therefore, the tables should report the current nomenclature associated with the MEC items, or include a footnote clarifying that the listed items may be described differently in the Army's MMRP database and elsewhere in the document. **Response:** The "Original OE Nomenclature" columns in Tables 4-1, 5-1, and 6-1 have been revised to state the current nomenclature for MEC and the original OE nomenclature for MD items. The Army's MMRP database does not provide updated nomenclature for one MEC item; therefore, this item has been listed by its original OE nomenclature and a footnote has been provided to clarify the origin of the item description.
4	General Comment, Vol. 2, p.4-3, Section 4.3 MEC Density Input (Laguna Seca Parking MRA Risk Assessment)	**Comment:** Second paragraph. According to the text, the density of potentially-remaining MEC in the subsurface of MRS-14A (area intended for habitat use) was estimated based on the density of MEC removed from the 1-foot removal action. While this is one way to choose the MEC density input factor in the risk assessment, it would be helpful if a brief discussion of the rationale for using this method (using the density of removed items in the top 1 -foot layer as the density of remaining MEC in the subsurface at any depth) is provided. **Response:** To clarify the approach, the second paragraph has been revised as follows: The remainder of MRS-14A was designated for habitat at the time and received a 1-ft removal action. ***As a conservative approach,*** ~~Therefore,~~ the score for ***the portion of MRS-14A that was subject to*** the 1-ft removal action ~~area~~ was calculated by dividing the number of MEC items found by the number of acres involved in the 1-ft removal action. The result for the 1-ft removal action area was 0.14 MEC item per acre (13 MEC items divided by 95 acres). ***For the subsurface density calculations, including the number of***

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		non-penetrating MEC items found on the surface and within the top 12 inches, conservatively increases the subsurface density, which increases the exposure factor score, thereby increasing the overall risk for the receptors exposed to the subsurface. This conservative density calculation helps to assure that the risk has not been under-estimated. The MEC density result equated to medium MEC density or a score of "3". The quality of these data was evaluated using the Munitions Response Activity Evaluation Checklists (Appendix D in Volume 1 of the Group 3 RI/FS Report). In the Munitions Response Activity Evaluation Checklist, Part 2: Removal Evaluation, Question "A", it was concluded that the data can be used for performance of the risk assessment.
5	General Comment, Vol. 2, p.4-3, Section 4.5 Migration / Erosion Potential Input (Laguna Seca Parking MRA Risk Assessment)	**Comment:** In this section, the score of 3 indicating significant migration/erosion potential is selected for the portions of the MRA other than MRS-30 because of the steep terrain. Significant erosion potential is generally associated with roads and previously disturbed surfaces, and based on many years of experience, steep slopes with vegetation cover, such as the case in the Laguna Seca Parking MRA, do not exhibit significant erosion problems. Therefore the scoring of 3 for the migration/erosion potential for the majority of the MRA is overly conservative. **Response:** The 2003 aerial photograph and the Laguna Seca 2007 Ortho were re-examined. The majority of MRS-29 appears vegetated and the migration/erosion potential could be changed to a score of "1". The change in the migration/erosion potential score from "3" to "1" does not subsequently change the accessibility factor (1) or the overall MEC risk (A, Lowest Risk). However, the after-action report (USA 12/30/2000, OE-0226A) relates direct field experience stating: "It seems likely, because of the non-penetrating types of ordnance scrap found below the surface, that erosion was a factor in the placement of some of the scrap… Both the 40mm projectiles found in Site OE-029 were deeper (0.5' and 1') than indicated in the penetration table: this discrepancy was likely caused by disposition of soil by erosion." The same aerials show that approximately half of MRS-47 has been denuded of vegetation and is a dirt parking lot. A dirt parking lot would fit the definition of a score of "3" Significant Migration: "Significant erosion at Fort Ord will likely be limited to areas disturbed by human activity, such as roads or firebreaks" (Pirnie 2002, Table 5-3 Migration/Erosion

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		Potential, footnote c, page 27). Similarly, the majority of the MRS-14A surface is either covered with off-road dirt roads or sparsely vegetated with the elevation ranging from approximately 870 ft to 470 ft above sea level. MRS-14A also fits the definition of significant erosion. Additionally, the Final OE Removal Action, After Action Report, Site OE-14A (Lookout Ridge II; USA 4/26/2001, OE-0296C) relates direct field experience stating: "It cannot be proven that erosion was a factor in the placement of the OE; however, the slope of the terrain makes it reasonable to believe that over the years erosion would have some effect. Erosion and soil displacement would explain the many non-penetrating UXO items found at depths to 18 inches." Since the change in the migration/erosion potential score from "3" to "1" does not subsequently change the accessibility factor (1) or the overall MEC risk, no changes have been made to the report.
6	General Comment, Vol.2, p.5-2, Section 5.3 MEC Density Input (MOUT Site MRA Risk Assessment)	**Comment:** According to the text, the density of potentially-remaining MEC in the MOUT Site MRA was estimated based on the number of MEC items recovered from the site to-date, and dividing the number by the acreage of the site. While this is one way to choose the MEC density input factor in the risk assessment, it would be helpful if a brief discussion of the rationale for using this method (using the density of items from various investigations as the density of remaining MEC in the site at any depth) is provided. MEC was recovered from various investigation actions including surface removal in the majority of the sites and subsurface investigation in limited portions of the sites; therefore simply averaging these items over the entire site seems overly simplistic. In addition, because the MEC depth input of 8 (any MEC on the surface) is used in the risk assessment, the scenario being assessed is closer to the condition of the sites before any of the MEC investigations occurred. Please re-examine each of these input factors. **Response:** A conservative approach to the risk assessment was taken. Portions of the site have not undergone any removal action and the majority of the site has not had a subsurface removal action. Therefore the inputs to the risk assessment have been chosen to represent the worst-case conditions. Section 5.3 has been revised as follows: "***The assumption was made that the MEC density at any depth was the same in order to simulate the worst-case scenario. The density was***

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		calculated using the total number of MEC items recovered during the visual surface, the SS/GS, and the 4-ft sampling events. As identified in Section 2.3, the MEC density is a component of the exposure factor and represents the potential density (items per acre) of MEC remaining on the site at a depth interval that is likely to be accessed by a receptor. MEC may potentially remain on the surface and below the surface at the MOUT Site MRA and some of the MEC items found were penetrating items (e.g., rockets and projectiles). In addition, two burial pits containing a total of 56 MEC items (DMM) were discovered in the MOUT training area; therefore, other burial pits may exist in the MRA. As a conservative approach, ~~Therefore,~~ the MEC density input score of "3" (medium density) was selected for both sectors in the MOUT Site MRA because there were 47 MEC items found (excluding the DMM found in burial pits) within the 54-acre MOUT training area (Parcel F1.7.2) and one MEC item found within the 7-acre Barloy Canyon Road area (Parcel L20.8). ***For the surface density calculation, including the number of MEC items found below the surface conservatively increases the surface density, which increases the exposure factor score, thereby increasing the overall risk for the receptors exposed to the surface. For the subsurface density calculations, including the large number of non-penetrating MEC items found on the surface conservatively increases the subsurface density, which increases the exposure factor score, thereby increasing the overall risk for the receptors exposed to the subsurface. This conservative density calculation helps to assure that the risk has not been underestimated***.
7	General Comment, Vol. 2, p.5-2, Section 5.4 MEC Density Input (MOUT Site MRA Risk Assessment)	**Comment:** Here, MEC depth input if 8 (any MEC on the surface) is used in the risk assessment because surface MEC removal was not conducted in a small portion of the MOUT site. Because surface MEC removal was conducted in the majority of the site, and due to regular uses of the properties, the use of the small portion of no surface removal to represent the MEC depth of the entire properties seems overly conservative. In addition, the 600 ft section east of Barloy Canyon Road is described as not likely to have MEC. Please reexamine the input factor scoring. **Response:** The "Fort Ord Ordnance and Explosives Risk Assessment Protocol" (Malcolm Pirnie 2002) provides instruction on page 25 for the calculation of the depth below ground surface score: "To determine the Depth Below Ground Surface score, geophysical and removal data should be used. …When scoring Depth Below Ground Surface, the minimum depth of OE items should be used…" Following this protocol, the MEC depth below

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		ground surface score of "8", "any MEC on the surface," was selected for the MOUT Site MRA, as MEC of all three risk codes were found on the surface during the TCRA visual surface removal.
8	General Comment, Vol.2, Appendix B, MEC Items Found by MRA	**Comment:** These tables show columns titled "Original OE Nomenclature" and "MEC Nomenclature" for the MEC items previously recovered from the MRAs. The tables are noted "2) Munitions descriptions have been taken directly from the Army's MMRP Database and/or other historical documents. Any errors in terminology, filler type, and/or discrepancies between model number and caliber/size are a result of misinformation from the data source." It should be noted that the MEC data in the Army's MMRP database has been reviewed through a 100 percent check of all available grid records to identify discrepancies between the after-action reports and the grid records, if any. Discrepancies were researched and appropriate corrections were made in the MMRP database. Ten percent of the data was further reviewed including a comparison of the data set with the data set reported in the contractor's after-action reports. Therefore, the risk assessment should utilize the corrected nomenclature for the listed MEC items. Please delete the "original nomenclature" column or describe the rationale for inclusion in the tables. **Response:** The "Original OE Nomenclature" columns in Tables B-1 through B-4 have been revised to state the current nomenclature for each MEC item. The Army's MMRP database does not provide updated nomenclature for one item; therefore, this item has been listed by its original OE nomenclature and a footnote has been provided to clarify the origin of the item description.
9	General Comment, Vol. 3, p. 3-6, Section 3.1.5 Residential Quality Assurance (RQA) (Development of General Response to Actions and Associated Process Options)	**Comment:** The RQA process or the pilot study is not described prior to this section. Please provide a brief description of the RQA process to assist the reader in understanding the response options that were evaluated in the FS, including the response option screening discussion in Section 3.2.2.10. **Response:** Section 2.1.1, Residential Quality Assurance Pilot Study, has been added to the report describing the RQA process.

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10	General Comment, Vol. 3, p.3-11, Section 3.2.2.3 Deed and/or Zoning Restrictions (Screening of General Response Actions and Process Options)	**Comment**: The "Overall Evaluation" paragraph notes that deed/zoning restrictions were not retained for further analysis because they were already in place. The existing deed restrictions were put in place based on information available at the time of the early transfer of the property; they can and should be modified if shown to be appropriate through a detailed evaluation in an RI/FS and documented in an appropriate decision document. In fact, continuing to require the land use controls was evaluated as part of the remedial alternatives. Please delete the sentence to avoid confusion. **Response**: The cited sentence has been deleted.
11	General Comment, Vol. 3, p.5-2, Section 5.1 Evaluation of Remedial Alternatives for DRO / Monterey MRA	**Comment**: For Alternative 3, Additional MEC Remediation, the vegetation clearance method should be clarified. In Section 3.1.4.1, under Description of General Response Actions and Associated Process Options, the text reads "...the type and extent of the vegetation removal will be evaluated as part of the remedial alternatives development for each of the Group 3 MRAs." In Section 4.3, under Development of Remedial Alternatives, it is stated "...the details of the vegetation clearance methods...would be presented in the RD/RA WP, or similar document." Under Evaluation of Remedial Alternatives, Section 5.1.6 Implementability, vegetation clearance is associated with high level of effort to implement; and in Section 5.1.9 Community Acceptance, the text cites the disturbance to the vegetation as potentially objectionable to the community. Finally, in Table 5-6 vegetation burning in 6 acres is included in the cost estimate. If burning of just 6 acres of the MRA is part of the remedial alternative, a conceptual discussion of how it would be conducted should be described in one or more of these sections of the FS in order for the alternative to be fully evaluated. Same comment applies to the evaluation of Alternative 3 for the Laguna Seca Parking MRA and the MOUT Site MRA. **Response**: To clarify the vegetation removal discussions, the following text has been added to the sections identified below. Section 3.1.4.1: · Prescribed burning – the use of fire under a specific set of conditions to burn vegetation. This type of vegetation removal is applicable to the plant communities found within the Group 3 MRAs, and is the primary method used by the Army in

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		designated maritime chaparral and coastal scrub communities within habitat reserve areas. ***The major elements of prescribed burning include: preparation of a burn prescription/burn plan outlining the objectives of the burn, burn area, and the range of environmental conditions under which the burn will be conducted; workforce and equipment resources required to ignite, manage, and contain the fire; communication procedures; site preparation, including establishment and maintenance of containment lines; conducting the burn within the range of environmental conditions established in the burn prescription; and follow-up operations to ensure that the fire is fully contained.*** Section 4.3: "This alternative has been developed for further analysis in the three Group 3 MRAs. This alternative assumes that subsurface MEC remediation would be conducted throughout the entire footprints of the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs. This alternative includes implementing the appropriate type of vegetation clearance in the MRA, if necessary, and the implementation of additional MEC remediation. ***For the portions of the Group 3 MRAs designated for development or development with restrictions, vegetation removal would be accomplished using mechanical methods. For the portions of the Group 3 MRAs designated for habitat reserve, vegetation removal would be accomplished using prescribed burning techniques, to the extent feasible. The general vegetation removal and subsurface MEC remediation techniques were described in Section 3.1.4.*** The ***specific*** details of the vegetation clearance methods and the MEC detection equipment used would be presented in the RD/RA WP, or similar document."
12	General Comment, Vol. 3, p.5-18, Section 5.3.2 Compliance with ARARs (Evaluation of Remedial Alternatives for	**Comment:** Fourth paragraph (Alternative 4). The last sentence suggests that excavation and sifting would be employed to conduct subsurface MEC removal in the selected area (2.3 acres along Barloy Canyon Road). Please reexamine the statement. If excavation and sifting in 2.3 acres of the MRA is part of the remedial alternative, the rationale for such an action and description of the method should be provided in the FS in order for the alternative to be fully evaluated. In Volume 2 Risk Assessment, Section 5.4, the 600 ft section east of Barloy Canyon Road was described as not likely to have MEC.

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	MOUT Site MRA)	**Response:** The reference to sifting has been removed and the paragraph revised as follows: "Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use controls): This alternative would be implemented in a manner that complies with the ARARs listed in Table A-2 in Appendix A of this report. Because removal actions would be conducted within small areas of the MOUT Site MRA, the vegetation removal could be conducted using manual methods (with proper safety precautions implemented to protect the safety of the workers) and still maintain compliance with the HMP and ESA. This alternative would have some impacts to the natural resources on the MRA since excavation ~~and sifting~~ would be required of the soil within the areas but could still be implemented in accordance with the ARARs identified on Table A-2."
13	General Comment, Vol. 3, p.7-1, Section 7.0 Approval Process	**Comment:** Third bullet, please replace "public review period" with "public comment period." Fourth bullet, please modify to read "Provide an opportunity for a public meeting on the Proposed Plan where written and verbal comments can be submitted by the public." Fifth bullet, second line, please delete "any" to read "...that summarizes public comments received…." **Response:** The requested changes have been made to Section 7.0.
14	General Comment, Vol. 3, Table 5-4, DRO / Monterey MRA Long-Term Management Costs	**Comment:** The table includes footnote [2] indicating that annual monitoring costs are the responsibility of Fort Ord Reuse Authority (FORA) until the land is transferred to the (next) recipient of the property. Please explain why this FORA responsibility is assumed to end at the time of property transfer, and who would then take the responsibility for annual monitoring costs. Same comment applies to Table 5-8 (Laguna Seca Parking MRA) and Table 5-11 (MOUT Site MRA). It should be noted also that transfer of any of the procedural responsibilities to another party would require the approval of the regulatory agencies. **Response:** In accordance with the "Memorandum of Agreement Among the Fort Ord Reuse Authority, Monterey County and Cities of Seaside, Monterey, Del Rey Oaks and Marina, California State University Monterey Bay, University of California Santa Cruz, Monterey Peninsula College, and the Department of Toxic Substances Control Concerning Monitoring and

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		Reporting on Environmental Restrictions on the Former Fort Ord, Monterey County, California" ("the MOA"), FORA will prepare an annual report and the County of Monterey has agreed to submit this report when FORA ceases to exist. The footnote on each table has been revised as follows: ***[2] Costs of annual monitoring assumed by FORA until FORA ceases to exist. The County of Monterey has agreed to prepare the annual report when FORA ceases to exist in accordance with the "Memorandum of Agreement Among the Fort Ord Reuse Authority, Monterey County and Cities of Seaside, Monterey, Del Rey Oaks and Marina, California State University Monterey Bay, University of California Santa Cruz, Monterey Peninsula College, and the Department of Toxic Substances Control Concerning Monitoring and Reporting on Environmental Restrictions on the Former Fort Ord, Monterey County, California."***
15	General Comment, Vol. 3, Table 5-6, DRO / Monterey MRA Alternative 3 – Additional Remediation Costs	**Comment:** The table includes footnote [3] indicating that post-remediation habitat management costs are FORA costs until the land is transferred to the (next) recipient of the property. Please explain why this FORA responsibility is assumed to end at the time of property transfer, and who would then take the responsibility for post-remediation habitat management costs. Same comment applies to tables associated with Alternatives 3 and 4 of each of the three MRAs. **Response:** The footnotes regarding annual habitat monitoring should not have appeared on the tables for the Laguna Seca Parking MRA and the MOUT Site MRA as annual habitat monitoring would not be required on these MRAs if the proposed additional MEC remediation alternative were selected. Therefore, the footnote [3] regarding annual habitat monitoring has been deleted from the tables for these MRAs. For the DRO/Monterey MRA, the annual monitoring would only be required if restoration were required within the habitat reserve portion of the MRA. The footnote for Alternative 3 for the DRO/Monterey MRA has been modified as follows: [3] = Annualized unit cost for maintaining roads, fuel breaks, performing invasive weed control, and species monitoring Costs assumed by FORA until ~~FORA land is transferred~~ ***site closeout, in accordance with the Environmental Services Cooperative Agreement.*** HMP annual monitoring plants assumed to be monitored during 3 events in the first five years and HMP habitat reserve species (e.g., chaparral) assumed to be monitored during 5 events in the first 13 years. Includes mapping, data

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		management/evaluation, and preparation of reports.
1	Detail/Minor Comment, Vol. 1, Page 2-4, Section 2.5.6, Special Status Biological Resources (DRO/Monterey MRA)	**Comment:** The third paragraph describes that the California tiger salamander (CTS) may be found in the DRO/Monterey MRA since the MRA is within 500 meters of aquatic features that may provide breeding habitat for the CTS. Please revise the distance from 500 meter to 2 kilometers, as CTS may be present within 2 kilometers of aquatic features. Please make similar updates throughout the document. **Response:** The following sections of the report have been modified to reflect the 2 kilometer distance to an aquatic feature within which the CTS may be present: Volume 1 - Sections 2.5.6 (DRO/Monterey), 2.6.6 (Laguna Seca Parking), and 2.7.6 (MOUT Site) Volume 2 - Sections 3.6.1 (DRO/Monterey), 4.6.1 (Laguna Seca Parking), and 5.6.1 (MOUT Site) Volume 3 – Sections 2.3.3.1 (DRO/Monterey), 2.3.3.2 (Laguna Seca Parking), and 2.3.3.3 (MOUT Site)
2	Detail/Minor Comment, Vol. 1, Page 2-7, Section 2.6.8, Land Use (Laguna Seca Parking MRA)	**Comment:** The second paragraph references the Base Reuse Plan and indicates that the area is predominantly planned for development reuse. However, in Volume 2 Risk Assessment and Volume 3 FS, the anticipated future land use is described to be less intensive in terms of development, such as "the Reuse Plan emphasizes the principles of minimal development and ecological restoration of these lands" (Volume 3 FS Section 2.3.3.2). It may be helpful to the reader if the description of the land use in Volume 1 RI, Section 2.6.8, included additional text particularly referencing the reuse category under the Habitat Management Plan. **Response:** Additional text particularly referencing the reuse category under the Habitat Management Plan has been included in Section 2.6.8 of the RI.
3	Detail/Minor Comment, Vol. 1, Page 2-9, Section 2.7.6, Special-Status Biological Resources (MOUT Site	**Comment:** Please add that a portion of the MRA is designated a critical habitat for Monterey spineflower. **Response:** Discussion has been added to Section 2.7.6 to state that a portion of the MRA is designated critical habitat for Monterey spineflower.

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	MRA)	
4	Detail/Minor Comment, Vol. 1, Page 4-7, Section 4.2, Previous MEC Investigations and Removal Actions (DRO/Monterey MRA Remedial Investigation)	**Comment:** Fourth bullet, "Removal action in MRS-43 by USA in 2000 using digital geophysical instruments." This work was described in Section 4.2.1.4 as "post-removal action geophysical investigation by USA using Digital Instruments." The latter description appropriately describes the digital geophysical investigation that was conducted to support the early transfer of the Del Rey Oaks property. Please revise the text in the bullet so as to avoid potential confusion regarding the nature of the work conducted. Same comment applies to Volume 2 Risk Assessment, Section 3.1. **Response:** The phrase "Post-removal action geophysical investigation by USA using digital geophysical instruments in 2000" has replaced "Removal Action by USA in 2000 using digital geophysical instruments" in Section 4.2 as well as in Volume 2 Risk Assessment, Section 3.1.
5	Detail/Minor Comment, Vol. 1, Page 4-18, Section 4.4.2.4, Sampling and Removal Methods (Data Analysis, DRO/Monterey MRA)	**Comment:** The second and third paragraphs suggest that all of the MEC and MD found in MRS-43 were found with the Schonstedt Model GA-52Cx. However, the after-action report for the work in the Del Rey Oaks Group (OE-0293A) indicates one MEC and several MD items were recovered during digital geophysical investigations. Please review the statements and modify where appropriate. **Response:** The statements in the second and third paragraphs are erroneous; therefore, the information has been deleted.
6	Detail/Minor Comment, Vol. 1, Page 5-18, Section 5.2.2.3, Previous MEC Investigation and Removal Actions (Laguna Seca Parking MRA), MRS-47	**Comment:** Please note that a prescribed burn was conducted in August 1995 to clear vegetation in support of munitions investigations at MRS-47. **Response:** As discussed with the Army, several references indicate that the prescribed burn referred to in the comment was conducted in 1994 (USA 2000b and USACE 1997a). Therefore, text indicating a prescribed burn was conducted in 1994 to clear vegetation in support of munitions investigations at MRS-47 has been added to Sections 5.2, 5.2.1.1, and 5.2.2.3 of Volume 1. Text has also been added to Section 4.1 of Volume 2, which summarizes previous removal activities conducted in MRS-47.

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7	Detail/Minor Comment, Vol. 1, Page 5-15, Section 5.2.1.5, MRS-47 USA (formerly CMS) 100% Grid Sampling (Previous MEC Investigations and Removal Actions, Laguna Seca Parking MRA)	**Comment:** Please revise the section title as the information presented here describe the 4-ft MEC removal (not sampling) conducted by USA Environmental. **Response:** The section title has been revised as follows: "MRS-47 USA (formerly CMS) ~~100% Grid Sampling~~ ***Removal Action***."
8	Detail/Minor Comment, Vol. 1, Page 5-21, Section 5.2.4, Completeness of Existing Records and Data Gaps (Previous MEC Investigations and Removal Actions, Laguna Seca Parking MRA)	**Comment:** The second paragraph notes that two grid sheets, reporting the finding of 176 electric blasting caps in MRS-47 (Grid 21S) and a MEC item (81 mm mortar) in Grid 18H (MRS-47), are missing from the records. These items are listed in the MMRP database and are documented in a report of the sampling effort by CMS Environmental. This document has been located and will be entered into the Administrative Record. **Response:** The document containing the information on these items has been reviewed and the text has subsequently been revised.
9	Detail/Minor Comment, Vol. 1, Page 5-23, Section 5.4.2.3, Investigation and Removal Action Design (Removal Action Review Evaluation Summary, Laguna Seca Parking MRA)	**Comment:** Please modify the last sentence to "...all anomalies detected within the Laguna Seca Parking MRA were investigated and all military munitions encountered <u>during MEC removal</u> were removed." **Response:** The requested modification has been made to Section 5.4.2.3.

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10	Detail/Minor Comment, Vol. 1, Page 6-9, Section 6.1.3.4, 1960s and 1970s Training (Review of Historical Military Training Practices, MOUT Site MRA)	**Comment**: The second bullet identifies possible use of claymore mines associated with training at Range 35A. Please clarify whether the sentence is suggesting the possible use of practice mines only. **Response**: The cited sentence has been modified to indicate "***practice*** claymore mines".
11	Detail/Minor Comment, Vol. 1, Page 6-13, Section 6.2.1.3, TCRA (Visual Surface) and Military Munitions Reconnaissance (Previous MEC Investigations and Removal Actions, MOUT Site MRA)	**Comment**: Please modify the first sentence to convey that the purpose of the time critical removal action in the Eucalyptus Fire Area was to remove surface MEC (to address explosives safety risk). Surface MD was also removed during the course of the work. **Response**: The following modification has been made to the cited sentence: "From approximately November to December 2003, a visual surface TCRA and military munitions reconnaissance was conducted for the Army by Shaw Environmental, Inc. (Shaw) to remove MEC ***following an accidental fire in the area (Shaw 2005).*** MD (greater than 2 inches in size) was also removed ~~following an accidental fire in the area (Shaw 2005)~~."
12	Detail/Minor Comment, Vol. 1, Page 6-13, Section 6.2.1.3, TCRA (Visual Surface) and Military Munitions Reconnaissance (Previous MEC Investigations and Removal Actions, MOUT Site MRA)	**Comment:** Second paragraph contains two sentences that describe MEC items found during the Eucalyptus Fire TCRA. Please review the information and consolidate or clarify. **Response:** The second sentence has been modified as follows: "MEC items found ***in the MOUT training site, Parcel F1.7.2,*** included practice hand grenades, smoke hand grenades, hand grenade fuzes (practice and non-practice), one MK II fragmentation hand grenade, 40mm projectiles (illumination parachute, smoke, and practice), antitank rifle grenades, a surface trip flare, and ground illumination flares."
13	Detail/Minor Comment, Vol.	**Comment:** The second paragraph describes a previously conducted removal action as

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	1, Page 6-13, Section 6.2.1.4, Grid Sampling in MRS-14D (east of Barloy Canyon Road) using Schonstedt Magnetometers (Previous MEC Investigations and Removal Actions, MOUT Site MRA)	"100% removal over the entire Site OE-14D." The use of "100%" to describe MEC removal actions has been noted as confusing to some people. Please use alternative wording if possible. **Response:** The term "100%" has been deleted from Section 6.2.1.4.
14	Detail/Minor Comment, Vol. 2, Page 3-9, Section 3.8.6, Overall MEC Risk Score Uncertainties (DRO/Monterey MRA Uncertainty)	**Comment:** The second sentence ends with "...because documentation supports 100% removal of MEC at the DRO/Monterey MRA." The use of phrase "100% removal of MEC" can be misinterpreted as overstatement since complete (100%) removal is generally considered to be not readily attainable with the investigation methods employed at the DRO/Monterey MRA. Please revise. Same comment applies to Section 4.8.6. **Response:** The following sentence has been added to Section 3.8.6: "***If 100% of the MEC at the DRO/Monterey MRA was not removed during the removal actions, or if there was a MEC item in the two areas that were not 100% investigated, then the overall MEC risk would be underestimated.***" Section 4.8.6 has been revised as follows: "The uncertainties for the input factors discussed in Sections 4.8.1 through 4.8.5 may ***overestimate or*** underestimate the overall MEC Risk score ~~depending on the receptor scenario~~ ***on an individual basis***. Inputs to the ~~risk p~~***P***rotocol ~~do not~~ reflect the uncertainty ~~related to~~ ***regarding the*** depth and density of MEC items potentially remaining at the site, ***as well as the actions of the receptors***~~, because documentation supports 100% removal of the MEC at the Laguna Seca Parking MRA with the exception of the 1-ft removal in a portion of MRS-14A~~. ***If 100% of the MEC at the Laguna Seca Parking MRA was not removed during the removal actions, or if there was a MEC item in the two areas that were not 100% investigated, then the overall MEC risk would be***

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		underestimated."
15	Detail/Minor Comment, Vol. 2, Page 4-2, Section 4.3, MEC Density Input (Laguna Seca Parking MRA Risk Assessment)	**Comment:** First paragraph. The second to the last sentence suggests that MEC removal was conducted to the depth of intrusion. The depth of intrusion for future construction workers (one of the receptors evaluated in the risk assessment) is up to 60 inches, therefore the sentence could be interpreted as if the MEC removal depth was up to 60 inches, which is more than the stated 4-foot depth. Please review the statement and revise as necessary to reduce the chance of confusion. In addition, the next sentence suggests that digital geophysical instruments were used during MEC investigations in the Laguna Seca Parking MRA, but it was not previously mentioned. Please review the statement and revise if necessary. **Response:** The final after-action reports for each of the Laguna Seca Parking MRSs were re-reviewed. The reports for MRS-14A, -29, -30, and -47 indicated that either no MEC was detected deeper than the 4-ft removal depth or that every anomaly found was excavated: · The CMS OE removal on Site OE-14A from 6/11/1997 to 4/9/1998 cleared 427 grids to 4 ft and 384 grids to 1 ft. The Site OE-14A (Lookout Ridge II) After Action Report (USA 4/26/2001, OE0296C) states on page 2-6: "All OE identified was removed and no OE was detected deeper than the removal depth specified (4 feet)." The report further indicated that the deepest depth penetrating ordnance was found was at 3 ft. · The CMS OE removal on Site OE-29 from 6/26/1997 to 7/10/1997 (USA 12/30/2000, OE-0226A) states: "All OE identified was removed and no OE was identified deeper than the removal depth specified (4 feet)." · The UXB International, Inc., Final Report for Ordnance and Explosives Removal Action Laguna Seca Turn 11 (LST11), (UXB 11/1/1995 OE-0108; MRS-30) details the removal action that occurred from 6/12/1995 to 8/9/1995. The report states: "Every magnetic anomaly found was marked and excavated." The report does not provide a comprehensive list of items found and their depths. · The CMS OE Removal Operation on Site OE-47 (Wolf Hill; USA 2000, OE-0213A) details the removal action that occurred from 2/6/1997 to 6/6/1997. The report states: "CMS removed all UXO encountered during the removal action on Site OE-47 (Wolf Hill).

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		All OE removed was located within the 4' removal depth." Beginning 4/1/1997, when it became required to record depths of discovered MEC, the deepest MEC recovered was from the 3 ft level (USA 2000, OE-0213A). These reports indicate that the depth of clearance at MRS-14A, -29, -30, and -47 covered the depth of intrusion for the construction worker receptor. The erroneous reference to digital geophysical instruments used during MEC investigations in the Laguna Seca Parking MRA has been removed.
16	Detail/Minor Comment, Vol. 2, Page 4-7, Section 4.8.1, Depth Below Ground Surface Uncertainties (Laguna Seca Parking MRA Uncertainty)	**Comment:** For completeness, please discuss uncertainties associated with the score of 1 for the 4-ft removal sections of the Laguna Seca Parking MRA. **Response:** The following discussion has been added to Section 4.8.1: "***The MEC depth bgs score of "1" selected for MRS-29, MRS-30, MRS-47, and the 4-ft removal action portion of MRS-14A indicates that 100% of detected MEC was removed. After-action reports stated that no anomalies were left uninvestigated within the depth of detection (USA 2001c, USA 2000a, UXB 1995a, UXB 1995b, UXB1995c, and USA 2000b). The score of "1" would underestimate the likely depth of any potential MEC items, if any remained, and therefore, would underestimate the overall MEC risk.***"
17	Detail/Minor Comment, Vol. 2, Page 4-9, Section 4.8.5, Intensity of Contact with Soil Uncertainties (Laguna Seca Parking MRA Uncertainty)	**Comment:** The second paragraph contains a discussion of uncertainty associated with the frequency of entry input factor. Please revise/update. **Response:** Section 4.8.5 has been revised to read: "The intensity of contact with soil and MEC density input scores are related to the exposure score and subsequently in the scoring of the overall MEC risk. For an individual receptor to come in contact with a MEC item, the individual will need to be in contact with the medium where the MEC is located. This input is a measure of the length of time the receptor will have in contact with the soil. Receptors are more likely to come in contact with a MEC item if they are at the site for a longer period of time. ***However, for MRS-29, MRS-30, MRS-47, and the 4-ft removal action area of MRS-14A, the density has been scored as a "1": 100% of detected MEC was removed to the level of***

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		intrusion; therefore, the intensity of contact with soil does not contribute to the risk because there is no MEC to encounter regardless of the length of time a receptor is in the area. If any MEC does remain in the MRA, then the overall MEC risk for receptors would underestimate the actual risk. For the 1-ft removal action area of MRS-14A, the Intensity of Contact with Soil, scored as a "1", "Very Low: less than or equal to 1 hour/day for the trespasser, and "4", "High: less than or equal to 9 hours/day" for the maintenance worker, may be improbable on the steep hillsides, and therefore contribute to an overestimation of the exposure factor and subsequently the overall MEC risk." ~~However, the density has been scored as a "1" (100% of detected MEC removed to the level of intrusion); therefore, the contribution to the overall MEC risk score by the intensity of contact with soil input score is negated. If the MEC density input score indicates there is no MEC to encounter, it does not matter how long the receptor is in contact with the soil. The uncertainty is that despite efforts to detect and remove 100% of the MEC at the site, MEC may remain bgs. Therefore, the intensity of contact with soil input score, being negated because of the MEC density input score of "1", may underestimate the overall MEC risk score depending on the receptor~~.
18	Detail/Minor Comment, Vol. 2, Page 4-10, Section 4.9, Laguna Seca Parking MRA Conclusions	**Comment:** The second paragraph discusses the risks to receptors in the DRO/Monterey MRA. Please revise/update. **Response:** The second sentence of the second paragraph has been corrected as follows: "Therefore, the risks associated with intrusive receptors (maintenance workers, construction workers) are assumed to remain at the ~~DRO/Monterey~~ ***Laguna Seca Parking*** MRA at a level that requires mitigation."
19	Detail/Minor Comment, Vol. 3, Page 1-3, Section 1.2.1, Cleanup Program Under the Army	**Comment:** Last paragraph describes the status of the Army's consultation with U.S. Fish & Wildlife Service (USFWS) under the Endangered Species Act (ESA). Please modify the last sentence for clarification as follows: "…but require mitigation measures to be implemented before, during and after the MEC cleanup activities…" **Response:** The last sentence has been revised as follows: "These permits allow impacts to and incidental takes of listed

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		species during MEC cleanup activities, but require mitigation measures to be implemented ***before,*** during***, and after*** the MEC cleanup activities to reduce and minimize impacts to the protected species and their habitats."
20	Detail/Minor Comment, Vol. 3, Page 2-11, Section 2.3.3.2, Laguna Seca Parking MRA (Summary of Remedial Investigation Results)	**Comment:** First sentence describes the MRA as being located in the southeastern portion of the former Fort Ord. However in Volume 1 RI, Section 2.6.1, the location was described as south-central portion of the former Fort Ord. Please check the information and modify text where appropriate. **Response:** The text has been modified as follows: "The Laguna Seca Parking MRA is located in the ~~**southeastern**~~ ***south-central*** portion of the former Fort Ord adjacent to the Laguna Seca Raceway (Figure 1)."
21	Detail/Minor Comment, Vol. 3, Page 3-14, Section 3.2.2.8, Technology-Aided Visual Surface MEC Removal (Screening of General Response Actions and Process Options)	**Comment:** The "Implementability" paragraph discusses that: "Because the DRO/Monterey MRA contains habitat reserve areas and the Laguna Seca Parking MRA contains restrictions on the development, the HMP and associated BOs would currently limit the amount of temporary habitat destruction to 75 acres within these areas" and goes on to describe the habitat monitoring and possible corrective action requirements for such disturbed areas. Under the HMP, areas that contain significant amounts of MEC and/or metallic debris that preclude the use of typical methods of removal, that require large-scale excavations to remove the MEC present in the subsurface, within the habitat reserve, would be subject to the intense habitat monitoring and corrective action requirements. This is not relevant to the technique of technology-aided surface MEC removal, therefore the discussion should be deleted. **Response:** The discussion has been deleted from this section.
22	Detail/Minor Comment, Vol. 3, Page 3-15, Section 3.2.2.9, Subsurface MEC Removal (Screening of General Response Actions and	**Comment:** The "Implementability" paragraph discusses that: "Because the DRO/Monterey MRA contains habitat reserve areas and the Laguna Seca Parking MRA contains restrictions on the development, the HMP and associated BOs would currently limit the amount of temporary habitat destruction to 75 acres within these areas" and goes on to describe the habitat monitoring and possible corrective action requirements for such disturbed areas. Under the HMP**,** areas that contain significant amounts of MEC and/or metallic debris that preclude the use of typical methods of removal, that require large-scale excavations to remove the MEC present in the subsurface, within the habitat reserve, would be subject to the

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	Process Options)	intense habitat monitoring and corrective action requirements. However, based on the previous investigations conducted in these areas as described in the RI, such high concentration of MEC or debris is not expected in the three MRAs addressed in the Group 3 RI/FS. Therefore large-scale excavation should not be considered further as part of any of the remedial alternatives and should be so noted at the end of this section. **Response:** The discussion has been deleted from this section and the following text added to the end of the section: *"Overall Evaluation.* This measure is retained for further analysis as an alternative that reduces MEC risks through reduction of volume of potentially remaining MEC at the Group 3 MRAs in accordance with the AOC ***through the use of typical methods of removal (e.g., mag and dig). Based upon the results of previous investigations conducted within the Group 3 MRAs, high concentrations of MEC are not expected. Therefore, large-scale excavations would not be applicable to the Group 3 MRAs.*** This measure may be implemented in all or a portion of the Group 3 MRAs." In addition, the following text has been added to Section 4.3 to clarify that large-scale excavations (and sifting of soil) is not anticipated for the Group 3 MRAs: "This alternative has been developed for further analysis in the three Group 3 MRAs. This alternative assumes that subsurface MEC remediation would be conducted throughout the entire footprints of the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs. This alternative includes implementing the appropriate type of vegetation clearance in the MRA, if necessary, and the implementation of additional MEC remediation. ***Within the three Group 3 MRAs, significant amounts of MEC and/or metallic debris that preclude the use of typical methods of removal (e.g., mag and dig) would not be expected because the majority of the MRAs have undergone previous removal actions. For the portions of the Group 3 MRAs designated for development, vegetation removal would be accomplished using mechanical methods. For the portions of the Group 3 MRAs designated for habitat reserve, vegetation removal would be accomplished using prescribed burning techniques, to the extent feasible. The general vegetation removal and subsurface MEC remediation techniques were described in Section 3.1.4.*** The ***specific*** details of the vegetation clearance methods and the MEC detection equipment used would be presented in the RD/RA WP, or

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		similar document."
23	Detail/Minor Comment, Vol. 3, Page 4-2, Section 4.4, Alternative 4 – Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls (Development of Remedial Alternatives)	**Comment:** The third paragraph describes the alternative for the MOUT Site MRA. The subsurface removal area is described here as 2.3 acres, but in the cost estimate in Table 5-14, the subsurface removal area is 5 acres. Please check the information and update as necessary. **Response:** The subsurface removal area in the cost table has been revised to 2.3 acres. This reduced the overall cost of the alternative from $1.15 million to $1.09 million. As a result, the cost information in the relevant sections of the text has been revised.
24	Detail/Minor Comment, Vol. 3, Page 5-3, Section 5.1.1, Overall Protection of Human Health and the Environment (Evaluation of Remedial Alternatives for DRO/Monterey MRA)	**Comment:** Third paragraph (Alternative 2). People who would provide construction monitoring are described as "qualified MEC personnel." In order to communicate their qualifications more clearly, please instead use relevant standard terms used by the Department of Defense Explosives Safety Board. Please check elsewhere in the document for similar revisions. **Response:** The term "qualified MEC personnel" has been changed to "UXO-qualified personnel."
25	Detail/Minor Comment, Vol. 3, Page 5-3, Section 5.1.1, Overall Protection of Human Health and the Environment (Evaluation of Remedial Alternatives for DRO/Monterey	**Comment:** The last sentence notes the impacts to natural resources from intrusive investigation of subsurface anomalies in the 5 acre portion of the DRO/Monterey MRA along South Boundary Road. Such impacts are considered manageable by following the mitigation measures described in the HMP. Please consider deleting this sentence or linking it with the one previous for clarity, **Response:** The sentence has been deleted.

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	MRA)	
26	Detail/Minor Comment, Vol. 3, Page 5-4, Section 5.1.2, Compliance with ARARs (Evaluation of Remedial Alternatives for DRO/Monterey MRA)	**Comment:** Second paragraph (Alternative 2). Please delete the word "other" from the second sentence. Current text suggests that the existing CRUPs are considered as an ARAR. Please check elsewhere in the document for similar revisions. **Response:** The word "other" has been deleted from this paragraph. The correction has also been made in Sections 5.2.2 (Laguna Seca Parking MRA) and 5.3.2 (MOUT Site MRA).
27	Detail/Minor Comment, Vol. 3, Page 5-6, Section 5.1.5, Reduction of Toxicity, Mobility, or Volume Through Treatment (Evaluation of Remedial Alternatives for DRO/Monterey MRA)	**Comment:** Please insert "potentially" to read "this alternative would not reduce the volume of MEC potentially remaining in the subsurface…" Additionally, please add a sentence noting that MEC removals have already been taken place at the site. Please check elsewhere in the document for similar revisions. **Response:** The text has been revised to use the term "MEC potentially remaining in the subsurface." In addition, this change has been made to similar text appearing in Sections 5.1.10, 5.2.5, 5.2.10, 5.3.5, and 5.3.10. The first paragraph of Section 5.1.5 contains the following text: "MEC-related field sampling and removal activities were completed at the DRO/Monterey MRA by the Army's Munitions Response contractors according to contractual and/or work plan requirements in place at the time the work was conducted." No additional text has been added.
28	Detail/Minor Comment, Vol. 3, Page 5-8, Section 5.1.7, Cost (Evaluation of Remedial Alternatives for DRO/Monterey MRA)	**Comment:** The last sentence suggests that additional risk mitigation measures such as LUCs may be required. However, LUCs are part of the alternative being evaluated and costs for implementing LUCs are included in Table 5-7. Please revise of delete the sentence. Same comment applies to Section 5.3.7, evaluation of costs for the MOUT Site MRA. **Response:** The sentence has been deleted from Sections 5.1.7 and 5.3.7.

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29	Detail/Minor Comment, Vol. 3, Page 5-16, Section 5.3.1, Overall Protectiveness of Human Health and the Environment (Evaluation of Remedial Alternatives for MOUT Site MRA)	**Comment:** The first sentence states that MEC removal actions were conducted to depth across the majority of the MOUT Site MRA. However, in Volume 1 RI, Section 6.6.1, it was concluded that a large portion of the MRA has not undergone a subsurface investigation. Please reexamine the sections and modify text as appropriate. **Response:** The first sentence of this section has been deleted.
30	Detail/Minor Comment, Vol. 3, Page 5-24, Section 5.4.1.1, Overall Protectiveness of Human Health and the Environment (Comparison of Remedial Alternatives for DRO/Monterey MRA)	**Comment:** Second paragraph notes that MEC removal components of Alternatives 3 and 4 may have some impacts to the natural resources due to excavations (associated with intrusive investigation of individual anomalies). As noted earlier, such impacts are considered manageable by following the mitigation measures described in the HMP. Please reexamine the section and modify text as appropriate. Same comment applies to Section 5.4.3.1, evaluation of overall protection of human health and the environment for the MOUT Site MRA. **Response:** The text in Section 5.4.1.1 has been revised as follows: "Alternative 3 (Additional MEC Remediation) and Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) may have some impacts to the natural resources on the site since excavation would be required of the soil within the selected area;***, however, these impacts would be considered manageable by following the mitigation measures described in the HMP."*** Similar revisions have been made to the text in Section 5.4.3.1.
31	Detail/Minor Comment, Vol. 3, Page 5-25, Section 5.4.1.2, Compliance with ARARs (Comparison of Remedial	**Comment:** The second sentence indicates that LUCs would continue to be implemented in accordance with DTSC policy. Please revise the sentence to indicate that LUCs that are selected as part of the remedy would be implemented in a manner that is consistent with the state and federal guidance. Relevant guidelines were described in Section 2.4.2. In addition, please modify the third sentence to read "...would be implemented in a manner that complies with the potential ARARs…" Please check

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	Alternatives for DRO/Monterey MRA)	elsewhere in the document for similar revisions. **Response:** The requested changes have been made to Section 5.4.1.2. In addition, changes have been made to similar text in Sections 5.2.1, 5.2.2, 5.3.2, 5.4.2.2, and 5.4.3.2.
32	Detail/Minor Comment, Vol. 3, Page 5-30, Section 5.4.3.1, Overall Protectiveness of Human Health and the Environment (Comparison of Remedial Alternatives for MOUT Site MRA)	**Comment:** The third paragraph includes a statement indicating that minimal amount of MEC is expected to be present in the MOUT Site MRA. The basis of this statement is not clear since the RI has concluded that a large portion of the MRA has not undergone a subsurface investigation, and the MEC density input factor of 3 (medium density) was used in the risk assessment. Please reexamine the sections and modify as appropriate. **Response:** The text has been modified as follows: "Alternative 3 (Additional MEC Remediation) and Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) may provide some additional protection of human health after MEC removal actions have been performed. ~~However, if~~ ***If*** MEC is found and removed, this alternative ~~is not expected to~~ ***may*** provide a ~~significant~~ decrease in potentially remaining MEC risks. ~~because a minimal amount of MEC is expected to remain in the MOUT Site MRA.~~ After additional MEC remediation is completed as part of Alternative 3, the removal areas may continue to require additional risk mitigation measures (e.g., LUCs) to protect human health for those receptors that would perform intrusive activities during development and reuse."
33	Detail/Minor Comment, Vol. 3, Page 6-1, Section 6.0, Identification of Preferred Remedial Alternative	**Comment:** Second to the last paragraph. Please add "if selected as the remedy" to read "If selected as the remedy, implementation of this alternative would…" to reduce the chance of confusion regarding the status of the remedial alternative which has not been selected. **Response:** The suggested text has been added.

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1	General Comment, Vol. 1	**Comment:** During the review of site information for MRS-14D as part of the Remaining RI/FS Areas investigation program, inconsistent of 14.5mm subcaliber practice projectiles were found in the Army's Military Munitions Response Program (MMRP) database. The 14.5mm projectiles reported as "potential unexploded ordnance (UXO)" items by USA Environmental, Inc. in the After Action Report (AAR) for MRS-14D are currently classified as small arms ammunition (SAA) in the MMRP database, while those found in Ranges 43-48 by Parsons are classified as munitions and explosives of concern (MEC). The 14.5mm projectiles from MRS-14D, currently classified as SAA, will be re-classified as MEC - insufficient data (ISD). Additional research would be required to determine whether these items were UXO, discarded military munitions (DMM), or munitions debris (MD). Five of the items reported in the MRS-14D AAR were found from within the Environmental Services Cooperative Agreement (ESCA) areas - parcels L20.5.1 and L20.8. · one in MRS- 14A (MRS-14D Grid 30); · one outside MRS-14A but within parcel L20.5.1 (MRS-14D Grid 40); and · three within M RS-14D along Barloy Canyon Road parcel L20.8 (MRS-14D Grid 60). These items are documented in the AAR for MRS-14D since the northern tip of MRS-14A was part of MRS-14D at the time. The removal grid sheets are included in *Final* OE *Sampling and Removal, After Action Report, Inland Range Contract, Former Fort* Ord, *California, Site OE-14D*, dated April 19, 2001, Administrative Record number OE-03 10A. **Response:** Four of the five additional items specified above have been identified in the MMRP and incorporated into the Group 3 RI/FS. One 14.5mm projectile, noted above as being located along Barloy Canyon Road parcel L20.8, was not found in the Army's MMRP database. The Group 3 RI/FS has been updated to include the four re-classified items. The main areas where changes have been made are discussed below. Discussion of the removal action performed by USA from September 26, 1996 through January 28, 1997, during which the re-classified items were recovered, was not included in Section 5.2, Previous MEC

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		Investigations and Removal Actions (Laguna Seca Parking MRA), of Volume 1 of the Group 3 RI/FS Report. A description of the removal action and findings has been added to Section 5.2 of Volume 1 of the Group 3 RI/FS and Table 5-1 (Summary of Laguna Seca Parking MRA MEC and MD by Item Description) and Appendix B Figure B4 (Laguna Seca Parking MRA Remedial Investigation Army Historical MEC and MD Projectiles) have been revised to include the re-classified items. Table B-2 (MEC Items Found in the Laguna Seca Parking MRA) of Appendix B of Volume 2 has also been updated to include the two 14.5 subcaliber practice projectiles. No sampling grids established for the sampling activities performed by USA from August 31, 1995 to November 6, 1995, in conjunction with this removal action were located within MRS-14A; therefore a description of the sampling activities has not been added to the Laguna Seca Parking MRA discussion in the Group 3 RI/FS. The Group 3 RI/FS included discussion of the sampling and 4-ft removal action performed by USA from 1995 to 1997 in Section 6.2 of Volume 1, Previous MEC Investigations and Removal Actions (MOUT Site MRA). Additional information regarding the division of Site OE 14 into subsites and the historical training that took place in Range P-5, located within Site OE 14D, has been incorporated into the 1997 Revised Archive Search Report discussion in Section 6.1.2.3 of Volume 1. Table 6-1 (Summary of MOUT Site MRA MEC and MD by Item Description) and Figure C4 of Appendix C (MOUT Site MRA Remedial Investigation Army Historical MEC and MD Miscellaneous Items) of Volume 1 have been updated to include the re-classified items found along the southern portion of Barloy Canyon Road. The two items have also been added to Table B-3 (MEC Items Found in the MOUT Site MRA) included in Appendix B of Volume 2.

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1	General Comment, Vol. 2, Page 1-6, Section 1.2, Fort Ord MEC Risk Assessment Protocol	**Comment:** This document (Section 1.2) references the Fort Ord Ordnance and Explosives Risk Assessment Protocol (Malcolm Pirnie, 2002). We represented the Human and Ecological Risk Office during the development of this protocol for Fort Ord. **Response:** The first sentence of Section 1.2 has been revised as follows: The Fort Ord MEC Risk Assessment Protocol (Malcolm Pirnie 2002) was prepared through a combined effort of the Army, the DTSC ***(representing the Human and Ecological Risk Office)***, and the EPA.
2	General Comment, Vol. 2, Future Land Use, Page 1-2, Section 1.1, Purpose of the Risk Assessment	**Comment:** The report states that "*The risk assessment is based on both the field conditions and on the intended future land reuse for each of the Group 3 MRAs*." The "*intended future land reuse*" of parcels at Fort Ord has changed in the past and can be expected to change in the future. Therefore, if the assessment is limited to current intended use, land use restrictions will be needed to prevent activities which might increase the risks. **Response:** The last paragraph has been revised as follows: This RA focuses on the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs. The risk assessment is ~~based on both the field conditions and on the intended future land reuse for each of the Group 3 MRAs.~~ ***limited to current intended land use. Land use restrictions are evaluated in Volume 3 of the RI/FS.***
3	General Comment, Vol.2, Overall Risk from MEC	**Comment:** A. The Fort Ord protocol (see Table 5-10 in the protocol and Table 3-4 in the present document) estimates overall risk from MEC based on three factors: MEC Type, Accessibility Factor and Exposure Factor. (1) The MEC Type is determined by munitions and explosives experts. We have not evaluated or commented on this component. (2) The Accessibility Factor (see Table 5-1 in the protocol and Appendix A in the present document) is based on the MEC Depth, the Level of Intrusion, and the Migration/Erosion Potential. (3) The Exposure Factor (see Table 5-2 in the protocol and Appendix A in the present document) is based on the MEC Density, Frequency of Entry, and the Intensity of Contact with Soil.

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		B. The Accessibility Factor can be dominated by the MEC Depth and the Exposure Factor can be dominated by the MEC Density. (1) MEC Depth is given a score of 1 when "*100% of detected MEC is removed considering data quality for the sector*." This is clarified in a footnote: "*Detection and removal procedures meeting the Data Qualify Objectives* (DQOs) *for the sector based on clearly defined investigation objectives including reuse and the defection of designated MEC. If DQOs have not been established for the sector the quality of data should be reviewed and approved to score a 1*." (2) Similarly, MEC Density is given a score of 1 when "*100% of detected MEC* is *moved to the level of intrusion*." A similar footnote ties this category to data quality. (3) The significance of a score of 1 for MEC Depth and MEC Density is that the overall Accessibility Factor also becomes 1 regardless of the Level of Intrusion and the Migration/Erosion Potential and the overall Exposure Factor also becomes 1 regardless of the Frequency of Entry and the Intensity of Contact with Soil. This has great impact on the overall estimate of risk. An example is discussed in General Comment 5 B. (4) The score of 1 is intended for conditions in which DQOs were developed, agreed to, and met for investigation and remediation of areas with MEC. In some instances, historical investigation and remediation may have been completed without DQOs. In this case, it may be determined that the data are sufficient without DQOs to give a score of 1. (5) The Fort Ord protocol (Tables 5-1 and 5-5) specifies that the data quality determination is to be made by the Base Realignment and Closure Cleanup Team. The present document (Appendix A) doesn't specify who is responsible for this determination. C. All of the Del Rey Oaks/Monterey MRA and most of the Laguna Seca Parking MRA have an Overall MEC Risk score of A which is the lowest risk. This results from consistent MEC Depth and MEC Density scores of 1. This comment is not intended to question the Overall MEC Risk scores for these two MRAs. Rather, we are pointing out the importance of the data quality determination. We have not reviewed the DQOs or the

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		investigations and removal actions. Therefore, we are relying on regional DTSC staff to determine whether these MEC Depth and MEC Density scores are correct. D. This document (Section 2.5; Appendix C) applies a Universal Soil Loss Equation to quantify potential soil erosion for each of the areas. Although this equation was included as Appendix F to the Fort Ord protocol, the main text of the protocol provided an estimate of 0.03 inches per year at Fort Ord. The estimates in this report are less than 1E-5 inches per year for erosion in each of the three areas. In any case, in the development of the Fort Ord protocol, the team agreed that migration and erosion from physical forces were likely to be minor for most areas of Fort Ord. Therefore, we don't object to the use of the equation or conclusions regarding the migration/erosion factor. We do think that the document should acknowledge that the estimates of erosion entail considerable uncertainty resulting from combining five factors, each of which has a high level of uncertainty. **Response:** A. Comment has been noted and requires no changes to the report. B(1) through B(4). Comments have been noted and require no changes to the report. B(5). The footnotes in Section 2.3, MEC Density, and Section 2.4, MEC Depth, of Volume 2 have been expanded as follows: [1] Detection and removal procedures meeting the data quality objectives (DQOs) for the sector based on clearly defined investigation objectives including reuse and the detection of designated MEC. If DQOs have not been established for the sector, the quality of data should be reviewed and approved ***by FORA under the ESCA, and EPA and DTSC*** to score a '1.' C. Comment has been noted. No change has been made to the report. D. Sections 3.8.2, 4.8.2, and 5.8.2 acknowledge the uncertainty in the erosion potential calculations. No changes have been made to the report.
4	General Comment, Vol.2, Risk Assessment, Section 3.0, DRO/Monterey	**Comment:** A. The description of previous investigations and removal actions (Section 3.1) states that two removal actions were conducted and that the entire MRA was included " . . . *with the exception of a strip of land approximately 50 ft wide along the northwestern edge of Parcel L6.2, which is located outside the boundary for MRS- 43, and the south side of South Boundary*

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	MRA Risk Assessment	*Road east of Parcel E29. 1 (Figure 3).*" (1) This description is somewhat ambiguous. MRS-43 is not shown on Figure 3. It is unclear how much of Parcels L20.13.1.2 and L20.13.3.7 is included in the exception. We recommend showing on Figure 3 the portions which did not undergo removal actions. (2) The description in Section 3.1 specifies that the two portions did not undergo removal actions, but is silent about whether they were included in the two magnetometer investigations. This should be explicitly stated. The text in Section 3.8.1does state that these areas were not investigated. (3) The report (Section 3.1) argues that these portions which did not undergo investigation or removal actions " . . . *are bounded by either: approved Track 1 sites, a paved road, or an area of the DRO/Monterey MRA where few MEC or munitions debris (MD) items were found. Therefore, it is expected that finding MEC in either of these two small portions of the MRA would not be likely.* " (4) While the argument quoted above is reassuring, the report should also note that these portions have the highest accessibility because they are along the South Boundary Road ("...*an active roadway with vehicle traffic on a daily basis.*"). Furthermore, roadway expansion and utility construction are planned (Section 3.6.1). These are, of course, intrusive activities and hence increase the potential exposure. B. The uncertainty discussion (Section 3.8) acknowledges that there is a potential that the overall MEC risk was underestimated. (1)The text (Section 3.8.1) reiterates the reasons that MEC is not expected in the two portions did not undergo investigation or removal actions (see Part A above), but acknowledges that overall MEC risk could have been underestimated. We concur that there is a potential for underestimation. (2) The potential for underestimation of risk in these two portions is exacerbated by the planned intrusive activities there (see Part A above). MEC removal differs significantly from removal of chemical contaminants, because a single MEC item may be sufficient to cause harm. The uncertainty discussion should

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		acknowledge the importance of the planned intrusive activities. (3) The text makes the important point with respect to MEC Depth (Sections 3.8.3 and 3.8.6) and with respect to MEC Density (Sections 3.8.4 and 3.8.6) that "*The uncertainty is that despite efforts to detect and remove 100% of the MEC at the MRS, MEC may remain bgs.*" The text notes that this may underestimate the overall MEC risk. We believe that this is a very important point, since the difficulty in removing 100% of MEC has been well established at Fort Ord and elsewhere. (4) The portrayal of uncertainties for the Del Rey Oaks/Monterey MRA is clearly written and is fair. We appreciate this. C. We audited the scores and overall MEC risk classifications (Tables 3-2 through 3-5) and found them to be consistent with the Fort Ord risk assessment protocol. D. The conclusions for this MRA (Section 3.9) are fair and well-written. (1) "*The overall MEC risk score for each receptor for each of the MEC hazard types was 'A', the lowest risk.*" With the caveats discussed above and in the document, this result is consistent with the Fort Ord protocol. (2) The document makes a second important conclusion: "*It* is *recognized* that *although the detected anomalies may have been removed during the previous removal actions conducted on the DRO/Monterey MRA, the potential exists that some MEC may remain in the subsurface* at *the MRA. Therefore, the risks associated with intrusive receptors (maintenance workers, construction workers) are assumed to remain at the DRO/Monterey MRA* at *a level that requires mitigations.* " **Response:** A(1). Figure 5 has been added to Volume 2 of the RI/FS to show the two areas of the MRA that have not undergone removal actions and the MRS boundaries for the DRO/Monterey MRA. A(2). The text in Section 3.1 has been revised to state that the two portions of the MRA that did not undergo removal actions, were not included in the magnetometer investigations. The first sentence of the fifth paragraph has

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		been changed as follows: "While the two small portions of the MRA (approximately 50 ft wide along the northwestern edge of Parcel L6.2 and the south side of South Boundary Road east of Parcel E29.1) have not been subjected to removal actions ***or magnetometer investigations***, they are bounded by either: approved Track 1 sites, a paved road, or an area of the DRO/Monterey MRA where few MEC or munitions debris (MD) items were found." A(3). Comment has been noted. No change has been made to the report. A(4). Text has been added to Section 3.8.1 to address the concerns regarding the risks in the areas noted in the comment. B(1). Comment has been noted. No change has been made to the report. B(2). Text has been added to Section 3.8.1 to address the concerns regarding the risks in the areas noted in the comment. B(3) and B(4). Comments have been noted. No changes have been made to the report. C. Comment has been noted. No change has been made to the report. D(1) and D(2). Comments have been noted. No changes have been made to the report.
5	General Comment, Vol.2, Risk Assessment, Section 4.0, Laguna Seca Parking MRA Risk Assessment	**Comment:** A. The document (Section 4.0) lists six property transfer parcels (L.20.3.1, L.20.3.2, L.20.5.1, L.20.5.2, L.20.5.3 and L.20.5.4) and shows their boundaries in Figures 5 and 6. However, the investigations (Section 4. 1), removal actions and the risk assessment are all based on dividing the Laguna Seca Parking MRA into four Munitions Response Sites (MRS-14A, MRS-29, MRS-30 and MRS-47). The document should add a figure to the risk assessment to show the relationships of the parcels (reuse areas) and the MRSs, or at least reference the appropriate figures in Volume 1 that allow the reader to see the locations of the MRSs. B. The results for MRS-47 illustrate the significance of the scores for MEC Depth and MEC Density in the Overall MEC Risk estimate. As shown in Table 4-5, a site can achieve an Overall MEC Risk estimate of " A (lowest risk) even with high scores (potential risks) for MEC Hazard, Level of

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		Intrusion, Migration/Erosion, Frequency of Entry, and Intensity of Contact with Soil, provided the MEC Depth and MEC Density scores are "1 ". This comment is not intended to take issue with the protocol on this point. If MEC has been adequately cleared, then the risk is minimized. Neither is the comment intended to criticize the investigations and removal actions that were performed at the Laguna Seca Parking MRA. Rather, the intent is to bring attention to the importance of the evaluating the completeness of the work with respect to DQOs. We are relying on regional DTSC staff to determine whether these MEC Depth and MEC Density scores are correct, based on the reliability of the investigations and removal actions. These issues are discussed in General Comment 3. C. We audited the scores and overall MEC risk classifications (Tables 4-2 through 4-7) and found them to be consistent with the Fort Ord risk assessment protocol. D. Some of our preceding comments about the uncertainty discussion for the Del Rey Oaks/Monterey MRA apply as well to the Laguna Seca Parking MRA. **Response:** A. Figure 8 has been added to Volume 2 of the RI/FS to show the MRS boundaries for the Laguna Seca Parking MRA. B. Comment has been noted. No change has been made to the report. C. Comment has been noted. No change has been made to the report. D. Text has been added to Section 4.8.1 to address the remaining concerns regarding the risks in the areas noted in the comment.
6	General Comment, Vol.2, Risk Assessment, Section 5.0, MOUT Site MRA Risk Assessment	**Comment:** A. The document (Section 5.0) lists two property transfer parcels (F1.7.2 and L.20.8) and shows their boundaries in Figures 7 and 8. However, the investigations and removal actions (Section 5.1) are described in terms of dividing the Military Operations In Urban Terrain Site MRA into Munitions Response Sites (MRS-14D, MRS-28 and MRS-270). The document should add a figure to the risk assessment to show the relationships of the parcels (reuse areas) and the MRSs and provide an explanation in the text. B. The description of previous investigations and removal actions (Section 5.1) lists two sampling investigations with a magnetometer, a removal

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		action and a visual surface time-critical removal action (TCRA). The text states that "*In addition to the investigations, the entire MOUT Site MRA was visually inspected during the visual surface TCRA with the exception of a small unburned portion in the south western portion of the MOUT training area (Parcel F1.7.2) and the southern portion of Barloy Canyon Road (Parcel L20.8) along the eastern side of the roadway; however, a portion of the eastern side of Barloy Canyon Road in Parcel L20.8 was included in a removal action to depth at MRS-14D, leaving an approximately 600-foot section of the eastern side of the roadway uninvestigated (Figure 6-2 of Volume I)*." Please add a figure to show the locations and extent of the areas which were not investigated. Figure 6-2 of Volume 1 does not illustrate what the text in Section 5.1 of Volume 2 is describing. C. We audited the scores and overall MEC risk classifications (Tables 5-2 through 5-5) and found them to be consistent with the Fort Ord risk assessment protocol. D. Our assessment of the potential risk from MEC at the Military Operations in Urban Terrain Site MRA is as follows: (1) As stated in Section 5.8.1, "*...MEC has been found on the surface of both the MOUT training area and the roadway...*" (2) It is also stated in Section 5.8.1 that "*...not all of the MOUT Site MRA has undergone a surface removal. Therefore, potentially, MEC could remain on the surface.* " (3) Further, as stated in Section 5.1, "*MEC items found at the MOUT Site MRA were penetrating items (e.g., rockets and projectiles) and could be expected below ground surface*." Thus, MEC may remain below the surface as well as on the surface. (4) At the same time, two burial pits were found at ten inches below ground surface (Section 5.4). It is possible that additional burial pits are located at the Military Operations in Urban Temin Site MRA. (5) Furthermore, as stated in Section 5.2, "*MEC items with risk codes corresponding to 1, 2 and 3 were found in the MOUT training area (Parcel Fl.* 7.2) *of the MOUT* Site *MRA.*" Category 3 is the most dangerous MEC, described (Section 2.2) as "*Will kill an individual if detonated by an individual's activities.*"

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		E. Based on the observations listed above, the potential risk remaining at this MRA is substantial. This is consistent with the risk assessment results that found Overall MEC Risk in the training area (Table 5-4) to be category C or D for a trespasser and D or E for a trainee, maintenance worker of construction worker. Similarly, the Overall MEC Risk in the roadway area (Table 5-5) was found to be category D or E for all receptors. An Overall MEC Risk of D is high risk and E is highest risk. F. We are therefore concerned that Section 5.6.1 reports that "*The HMP (Habitat Management Plan) identifies the MOUT Site MRA as development without restriction.*" This classification is inappropriate. **Response:** A. Figure 11 has been added to Volume 2 of the RI/FS to show the MRS boundaries for the MOUT Site MRA. B. Figure 6-2 of Volume 1 has been modified to better illustrate the two areas in the MRA where investigations were not completed. C. Comment has been noted. No change has been made to the report. D(1) through D(5). No change has been made to the report in response to these comments. E. Comment has been noted. No change has been made to the report. F. The classification has been revised to “development” as stated in the HMP in the cited text, as well as applicable sections of Volume 1 and Volume 3. The “development” land use category stated in the HMP describes the land use classifications with respect to the impacts development may have on critical habitat and threatened or endangered species at the former Fort Ord. The development land use category as described in the HMP does not consider MEC risks.

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Review Comments provided by Mike Weaver of the Fort Ord Community Advisory Group, dated June 10, 2010

No.	Comment Type / Report Section	Comment/Response
1	General Comment	**Comment:** To begin, please provide a colored copy of FORA's current Reuse Plan with a transparent overlay of the Group 3 Sites. **Response:** The Fort Ord Reuse Plan is available from the Fort Ord Reuse Authority's website at www.fora.org.
2	General Comment	**Comment**: Detail the differences made in the Federal Facilities Agreement for the AOC. **Response**: The modifications made to the Federal Facilities Agreement (FFA) were detailed in the Federal Facility Agreement, Amendment No. 1 Related to Early Transfer Property Referenced in FOSET 5 ("the Amendment"; Administrative Record No. BW-0119B). The Amendment is available to the public on the Administrative Record. No changes have been incorporated into the report based on this comment.
3	Specific Comment, Vol. 1, Figures 2-2, 2-3, 2-4, 2-5	**Comment**: The Del Rey Oaks/Monterey MRA Figures 2-2, 2-3, 2-4, 2-5 do not disclose the State of California's property, dedicated to Cal Trans for the Fort Ord Bypass, also known as the Southwest Alternative. Please identify this area. **Response**: The proposed boundaries for the future bypass of Highway 68 are located approximately 800 feet southeast of parcel L20.13.3.1, outside the boundaries of the DRO/Monterey MRA. Therefore, the boundaries are not relevant to DRO/Monterey MRA figures. No changes have been made to the figures based on this comment.
4	Specific Comment, Vol.1, Section 1.2.1 Cleanup Program Under the Army, Page 1-3	**Comment**: Page 1-3 of Volume 1 states: "In November 1998, the Army agreed to evaluate MEC at the Former Fort Ord and perform a basewide munitions response (MR) RI/FS consistent with CERCLA. Please provide information that this was a settlement agreement of the following lawsuit: Fort Ord Toxics Project, Inc.; California Public Interest Research Group; Curt Gandy; Joe Manaea, Plaintiffs-appellants, v. California Environmental Protection Agency; Sub. Department of Toxic Substances Control; Jesse Huff, Director, Department of Toxic Substances Control, Defendants, and United States Department of Defense, Real Parties in Interest-appellees

Response to Comments
Draft Group 3 Remedial Investigation / Feasibility Study, dated April 8, 2010
Review Comments provided by Mike Weaver of the Fort Ord Community Advisory Group, dated June 10, 2010

No.	Comment Type / Report Section	Comment/Response
		United States Court of Appeals for the Ninth Circuit – 189 F.3d 828 (9th Cir. 1999) **Response**: It is not necessary to expand the text as suggested. No changes have been incorporated into the report based on this comment.
5	General Comment	**Comment**: This document discusses some of the important unexploded ordnance issues but does not address the other elements of the Fort Ord National Superfund Site. Those are: a) Contaminated groundwater b) Residual chemical contamination from years of pyrotechnics, that is flares, tracers, smoke bombs, chemical warfare training, etc. c) Years of heavy herbicide and pesticide use at the former training base. These carcinogens need to be tested for and cleaned. The FOCAG is including two attachments, a couple of our research papers from this past year. Please include details of plans to address these other issues, and a time line in your Draft Final RI/FS. **Response**: These issues were raised in the FOCAG Position Paper dated August 12, 2008. The response from the Army, DTSC, EPA, and FORA to this concern and others was presented to FOCAG in a letter from the Army, dated November 17, 2008 (Fort Ord Administrative No. ESCA-0126). This comment is outside of the intended scope of the Group 3 RI/FS under the AOC. The purpose of the Group 3 RI/FS as defined under Task 3 of the AOC Scope of Work is to propose methodology to obtain the necessary information identified in the SEDR to characterize the nature and extent of MEC in order to propose a preferred remediation alternative pursuant to CERCLA. No changes have been incorporated into the report based on this comment.
6	General Comment, Vol. 1	**Comment**: Your Volume 1 Remedial Investigation does not disclose that both the Parker Flats and Del Rey Oaks areas were used for Army tank training. Provide details of tank munitions and depths to which tank munitions can penetrate the various soil types at Fort Ord.

Response to Comments
Draft Group 3 Remedial Investigation / Feasibility Study, dated September 17, 2009
Review Comments provided by Mike Weaver of the Fort Ord Community Advisory Group, dated June 10, 2010

No.	Comment Type / Report Section	Comment/Response
		Response: The Parker Flats MRA is not included in the Group 3 MRAs and will be addressed in the Group 1 RI/FS. It appears that tank driving training did occur at the former Fort Ord; however, no evidence of firing from tanks has been identified based on historical records. As stated in Section 4.4.2.1 of Volume 1, Types of Munitions Removed, Practice M11 Antitank rifle grenades were recovered on the MRA. Section 4.5.3 Rifle Grenade Training further describes these inert antitank munitions. No changes have been incorporated into the report based on this comment.
7	Specific Comment, Vol. 1, Section 4.1.1 Review of Aerial Photographs and Historical Training Maps, Page 4-1	**Comment**: Volume 1, Section 4.1.1 Regarding DRO/Monterey Multi-Range Area "Review of Aerial Photographs and Historical Training Maps" Your one paragraph of the 1940's Era doesn't even mention WWII! You state someone reviewed aerial photographs from 1941 and 1949. This was both before and after the war. Infantry training for the Pacific Theatre was conducted at Fort Ord and Fort Hunter Liggett. Your one-paragraph review analysis last sentence states: "Training and/or facility maps were not available for the vicinity of DRO/Monterey MRA in the 1940's." **Response**: All available aerial photographs and historical training maps for the DRO/Monterey MRA were included in the review provided in Section 4.1.1. Review of the available aerial photographs for the 1940's era, consisting of two aerial photographs (circa 1941 and 1949), did not indicate infantry training within the DRO/Monterey MRA. As stated, no training and/or facility maps for the vicinity of the MRA were available for the 1940's era. No changes have been incorporated into the report based on this comment.
8	Specific Comment, Vol. 1, Section 5.1 Laguna Seca Parking MRA Historical Records and Military History, Page 5-1	**Comment**: Volume 1, Section 5.1 Regarding Laguna Seca Parking MRA Historical Records and Military History states no training maps were available from the 1940's. Further, someone again reviewed aerial photographs from 1941 and 1949, again, both before and after WWII. **Response**: All available aerial photographs and historical training maps for the DRO/Monterey MRA were included in the review provided in Section 5.1.1. Review of the available aerial photographs obtained during the 1940's era consisted of two aerial photographs (circa 1941 and 1949). As stated, no training and/or facility maps for the vicinity of the MRA were available for the 1940's era.

Response to Comments
Draft Group 3 Remedial Investigation / Feasibility Study, dated April 8, 2010
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No.	Comment Type / Report Section	Comment/Response
		No changes have been incorporated into the report based on this comment.
9	Specific Comment, Vol. 1, Section 6.1 MOUT Site MRA Historical Records and Military History, Page 6-1	**Comment**: Volume 1, Section 6.1 MOUT Site Historical records and Military History states that there was troop training and grenade training in the 1940's at this site but says, "historical maps were not available for that time period ..." Again, someone looked at aerial photographs from 1941 and 1949. **Response**: All available aerial photographs and historical training maps for the DRO/Monterey MRA were included in the review provided in Section 6.1.1. Review of the available aerial photographs for the 1940's era consisted of two aerial photographs (circa 1941 and 1949). As stated in Section 6.1, review of the MEC and MD items listed in the Army's MMRP database suggests hand grenade training and troop training in the MOUT Site MRA began in the 1940s. No changes have been incorporated into the report based on this comment.
10	Specific Comment, Vol. 1, Section 6.2.2.1 Schonstedt Model GA-52 Cx Magnetometer, Page 6-14	**Comment**: Volume 1, Section 6.2.2.1 Schonstedt Model GA-52Cx Magnetometer states, "it cannot detect nonferrous metal objects (e.g., lead, brass, copper, aluminum). a) This section fails to disclose the depths to which this Schonstedt can detect other metals in various soil types at Fort Ord. b) This section also fails to disclose that the Schonstedt cannot detect plastic objects, for example, non-metallic land mines. **Response**: a) The geophysical instruments used during sampling and investigation activities on the MOUT Site MRA (i.e., Schonstedt magnetometers) are capable of detecting the types of munitions items to the depths at which they are expected to be found (see the Ordnance Detection and Discrimination Study [Administrative Record No. OE-0310F]). In addition, as stated in the Track 1 ROD, Schonstedt magnetometers have been most commonly used in the UXO remediation industry for many years and are the appropriate instrument for the type of investigations that were conducted at the MOUT Site MRA. b) The cited section states that the Schonstedt Model GA-52Cx Magnetometer is "…a highly sensitive magnetic locator that detects ferrous (iron) metal objects." Based on the review of historical records and military history, non-metallic land mines are not expected to be present at the MOUT Site MRA.

Response to Comments
Draft Group 3 Remedial Investigation / Feasibility Study, dated September 17, 2009
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No.	Comment Type / Report Section	Comment/Response
		No changes have been incorporated into the report based on this comment.
11	General Comment, Vol. 1	**Comment:** Please provide a description of the sample of a sample investigative process used for these areas. Please provide the size in acres of each area and a map of the specific areas sampled, the specific samples in those sample areas and to what depths these were accurately sampled using GPS records. As there is no 100% accuracy, provide the Army's estimate as to the accuracy of the samples. **Response:** The GridStat/SiteStat sampling performed at the DRO/Monterey MRA is detailed in the Final GridStats/SiteStats Sampling After Action Report, Inland Range Contract, Former Fort Ord, California, Site OE-43 and OE-15DRO.1 (Fort Ord Administrative Record No. OE-0336). The GridStat/SiteStat sampling performed at the Laguna Seca MRA is described in the Final SS/GS and 100% Grid Sampling, After Action Report, Inland Range Contract, Former Fort Ord, California, Site OE-28 (Fort Ord Administrative Record No. OE-0314). Both After-Action reports are available online from the Fort Ord Administrative Record through the Former Fort Ord Environmental Cleanup website at www.fortordcleanup.com. No changes have been incorporated into the report based on this comment.
12	General Comment	**Comment:** Provide sequential maps by date since 1993 of former Fort Ord, divided into sites based on previous uses. The maps should show the identification numbers in use at the time of the map. Please highlight any areas that have been subsumed. **Response:** Historical maps of the former Fort Ord are included in the 1993 ASR (USACE 1993; Fort Ord Administrative Record No. OE-0005A), 1994 ASR (Supplement 1) (USACE 1994; Fort Ord Administrative Record No. OE-0010), and 1997 ASR (USACE 1997a; Fort Ord Administrative Record No. OE-0022). The most recent map available is the Map of Backcountry Roads dated September, 1992 (Army 1992). No new maps showing previous uses have been produced since the former Fort Ord was closed in September of 1994. No changes have been incorporated into the report based on this comment.

Response to Comments
Draft Group 3 Remedial Investigation / Feasibility Study, dated April 8, 2010
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No.	Comment Type / Report Section	Comment/Response
13	Specific Comment, Vol. 2, Section 1.1.2 Early Transfer Property and Environmental Services Cooperative Agreement, Page 1-4	**Comment:** In Volume 2, page 1-4, it states, "The ESCA and the AOC identify the Army retained conditions for which the Army assumes responsibility. If these conditions are encountered, FOR A is required to notify the Army of their presence in accordance with the guidelines set forth in the ESCA and the Army assumes responsibility. Included in the Army-retained conditions are: * Radiological material * Chemical or biological warfare agents * Natural resource injuries or damages occurring as a result of contamination releases that have occurred due to Army ownership or activities except to the extent such injuries are a direct result of FOR A's activities. * Unknown uninsured conditions, which include the management and cleanup of non-MEC-related hazardous and toxic wastes above insurance parameters * Perchlorate contamination in soil or groundwater Please provide descriptions of all the various materials, agents, and non-MEC related Hazardous and toxic wastes in the Draft Final Risk Assessment. **Response:** The scope of the Group 3 RI/FS is limited to MEC Explosive Hazard. Investigation of potential contamination issues other than the explosives hazards associated with MEC at the former Fort Ord will continue to be conducted by the Army. No changes have been incorporated into the report based on this comment.
14	General Comment	**Comment:** Please provide an estimate of when the referenced Army BRA Program (Shaw/MACTEC 2009) report will be available regarding soil contamination from munitions constituents. **Response:** The Final Comprehensive Basewide Range Assessment Report (Shaw/MACTEC 2009) for the former Fort Ord was posted to the Fort Ord Administrative Record (No. BW-2300J) on June 3, 2009. The Administrative Record can be accessed online through the Former Fort Ord Environmental Cleanup website at www.fortordcleanup.com.

Response to Comments
Draft Group 3 Remedial Investigation / Feasibility Study, dated September 17, 2009
Review Comments provided by Mike Weaver of the Fort Ord Community Advisory Group, dated June 10, 2010

No.	Comment Type / Report Section	Comment/Response
		No changes have been incorporated into the report based on this comment.
15	Specific Comment, Vol. 2, Section 1.1.3 FORA ESCA Remediation Program, Page 1-5	**Comment:** Page 1-5 of volume 2 tells us that nine Multi Range Areas (MRA) were consolidated into four groups, according to similar pathway-to-closure characteristics. a) Please identify and describe these characteristics. b) Please identify who determined these characteristics **Response:** a) The rationale and proposed pathway to closure for each MRA Grouping is presented in detail in Section 13.0, Program Implementation, of the Summary of Existing Data Report (SEDR; Administrative Record No. ESCA-0130). b) The ESCA RP Team evaluated the pathway-to-closure for each MRA based on the information available. The MRAs requiring similar steps to closure were grouped together. No changes have been incorporated into the report based on this comment.
16	Specific Comment, Vol. 2, Section 1.2 Fort Ord MEC Risk Assessment Protocol, Page 1-6	**Comment:** Page 1-6 Fort Ord Risk Assessment Protocol tells us that, " The Protocol does not calculate the probability of adverse consequences, but instead assumes that encounters with MEC items will result in adverse consequences and, therefore, describes and estimates the MEC risk recognizing that basic assumption." The FOCAG asks, a) Given the paucity of training maps and aerial photographs, especially from key years of war training b) Given the sample of a sample approach to much of the clean up for unexploded ordnance c) Given the layers upon layers of training ranges, and the different types of training d) Given the list of materials, agents, and toxic wastes the Army is still responsible for How can you come up with "RISK" scores in this Draft? **Response:** As stated in Volume 2, Section 1.2 Fort Ord MEC Risk Assessment Protocol, the Group 3 Risk Assessment complies with the Fort Ord MEC Risk Assessment Protocol (Malcolm Pirnie 2002) prepared through a combined effort of the Army, the EPA, and the DTSC. The purpose of the Protocol is to allow for comparative review of MEC risks at sites where MEC was

Response to Comments
Draft Group 3 Remedial Investigation / Feasibility Study, dated April 8, 2010
Review Comments provided by Mike Weaver of the Fort Ord Community Advisory Group, dated June 10, 2010

No.	Comment Type / Report Section	Comment/Response
		encountered at the former Fort Ord. The Protocol is not designed to assess absolute risk, but is rather an approach for understanding risks and comparing the relative risk between remedial alternatives on a site where MEC was encountered at the former Fort Ord. No changes have been incorporated into the report based on this comment.

SC
LB

DEPARTMENT OF THE ARMY
FORT ORD OFFICE, ARMY BASE REALIGNMENT AND CLOSURE
P.O. BOX 5008, BUILDING #4463 GIGLING ROAD
MONTEREY, CALIFORNIA 93944-5008

April 28, 2010

REPLY TO
ATTENTION OF:
Fort Ord BRAC Office

Mr. Stan Cook
Program Manager
Environmental Services Cooperative Agreement
Fort Ord Reuse Authority
100 12th Street, Building 2880
Marina, CA 93933

Dear Mr. Cook:

Pursuant to section 2.1.12 of the Technical Specifications and Requirements Statement of the Fort Ord Environmental Services Cooperative Agreement (ESCA), this letter serves to document an agreement between the Fort Ord Reuse Authority (FORA) and the Fort Ord BRAC Office (Army) regarding the schedule for the Army to complete its review of the *Draft Group 3 Remedial Investigation/Feasibility Study Report* issued for Army review on April 9, 2010 with comments due on April 30, 2010. The ESCA requires that the Army complete its review of documents within 21 days. Some sections of the report require additional research on the Army's part before review can be completed. Extending the Army's review will have no effect on the overall schedule for completing the review/comment process for the report. Therefore, FORA and the Army have agreed to extend the Army's comment period by one week, ending on May 7, 2010.

Thank you for your help in this matter, and for your continued work in moving forward with the complex cleanup projects included in the ESCA. As always, we look forward to working together making progress to complete this valuable program.

Sincerely,

G Youngblood

Gail Youngblood
Fort Ord BRAC Environmental Coordinator

5

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

June 7, 2010

Mr. Stan Cook
Fort Ord Reuse Authority
100 12th Street, Building 2880
Marina, CA 93933

Re: EPA Comments on the *Draft Group 3 Remedial Investigation / Feasibility Study, Del Rey Oaks/Monterey, Laguna Seca Parking, and Military Operations in Urban Terrain Site Munitions Response Areas, Former Fort Ord, Monterey County, California* Dated April 8, 2010

Dear Stan:

Attached are EPA's comments on the *Draft Group 3 Remedial Investigation / Feasibility Study, Del Rey Oaks/Monterey, Laguna Seca Parking, and Military Operations in Urban Terrain Site Munitions Response Areas, Former Fort Ord, Monterey County, California,* dated April 8, 2010.

If you have any questions, please do not hesitate to call me at (415) 972-3681 or e-mail me at huang.judy@epa.gov.

Sincerely,

Judy C. Huang, P.E.
Remedial Project Manager

cc:

Roman Racca (DTSC)
Site Mitigation/Office of Military Facilities
8800 Cal Center Drive
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Kristie Reimer, AICP
Principal Planner
BRAC / Federal Programs
LFR Inc.
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Emeryville, CA 94608

Ms. Gail Youngblood
Fort Ord Base Realignment and Closure Office
P.O. Box 5008
Monterey, CA 93944-5004

Mr. Thomas Hall (via E-mail)

REVIEW OF THE
FORT ORD REUSE AUTHORITY (FORA)
DRAFT GROUP 3
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DEL REY OAKS/MONTEREY, LAGUNA SECA PARKING
AND
MILITARY OPERATIONS IN URBAN TERRAIN SITE
MUNITIONS RESPONSE AREAS

FORMER FORT ORD, CALIFORNIA
APRIL 8, 2010

GENERAL COMMENTS

1. The report identified Land Use Controls as the preferred remedial alternative for both the Del Rey Oaks/Monterey and the Laguna Seca Parking Munitions Response areas based on previous investigations and removal activities occurred at these two munitions response areas. However, portions of these two munitions response areas had either not been investigated or only had surface/near surface clearance. Therefore these areas may still have MEC both on the surface and in the subsurface and warrant access controls above and beyond what is proposed for the rest of the Del Rey Oaks/Monterey and Laguna Seca Parking Munitions Response areas. Please provide additional access controls for these areas.

Volume 1 - Remedial Investigation

2. The Fort Ord Reuse Authority (FORA) Draft Group 3 Remedial Investigation/Feasibility Study, Del Rey Oaks/Monterey, Laguna Seca Parking, and Military Operations in Urban Terrain Site Munitions Response Areas (MRAs), Former Fort Ord, Monterey, California, dated April 8, 2010 (hereinafter referred to as the Draft Group 3 RI/FS), contains a number of questionable entries concerning munitions and explosives of concern (MEC) employed on the MRAs. Examples of these entries include:

   - There is no statement as to whether the use dates presented for a particular munitions item are the dates when the item was used by the military worldwide, the dates the item was used at the former Fort Ord, or the dates the item was employed at the specific location under discussion.

   - The dates specified for the use of a particular munition are not consistent. For example, Volume 1:Remedial Investigation, Section 5.1.3.2 (1940-90s Training) states in the "60mm and 81mm Mortar Training" subsection, that, "The M68 was used between 1942 and 1957 and the M43 HE was used in the 1960s." However, Section 5.5.3, Mortars, states in the 81mm subsection that, "The following 81mm mortars were found within the Laguna Seca area:
     - M43 series HE mortars (22 MEC in MRS-47)
     - M43 series practice mortars (1 MEC in MRS-47)
     - M68 training mortars (3 MD in MRS-14A)

The 81mm mortars found in this area were available for use beginning in the mid-1940s."

These statements may be correct if they only refer to the dates of use for these cartridges on this specific site. However, if this is intended to reflect the universal military use period for these items, or the use period at the former Fort Ord, they are in conflict. This is further complicated by the statements in Army Field Manual (FM) 23-90, "81-MM Mortar," dated February 1972, where these 81mm cartridges are listed as authorized for use at the date of publication of the FM.

- The Draft Group 3 RI/FS refers to the 4.2-inch mortar as a "Stokes" mortar. This is technically incorrect and may result in some confusion as to precisely what weapon and associated munitions is intended. While it is true that the 4.2-inch mortar was developed using the design data from the 4-inch Stokes mortar of World War I, the original nomenclature assigned to the first 4.2-inch mortar employed by the U.S. Army in 1928 was "4.2-inch Chemical Mortar." The term "Stokes" should not be associated with the 4.2-inch mortar to avoid confusion with the 4-inch Stokes Mortar and its related munitions.

Please review the cited date of use time period and item nomenclature issues and correct them as necessary.

3. The use of the term "round" in the Draft Group 3 RI/FS appears to include both fired munitions that were fired into or on the site (incorrect usage) as well as complete cartridges that have not been fired (correct usage). An example of this incorrect usage may be found in Section 6.1.2.2 on page 6-7 of Volume 1.

The following definitions referring to the term "round" are found in Army Regulation (AR) 310-25, Dictionary of United States Army Terms:

"Round
See round of ammunition.

Round of ammunition
A round of ammunition comprises all the components necessary to fire the weapon once. In general, these components are primer, propellant, container or holder for propellant (cartridge case or bag), and projectile–with fuze and booster if necessary– for the proper functioning of the projectile."

While AR 310-25 has been superseded, the superseding document contains no definitions, and it is reasonable to assume that this long-standing definition has not changed in the last six years. The Navy currently defines "complete round of ammunition" in the same manner as AR 310-25 identified a "round of ammunition."

The incorrect use of the term "round" may cause the reader to mistakenly believe that a fuze, propellant increments, and an ignition cartridge (or cartridge case with primer and propellant) were all present in the items described, which is very likely not the case. An

artillery, small arms, rocket, or mortar projectile that has been fired, or one which has been separated from its cartridge case/propellant for demilitarization, should not be referred to as a "round."

Please review the use of the term "round" throughout the Draft RI/FS and replace it with the term "projectile" or other appropriate terms as necessary to better express the identity of the munitions items described. (Note: This request should not be interpreted as a request to correct the cited usage in historical documents attached to the Draft RI/FS or used as references therein.)

Volume 2 – Risk Assessment

4. The Risk Assessment (RA) (Volume 2 of the Draft RI/FS) assigns an Overall MEC Risk of "A" (Lowest Risk) to the entire DRO/Monterey MRA. This is somewhat questionable, in that two sections of the site (see Section 4.2.5 of Volume 1) have not undergone an investigation or a removal action. The "A" designation is acceptable for the major portion of the MRA. However, it is questionable that these two uninvestigated sections have a low likelihood of any MEC presence. This is because the determination is not founded on definitive data, but is based on an assumption that the characterization of the adjacent areas applies to these areas. It would therefore appear that an appropriate investigation of these two areas should be conducted prior to the acceptance of their designation as lowest risk areas, or that the risk for these areas should be revised to reflect the uncertain level of MEC contamination.

   A similar issue exists for the six uninvestigated grids in the Laguna Seca Parking Area (see Section 5.2.4 of Volume 1). At a minimum, these grids should be assigned the same or higher risk levels assigned to the 1-foot removal action sector due to the potential for contact with undetected surface and subsurface MEC.

   Please revise the RA and any other appropriate portions of the Draft RI/FS to address these concerns.

Volume 3 – Feasibility Study

5. The Feasibility Study (FS) (Volume 3 of the Draft RI/FS) uses the term "UXO-qualified personnel" a significant number of times without defining the term. Please revise the Volume 3 Glossary to include a definition of the term "UXO-qualified personnel."

SPECIFIC COMMENTS

Volume 1 – Remedial Investigation

1. **Glossary, Pages xii through xiv:** The Glossary contains a number of munitions related definitions that do not match those found in the Department of Defense Ammunition and Explosives Safety Standards (DoD 6055.09-STD). The variant definitions include:

- Explosive
- Material Potentially Presenting an Explosive Hazard (MPPEH)
- Minimum Separation Distance (MSD)

Please review the definitions of the cited terms and correct them as necessary. In addition, please add the definition of the term "UXO-Qualified Personnel" to the Glossary. It is used in the definition of "Construction Support" in the Glossary without being defined there or elsewhere in Volume 1.

2. **Section 4.1.4, Historical Land Use Summary, Page 4-6:** This section states that, "In addition, the Army's contractor conducting activities in support of ordnance and explosives inspection at MRS-43 found evidence of military training related to 37mm projectiles. Based on the review of historical aerial photographs and training facility maps, there was no evidence that portions of MRS-43 and the DRO/Monterey MRA were used as an artillery range." These statements require further explanation.

   The version of TM 9-1300-200, Ammunition General, that was current at the time of the closing of the former Fort Ord defines Artillery Ammunition as: "Artillery ammunition is designed for use in guns, howitzers, mortars and recoilless rifles ranging from 37 millimeters through 280 millimeters." Based upon this definition and the statements that the Army contractor found "…evidence of military training related to 37mm projectiles" and the statement that "there was no evidence that portions of MRS-43 and the DRO/Monterey MRA were used as an artillery range," an expanded explanation of what the noted "military training related to 37mm projectiles" actually involved. Please revise the cited section to include a discussion of the type of training involving "37mm projectiles" that was conducted at the noted location.

3. **Section 4.4.2.3, Investigation and Removal Action Design, Page 4-18:** The last sentence in the last paragraph of this section indicates that, "Based on the statements in the USA report, all anomalies detected within the DRO/Monterey MRA were investigated and all military munitions removed." This statement may give the impression that all military munitions were removed from the DRO/Monterey MRA, which may not be the actual situation. A better description of what was accomplished by the investigations noted would be that all <u>detected</u> military munitions were removed, as it is later stated in the Draft RI/FS that some residual MEC may still be present in the MRA. Please revise the cited section to restructure the definitive statement that "…all military munitions were removed…"

4. **Section 4.5.5, Projectiles, Page 4-21:** The last paragraph in this section states that, "The M1916 gun, with an M5 Subcaliber mount for the 37mm munitions was used for training in the firing of the 75mm Howitzer M1A1. The M1916 gun and its recoil mechanism were fastened to the 37mm Subcaliber Mount, M5, and used for training in the handling and firing of the 75mm Howitzer M1A1." These two sentences are redundant and seem to indicate that the M5 Subcaliber mount was used to mount the 37mm munitions to the 75mm Howitzer. Please revise the cited sentences to eliminate the redundancy and to

ensure that it is clear that the 37mm gun, and not the 37mm munitions, is mounted to the 75mm Howitzer.

5. **Section 5.1.1.3, 1950s Era, Page 5-2:** The first bullet in this section indicates that, "Hash marks on the map indicated that MRS-14A and MRS-29 were assigned to the Artillery Division and MRS-30 and MRS-47 were assigned to the 2nd Infantry." The use of the term "Artillery Division" is somewhat confusing, as no such unit existed in the U.S. Army at the time under discussion. However, each Army Division had an organization of regimental size referred to as "Division Artillery," and this term is used in the following (second) bullet in this section. Please review the use of the term "Artillery Division" and correct it as necessary.

6. **Section 5.1.2.3, 1997 Revised Archives Search Report, Page 5-6:** The fourth paragraph in this section states that, "Site OE 30, Laguna Seca Turn 11 (now MRS-30), is located at the southwest end of MRS-14A. The ASR states that this area is 5.9 acres in size and has undergone a 4-ft removal action by the Army's contractor UXB. The Revised ASR recommended that removal actions be completed." This is somewhat confusing.

   If the noted 4-foot removal was conducted, but not completed, please so state. If it was completed, please expand the section to explain the purpose of the sentence that reads, "The Revised ASR recommended that removal actions be completed."

7. **Section 5.1.3.1, Pre-World War II Training, Page 5-7:** The first paragraph in this section indicates that, "MRS-29 appears to be located outside of the installation." Please expand this paragraph to clarify the intent of this statement (i.e., Does this indicate that MRS-29 was outside of the installation boundary prior to World War II, that it is unsure as to whether it was inside or outside of the boundary during this period, or that it has always been outside the installation boundary?).

8. **Section 5.2.2.2, Evaluation of Instrument Detection Efficiency at Laguna Seca Parking MRA, Page 5-18:** The third bullet of the second paragraph on this page states that, "Unlike surveys with digital instruments, where positioning data are also obtained, there is no way to check or document the actual coverage of a Schonstedt survey." This appears to be an absolute statement that is not totally correct. Please review the noted statement and revise it to better express the type of information gathered from an analog survey and to eliminate the inference that it cannot be effectively documented as to the area covered.

9. **Section 5.4.2.2, Removal Action Site Boundaries, Page 5-22:** This section notes that, "The establishment of the Laguna Seca Parking MRA boundary is based upon the property transfer boundary and removal actions were conducted across the entire MRA with the exception of six inaccessible grids on the eastern slope of MRS-14A and a paved ditch along Lookout Ridge Road." However, the paved ditch is not mentioned in the conclusions listed in Section 5.6.1, Laguna Seca Parking MRA Conclusions. Please revise the two cited sections to make the listed uninvestigated areas consistent.

10. **Section 5.5.1, Basic Maneuvers, Page 5-25:** The third paragraph of the Smoke Rifle Grenades subsection notes that, "The M22 and M22A2 rifle grenades can be used for both signaling and laying of smoke screens. The M23A1 is used only for signaling. The grenades are fired from a rifle equipped with a grenade launcher and function on impact. At impact, a firing pin strikes a primer producing a flame, which ignites a starter mixture charge, which in turn ignites a smoke mixture charge." While the cited information is correct for the M22 series, it is incorrect for the M23 series. The M23 does not have an impact fuze and does not function on impact, as it is a smoke streamer. Instead, when the grenade cartridge is fired to launch the grenade, fire from the cartridge ignites the fuze, which causes the filler to burn and the grenade then emits a stream of smoke along its trajectory. Unlike the M22 series, this grenade does not have a safety pin.

    Please revise the cited paragraph to reflect this information.

11. **Section 5.5.1, Basic Maneuvers, Page 5-27:** The second paragraph of the Hand Grenades subsection notes that, "Grenade fuze models identified include: M228, M218E1, M213, M204 series, and the M205 series (the only fuzes authorized for use with the M30 practice grenade [Army 1969])." The construction of this sentence makes it unclear as to whether all of the listed fuzes are the "…only fuzes authorized for use with the M30 practice grenade…" or if it is intended to state that the M205 series of fuzes are the only ones authorized for use with that grenade. Please revise the noted verbiage to correct this ambiguity.

12. **Appendix A, Plate A3, DRO/Monterey MRA Remedial Investigation Army Historical MEC and MD Pyrotechnics:** This plate lists a TNT charge as a pyrotechnic and lists an item as "Smoke (M1)." The noted TNT charge is a demolition material made up of explosives in a protective container, and it is not a pyrotechnic. The munitions item described as "Smoke (M1)" is difficult to identify without additional nomenclature (e.g., is it a projectile, a grenade, or a smoke pot?). Please correct this.

Volume 3 – Feasibility Study

13. **Glossary, Pages x and xii:** The Glossary contains two munitions-related definitions that do not match those found in the Department of Defense Ammunition and Explosives Safety Standards (DoD 6055.09-STD). The variant definitions are:

    - Explosive

    - Minimum Separation Distance (MSD)

    Please review the definitions of the cited terms and correct them as necessary. In addition, please add the definition of the term "UXO-Qualified Personnel" to the Glossary, as it is used a number of times in Volume 3 without being defined therein.

DEPARTMENT OF THE ARMY
FORT ORD OFFICE, ARMY BASE REALIGNMENT AND CLOSURE
P.O. BOX 5008, BUILDING #4463 GIGLING ROAD
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REPLY TO
ATTENTION OF

MAY 0 6 2010

Fort Ord BRAC Field Office

Stan Cook
ESCA Remediation Program Manager
Fort Ord Reuse Authority
100 12th Street, Building 2880
Marina, CA 93933

Subject: *Draft Group 3 Remedial Investigation/Feasibility Study, Del Rey Oaks/ Monterey, Laguna Seca Parking, and Military Operations in Urban Terrain (MOUT) Site Munitions Response Areas (MRAs)*, dated April 8, 2010.

Dear Mr. Cook:

Thank you for an opportunity to review and comment on the subject document. The Army's comments are enclosed. Please note our comments are focused on "big picture" issues such as the consistency with documents previously produced under the Army's cleanup program. A copy of this letter will be furnished to U.S. Environmental Protection Agency (Judy Huang) and California Department of Toxic Substances Control (Roman Racca).

If you have any questions, please contact me. Thank you.

Sincerely,

Gail Youngblood
BRAC Environmental Coordinator

Enclosure

DRAFT Group 3 Remedial Investigation/Feasibility Study (RI/FS), Del Rey Oaks/ Monterey, Laguna Seca Parking, and Military Operations in Urban Terrain (MOUT) Site Munitions Response Areas (MRAs)

Dated April 8, 2010

Army Comments:

Volume 1: Remedial Investigation (RI)

1. p.2-4, Section 2.5.8 Land Use (DRO/Monterey MRA) and Volume 2 Risk Assessment, Section 3.6, Description of Reuse Areas (DRO/Monterey MRA Reuse Areas and Future Land Use Receptors). The information provided in these sections is not incorrect, but it appears slightly different from the reuse category designations in the 1997 Fort Ord Base Reuse Plan (as updated). The Base Reuse Plan designations for the areas included in the DRO/Monterey MRA are "habitat management" and "business park/light industrial and office/R&D." Under CERCLA, the goal of the Army's environmental cleanup program is to support the designated reuse of the former Fort Ord, which is documented in the Base Reuse Plan, and the scope of the ESCA includes environmental services that support the Base Reuse Plan. Please update these sections. The Current land use restrictions should also be noted. Same comment applies to discussions of the Laguna Seca Parking and MOUT Site MRAs.

2. p.6-14, Section 6.2.2 Equipment Evaluation (MOUT Site MRA). This section provides a general discussion of Schonstedt magnetometers used during the previous munitions and explosives of concern (MEC) investigations at the MOUT Site MRA. Please also provide information about the evaluation of detection efficiency of the instrument.

3. Tables 4-1, 5-1 and 6-1. These tables list the MEC and munitions debris (MD) items found during previous MEC investigations at the MRAs. These tables show columns titled "Original OE Nomenclature." It should be noted that the MEC data in the Army's MMRP database has been reviewed through a 100 percent check of all available grid records to identify discrepancies between the after-action reports and the grid records, if any. Discrepancies were researched and appropriate corrections were made in the MMRP database. Ten percent of the data was further reviewed including a comparison of the data set with the data set reported in the contractor's after-action reports. Therefore, the tables should report the current nomenclature associated with the MEC items, or include a footnote clarifying that the listed items may be described differently in the Army's MMRP database and elsewhere in the document.

Volume 2: Risk Assessment

4. p.4-3, Section 4.3 MEC Density Input (Laguna Seca Parking MRA Risk Assessment). Second paragraph. According to the text, the density of potentially-remaining MEC in the subsurface of MRS-14A (area intended for habitat use) was estimated based on the density of MEC removed from the 1-foot removal action. While this is one way to choose the MEC density input factor in the risk assessment, it would be helpful if a brief discussion of the rationale for using this method (using the density of removed items in the top 1-foot layer as the density of remaining MEC in the subsurface at any depth) is provided.

5. p.4-3, Section 4.5 Migration/Erosion Potential Input (Laguna Seca Parking MRA Risk Assessment). In this section, the score of 3 indicating significant migration/erosion potential is

selected for the portions of the MRA other than MRS-30 because of the steep terrain. Significant erosion potential is generally associated with roads and previously disturbed surfaces, and based on many years of experience, steep slopes with vegetation cover, such as the case in the Laguna Seca Parking MRA, do not exhibit significant erosion problems. Therefore the scoring of 3 for the migration/erosion potential for the majority of the MRA is overly conservative.

6. p.5-2, Section 5.3 MEC Density Input (MOUT Site MRA Risk Assessment). According to the text, the density of potentially-remaining MEC in the MOUT Site MRA was estimated based on the number of MEC items recovered from the site to-date, and dividing the number by the acreage of the site. While this is one way to choose the MEC density input factor in the risk assessment, it would be helpful if a brief discussion of the rationale for using this method (using the density of items from various investigations as the density of remaining MEC in the site at any depth) is provided. MEC was recovered from various investigation actions including surface removal in the majority of the sites and subsurface investigation in limited portions of the sites; therefore simply averaging these items over the entire site seems overly simplistic. In addition, because the MEC depth input if 8 (any MEC on the surface) is used in the risk assessment, the scenario being assessed is closer to the condition of the sites before any of the MEC investigations occurred. Please re-examine each of these input factors.

7. p.5-2, Section 5.4 MEC Depth Input (MOUT Site MRA Risk Assessment). Here, MEC depth input if 8 (any MEC on the surface) is used in the risk assessment because surface MEC removal was not conducted in a small portion of the MOUT site. Because surface MEC removal was conducted in the majority of the site, and due to regular uses of the properties, the use of the small portion of no surface removal to represent the MEC depth of the entire properties seems overly conservative. In addition, the 600 ft section east of Barloy Canyon Road is described as not likely to have MEC. Please reexamine the input factor scoring.

8. Appendix B, MEC Items Found by MRA. These tables show columns titled "Original OE Nomenclature" and "MEC Nomenclature" for the MEC items previously recovered from the MRAs. The tables are noted "2) Munitions descriptions have been taken directly from the Army's MMRP Database and/or other historical documents. Any errors in terminology, filler type, and/or discrepancies between model number and caliber/size are a result of misinformation from the data source." It should be noted that the MEC data in the Army's MMRP database has been reviewed through a 100 percent check of all available grid records to identify discrepancies between the after-action reports and the grid records, if any. Discrepancies were researched and appropriate corrections were made in the MMRP database. Ten percent of the data was further reviewed including a comparison of the data set with the data set reported in the contractor's after-action reports. Therefore, the risk assessment should utilize the corrected nomenclature for the listed MEC items. Please delete the "original nomenclature" column or describe the rationale for inclusion in the tables.

Volume 3: Feasibility Study (FS)

9. p.3-6, Section 3.1.5 Residential Quality Assurance (RQA) (Development of General Response Actions and Associated Process Options). The RQA process or the pilot study is not described prior to this section. Please provide a brief description of the RQA process to assist the reader in understanding the response options that were evaluated in the FS, including the response option screening discussion in Section 3.2.2.10.

10. p.3-11, Section 3.2.2.3 Deed and/or Zoning Restrictions (Screening of General Response Actions and Process Options). The "Overall Evaluation" paragraph notes that deed/zoning restrictions

were not retained for further analysis because they were already in place. The existing deed restrictions were put in place based on information available at the time of the early transfer of the property; they can and should be modified if shown to be appropriate through a detailed evaluation in an RI/FS and documented in an appropriate decision document. In fact, continuing to require the land use controls was evaluated as part of the remedial alternatives. Please delete the sentence to avoid confusion.

11. p.5-2, Section 5.1 Evaluation of Remedial Alternatives for DRO/Monterey MRA. For Alternative 3, Additional MEC Remediation, the vegetation clearance method should be clarified. In Section 3.1.4.1, under Description of General Response Actions and Associated Process Options, the text reads "...the type and extent of the vegetation removal will be evaluated as part of the remedial alternatives development for each of the Group 3 MRAs." In Section 4.3, under Development of Remedial Alternatives, it is stated "...the details of the vegetation clearance methods...would be presented in the RD/RA WP, or similar document." Under Evaluation of Remedial Alternatives, Section 5.1.6 Implementability, vegetation clearance is associated with high level of effort to implement; and in Section 5.1.9 Community Acceptance, the text cites the disturbance to the vegetation as potentially objectionable to the community. Finally, in Table 5-6 vegetation burning in 6 acres is included in the cost estimate. If burning of just 6 acres of the MRA is part of the remedial alternative, a conceptual discussion of how it would be conducted should be described in one or more of these sections of the FS in order for the alternative to be fully evaluated. Same comment applies to the evaluation of Alternative 3 for the Laguna Seca Parking MRA and the MOUT Site MRA.

12. p.5-18, Section 5.3.2 Compliance with ARARs (Evaluation of Remedial Alternatives for MOUT Site MRA). Fourth paragraph (Alternative 4). The last sentence suggests that excavation and sifting would be employed to conduct subsurface MEC removal in the selected area (2.3 acres along Barloy Canyon Road). Please reexamine the statement. If excavation and sifting in 2.3 acres of the MRA is part of the remedial alternative, the rationale for such an action and description of the method should be provided in the FS in order for the alternative to be fully evaluated. In Volume 2 Risk Assessment, Section 5.4, the 600 ft section east of Barloy Canyon Road was described as not likely to have MEC.

13. p.7-1, Section 7.0 Approval Process. Third bullet, please replace "public review period" with "public comment period." Fourth bullet, please modify to read "Provide an opportunity for a public meeting on the Proposed Plan where written and verbal comments can be submitted by the public." Fifth bullet, second line, please delete "any" to read "...that summarizes public comments received...."

14. Table 5-4, DRO/Monterey MRA Long-Term Management Costs. The table includes footnote [2] indicating that annual monitoring costs are the responsibility of Fort Ord Reuse Authority (FORA) until the land is transferred to the (next) recipient of the property. Please explain why this FORA responsibility is assumed to end at the time of property transfer, and who would then take the responsibility for annual monitoring costs. Same comment applies to Table 5-8 (Laguna Seca Parking MRA) and Table 5-11 (MOUT Site MRA). It should be noted also that transfer of any of the procedural responsibilities to another party would require the approval of the regulatory agencies.

15. Table 5-6, DRO/Monterey MRA Alternative 3 – Additional MEC Remediation Costs. The table includes footnote [3] indicating that post-remediation habitat management costs are FORA costs until the land is transferred to the (next) recipient of the property. Please explain why this FORA responsibility is assumed to end at the time of property transfer, and who would then take the

responsibility for post-remediation habitat management costs. Same comment applies to tables associated with Alternatives 3 and 4 of each of the three MRAs.

Detail/minor comments:

Volume 1: Remedial Investigation (RI)

1. p.2-4, Section 2.5.6 Special Status Biological Resources (DRO/Monterey MRA). The third paragraph describes that the California tiger salamander (CTS) may be found in the DRO/Monterey MRA since the MRA is within 500 meters of aquatic features that may provide breeding habitat for the CTS. Please revise the distance from 500 meter to 2 kilometers, as CTS may be present within 2 kilometers of aquatic features. Please make similar updates throughout the document.

2. p.2-7, Section 2.6.8 Land Use (Laguna Seca Parking MRA). The second paragraph references the Base Reuse Plan and indicates that the area is predominantly planned for development reuse. However, in Volume 2 Risk Assessment and Volume 3 FS, the anticipated future land use is described to be less intensive in terms of development, such as "the Reuse Plan emphasizes the principles of minimal development and ecological restoration of these lands" (Volume 3 FS Section 2.3.3.2). It may be helpful to the reader if the description of the land use in Volume 1 RI, Section 2.6.8, included additional text particularly referencing the reuse category under the Habitat Management Plan.

3. p.2-9, Section 2.7.6 Special-Status Biological Resources (MOUT Site MRA). Please add that a portion of the MRA is designated a critical habitat for Monterey spineflower.

4. p.4-7, Section 4.2 Previous MEC Investigations and Removal Actions (DRO/Monterey MRA Remedial Investigation). Fourth bullet, "Removal action in MRS-43 by USA in 2000 using digital geophysical instruments." This work was described in Section 4.2.1.4 as "post-removal action geophysical investigation by USA using Digital Instruments." The latter description appropriately describes the digital geophysical investigation that was conducted to support the early transfer of the Del Rey Oaks property. Please revise the text in the bullet so as to avoid potential confusion regarding the nature of the work conducted. Same comment applies to Volume 2 Risk Assessment, Section 3.1.

5. p.4-18, Section 4.4.2.4 Sampling and Removal Methods (Data Analysis, DRO/Monterey MRA). The second and third paragraphs suggest that all of the MEC and MD found in MRS-43 were found with the Schonstedt Model GA-52Cx. However, the after-action report for the work in the Del Rey Oaks Group (OE-0293A) indicates one MEC and several MD items were recovered during digital geophysical investigations. Please review the statements and modify where appropriate.

6. p.5-18, Section 5.2.2.3 Previous MEC Investigations and Removal Actions (Laguna Seca Parking MRA). MRS-47. Please note that a prescribed burn was conducted in August 1995 to clear vegetation in support of munitions investigations at MRS-47.

7. p.5-15, Section 5.2.1.5 MRS-47 USA (formerly CMS) 100% Grid Sampling (Previous MEC Investigations and Removal Actions, Laguna Seca Parking MRA). Please revise the section title

as the information presented here describe the 4-ft MEC removal (not sampling) conducted by USA Environmental.

8. p.5-21, Section 5.2.4 Completeness of Existing Records and Data Gaps (Previous MEC Investigations and Removal Actions, Laguna Seca Parking MRA). The second paragraph notes that two grid sheets, reporting the finding of 176 electric blasting caps in MRS-47 (Grid 21S) and a MEC item (81mm mortar) in Grid 18H (MRS-47), are missing from the records. These items are listed in the MMRP database and are documented in a report of the sampling effort by CMS Environmental. This document has been located and will be entered into the Administrative Record.

9. p.5-23, Section 5.4.2.3 Investigation and Removal Action Design (Removal Action Review Evaluation Summary, Laguna Seca Parking MRA). Please modify the last sentence to "...all anomalies detected within the Laguna Seca Parking MRA were investigated and all military munitions encountered during MEC removal were removed."

10. p.6-9, Section 6.1.3.4 1960s and 1970s Training (Review of Historical Military Training Practices, MOUT Site MRA). The second bullet identifies possible use of claymore mines associated with training at Range 35A. Please clarify whether the sentence is suggesting the possible use of practice mines only.

11. p.6-13, Section 6.2.1.3 TCRA (Visual Surface) and Military Munitions Reconnaissance (Previous MEC Investigations and Removal Actions, MOUT Site MRA). Please modify the first sentence to convey that the purpose of the time critical removal action in the Eucalyptus Fire Area was to remove surface MEC (to address explosives safety risk). Surface MD was also removed during the course of the work.

12. p.6-13, Section 6.2.1.3 TCRA (Visual Surface) and Military Munitions Reconnaissance (Previous MEC Investigations and Removal Actions, MOUT Site MRA). Second paragraph contains two sentences that describe MEC items found during the Eucalyptus Fire TCRA. Please review the information and consolidate or clarify.

13. p.6-13, Section 6.2.1.4 Grid Sampling in MRS-14D (east of Barloy Canyon Road) using Schonstedt Magnetometers (Previous MEC Investigations and Removal Actions, MOUT Site MRA). The second paragraph describes a previously conducted removal action as "100% removal over the entire Site OE-14D." The use of "100%" to describe MEC removal actions has been noted as confusing to some people. Please use alternative wording if possible.

Volume 2: Risk Assessment

14. p.3-9, Section 3.8.6 Overall MEC Risk Score Uncertainties (DRO/Monterey MRA Uncertainty). The second sentence ends with "...because documentation supports 100% removal of MEC at the DRO/Monterey MRA." The use of phrase "100% removal of MEC" can be misinterpreted as overstatement since complete (100%) removal is generally considered to be not readily attainable with the investigation methods employed at the DRO/Monterey MRA. Please revise. Same comment applies to Section 4.8.6.

15. p.4-2, Section 4.3 MEC Density Input (Laguna Seca Parking MRA Risk Assessment). First paragraph. The second to the last sentence suggests that MEC removal was conducted to the depth of intrusion. The depth of intrusion for future construction workers (one of the receptors evaluated in the risk assessment) is up to 60 inches, therefore the sentence could be interpreted as

if the MEC removal depth was up to 60 inches, which is more than the stated 4-foot depth. Please review the statement and revise as necessary to reduce the chance of confusion. In addition, the next sentence suggests that digital geophysical instruments were used during MEC investigations in the Laguna Seca Parking MRA, but it was not previously mentioned. Please review the statement and revise if necessary.

16. p.4-7, Section 4.8.1 Depth Below Ground Surface Uncertainties (Laguna Seca Parking MRA Uncertainty). For completeness, please discuss uncertainties associated with the score of 1 for the 4-ft removal sections of the Laguna Seca Parking MRA.

17. p.4-9, Section 4.8.5 Intensity of Contact with Soil Uncertainties (Laguna Seca Parking MRA Uncertainty). The second paragraph contains a discussion of uncertainty associated with the frequency of entry input factor. Please revise/update.

18. p.4-10, Section 4.9 Laguna Seca Parking MRA Conclusions. The second paragraph discusses the risks to receptors in the DRO/Monterey MRA. Please revise/update.

Volume 3: Feasibility Study (FS)

19. p.1-3, Section 1.2.1 Cleanup Program Under the Army. Last paragraph describes the status of the Army's consultation with U.S. Fish & Wildlife Service (USFWS) under the Endangered Species Act (ESA). Please modify the last sentence for clarification as follows: "...but require mitigation measures to be implemented before, during and after the MEC cleanup activities...."

20. p.2-11, Section 2.3.3.2 Laguna Seca Parking MRA (Summary of Remedial Investigation Results). First sentence describes the MRA as being located in the southeastern portion of the former Fort Ord. However in Volume 1 RI, Section 2.6.1, the location was described as south-central portion of the former Fort Ord. Please check the information and modify text where appropriate.

21. p.3-14, Section 3.2.2.8 Technology-Aided Visual Surface MEC Removal (Screening of General Response Actions and Process Options). The "Implementability" paragraph discusses that: "Because the DRO/Monterey MRA contains habitat reserve areas and the Laguna Seca Parking MRA contains restrictions on the development, the HMP and associated BOs would currently limit the amount of temporary habitat destruction to 75 acres within these areas" and goes on to describe the habitat monitoring and possible corrective action requirements for such disturbed areas. Under the HMP, areas that contain significant amounts of MEC and/or metallic debris that preclude the use of typical methods of removal, that require large-scale excavations to remove the MEC present in the subsurface, within the habitat reserve, would be subject to the intense habitat monitoring and corrective action requirements. This is not relevant to the technique of technology-aided surface MEC removal, therefore the discussion should be deleted.

22. p.3-15, Section 3.2.2.9 Subsurface MEC Removal (Screening of General Response Actions and Process Options). The "Implementability" paragraph discusses that: "Because the DRO/Monterey MRA contains habitat reserve areas and the Laguna Seca Parking MRA contains restrictions on the development, the HMP and associated BOs would currently limit the amount of temporary habitat destruction to 75 acres within these areas" and goes on to describe the habitat monitoring and possible corrective action requirements for such disturbed areas. Under the HMP, areas that contain significant amounts of MEC and/or metallic debris that preclude the use of typical methods of removal, that require large-scale excavations to remove the MEC present in the subsurface, within the habitat reserve, would be subject to the intense habitat monitoring and corrective action requirements. However, based on the previous investigations conducted in these

areas as described in the RI, such high concentration of MEC or debris is not expected in the three MRAs addressed in the Group 3 RI/FS. Therefore large-scale excavation should not be considered further as part of any of the remedial alternatives and should be so noted at the end of this section.

23. p.4-2, Section 4.4 Alternative 4 – Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls (Development of Remedial Alternatives). The third paragraph describes the alternative for the MOUT Site MRA. The subsurface removal area is described here as 2.3 acres, but in the cost estimate in Table 5-14, the subsurface removal area is 5 acres. Please check the information and update as necessary.

24. p.5-3, Section 5.1.1 Overall Protection of Human Health and the Environment (Evaluation of Remedial Alternatives for DRO/Monterey MRA). Third paragraph (Alternative 2). People who would provide construction monitoring are described as "qualified MEC personnel." In order to communicate their qualifications more clearly, please instead use relevant standard terms used by the Department of Defense Explosives Safety Board. Please check elsewhere in the document for similar revisions.

25. p.5-3, Section 5.1.1 Overall Protection of Human Health and the Environment (Evaluation of Remedial Alternatives for DRO/Monterey MRA). Fifth paragraph (Alternative 4). The last sentence notes the impacts to natural resources from intrusive investigation of subsurface anomalies in the 5 acre portion of the DRO/Monterey MRA along South Boundary Road. Such impacts are considered manageable by following the mitigation measures described in the HMP. Please consider deleting this sentence or linking it with the one previous for clarity.

26. p.5-4, Section 5.1.2 Compliance with ARARs (Evaluation of Remedial Alternatives for DRO/Monterey MRA). Second paragraph (Alternative 2). Please delete the word "other" from the second sentence. Current text suggests that the existing CRUPs are considered as an ARAR. Please check elsewhere in the document for similar revisions.

27. p.5-6, Section 5.1.5 Reduction of Toxicity, Mobility, or Volume Through Treatment (Evaluation of Remedial Alternatives for DRO/Monterey MRA). Please insert "potentially" to read "this alternative would not reduce the volume of MEC potentially remaining in the subsurface...." Additionally, please add a sentence noting that MEC removals have already been taken place at the site. Please check elsewhere in the document for similar revisions.

28. p.5-8, Section 5.1.7 Cost (Evaluation of Remedial Alternatives for DRO/Monterey MRA). Seventh paragraph (Alternative 4). The last sentence suggests that additional risk mitigation measures such as LUCs may be required. However, LUCs are part of the alternative being evaluated and costs for implementing LUCs are included in Table 5-7. Please revise of delete the sentence. Same comment applies to Section 5.3.7, evaluation of costs for the MOUT Site MRA.

29. p.5-16, Section 5.3.1 Overall Protection of Human Health and the Environment (Evaluation of Remedial Alternatives for MOUT Site MRA). The first sentence states that MEC removal actions were conducted to depth across the majority of the MOUT Site MRA. However, in Volume 1 RI, Section 6.6.1, it was concluded that a large portion of the MRA has not undergone a subsurface investigation. Please reexamine the sections and modify text as appropriate.

30. p.5-24, Section 5.4.1.1 Overall Protection of Human Health and the Environment (Comparison of Remedial Alternatives for DRO/Monterey MRA). Second paragraph notes that MEC removal-components of Alternatives 3 and 4 may have some impacts to the natural resources due to

excavations (associated with intrusive investigation of individual anomalies). As noted earlier, such impacts are considered manageable by following the mitigation measures described in the HMP. Please reexamine the section and modify text as appropriate. Same comment applies to Section 5.4.3.1, evaluation of overall protection of human health and the environment for the MOUT Site MRA.

31. p.5-25, Section 5.4.1.2 Compliance with ARARs (Comparison of Remedial Alternatives, DRO/Monterey MRA). The second sentence indicates that LUCs would continue to be implemented in accordance with DTSC policy. Please revise the sentence to indicate that LUCs that are selected as part of the remedy would be implemented in a manner that is consistent with the state and federal guidance. Relevant guidelines were described in Section 2.4.2. In addition, please modify the third sentence to read "...would be implemented in a manner that complies with the potential ARARs...." Please check elsewhere in the document for similar revisions.

32. p.5-30, Section 5.4.3.1 Overall Protection of Human Health and the Environment (Comparison of Remedial Alternatives for MOUT Site MRA). The third paragraph includes a statement indicating that minimal amount of MEC is expected to be present in the MOUT Site MRA. The basis of this statement is not clear since the RI has concluded that a large portion of the MRA has not undergone a subsurface investigation, and the MEC density input factor of 3 (medium density) was used in the risk assessment. Please reexamine the sections and modify as appropriate.

33. p.6-1, Section 6.0 Identification of Preferred Remedial Alternative. Second to the last paragraph. Please add "if selected as the remedy" to read "<u>If selected as the remedy,</u> implementation of this alternative would..." to reduce the chance of confusion regarding the status of the remedial alternative which has not been selected.

DEPARTMENT OF THE ARMY
FORT ORD OFFICE, ARMY BASE REALIGNMENT AND CLOSURE
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REPLY TO
ATTENTION OF

July 28, 2010

Fort Ord BRAC Field Office

Stan Cook
ESCA Remediation Program Manager
Fort Ord Reuse Authority
100 12th Street, Building 2880
Marina, CA 93933

Subject: *Draft Group 3 Remedial Investigation/Feasibility Study, Del Rey Oaks/ Monterey, Laguna Seca Parking, and Military Operations in Urban Terrain (MOUT) Site Munitions Response Areas (MRAs)*, dated April 8, 2010.

Dear Mr. Cook:

This is to forward additional Army comments to the subject document. It has been brought to my attention that a recent update to the Army's Fort Ord Military Munitions Response Program (MMRP) database includes five data points that affect the Group 3 MRAs. A copy of this letter will be furnished to U.S. Environmental Protection Agency (Judy Huang) and California Department of Toxic Substances Control (Roman Racca).

Sincerely,

Gail Youngblood
BRAC Environmental Coordinator

Enclosure

DRAFT Group 3 Remedial Investigation/Feasibility Study (RI/FS), Del Rey Oaks/ Monterey, Laguna Seca Parking, and Military Operations in Urban Terrain (MOUT) Site Munitions Response Areas (MRAs)

Dated April 8, 2010

Additional Army Comments:

Volume 1: Remedial Investigation (RI)

During the review of site information for MRS-14D as part of the Remaining RI/FS Areas investigation program, inconsistent of 14.5mm subcaliber practice projectiles were found in the Army's Military Munitions Response Program (MMRP) database. The 14.5mm projectiles reported as "potential unexploded ordnance (UXO)" items by USA Environmental, Inc. in the After Action Report (AAR) for MRS-14D are currently classified as small arms ammunition (SAA) in the MMRP database, while those found in Ranges 43-48 by Parsons are classified as munitions and explosives of concern (MEC). The 14.5mm projectiles from MRS-14D, currently classified as SAA, will be re-classified as MEC - insufficient data (ISD). Additional research would be required to determine whether these items were UXO, discarded military munitions (DMM), or munitions debris (MD).

Five of the items reported in the MRS-14D AAR were found from within the Environmental Services Cooperative Agreement (ESCA) areas - parcels L20.5.1 and L20.8.

- one in MRS-14A (MRS-14D Grid 3O);
- one outside MRS-14A but within parcel L20.5.1 (MRS-14D Grid 4O); and
- three within MRS-14D along Barloy Canyon Road parcel L20.8 (MRS-14D Grid 6O).

These items are documented in the AAR for MRS-14D since the northern tip of MRS-14A was part of MRS-14D at the time. The removal grid sheets are included in *Final OE Sampling and Removal, After Action Report, Inland Range Contract, Former Fort Ord, California, Site OE-14D*, dated April 19, 2001, Administrative Record number OE-0310A.

Department of Toxic Substances Control

Linda S. Adams
Secretary for
Environmental Protection

Maziar Movassaghi
Acting Director
8800 Cal Center Drive
Sacramento, California 95826-3200

Arnold Schwarzenegger
Governor

MEMORANDUM

TO: Roman Racca, Project Manager
8800 Cal Center Drive
Sacramento, CA 95826

FROM: Brian K. Davis, Ph.D.
Staff Toxicologist
Human and Ecological Risk Office

DATE: July 1, 2010

SUBJECT: Draft RI/FS for Group 3 Sites, Fort Ord Reuse Authority
PCA: 12050 Site: 201729-11

DOCUMENT REVIEWED: Draft Group 3 Remedial Investigation/Feasibility Study; Munitions Response Areas; Former Fort Ord. This report was prepared for the Fort Ord Reuse Authority and is dated April 8, 2010.

BACKGROUND AND SITE DESCRIPTION BASED ON INFORMATION IN THIS AND OTHER ARMY DOCUMENTS: Fort Ord is a closed Army facility in Monterey County, consisting of about 28,000 acres.

In 1917, the U.S. Army began using the base as a maneuver and training ground for field artillery and cavalry troops stationed at the Presidio of Monterey. During its active period, 15,000 active duty military personnel and 5,100 civilians worked on the base. A variety of military munitions was used in this training, with the consequence that "*Munitions and Explosives of Concern*" or "*MEC*" have been found at numerous locations. Military munitions that have been fired into, fired upon, or used at Fort Ord include artillery and mortar projectiles, rockets and guided missiles, rifle and hand grenades, practice land mines, pyrotechnics, bombs, and demolition materials. Military training continued until base closure in 1994.

The Group 3 Munitions Response Areas (MRAs) includes the Del Rey Oaks/Monterey, Laguna Seca Parking, the Military Operations in Urban Terrain Site and the Interim Action Ranges Munitions Response Areas. However, this document addresses only the first three areas. The Interim Action Ranges Munitions Response Areas are excluded.

The Del Rey Oaks/Monterey MRA is about 29 acres (Parcels L6.2 and E29.1) plus 5.245 acres of South Boundary road and the associated right-of-way (L20.13.1.2 and

L.20.13.3.1) along the southwestern border of the former Fort Ord. Sector 1 consists of Parcel L6.2 and is designated as a habitat reuse area. Section 2 consists of the other three parcels (E29.1, L20.13.1.2 and L.20.13.3.1) and is designated as a development reuse area.

The Laguna Seca Parking MRA is about 276 acres and includes six property transfer parcels (L.20.3.1, L.20.3.2, L.20.5.1, L.20.5.2, L.20.5.3 and L.20.5.4). This MRA "*...is designated as a development with reserve areas or with restrictions and used for parking during Laguna Seca Raceway events.*"

The Military Operations in Urban Terrain Site MRA is about 54 acres of "*partially developed*" land (Parcel F1.7.2) and seven acres of Barloy Canyon Road and the associated right-of-way (L.20.8). Parcel F1.7.2 is designated as "*...a development area for training (Sector 1)...*" and Parcel L.20.8 is designated as a development area for a roadway (Sector 2).

SCOPE OF REVIEW: We reviewed Volume 2 with respect to risk assessment issues. We reviewed portions of Volume 1 (Remedial Investigation) for background information, but in general we have not commented on the investigations and removal actions. We assume that regional staff has reviewed these aspects.

COMMENTS

1. FORT ORD ORDNANCE AND EXPLOSIVES RISK ASSESSMENT PROTOCOL. This document (Section 1.2) references the Fort Ord Ordnance and Explosives Risk Assessment Protocol (Malcolm Pirnie, 2002). We represented the Human and Ecological Risk Office during the development of this protocol for Fort Ord.

2. FUTURE LAND USE. The report states that "*The risk assessment is based on both the field conditions and on the intended future land reuse for each of the Group 3 MRAs.*" The "*intended future land reuse*" of parcels at Fort Ord has changed in the past and can be expected to change in the future. Therefore, if the assessment is limited to current intended use, land use restrictions will be needed to prevent activities which might increase the risks.

3. OVERALL RISK FROM MEC.

   A. The Fort Ord protocol (see Table 5-10 in the protocol and Table 3-4 in the present document) estimates overall risk from MEC based on three factors: MEC Type, Accessibility Factor and Exposure Factor.

(1) The MEC Type is determined by munitions and explosives experts. We have not evaluated or commented on this component.

(2) The Accessibility Factor (see Table 5-1 in the protocol and Appendix A in the present document) is based on the MEC Depth, the Level of Intrusion, and the Migration/Erosion Potential.

(3) The Exposure Factor (see Table 5-2 in the protocol and Appendix A in the present document) is based on the MEC Density, Frequency of Entry, and the Intensity of Contact with Soil.

B. The Accessibility Factor can be dominated by the MEC Depth and the Exposure Factor can be dominated by the MEC Density.

(1) MEC Depth is given a score of 1 when "*100% of detected MEC is removed considering data quality for the sector.*" This is clarified in a footnote: "*Detection and removal procedures meeting the Data Quality Objectives (DQOs) for the sector based on clearly defined investigation objectives including reuse and the detection of designated MEC. If DQOs have not been established for the sector, the quality of data should be reviewed and approved to score a 1.*"

(2) Similarly, MEC Density is given a score of 1 when "*100% of detected MEC is removed to the level of intrusion.*" A similar footnote ties this category to data quality.

(3) The significance of a score of 1 for MEC Depth and MEC Density is that the overall Accessibility Factor also becomes 1 regardless of the Level of Intrusion and the Migration/Erosion Potential and the overall Exposure Factor also becomes 1 regardless of the Frequency of Entry and the Intensity of Contact with Soil. This has great impact on the overall estimate of risk. An example is discussed in General Comment 5 B.

(4) The score of 1 is intended for conditions in which DQOs were developed, agreed to, and met for investigation and remediation of areas with MEC. In some instances, historical investigation and remediation may have been completed without DQOs. In this case, it may be determined that the data are sufficient without DQOs to give a score of 1.

(5) The Fort Ord protocol (Tables 5-1 and 5-5) specifies that the data quality determination is to be made by the Base Realignment and Closure Cleanup Team. The present document (Appendix A) doesn't specify who is responsible for this determination.

C. All of the Del Rey Oaks/Monterey MRA and most of the Laguna Seca Parking MRA have an Overall MEC Risk score of A which is the lowest risk. This results from consistent MEC Depth and MEC Density scores of 1.

This comment is not intended to question the Overall MEC Risk scores for these two MRAs. Rather, we are pointing out the importance of the data quality determination. We have not reviewed the DQOs or the investigations and removal actions. Therefore, we are relying on regional DTSC staff to determine whether these MEC Depth and MEC Density scores are correct.

D. This document (Section 2.5; Appendix C) applies a Universal Soil Loss Equation to quantify potential soil erosion for each of the areas. Although this equation was included as Appendix F to the Fort Ord protocol, the main text of the protocol provided an estimate of 0.03 inches per year at Fort Ord. The estimates in this report are less than 1E-5 inches per year for erosion in each of the three areas.

In any case, in the development of the Fort Ord protocol, the team agreed that migration and erosion from physical forces were likely to be minor for most areas of Fort Ord. Therefore, we don't object to the use of the equation or conclusions regarding the migration/erosion factor. We do think that the document should acknowledge that the estimates of erosion entail considerable uncertainty resulting from combining five factors, each of which has a high level of uncertainty.

4. DEL REY OAKS/MONTEREY MRA.

A. The description of previous investigations and removal actions (Section 3.1) states that two removal actions were conducted and that the entire MRA was included "*...with the exception of a strip of land approximately 50 ft wide along the northwestern edge of Parcel L6.2, which is located outside the boundary for MRS-43, and the south side of South Boundary Road east of Parcel E29.1 (Figure 3).*"

(1) This description is somewhat ambiguous. MRS-43 is not shown on Figure 3. It is unclear how much of Parcels L20.13.1.2 and L20.13.3.1 is included in the exception. We recommend showing on Figure 3 the portions which did not undergo removal actions.

(2) The description in Section 3.1 specifies that the two portions did not undergo removal actions, but is silent about whether they were included in the two magnetometer investigations. This should be explicitly stated.

The text in Section 3.8.1 does state that these areas were not investigated.

(3) The report (Section 3.1) argues that these portions which did not undergo investigation or removal actions "*...are bounded by either: approved Track 1 sites, a paved road, or an area of the DRO/Monterey MRA where few MEC or munitions debris (MD)items were found. Therefore, it is expected that finding MEC in either of these two small portions of the MRA would not be likely.*"

(4) While the argument quoted above is reassuring, the report should also note that these portions have the highest accessibility because they are along the South Boundary Road ("*...an active roadway with vehicle traffic on a daily basis.*"). Furthermore, roadway expansion and utility construction are planned (Section 3.6.1). These are, of course, intrusive activities and hence increase the potential exposure.

B. The uncertainty discussion (Section 3.8) acknowledges that there is a potential that the overall MEC risk was underestimated.

(1) The text (Section 3.8.1) reiterates the reasons that MEC is not expected in the two portions did not undergo investigation or removal actions (see Part A above), but acknowledges that overall MEC risk could have been underestimated. We concur that there is a potential for underestimation.

(2) The potential for underestimation of risk in these two portions is exacerbated by the planned intrusive activities there (see Part A above). MEC removal differs significantly from removal of chemical contaminants, because a single MEC item may be sufficient to cause harm. The uncertainty discussion should acknowledge the importance of the planned intrusive activities.

(3) The text makes the important point with respect to MEC Depth (Sections 3.8.3 and 3.8.6) and with respect to MEC Density (Sections 3.8.4 and 3.8.6) that "*The uncertainty is that despite efforts to detect and remove 100% of the MEC at the MRS, MEC may remain bgs.*" The text notes that this may underestimate the overall MEC risk.

We believe that this is a very important point, since the difficulty in removing 100% of MEC has been well established at Fort Ord and elsewhere.

(4) The portrayal of uncertainties for the Del Rey Oaks/Monterey MRA is clearly written and is fair. We appreciate this.

C. We audited the scores and overall MEC risk classifications (Tables 3-2 through 3-5) and found them to be consistent with the Fort Ord risk assessment protocol.

D. The conclusions for this MRA (Section 3.9) are fair and well-written.

(1) "*The overall MEC risk score for each receptor for each of the MEC hazard types was 'A', the lowest risk.*" With the caveats discussed above and in the document, this result is consistent with the Fort Ord protocol.

(2) The document makes a second important conclusion: "*It is recognized that although the detected anomalies may have been removed during the previous removal actions conducted on the DRO/Monterey MRA, the potential exists that some MEC may remain in the subsurface at the MRA. Therefore, the risks associated with intrusive receptors (maintenance workers, construction workers) are assumed to remain at the DRO/Monterey MRA at a level that requires mitigations.*"

5. LAGUNA SECA PARKING MRA.

A. The document (Section 4.0) lists six property transfer parcels (L.20.3.1, L.20.3.2, L.20.5.1, L.20.5.2, L.20.5.3 and L.20.5.4) and shows their boundaries in Figures 5 and 6. However, the investigations (Section 4.1), removal actions and the risk assessment are all based on dividing the Laguna Seca Parking MRA into four Munitions Response Sites (MRS-14A, MRS-29, MRS-30 and MRS-47).

The document should add a figure to the risk assessment to show the relationships of the parcels (reuse areas) and the MRSs, or at least reference the appropriate figures in Volume 1 that allow the reader to see the locations of the MRSs.

B. The results for MRS-47 illustrate the significance of the scores for MEC Depth and MEC Density in the Overall MEC Risk estimate. As shown in Table 4-5, a site can achieve an Overall MEC Risk estimate of "A" (lowest risk) even with high scores (potential risks) for MEC Hazard, Level of Intrusion, Migration/Erosion, Frequency of Entry, and Intensity of Contact with Soil, provided the MEC Depth and MEC Density scores are "1".

This comment is not intended to take issue with the protocol on this point. If MEC has been adequately cleared, then the risk is minimized. Neither is the comment intended to criticize the investigations and removal actions that were performed at the Laguna Seca Parking MRA. Rather, the intent is to bring attention to the importance of the evaluating the completeness of the work with respect to DQOs. We are relying on regional DTSC staff to determine whether these MEC Depth and MEC Density scores are correct, based on the reliability of the investigations and removal actions. These issues are discussed in General Comment 3.

C. We audited the scores and overall MEC risk classifications (Tables 4-2 through 4-7) and found them to be consistent with the Fort Ord risk assessment protocol.

D. Some of our preceding comments about the uncertainty discussion for the Del Rey Oaks/Monterey MRA apply as well to the Laguna Seca Parking MRA.

6. MILITARY OPERATIONS IN URBAN TERRAIN (MOUT) SITE MRA.

A. The document (Section 5.0) lists two property transfer parcels (F1.7.2 and L.20.8) and shows their boundaries in Figures 7 and 8. However, the investigations and removal actions (Section 5.1) are described in terms of dividing the Military Operations In Urban Terrain Site MRA into Munitions Response Sites (MRS-14D, MRS-28 and MRS-27O).

The document should add a figure to the risk assessment to show the relationships of the parcels (reuse areas) and the MRSs and provide an explanation in the text.

B. The description of previous investigations and removal actions (Section 5.1) lists two sampling investigations with a magnetometer, a removal action and a visual surface time-critical removal action (TCRA). The text states that "*In addition to the investigations, the entire MOUT Site MRA was visually inspected during the visual surface TCRA with the exception of a small unburned portion in the southwestern portion of the MOUT training area (Parcel F1.7.2) and the southern portion of Barloy Canyon Road (Parcel L20.8) along the eastern side of the roadway; however, a portion of the eastern side of Barloy Canyon Road in Parcel L20.8 was included in a removal action to depth at MRS-14D, leaving an approximately 600-foot section of the eastern side of the roadway uninvestigated (Figure 6-2 of Volume 1).*"

Please add a figure to show the locations and extent of the areas which were not investigated. Figure 6-2 of Volume 1 does not illustrate what the text in Section 5.1 of Volume 2 is describing.

C. We audited the scores and overall MEC risk classifications (Tables 5-2 through 5-5) and found them to be consistent with the Fort Ord risk assessment protocol.

D. Our assessment of the potential risk from MEC at the Military Operations in Urban Terrain Site MRA is as follows:

(1) As stated in Section 5.8.1, "*...MEC has been found on the surface of both the MOUT training area and the roadway...*"

(2) It is also stated in Section 5.8.1 that "*...not all of the MOUT Site MRA has undergone a surface removal. Therefore, potentially, MEC could remain on the surface.*"

(3) Further, as stated in Section 5.1, "*MEC items found at the MOUT Site MRA were penetrating items (e.g., rockets and projectiles) and could be expected below ground surface.*" Thus, MEC may remain below the surface as well as on the surface.

(4) At the same time, two burial pits were found at ten inches below ground surface (Section 5.4). It is possible that additional burial pits are located at the Military Operations in Urban Terrain Site MRA.

(5) Furthermore, as stated in Section 5.2, "*MEC items with risk codes corresponding to 1, 2 and 3 were found in the MOUT training area (Parcel F1.7.2) of the MOUT Site MRA.*" Category 3 is the most dangerous MEC, described (Section 2.2) as "*Will kill an individual if detonated by an individual's activities.*"

E. Based on the observations listed above, the potential risk remaining at this MRA is substantial. This is consistent with the risk assessment results that found Overall MEC Risk in the training area (Table 5-4) to be category C or D for a trespasser and D or E for a trainee, maintenance worker of construction worker. Similarly, the Overall MEC Risk in the roadway area (Table 5-5) was found to be category D or E for all receptors. An Overall MEC Risk of D is high risk and E is highest risk.

F. We are therefore concerned that Section 5.6.1 reports that "*The HMP (Habitat Management Plan) identifies the MOUT Site MRA as development without restriction.*" This classification is inappropriate.

CONCLUSIONS

1. We found this document to be well written and illustrated. We appreciate the thoroughness and the fairness of the evaluation. In particular, the discussions of uncertainty point out possible underestimations of risk as well as possible overestimations.

2. The text and figures could be improved to clarify the relationships among the parcels, the sectors and the MRSs for each MRA.

3. Our review of the risk assessments found them to be accurate and consistent with the protocol.

4. Risk managers should be cognizant that risk assessments based on projected future land use may not be protective if land use changes. Land use restrictions may be appropriate.

5. The Accessibility Factor can be dominated by the MEC Depth and the Exposure Factor can be dominated by the MEC Density. Scores of "1" for MEC Depth and MEC Density depend on data quality. We have relied on DTSC regional staff to evaluate the data quality.

6. The importance of scores of "1" for MEC Depth and MEC Density are illustrated by the Del Rey Oaks/Monterey MRA and the Laguna Seca Parking MRA. Almost all Overall MEC Risk classifications were "A" (lowest risk) because of scores of "1" for MEC Depth and MEC Density.

7. The potential risk remaining at Military Operations in Urban Terrain Site MRA is substantial. A qualitative review of the information about this MRA is consistent with the risk assessment results in suggesting high levels of risk. We are therefore concerned that this MRA is identified for development without restriction. This is inappropriate under current conditions.

REFERENCE

Malcolm Pirnie, 2002. Fort Ord Ordnance and Explosives Risk Assessment Protocol. August.

cc: Michael Wade, Ph.D., DABT
Senior Toxicologist
Human and Ecological Risk Office

SC
JB

Fort Ord Community Advisory Group (FOCAG)
P.O. Box 969
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Email: focagemail@yahoo.com

Fort Ord Community Advisory Group Mission Statement:

"The Fort Ord Community Advisory Group is a public interest group formed to review, comment and advise on the remediation (cleanup) of the Fort Ord Army Base Superfund Site, to ensure that human health, safety and the environment are protected to the greatest extent possible."

Fort Ord Reuse Authority
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Department of the Army
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Via fax: 831-393-9188, with hard copy to follow via U.S. Mail

Re: Comments to the following:
Draft Group 3 Remedial Investigation/Feasibility Study Report, dated April 8, 2010 ("the Draft Group 3 RI/FS Report"). The Draft Group 3 RI/FS Report consists of the following items:

* Volume 1: Remedial Investigation
* Volume 2: Risk Assessment
* Volume 3: Feasibility Study

FOR BOTH THE ESCA AND U.S. ARMY FORT ORD CLEANUP ADMINISTRATIVE RECORDS

June 10, 2010

S

Dear FOR A,

These three documents appear to be a regurgitated version of some portions of the U.S. Army's Administrative Record regarding the clean up efforts at former Fort Ord, a National Superfund Site. The FOCAG finds very little new information in these three "Cliffs Notes" type reports. It is unfortunate as it is about some of the dirtiest and most dangerous areas of former Fort Ord. May we make some constructive suggestions and requests?

1) To begin, please provide a colored copy of FOR A's current Reuse Plan with a transparent overlay of the Group 3 Sites.

2) Detail the differences made in the Federal Facilities Agreement for the AOC.

3) The Del Rey Oaks/Monterey MRA Figures 2-2, 2-3, 2-4, 2-5 do not disclose the State of California's property, dedicated to Cal Trans for the Fort Ord Bypass, also known as the Southwest Alternative. Please identify this area. You'll remember it is the main traffic mitigation measure for the FOR A 1997 Fort Ord Reuse Plan.

4) Page 1-3 of Volume 1 states: "In November 1998, the Army agreed to evaluate MEC at the former Fort Ord and perform a basewide munitions response (MR) RI/FS consistent with CERCLA. Please provide information that this was a settlement agreement of the following lawsuit:

Fort Ord Toxics Project, Inc.; California Public Interest Research Group; Curt Gandy; Joe Manaea, Plaintiffs-appellants, v. California Environmental Protection Agency; Sub. Department of Toxic Substances Control; Jesse Huff, Director, Department of Toxic Substances Control, Defendants, and United States Department of the Army; United States Department of Defense, Real Parties in Interest-appellees

UNITED STATES COURT OF APPEALS FOR THE NINTH CIRCUIT - 189 F.3d 828 (9th Cir. 1999)

5) This document discusses some of the important unexploded ordnance issues but does not address the other elements of the Fort Ord National Superfund Site. Those are:
a) Contaminated groundwater
b) Residual chemical contamination from years of pyrotechnics, that is flares, tracers, smoke bombs, chemical warfare training, etc.
c) Years of heavy herbicide and pesticide use at the former training base.
These carcinogens need to be tested for and cleaned. The FOCAG is including two attachments, a couple of our research papers from this past year.
Please include details of plans to address these other issues, and a time line in your Draft Final RI/FS.

6) Your Volume 1 Remedial Investigation does not disclose that both the Parker Flats and Del Rey Oaks areas were used for Army tank training. Provide details of tank munitions and depths to which tank munitions can penetrate the various soil types at Fort Ord.

7) Volume 1, Section 4.1.1 Regarding DRO/Monterey Multi-Range Area "Review of Aerial Photographs and Historical Training Maps"
Your one paragraph of the 1940's Era doesn't even mention WWII! You state someone reviewed aerial photographs from 1941 and 1949. This was both before and after the war. Infantry training for the Pacific Theatre was conducted at Fort Ord and Fort Hunter Liggett. Your one-paragraph review analysis last sentence states:
"Training and/or facility maps were not available for the vicinity of DRO/Monterey MRA in the 1940's."

8) Volume 1, Section 5.1 Regarding Laguna Seca Parking MRA Historical Records and Military History states no training maps were available from the 1940's. Further, someone again reviewed aerial photographs from 1941 and 1949, again, both before and after WWII.

9) Volume 1, Section 6.1 MOUT Site Historical records and Military History states that there was troop training and grenade training in the 1940's at this site but says, "historical maps were not available for that time period..."
Again, someone looked at aerial photographs from 1941 and 1949.

10) Volume 1, Section 6.2.2.1 Schonstedt Model GA-52Cx Magnetometer states, "it cannot detect nonferrous metal objects (e.g., lead, brass, copper, aluminum).
a) This section fails to disclose the depths to which this Schonstedt can detect other metals in various soil types at Fort Ord.
b) This section also fails to disclose that the Schonstedt cannot detect plastic objects, for example, non-metallic land mines.

11) Please provide a description of the sample of a sample investigative process used for these areas. Please provide the size in acres of each area and a map of the

specific areas sampled, the specific samples in those sample areas and to what depths these were accurately sampled using GPS records. As there is no 100% accuracy, provide the Army's estimate as to the accuracy of the samples.

12) Provide sequential maps by date since 1993 of former Fort Ord, divided into sites based on previous uses. The maps should show the identification numbers in use at the time of the map. Please highlight any areas that have been subsumed.

VOLUME 2 RISK ASSESSMENT

13) In Volume 2, page 1-4, it states, "The ESCA and the AOC identify the Army-retained conditions for which the Army assumes responsibility. If these conditions are encountered, FOR A is required to notify the Army of their presence in accordance with the guidelines set forth in the ESCA and the Army assumes responsibility. Included in the Army-retained conditions are:

*** Radiological material**

*** Chemical or biological warfare agents**

*** Natural resource injuries or damages occurring as a result of contamination releases that have occurred due to Army ownership or activities except to the extent such injuries are a direct result of FOR A's activities.**

*** Unknown uninsured conditions, which include the management and cleanup of non-MEC-related hazardous and toxic wastes above insurance parameters**

*** Perchlorate contamination in soil or groundwater**

Please provide descriptions of all the various materials, agents, and non-MEC related Hazardous and toxic wastes in the Draft Final Risk Assessment.

14) Please provide an estimate of when the referenced Army BRA Program (Shaw/MACTEC 2009) report will be available regarding soil contamination from munitions constituents.

15) Page 1-5 of volume 2 tells us that nine Multi Range Areas (MRA) were consolidated into four groups, according to similar pathway-to-closure characteristics.
a) Please identify and describe these characteristics.
b) Please identify who determined these characteristics

16) Page 1-6 Fort Ord Risk Assessment Protocol tells us that, " The Protocol does not calculate the probability of adverse consequences, but instead assumes that encounters

with MEC items will result in adverse consequences and, therefore, describes and estimates the MEC risk recognizing that basic assumption."

The FOCAG asks,
a) Given the paucity of training maps and aerial photographs, especially from key years of war training
b) Given the sample of a sample approach to much of the clean up for unexploded ordnance
c) Given the layers upon layers of training ranges, and the different types of training
d) Given the list of materials, agents, and toxic wastes the Army is still responsible for

How can you come up with "RISK" scores in this Draft?

You state, "The uncertainties for the input factors discussed in Sections 3.8.1 through 3.8.5 MAY UNDERESTIMATE (emphasis ours) the overall MEC risk score depending on the receptor scenario."

Of course the "receptors" are real people categorized as trespassers, trainees, maintenance workers, construction workers, etc.

VOLUME 3: FEASIBILITY STUDY

17) Section 3.1, page 3-1 identifies general response actions to potentially address remaining MEC risks at the Group 3 MRA's. These are the following:
* No further action
* Land Use Controls
* Containment
*Additional MEC Remediation
* Residential Quality Assurance

These deal with MEC. As pointed out earlier, there are several areas of contamination on former Fort Ord. The FOCAG will withhold comments on Volume 3 until we see the Draft Final Volumes 1 and 2, as there are still too many unknowns.

Thank you for the opportunity to comment on your Draft documents identified as FOR A ESCA Remediation Program Document Control Number: 09595-10-079-001. We look forward to substantive answers to our questions and concerns. Please include the entirety of this FOCAG letter plus attachments in your Draft Final.

Yours for a cleaner, safer, healthier, former Fort Ord,

Mike Weaver
Co-Chair, FOCAG

Attachments
1) FOCAG letter from Lance Houston, Chemical Warfare Materials. Community Right-To-Know. Letter and attachments, 18 pages.
2) FOCAG letter from Lance Houston, Former Fort Ord Pesticide Use and the effects on human health as dealt with by the cleanup effort. Community Right-To-Know. Letter and attachments, 19 pages.

Fort Ord Community Advisory Group (FOCAG)
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June 2, 2010

FOR THE ADMINISTRATIVE RECORD
Letter and attachments 18 pages

U.S. Army BRAC
Gail Youngblood
4463 Gigling Road
Monterey, CA 93940

RE: Chemical Warfare Materials (CWM) Training Triangle; Omission of former training area uses and incidents. Transfer and development of former training areas. Community Right-To-Know

Dear Ms. Youngblood,

Attached is a FOCAG research paper raising questions and concerns over CWM use at former Fort Ord. These concerns include but are not limited to:

1) The Failure to maintain the Administrative Record and include all site specific discoveries and incidents. Final decision documents omit vital information. In training areas, unless the entire site has been sampled for chemicals, there is no way of telling what may surface. Dangerous munitions and chemicals turn up in the most unlikely places.

2) The failure to conduct site specific base line risk assessments (human health and ecological) as part of the Remedial Investigation (RI), prior to the development of Feasibility Studies (FS). The investigation and cleanup of training areas is skewed as a direct result of omitting this vital Superfund step.

3) The failure to develop and implement detection equipment capable of detecting Chemical Agent Identification Sets (CAIS) glass ampoules, and to conduct extensive site soil sampling for CWM chemicals. Most of the proposed Monterey Horse Park is within the CWM triangle. This use is perhaps the worst imaginable for an area where training of this type occurred, undetected glass vials of CWM agents could be anywhere. Dust would be a widespread human health concern.

We look forward to your substantive written response to the enclosed issues and concerns.

Sincerely

Lance Houston
FOCAG member

Chemical Warfare Materials (CWM) used at Fort Ord

Compiled from Fort Ord cleanup documents

Summary: The Fort Ord cleanup has downplayed the use of CWM at Fort Ord. There is a conclusive body of evidence that CWM was used for experiments and field training of troops at Fort Ord from the1930s to1974. Shortly after cleanup operations began, physical evidence of CWM use at Fort Ord emerged. Suspected and known CWM training areas and their potential residual contamination have virtually been ignored. Despite the potential CWM hazard, thousands of acres of former training areas are being transferred for residential, commercial, and other public uses. Despite the body of evidence, the CWM issue is being whitewashed. The FORA officials and regulatory agencies have turned a blind eye to this significant hazard. Failure to yield to the evidence and red flags of CWM use in training areas is an accident waiting to happen.

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Map 6; The Monterey Horse Park - added

Fort Ord Community Advisory Group (FOCAG)
www.fortordcag.org December 2009

Record of CWM Sites

Identified CWM training areas:

- Site 2 / OE-2, Chemical Training Area; Area between intersection of Fifth and Eighth Streets and intersection of Imjin and Eighth Street.[1]
- Chemical, Biological, Radiological (CBR) 4 field training sites.[2]
  - OE-4A - CBR #1, Parker Flats
  - OE-4B - CBR #2, Parker Flats, CS Gas Chamber
  - OE-4C - CBR #3, OE-31, CSU footprint
  - OE-4D - CBR #4, OE-40, Parker Flats Gas House

Discovery of buried CWM

HD Mustard container found:

- In 1993 in the vicinity of Site 2 (offsite), a suspected Chemical Training Area, a 55 gal drum was unearthed during ditching operations which was suspected to be a chemical agent container. Soil samples confirmed traces of HD Mustard.[3]

Chemical Agent Identification Sets found:

- In 1997 Chemical Agent Identification Sets (CAIS). 24 ampoules (glass vials) were found 12 and 18 inches deep during a Ordnance and Explosive (OE) removal action at Site 13B.[4]

An apparent CWM incident

Hazardous Material incident:

- In 1994 in the vicinity of Site 4C, a known CBR training site within CSU property, 2 EOD specialists were overcome by fumes. One of the men vomits and the other became dizzy. They retreated up wind, called for help, and are taken to the hospital. The incident was serious enough that all operations in the area were halted, their vehicle was confiscated, the area was fenced off, and a Army team from 87th Ord Det (EOD) was called in. The incident remains unresolved.[5]

Significant Documents state CWM use

Chemical training and experiments were conducted at Fort Ord

- "During World War II, troops assigned to Edgewood Arsenal, Maryland, trained and conducted experiments at Fort Ord. CAIS were used at Fort Ord prior to 1974 for field training of troops."[6]

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[1] Map 2,3,4,5: Site 2 / OE-2 location; vicinity of Marina horse stables; Archive Search Report OE-0005A Sec. 6.2

[2] Map 1 & 2: OE / CBR Site locations, BW-0540 Plate 1, mockup of Archive Search Report map OE-0022 Plate B2

[3] Map 3: Site 2 / OE-2 location, vicinity of Marina Horse Stables adjacent to CSUMB, Archive Search Report OE-0005A Sec. 6.2

[4] Map 5: Site 13B, adjacent to CSUMB and Monterey County. MST Parcel; OE-0265E

[5] Map 5: OE-4C; incident within CSUMB Parcel, excerpts OE-0011, Substances unknown-Removal Action Report BW-0841

[6] Quote: Non-Stockpile Chemical Material; Former Fort Ord 1997, OE-0202

Chemical training was conducted at Fort Ord

- "During the World War II years the installation was a staging and training area for other divisions and units. Chemical training was conducted at Fort Ord starting in 1940. Training consisted of defense against chemical attack, gun drills wearing masks, passing through smoke and gas, chemical agent identification, weapons and tactics, and treatment of gas casualties. However, no conclusive evidence was found of toxic chemical use. During WWII troops assigned to Edgewood Arsenal, Maryland trained and conducted experiments at Camp Roberts and Fort Hunter Liggett. Chemical Agent Identification Sets (CAIS) were used at Fort Ord." [7]

Ordnance used or fired at Fort Ord

- "Chemicals: Riot Control tear gases such as CN and CS were dispensed in capsules, candles, and M79 grenade launchers. No other delivery means are known. CAIS were used at Fort Ord."
- "Projectiles: 20mm; 37mm gun and anti-aircraft; 40mm grenade (linked and single) and anti-aircraft; 57mm, 75mm, 90mm, 106mm recoilless rifle; rifle grenades; 75mm, 105mm, 155mm Howitzer; 7" and 8" naval gun; 60mm, 81mm, 4.2" and 4" stokes mortars. Types identified have been HE, HEAT, APEH, illumination, and smoke, FS, HC, WP." [8]

Chemical Agents buried in WWII training areas

- "K951 ampoules (glass vials) containing chemical agents are frequently found in burial sites at old WWII training areas. They are sometimes found loose, sometimes found in their original steel cylinders (also called "pigs"), and are sometimes found in drums, cans, or other disposal containers. When found loose, the agent type cannot be readily identified without sophisticated spectrographic equipments, and a worse case assumption of phosgene should be made by field personnel." [9]

Mustard Agent: Addendum to Health And Safety Plan (HASP)

- "...the addendum was initiated as a result of further information obtained from both historical data and recent site investigation observations which indicate an increased probability that chemical agents will be encountered during subsurface investigations. Specifically, blister (a.k.a. mustard) agents are the chemical hazards addressed in the addendum." [10]

<u>Summary of Events:</u>

- 1993 Mr. Macbride, a military dependent, stated he saw soldiers with masks training 1930s. (vicinity of Site 2)

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[7] Quote: Contradictory statement, Archives Search Report; Sec. 6.0 site analysis 1993, OE-0005A

[8] Chemical Agents, chemical munitions, and toxic smokes, were used at Fort Ord; 1993 OE-0005A Fig. 6-1

[9] Quote: CAIS consist of Mustard (H), Lewisite (L), Chloropicrin (PS), Phosgene (CG); 1995 OE-0265E

[10] Quote: OE-0522; 4/22/1994 DTSC Memorandum issued eight days after Haz Mat incident. CSU footprint; Haz Mat incident occurred on 4/14/1994 in the vicinity of CBR Site 4C, aka Inter-Garrison response site

- 1993 Staff Sergeant Davis, stationed at Fort Ord, stated CAIS are buried along Imjin Rd. (outside Site 2)?

- 1993 Site16 Characterization; vicinity of Site 2, physical evidence emerges, empty 55 gal drum mustard agent is dug up. (confirms Mr. Macbrides recollection)

- 2-17-1994; Mustard Agent Addendum is added to Health And Safety Plan, procedures for work involving potential exposure to Chemical Warfare Agents. BW-0496

- 4-14-1994; 2 cleanup specialists, while digging, are overcome by fumes next to a known chemical training site.[11] (CWM incident)? (Site 4C-experimental CWM site)? (no accounting of TCRA removal, chemical containers or their contents)?

- 4-22-1994; DTSC issues Fort Ord RI/FS Mustard Agent Memorandum stating specific sites are not identified in the addendum due to uncertainty of location(s) of historical use and disposal of blister agents(mustard).(could be anywhere)? BW-0522

- 1997 CAIS CWM glass vials are dug up at site 13B.(unknown CWM training site)?

- Army documents state CWM experiments and field training occurred at Fort Ord for decades.[12] [13] Picture of CWM field training. Does not appear to be a classroom.

- Remediation documents omit empty 55 gal HD mustard drum (a), the CSU site Haz Mat incident (b), and Site 13B CAIS discovery (c).[14] (CWM whitewash)

Failure to Comply with CERCLA

- According to the NCP, 40 C.F.R. 300.430(d)(4) an RI/FS must include a site-specific baseline risk assessment. "to characterize the current and potential threats to human health and the environment." The baseline risk assessment is a vital component of the RI/FS, and the results of the risk assessment is used to " establish acceptable exposure levels for use in developing remedial alternatives in the FS." Remedial goals are established based on the acceptable exposure levels derived in accordance with the factors set in 40 C.F.R. 300.430(e)(2)(i). A OE baseline risk assessment has not been performed for any Training Areas outside of Site 39; nor have acceptable exposure levels or remediation goals been derived in a manner required by the NCP. The Army, FORA ESCA Privatized RP, and the regulatory agencies have turned a blind eye to this vital RI/FS requirement.

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[11] Haz Mat incident triggers Time Critical Removal Action (TCRA) BW-0647

[12] Reference documents / section: BW-0013 2.1.6, OE-0202 ES, OE-0265E pg 6, OE-0005A 6.2, OE-0002 4.4.3.2,

[13] Attachments: Excerpts OE-0011; (5) Maps - 4 CBR sites BW-0540, OE sites OE-0245H, Site 2 "no further action" OE-0029, Site 2 OE-0001, Site 2 OE-0002; Picture of CWM training at Fort Ord; baseline risk assessment CERCLA CFR §300.430(d)(4)

[14] (a) Site 16 Post Remediation BW-2021A - BRA BW-2300J HA-91, (b) CSUMB RI/FS WP1 ESCA-0139 - CBR #3 Site and Haz Mat incident have disappeared BRA BW-2300J HA-161, (c) Site 13B CAIS has disappeared BRA BW-2300J HA-103

Question:

- In light of the above events and supporting documentation, how can areas where CWM use is suspected or has been found be rendered as safe (no further action)?

Conclusion:

- Chemical Warfare Materials were used at Fort Ord for experiments and for field training of troops. Of particular concern, some of the agents found were housed in glass vials and cannot be detected with the magnetometers used for the cleanup of ordnance and explosives. To date, technology either does not exist or has not been deployed to address the significant threat from CWM. Because of the outlined events and Army's poor record keeping of what, when, and where CWM was used and disposed of, the precautionary approach should be taken. It would be reasonable to triangulate the known CBR and CWM discovery sites and consider the entire area a high risk CWM site. (see map 2, CWM triangle)

Acronyms:

BRA	Basewide Range Assessment 2009
CAIS	Chemical Agent Identification Sets
CBR	Chemical, Biological, Radiological
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CN	chloroacetophenone (riot control gas)
CS	2-chlorobenzalmalononitrile (riot control gas)
CSU	California State University
CSUMB	California State University Monterey Bay
CWM	Chemical Warfare Material
DTSC	Department of Toxic Substance Control, California
EOD	Explosive Ordnance Disposal
ESCA	Environmental Services and Cooperative Agreement
FORA	Fort Ord Reuse Authority
FS	Sulfur trioxide
HC	Mixture of hexachloroethane, zinc oxide, and approximately 7% aluminum
HD	Mustard agent
NCP	National Contingency Plan
OE	Ordnance and Explosives
RI/FS	Remedial Investigation / Feasibility Study
RP	Remediation Program
WP	White Phosphorous
WP_1	Work Plan

Note: Footnotes with references such as BW-0013, OE-0029, etc., are Administrative Record numbers that the information was compiled from. These documents are available at the Fort Ord cleanup web site at: http://fortordcleanup.com/adminrec/arsearch.asp

OE-0011:
Journal excerpts of HAZ MAT incident CSU Footprint aka CSUMB

OE-0011: Delivery Order 015A Entry 27; **CSU Footprint 4-14-1994**
Grid 37-D EOD specialists became ill, vomiting. **HAZ MAT** team called in...
all intrusive work stopped

COMMENTS/CONCERNS: AT APPROXAMATLY 0845 THIS MORNING TM6 CALLED ON THE RADIO FROM GRID 37-D STATING THAT WHILE DIGGING UP A TRASH PIT TWO EOD SPECIALISTS BECAME ILL, ONE VOMITED AND THE OTHER BECAME DIZZY. THE TEAM HAD RETREATED UP WIND TO A SAFE AREA AND REQUESTED ASSISTANCE. HFA SITE SAFETY AND COE REP RESPONDED. SUXOS CALLED BILL COLLINS AND REQUESTED ASSISTANCE. THE TWO MEN WERE TAKEN TO THE BASE HOSPITAL BY HFA SAFETY, COE REMAINED ON SITE WITH THE REMAINDER OF TM6 AWAITING BASE HAZ MAT RESPONSE TEAM. BASE HAZ MAT ARRIVED AND DECONTAMINATED ALL EOD PERSONELL AND SECURED THE AREA. ALL INTRUSIVE WORK WAS STOPPED AT 1130 HOURS. CLEARANCE TEAMS WERE SENT BACK INTO THE FIELD TO PICK UP UXO RELATED SCRAP ON THE SURFACE REMAINING WELL CLEAR OF THE CONTAMINATED AREA.

OE-0011: Delivery Order 015A Entry 28; **CSU Footprint vehicles and equipment impounded due to possible HAZ MAT contamination**

COMMENTS/CONCERNS: DUE TO THE POSSIBLE HAZ MAT CONTAMINATION ALL BRUSH CREW LABORS TEMINATED AT NOON UNTIL FURTHER NOTICE. CONCERNED ABOUT CONTINUING WORK FOR ENTIRE JOB. HAZ MAT PERS HAVE SSO VEHICLE AND TM 6 VEHICLE IMPOUNDED DUE TO POSSIBLE CONTAMINATION. ALSO ALL OF TM 6'S EQUIPMEMT AND MOST PERSONAL ITEMS HAVE BEEN IMPOUNDED.

OE-0011: Delivery Order 015A Entry 29; **CSU Footprint fence placed around HAZ MAT pit**

COMMENTS/CONCERNS: CONTINUE TO BRUSH GRIDS, TM 6 STILL WITHOUT EQUIPMENT DUE TO POSSIBLE CONTAMINATION. SSO VEHICLE REMAINS IMPOUNDED.?? BASE PLACED HURRICANE FENCE AROUND ACTUAL PIT.

A couple of notable sections from cleanup documents:

OE-0002 TCRA

4.4.3.2 Site 2, Chemical Training Area

4.4.3.2.1 Site 2 is also located in an area which is heavily traveled and populated. Site 2 was identified as a site which may contain CWM in the form of vials of a 10% solution of mustard and lewisite. The vials are said to have been components of Chemical Agent Identification Sets (CAIS). With this in mind, special requirements for conducting operations in this area will be placed in effect. Appendix F contains health and safety plans for this area and PPE necessary to protect personnel.

6.2.2. Site 2. Chemical training area. (vicinity FR 075575 to 078577; area between intersection of Fifth and Eighth Streets and intersection of Imjin and Eighth).

Discussion: The area between Imjin Road and the stockade has been described as a chemical training area by Mr. Maurice Macbride, who was a military dependent during 1933-37. He remembers watching soldiers training with protective masks on. He said later the area was used for landmine warfare training. During a terrain walk, no evidence of OEW contamination was found, except for one unidentified item protruding from the ground at FR 07805772. It is not suspected to be ordnance-related.

A Mr. Lee Stickler, who was in the Field Artillery in 1940-41 at Fort Ord, and much later served as Range Control Officer from 1971-89, stated that the area was a horse corral when he was there. This is confirmed by a map from 1943-44. At some point, the area was a 2.36" bazooka range, since these rockets have recently been found just east of Pete's Pond. The remains of what appear to be concrete target bunkers can still be seen.

Recently, a 55-gallon drum was unearthed (vicinity FR 074575) during ditching operations which was suspected to be a chemical agent container. It was tentatively identified as such by UXB International (subcontractor to Harding Lawson Associates) personnel who were working in the area. The drum apparently had reinforcing ribs of the kind used on chemical containers. An explosive ordnance disposal team from the 87th Ord Det (EOD), Presidio of San Francisco, was called out. The team responded as if it were a full-blown chemical incident.

The drum turned out to be empty. The Directorate of Engineering and Housing had the firm of Harding Lawson run soil sample tests. Traces of HD mustard were found. The consensus of opinion was that at one time the drum may have contained agent, but was empty when buried. This drum is the only evidence that toxic chemicals may have been used or stored on Fort Ord.

The EOD team leader, Staff Sergeant Davis, further stated that chemical agent training kits (containing 10% solutions HD) were buried along Imjin Road between the roadway and old stockade.

Recommendations: This area requires further investigation to determine the extent of the hazards present. The soil surrounding the ditching area where the drum was unearthed should have further analysis done. Any further excavation should proceed with caution due to the likelihood of uncovering 2.36" rockets.

Further investigation should be made along Imjin Road (southeast and south-southeast of stockade), to ascertain whether any of the buried training kits might be uncovered.

Maps

Map1:	Chemical training areas:	Pete's Pond / Site 2 / OE-2 CBR #1 CBR #2 CBR #3 CBR #4
Map 2:	Chemical training areas: **high risk CWM triangle**	OE-2 - Pete's Pond OE-4A - CBR #1 OE-4B - CBR #2 OE-4C - CBR #3 OE-40 - CBR #4
Map 3:	Chemical training area	OE-2 next to horse stables at 9th Street
Map 4 :	Chemical training area	Site 2 grid location and site boundary
Map 5 :	CSUMB OE cleanup	Site 13B location of CWM CAIS found, location of Haz Mat incident 4-14-94 in vicinity of CBR site 4C
Map 6:	Monterey Horse Park	Most of Horse Park within CWM Triangle

Note: During the Fort Ord cleanup, the names of sites have changed several times, or been subsumed into other sites (disappeared from the record).

Acronyms:

CBR Chemical, Biological, Radiological Sites

OE Ordnance and Explosives Sites

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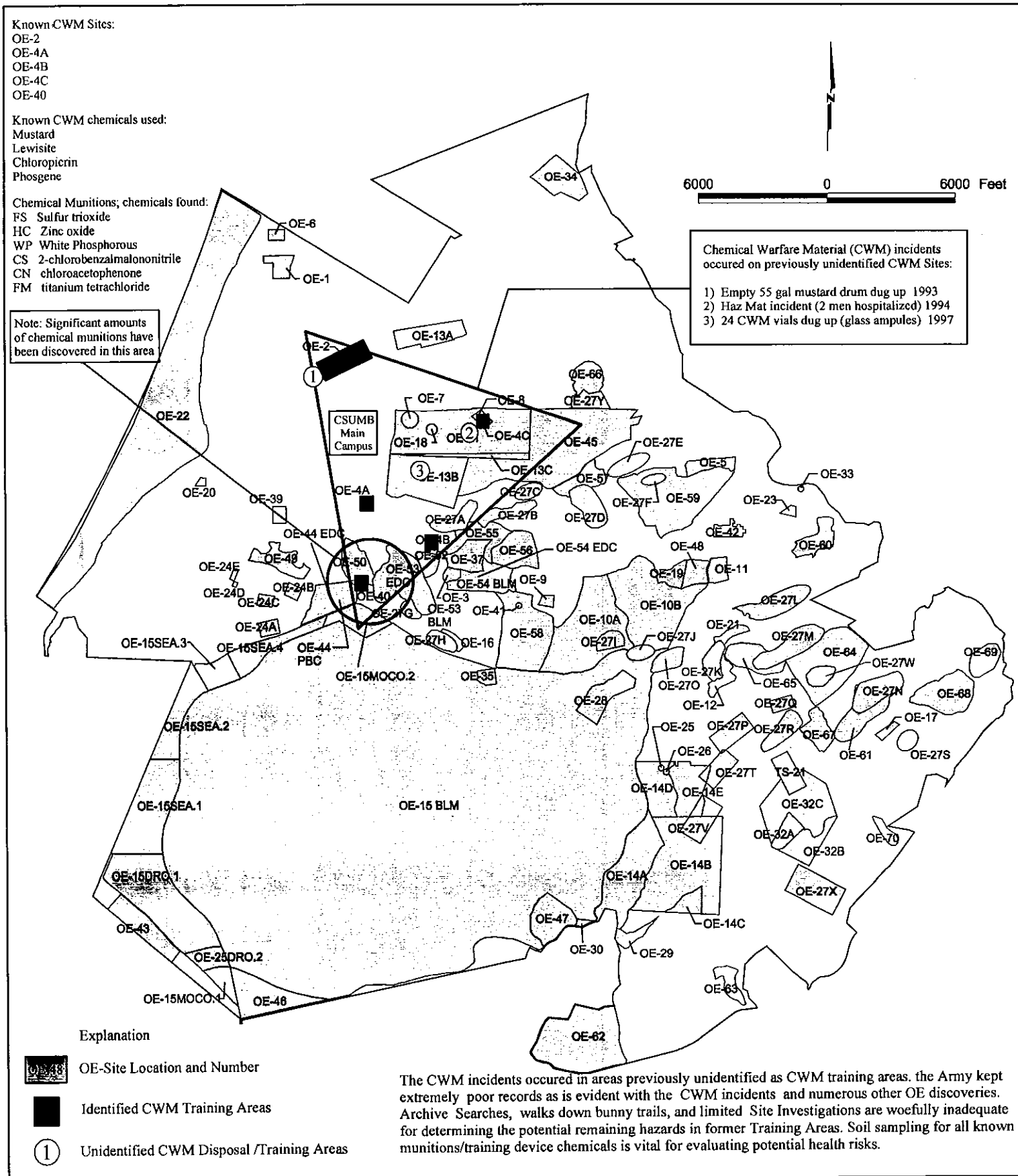
NO.	DATE	REVISIONS	BY	CHK

DESIGNED:
DRAWN: DEK/KJH
CHECKED:
DATE:

PROJECT NO: 23366 006/2
SCALE: 1"=2000'
APPROVED:
DATE: 5/18/89

Harding Lawson Associates
Engineering and Environmental Services
105 Digital Drive
Novato, California 94949
Phone: (415) 883-3300

DEPARTMENT OF THE ARMY
Sacrar
Draft Final Data
Site 39
Fort Ord
Fort C



Former Fort Ord Identified and Suspected OE Training Sites

Chemical Warfare Material (CWM) Triangle

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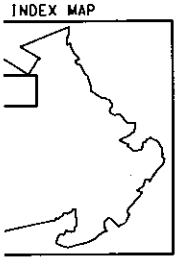
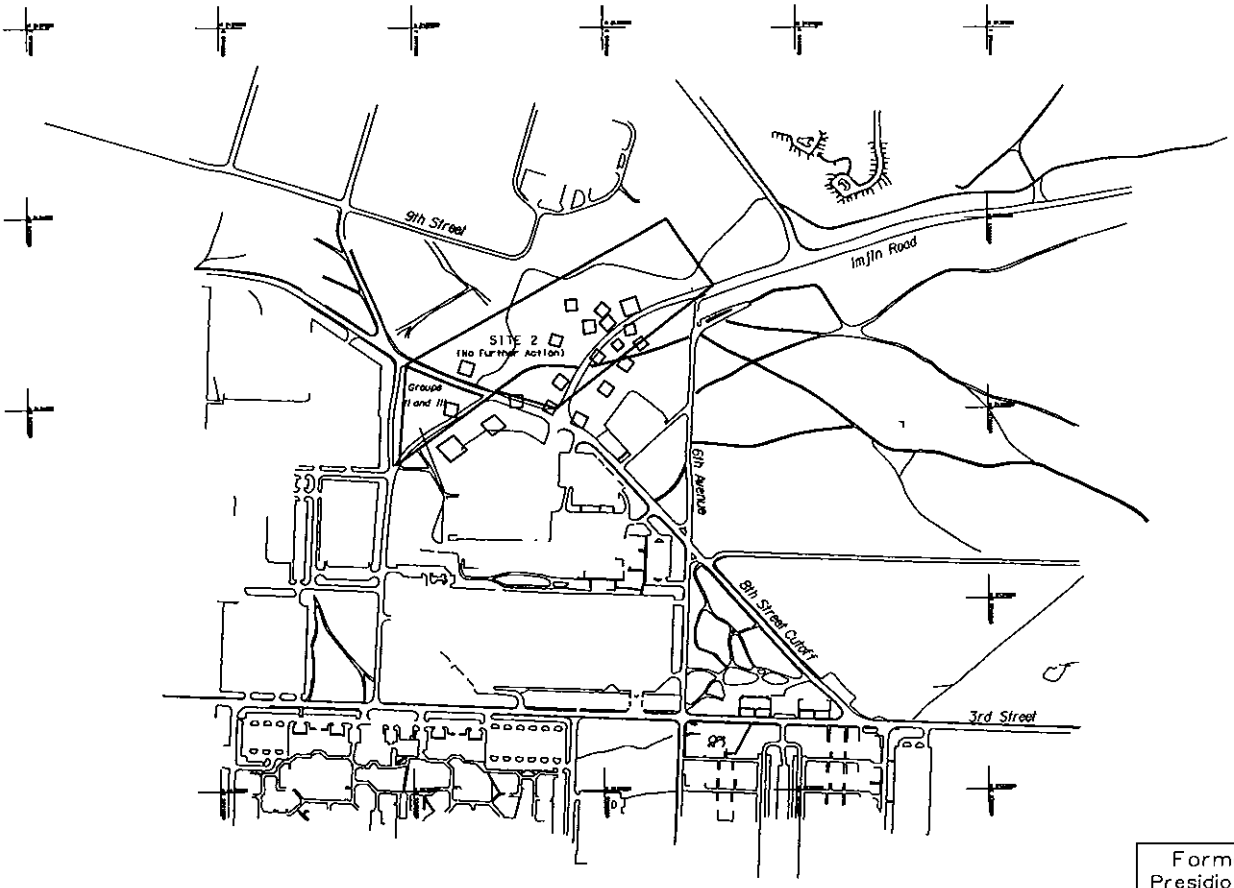
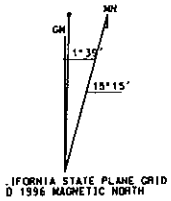
3-20-10

B C D E F G H

INDEX MAP







IFORNIA STATE PLANE GRID
D 1996 MAGNETIC NORTH

LEGEND

OE Site Boundary
Existing Infrastructure
Land Use Group Designation

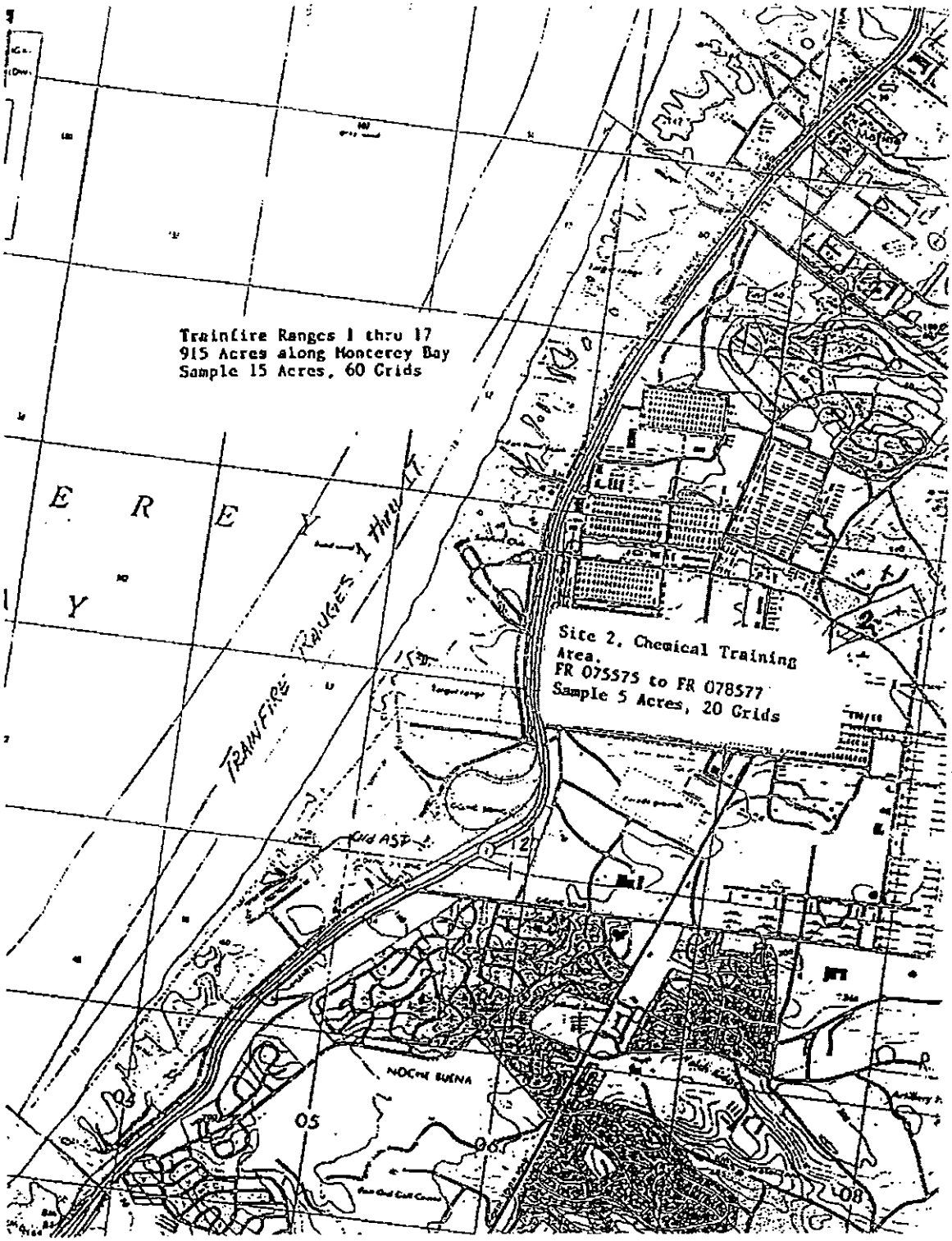
Sampling Grid

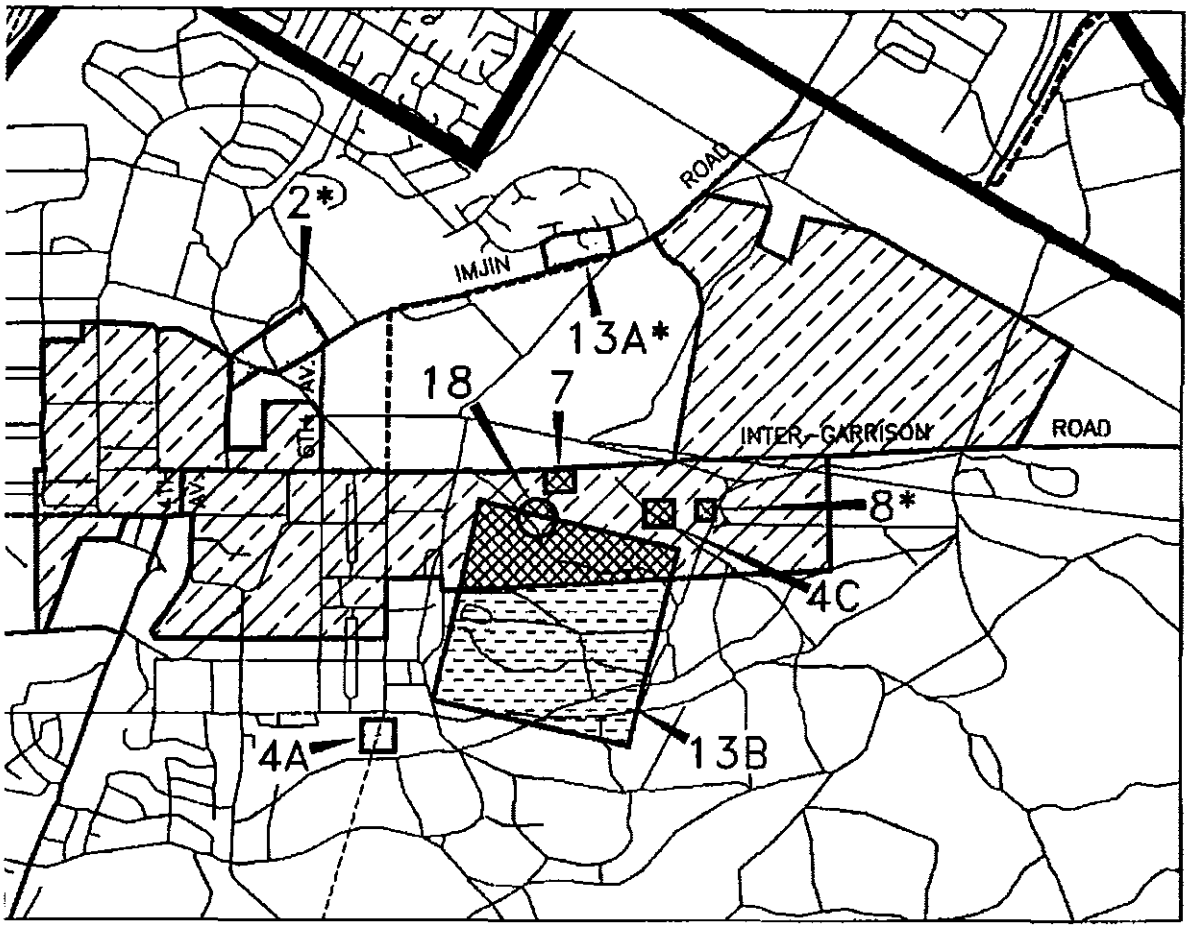
Former Fort
Presidio of Mon

Site
Sample Grids,

Scale: 1"= 650'

Figure 3


Trainfire Ranges 1 thru 17
915 Acres along Monterey Bay
Sample 15 Acres, 60 Grids
Site 2, Chemical Training Area.
FR 075575 to FR 078577
Sample 5 Acres, 20 Grids
TRAINFIRE RANGES 1 thru 17
NOCHE BUENA
05
06
08



UXO SITE LEG

SITE	DESCRIPTION
1*	
2*	
3*	
4A*	
4B*	
4C	
5	
6*	
7	
8	
9*	
10	
11	
12	
13A*	
13B	
14	
15	
16	
17	
18	
19	
20*	
21	
22*	

* AS OF 20 MAY 1994 THESE SITES DETERMINED TO BE UXO FREE

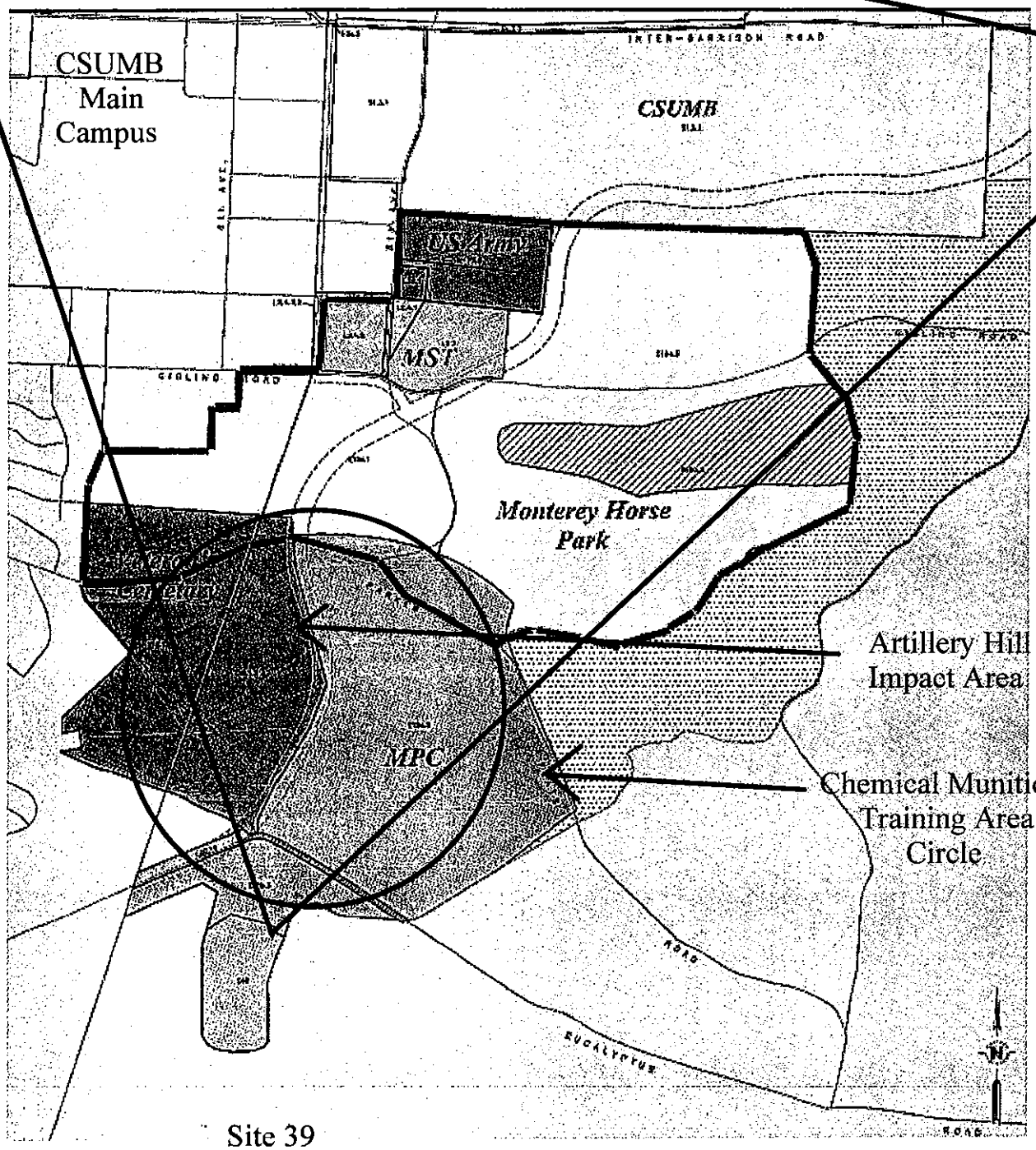
CURRENT OEW CRITICAL REMOVAL

- REMOVAL ACTIONS IN PROGRESS
- SITE SAMPLED, ADDITIONAL REMOVAL ACTIONS R
- NO REMOVAL ACTIONS REQUIRED
- CSUMB CAMPUS SITE
- FORT ORD BASE BOUNDARY

0 300 600
SCALE IN FEET

NORTH

Horse Park Location



Site 39

Approximate location of Chemical Warfare Material (CWM) training Triangle

Former Fort Ord Training Area / Parker Flats

FIELD TRAINING

Training during the early forties was still based on tactics used during World War I. The equipment used at that time was just as outdated.

CERCLA Requirement

Baseline Risk Assessment

CFR §300.430(d)(4)
(d) Remedial investigation. (1) The purpose of the remedial investigation (RI) is to collect data necessary to adequately characterize the site for the purpose of developing and evaluating effective remedial alternatives. To characterize the site, the lead agency shall, as appropriate, conduct field investigations, including treatability studies, and conduct a base line risk assessment. The RI provides information to assess the risks to human health and the environment and to support the development, evaluation, and selection of appropriate response alternatives. Site characterization may be conducted in one or more phases to focus sampling efforts and increase the efficiency of the investigation. Because estimates of actual or potential exposures and associated impacts on human and environmental receptors may be refined throughout the phases the RI as new information is obtained, site characterization activities should be fully integrated with the development and evaluation of alternatives in the feasibility study. Bench-or pilot-scale treatability studies shall be conducted, when appropriate and practicable, to provide additional data for the detailed analysis and to support engineering design of remedial alternatives.

(4) Using the data developed under paragraphs (d)(1) and (2) of this section, the lead agency shall conduct a site specific base line risk assessment to characterize the current and potential threats to human health and the environment that may be posed by contaminates migrating to ground water or surface water, releasing to air, leaching through soil, remaining in the soil, and bio accumulating in the food chain. The results of the base line risk assessment will help establish acceptable exposure levels for use in developing remedial alternatives in the FS, as described in paragraph (e) of this section

Mustard Agent HD

Physiological effects

Mustard gas has extremely powerful vesicant effects on its victims. Additionally, it is strongly mutagenic and carcinogenic, due to its alkylating properties. It is also lipophilic. Because people exposed to mustard gas rarely suffer immediate symptoms, and mustard-contaminated areas may appear completely normal, victims can unknowingly receive high dosages. However, within 6 to 24 hours of exposure to mustard agent, victims experience intense itching and skin irritation which gradually turns into large blisters filled with yellow fluid wherever the mustard agent contacted the skin. These are chemical burns and they are very debilitating. If the victim's eyes were exposed then they become sore, starting with conjunctivitis, after which the eyelids swell, resulting in temporary blindness. According to the Medical Management of Chemical Casualties handbook, there have been experimental cases in humans where the patient has suffered miosis, or pinpointing of pupils, as a result of the cholinomimetic activity of mustard. At very high concentrations, if inhaled, mustard agent causes bleeding and blistering within the respiratory system, damaging mucous membranes and causing pulmonary edema. Depending on the level of contamination, mustard gas burns can vary between first and second degree burns, though they can also be every bit as severe, disfiguring and dangerous as third degree burns. Severe mustard gas burns (i.e. where more than 50% of the victim's skin has been burned) are often fatal, with death occurring after some days or even weeks have passed. Mild or moderate exposure to mustard agent is unlikely to kill, though victims invariably require lengthy periods of medical treatment and convalescence before recovery is complete. The mutagenic and carcinogenic effects of mustard agent mean that victims who recover from mustard gas burns have an increased risk of developing cancer in later life.

Source:
http://en.wikipedia.org/wiki/Sulfur_mustard

Additional information:
http://emedicine.medscape.com/article/832060-overview

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March 24, 2010

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Environmental and Natural Resources
P.O. Box 5004
Monterey, Ca 93944-5004

California Assemblyman **Bill Monning**
U.S. Congressman **Sam Farr**
Fort Ord Reuse Authority (FORA) **Board of Directors**
City of Marina Mayor **Bruce Delgado and City Council members**
City of Seaside Mayor **Ralph Rubio and City Council members**
U.S. EPA, Region 9
Monterey Bay Unified **Air Pollution** Control District - Board of Directors
California Regional **Water Quality** Control Board - Board of Directors
California EPA Department of **Toxic Substance Control**
Monterey County Health Department-**Environmental Health Division**

RE: Former Fort Ord Pesticide Use and the effects on human health as dealt with by the cleanup effort. Community Right-To-Know

US EPA Definition of pesticide: www.epa.gov/pesticides/about/index.htm#what_pesticide
A pesticide is any substance or mixture of substances intended for: preventing, destroying, repelling, or mitigating any pest. "pests" include: insects, mice and other animals, unwanted plants (weeds), fungi, microorganisms such as bacteria and viruses, and pirons.

The Fort Ord SuperFund Cleanup has grossly ignored the danger from the wide range of toxic pesticides used for decades throughout former Fort Ord.

Despite clear evidence of long term widespread pesticide use, the Fort Ord Superfund Cleanup has failed to:

1) establish a basewide pesticide sampling protocol,

2) sample for all the pesticides known to have been used on base,

3) identify pesticides potentially used on base, and

4) analyze and determine exposure risks.

Thousands of acres have been transferred for recreational, residential and commercial use under this cleanup standard. To ignore past pesticide use at Fort Ord causes public health hazards. Allowing people to live in areas where these pesticides are found is a potentially deadly accident waiting to happen. Unfortunately, it will be uninformed mothers, infants, and children who will unknowingly be exposed to these contaminates who will suffer the most.

History of pesticide use:

For several decades, Fort Ord had a routine pesticide program. Pesticides were applied by air and ground to manage pests (rodents, insects, fungi, and vegetation) throughout Fort Ord. Pesticides were applied to training areas, training ranges, cantonment areas, golf courses, housing, schools, parks and food service areas.

While not fully known at the time, there are a wide range of serious health impacts from exposure to pesticides. Some of the pesticides at levels of a couple parts per billion can adversely affect humans, mammals and other living organisms. Fort Ord likely has a toxic brew of pesticide residuals that have never been quantified.

Intentionally Burning Fort Ord Creates Pesticide Laden Smoke:

Thousands of acres of training areas and ranges have been burned off over the years in the name of cleanup. In 2003 alone, 1500 acres of training ranges were burned, making hundreds of people sick. To our knowledge, pesticides have not been evaluated for any of the burns. The Fort Ord munitions cleanup intends to continue this practice for another 12 to 15 years.

In spite of the ARMY's refusal to help , we now know that pesticides, including DDT, were used for training area control of rodents, insects, weeds, and heavy brush. The use of pesticides at Fort Ord has been withheld from the public until very late in the cleanup. The Superfund program at former Fort Ord's failure includes:

- Failure to thoroughly investigate the use and fate of pesticides, herbicides, rodenticides, and fungicides.
- Failure to include meaningful public participation, inclusion in the Base Closure Team (BCT) or the Technical Review Committee (TRC) meetings.
- Failure to make vital documents available to the public in a timely manner.
- Failure to analyze vegetation uptake of pesticide before conducting burns.
- Failure to use sound scientific sampling methods. Statistical Sampling and Statistical Methodologies are relied upon to determine levels of, and risks from contaminates that are not uniformly distributed. Assumptions may be deadly.
- Failure by the regulatory agencies to recognize vital, clear information from early cleanup documents and require research on pesticide use at Fort Ord..
- Failure to require a uniform sampling model where pesticides would be looked for throughout the known pesticide use area, Fort Ord, wall to wall.

How can anyone morally allow this to continue?

Public Participation Failure:
The California EPA authorized Fort Ord Community Advisory Group (FOCAG) has repeatedly requested information regarding the uses and quantities of pesticides used at Fort Ord to no avail. This is a pattern with the Fort Ord Superfund project. As a result of the FOCAG's research, a very disturbing discovery has been made.

The Fort Ord adopted scientific rational to ignore pesticide contamination:

Quote: Basewide Background Soil Investigation draft 1992; BW-0289

"The goal of this investigation was to estimate the upper-limit threshold of background soil concentrations for pesticide and the 13 priority pollutant metals analyzed during the Fort Ord investigations"

"Pesticide residues were detected primarily in agricultural soils, in 10 of the 33 off base surface soil samples. However, only 1 out of 17 onbase background surface soil samples contained pesticide. This dissimilar detection frequency indicates that sample location (and land use) significantly influences background concentrations of pesticides. Furthermore, the low detection frequency onbase makes it difficult to develop background threshold vales for pesticides in onbase Fort Ord soils. The low frequency of detected pesticides suggests that onbase pesticide residue levels a relatively low compared to off base locations. **Until further site investigations indicate otherwise, pesticide threshold values are assumed to be no detect by EPA Test Method 8080 detection limits."**

Fort Ord Superfund Guidance Document; pesticide sampling eliminated:

Quote: Basewide Background Soil Investigation final 1995; BW-1283E Basewide RI/FS

"Pesticide residues were detected, in 10 of the 33 offbase surface soil samples, primarily in ***agricultural soils***. However, only 1 out of 17 onbase background surface soil samples contained pesticides. This dissimilar detection frequency indicates that sample location (and land use) significantly influenced background concentrations of pesticides. The low frequency of detected pesticides suggests that concentrations of pesticide residues onbase are relatively low compared to offbase locations. However, **the low detection frequency onbase precludes the estimation of background threshold values for pesticides in onbase Fort Ord soils."** (no further investigation)

Finding:
The Fort Ord investigation of pesticides was halted based on a comparison with nearby agriculture fields with known high rates of pesticide application . They arbitrarily chose 8 organochlorine pesticides and **did not sample for any herbicides or rodenticides.** No one should have been surprised when they found more organochlorine pesticides in agriculture fields.

In using this cherry picking approach, the ARMY declared all other pesticides known and potentially used at Fort Ord were irrelevant and excluded from any future sampling. The FOCAG cannot find any documentation that included the public in the Scoping of the Basewide Background Soil Investigation or formulation of a sampling rational for pesticides.

Question:
When will a public scoping meeting for a meaningful pesticide investigation begin?

48 Pesticides Known as used at Fort Ord:
Calcium Cyanide Gas, Mercury, DDT, DDD, DDE, 2,4-D, Malathion, Chlordane, Dieldrin, Warfarin, Diazinon, Baygon, Altosid SR-10, Tordon 101, Hyvar X, Sevin (Carbyrl Dust), 1080, Diphacinone, Chlorophacinone, Zinc Phosphide, Endrin, Heptachlor Epoxide, Gamma-BHC, Derzan-T, Derzvan, Methyl Bromide, Cyntroid 3-EC, Pyrethrum, Permaguard, Ficam W, Gophercide, Diphacin, Weed-Rhap LY-4P, Monuron, Ded-Weed Silvex LV , Simazine, Aertex, Paraquat CL, Banvel, Betasan, Trexsan, Amino Triazole, Amitrol-T, Diquat, Tok-E-25, Surflan, Enide, Metalde HTDE, Arochlor 1254. (References below, attachment 1)
Note: **2,4,D** is a primary chemical in Agent Orange and Agent Purple.

Several of these toxics are known to cause Cancer and Reproductive harm; they are suspected of a huge range of harm to humans and wildlife.

Pesticides Potentially used or tested at Fort Ord
We would like the soils tested for TCDD ("**Agent Orange**" or 2,3,7,8-tetrachloridebenzo-dioxin), 2,4,5,-T, and other **Dioxin** laden pesticides which may have been used or tested at Fort Ord.

The FOCAG believes it imperative that previous heavy pesticide uses at former Fort Ord be seriously investigated and cleaned up.

Sampling needs to be done and a plan established that involves meaningful public participation. The health and safety of current and future residents is at risk. The grading and the resulting dust are putting residents and neighbors at risk daily.

Please place the entirety of this letter in the Fort Ord Administrative Record.

With all due respect,

Fort Ord Community Advisory Group

Copy to: Fort Ord Environmental Justice Network

Attachments:
1) Former Fort Ord identified pesticides; Types and Health data: 7 pages
2) Pesticide types and uses; Excerpts from BW-0013 and BW-2427: 7 pages

Former Fort Ord Pesticide Use; Research Documents:
Available at Fort Ord Administrative Record; http://fortordcleanup.com/adminrec/arsearch.asp
enter record number, example: BW-0013
1) Fort Ord Installation Assessment 1983; BW-0013, pesticide types and uses
2) Fort Ord Base Closure Preliminary Assessment 1990; BW-2427, pesticide types and uses
3) Fort Ord Literature review and Base Inventory Report Vol I, 1991; RIFS BW-0136
4) Fort Ord Basewide Background Soil Investigation draft 1992; BW-0289
5) Fort Ord Basewide Background Soil Investigation draft final 1993; BW-0352
6) Fort Ord Basewide Background Soil Investigation final 1995; BW-I283E Basewide RI/FS
7) Fort Ord 2003 Burn ATSDR Health Consultation; OE-0522

Full Addresses of addressees --

Board of Directors
Fort Ord Reuse Authority (FORA)
Environmental Services
c/o Stan Cook
100 12th St, Building 2880
Marina, CA 93933

U.S. Congressman Sam Farr
c/o Salinas Office
100 West Alisal St
Salinas, CA 93901

California Assemblyman Bill Monning
c/o Monterey Office
99 Pacific St, Suite 555D
Monterey, CA 93940

Mayor Bruce Delgado
City Council members
City of Marina
c/o Marina City Hall
211 Hillcrest Ave
Marina, CA 93933

Mayor Ralph Rubio, and
City Council Members
City of Seaside
c/o Seaside City Hall
440 Harcourt Ave
Seaside, CA 93955

U.S. EPA, Region 9
c/o Judy Huang
75 Hawthorne St
San Francisco, CA 94105

California EPA
Department of Toxic Substance Control
c/o Roman Racca
8800 Cal Center Drive
Sacramento, CA 95826

Board of Directors
California Regional Water Quality Control Board
c/o Grant Himebaugh
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401

Board of Directors
Monterey Bay Unified Air
Pollution Control District
24580 Silver Cloud Court
Monterey, CA 93940

Director Allen J. Stroh
Monterey County Health Department-
Environmental Health Division Administration
1270 Natividad Road
Salinas, CA 93906

Attachment 1

Fort Ord identified pesticides; Types and Health data:
Note: Health data compiled from Scorecard database

Gamma-BHC (Lindane): CAS #: 58-89-9
Recognized: Carcinogen P65,
Suspected: Cardiovascular or Blood Toxicant EPA-HEN HAZMAP MALA RTECS, Developmental Toxicant ATSDR EPA-SARA, Endocrine Toxicant BKH JNIHS KEIT WWF, Gastrointestinal or Liver Toxicant EPA-HEN RTECS, Immunotoxicant ATSDR EPA-HEN RTECS, Kidney Toxicant KLAA MERCK OEHHA-CREL, Neurotoxicant DAN EPA-HEN EVAN RTECS, Reproductive Toxicant EPA-SARA FRAZIER JANK, Respiratory Toxicant EPA-HEN RTECS, Skin or Sense Organ Toxicant HARV RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=58%2d89%2d9

Heptachlor Epoxide: CAS #: 1024-57-3
Recognized: Carcinogen P65,
Suspected: Endocrine Toxicant IL-EPA JNIHS KEIT WWF
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=1024-57-3

Dieldrin: CAS #:60-57-1
Recognized: Carcinogen P65,
Suspected: Cardiovascular or Blood Toxicant HAZMAP LADO RTECS, Endocrine Toxicant GUIL IL-EPA JNIHS KEIT WWF, Gastrointestinal or Liver Toxicant ATSDR RTECS, Immunotoxicant RTECS, Kidney Toxicant MERCK, Neurotoxicant ATSDR DAN EVAN RTECS, Reproductive Toxicant JANK, Respiratory Toxicant RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=+60-57-1

Endrin: CAS #: 72-20-8
Recognized: Developmental Toxicant P65,
Suspected: Cardiovascular or Blood Toxicant RTECS, Endocrine Toxicant IL-EPA JNIHS, Gastrointestinal or Liver Toxicant RTECS, Kidney Toxicant MERCK RTECS, Neurotoxicant ATSDR DAN RTECS, Reproductive
Toxicant JANK, Respiratory Toxicant RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=72%2d20%2d8

4,4'-DDT: CAS #: 50-29-3
Recognized: Carcinogen P65, Developmental Toxicant P65, Reproductive Toxicant P65,
Suspected: Cardiovascular or Blood Toxicant LADO MALA RTECS, Endocrine Toxicant BKH BRUC IL-EPA JNIHS KEIT RTECS WWF, Gastrointestinal or Liver Toxicant ATSDR MALA RTECS, Immunotoxicant RTECS, Kidney Toxicant MERCK, Neurotoxicant DAN EVAN FELD RTECS, Respiratory Toxicant RTECS, Skin or Sense Organ Toxicant RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=+50-29-3

4,4'-DDE: CAS #: 72-55-9
Recognized: Carcinogen P65,

Suspected: Endocrine Toxicant BRUC GUIL IL-EPA JNIHS KEIT WWF, Gastrointestinal or Liver Toxicant RTECS, Neurotoxicant EPA-HEN
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=72%2d55%2d9

4,4'-DDD: CAS #: 72-54-8
Recognized: Carcinogen P65,
Suspected: Endocrine Toxicant BRUC IL-EPA JNIHS KEIT, Neurotoxicant RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=72%2d54%2d8

Chlordane: CAS #: 57-74-9
Recognized: Carcinogen P65,
Suspected: Cardiovascular or Blood Toxicant EPA-HEN MALA, Developmental Toxicant ATSDR EPA-SARA, Endocrine Toxicant BKH IL-EPA JNIHS WWF, Gastrointestinal or Liver Toxicant ATSDR EPA-HEN RTECS, Kidney Toxicant MERCK, Neurotoxicant DAN EPA-HEN EPA-SARA RTECS, Reproductive Toxicant EPA-SARA, Respiratory Toxicant RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=57%2d74%2d9

Zinc phosphide: CAS# 1314-84-7
Suspected: Gastrointestinal or Liver Toxicant RTECS, Neurotoxicant RTECS, Respiratory Toxicant RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=1314%2d84%2d7

Chlorophacinone: CAS# 3691-35-8
Suspected: Cardiovascular or Blood Toxicant RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=3691%2d35%2d8

Diphacinone: CAS# 82-66-6
No health data
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=82%2d66%2d6

Calcium cyanide gas: CAS# 592-01-8
No health data
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=592%2d01%2d8

1080 (Fluoroacetic Acid, Sodium Salt): CAS# 62-74-8
Recognized: Reproductive Toxicant P65,
Suspected: Cardiovascular or Blood Toxicant RTECS, Neurotoxicant EPA-TRI HAZMAP RTECS, Respiratory Toxicant RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=62%2d74%2d8

Sevin (carbyrl dust): CAS# 63-25-2
Suspected: Carcinogen OPP-CAN, Cardiovascular or Blood Toxicant RTECS, Developmental Toxicant EPA-SARA JANK, Endocrine Toxicant JNIHS KEIT WWF, Gastrointestinal or Liver Toxicant RTECS, Immunotoxicant HAZMAP, Musculoskeletal Toxicant EPA-HEN, Neurotoxicant DAN DPR-CIP EPA-HEN EPA-SARA MASL RTECS, Reproductive Toxicant EPA-SARA FRAZIER, Skin or Sense Organ Toxicant HAZMAP
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=63%2d25%2d2

Hyvar X (Bromacil): CAS# 314-40-9
Suspected: Carcinogen OPP-CAN, Endocrine Toxicant EPA-TRI
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=314%2d40%2d9

2,4-D: CAS# 94-75-7
Suspected: Carcinogen HAZMAP, Cardiovascular or Blood Toxicant RTECS, Developmental Toxicant EPA-SARA, Endocrine Toxicant IL-EPA JNIHS KEIT, Gastrointestinal or Liver Toxicant EPA-HEN RTECS, Neurotoxicant EPA-HEN EVAN RTECS STAC, Reproductive Toxicant EPA-SARA FRAZIER HAZMAP JANK, Respiratory Toxicant RTECS, Skin or Sense Organ Toxicant EPA-HEN RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=94%2d75%2d7

Tordon 101 (Picloram): CAS# 1918-02-1
Suspected: Endocrine Toxicant RTECS, Gastrointestinal or Liver Toxicant EPA-TRI RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=1918%2d02%2d1

Malathion: CAS# 121-75-5
Suspected: Cardiovascular or Blood Toxicant RTECS, Endocrine Toxicant BRUC JNIHS KEIT WWF, Gastrointestinal or Liver Toxicant RTECS, Immunotoxicant HAZMAP, Neurotoxicant ATSDR DAN DPR-CIP EPA-TRI MASL RTECS, Reproductive Toxicant FRAZIER, Respiratory Toxicant ATSDR RTECS, Skin or Sense Organ Toxicant HAZMAP RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=121%2d75%2d5

Altosid SR-10 (Methoprene) CAS# 40596-69-8
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=40596%2d69%2d8
No health data

Mercury: CAS #: 7439-97-6
Recognized: Developmental Toxicant P65,
Suspected: Cardiovascular or Blood Toxicant KLAA, Endocrine Toxicant IL-EPA KEIT WWF, Gastrointestinal or Liver Toxicant RTECS STAC, Immunotoxicant HAZMAP SNCI, Kidney Toxicant HAZMAP KLAA LAND MERCK STAC, Neurotoxicant ATSDR

DAN EPA-HEN EPA-SARA FELD, HAZMAP KLAA OEHHA-CREL RTECS STAC, Reproductive Toxicant EPA-SARA FRAZIER HAZMAP OEHHA-AREL, Respiratory Toxicant HAZMAP NEME, Skin or Sense Organ Toxicant HAZMAP KLAA RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=7439%2d97%2d6

Warfarin: CAS# 81-81-2
Recognized: Developmental Toxicant P65,
Suspected: Cardiovascular or Blood Toxicant RTECS, Gastrointestinal or Liver Toxicant RTECS, Neurotoxicant RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=81%2d81%2d2

Baygon (Propoxur): CAS# 114-26-1
Suspected: Carcinogen OPP-CAN P65-CAND, Cardiovascular or Blood Toxicant RTECS Neurotoxicant DPR-CIP EPA-HEN MASL RTECS, Reproductive Toxicant JANK
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=114%2d26%2d1

Diazinon: CAS# 333-41-5
Suspected: Cardiovascular or Blood Toxicant RTECS, Developmental Toxicant EPA-TRI JANK, Gastrointestinal or Liver Toxicant RTECS, Neurotoxicant ATSDR DAN DPR-CIP EPA-TRI MASL RTECS, Reproductive Toxicant FRAZIER, Skin or Sense Organ Toxicant RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=333%2d41%2d5

Derzvan:
No data found

Methyl Bromide CAS #: 74-83-9
Recognized: Developmental Toxicant P65,
Suspected: Cardiovascular or Blood Toxicant KLAA RTECS, Gastrointestinal or Liver Toxicant ATSDR RTECS, Kidney Toxicant RTECS, Neurotoxicant ATSDR DAN EPA-HEN EPA-SARA HAZMAP KLAA OEHHA-AREL OEHHA-CREL RTECS STAC, Reproductive Toxicant FRAZIER, Respiratory Toxicant EPA-HEN HAZMAP OEHHA-CREL RTECS, Skin or Sense Organ Toxicant HAZMAP KLAA LOCK RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=74%2d83%2d9

Cyntroid 3-EC
No data found

Pyrethrum CAS #: 8003-34-7
Suspected: Carcinogen OPP-CAN, Gastrointestinal or Liver Toxicant RTECS, Immunotoxicant HAZMAP, Respiratory Toxicant HAZMAP, Skin or Sense Organ Toxicant HAZMAP
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=8003%2d34%2d7

Permaguard
No data found

Ficam W (bendiocarb) CAS #: 22781-23-3
Suspected: Neurotoxicant DPR-CIP EPA-TRI
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=22781%2d23%2d3

Gophercide (Chlorophacinone) CAS #: 3691-35-8
PANNA bad actor, highly toxic
http://www.pesticideinfo.org/Summary_Chemical.jsp?Rec_Id=PC35308

Diphacin (Diphacinone) CAS #: 82-66-6
PANNA bad actor, highly toxic
http://www.pesticideinfo.org/Summary_Chemical.jsp?Rec_Id=PC35081

Weed-Rhap LY-4P (Methoxone) CAS #: 94-74-6
Suspected: Cardiovascular or Blood Toxicant RTECS, Gastrointestinal or Liver Toxicant EPA-TRI, Kidney Toxicant EPA-TRI, Neurotoxicant RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=94%2d74%2d6

Monuron CAS #: 150-68-5
Suspected: Cardiovascular or Blood Toxicant HAZMAP, Gastrointestinal or Liver Toxicant RTECS, Respiratory Toxicant RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=150%2d68%2d5

Ded-Weed Silvex LV (2,4,5-TP) CAS #: 93-72-1
Suspected: Carcinogen HAZMAP, Endocrine Toxicant IL-EPA JNIHS KEIT, Neurotoxicant DAN, Reproductive Toxicant HAZMAP JANK
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=93%2d76%2d5

Simazine CAS #: 122-34-9
Suspected: Carcinogen OPP-CAN, Cardiovascular or Blood Toxicant RTECS, Endocrine Toxicant JNIHS, Gastrointestinal or Liver Toxicant EPA-TRI, Kidney Toxicant EPA-TRI, Neurotoxicant RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=122%2d34%2d9

Paraquat CL (Paraquat) CAS #: 1910-42-5
Suspected: Carcinogen IRIS, Cardiovascular or Blood Toxicant KLAA, Gastrointestinal or Liver Toxicant DOSS MALA RTECS ZIMM, Kidney Toxicant HAZMAP KLAA MERCK RTECS STAC, Neurotoxicant DAN RTECS, Reproductive Toxicant FRAZIER, Respiratory Toxicant EPA-TRI FOTH HAZMAP RTECS, Skin or Sense Organ Toxicant HAZMAP
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=1910%2d42%2d5

Aertex (Atrazine) CAS #: 1912-24-9
Suspected: Carcinogen EPA-TRI NTP-BR OEHHA-TCD SCDM, Endocrine Toxicant BKH GUIL IL-EPA JNIHS KEIT WWF, Gastrointestinal or Liver Toxicant RTECS, Immunotoxicant EEC, Neurotoxicant DAN, Reproductive Toxicant ATSDR JANK, Skin or Sense Organ Toxicant EEC HAZMAP
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=1912%2d24%2d9

Banvel (Dimethylaminel Dicamba) CAS #: 2300-66-5
Suspected: Developmental Toxicant EPA-TRI
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=2300%2d66%2d5

Betasan (Bensulide) CAS #: 741-58-2
Suspected: Neurotoxicant DPR-CIP
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=741%2d58%2d2

Trexsan
No data found

Amino Triazole (Amitrole) CAS #: 61-82-5
Recognized: Carcinogen P65
Suspected: Developmental Toxicant JANK, Endocrine Toxicant BRUC EPA-SDWA IL-EPA JNIHS KEIT RTECS WWF
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=61%2d82%2d5

Amitrol-T (Amitrole) CAS #: 61-82-5
Recognized: Carcinogen P65
Suspected: Developmental Toxicant JANK, Endocrine Toxicant BRUC EPA-SDWA IL-EPA JNIHS KEIT RTECS WWF

Diquat CAS #: 85-00-7
Suspected: Kidney Toxicant HAZMAP KLAA STAC, Neurotoxicant DAN, Skin or Sense Organ Toxicant LU
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=85%2d00%2d7

Tok E-25 (Nitrofen) CAS #: 1836-75-5
Recognized: Carcinogen P65
Suspected: Cardiovascular or Blood Toxicant RTECS, Developmental Toxicant EPA-SARA JANK, Endocrine Toxicant EPA-SDWA JNIHS KEIT WWF, Gastrointestinal or Liver Toxicant RTECS, Neurotoxicant EPA-SARA RTECS, Reproductive Toxicant EPA-SARA, Respiratory Toxicant RTECS
http://www.scorecard.org/chemical-profiles/product.tcl?reg_nr=00070706609&prod_name=TOK%20E-25

Surflan (Oryzalin) CAS #: 19044-88-3
Suspected: Carcinogen IRIS OPP-CAN, Cardiovascular or Blood Toxicant EPA-TRI,

Endocrine Toxicant JNIHS, Gastrointestinal or Liver Toxicant EPA-TRI
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=19044%2d88%2d3

Enide
No data found

Metalde HTDE (Metacetaldehyde) CAS #: 108-62-3
Suspected: Neurotoxicant RTECS
http://scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=108%2d62%2d3

Arochlor 1254 CAS #: 11097-69-1
Recognized: Carcinogen P65-MC, Developmental Toxicant P65-MC
Suspected: Cardiovascular or Blood Toxicant RTECS, Endocrine Toxicant BKH, Gastrointestinal or Liver Toxicant RTECS, Immunotoxicant ATSDR, Neurotoxicant ATSDR, Reproductive Toxicant HAZMAP, Skin or Sense Organ Toxicant HAZMAP RTECS

Attachment 2

Fort Ord Installation Assessment 1983; BW-0013

Pesticides

At the time of the team's visit, all pesticide (insecticide, herbicide, rodenticide) application was done by trained and certified post personnel from the Directorate of Engineering and Housing (DEH) Pest Control Office, which has the responsibility for FO and its subinstallations. However, herbicides are reportedly applied on the post golf course by golf course personnel, uncertified in pesticide application, but closely supervised by pest management personnel.

Pest control report DD Form 1532 is compiled monthly by the Pest Control Office and reviewed by the Preventive Medicine Activity (PVNTMED) as required by Army regulation 420-76. However, it was reported that in the past herbicides from the golf course were stored in an unapproved location, and usage was improperly reported on DD Form 1532. This has since been corrected. IMPROPER HERB STORAGE

Pesticide, rodenticides, squirrel control at garrison and range areas

Current pesticide application consists primarily of various rodenticides in the garrison and range areas to control the ground squirrel population. Ground squirrels are an ideal host for fleas, including those infected with bubonic plague. The fleas live on these rodents and in their burrows and nesting locations. Starting at the lower food chain, these squirrels are subject to the carnivores and, if infected with the plague, can in turn eventually infect man via the flea itself or the infected animal. Additionally, squirrels are the leading cause of structural damage to manmade facilities onpost [Lettermen Army Institute of Research (LAIR), 1977].

Pesticide, range areas, extremely toxic applied aerially

Ground squirrel control is the major pest control operation and it is reported that contracts to alleviate this problem will be awarded in FY82. The Pest Control Office was trying to control the ground squirrel

population by maintaining them at low levels in the range areas and eradicating them in the cantonment and housing areas. Rodenticides (such as zinc phosphide) were baited in the range lands, and chlorophacinone and diphacinone (mild anticoagulants) were baited in the cantonment areas. Prior to February 1972, an extremely toxic rodenticide, 1080, an anticoagulant containing sodium fluoroacetate, was applied both aerially and as a bait. The use of this material (1080) was discontinued after the issuance of Executive Order 11643, titled: Environmental Safeguards on Activities for Animal Damage Control on Federal Lands (Sixth U.S. Army Medical Laboratory, 1974). However, it is still used in the surrounding county by the civilian population.

Squirrel control, poison, smoke bombs

In addition to anticoagulant poison baits, other methods of ground squirrel control were utilized, such as the use of calcium cyanide gas cartridges in the burrows and nests of squirrels located in the open areas. Another method reportedly used was having uncertified pest control summer employees locate nests, cover all exits but one, and drop smoke bombs in the remaining entrance.

Another method in the attempt to prevent possible outbreaks of bubonic plague was to eliminate the flea itself and not the host. This method is achieved through the application of sevin (carbyrl dust) in and around the rodent nests. Squirrels found dead were reported to be buried on location to prevent possible secondary killing of animals likely to eat dead squirrels containing lethal quantities of poison. Other methods of control have been trapping and shooting. Despite these control programs, plague has broken out on occasion at FO and its subinstallations.

Pesticide application monthly food establishments

Pesticides are applied on a monthly schedule at food handling establishments as preventive maintenance against cockroaches. All other applications are done on an as-needed basis and include: spraying malathion at the landfill and latrines to control annoying flies and in muddy low areas to reduce mosquito breeding, and spraying herbicides

Herbicides nonselective weed killers, training areas

with nonselective and preemergent weed killers such as Hyvar X, 2,4-D, and Tordon 101 to control poison oak and thick brush in the training areas and dandelions on the golf course. It was reported that mosquito control at Mud Hen Lake and East Garrison Lake was handled on a regular basis by the Northern Salinas Valley Mosquito Abatement District through the use of malathion and Altosid SR-10, a growth regulator. Additionally, the Linda Vista Landscaping Co. is responsible for fertilizing trees, shrubs, and lawns.

Although FO has both a complete Spill Prevention Control and Countermeasure (SPCC) plan and an Installation Spill Contingency Plan (ISCP), the Fire Department does not maintain records of current quantities and types of pesticides being used by the pest controllers. In the future, the Fire Department, under the ISCP, will maintain inventories and locations of toxic and hazardous materials including pesticides.

Currently, all pesticides are stored in Bldg. 4912. The concrete building has an exhaust fan and is properly vented. The 1-room building is unbermed; has incompatible storage of rodenticides, insecticides, and herbicides within the same room; and does not have inventories of pesticides stored within posted as required by Army regulations (U.S. Army 1978) and Federal regulations (EPA, 1981e). Pesticides are inventoried quarterly, and records are kept on file with the post agronomist and Pest Control foreman. A list of these pesticides is included in App. D.

The mixing facility is located in Bldg. 4897, a concrete building subdivided into several maintenance activities. The pesticide mixing area is properly sealed from the rest of the workshop. It has a concrete floor and is properly vented. It is, however, unbermed and an open French drain to the sand under the foundation is located next to the mixing sink. This is not in compliance with Federal regulations (EPA, 1981e). Rinse water is recycled.

At present, there are neither a formally approved pest control standing operating procedure (SOP) nor an Installation Pest Management Program. Currently, a formal pest control SOP is being prepared by the post agronomist to update and standardize operations.

Expended pesticide containers are triple-rinsed and crushed for disposal at the landfill. Protective clothing is sent to the post laundry daily and washed separately from other clothing. There have never been any pesticide spills reported. A trash can full of sawdust absorbent is kept on hand in the event that a spill may have to be contained.

3.5.5 PESTICIDE MIXING AND STORAGE AREAS

3.5.5.1 Description

Pesticides are currently stored and mixed at the pesticide shop facilities located in the Building 2076 complex at the former Main Garrison STP (operated by the DEH) and in Building 4109 at the golf course, as shown in Figures 3-2a and 3-2c, respectively (AREE 18). At the time of the site visit, DEH was in the process of moving the pesticide operations to the former STP location; therefore, operations at this new facility could not be assessed. Herbicides are also stored at the golf course building [R-1].

Former locations of pesticide mixing and/or storage areas include Buildings 4897, 4913, 142, and 2992, as shown on Figures 3-2d, 3-2e, 3-2f, and 3-2h. In addition, pesticides were reportedly stored in the past in the East Garrison at Building 142, as shown on Figure 3-2h. Most currently, all pesticides were stored in Building 4913, a concrete, unbermed, 1-room building where incompatible storage of pesticides, herbicides, and insecticides occurred in the past [R-22]. The pesticide mixing area was most recently located in Building 4897, a concrete and metal building subdivided into separate work and maintenance areas. This building has an unbermed concrete floor and there is an open french drain (to the soil below the building) located next to the sink used to mix pesticides.

Standard practices for pesticide mixing by DEH-supervised personnel [R-3, R-22] includes triple rinsing of used pesticide containers and recycling of rinse water. The empty, rinsed cans are disposed of offsite in a Class III landfill and in the past were disposed of at the onsite landfill. Types of pesticides used at Ord include Warfarin, lindane, chlordane, Sevin, Baygon, Diazinon, Derzvan, and malathion.

Building 2992 was utilized in the past to store rodenticides; use of these pest controls at Ord includes zinc phosphide, Sevin, and anticoagulants. Application of pesticides at Ord is discussed in Subsection 3.15.

3.5.5.2 Known and Suspected Releases

According to site reports [R-22], pesticide mixing operations at Ord have been well-maintained operations without obvious spillage. However, the potential exists for isolated spills to have occurred at any of the storage or mixing facilities. In addition, in the past triple-rinsed drained containers were disposed of in the onsite landfill. However, the potential environmental threat due to this disposal activity is low because of the rinsing process.

3.15.3 PESTICIDE USAGE

3.15.3.1 Description

Application of all pesticides, including insecticides, herbicides and rodenticides (AREE 61), is reportedly done by trained and certified post personnel from the DEH Pest Control Office. However, herbicides are reportedly applied on the post golf course by golf course personnel, who are uncertified in pesticide application but are closely supervised by pest management personnel.

Pest control report DD Form 1532 is compiled monthly by the Pest Control Office and reviewed by the Preventive Medicine Activity (PVNTMED), as required by Army regulation 420-76. However, it was reported that in the past herbicides from

Various rodenticides in the Garrison and range areas

the golf course were stored in an unapproved location, and usage was improperly reported on DD Form 1531. This has since been corrected.

Current pesticide application consists primarily of various rodenticides in the garrison and range areas to control the ground squirrel population. Ground squirrels are an ideal host for fleas, including those infected with bubonic plague. The fleas live on these rodents and in their burrows and nesting locations. Starting at the lower food chain, these squirrels are subject to the carnivores and, if infected with the plague, can in turn eventually infect man via the flea itself or the infected animal. In addition, squirrels are the leading cause of structural damage to manmade facilities onpost [R-3].

Ground squirrel control is the major pest control operation at Ord. The Pest Control Office was trying to control the ground squirrel population by maintaining them at low levels in the range areas and eradicating them in the cantonment and housing areas. Rodenticides (such as zinc phosphide) were baited in the range lands, and chlorophacinone and diphacinone (mild anticoagulants) were baited in the cantonment areas. Prior to February 1972, an extremely toxic rodenticide, 1080, a citric acid cycle inhibitor containing sodium fluoroacetate, was applied both aerially and as a bait. The use of 1080 was discontinued after the issuance of Executive Order 11643, entitled Environmental Safeguards on Activities for Animal Damage Control on Federal Lands [R-3].

In addition to anticoagulant poison baits, other methods of ground squirrel control were used, such as calcium cyanide gas cartridges in the burrows and nests of squirrels located in the open areas. Another method reportedly used was to have uncertified summer employees locate nests, cover all exits but one, and drop smoke bombs into the remaining entrance.

Herbicides in training areas to control poison oak and thick brush.

Another method in the attempt to prevent possible outbreaks of bubonic plague was to eliminate the flea itself and not the host. This consisted of applying sevin (carbayrl dust) in and around the rodent nests. Squirrels found dead were reported to be buried on location to prevent possible secondary killing of animals likely to eat dead squirrels containing lethal quantities of poison. Other methods of control have been trapping and shooting. Despite these control programs, plague has broken out on occasion at Ord and its subinstallations.

Pesticides are applied on a monthly schedule at food handling establishments as preventive maintenance against cockroaches. All other applications, which are done on an as-needed basis, include spraying malathion at the landfill and latrines to control annoying flies and in muddy low areas to reduce mosquito breeding, and spraying herbicides with nonselective and pre-emergent weed killers such as Hyvar X, 2,4-D, and Tordon 101 to control poison oak and thick brush in the training areas and dandelions on the golf course. It was reported that mosquito control at Mud Hen Lake and East Garrison Lake was handled on a regular basis by the Northern Salinas Valley Mosquito Abatement District through the use of malathion

and Altosid SR-10, a growth regulator. The Linda Vista Landscaping Company is responsible for fertilizing trees, shrubs, and lawns [R-3]. In addition, pesticides are and have been used periodically in housing areas on an as-needed basis. Interviews with the site personnel indicate that chlordane was used in the foundation areas of some of the older base housing units and that DERZAN-T has been used in new housing units for termite control since about 1975 [I-3, I-9].

A hearsay report [I-3] indicates that mercury compounds may have been applied to the golf course for control of fungus.

3.15.3.2 Known and Suspected Releases

Pesticides have been applied in many areas at Ord. In most cases, the quantity of pesticides applied in a given area has been minimal and does not constitute a concern for further evaluation. However, at the golf course, the possibility exists that herbicides may have been improperly stored or applied (in addition to the possible application of mercury compounds).

APPENDIX G

Response to Comments on Draft Final Group 3 RI/FS

Response to Comments
Draft Final Group 3 Remedial Investigation / Feasibility Study, dated February 8, 2011
Review Comments provided by Gail Youngblood of the Army, dated March 3, 2011

No.	Comment Type / Report Section	Comment/Response
1	Volume 2: Risk Assessment; Page 5-2, Section 5.3 MEC Density Input and Section 5.4 MEC Depth Input (MOUT Site MRA Risk Assessment)	**Comment:** In response to comments on the draft version of the document, additional text has been included to provide the rationale for selecting the MEC Density input score for the MOUT Site MRA. It describes that the selection of MEC Density input score of 3 (medium density) [in conjunction with the MEC Depth input of 8 (any MEC on the surface) for all MEC Hazard Type (1, 2 and 3)] was based on the worst-case scenario for the site, i.e. previously-removed MEC items were assumed to be present on the surface; and the same items were again assumed to be present in the subsurface. We are concerned with the overly conservative nature of the scoring process. The Fort Ord MEC Risk Assessment Protocol was developed incorporating conservative integration of input factors, and was designed to assess risk based on input factors that reflect actual or expected site conditions. Therefore it is not necessary to intentionally select higher (more conservative) scores for any of the individual input factors. The assumption that surface MEC of Hazard Type 3 at medium density exist across the MOUT training area is not consistent with the Conceptual Site Model (CSM) described in Volume 1, Remedial Investigation. Therefore the risk assessment section should be updated to either: assess the CSM scenario; or include an explicit explanation that the scenario being assessed does not represent the actual condition of the site and that the site is safe for the current designated uses. In addition, data from the MOUT training area was used to estimate the worst-case extent of MEC potentially present in the Barloy Canyon Road parcel. Please either revise the risk assessment or provide an explicit explanation that the modeled scenario does not represent the actual site conditions. Please see MEC risk assessment for the Parker Flats MRA in *Final Track 2 Munitions Response Remedial Investigation/Feasibility Study Parker Flats Munitions Response Area* (OE-0523N), which is an example of how the Fort Ord MEC Risk Assessment Protocol (OE-0420G) has been implemented at the former Fort Ord. **Response:** The risk assessment for the Military Operations in Urban Terrain (MOUT) Site Munitions Response Area (MRA) has been revised to more accurately assess the CSM scenario. Revisions were made to Sections 5.1, 5.3, 5.4, 5.7, 5.8, and 5.9 of the risk assessment. In addition, Section 6.2.2.2 of Volume 1 and Sections 2.3.1.3, 2.3.2.3, 3.2.2, and 5.3.1 of Volume 3 have been updated to reflect revisions to the risk assessment. Clarification has also been made in Section 5.3 of the risk assessment regarding data used for the calculation of potential munitions and explosives of

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		concern (MEC) density for the Barloy Canyon Road portion and MOUT training area of the MOUT Site MRA. Corresponding Table 5-3 has been revised to specify that the MEC densities presented are for USACE Parcels F1.7.2 and L20.8. Through consultation with the regulatory agencies and the Army, an instrument-aided field verification survey in the unburned portion of the MOUT Site MRA, where the time-critical removal action (TCRA) was not performed, was completed by the Environmental Services Cooperative Agreement Remediation Program (ESCA RP) Team in February, 2012. The data collected during the field verification survey have been included in the remedial investigation as Appendix E and have been incorporated into the risk assessment. The feasibility study has been revised as appropriate.
2	Volume 2: Risk Assessment; Page 4-3, Section 4.3 MEC Density Input and Section 4.4 MEC Depth Input (Laguna Seca Parking MRA Risk Assessment)	**Comment:** In response to comments on the draft version of the document, additional text has been included to provide the rationale for selecting the MEC Density input score for the 1-ft removal section of MRS-14A. Similarly, we are concerned with the overly conservative assumptions used in the scoring. Previously-removed MEC items (from surface and 1-ft depth) were assumed to be present in the subsurface below 1-ft depth even though the MEC items previously encountered in the area were noted as non-penetrating types such as flares and signals. As demonstrated in the MEC risk assessment conducted for the Parker Flats MRA, the MEC density estimate can be refined based on currently available data. Please either revise the risk assessment or provide an explicit explanation that the modeled scenario does not represent the actual site conditions. **Response:** The risk assessment for the Laguna Seca Parking MRA has been revised to more accurately assess the CSM scenario, which included Sections 4.1, 4.3, 4.4, 4.7, 4.8, and 4.9. In addition, Section 5.2.2.2 of Volume 1 and Sections 2.3.2.2, 3.2.2, and 5.2.1 of Volume 3 have been updated to reflect revisions to the risk assessment.
3	Volume 3: Feasibility Study; Table 5-10	**Comment:** Footnote 3 (regarding habitat monitoring) has been deleted. For this alternative, which entails subsurface MEC remediation in the entire Laguna Seca MRA, wetland monitoring for California Tiger Salamanders would be required. Recommend adding a footnote or adding the estimated cost of wetland monitoring. **Response:** The following footnote has been added to Table 5-10:

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		"[2] = Includes monitoring for California Tiger Salamander (CTS) during excavation within the 2km boundary of an aquatic feature that could serve as breeding habitat for CTS."

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No.	Comment Type / Report Section	Comment/Response
1	Volume 1: Remedial Investigation; Page 5-21, Section 5.2.3 Collection and Management of Field Data	**Comment:** Please delete text "However, upon review, the grid sheet recording the 176 electric blasting caps…is missing." This (and another) grid sheet is available as noted in response to Army detail comment 8. **Response:** The quoted text has been deleted from Page 5-21.
2	Volume 3: Feasibility Study; Page 4-1, Section 4.4 Alternative 4 – Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls	**Comment:** Please delete text "to include excavation" at the end of the first paragraph. In Section 3.2.2.9, large-scale excavation and sifting was determined as not applicable to the three MRAs. **Response:** The last sentence of the first paragraph of Section 4.4 has been revised as follows: "These areas would be candidates for subsurface MEC removals ~~to include excavation~~."
3	Volume 3: Feasibility Study; Table 5-6	**Comment:** Footnote 3 notes the habitat monitoring requirement for 13 years (DRO/Monterey Alternative 3). With regard to the cost it has been revised to read that FORA would be responsible for the post-remediation habitat monitoring costs until site closeout in accordance with the ESCA (rather than "until property transfer"). It is our understanding that the habitat monitoring tasks and making a conclusion that the habitat has recovered, are part of implementing the remedy (under this Alternative), therefore, are part of the requirements to achieve Site Closeout. The current text is not totally clear since FORA is scheduled to sunset before the 13 years and so leaves the possibility of misinterpretation that Site Closeout might be obtainable before confirming the successful recovery of the habitat. **Response:** Footnote 3 has been revised as follows: "Annualized unit cost for maintaining roads, fuel-breaks, performing invasive weed control, and species monitoring. ~~Costs assumed by FORA until FORA land is transferred~~ ***For costing purposes,*** HMP annual monitoring plants assumed to be monitored during 3 events in the first five years and HMP habitat reserve species (e.g., chaparral) assumed to be monitored during 5 events in the first 13 years. Includes mapping, data management/evaluation, preparation of reports."

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4	Volume 3: Feasibility Study; Table 5-7	**Comment:** Please make the same updates as was made to Footnote 7 in Table 5-6 regarding the cost of habitat monitoring (DRO/Monterey Alternative 4). Why is the habitat monitoring applied for 6 acres when overall additional MEC remediation area is 5 acres? **Response:** The additional MEC remediation area is 5 acres and includes the roadway parcels and associated fencing. No MEC remediation was proposed for the habitat reserve parcel under this remedial alternative; therefore, the cost section for habitat management has been deleted from Table 5-6.
5	Volume 3: Feasibility Study; Table 5-15	**Comment:** Table 5-15 has a blank cell. **Response:** Table 5-15 has been completed by adding an open circle representing "Does not meet the CERCLA criteria" to the blank cell (Reduction of Toxicity, Mobility, and Volume Through Treatment under Alternative 1 – No Further Action).

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Review Comments provided by Dan Amadeo of the Marina in Motion, dated March 12, 2011

No.	Comment Type / Report Section	Comment/Response
	Cover Letter Comment	**Comment:** Please accept MIM's Technical Advisor's comments attached at enclosure. We again appreciate the time allowed to review such a critical series of documents which will provide the foundation for the Record of Decision of these areas in the future. Unfortunately, as this report is presented, it is extremely difficult and not cost effective to review fifteen years of historical remedial investigation/removal actions documents in analysis of the final draft. As a result, MIM typically cannot comment on conclusions and recommendations of remediation efforts already completed. However, we do suggest that when remediation and clearance of areas has occurred sometime in the past, that, as a minimum, prior to concluding those efforts fulfilled the intended purpose that a sampling plan using current state of the art technologies be considered to further verify the conclusions of these historical documents. Strict reliance on past efforts which were likely very valid at the time conducted may not be deemed complete today as improvements in MEC investigative planning and technologies have occurred since the original effort. These improvements may detect anomalies previous technologies would not have been capable of doing and thus influence the final recommendation. **Response:** This comment has been noted. Please see response to Marina in Motion's General Comment 1.
1	General Comment	**Comment:** The RI of these three MRAs was based entirely on the review of historical investigations and removal actions performed by the Army and its contractors. It appears no field verification sampling was performed by FORA to validate the accuracy of the historical Army documents associated with the RI activities. Instead, in validating the quality of these investigations and removal actions, the Fort Ord Redevelopment Authority (FORA) evaluated previous investigations and removal actions including 1) the adequacy of the previous investigations and removal actions; 2) the effectiveness of the equipment used based upon its implementation and maintenance records, and 3) the accuracy and consistency of data records. It is apparent that FORA invested a significant amount of time and effort in the development of this RI/FS document. The summaries of each of the Group 3 MRA historical land uses, investigations, and removal actions are important tools to be used as background in the formation of the Army's Proposed Plan and Record of Decision (ROD). However for MiM to concur with the conclusions of this RI/FS report, we must rely only on the information

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		provided, without the opportunity for an independent review of these same documents. Much of the critical information associated with these investigations and removal actions is summarized in this RI/FS report; however, MiM cannot validate the RI's adequacy without being provided the opportunity to review and independently interpret the site specific documents FORA relied on to develop the RI. However, MiM has no intention, time, or funds to review the volume of documents referenced in the RI. Instead MiM provides these comments simply to assist FORA in performing a level of environmental due diligence necessary to base their RI, RA, and FS conclusions. Finally, MiM believes that as part of FORA's remedial investigation, some degree of verification sampling needs to be performed in each of the MRAs. The review of verification sampling, using state of the art geophysical equipment and agreed upon data quality objectives and QA/QC plans, would provide MiM greater comfort with the reliability of historical investigation and removal action reports. **Response:** The remedial investigation for the Group 3 MRA is based on all available data, including historical information and MEC investigations and removal actions as referenced in the document. The MEC investigations and removal actions were conducted by the Army prior to the ESCA. During the remedial investigation the results of prior Army investigation and removal actions were reviewed in accordance with the data validation process identified in the Final Group 3 RI/FS Work Plan (Fort Ord Administrative Record ESCA-0241). Specific items addressed during the evaluation were provided in the munitions response activity evaluation checklists included in Appendix E of the Work Plan. The evaluation process takes into account the quality and quantity of the available data, the work completed, and the intended future land uses. If the evaluation of the previous work indicated that the Army's previous work was not adequate, FORA would prepare a work plan to conduct additional investigation activities. Based upon the analysis conducted in the Group 3 RI, additional investigation was not deemed necessary as the data was of sufficient quality and quantity to proceed to the risk assessment and feasibility study. To supplement the Group 3 RI/FS, FORA conducted a field verification survey in a portion of the MOUT training facility in the MOUT Site MRA.
2	General Comment	**Comment:** One potential concern with the quality of historical investigations is reliance on SiteStat/GridStat (SS/GS) in locating munitions and explosives of concern (MEC). In January 2001, U.S. EPA published interim guidance on the use of

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		SS/GS, identifying numerous concerns with its use, including: · The ability of SS/GS and UXO Calculator to locate Unexploded Ordnance (UXO) clusters (e.g., target impact areas) and the boundaries of UXO contaminated areas; · Whether the assumption of homogeneity of UXO used in these techniques is valid; · The extent to which an area is classified as "homogeneous;" · The statistical validity of assessing sector non-homogeneity; · The consistency/reproducibility of results; · A problem in the algorithm and confidence intervals for UXO Calculator; and · Variability in UXO estimates and exposure scenarios. It is unclear whether these issues were understood at the time of SS/GS use, and if modifications to site investigations were implemented to address these concerns. Did FORA look into these concerns to adjust any of its RI interpretations based on these concerns? **Response:** The remedial investigation does not rely solely on the results of the SiteStat/GridStat (SS/GS) investigations. The remedial investigation for Group 3 MRAs is based on all available data including historical information, MEC investigations and MEC removal actions. The data from SS/GS investigations is included in the information used for the study; however, the remedial investigation does not utilize the SS/GS and UXO Calculator statistical tools.
3	General Comment	**Comment:** The RI provides limited information regarding the regulatory frameworks followed by the Army and its contractors during the investigations and response actions of each munitions response sites (MRS). Were these conducted under the Comprehensive Environmental Response and Compensation Liability Act (CERCLA)? What regulatory oversight was involved in investigative and remedial work plans? Were there regulatory concurrence letters associated with each investigation work plan and after action reports? Were "no further action" letters issued by regulatory agencies? Was the public part of this review/oversight process? **Response:** Fort Ord is an NPL site. The investigation and remedial actions are conducted in accordance with CERCLA, the NCP, and the Fort Ord Federal Facility Agreement (FFA). As described in Section 1.2.1, the Army agreed to evaluate MEC at the former Fort Ord and perform a basewide munitions response (MR) RI/FS consistent with CERCLA in November 1998. The basewide MR RI/FS program addressed MEC hazards at the former Fort Ord and evaluated past

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		removal actions as well as recommended future remedial actions deemed necessary to protect human health and the environment under future uses. In April 2000, an agreement was signed between the Army, EPA, and DTSC to evaluate MEC at the former Fort Ord subject to the regulatory oversight provisions of the FFA. Prior to the MR RI/FS, the regulatory agencies were provided copies of work plans and after action reports for removal actions. The agencies had the opportunity to provide input during MEC removal; however, the removal actions were ultimately completed by the Army using its delegated removal authority under CERCLA. For documents that were reviewed, regulatory agency comments and concurrence letters are available on the Fort Ord Administrative Record. "No Further Action" letters have not been issued by the regulatory agencies for the Group 3 MRAs as the final remedial decisions for the Group 3 MRAs will be documented in a Record of Decision (ROD). The Fort Ord Cleanup Program maintains an extensive community outreach program to keep the public informed about the cleanup activities at the former Fort Ord and provide opportunities for the public to participate in decisions before they are made. The Army works in partnership with the FORA ESCA RP to provide the community with information and documents for the entire cleanup.
1	Specific Comment; Volume 1; Section 1.2.4	**Comment:** Prior to removal from the Group 3 RI/FS, how did the Summary of Existing Data Report (SEDR) characterize the potential presence of MEC in the Interim Action Ranges MRA? How and what was discovered in the Interim Action Ranges MRA that resulted in it being removed from the Group 3 RI/FS? Why does FORA believe historical investigations did not locate these recently discovered MEC? The report should address the circumstances that lead to the removal of the Interim Action Ranges MRA from Group 3 RI/FS. **Response:** As described in the SEDR, the Interim Action Ranges MRA contained special case areas (SCAs) and non-completed areas (NCAs) where MEC interim remedial action activities were not completed for a variety of reasons. As described in the Final Interim Action Ranges Work Plan (Fort Ord Administrative Record No. ESCA-0252B) prepared by the ESCA RP Team, the discovery of two 40mm projectiles within an SCA located in the Interim Action Ranges MRA indicated that sensitively fuzed munitions may still remain within the SCAs and NCAs of the MRA. Therefore, further evaluation will be conducted and a separate RI/FS will be prepared for the Interim Action Ranges MRA. Section 1.2.4 has been revised as follows:

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		"The Interim Action Ranges MRA was included in the Group 3 RI/FS Work Plan; however, it is not presented in this RI/FS Report. The Interim Action Ranges MRA has been removed from this Group 3 RI/FS report for further evaluation as agreed upon by FORA, the EPA, DTSC, and the Army ***and as described in the Interim Action Ranges Work Plan (ESCA RP Team 2011).***"
2	Specific Comment; Volume 1; Section 2.5.1	**Comment:** The report is confusing when in this section it states, "The DRO/Monterey MRA encompasses approximately 29 acres of undeveloped land (Parcels E29.1 and L6.2) and 5.245 acres of a portion of the existing South Boundary Road and associated right-of-way (Parcels L20.13.2 and L20.13.3.1.). To facilitate previous MEC investigations and removal activities, the area was divided into Munitions Response Sites (MRSs)" (emphasis added). However, in Section 4.0 the report states that "The only MRS associated with the DRO/Monterey MRA was MRS-43." The report should clarify the number of MRSs in this MRA. **Response:** The second paragraph of Section 2.5.1 has been revised as follows: "The DRO/Monterey MRA encompasses approximately 29 acres of undeveloped land (Parcels E29.1 and L6.2) and 5.245 acres of a portion of the existing South Boundary Road and associated right-of-way (Parcels L20.13.2 and L20.13.3.1.). To facilitate previous MEC investigations and removal activities, the area was ~~divided into~~ ***designated as a*** Munitions Response Site~~s~~ (MRS~~s~~). The MRS~~s were~~ ***was*** identified through a review of Fort Ord records completed for the Revised Fort Ord Archive Search Report (ASR; USACE 1997a). The DRO/Monterey MRA is comprised of two non-contiguous portions of MRS-43 and a portion of the South Boundary Road, which is not located within the boundaries of an MRS (Figure 2-3). The DRO/Monterey MRA is bounded by MRS-15 DRO.1 along the northern side of South Boundary Road and by Track 1 sites to the northwest (no MRS designation) and southeast (formerly MRS-43A)."
3	Specific Comment; Volume 1; Section 4.1	**Comment:** As with many military installations, historical records associated with the use of DRO/Monterey MRA are unclear and can be contradictory. While this section states, "An interview included in the 1997 ASR indicated that a portion of a ridge in the area of the DRO/Monterey MRA served as a backstop for rifle grenades and shoulder-launched projectiles from 1942 to 1944 and that firing positions were located along South Boundary Road (USACE 1997a)(this according to the 1997 ASR, the former Fire Chief Fred Stephani), the section concludes, "…based on the review of historical aerial photographs and training facility maps, there was no indication that the area was used as a firing range."

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		In addition, Section 4.1.1.3, the report states, "Review of 1950s era training and facility maps indicated no military activity in the vicinity of the DRO/Monterey MRA" but in the same section the report states, "A 1953 Training Area map shows that the area encompassing the DRO/Monterey MRA was assigned to the 11th Infantry (Army 1954). Clarification is necessary when historical records in the report are inconsistent or do not correspond with personal interviews. **Section 4.1.3.2** This section states, "Based on the types of MEC and MD identified in the Army's MMRP database as being found within and in the vicinity of the MRA, rifle grenade training occurred within the DRO/Monterey MRA during the 1940s, as discussed in Section 4.5." However, Section 4.4 concludes, "However, based on the review of historical aerial photographs and training facility maps, there was no visible indication that artillery training, including the use of 37mm projectiles, took place on portions of MRS-43 and the DRO/Monterey MRA." It's unclear whether these statements are contradictory or instead that rifle grenades were not considered part of artillery training. As stated in comment 3 above, historical records at most military installations are incomplete and often contradict themselves. In this report, when there are historical contradictions, it is unclear which assumption FORA uses to base historical use conclusions. It may be appropriate to place a statement in the text that historical records are not always reliable and are used as tools with other information such as field investigation and removal action reports. **Response:** Section 4.1 of Volume 1 is intended to provide a summary of the review of the historical maps and aerial photographs. Subsequent sections are meant to elaborate on the analysis leading to the final conclusion of historical use provided in the Conceptual Site Model in Section 4.5. To clarify Section 4.1.1.3, the first paragraph of this section has been revised as follows: "Review of 1950s era training and facility maps ~~indicated~~ ***provided*** no ***indication of specific*** military activity in the vicinity of the DRO/Monterey MRA." In addition, Section 4.1.4 has been revised as follows: "A review of the historical aerial photographs and training maps indicate that historical records for MRS-43 and the DRO/Monterey

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		MRA were incomplete for the1940s. ***Based on the review of historical aerial photographs and training facility maps, there was no visible indication that artillery training, including the use of 37mm projectiles, took place on portions of MRS-43 and the DRO/Monterey MRA. However, the Army's contractor conducting activities in support of ordnance and explosives inspection at MRS-43 found evidence of military training related to 37mm projectiles in a portion of MRS-43***. ***In addition, a*** ~~A~~ statement in the 1997 ASR indicated that the area of MRS-43 served as a backstop for rifle grenades and shoulder-launched projectiles from 1942 to 1944 and that firing positions were located along the South Boundary Road. ~~In addition, the Army's contractor conducting activities in support of ordnance and explosives inspection at MRS-43 found evidence of military training related to 37mm projectiles. However, based on the review of historical aerial photographs and training facility maps, there was no visible indication that artillery training, including the use of 37mm projectiles, took place on portions of MRS-43 and the DRO/Monterey MRA.~~
4	Specific Comment; Volume 1; Section 4.2.1.1	**Comment:** It is difficult for MiM to understand the extent of previous MEC investigations and removal actions based on this section's narrative and Figure 4.1. What is the percentage of geophysical coverage throughout DRO/Monterey MRA through the various investigations and removal actions? How many follow-up grids were placed outside the original SS/GS locations? Did the investigations cover the ridge described by Fire Chief Stephani? **Response:** Section 4.2.1.1 and Figure 4-1 present the results of the grid sampling and SS/GS investigations. As described in Section 4.2.1.3 and 4.2.1.4 and shown on Figure 4-2, the DRO/Monterey MRA (including the previous SS/GS grids and the sampling grids) were subjected to two subsequent removal actions, which included the ridge within the MRA.
5	Specific Comment; Volume 1; Section 4.2.1.2	**Comment:** This section states, "The result of the grid sampling investigation indicated that MEC and MD related to hand grenades (single burial pit with 23 MEC items) and 37mm projectiles were found in MRS-43(USA 2001b). The MEC was not found within the boundaries of the DRO/Monterey MRA." Does MRA-43 extend outside the DRO/Monterey MRA or does this refer to the area between the non-contiguous MRA parcels? **Response:**

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		The boundaries of MRS-43 are shown on Figure 2-3. As shown on Figure 2-3, portions of MRS-43 are located outside of the DRO/Monterey MRA. The locations of MEC and munitions debris (MD) recovered from MRS-43 are presented in Appendix A.
6	Specific Comment; Volume 1; Section 4.2.5	**Comment:** The section states, "A review of the DRO/Monterey MRA boundaries and the MRS boundaries indicates that previous investigations and removal actions were conducted across the entire MRA with the exception of two small areas." Is it correct to assume that 100% geophysical coverage and clearance was completed in this MRA (with the exception of the two areas). Why were the two areas not included in previous investigations, and were visual surveys performed? **Response:** The MRA is defined by the transfer parcel which is off-set from the MRS-43 boundary. MRS-43 covers the majority of the DRO/Monterey MRA. As described in Section 4.2.1.3 and 4.2.1.4 and shown on Figure 4-2, MRS-43 was subjected to two removal actions following the SS/GS sampling and grid sampling investigations. The two areas of the DRO/Monterey MRA that were not included in the removal actions are located outside of the boundaries of MRS-43. The end of Section 4.2.5 has been revised as follows: "The DRO/Monterey MRA boundaries are based on property transfer parcel boundaries as provided by the Army. A review of the DRO/Monterey MRA boundaries and the MRS boundaries indicates that previous investigations and removal actions were conducted across the entire ***MRS-43, which includes the DRO/Monterey*** MRA ***and several parcels located outside the boundaries of the MRA***. ***T***wo ***small*** areas within the DRO/Monterey MRA that have not been part of ~~previous~~ investigations and removal actions ***and are located outside the boundaries of an MRS*** include ***the following***: · A narrow strip of land approximately 50 ft wide and 900 ft long (approximately one acre) on the northwestern boundary of the MRA. ***As shown on Figure 4-1, a portion of one SS/GS grid was located within this area. No MEC or MD items were recovered within this grid during the SS/GS investigations.*** As shown in Plates A1 and A2 in Appendix A, the amount of recovered MD ***in the adjacent MRS-43*** decreases in the westerly direction. Within approximately 100 ft from this strip of land there were two MEC finds: one find of 2 sticks of TNT and one find of a discarded M2

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		series ignition cartridge. On the other side of this strip of land is land transfer Parcel L6.1, which is a Track 1 Site. · A narrow strip of land on the southern side of South Boundary Road to the east of Parcel E29.1 (parallel to the road). The road is on one side and the Track 1 Plug-In Site L4.1 ***(which includes MRS-43A)*** on the other side. ***Although no investigation or removal activities were conducted within the narrow strip of land on the southern side of South Boundary Road to the east of Parcel E29.1, several SS/GS sampling grids were located in MRS-43A, immediately adjacent to the south side of South Boundary Road (Figure 4-1). No MEC or MD items were found in the SS/GS grids located in the adjacent MRS-43A.*** While these two small areas have not been part of ~~an investigation or~~ a removal action, they are bounded by Track 1 Sites, a road, or an area of DRO/Monterey MRA in which very little MEC or debris was found. Therefore, it is expected that finding MEC in either of these two areas would not be very likely."
7	Specific Comment; Volume 1; Section 5.1.3.2	**Comment:** This section should refer to Figure 2-8, not Figure 2-9. In addition, in the 37mm Training section, it identifies the discovery of a M80 canister or projectile. Is there history of air to ground training at Ft Ord? If not, how was this discovery explained by the Army? **Response:** The text has been revised to refer to Figure 2-8. Approximately 17 MD, 1 insufficient data (ISD), and 1 M80 projectile MD (found in MRS-30), related to air-to-ground training, have been recovered at the former Fort Ord. The remedial investigation indicated no evidence that MEC 37mm M80 armor-piercing tracer projectiles are likely present in the Laguna Seca Parking MRA.

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8	Specific Comment; Volume 1; Section 5.2.4	**Comment:** This section states, "In general, the majority of existing records and data were complete and the removal actions were conducted in accordance with the work plan requirements." Were there instances of incomplete records and data that FORA identified for the Laguna Seca Parking MRA? How did this impact conclusions developed by FORA regarding the adequacy of the MRA's historical investigations and removal actions? **Response:** Section 5.2.3 describes the review and assessment of records and data for the Laguna Seca Parking MRA including identification of specific instances of incomplete or missing records. Identified instances of incomplete or missing records were considered in assessing the adequacy of the response actions and such instances were determined not to be significant enough to impact the defensibility of the data or adequacy of the response actions.
9	Specific Comment; Volume 1; Section 5.5.4	**Comment:** Approximately 20 "miscellaneous items" were identified in the Laguna Seca Parking MRA. This section states, "Because very few of the above listed items were found during the removal actions conducted within the Laguna Seca Parking MRA, it appears that there was no pattern of use to indicate training with these items in this area. It is not expected that additional items of the types listed above would remain in the Laguna Seca Parking MRA." What is the basis of this conclusion? **Response:** The conclusion that additional miscellaneous items are not expected to remain in the Laguna Seca Parking MRA is based on a review of each individual type of munitions. Very few of each type of munitions item were found during the removal action indicating no pattern of use. Given no evidence of training ranges or patterns of use for each of the miscellaneous items, additional items of the types listed are not expected to be present in the Laguna Seca Parking MRA.
10	Specific Comment; Volume 1; Section 5.6.1	**Comment:** Are there institutional controls associated with the Laguna Seca Parking MRA; will the future land use be limited to Laguna Seca Raceway events including parking, staging, and event-related roadway access along Barloy Canyon Road and South Boundary Road? **Response:** Section 2.6.8 discusses current and future land uses of the Laguna Seca

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		Parking MRA. Section 4.6.1 of Volume 2 also discusses the land use and current land use restrictions for the Laguna Seca Parking MRA.
11	Specific Comment; Volume 1; Section 6.2.1.3	**Comment:** This section states, "Schonstedt magnetometers were not used in the MOUT Site MRA to assist in the visual inspection (Shaw 2005). The AAR (After Action Report) did not contain a recommendation." This is unusual for a Time Critical Removal Action (TCRA); was there regulatory approval of the work plan and were there any follow-up activities associated with the TCRA? **Response:** The statement is correct; Schonstedt magnetometers were not used in the MOUT Site MRA. The Time Critical Removal Action was conducted by the Army in full coordination with the regulatory agencies. As required under CERCLA and the National Contingency Plan, the Action Memorandum (Army 2003; Administrative Record No. OE-0469) was signed by the Army. The work plan and the resulting AAR were fully coordinated with the regulatory agencies.
12	Specific Comment; Volume 1; Section 6.2.1.5	**Comment:** This section states, "The AAR recommended further removal actions in grids where MEC was found due to the expected penetration depth of some of the items." Were there follow-up investigations and removal actions in this area? **Response:** This specific recommendation was made for grids within the boundaries of MRS-14D that were located outside of the MOUT Site MRA. The text at the end of Section 6.2.1.5 has been revised as follows: "The AAR recommended further removal actions in grids where MEC was found due to the expected penetration depth of some of the items***. The grids recommended for removal actions were located within the boundaries of MRS-14D, though were outside of the MOUT Site MRA*** (USA 2001a)."
1	Specific Comment; Volume 2; Section 1.1	**Comment:** This section states, "According to CERCLA, the results of the risk assessment should help establish acceptable remediation levels for use in developing remedial alternatives during the FS." The assessment of risk under CERCLA normally looks at all exposure pathways prior to evaluating remedial alternatives. At Fort Ord, "Risk due to

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		potential chemical contamination in soil is addressed in the Basewide Range Assessment." MiM recommends that language be inserted in this report that describes how soil and other exposure pathways will be incorporated into these MRA's Records of Decision (RODs). **Response:** Potential human health and ecological risks related to soil contamination from military munitions uses are addressed in the following reports: · The "Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2," dated January 2012. (Administrative Record No. BW-2300L) · The "Final Feasibility Study Addendum, Site 39, Former Fort Ord, California," dated March 28, 2008. (Administrative Record No. BW-2423F) · The "Final Basewide Remedial Investigation/Feasibility Study (RI/FS), Fort Ord, California (binders 1 through 18)," dated October 1, 1995 provides information related to the RI/FS for Fort Ord and consists of 6 volumes. Volume I presents an overview and background on Fort Ord and summarizes the results of the Basewide RI/FS. Volume II presents the Remedial Investigations. Volume III presents the Baseline Human Health Risk Assessment. Volume IV presents the Baseline Ecological Risk Assessment. Volume V presents the Feasibility Study and Volume VI presents the response to agency comments received on the draft final version of the RI/FS. The information provided (as it related to Site 39) includes munitions constituents investigation and feasibility study information. (Administrative Record Nos. BW-1283A through BW-1283S). As stated in the FOSET5 (Administrative Record No. FOSET-004J), no further action related to munitions constituents in soil are recommended for the parcels that are the subject of the Group 3 RI/FS.
2	Specific Comment; Volume 2; Section 1.1.3	**Comment:** This section states, "...no further action has been recommended for historical areas (HAs) within the Laguna Seca Parking, MOUT Site, and DRO/Monterey MRAs. In addition, Laguna Seca Parking and MOUT Site MRAs are part of Installation Restoration Program (IRP) Site 39 at the former Fort Ord. Previous soil remediation activities were conducted as part of the Site 39 program, which has an existing ROD." Has soil risk been evaluated outside the HAs? In addition, it would be

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		beneficial if this report included a section describing what data the no further action decisions were based. Finally the report should define the process to incorporate the risk associated with all exposure pathways (i.e., soil, groundwater, surface water sediments, etc.) into the final remedies of the 3 MRAs. **Response:** Please see response to Marina in Motion Specific Comment Number 1 on Volume 2; Section 1.1.
3	Specific Comment; Volume 2; Section 1.2	**Comment:** MiM has not had the opportunity to review and provide comments on the use of the "Fort Ord MEC Risk Assessment Protocol" in defining risk associated with MEC exposure at Fort Ord. Therefore, at this time, MiM will not provide comments on the protocol's assumptions incorporated into this report. **Response:** The Fort Ord Risk Assessment Protocol is available on the Fort Ord Administrative Record (Fort Ord Administrative Record No. OE-0402G).
4	Specific Comment; Volume 2; Section 3.1	**Comment:** This section states, "While the two small portions of the MRA (approximately 50 ft wide along the northwestern edge of Parcel L6.2 and the south side of South Boundary Road east of Parcel E29.1) have not been subjected to removal actions or magnetometer investigations, they are bounded by either: approved Track 1 sites, a paved road, or an area of the DRO/Monterey MRA where few MEC or munitions debris (MD) items were found. Therefore, it is expected that finding MEC in either of these two small portions of the MRA would not be likely." It is not clear how this conclusion is supported in lieu of munitions debris (MD) being discovered adjacent to this area. What types of MD were discovered? **Response:** Please see the response to Marina in Motion Specific Comment Number 6 on Volume 1; Section 4.2.5. Section 3.1 has been revised as follows: "While the two small portions of the MRA (approximately 50 ft wide along the northwestern edge of Parcel L6.2 and the south side of South Boundary Road east of Parcel E29.1) have not been subjected to removal actions ~~or magnetometer investigations~~, ***MEC and munitions debris (MD) were not found in the SS/GS grids located partially in***

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		Parcel L6.2 or near the south side of South Boundary Road east of Parcel 29.1 and they are bounded by either: approved Track 1 sites, a paved road, or an area of the DRO/Monterey MRA where few MEC or ~~munitions debris (~~MD~~)~~ items were found. Therefore, it is expected that finding MEC in either of these two small portions of the MRA would not be likely."
5	Specific Comment; Volume 2; Section 3.2, Section 3.3, and Section 3.4	**Comment:** As stated in General Comment 1, MiM cannot validate the findings of the RI without an independent review of documents that formed the basis of the report. Without RI concurrence, MiM also can not verify and/or validate FORA's proposed MEC hazard type, MEC density, and MEC depth scores. In addition, without this validation, MiM cannot concur or refute FORA's Accessibility Factors, Overall Hazard Factors, and/or Exposure Factors and ultimately the DRO/Monterey MRA's overall MEC risk. **Response:** Please see the response to Marina in Motion General Comment Number 1 on Volume 1. The Fort Ord Risk Assessment Protocol is available on the Fort Ord Administrative Record (Fort Ord Administrative Record No. OE-0402G).
6	Specific Comment; Volume 2; Section 3.3	**Comment:** This section states, "In accordance with the RI, the distribution of MEC and MD at the DRO/Monterey MRA did not exhibit a pattern of use characteristic of a target range with identifiable and consistently used targets. The distribution did show patterns of use characteristic of weapons and troop training; however, the MRA was not indicated on historical training maps as being a training site or an impact area." MiM believes that reliance on historical Army documents (training maps) in defining past land use should not be relied on when field data indicates otherwise. **Response:** The determination of former uses of the Group 3 MRAs does not rely solely on training maps, but is based on the results of a comprehensive site evaluation presented in Volume 1, which included literature searches, review of archival information, review of aerial photographs, and the results of Army sampling and investigation activities. The section has been revised as follows: "In accordance with the RI, the distribution of MEC and MD at the DRO/Monterey MRA did not exhibit a pattern of use characteristic of a

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		target range with identifiable and consistently used targets. The distribution did show patterns of use characteristic of weapons and troop training~~; however~~, ***although*** the MRA was not indicated on historical training maps as being a training site~~ or an impact area~~. ***There was no indication in any of the information reviewed that the MRA was used as an impact area."***
7	Specific Comment; Volume 2; Section 3.6.1	**Comment:** This section states, "DTSC, the United States acting through the Army, and their contractors/agents shall have reasonable right-of-entry and access to the property for inspection, monitoring, testing, sampling, and other activities consistent with the covenant as deemed necessary by the DTSC in order to protect the public health and safety or the environment and oversee any required activities." Which agency is directly responsible for monitoring and enforcing land use restrictions in this MRA? **Response:** FORA, as the current landowner, is responsible for monitoring and enforcing the land use restrictions that are currently in place on the MRA. The responsibility will transfer to the local land use jurisdiction when FORA transfers the land. The current deed restriction would continue to apply to the MRA after transfer of the land if chosen as part of the remedy. If land use controls are selected as part of the remedy, this information will be included in the Land Use Controls Implementation Plan which will be submitted for public and agency review and comment following the Record of Decision for the Group 3 MRAs.
8	Specific Comment; Volume 2; Section 3.8.5	**Comment:** It is unclear how this section relates to MEC risk if "Risk due to potential chemical contamination in soil is addressed in the Basewide Range Assessment." **Response:** As stated in Section 1.1, risk due to potential chemical contamination in soil is addressed in the Basewide Range Assessment (BRA; Administrative Record No. BW-2300J). Therefore, only MEC are addressed in this risk assessment. As described in the risk assessment protocol, the intensity of contact with soil is an hours/day assessment of the receptor's contact with soil based on proposed site use as a component of assessing the level of potential exposure to MEC.
9	Specific	**Comment:**

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	Comment; Volume 2; Section 4.2, Section 4.3, and Section 4.4	As stated in General Comment 1, MiM cannot validate the findings of the RI without an independent review of documents that formed the basis of the report. Without RI concurrence, MiM also can not verify and/or validate FORA's proposed MEC hazard type, MEC density, and MEC depth scores. In addition, without this validation, MiM cannot concur or refute FORA's Accessibility Factors, Overall Hazard Factors, and/or Exposure Factors and ultimately the DRO/Monterey MRA's overall MEC risk. **Response:** Please see response to Marina in Motion General Comment Number 1 on Volume 1 and Specific Comment Number 5 on Volume 2; Sections 3.2, 3.3 and 3.4. The Fort Ord Risk Assessment Protocol is available on the Fort Ord Administrative Record (Fort Ord Administrative Record No. OE-0402G).
10	Specific Comment; Volume 2; Section 4.6.1	**Comment:** This section states, "DTSC, the United States acting through the Army, and their contractors/agents shall have reasonable right-of-entry and access to the property for inspection, monitoring, testing, sampling, and other activities consistent with the covenant as deemed necessary by the DTSC in order to protect the public health and safety or the environment and oversee any required activities." Which agency is directly responsible for monitoring and enforcing land use restrictions in this MRA? **Response:** Please see response to Marina in Motion Specific Comment Number 7 on Volume 2; Section 3.6.1.
11	Specific Comment; Volume 2; Section 4.8.5	**Comment:** It is unclear how this section relates to MEC risk if "Risk due to potential chemical contamination in soil is addressed in the Basewide Range Assessment." **Response:** Please see response to Marina in Motion Specific Comment Number 8 on Volume 2 Section 3.8.5.
12	Specific Comment; Volume 2; Section 5.2, Section 5.3 and	**Comment:** As stated in General Comment 1, MiM cannot validate the findings of the RI without an independent review of documents that formed the basis of the report. Without RI concurrence, MiM also can not verify and/or validate FORA's proposed MEC hazard type, MEC density, and MEC depth scores. In

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	Section 5.4	addition, without this validation, MiM cannot concur or refute FORA's Accessibility Factors, Overall Hazard Factors, and/or Exposure Factors and ultimately the DRO/Monterey MRA's overall MEC risk. **Response:** Please see response to Marina in Motion General Comment Number 1 on Volume 1 and Specific Comment Number 5 on Volume 2; Sections 3.2, 3.3 and 3.4. The Fort Ord Risk Assessment Protocol is available on the Fort Ord Administrative Record (Fort Ord Administrative Record No. OE-0402G).
13	Specific Comment; Volume 2; Section 5.6.1	**Comment:** This section states, "DTSC, the United States acting- through the Army, and their contractors/agents shall have reasonable right-of-entry and access to the property for inspection, monitoring, testing, sampling, and other activities consistent with the covenant as deemed necessary by the DTSC in order to protect the public health and safety or the environment and oversee any required activities." Which agency is directly responsible for monitoring and enforcing land use restrictions in this MRA? **Response:** Please see response to Marina in Motion Specific Comment Number 7 on Volume 2; Section 3.6.1.
14	Specific Comment; Volume 2; Section 5.8.5	**Comment:** It is unclear how this section relates to MEC risk if "Risk due to potential chemical contamination in soil is addressed in the Basewide Range Assessment." **Response:** Please see response to Marina in Motion Specific Comment Number 8 on Volume 2 Section 3.8.5.
1	Specific Comment; Volume 3; Section 2.0	**Comment:** In addition to EPA's "RI/FS Guidance," EPA has published additional guidance documents associated with MEC response actions. These include "EPA Handbook on the Management of Munitions Response Actions" and "EPA Munitions Response Guidelines." This guidance should be incorporated into this RI/FS document as necessary. **Response:** The cited EPA guidance documents are applicable to munitions response

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		actions; however, in preparing the RI/FS document, as discussed in this section, these particular guidance documents are not relevant. FORA will cite these guidance documents when appropriate.
2	Specific Comment; Volume 3; Section 2.1.1	**Comment:** This section states, "The regulatory agencies have expressed concern regarding the residual risk that remains after MEC removals have taken place, particularly in areas that are specified for residential development (i.e., unrestricted land use). In an effort to satisfy regulatory agency concerns, a QA process was developed that will allow the regulators to assess the previous removal actions and the acceptability of a parcel, where MEC removal was conducted, for residential use. The relevance and usefulness of this RQA process is being tested during the RQA Pilot Study." The details of the residential quality assurance (RQA) pilot study should be included in this report. In addition, there should be discussion as to how the results of the pilot study impacts the results of the Group 3 feasibility study. Finally, MiM questions why the RQA is limited to future residential use. MiM believes a RQA-type pilot study would be helpful in verifying residual risk from previous removals actions associated with all future land uses. **Response:** The RQA process is being developed for application to the portions of the former Fort Ord that are proposed for residential reuse in accordance with the terms of the Environmental Service Cooperative Agreement. Since residential reuse is not proposed for the Group 3 MRAs, the RQA pilot study does not impact the Group 3 feasibility study.
3	Specific Comment; Volume 3; Section 2.1.3	**Comment:** The section and associated Table 2-1 should include a description of how the land use covenants and other administrative controls will be monitored and enforced. **Response:** If land use controls are selected as part of the remedy, this type of information will be included in the Land Use Controls Implementation Plan which will be submitted for public and agency review and comment following the Record of Decision for the Group 3 MRAs.
4	Specific Comment; Volume 3; Section 2.4	**Comment:** This section states, "Based upon the risk assessment and the EPA's RI/FS Guidance, the following RAO was developed for the protection of human health and the environment for the Group 3 MRAs: Prevent or reduce the potential for the Group 3 MRA reuse receptors to come in direct contact with

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		MEC items potentially remaining in subsurface soil." According to Volume 1, small portions of the each of the MRAs were not included in removal actions. Why doesn't the remedial action objective (RAO) include the potential for receptors to also come in direct contact with MEC items potentially remaining in surface soil? **Response:** As described in the Group 3 RI/FS, areas within the DRO/Monterey and Laguna Seca Parking MRAs and the 600ft section of Parcel L20.8 in the MOUT Site MRA where removal actions were not completed are not expected to contain surface MEC. This is discussed in the following sections of the RI/FS; · DRO/Monterey MRA: Volume 1, Section 4.2.5 · Laguna Seca Parking MRA: Volume 3, Section 2.3.1.2 · MOUT Site MRA
5	Specific Comment; Volume 3; Section 3.2.1.2	**Comment:** This section states, "Administrative feasibility considerations may include: the ability to obtain permits and approvals from regulatory agencies and other offices" Typically, CERCLA response actions are exempted by law from the requirement to obtain Federal, State, and local permits related to any activities conducted completely on site. With this being the case, what permits do you believe will be necessary? **Response:** As described in Section 1.2.1, MEC cleanup activities at the former Fort Ord are conducted to remain consistent with the Endangered Species Act. The Army has completed consultations with the United States Fish and Wildlife Service (USFWS) on the Army's predisposal actions, including cleanup of MEC. These consultations are a substantive requirement of the Endangered Species Act and have resulted in the development of biological opinions (BOs) that include endangered species incidental take statements. These BOs allow impacts to and incidental takes of listed species during predisposal actions such as MEC cleanup activities, but require mitigation measures to be implemented before, during, and after to reduce and minimize impacts to the protected species and their habitats as required by the HMP.

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6	Specific Comment; Volume 3; Section 3.2.2.2	**Comment:** This section states, "Access to the MOUT Site will be restricted to authorized personnel only and implementation of fencing would likely be redundant to any access restriction measures that will be necessary because of the intended future use of the site." Because FORA is uncertain of what future access restrictions will be required, and how they will be enforced, it is unclear why access management measures are not retained for further analysis for the MOUT Site MRA. Isn't it possible that fencing will be the chosen future access restriction? **Response:** The planned reuse of the MOUT training facility portion of the MOUT Site MRA is to continue use of the site as a tactical training area for law enforcement personnel. Access to the MOUT training facility portion of the MOUT Site MRA is by right-of-entry agreement only and is further restricted by the existing barbed wire fencing and locking gates associated with the historical impact area. The use of additional fencing to further restrict access to the MOUT training facility portion of the MOUT Site MRA is not necessary. Therefore, fencing was not retained for further analysis.
7	Specific Comment; Volume 3; Section 3.2.2.3	**Comment:** While deed restrictions are a valuable tool in reducing risk, they are only effective when carefully planned. Explain what agreements FORA has in place regarding monitoring and enforcing deed restrictions at these MRAs, ensuring these restrictions are complied with by property owners? Which agencies will monitor deed restrictions to ensure all are included in future deeds as properties are sold or transferred? As the contaminant of concern is MEC, will these restrictions be monitored and enforced in perpetuity **Response:** Please see the response to Marina in Motion Specific Comment Number 7 on Volume 2; Section 3.6.1.
8	Specific Comment; Volume 3; Section 3.2.2.5	**Comment:** As with deed restrictions, is the Army and/or FORA committed to providing MEC recognition and safety training in perpetuity? **Response:** Please see Volume 3, Section 2.1.5 for a brief description of the MEC Recognition and Safety Training programs. If chosen as part of the remedy, MEC recognition and safety training will be implemented as long as deemed necessary. Details on implementation of LUCs, including monitoring and enforcement would be included in the Land Use Controls Implementation Plan which would be submitted for public and agency review and comment

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		following the Record of Decision for the Group 3 MRAs.
9	Specific Comment; Volume 3; Section 3.2.2.7	**Comment:** This section states, "Because this type of response action involves placing a physical barrier over the existing soil surface to eliminate the exposure pathway, the nature of the response would virtually eliminate, or at least greatly disturb, the existing vegetation within the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs." While MiM agrees that covering the 3 MRAs with soil is impracticable, are there areas within each of the MRAs where the placement of a barrier would not greatly disturb vegetation and therefore would provide some reduction of risk? Have these areas been evaluated? **Response:** Text has been added to the end of the section indicating that this alternative may violate the terms of the endangered species act within the habitat management area (DRO/Monterey MRA) or the areas of development with restrictions (Laguna Seca Parking MRA). Therefore, this alternative would only be applicable to the development portion of the DRO/Monterey MRA or the MOUT Site MRA where surface MEC would not be expected to remain. This alternative was eliminated for further analysis because of the implementability issues; cost; and overall effectiveness.
10	Specific Comment; Volume 3; Section 3.2.2.8	**Comment:** This section states, “The added protection gained by performing a technology-aided visual surface MEC removal in the areas not previously surveyed in the DRO/Monterey MRA would be considered minimal for the amount of effort involved.” MiM disagrees with this statement. The use of technology-aided visual surface MEC removal is not labor intensive; the discovery of a single MEC by this technology, and potentially saving someone's life should not be considered minimal. (This comment also applies to areas of the Laguna Seca Parking where removal actions were not previously completed). **Response:** As stated in the RI, MEC removal actions have been conducted throughout the majority of the DRO/Monterey MRA. The areas where removal actions have not been completed are not expected to contain MEC (Volume 1; Section 4.2.5 and Section 4.6.1). The areas where removal actions were not completed in the Laguna Seca

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Review Comments provided by Dan Amadeo of the Marina in Motion, dated March 12, 2011

No.	Comment Type / Report Section	Comment/Response
		Parking MRA are not easily accessible due to steep terrain; therefore, requiring a significant effort in order for UXO Technicians to safely access the steep terrain and conduct the visual surface MEC removal (Volume 1; Section 5.2.1.2). No changes have been incorporated into the document based on this comment.
11	Specific Comment; Volume 3; Section 3.2.2.10	**Comment:** MiM cannot comment of the viability of the RQA alternative as this document provides little information regarding the details and goals of the pilot study. This information should be included in this document, providing MiM the opportunity to review and comment. **Response:** Please see the response to Marina in Motion Comment Number 2 on Volume 3; Section 2.1.1.
12	Specific Comment; Volume 3; Section 5.1.1	**Comment:** This section states, "These receptors performing intrusive activities during or after development would be protected under this alternative because the landowner will be required to (1) provide notice of planned intrusive activities, and arrange for and provide MEC recognition and safety training to construction personnel prior to the start of intrusive work and (2) coordinate and arrange for construction monitoring by UXO-qualified personnel during any construction that involves intrusive activities." MiM is unclear who is responsible for the MEC recognition and safety training. Section 3.2.2.5 states "The Army already offers the MEC recognition and safety training as part of their public education program. FORA is currently in the process of setting up a system to offer this type of training." Will FORA provide training or is the landowner responsible? Will there be a cost associated with the training? Who will provide training if FORA is dissolved? In addition, do local ordinances require property owners to pay for all necessary construction monitoring? As the federal government is responsible for their waste (MEC), can property owners seek reimbursement from the Army? Will the Army manage the disposal of any and all MEC discovered during construction monitoring? This section also states, "Because current MEC-detection technologies do not have a100% detection efficiency, this alternative is not expected to provide a significant increase in the protection of human health because these areas may

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		require additional risk mitigation measures (e.g., LUCs) following the completion of the additional remediation to protect human health for those receptors that would perform intrusive activities during development and reuse." Is this statement a description of Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls)? It is understood that the potential exists that residual MEC may exist, as with all MEC clearances. It is not clear why LUCs would be required for receptors that perform intrusive activities. Wouldn't the clearance be to a depth that eliminates this potential exposure? In addition, the remedy should attempt to provide the greatest level of protectiveness through the use of the CERCLA nine criteria. This statement implies that if LUCs will be required, even with the additional MEC remediation, then there's no need to perform the remediation. MiM would offer that if additional MEC remediation was performed, the potential of public exposure and public risk are reduced. This is the intent of CERCLA's threshold and balancing criteria, particularly Overall Protection of Human Health and the Environment, Long-Term Effectiveness and Permanence, and Reduction of Toxicity, Mobility, or Volume Through Treatment. **Response:** MEC Recognition and Safety Training - Please see response to Marina in Motion Specific Comment Number 8 on Volume 3; Section 3.2.2.5. Local Ordnance Ordinance - This type of information will be included in the Land Use Controls Implementation Plan which will be submitted for public and agency review and comment following the Record of Decision for the Group 3 MRAs. Land Use Controls - The potential for residual subsurface MEC risks to remain at the site would not be eliminated by additional subsurface MEC remediation. Therefore, additional MEC risk mitigation measures (i.e., LUCs) would likely be required. The evaluation includes all of the nine CERCLA criteria.
13	Specific Comment; Volume 3; Section 5.1.5	**Comment:** This section states, "This alternative may result in some reduction of the volume of MEC potentially remaining in the subsurface if MEC is discovered and removed during additional MEC remediation." MiM recommends that Alternatives 3 and 4 be modified to state "This alternative would result in varying levels of reduction of the volume of MEC

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		potentially remaining in the subsurface depending on the amount of MEC discovered and removed during additional MEC remediation." **Response:** The statement for Alternative 3 has been revised as follows: "This alternative ~~may~~ ***would*** result in ~~some~~ ***varying levels of*** reduction of the volume of MEC potentially remaining in the subsurface ~~if MEC is~~ ***depending on the amount of MEC, if any,*** discovered and removed during additional MEC remediation." The statement for Alternative 4 has been revised as follows: "This alternative ~~may~~ ***would*** result in ~~some~~ ***varying levels of*** reduction of the volume of MEC potentially remaining in the subsurface ~~if MEC is~~ ***depending on the amount of MEC, if any,*** discovered and removed during additional MEC remediation."
14	Specific Comment; Volume 3; Section 5.1.6	**Comment:** This section states, "It is anticipated that this alternative would not be administratively feasible to implement because the necessary approvals from the regulatory agencies to take no further action are not expected to be obtainable." This discussion regarding obtaining "necessary approvals" should be evaluated in the "State acceptance" modifying criteria, not as part of "Implementability." **Response:** As stated in the EPA's RI/FS guidance, "Implementability encompasses both the technical and administrative feasibility of implementing a technology process." Administrative feasibility includes activities needed to coordinate with other offices and agencies. Since approval by the regulatory agencies is an important part of implementing a selected alternative, the likely unacceptable nature of an alternative is an important part of evaluating its administrative feasibility. This discussion is also relevant to the State Acceptance and has been included in the "State Acceptance" discussion sections for each of the Group 3 MRAs. As stated in Section 5.0 of Volume 3: *"State Acceptance* – Evaluates technical and administrative issues and concerns that the state may have regarding each alternative. State acceptance will be addressed in the Group 3 MRA ROD once comments on the RI/FS Report and Proposed Plan have been received (EPA 1988)." No changes have been incorporated into the document based on this comment.

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No.	Comment Type / Report Section	Comment/Response
15	Specific Comment; Volume 3; Section 5.1.9	**Comment:** This section states "Alternative 3 (Additional MEC Remediation): It is unknown at this time whether the vegetation disturbance and removal required to implement this alternative would be acceptable to the community. Won't the concern associated with community acceptance of vegetation disturbance and removal also apply to Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls)? **Response:** The level of vegetation disturbance required for Alternative 4 would be less extensive than under Alternative 3. However, the discussion of Alternative 4 in this section has been revised as follows: "Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): This alternative may be acceptable to the community. It takes action both in the short and long term to mitigate potentially remaining MEC risks to users who may conduct intrusive activities during the planned development and reuse of the MRA. ***It is unknown at this time whether the vegetation disturbance and removal required to implement this alternative would be acceptable to the community."***
16	Specific Comment; Volume 3; Section 5.2	**Comment:** It is unclear why "Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls" was not considered for the Laguna Seca Parking MRA. In addition, in general all comments provided for Section 5.1 apply to this section. **Response:** Alternative 4 - Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls was retained for accessible areas of the MRAs. Since the uninvestigated portions of the Laguna Seca Parking MRA are not accessible, this alternative was not retained for further analysis in this MRA. No changes have been incorporated into the document based on this comment. Please see responses to Marina in Motion Specific Comment Numbers 12 through 15 related to Section 5.1.

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Draft Final Group 3 Remedial Investigation / Feasibility Study, dated February 8, 2011
Review Comments provided by Dan Amadeo of the Marina in Motion, dated March 12, 2011

No.	Comment Type / Report Section	Comment/Response
17	Specific Comment; Volume 3; Section 5.3	**Comment:** In general, all comments provided for Section 5.1 apply to this section. **Response:** Please see responses to Marina in Motion Specific Comment Numbers 12 through 15.
18	Specific Comment; Volume 3; Section 5.4.1.5	**Comment:** This section states, "Alternatives 1 (No Further Action) and 2 (Land Use Controls) would provide the least reduction of remaining MEC risks through treatment. However, under Alternative 2 (Land Use Controls), potential exposures would be reduced through controls that would mitigate potentially remaining MEC risks to workers conducting intrusive activities" (emphasis added). The use of LUCs do not relate to the Reduction of Toxicity, Mobility, or Volume Through Treatment alternative, and therefore, should not be stated in this section. **Response:** FORA agrees that implementation of LUCs would not reduce the volume of MEC; however, the implementation of LUCs would reduce the remaining MEC risks. The statement, "However, under Alternative 2 (Land Use Controls), potential exposures would be reduced through controls that would mitigate potentially remaining MEC risks to workers conducting intrusive activities" has been deleted from this section of the text.
19	Specific Comment; Volume 3; Section 5.4.2.1	**Comment:** This section states, "Alternative 2 (Land Use Controls) would provide the most protection for future receptors conducting intrusive activities. Alternative 3 (Additional MEC Remediation) may provide some additional protection of human health. However, after additional MEC remediation is completed, these areas may continue to require additional risk mitigation measures (e.g., LUCs) to protect human health for those receptors that would perform intrusive activities during development and reuse." It is unclear why Alternative 3 wouldn't provide the most protection for future receptors conducting intrusive activities, as the alternative provides MEC clearance and LUCs while Alternative 2 is limited to LUCs. **Response:** Alternative 3 as described in Section 4.3 does not include land use controls as

Response to Comments
Draft Final Group 3 Remedial Investigation / Feasibility Study, dated February 8, 2011
Review Comments provided by Dan Amadeo of the Marina in Motion, dated March 12, 2011

No.	Comment Type / Report Section	Comment/Response
		part of the alternative. No changes have been incorporated into the document based on this comment.
20	Specific Comment; Volume 3; Section 5.4.2.5	**Comment:** See comment 5.4.1.5 above. **Response:** Please see response to Marina in Motion Specific Comment Number 18 on Volume 3, Section 5.4.1.5.
21	Specific Comment; Volume 3; Section 6.0	**Comment:** MiM cannot concur or refute FORA's preferred remedial alternatives. As stated in General Comment 1, in order for MiM to concur, it would require an independent analysis of the investigations and removal actions historically performed by the Army and its contractors. MiM has no intention of such a review. **Response:** The Group 3 RI/FS Report and supporting documents are available and accessible to the public at the Fort Ord Administrative Record. In accordance with the CERCLA process, a Proposed Plan, which will describe the Army's preferred remedial alternatives and proposed cleanup plan, will be issued for a formal 30-day public comment period. The public will be given the opportunity to provide verbal as well as written comments on the Proposed Plan. Public comments received by the Army during the public comment period will be considered before any remedy selection decision is made.

DEPARTMENT OF THE ARMY
FORT ORD OFFICE, ARMY BASE REALIGNMENT AND CLOSURE
P.O. BOX 5008, BUILDING #4463 GIGLING ROAD
MONTEREY, CALIFORNIA 93944-5008

REPLY TO
ATTENTION OF

MAR 0 3 2011

Fort Ord BRAC Field Office

SC
LB

Stan Cook
ESCA Remediation Program Manager
Fort Ord Reuse Authority
100 12th Street, Building 2880
Marina, CA 93933

Subject: *Draft Final Group 3 Remedial Investigation/Feasibility Study, Del Rey Oaks/ Monterey, Laguna Seca Parking, and Military Operations in Urban Terrain (MOUT) Site Munitions Response Areas (MRAs)*, dated February 8, 2011.

Dear Mr. Cook:

Thank you for an opportunity to review and comment on the subject document. The Army's comments are enclosed. Please note our comments are focused on "big picture" issues such as the consistency with documents previously produced under the Army's cleanup program. A copy of this letter will be furnished to U.S. Environmental Protection Agency (Judy Huang) and California Department of Toxic Substances Control (Roman Racca).

If you have any questions, please contact me. Thank you.

Sincerely,

Gail Youngblood
BRAC Environmental Coordinator

Enclosure

5

DRAFT FINAL Group 3 Remedial Investigation/Feasibility Study (RI/FS), Del Rey Oaks/ Monterey, Laguna Seca Parking, and Military Operations in Urban Terrain (MOUT) Site Munitions Response Areas (MRAs)

Dated February 8, 2011

Army Comments:

Volume 2: Risk Assessment

1. P.5-2, Section 5.3 MEC Density Input and Section 5.4 MEC Depth Input (MOUT Site MRA Risk Assessment). In response to comments on the draft version of the document, additional text has been included to provide the rationale for selecting the MEC Density input score for the MOUT Site MRA. It describes that the selection of MEC Density input score of 3 (medium density) [in conjunction with the MEC Depth input of 8 (any MEC on the surface) for all MEC Hazard Type (1, 2 and 3)] was based on the worst-case scenario for the site, i.e. previously-removed MEC items were assumed to be present on the surface; and the same items were again assumed to be present in the subsurface. We are concerned with the overly conservative nature of the scoring process. The Fort Ord MEC Risk Assessment Protocol was developed incorporating conservative integration of input factors, and was designed to assess risk based on input factors that reflect actual or expected site conditions. Therefore it is not necessary to intentionally select higher (more conservative) scores for any of the individual input factors.

   The assumption that surface MEC of Hazard Type 3 at medium density exist across the MOUT training area is not consistent with the Conceptual Site Model (CSM) described in Volume 1, Remedial Investigation. Therefore the risk assessment section should be updated to either: assess the CSM scenario; or include an explicit explanation that the scenario being assessed does not represent the actual condition of the site and that the site is safe for the current designated uses.

   In addition, data from the MOUT training area was used to estimate the worst-case extent of MEC potentially present in the Barloy Canyon Road parcel. Please either revise the risk assessment or provide an explicit explanation that the modeled scenario does not represent the actual site conditions.

   Please see MEC risk assessment for the Parker Flats MRA in *Final Track 2 Munitions Response Remedial Investigation/Feasibility Study Parker Flats Munitions Response Area* (OE-0523N), which is an example of how the Fort Ord MEC Risk Assessment Protocol (OE-0420G) has been implemented at the former Fort Ord.

2. P.4-3, Section 4.3 MEC Density Input and Section 4.4 MEC Depth Input (Laguna Seca Parking MRA Risk Assessment). In response to comments on the draft version of the document, additional text has been included to provide the rationale for selecting the MEC Density input score for the 1-ft removal section of MRS-14A. Similarly, we are concerned with the overly conservative assumptions used in the scoring. Previously-removed MEC items (from surface and 1-ft depth) were assumed to be present in the subsurface below 1-ft depth even though the MEC items previously encountered in the area were noted as non-penetrating types such as flares and signals.

   As demonstrated in the MEC risk assessment conducted for the Parker Flats MRA, the MEC density estimate can be refined based on currently available data. Please either revise the risk assessment or provide an explicit explanation that the modeled scenario does not represent the actual site conditions.

Volume 3: Feasibility Study

3. Table 5-10. Footnote 3 (regarding habitat monitoring) has been deleted. For this alternative, which entails subsurface MEC remediation in the entire Laguna Seca MRA, wetland monitoring for California Tiger Salamanders would be required. Recommend adding a footnote or adding the estimated cost of wetland monitoring.

From: Nozaki, Chieko CTR FN USA IMCOM
Sent: Tuesday, March 08, 2011 11:21 AM
To: Spill, Chris; Bellah, Wendy
Cc: Reimer, Kristie; Temple, Linda; Stan Cook; Youngblood, Gail CIV USA
Subject: Draft Final Group 3 RI/FS - Minor Comments (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: FOUO

Chris and Wendy:
The Army comment letter on the draft final Group 3 RIFS was sent on 3 March (ESCA-0249A.2). We also have a few minor comments that we wanted to bring to your attention (below)(if you'd like to receive these comments in a letter let me know). Please let me know if you have any questions. Thank you.

Chieko Nozaki
831-899-7372

***

Draft final Group 3 RI/FS Report minor comments

Volume 1:
Page 5-21 MRS-47. Please delete text "However, upon review, the grid sheet recording the 176 electric blasting caps…is missing." This (and another) grid sheet is available as noted in response to Army detail comment 8.

Volume 3:
Page 4-1 Sec. 4.4. Please delete text "to include excavation" at the end of the first paragraph. In Section 3.2.2.9, large-scale excavation and sifting was determined as not applicable to the three MRAs.

Table 5-6. Footnote 3 notes the habitat monitoring requirement for 13 years (DRO/Monterey Alternative 3). With regard to the cost it has been revised to read that FORA would be responsible for the post-remediation habitat monitoring costs until site closeout in accordance with the ESCA (rather than "until property transfer"). It is our understanding that the habitat monitoring tasks and making a conclusion that the habitat has recovered, are part of implementing the remedy (under this Alternative), therefore, are part of the requirements to achieve Site Closeout. The current text is not totally clear since FORA is scheduled to sunset before the 13 years and so leaves the possibility of misinterpretation that Site Closeout might be obtainable before confirming the successful recovery of the habitat.

Table 5-7, Footnote 7. Please make the same updates as was made to Footnote 7 in Table 5-6 regarding the cost of habitat monitoring (DRO/Monterey Alternative 4). Why is the habitat monitoring applied for 6 acres when overall additional MEC remediation area is 5 acres?

Table 5-15 has a blank cell.

Marina in Motion
PO Box 1641, Marina CA 93933

Mr. Stan Cook
FORA ESCA Program Manager
100 12th Street, BLDG 2880
Marina, CA 93933

March 12, 2011

Subject: Draft Final Group 3 Remedial Investigation/Feasibility Study, Del Rey Oaks/Monterey, Laguna Seca Parking, and Military Operations in Urban Terrain Site Munitions Response Areas, Former Fort Ord dated February 2011.

Please accept MIM's Technical Advisor's comments attached at enclosure. We again appreciate the time allowed to review such a critical series of documents which will provide the foundation for the Record of Decision of these areas in the future.

Unfortunately, as this report is presented, it is extremely difficult and not cost effective to review fifteen years of historical remedial investigation/removal actions documents in analysis of the final draft. As a result, MIM typically cannot comment on conclusions and recommendations of remediation efforts already completed.

However, we do suggest that when remediation and clearance of areas has occurred sometime in the past, that, as a minimum, prior to concluding those efforts fulfilled the intended purpose that a sampling plan using current state of the art technologies be considered to further verify the conclusions of these historical documents. Strict reliance on past efforts which were likely very valid at the time conducted may not be deemed complete today as improvements in MEC investigative planning and technologies have occurred since the original effort. These improvements may detect anomalies previous technologies would not have been capable of doing and thus influence the final recommendation.

Dan Amadeo
Marina in Motion

Encl 1

Edson Ecosystems, LLC

Technical Advisor for Marina in Motion's (MiM) comments on the "Draft FinalGroup 3 Remedial Investigation / Feasibility Study, Del Rey Oaks / Monterey, Laguna Seca Parking, and Military Operations in Urban Terrain Site Munitions Response Areas" Former Fort Ord February 8, 2011

Introduction:

The purpose of the Draft Final Group 3 Remedial Investigation/Feasibility Study (RI/FS) is to gather information necessary to describe the nature and extent of munitions and explosives of concern (MEC), conduct a baseline risk assessment using this information, and develop preliminary remedial action objectives for three Munitions Response Areas (MRAs) on Fort Ord, DRO/Monterey, Laguna Seca Parking, and MOUT Site.

Volume 1 of the RI/FS contains a description of the nature and extent of MEC in these MRAs based on Fort Ord Redevelopment Authority's (FORA) review of historical records, military history, archive search reports, and previous munitions response program investigations and removal actions. In addition, FORA performed an evaluation of the equipment used during previous investigation and removal activities. Finally, FORA reviewed data contained in the after-action reports and compared the data to information contained in the Military Munitions Response Program (MMRP) database to determine the completeness of the data set.

The results of analyses described above were used to update the MRAs conceptual site models and make recommendations as to whether the data can be used to complete a risk assessment (RA) and feasibility study (FS). FORA concluded the data was appropriate to move forward with RAs and FSs for the MRAs.

Volume 2 provides a description of the RA, based on the results of the RI data analysis. The RA uses the "Fort Ord MEC Risk Assessment Protocol," developed specifically for Fort Ord cleanup. Risks were calculated based on each MRA's projected future land use; these include; a) habitat reserve areas, b) open space/recreation reuse, c) business park/light, industrial and office/Research & Development, d) school/university reuse, and e) residential.

Finally, Volume 3 describes how remedial alternatives were developed and selected to address any potential MEC risks remaining at the three MRAs. It also provides FORA's "preferred remedial alternative" for each of the three MRAs, with the preferred alternative for each of the MRSs being Land Use Controls.

General Comments

1. The RI of these three MRAs was based entirely on the review of historical investigations and removal actions performed by the Army and its contractors. It appears no field verification sampling was performed by FORA to validate the accuracy of the historical Army documents associated with RI activities. Instead, in validating the quality of these investigations and removal actions, the Fort Ord Redevelopment Authority (FORA) evaluated previous investigations and removal actions including: 1) the adequacy of the previous investigation and removal actions; 2) the effectiveness of the equipment used based upon its implementation and maintenance records, and 3) the accuracy and consistency of data records.

   It is apparent that FORA invested a significant amount of time and effort in the development of this RI/FS document. The summaries of each of the Group 3 MRA historical land uses, investigations, and removal actions are important tools to be used as background in the formation of the Army's Proposed Plan and Record of Decision (ROD). However, for MiM to concur with the conclusions of this RI/FS report, we must rely only on the information provided, without the opportunity for an independent review of these same documents. Much of the critical information associated with these investigations and removal actions is summarized in this RI/FS report; however, MiM cannot validate the RI's adequacy without being provided the opportunity to review and independently interpret the site specific documents FORA relied on to develop the RI.

   However, MiM has no intention, time, or funds to review the volume of documents referenced in the RI. Instead MiM provides these comments simply to assist FORA in performing a level of environmental due diligence to necessary to base their RI, RA, and FS conclusions.

   Finally, MiM believes that as part of FORA's remedial investigation, some degree of verification sampling needs to be performed in each of the MRAs. The review of verification sampling, using state of the art geophysical equipment and agreed upon data quality objectives and QA/QC plans, would provide MiM greater comfort with the reliability of historical investigation and removal action reports.

2. One potential concern with the quality of historical investigations is reliance on SiteStat/GridStat (SS/GS) in locating munitions and explosives of concern (MEC). In January 2001, U.S. EPA published interim guidance on the use of SS/GS, identifying numerous concerns with its use, including:

   - the ability of SS/GS and UXO Calculator to locate Unexploded Ordnance (UXO) clusters e.g., target impact areas) and the boundaries of UXO contaminated areas;
   - whether the assumption of homogeneity of UXO used in these techniques is valid;
   - the extent to which an area is classified as "homogeneous;"
   - the statistical validity of assessing sector non-homogeneity;
   - the consistency/reproducibility of results;
   - a problem in the algorithm and confidence intervals for UXO Calculator; and
   - variability in UXO estimates and exposure scenarios.

It is unclear whether these issues were understood at the time of SS/GS use, and if modifications to site investigations were implemented to address these concerns. Did FORA look into these concerns to adjust any of its RI interpretations based on these concerns?

3. The RI provides limited information regarding the regulatory frameworks followed by the Army and its contractors during the investigations and response actions of each munitions response sites (MRS). Were these conducted under the Comprehensive Environmental Response and Compensation Liability Act (CERCLA)? What regulatory oversight was involved in investigative and remedial work plans? Were there regulatory concurrence letters associated with each investigation work plan and after action reports? Were "no further action" letters issued by regulatory agencies? Was the public part of this review/oversight process?

Volume 1, Remedial Investigation

Specific Comments

1. **Section 1.2.4** - Prior to removal from the Group 3 RI/FS, how did the Summary of Existing Data Report (SEDR) characterize the potential presence of MEC in the Interim Actions Ranges MRA? How and what was discovered in the Interim Actions Ranges MRA that resulted in it being removed from the Group 3 RI/FS? Why does FORA believe historical investigations did not locate these recently discovered MEC? The report should address the circumstances that lead to the removal of the Interim Actions Ranges MRA from Group 3 RI/FS.

2. **Section 2.5.1** - The report is confusing when in this section it states, "The DRO/Monterey MRA encompasses approximately 29 acres of undeveloped land (Parcels E29.1 and L6.2) and 5.245 acres of a portion of the existing South Boundary Road and associated right-of-way (Parcels L20.13.2 and L20.13.3.1.). To facilitate previous MEC investigations and removal activities, the area was divided into Munitions Response Sites (MRSs)" (emphasis added). However, in Section 4.0 the report states "The only MRS associated with the DRO/Monterey MRA was MRS-43." The report should clarify the number of MRSs in this MRA.

3. **Section 4.1** - As with many military installations, historical records associated with the use of DRO/Monterey MRA are unclear and can be contradictory. While this section states, "An interview included in the 1997 ASR indicated that a portion of a ridge in the area of the DRO/Monterey MRA served as a backstop for rifle grenades and shoulder-launched projectiles from 1942 to 1944 and that firing positions were located along South Boundary Road (USACE 1997a) (this according to the 1997ASR, the former Fire Chief Fred Stephani), the section concludes "...based on the review of historical aerial photographs and training facility maps, there was no indication that the area was used as a firing range."

   In addition, section 4.1.1.3, the report states, "Review of 1950s era training and facility maps indicated no military activity in the vicinity of the DRO/Monterey MRA" but in the same section the report states "A 1953 Training Areas map shows that the area encompassing the DRO/Monterey MRA was assigned to the 11th Infantry (Army 1954).

Clarification is necessary when historical records in the report are inconsistent or do not correspond with personal interviews.

Section 4.1.3.2 This section states, "Based on the types of MEC and MD identified in the Army's MMRP database as being found within and in the vicinity of the MRA, rifle grenade training occurred within the DRO/Monterey MRA during the 1940s, as discussed in Section 4.5." However, Section 4.4 concludes "However, based on the review of historical aerial photographs and training facility maps, there was no visible indication that artillery training, including the use of 37mm projectiles, took place on portions of MRS-43 and the DRO/Monterey MRA."

It's unclear whether these statements are contradictory or instead that rifle grenades were not considered part of artillery training. As stated in comment 3 above, historical records at most military installations are incomplete and often contradict themselves. In this report, when there are historical contradictions, it is unclear which assumption FORA uses to base historical use conclusions.

It may be appropriate to place a statement in the text that historical records are not always reliable and are used as tools with other information such as field investigation and removal action reports.

4. **Section 4.2.1.1** – It is difficult for MiM to understand the extent of previous MEC investigations and removal actions based on this section's narrative and Figure 4.1. What is the percentage of geophysical coverage throughout DRO/Monterey MRA through the various investigations and removal actions? How many follow-up grids were placed outside the original SS/GS locations? Did the investigations cover the ridge described by Fire Chief Stephani?

5. **Section 4.2.1.2** – This section states, "The result of the grid sampling investigation indicated that MEC and MD related to hand grenades (single burial pit with 23 MEC items) and 37mm projectiles were found in MRS-43 (USA 2001b). The MEC was not found within the boundaries of the DRO/Monterey MRA."

   Does MRA-43 extend outside the DRO/Monterey MRA or does this refer to the area between the non-contiguous MRA parcels?

6. **Section 4.2.5** – The section states, "A review of the DRO/Monterey MRA boundaries and the MRS boundaries indicates that previous investigations and removal actions were conducted across the entire MRA with the exception of two small areas."

   Is it correct to assume that 100% geophysical coverage and clearance was completed in this MRA (with the exception of the two areas). Why were the two areas not included in previous investigations, and were visual surveys performed?

7. **Section 5.1.3.2** – This section should refer to Figure 2-8, not Figure 2-9.

In addition, in the 37mm Training section, it identifies the discovery of a M80 canister or projectile. Is there history of air to ground training at Ft Ord? If not, how was this discovery explained by the Army?

8. **Section 5.2.4** – This section states, "In general, the majority of existing records and data were complete and the removal actions were conducted in accordance with the work plan requirements."

   Were there instances of incomplete records and data that FORA identified for the Laguna Seca Parking MRA? How did this impact conclusions developed by FORA regarding the adequacy of the MRA's historical investigations and removal actions?

9. **Section 5.5.4** - Approximately 20 "miscellaneous items" were identified in the Laguna Seca Parking MRA. This section states, "Because very few of the above listed items were found during the removal actions conducted within the Laguna Seca Parking MRA, it appears that there was no pattern of use to indicate training with these items in this area. It is not expected that additional items of the types listed above would remain in the Laguna Seca Parking MRA."

   What is the basis of this conclusion?

10. **Section 5.6.1** - Are there institutional controls associated with the Laguna Seca Parking MRA; will the future land use be limited to Laguna Seca Raceway events including parking, staging, and event-related roadway access along Barloy Canyon Road and South Boundary Road?

11. **Section 6.2.1.3** – This section states, "Schonstedt magnetometers were not used in the MOUT Site MRA to assist in the visual inspection (Shaw 2005). The AAR (After Action Report) did not contain a recommendation."

    This is unusual for a Time Critical Removal Action (TCRA); was there regulatory approval of the work plan and were there any follow-up activities associated with the TCRA?

12. **Section 6.2.1.5** – This section states, "The AAR recommended further removal actions in grids where MEC was found due to the expected penetration depth of some of the items."

    Were there follow-up investigations and removal actions in this area?

Volume 2, Risk Assessment

Specific Comments

1. **Section 1.1** – This section states, "According to CERCLA, the results of the risk assessment should help establish acceptable remediation levels for use in developing remedial alternatives during the FS."

The assessment of risk under CERCLA normally looks at all exposure pathways prior to evaluating remedial alternatives. At Fort Ord, "Risk due to potential chemical contamination in soil is addressed in the Basewide Range Assessment." MiM recommends that language be inserted in this report that describes how soil and other exposure pathways will be incorporated into these MRA's Records of Decision (RODs).

2. **Section 1.1.3** – This section states, "...no further action has been recommended for historical areas (HAs) within the Laguna Seca Parking, MOUT Site, and DRO/Monterey MRAs. In addition, Laguna Seca Parking and MOUT Site MRAs are part of Installation Restoration Program (IRP) Site 39 at the former Fort Ord. Previous soil remediation activities were conducted as part of the Site 39 program, which has an existing ROD."

   Has soil risk been evaluated outside the HAs? In addition, it would be beneficial if this report included a section describing what data the no further action decisions were based. Finally the report should define the process to incorporate the risk associated with all exposure pathways (i.e., soil, groundwater, surface water sediments, etc.) into the final remedies of the 3 MRAs.

3. **Section 1.2** – MiM has not had the opportunity to review and provide comments on the use of the "Fort Ord MEC Risk Assessment Protocol" in defining risk associated with MEC exposure at Fort Ord. Therefore, at this time, MiM will not provide comments on the protocol's assumptions incorporated into this report.

4. **Section 3.1** – This section states, "While the two small portions of the MRA (approximately 50 ft wide along the northwestern edge of Parcel L6.2 and the south side of South Boundary Road east of Parcel E29.1) have not been subjected to removal actions or magnetometer investigations, they are bounded by either: approved Track 1 sites, a paved road, or an area of the DRO/Monterey MRA where few MEC or munitions debris (MD) items were found. Therefore, it is expected that finding MEC in either of these two small portions of the MRA would not be likely."

   It is not clear how this conclusion is supported in lieu of munitions debris (MD) being discovered adjacent to this area. What types of MD were discovered?

5. **Section 3.2, Section 3.3 and Section 3.4** – As stated in General Comment 1, MiM cannot validate the findings of the RI without an independent review of documents that formed the basis of the report. Without RI concurrence, MiM also can not verify and/or validate FORA's proposed MEC hazard type, MEC density, and MEC depth scores. In addition, without this validation, MiM cannot concur or refute FORA's Accessibility Factors, Overall Hazard Factors, and/or Exposure Factors and ultimately the DRO/Monterey MRA's overall MEC risk.

6. **Section 3.3** – This section states, "In accordance with the RI, the distribution of MEC and MD at the DRO/Monterey MRA did not exhibit a pattern of use characteristic of a target range with identifiable and consistently used targets. The distribution did show patterns of use characteristic of weapons and troop training; however, the MRA was not indicated on historical training maps as being a training site or an impact area."

MiM believes that reliance on historical Army documents (training maps) in defining past land use should not be relied on when field data indicates otherwise.

7. **Section 3.6.1** – This section states, "DTSC, the United States acting through the Army, and their contractors/agents shall have reasonable right-of-entry and access to the property for inspection, monitoring, testing, sampling, and other activities consistent with the covenant as deemed necessary by the DTSC in order to protect the public health and safety or the environment and oversee any required activities."

   Which agency is directly responsible for monitoring and enforcing land use restrictions in this MRA?

8. **Section 3.8.5** – It is unclear how this section relates to MEC risk if "Risk due to potential chemical contamination in soil is addressed in the Basewide Range Assessment."

9. **Section 4.2, Section 4.3 and Section 4.4** – As stated in General Comment 1, MiM cannot validate the findings of the RI without an independent review of documents that formed the basis of the report. Without RI concurrence, MiM also can not verify and/or validate FORA's proposed MEC hazard type, MEC density, and MEC depth scores. In addition, without this validation, MiM cannot concur or refute FORA's Accessibility Factors, Overall Hazard Factors, and/or Exposure Factors and ultimately the DRO/Monterey MRA's overall MEC risk.

10. **Section 4.6.1** – This section states, "DTSC, the United States acting through the Army, and their contractors/agents shall have reasonable right-of-entry and access to the property for inspection, monitoring, testing, sampling, and other activities consistent with the covenant as deemed necessary by the DTSC in order to protect the public health and safety or the environment and oversee any required activities."

    Which agency is directly responsible for monitoring and enforcing land use restrictions in this MRA?

11. **Section 4.8.5** – It is unclear how this section relates to MEC risk if "Risk due to potential chemical contamination in soil is addressed in the Basewide Range Assessment."

12. **Section 5.2, Section 5.3 and Section 5.4** – As stated in General Comment 1, MiM cannot validate the findings of the RI without an independent review of documents that formed the basis of the report. Without RI concurrence, MiM also can not verify and/or validate FORA's proposed MEC hazard type, MEC density, and MEC depth scores. In addition, without this validation, MiM cannot concur or refute FORA's Accessibility Factors, Overall Hazard Factors, and/or Exposure Factors and ultimately the DRO/Monterey MRA's overall MEC risk.

13. **Section 5.6.1** – This section states, "DTSC, the United States acting through the Army, and their contractors/agents shall have reasonable right-of-entry and access to the property for inspection, monitoring, testing, sampling, and other activities consistent with the covenant as deemed

necessary by the DTSC in order to protect the public health and safety or the environment and oversee any required activities."

Which agency is directly responsible for monitoring and enforcing land use restrictions in this MRA?

14. **Section 5.8.5** – It is unclear how this section relates to MEC risk if "Risk due to potential chemical contamination in soil is addressed in the Basewide Range Assessment."

Volume 3, Feasibility Study

Specific Comments

1. **Section 2.0** – In addition to EPA's "RI/FS Guidance," EPA has published additional guidance documents associated with MEC response actions. These include "EPA Handbook on the Management of Munitions Response Actions" and "EPA Munitions Response Guidelines." This guidance should be incorporated into this RI/FS document as necessary.

2. **Section 2.1.1** – This section states, "The regulatory agencies have expressed concern regarding the residual risk that remains after MEC removals have taken place, particularly in areas that are specified for residential development (i.e., unrestricted land use). In an effort to satisfy regulatory agency concerns, a QA process was developed that will allow the regulators to assess the previous removal actions and the acceptability of a parcel, where MEC removal was conducted, for residential use. The relevance and usefulness of this RQA process is being tested during the RQA Pilot Study."

   The details of the residential quality assurance (RQA) pilot study should be included in this report. In addition, there should be discussion as to how the results of the pilot study impacts the results of the Group 3 feasibility study. Finally, MiM questions why the RQA is limited to future residential use. MiM believes a RQA-type pilot study would be helpful in verifying residual risk from previous removals actions associated with all future land uses.

3. **Section 2.1.3** – The section and associated Table 2-1 should include a description of how the land use covenants and other administrative controls will be monitored and enforced.

4. **Section 2.4** – This section states, "Based upon the risk assessment and the EPA's RI/FS Guidance, the following RAO was developed for the protection of human health and the environment for the Group 3 MRAs: Prevent or reduce the potential for the Group 3 MRA reuse receptors to come in direct contact with MEC items potentially remaining in subsurface soil."

   According to Volume 1, small portions of the each of the MRAs were not included in removal actions. Why doesn't the remedial action objective (RAO) include the potential for receptors to also come in direct contact with MEC items potentially remaining in surface soil?

5. **Section 3.2.1.2** – This section states, "Administrative feasibility considerations may include: the ability to obtain permits and approvals from regulatory agencies and other offices"

   Typically, CERCLA response actions are exempted by law from the requirement to obtain Federal, State, and local permits related to any activities conducted completely on site. With this being the case, what permits do you believe will be necessary?

6. **Section 3.2.2.2** – This section states, "Access to the MOUT Site will be restricted to authorized personnel only and implementation of fencing would likely be redundant to any access restriction measures that will be necessary because of the intended future use of the site."

   Because FORA is uncertain of what future access restrictions will be required, and how they will be enforced, it is unclear why access management measures are not retained for further analysis for the MOUT Site MRA. Isn't it possible that fencing will be the chosen future access restriction?

7. **Section 3.2.2.3** – While deed restrictions are a valuable tool in reducing risk, they are only effective when carefully planned. Explain what agreements FORA has in place regarding monitoring and enforcing deed restrictions at these MRAs, ensuring these restrictions are complied with by property owners? Which agencies will monitor deed restrictions to ensure all are included in future deeds as properties are sold or transferred? As the contaminant of concern is MEC, will these restrictions be monitored and enforced in perpetuity

8. **Section 3.2.2.5** – As with deed restrictions, is the Army and/or FORA committed to providing MEC recognition and safety training in perpetuity?

9. **Section 3.2.2.7** – This section states, "Because this type of response action involves placing a physical barrier over the existing soil surface to eliminate the exposure pathway, the nature of the response would virtually eliminate, or at least greatly disturb, the existing vegetation within the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs."

   While MiM agrees that covering the 3 MRAs with soil is impracticable, are there areas within each of the MRAs where the placement of a barrier would not greatly disturb vegetation and therefore would provide some reduction of risk? Have these areas been evaluated?

10. **Section 3.2.2.8** – This section states, "The added protection gained by performing a technology-aided visual surface MEC removal in the areas not previously surveyed in the DRO/Monterey MRA would be considered minimal for the amount of effort involved."

    MiM disagrees with this statement. The use of technology-aided visual surface MEC removal is not labor intensive; the discovery of a single MEC by this technology, and potentially saving someone's life should not be considered minimal.

    (This comment also applies to areas of the Laguna Seca Parking where removal actions were not previously completed).

11. **Section 3.2.2.10** – MiM cannot comment of the viability of the RQA alternative as this document provides little information regarding the details and goals of the pilot study. This information should be included in this document, providing MiM the opportunity to review and comment.

12. **Section 5.1.1** – This section states, "These receptors performing intrusive activities during or after development would be protected under this alternative because the landowner will be required to (1) provide notice of planned intrusive activities, and arrange for and provide MEC recognition and safety training to construction personnel prior to the start of intrusive work and (2) coordinate and arrange for construction monitoring by UXO-qualified personnel during any construction that involves intrusive activities."

    MiM is unclear who is responsible for the MEC recognition and safety training. Section 3.2.2.5 states "The Army already offers the MEC recognition and safety training as part of their public education program. FORA is currently in the process of setting up a system to offer this type of training."

    Will FORA provide training or is the landowner responsible? Will there be a cost associated with the training? Who will provide training if FORA is dissolved?

    In addition, do local ordinances require property owners to pay for all necessary construction monitoring? As the federal government is responsible for their waste (MEC), can property owners seek reimbursement from the Army? Will the Army manage the disposal of any and all MEC discovered during construction monitoring?

    This section also states, "Because current MEC-detection technologies do not have a100% detection efficiency, this alternative is not expected to provide a significant increase in the protection of human health because these areas may require additional risk mitigation measures (e.g., LUCs) following the completion of the additional remediation to protect human health for those receptors that would perform intrusive activities during development and reuse."

    Is this statement a description of Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls)? It is understood that the potential exists that residual MEC may exist, as with all MEC clearances. It is not clear why LUCs would be required for receptors that perform intrusive activities. Wouldn't the clearance be to a depth that eliminates this potential exposure?

    In addition, the remedy should attempt to provide the greatest level of protectiveness through the use of the CERCLA nine criteria. This statement implies that if LUCs will be required, even with the additional MEC remediation, then there's no need to perform the remediation. MiM would offer that if additional MEC remediation was performed, the potential of public exposure and public risk are reduced. This is the intent of CERCLA's threshold and balancing criteria, particularly Overall Protection of Human Health and the Environment, Long-Term Effectiveness and Permanence, and Reduction of Toxicity, Mobility, or Volume Through Treatment.

13. **Section 5.1.5** – This section states, "This alternative may result in some reduction of the volume of MEC potentially remaining in the subsurface if MEC is discovered and removed during additional MEC remediation."

    MiM recommends that Alternatives 3 and 4 be modified to state "This alternative would result in varying levels of reduction of the volume of MEC potentially remaining in the subsurface depending on the amount of MEC discovered and removed during additional MEC remediation."

14. **Section 5.1.6** – This section states, "It is anticipated that this alternative would not be administratively feasible to implement because the necessary approvals from the regulatory agencies to take no further action are not expected to be obtainable."

    This discussion regarding obtaining "necessary approvals" should be evaluated in the "State acceptance" modifying criteria, not as part of "Implementability."

15. **Section 5.1.9** – This section states "Alternative 3 (Additional MEC Remediation): It is unknown at this time whether the vegetation disturbance and removal required to implement this alternative would be acceptable to the community. Won't the concern associated with community acceptance of vegetation disturbance and removal also apply to Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls)?

16. **Section 5.2** - It is unclear why "Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls" was not considered for the Laguna Seca Parking MRA.

    In addition, in general all comments provided for Section 5.1 apply to this section.

17. **Section 5.3** – In general, all comments provided for Section 5.1 apply to this section.

18. **Section 5.4.1.5** – This section states, "Alternatives 1 (No Further Action) and 2 (Land Use Controls) would provide the least reduction of remaining MEC risks through treatment. However, under Alternative 2 (Land Use Controls), potential exposures would be reduced through controls that would mitigate potentially remaining MEC risks to workers conducting intrusive activities" (emphasis added).

    The use of LUCs do not relate to the Reduction of Toxicity, Mobility, or Volume Through Treatment alternative, and therefore, should not be stated in this section.

19. **Section 5.4.2.1** - This section states, "Alternative 2 (Land Use Controls) would provide the most protection for future receptors conducting intrusive activities. Alternative 3 (Additional MEC Remediation) may provide some additional protection of human health. However, after additional MEC remediation is completed, these areas may continue to require additional risk mitigation measures (e.g., LUCs) to protect human health for those receptors that would perform intrusive activities during development and reuse."

It is unclear why Alternative 3 wouldn't provide the most protection for future receptors conducting intrusive activities, as the alternative provides MEC clearance and LUCs while Alternative 2 in limited to LUCs.

20. **Section 5.4.2.5** – See comment 5.4.1.5 above.

21. **Section 6.0** – MiM cannot concur or refute FORA's preferred remedial alternatives. As stated in General Comment 1, in order for MiM to concur, it would require an independent analysis of the investigations and removal actions historically performed by the Army and its contractors. MiM has no intention of such a review.

    In addition, as provided above, MiM has provided FORA numerous comments associated with this document. Until responses to these comments are provided, MiM will continue to have concerns with some of the assumptions and conclusions provided by FORA in this report.

    Thank you for the opportunity to comment on this report. MiM looks forward to future discussions regarding these comments as FORA progresses toward the Proposed Plan and ROD.

Jeff Edson
Principal
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APPENDIX H

Distribution List

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