

FORA ESCA REMEDIATION PROGRAM

FINAL

Group 3

Remedial Investigation / Feasibility Study Work Plan

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

Former Fort Ord
Monterey County, California

November 13, 2009

Prepared for:

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**Group 3 Remedial Investigation/Feasibility Study Work Plan
Former Fort Ord
Monterey County, California**



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ACRONYMS AND ABBREVIATIONS

ACES	Areas Covered by Environmental Services
AOC	Administrative Order on Consent
ARARs	applicable or relevant and appropriate requirements
Army	United States Department of the Army
bgs	below ground surface
BO	biological opinion
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIOP	Community Involvement and Outreach Program
CRP	Community Relations Plan
CSM	Conceptual Site Model
CSUMB	California State University Monterey Bay
CTS	California tiger salamander
DDESB	Department of Defense Explosives Safety Board
DMM	discarded military munitions
DOD	United States Department of Defense
DQO	Data Quality Objective
DRO	Del Rey Oaks
DTSC	Department of Toxic Substances Control
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
ESCA	Environmental Services Cooperative Agreement
ESCA RP	Environmental Services Cooperative Agreement Remediation Program
FS	Feasibility Study
FFA	Federal Facility Agreement
FORA	Fort Ord Reuse Authority
FOSET	Findings of Suitability of Early Transfer
HFA	Human Factors Applications, Inc.
HMP	Habitat Management Plan
ISD	Insufficient Data
km	kilometer
MBTA	Migratory Bird Treaty Act
MEC	munitions and explosives of concern
MD	munitions debris
mm	millimeter

MMRP	Military Munitions Response Program
MOUT	Military Operations in Urban Terrain
MRA	Munitions Response Area
MRS	Munitions Response Site
msl	mean sea level
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRMA	natural resources management area
OB/OD	open burning/open detonation
OE	Ordnance and Explosives
PRGs	preliminary remediation goals
QA	quality assurance
QA/QC	quality assurance/quality control
QC	quality control
RAOs	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RQA	Residential Quality Assurance
RWQCB	Regional Water Quality Control Board
SCA	Special Case Area
SEDR	Summary of Existing Data Report
SOP	standard operating procedure
SS/GS	Site Stats/Grid Stats
TBC	to-be-considered criteria
TCRA	Time-Critical Removal Action
TRC	Technical Review Committee
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
UXB	UXB International, Inc.
UXO	unexploded ordnance

GLOSSARY

Anomaly

Any item that is seen as a subsurface irregularity after geophysical investigation. This irregularity should deviate from the expected subsurface ferrous and non-ferrous 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

Support provided by qualified UXO personnel during construction activities at potential MEC sites to reduce the potential for exposure to MEC. When a determination is made that the probability of encountering MEC is low (i.e., current or previous land use leads to an initial determination that MEC may be present), only MEC safety support is required. When a determination is made that the probability of encountering MEC is moderate to high (current or previous land use leads to an initial determination that MEC were employed or disposed of in the area of concern), UXO teams are required to conduct subsurface MEC clearance of the known construction footprint either in conjunction with the construction contractor or prior to construction intrusive activities. The level of effort will be determined on a case-by-case basis.

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

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

Includes items designed to cause damage to personnel or material through explosive force that may be accomplished by bombs, warheads, missiles, projectiles, rockets, antipersonnel and antitank mines, demolition and spotting charges, grenades, torpedoes and depth charges, high explosives and propellants, fuzes from practice items, and all similar and related items or components explosive in nature.

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 hand held 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 material potentially containing 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 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

Department of Defense-established program that manages the environmental, health and safety issues presented by munitions of explosives concern.

Minimum Separation Distance (MSD)

MSD is the distance at which personnel in the open must be from an intentional or unintentional detonation.

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.

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 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.

EXECUTIVE SUMMARY

This Group 3 Remedial Investigation/Feasibility Study (RI/FS) Work Plan (“the Group 3 RI/FS Work Plan”) describes the cleanup of munitions and explosives of concern (MEC) on portions of the former Fort Ord in Monterey County, California (Figure 1). Group 3 consists of the Interim Action Ranges Munitions Response Area (MRA), the Military Operations in Urban Terrain (MOUT) Site MRA, the Laguna Seca Parking MRA, and the Del Rey Oaks (DRO)/Monterey MRA (Figure 2). The objective of this Group 3 RI/FS Work Plan is to outline the steps that will be taken to: 1) evaluate whether the nature and extent of MEC contamination has been adequately characterized; 2) assess explosives safety risk that may be present; and 3) develop, screen, and evaluate alternatives to reduce the potential explosives safety risk to current and future property owners and the general public. An initial evaluation of the data for the Group 3 MRAs was conducted as part of the Summary of Existing Data Report, and the results indicated that the existing data is of sufficient quantity to characterize the MRAs and no data gaps were identified. Therefore, no additional field data will be collected to complete the Remedial Investigation for Group 3.

This Group 3 RI/FS Work Plan presents the tasks to be performed to complete the RI/FS process, including documenting the nature and extent of MEC contamination, a baseline risk assessment, and a Feasibility Study (FS) for the Group 3 MRAs. In order to complete the RI/FS process for the Group 3 MRAs, an assessment of the risk of explosive hazard is required. To properly assess explosives safety risks that may be present at the Group 3 MRAs, and to recommend an appropriate remedial alternative, the quality and quantity of existing data for the Group 3 MRAs must be evaluated. The existing data will be further analyzed to document that the data are of sufficient quality to support an evaluation of alternatives for the FS and that the removal data are sufficient to be used to support explosives safety risk management decision making.

Once the data are determined to be sufficient, the Group 3 MRAs will proceed to the risk assessment phase. The explosives safety risk assessment will be conducted using the specific protocol previously developed to evaluate current and future explosives safety risks at the former Fort Ord. The Fort Ord Ordnance and Explosives Risk Assessment Protocol allows for a comparative review of MEC risks at affected sites. Once the baseline risk is evaluated, remedial action alternatives will be developed and evaluated in the FS against the nine Comprehensive Environmental Response, Compensation, and Liability Act criteria to identify whether remedial action (e.g., further MEC removal and/or land use controls) will be necessary to mitigate any unacceptable risks. The RI/FS tasks that will be performed to make decisions regarding risk and remedial actions during the Group 3 RI/FS were defined by the Administrative Order on Consent (AOC). The AOC tasks presented in the Group 3 RI/FS Work Plan are consistent with those provided in the United States Environmental Protection Agency’s current RI/FS guidance document.

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1.0 INTRODUCTION

The former Fort Ord is located near Monterey Bay in the northwestern portion of Monterey County, California. Since 1917, portions of the former Fort Ord were used by infantry units for maneuvers, target ranges, and other purposes. Military munitions were fired into, fired upon, or used on the facility in the form of artillery and mortar projectiles, rockets, guided missiles, rifle and hand grenades, land mines, pyrotechnics, and demolition materials. Some of these military munitions are still present at the former Fort Ord as either munitions and explosives of concern (MEC) or munitions debris (MD).

This Group 3 Remedial Investigation/Feasibility Study (RI/FS) Work Plan (“the Group 3 RI/FS Work Plan”) 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 (Figure 1). Group 3 includes the Interim Action Ranges Munitions Response Area (MRA), the Military Operations in Urban Terrain (MOUT) Site MRA, the Laguna Seca Parking MRA, and the Del Rey Oaks (DRO)/Monterey MRA (Figure 2). The ESCA RP Team consists of 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.

This Group 3 RI/FS Work Plan outlines the steps to be taken to: 1) evaluate whether the nature and extent of MEC contamination has been adequately characterized; 2) assess explosives safety risk that may be present; and 3) develop, screen, and evaluate alternatives to reduce the potential explosives safety risk to current and future property owners and the general public. The results of the above steps will be documented in the RI/FS report for use by the United States Department of the Army (Army) in developing the proposed plan and making a decision on remedial actions.

This effort was sponsored by the Army, Assistant Chief of Staff Installation Management. The content of the information does not necessarily reflect the position or policy of the Government and no official endorsement should be inferred.

1.1 Work Plan Purpose

The purpose of the Group 3 RI/FS Work Plan as defined under Task 3 of the AOC Scope of Work is to propose methodology to obtain the necessary information identified in the Summary of Existing Data Report (SEDR) to characterize the nature and extent of MEC in

order to propose a preferred remediation alternative pursuant to CERCLA. In compliance with AOC paragraph 25, at a minimum, the Group 3 RI/FS Work Plan includes plans and schedules for the following activities:

- Validation of existing data necessary to characterize conditions under previous investigations
- Human health risk assessment
- Development and screening of a range of possible remedial alternatives
- Detailed analysis of alternatives
- Development of sufficient information to enable the Army to select appropriate remedies for each parcel comprising the site

The results of the above activities will be documented in the RI/FS report for use by the Army in developing the proposed plan and making a remedial action decision.

1.2 Work Plan Objectives

The objectives of the Group 3 RI/FS Work Plan are to:

- Present the overall RI/FS process for MEC remediation within the Group 3 MRAs
- Provide background information on the Group 3 MRAs as it relates to MEC
- Summarize previous MEC investigations, sampling, and/or removal actions in the Group 3 MRAs
- Provide an initial evaluation of the nature and extent of MEC in the environment and identify the potential receptors and routes of exposure to MEC hazards
- Document data requirements for explosives safety risk and response alternative evaluations

1.3 Former Fort Ord Munitions Response Program

This section summarizes the munitions response program related to MEC cleanup that was previously 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.

1.3.1 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 occupation. To oversee the cleanup of the base, the Army, DTSC, the Central Coast Regional Water Quality Control Board (RWQCB), and EPA 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 the 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 are supporting agencies.

The base was selected for closure under the Base Realignment and Closure authority in 1991 and officially closed in September 1994. Since the closure of Fort Ord, cleanup operations have been performed to address the presence of MEC and to prepare former Fort Ord property for transfer to federal, state, and local agencies and the surrounding Monterey County communities. The Army conducted a number of MEC survey and clearance activities, including geophysical surveys. The Army performed 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 the process set out in CERCLA Section 120.

In November 1998, the Army agreed to evaluate MEC at the former Fort Ord and perform a base-wide Munitions Response RI/FS consistent with CERCLA. The base-wide RI/FS program addressed MEC hazards on 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 RI/FSs, and required that remedial actions be completed expeditiously.

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). 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 into 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. 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 into 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.

To remain consistent with the federal Endangered Species Act, the Army has completed consultations with the United States Fish and Wildlife Service on the Army's predisposal actions, including cleanup of MEC. These consultations have resulted in biological opinions that include endangered species incidental take permits. These permits allow impacts to, and incidental take 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.

1.3.2 Process for Early Transfer of Former Fort Ord Property

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.

The EPA Administrator, with the concurrence of the governor of the state in which the property is located, may defer the CERCLA warranty requirement if the property is determined to be suitable for transfer. 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). This FOSET will be submitted as part of the Covenant Deferral Request, in which the Army will seek approval by the EPA Administrator and concurrence by the governor of the state of the Early Transfer.

On March 31, 2007, the Army and FORA entered into an Environmental Services Cooperative Agreement (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 being transferred under the ESCA is shown on Figure 1 and is collectively referred to as the Areas Covered by Environmental Services (ACES). In accordance with the ESCA, FORA is responsible for addressing all response actions for the property except for those responsibilities retained by the Army. To accomplish this effort, FORA entered into an agreement with the ESCA RP Team to assist in the completion of the MEC cleanup activities in accordance with the ESCA and the AOC. During the ESCA, FORA is responsible for administrative and management program elements, while the ESCA RP Team conducts the MEC remediation under FORA oversight.

1.3.3 FORA ESCA Remediation Program

As defined by the ESCA, the Army prepared a Technical Specifications and Requirement Statement to identify the general specifications for the environmental services to be conducted by FORA under the ESCA RP. The purpose of the ESCA RP is to provide the necessary environmental services to FORA, which include characterization, assessment of risk of explosive hazards, Feasibility Study (FS), remediation alternatives analysis, and performance of remediation of hazardous substances, including but not limited to MEC, which pose unacceptable risk to human health and the environment. A primary benefit of the ESCA RP is to facilitate completion of these activities in a manner that is more expeditious than could be performed by the Army.

The primary objective of the ESCA RP is to complete a timely cleanup of the property in accordance with the ESCA and AOC, while promoting and enhancing the public health and safety of current and future users of the property. In addition, the ESCA RP allows remediation activities to be integrated with community reuse objectives, such as the construction of street improvements and backbone utility infrastructure.

1.4 Preliminary RI/FS Scoping and Implementation

Based on an evaluation of the available data, Conceptual Site Models (CSMs), preliminary assessments of risk, and regulatory pathway requirements, the nine MRAs were consolidated into four groups (i.e., Group 1 through Group 4). Each group consists of one or more MRAs that have similar pathway-to-closure characteristics. The four groups are shown on Figure 2. This work plan focuses on the Group 3 MRAs.

Group 3 includes the Interim Action Ranges MRA, the MOUT Site MRA, the Laguna Seca Parking MRA, and the DRO/Monterey MRA. The Interim Action Ranges MRA, the MOUT Site MRA, the Laguna Seca Parking MRA, and the DRO/Monterey MRA are shown on Figures 3 through 10. Surface and/or subsurface MEC removal actions have been conducted within the Group 3 MRAs. Military munitions encountered during these actions are consistent with the historical use of the areas. Data from these munitions response actions are available in the Military Munitions Response Program (MMRP) database and after-action reports, and appear to be of sufficient quality and quantity to support the development of an RI/FS without performing additional field investigation activities.

1.4.1 Summary of Existing Data Report

A SEDR was completed for the ACES by the ESCA RP Team as required under Task 2 of the AOC (ESCA RP Team 2008a). In the SEDR, ESCA parcels 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 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 Remedial Investigation (RI) planning efforts.

One of the goals of the SEDR was to develop a process to complete the remaining steps in the sequence and phasing of the CERCLA activities, as described in the AOC, within Group 3. The overall process for navigating Group 3 through the CERCLA process and a detailed regulatory pathway to closure was developed and presented in the SEDR. The regulatory pathway for Group 3 considers the conclusions and recommendations presented in the CSMs for each of the Group 3 MRAs; the CSMs are discussed in more detail in Section 3.0 of this work plan.

The proposed pathway to closure for Group 3 is depicted on Figure 11. Group 3 enters the pathway beginning with preparation of this RI/FS Work Plan. An RI/FS report will then be developed using the 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. The Army ROD will be implemented via the AOC process. The ROD implementation will include preparation of a Remedial Design/Remedial Action Work Plan and an Institutional Control Implementation Plan, execution of necessary remedial actions, and preparation of a Remedial Action Completion Report to document that all requirements for closure have been achieved.

1.5 Work Plan Organization

This Group 3 RI/FS Work Plan was prepared in accordance with the EPA “Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA” (EPA 1988b). This Group 3 RI/FS Work Plan contains the following components:

- **Executive Summary**
- **Section 1 – Introduction.** This section includes a general explanation of the reasons for the RI/FS and the expected results or goals.
- **Section 2 – History and Physical Setting.** This section provides an overview of the current understanding of the physical setting, history, and condition of the Group 3 MRAs.
- **Section 3 – Initial Evaluation.** This section presents an initial characterization of military training activities conducted within the Interim Action Ranges, MOUT Site, Laguna Seca Parking, and DRO/Monterey MRAs based on the information documented in the SEDR.
- **Section 4 – Work Plan Rationale.** This section presents the work plan approach, documentation of data requirements for both the explosives safety risk assessment and the alternatives evaluation, and an explanation of how RI/FS tasks will meet Data Quality Objective (DQO) needs.
- **Section 5 – Group 3 RI/FS Tasks.** This section summarizes the 11 tasks for completing an RI/FS.
- **Section 6 – Reporting and Scheduling.** This section includes a generalized outline for the RI/FS report and an anticipated project schedule.

- **Section 7 – References.** This section provides a list of references to pertinent documents cited in this work plan.

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2.0 HISTORY AND PHYSICAL SETTING

This section provides a summary of the MEC-related history, physical setting, and land use related to the former Fort Ord and the Group 3 MRAs. An evaluation of these components is included in Section 3.0 of this work plan.

2.1 MEC-Related History

In 1917, the Army bought a portion of the Main Garrison and East Garrison and nearby lands on the eastern side of the former Fort Ord to use as a maneuver and training ground for field artillery and cavalry troops stationed at the Presidio of Monterey. Prior to acquisition by the Army, the land was in agricultural use. No permanent improvements were constructed until the late 1930s. In the 1940s, more land was purchased to expand the development of the Main Garrison area, and the beach range area was given to the Army. With up to 15,000 active duty military personnel and 5,100 civilians working on site during its active history, the former Fort Ord Garrison areas resembled a mid-sized city, with accompanying family housing, medical facilities, warehouses, office buildings, industrial complexes, and gas stations.

Fort Ord was used to train Army infantry, cavalry, and field artillery units until formal closure. In support of the training of soldiers, military munitions were used at the ranges throughout the former Fort Ord. As a result of the training activities, a wide variety of conventional MEC (related to infantry and artillery training) have been encountered in areas throughout the former Fort Ord. The MEC encountered at the former Fort Ord have been either unexploded ordnance (UXO) or discarded military munitions (DMM).

The Group 3 MRAs include all or portions of several Munitions Response Sites (MRSs), which have been evaluated for the presence of MEC, and smaller portions of property that lie outside the MRS boundaries, which have had little or no evaluation for the presence of MEC. Within the MRS boundaries, these evaluations have included one or more of the following actions: site reconnaissance, surface and/or subsurface MEC investigation, and/or removal actions. The evaluation of those portions of the parcels lying outside of the MRS boundaries included: literature reviews and, in some cases, surface removals completed within the accessible areas. The MEC-related history for the Interim Action Ranges, MOUT Site, Laguna Seca Parking, and DRO/Monterey MRAs is summarized in the following sections.

2.1.1 Interim Action Ranges MRA

Initial use of the Interim Action Ranges MRA began in approximately 1917 when the United States Government purchased more than 15,000 acres of land and designated it as an artillery range. Although no training maps from this time period have been found, pre-World War II-era military munitions have been removed during previous Army response actions within the Interim Action Ranges MRA.

The Interim Action Ranges MRA contains all or portions of the firing points and range safety fans for Ranges 43, 44, 45, 46, and 47 (Figure 3). The Interim Action Ranges MRA contains

the following five USACE property transfer parcels: E38, E39, E40, E41, and E42 (Figure 4). It is expected that munitions activity within the Interim Action Ranges MRA occurred within the firing points on the ranges previously used for weapons training activities. The firing points for the ranges are located along the northern portion of the MRA. Historical range usage is summarized as follows:

- Range 43 - Platoon live-fire course, mortar training
- Range 44 - Antitank weapons
- Range 45 - Grenade launcher
- Range 46 - Small arms
- Range 47 - 40 millimeter (mm) grenades

To facilitate previous MEC investigations and removal activities, the historical use areas were designated as MRS-Ranges 43-48, which encompassed a larger area than the Interim Action Ranges MRA and included Range 48 (Figure 3). Previous work in the Interim Action Ranges MRA includes grid sampling, Ordnance and Explosives (OE) support for the establishment of trails and fuel breaks, limited surface removal, a surface Time-Critical Removal Action (TCRA), OE support for a prescribed burn, and removal actions. The following describes the investigation and removal operations performed by the Army in the Interim Action Ranges MRA:

- Range 44 Trail Sampling – 4-foot grid sampling and MEC removal at 11 15-foot by 100-foot grids in April 1997 (USA 2001c)
- Range 44 Subsurface Removal – 4-foot MEC removal at two 100-foot by 100-foot grids in April 1997 (USA 2001e and Parsons 2007)
- Range 44 Grid Sampling – grid sampling at one 100-foot by 100-foot grid in August 1997 (Parsons 2007)
- OE-15A Grid Sampling (Range 46) – 100 percent sampling to a depth of 4 feet at three 100-foot by 100-foot grids in October 1997 (USA 2000a)
- OE-15B Grid Sampling – 100 percent sampling to a depth of 4 feet at two 100-foot by 100-foot grids in October 1997 (USA 2000c)
- Evolution Road Fuel Break Reestablishment – 4-foot MEC removal at 53 15-foot by 100-foot grids from November 1997 to January 1998 (USA 2001g)
- Blue Line Fuel Break Establishment – 4-foot MEC removal at 56 100-foot by 30-foot grids from May to June 1998 (USA 2001g)
- Impact Area Grid Sampling – 100 percent grid sampling and 4-foot MEC removal at six 100-foot by 100-foot grids from March to August 1999 (USA 2001f)
- Range 46 Lead-Contamination Soil Remediation Project – grid sampling and 4-foot MEC removal to support efforts to remediate spent arms ammunition and lead contamination at nine 100-foot by 100-foot grids from April to August 1999 (Parsons 2007)

- Range 45 Safety Surface Removal – surface removal conducted in response to trespassing incidents at 11 100-foot by 100-foot grids from April to October 1999 (Parsons 2007)
- Impact Area Fuel Break Maintenance – surface and subsurface removals conducted to establish fuel breaks at 62 45-foot by 100-foot grids, 52 30-foot by 100-foot grids, and 89 15-foot by 100-foot grids from February to August 2001 (Parsons 2006)
- Surface TCRA in visible areas at 37 1,000-foot by 1,000-foot grids from August to December 2001 (Parsons 2002)
- Preparatory Action – fire preparation and control work was completed between August and October 2002 in preparation for the Ranges 43-48 prescribed burn (Parsons 2004a)
- Prescribed Burn – a prescribed burn was conducted in October 2003 on Ranges 43-48 to clear vegetation from the ranges so that MEC removal teams could safely operate geophysical detection instruments over the site. The prescribed burn cleared approximately 95 percent of the vegetation covering the site, revealing numerous MEC previously hidden by the brush (Parsons 2004a)
- MRS-Ranges 43-48 Interim Action – visual surface removal from November 2003 to February 2004 (Parsons 2007)
- Analog removal to depth at 1,251 100-foot by 100-foot grids on 271.8 acres of Ranges 43-48 from December 2003 to July 2005, and analog removal to depth at 10 100-foot by 100-foot grids on 2.3 acres of Ranges 43-48 from May 2005 to October 2005 following the completion of sifting operations (Parsons 2007)
- Range 45 Sifting and Sorting Operations – sifting and sorting in 14-acre area to a depth of 2 feet and Range 45 pad deconstruction from May to October 2005 (Parsons 2007)
- Range 45 Analog Removal and Digital Geophysical Mapping – Range 45 scraped areas at eight 100-foot by 100-foot grids from October to November 2005 (Parsons 2007)
- Range 43-48 Digital Mapping and Excavation Operations – accessible areas subject to analog removal included 1,249 100-foot by 100-foot grids from July 2004 to November 2005 (Parsons 2007)
- Interim Action at Ranges 43-48 – designated several areas as Special Case Areas (SCAs) or non-completed areas. Subsurface removal was not completed due to high concentrations of debris/anomalies and other reasons (Parsons 2007)
- Range 44 Special Case Area Surface Removal – surface removal of any MEC, non MEC-like MD, or general metallic debris items greater than 2 inches in any dimension encountered within accessible areas from March 19 to 30, 2007 (Shaw 2007)

More detailed information on the MEC-related history and nature and extent of contamination within the Interim Action Ranges MRA has been presented in the SEDR as a CSM. The CSM from the SEDR is provided in Appendix A of this work plan.

2.1.2 MOUT Site MRA

The MOUT Site MRA includes the MOUT training area and a portion of Barloy Canyon Road located along the eastern boundary of the former impact area. Initial use of the area including the MOUT Site MRA began in approximately 1917. No training maps from this time period have been found, and no pre-World War II-era military munitions have been encountered during previous Army response actions within the MOUT Site MRA.

To facilitate previous MEC investigation and removal activities, the MOUT training area was designated as MRS-28 (Figure 5), which corresponds to United States Army Corps of Engineers (USACE) Parcel F1.7.2 (Figure 6). The Barloy Canyon Road portion of the MRA was designated as USACE Parcel L20.8, and borders a former military training area to the east and also a part of the eastern boundary of the former impact area. USACE Parcel L20.8 passes through one of the former training sites (MRS-27O).

The primary historical military use within MRS-28 was 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).

Numerous investigations and removal actions were conducted by the Army in the MOUT Site MRA, which included:

MRS-27O (portion of Barloy Canyon Road):

- Site inspection in March 1996 (USACE 1997a)
- TCRA (visual surface) and military munitions reconnaissance from October to November 2003 (Shaw 2005)

MRS-28 (MOUT training area):

- 4-foot 100 Percent grid sampling of 16 Grids from March to September 1998 (USA 2001b)
- Site Stats/Grid Stats (SS/GS) sampling of 13 100-foot by 200-foot grids from March to September 1998 (USA 2001b)
- TCRA (visual surface) and military munitions reconnaissance from November to December 2003 (Shaw 2005)

More detailed information on the MEC-related history and nature and extent of contamination within the MOUT Site MRA has been presented in the SEDR as a CSM. The CSM from the SEDR is provided in Appendix B of this work plan.

2.1.3 Laguna Seca Parking MRA

Initial use of the Laguna Seca Parking MRA began in approximately 1917. Although no training maps from this time period have been found, pre-World War II-era military munitions have been removed during previous Army response actions within the Laguna Seca Parking MRA.

The vicinity of Laguna Seca Parking MRA was identified as a training area on historical maps for the 1st Brigade and Division Artillery. A review of available documentation indicated the potential presence of 7- and 8-inch naval rounds within the MRA (USACE 1997a). To facilitate previous MEC investigations and removal activities, the MRA was divided into four MRSs, which generally correspond to 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 (Figure 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 8).

Numerous investigations and removal actions were conducted by the Army in the Laguna Seca Parking MRA, which included:

MRS-14A:

- Removal action to support proposed Laguna Seca Raceway parking on 50 acres from 1993 to 1994 (HFA 1994)
- 100 percent grid sampling on 86 grids (10 percent of 193 acres; UXB 1995c)
- 4-foot removal action on 427 grids and 1-foot removal action on 384 grids from June 1997 to April 1998 (USA 2001a)

MRS-29:

- Random Sampling – converted to 100 percent removal action that was 53 percent completed (69 grids) from June to August 1995 (UXB 1995a)
- 4-foot removal action at 125 grids, including grids cleared by UXB International, Inc. (UXB), from February to July 1998 (USA 2000d)

MRS-30:

- 4-foot removal action from June to August 1995 (UXB 1995b)
- 30 feet to 40 feet 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:

- Sampling Investigation at three grids in January 1994 (HFA 1994)

- 3-foot removal action roads and trails southern and western perimeter on 39 grids in July 1994 (USA 2000b)
- 100 percent 4-foot sampling investigation at 32 grids from July to September 1996 (USA 2000b)
- 4-foot removal action on 79 acres from February to June 1997 (USA 2000b)

It was reported that six 100-foot by 100-foot grids were omitted from the removal action conducted from June 1997 to April 1998 at MRS-14A because of accessibility issues (i.e., steep grade, heavy brush, or deep ravine; USA 2001a).

More detailed information on the MEC-related history and nature and extent of contamination within the Laguna Seca Parking MRA has been presented in the SEDR as a CSM. The CSM from the SEDR is provided in Appendix C of this work plan.

2.1.4 DRO/Monterey MRA

Initial use of the DRO/Monterey MRA began in approximately 1917. Although no training maps from this time period have been found, pre-World War II-era military munitions were removed during previous Army response actions within the DRO/Monterey MRA.

To facilitate previous MEC investigations and removal activities, the area was divided into MRSs. The MRSs were identified through a review of Fort Ord records completed for the Revised Fort Ord Archive Search Report (USACE 1997a). The MRA is comprised of two non-contiguous portions of MRS-43 and a portion of the South Boundary Road, which is located within the boundaries of MRS-15 DRO.1 (Figure 9). The boundaries of the two non-contiguous portions of MRS-43 include a large portion of Parcel L6.2 and all of Parcel E29.1 for a combined area of approximately 29 acres (Figure 10). The South Boundary Road portion of the DRO/Monterey MRA includes Parcels L20.13.1.2 and L20.13.3.1 for a total area of approximately 5 acres (Figure 10).

Based on information obtained during an interview, the 1997 Revised Archive Search Report identified portions of the ridge in the area of MRS-43 that were used as a backstop for rifle grenades and shoulder launched projectiles from 1942 to 1944. Firing positions were excavated along South Boundary Road, and firing was from the southeast to the northwest at a diagonal to the hill. Impact occurred just north of a large stand of trees and continued up to the next to last large fire break. The firing positions were buried when the use was discontinued. The area was control burned in the 1940s to support this training (USACE 1997a).

Based on the results of previous investigations and removal actions, it was anticipated that weapons capable of firing 37 mm projectiles had been fired from the east of the DRO/Monterey MRA toward the hillside in MRS-43 through the 1940s (Shaw/MACTEC 2007).

MRS-15 DRO-1 is not being evaluated as part of the Group 3 MRAs. This information is included because it was adjacent to the portion of South Boundary Road that lies within this

DRO/Monterey MRA. There were several known ranges in MRS-15 DRO-1, all with firing points positioned such that they fired into the former impact area, away from MRS-43 (Shaw/MACTEC 2007).

Numerous investigation and removal operations were performed by the Army in the DRO/Monterey MRA (MRS-43), which included:

- SS/GS investigation at 19 100-foot by 200-foot grids in 1998 (USA 2001d)
- 4-foot removal action with Schonstedt GA-52/Cx instrumentation between May and July of 1998 (USA 2001f)
- 100 percent grid sampling at 11 100-foot by 100-foot grids in December 1999 and March 2000 (Parsons 2001)
- Geophysical investigation with G-858 digital magnetometer at 23 100-foot by 100-foot grids and partial grids (approximately 5.5 acres; Parsons 2001)
- Geophysical investigation with EM61 instrument at 164 100-foot by 100-foot grids and partial grids (Parsons 2001)
- Geophysical investigation with EM-61HH instrument at 20 100-foot by 100-foot grids (Parsons 2001)

Investigations and removal actions conducted by the Army at the adjacent property to the northeast (MRS-15 DRO-1) are summarized in the “Track 2 Munitions Response, Remedial Investigation/Feasibility Study, Del Rey Oaks Munitions Response Area, Former Fort Ord, California” (Shaw/MACTEC 2007).

During the removal actions, no burial pits containing MEC were encountered in the MRA. More detailed information on the MEC-related history and nature and extent of contamination within the DRO/Monterey MRA has been presented in the SEDR as a CSM. The CSM from the SEDR is provided in Appendix D of this work plan.

2.2 Physical Setting

The former Fort Ord is located approximately 100 miles south of San Francisco and occupies approximately 28,000 acres adjacent to Monterey Bay and the cities of Marina, Seaside, Sand City, Del Rey Oaks, and Monterey. State Highway 1 crosses the western portion of the former Fort Ord, separating the beachfront from most of the installation. Laguna Seca Recreational Area and Toro Regional Park border the former Fort Ord to the south and southeast, respectively, as do several small communities, such as Toro Park Estates and San Benancio (Figure 1). The physical settings for the Interim Action Ranges, MOUT Site, Laguna Seca Parking, and DRO/Monterey MRAs are summarized in the following sections.

2.2.1 Interim Action Ranges MRA

The Interim Action Ranges MRA is located in the north-central portion of the former Fort Ord, within the boundary of the former impact area. The Interim Action Ranges MRA is

bordered by the Parker Flats MRA to the north, the Seaside MRA to the east, and the former impact area to the southeast, south, and southwest (Figure 1). The Interim Action Ranges MRA is contained within the jurisdictional boundaries of the City of Seaside and Monterey County.

The Interim Action Ranges MRA encompasses approximately 231 acres and fully contains the following five USACE property transfer parcels: E38, E39, E40, E41, and E42 (Figure 4).

The terrain of the Interim Action Ranges MRA is relatively flat. The elevation ranges from approximately 370 to approximately 530 feet mean sea level (msl) with 2 to 15 percent slopes. 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 type present in the Interim Action Ranges MRA is Arnold-Santa Ynez Complex with Baywood Sand in the northwestern portion of the MRA. Soil conditions at the MRA consist predominantly of weathered dune sand, which provides a relatively good environment for conducting geophysical surveys, including electromagnetic and magnetic surveys. Vegetation in the Interim Action Ranges MRA consists primarily of maritime chaparral. Before the prescribed burn in 2003, most of the Interim Action Ranges MRA was covered by dense, 4- to 5-foot-tall maritime chaparral. Patches of annual grassland habitats exist along the western and southern boundaries of the MRA. There are areas within the MRA that are overgrown with poison oak.

Groundwater investigations associated with the Basewide RI/FS have resulted in the installation of a number of groundwater monitoring wells on former Fort Ord property near the Interim Action Ranges MRA (HLA 1995). The Interim Action Ranges MRA overlies the Seaside Groundwater Basin, which is structurally complex and divided into several sub-basins. The depth to groundwater is estimated to be greater than 100 feet below ground surface (bgs). No wells are located within the MRA. The occurrence of groundwater beneath the MRA is not expected to influence geophysical surveys conducted for MEC remediation activities. Reportedly, no surface-water features or delineated wetlands are present on the Interim Action Ranges MRA; however, an aquatic feature is present over 4,500 feet to the east-southeast of the MRA.

The Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord, California (HMP; USACE 1997b) identifies the Interim Action Ranges MRA as development with borderland interface areas along a natural resources management area (NRMA) interface and habitat reserve. The NRMA separates the development category land from the adjacent habitat reserve area. The 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 Endangered Species Act (ESA) and to minimize impacts to listed species.

Threatened or endangered plant species identified as having possible occurrence in the Interim Action Ranges MRA include sand gilia (endangered) and Monterey spineflower (threatened). A portion of the Interim Action Ranges MRA has been designated as critical habitat for the Monterey spineflower by the United States Fish and Wildlife Service (USFWS).

In 2004, the California tiger salamander (CTS) was identified as a threatened species. CTS may be found as far as 2 kilometers (km) from aquatic breeding habitats. It is possible the CTS may be found in the Interim Action Ranges MRA as the MRA is within 2 km of aquatic features (i.e., vernal pools, ponds) that may provide habitat for the CTS.

FORA will implement the mitigation requirements identified in the HMP for MEC activities in accordance with the biological opinions (BOs) developed during formal consultation between the Army and the USFWS under Section 7 of the ESA. For habitat areas, these measures include conducting habitat monitoring in compliance with Chapter 3 of the HMP (USACE 1997b). For borderland areas, FORA will follow best management practices while conducting work to prevent the spread of exotic species, limit erosion, and limit access to the NRMA. More detailed information on the geology, vegetation, surface water, and groundwater of the Interim Action Ranges MRA has been presented in the SEDR as a CSM. The CSM from the SEDR is provided in Appendix A of this work plan.

2.2.2 MOUT Site MRA

The MOUT Site MRA is located in the central portion of the former Fort Ord within the northeastern portion of the former impact area (Figure 1). The MRA includes the MOUT training area and a portion of Barloy Canyon Road located along the eastern boundary of the former impact area (Figure 6). The MOUT Site MRA is wholly contained within the jurisdictional boundaries of Monterey County.

The MOUT Site MRA encompasses approximately 61 acres and contains the following two USACE property transfer parcels: F1.7.2 and L20.8 (Figure 6).

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 feet msl to approximately 420 feet msl in the MOUT training area and from approximately 200 feet msl to approximately 480 feet msl in the Barloy Canyon Road portion of the MRA. The geology includes alluvial fan and flood deposits for the Paso Robles Formation, and sand and gravel deposits of the Aromas Formation. 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.

The vegetation of the MOUT Site MRA consists primarily of inland coast live oak woodland and grassland with smaller areas of maritime chaparral (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.

Groundwater investigations associated with the Basewide RI/FS have resulted in the installation of a number of groundwater monitoring wells on former Fort Ord property (HLA 1995). The Seaside Groundwater Basin is the main hydrogeologic structure that underlies the

MRA. The depth to groundwater is estimated to be greater than 100 feet bgs and is not expected to influence geophysical surveys conducted for MEC remediation activities. No water supply wells or groundwater monitoring wells are identified in the area.

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

The HMP identifies the MOUT Site MRA as development without restriction. 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 sand gilia (endangered) and Monterey spineflower (threatened).

The MOUT Site MRA may have a presence of CTS because the MRA is located within 500 meters of two aquatic features, one of which was identified as suitable breeding habitat and the other of which was identified as a known CTS breeding site in 2004.

FORA will implement the mitigation requirements identified in the HMP for MEC activities in accordance with the BOs developed during formal consultation between the Army and the USFWS under Section 7 of the ESA. For borderland areas, FORA will follow best management practices while conducting work to prevent the spread of exotic species, limit erosion, and limit access to the NRMA.

More detailed information on the geology, vegetation, surface water, and groundwater of the MOUT Site MRA has been presented in the SEDR as a CSM. The CSM from the SEDR is provided in Appendix B of this work plan.

2.2.3 Laguna Seca Parking MRA

The Laguna Seca Parking MRA is located in the southeastern portion of the former Fort Ord adjacent to the Laguna Seca Raceway (Figure 1). The MRA is bordered by Barloy Canyon Road and the former 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. The Laguna Seca Parking MRA is wholly contained within the jurisdictional boundaries of Monterey County.

The MRA encompasses approximately 276 acres and 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 8).

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 8).

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 feet msl in the northern portion of the MRA to approximately 950 feet msl in the southern portion of the MRA. The geology includes deposits from the Paso Robles Formation and sand and gravel deposits of the Aromas Formation. 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.

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 (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 prescribed burning, and both manual and mechanical methods. During past field activities, the presence of poison oak was noted in the MRA.

Groundwater investigations associated with the Basewide RI/FS have resulted in the installation of one monitoring well adjacent to the Laguna Seca Parking MRA (HLA 1995). The Seaside Groundwater Basin is the main hydrogeologic structure that underlies the Laguna Seca Parking MRA. The depth to groundwater is estimated to be greater than 100 feet bgs and is not expected to influence geophysical surveys conducted for MEC remediation activities.

A number of aquatic features (i.e., vernal pools, ponds) are located within 1,600 feet (approximately 500 meters) of the Laguna Seca Parking MRA.

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 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 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.

The Laguna Seca Parking MRA may have a presence of CTS because the MRA is located within 500 meters of several aquatic features.

FORA will implement the mitigation requirements identified in the HMP for MEC activities in accordance with the BOs developed during formal consultation between the Army and the USFWS under Section 7 of the ESA. For habitat areas, these measures include conducting habitat monitoring in compliance with Chapter 3 of the HMP (USACE 1997b).

More detailed information on the geology, vegetation, surface water, and groundwater of the Laguna Seca Parking MRA has been presented in the SEDR as a CSM. The CSM from the SEDR is provided in Appendix C of this work plan.

2.2.4 DRO/Monterey MRA

The DRO/Monterey MRA is located in the southwestern portion of the former Fort Ord, along South Boundary Road (Figure 1). 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 and 5.245 acres of a portion of the existing South Boundary Road and associated right-of-way. 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 10).

The terrain of the DRO/Monterey MRA is hilly and sloping from the southwest to the northeast, while relatively flat along the roadway. The elevation ranges from approximately 150 to 260 feet msl with 0 to 30 percent slopes. 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 series present in the DRO/Monterey MRA are Baywood Sand and Arnold-Santa Ynez Complex. Soil conditions at the survey sites are predominantly weathered dune sand, which provides a relatively good environment for conducting geophysical surveys, including electromagnetic and magnetic surveys.

Vegetation consists primarily of maritime chaparral in the DRO/Monterey MRA (USACE/Jones & Stokes 1992). The area south of South Boundary Road consists of dense brush. The area along South Boundary Road transitions from sparse vegetation adjacent to the roadway to more dense vegetation to the south. 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.

Groundwater investigations associated with the Basewide RI/FS have resulted in the installation of a number of groundwater monitoring wells on former Fort Ord property near the DRO/Monterey MRA (HLA 1995). The MRA overlies the Seaside Groundwater Basin, which is structurally complex and divided into several sub-basins. Groundwater is generally encountered at a depth of more than 100 feet bgs; however, layers of perched groundwater may be present. The occurrence of groundwater beneath the MRA is not expected to influence geophysical surveys conducted for MEC remediation activities.

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 of the MRA.

The 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.

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 CTS may be found in the DRO/Monterey MRA as the MRA is within 500 meters of aquatic features that may provide breeding habitat for the CTS.

FORA will implement the mitigation requirements identified in the HMP for MEC activities in accordance with the BOs developed during formal consultation between the Army and the USFWS under Section 7 of the ESA. For habitat areas, these measures include conducting habitat monitoring in compliance with Chapter 3 of the HMP (USACE 1997b).

More detailed information on the geology, vegetation, surface water, and groundwater of the DRO/Monterey MRA has been presented in the SEDR as a CSM. The CSM from the SEDR is provided in Appendix D of this work plan.

2.3 Land Use

The former Fort Ord consists of both developed and undeveloped land. This section summarizes the current and future land uses for Group 3.

2.3.1 Current Land Use

The Group 3 MRAs currently consist of mostly undeveloped open space, with the exception of paved roadways, such as Barloy Canyon Road and South Boundary Road, and the mock city located on the MOUT Site MRA that is currently used for tactical training of military, federal, and local law enforcement agencies. 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. In addition, there are residual structures that supported training activities at the Interim Action Ranges MRA. Most of these residual structures have been abandoned.

Reportedly, the DRO/Monterey MRA is accessed by day recreational users, including hikers and mountain bikers. There is also evidence of trespasser activity and illegal dumping in the Interim Action Ranges and DRO/Monterey MRAs.

More detailed information on the current land uses of the Group 3 MRAs has been documented in the SEDR as CSMs. The CSMs for the Interim Action Ranges, MOUT Site, Laguna Seca Parking, and DRO/Monterey MRAs from the SEDR are provided as Appendices A, B, C, and D, respectively, of this work plan.

2.3.2 Future Land Use

The Fort Ord Base Reuse Plan, adopted by FORA on June 13, 1997, serves as a general development plan for the former base (FORA 1997). Future land uses for the Group 3 MRAs include: nonresidential development, including infrastructure improvements and a roadway easement for a future bypass of Highway 68, borderland interface, and habitat reserve. The mock city located on the MOUT Site MRA is expected to continue being used as a tactical training area for law enforcement agencies.

Special circumstances apply at the Group 3 MRAs for the following types of reuse areas: (1) habitat reserve areas, and (2) borderlands between habitat reserve areas and development areas. The Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord, California (HMP; USACE 1997b) and modifications to the HMP provided in the Assessment, East Garrison—Parker Flats Land Use Modifications, Fort Ord, California (Zander 2002) present the boundaries of habitat reserve and development areas and describe land use, conservation, management, and habitat monitoring requirements for target species within the Group 3 MRAs. The HMP for former Fort Ord was prepared in accordance with the USFWS Biological Opinion and establishes the guidelines for the conservation and management of wildlife and plant species and habitats that largely depend on former Fort Ord land for survival (USACE 1997b). More detailed information on the future land uses of the Group 3 MRAs has been documented in the SEDR as CSMs. The CSMs for the Interim Action Ranges, MOUT Site, Laguna Seca Parking, and DRO/Monterey MRAs from the SEDR are provided as Appendices A, B, C, and D, respectively, of this work plan.

3.0 INITIAL EVALUATION

An initial evaluation of the Group 3 MRAs was conducted during development of the SEDR. Development of the CSMs included an evaluation of the known historical military use and associated munitions-related activities, as well as existing information related to previous munitions response actions for each of the MRAs. These evaluations included facility profiles, physical profiles, release profiles, land use profiles, ecological profiles, and pathway analyses, to include identification of source areas, accessibility, receptors, and receptor activities that could result in human health risks related to the potential presence of MEC remaining within the MRAs. The SEDR also provided recommendations and conclusions, which are summarized in Section 4.0 of this work plan. Copies of the CSMs from the SEDR for the Group 3 MRAs are provided in Appendices A, B, C, and D.

The following sections provide a summary of the initial evaluations for the Group 3 MRAs to support the work plan rationale presented in Section 4.0 of this work plan.

3.1 Interim Action Ranges MRA Evaluation

The documented historical use of the Interim Action Ranges MRA was as a weapons and troop training area, and it contained the firing points for Ranges 43, 44, 45, 46, and 47 (Appendix A). Previous work in the Interim Action Ranges MRA conducted by the Army included grid sampling, OE support for the establishment of trails and fuel breaks, limited surface removal, a surface TCRA, OE support for a prescribed burn, and surface and subsurface removal actions conducted as part of the interim remedial action in accordance with the Interim Action ROD for Ranges 43-48, Range 30A, and Site OE-16 (Army 2002). The Army's removal actions were completed over a majority of the footprint of the MRA, except for approximately 44 acres within the MRA designated by the Army as SCAs or non-completed areas (Parsons 2007). Subsurface removal was not completed in the SCAs and non-completed areas for a variety of reasons, including high concentrations of debris/anomalies. The remaining risks present at the Interim Action Ranges, including the SCAs, will be evaluated as part of the Group 3 RI/FS. It is anticipated that SCAs and non-completed areas would contain types of MEC similar to those found in the adjacent areas.

The MEC and MD encountered to date within the MRA are consistent with its documented historical use primarily as a weapons and troop training area. A majority of the MEC items are associated with munitions that were used for the following purposes:

- Direct and Indirect Firing (antitank rockets, projectiles, and fragmentation hand grenades)
- Illumination (illumination signals, illumination hand grenades, trip flares, parachute illumination projectiles, and pyrotechnic mixtures)
- Smoke (smoke rifle grenades, smoke hand grenades, smoke signals, and pyrotechnic smoke mixtures)
- Demolition (blasting caps and demolition charges)

- Igniters (firing devices, electric squibs, hand grenade fuzes, practice mine activators, mine fuzes, and time fuze igniters)
- Training (practice hand grenade fuzes, practice mines, practice rockets, practice hand grenades, and practice rifle grenades)

A summary of the MEC and MD encountered during previous investigations and removal actions in the Interim Action Ranges MRA is provided in Appendix A.

During the removal actions, 20 burial pits containing MEC were discovered in the MRA. A total of 144 MEC items were recovered from these burial pits. Appendix A provides more detail on the specific types of MEC recovered from the burial pits, as well as the types of MEC found elsewhere at the Interim Action Ranges MRA. In total, the removal actions in the Interim Action Ranges MRA resulted in the removal of:

- 10,167 UXO items
- 84 DMM items
- 125 Insufficient Data (ISD) items (could not be classified as UXO, DMM, or MD)
- 196,996 pounds of MD

Of the 10,013 MEC items and 27 pyrotechnic mixtures recovered from the MRA (which includes ISD items, as defined in the SEDR) that were assigned hazard classifications, 3 items had a hazard classification of 0 (inert munitions item that will cause no injury), 8,760 items and 27 pyrotechnic mixtures had a hazard classification of 1 (MEC that will cause an injury or, in extreme cases, could cause major injury or death to an individual if functioned by an individual's activities), 120 items had a hazard classification of 2 (MEC that will cause major injury or, in extreme cases, could cause death to an individual if functioned by an individual's activities), and 1,130 items had a hazard classification of 3 (MEC that will kill an individual if detonated by an individual's activities). The remaining items recovered from the MRA (337 MEC items) were not assigned hazard classification values due to insufficient information.

The greatest concentrations of MEC and MD were encountered in the vicinity of Ranges 44 and 45. The weight of MD ranges from zero to greater than 100 pounds per grid in these ranges. Additional literature research will be conducted as part of the RI/FS to verify that the MD reported within these grids are an accurate representation of data. It appears that these zero MD grids are in areas in which no subsurface removal actions have been conducted.

The MMRP database indicates that the majority of the MEC removed from the Interim Action Ranges MRA was located on the surface. However, the nature of the scraping and sifting operations was such that it was not possible to track the depth of the MEC items recovered. Therefore, a depth may not have been recorded in the database for the MEC items removed during the Range 45 scraping and sifting operations.

Since the MEC encountered within the Interim Action Ranges MRA are consistent with the documented historical use as a military weapons training and troop training area, and the

Army has conducted removal actions over the majority of the MRA, the initial evaluation of previous munitions response actions within the Interim Action Ranges MRA indicates that the existing data is of sufficient quantity to characterize the MRA.

3.2 MOUT Site MRA Evaluation

The documented historical use of the MOUT Site MRA included weapons and troop training, and maneuver areas and bivouac areas (Appendix B). Previous work within the MOUT Site MRA included visual surface TCRA across the majority of the MRA; subsurface investigation to a depth of 4 feet across the northeastern and southwestern portions of the MRA; and SS/GS sampling in the central portion of the MRA. The MEC and MD encountered to date within the MRA are consistent with its documented historical use primarily as a weapons and troop training area, to include maneuver and bivouac areas. A majority of the MEC items are associated with munitions that were used for the following purposes:

- Direct and Indirect Firing (antitank rifle grenade, high explosive and mortar projectiles, and fragmentation hand grenades)
- Illumination (illumination signal, trip flare, and parachute illumination projectile)
- Smoke (smoke hand grenades)
- Igniters (hand grenade fuzes and mine fuzes)
- Training (practice hand grenade fuzes, practice rocket, practice hand grenades, simulators, and practice projectile)

During the removal actions, two burial pits containing MEC were discovered in the northern portion of MRS-28. A total of 56 MEC items were recovered from these burial pits. Appendix B provides more detailed information on the specific types of MEC recovered from these burial pits, as well as the types of MEC found elsewhere at the MOUT Site MRA. In total, the removal actions in the MOUT Site MRA resulted in the removal of:

- 53 UXO items
- 59 DMM items
- 22,110 pounds of MD

Of the 112 MEC items recovered from the MRA that were assigned hazard classifications, 1 item had a hazard classification of 0 (inert munitions item that will cause no injury), 99 items had a hazard classification of 1 (MEC that will cause an injury or, in extreme cases, could cause major injury or death to an individual if functioned by an individual's activities), 5 items had a hazard classification of 2 (MEC that will cause major injury or, in extreme cases, could cause death to an individual if functioned by an individual's activities), and 7 items had a hazard classification of 3 (MEC that will kill an individual if detonated by an individual's activities).

The MMRP database indicates that the greatest concentrations of MEC and MD were encountered in the southern portion of MRS-28. The majority of MEC in MRS-28 were consistent with troop maneuver and close combat training, with the exception of a single high-explosive mortar. MEC consistent with use as a troop maneuver area were encountered east of Barloy Canyon Road, as expected, and high concentrations of subcaliber practice projectiles were encountered east of the southern end of Barloy Canyon Road. In addition, MEC consisting of 40 grenade fuzes and 16 mine fuzes were found in two separate burial pits. The MMRP database indicates that all MEC and MD encountered and removed during previous removal actions were located within the 4-foot removal depth. The majority of MEC and MD removed were located within 0 to 24 inches bgs.

Since the MEC encountered within the MOUT Site MRA are consistent with the documented historical use as a military weapons training and troop training area, and maneuver and bivouac areas, and the Army has conducted removal actions over the majority of the MRA, the initial evaluation of previous munitions response actions within the MOUT Site MRA indicates that the existing data is of sufficient quantity to characterize the MRA.

3.3 Laguna Seca Parking MRA Evaluation

The documented historical use of the Laguna Seca Parking MRA was as a weapons and troop training area (Appendix C). Previous work within the Laguna Seca Parking MRA included subsurface removal actions; random sampling converted to removal actions; targeted 4-foot removal actions; and 30 to 40 feet of fill placed over MRS-30 in support of construction activities associated with the Laguna Seca Raceway. The MEC and MD encountered to date within the MRA are consistent with its documented historical use primarily as a weapons and troop training area. A majority of the MEC items are associated with munitions that were used for the following purposes:

- Direct and Indirect Firing (high explosive antitank rocket, armor-piercing tracer projectiles, high explosive projectiles, mortar projectiles, and hand grenades)
- Illumination (illumination signals, trip flares, and pyrotechnic mixtures)
- Smoke (smoke rifle grenades, smoke hand grenades, and smoke pot)
- Igniters (hand grenade fuzes and mine fuze)
- Demolition (blasting caps and demolition charges)
- Training (practice hand grenade fuzes, practice hand grenade, simulators, and practice projectiles)

It was reported that six 100-foot by 100-foot grids were omitted from the removal action at MRS-14A because of accessibility issues (i.e., steep grade, heavy brush, or deep ravine; USA 2001b). During the removal actions, one burial pit containing MEC related to troop training was encountered in MRS-14A. A total of 11 MEC items were recovered from this burial pit. Appendix C provides more detailed information on the specific types of MEC recovered from this burial pit, as well as the types of MEC found elsewhere at the Laguna Seca Parking

MRA. In total, the removal actions in the Laguna Seca Parking MRA resulted in the removal of:

- 320 UXO items
- 1 DMM item
- 1 ISD item (could not be classified as UXO, DMM, or MD)
- 10,903 pounds of MD

Of the 317 MEC items and five pyrotechnic mixtures recovered from the MRA that were assigned hazard classifications, seven items had a hazard classification of 0 (inert munitions item that will cause no injury), 257 items and five pyrotechnic mixtures had a hazard classification of 1 (MEC that will cause an injury or, in extreme cases, could cause major injury or death to an individual if functioned by an individual's activities), 14 items had a hazard classification of 2 (MEC that will cause major injury or, in extreme cases, could cause death to an individual if functioned by an individual's activities), and 39 items had a hazard classification of 3 (MEC that will kill an individual if detonated by an individual's activities).

The MMRP database indicates that the majority of MEC were found in the northwesternmost portion of MRS-47. A small concentration of MEC were located in the southern portion of MRS-47, and individual MEC items were found along Barloy Canyon Road within the boundary of the MRA. A large number of MEC were also found outside of the MRA boundary to the northeast.

The MMRP database does not indicate that MD was found in most of the investigated grids within MRS-14A and MRS-30. A small percentage of the grids in these two MRSs and most of the grids in MRS-29 and MRS-47 contained up to 100 pounds of MD. Most of the MD (by weight) was recovered from MRS-47, especially in the northern portion of the MRS.

All MEC and MD encountered and removed during previous removal operations were located within the 4-foot removal depth. The majority of MEC and MD removed were located within 0 to 24 inches bgs.

Since the MEC encountered within the Laguna Seca Parking MRA are consistent with the documented historical use as a military weapons training and troop training area, and the Army has conducted removal actions over the majority of the MRA, the initial evaluation of previous munitions response actions within the Laguna Seca Parking MRA indicates that the existing data is of sufficient quantity to characterize the MRA.

3.4 DRO/Monterey MRA Evaluation

The documented historical use of the DRO/Monterey MRA was as a weapons and troop training area (Appendix D). Numerous investigation and removal operations were performed by the Army in the DRO/Monterey MRA (MRS-43). These included subsurface sampling investigation conducted with SS/GS methodology; grid sampling; a 4-foot removal action; and geophysical investigations. The MEC and MD encountered to date within the MRA are

consistent with its documented historical use as a weapons and troop training area. A majority of the MEC items are associated with munitions that were used for the following purposes:

- Direct and Indirect Firing (low explosive projectile)
- Smoke (smoke pot and smoke rifle grenade)
- Demolition (demolition charge)
- Training (practice cartridges)

During the removal actions, no burial pits containing MEC were encountered in the MRA. In total, the removal actions in the DRO/Monterey MRA resulted in the removal of:

- 3 UXO items
- 3 DMM items
- 1,012 pounds of MD

Of the six MEC items recovered from the MRA that were assigned hazard classifications, no items had a hazard classification of 0 (inert munitions item that will cause no injury), four items had a hazard classification of 1 (MEC that will cause an injury or, in extreme cases, could cause major injury or death to an individual if functioned by an individual's activities), one item had a hazard classification of 2 (MEC that will cause major injury or, in extreme cases, could cause death to an individual if functioned by an individual's activities), and one item had a hazard classification of 3 (MEC that will kill an individual if detonated by an individual's activities).

The MMRP database indicates that MEC were encountered in the northwestern portion of MRS-43 (Parcel L6.2) and along the northeastern side of South Boundary Road. Most of the investigated grids within the central portion of MRS-43 did not contain any MD. Grids in the remaining portions of MRS-43 contained up to 10 pounds of MD with a few grids containing between 10 to 100 pounds of MD. All of the MEC removed from the MRA were located within 0 to 6 inches bgs.

Since the MEC encountered within the DRO/Monterey MRA are consistent with the documented historical use as a military weapons training and troop training area, and the Army has conducted removal actions over the majority of the MRA, the initial evaluation of previous munitions response actions within the DRO/Monterey MRA indicates that the existing data is of sufficient quantity to characterize the MRA.

4.0 WORK PLAN RATIONALE

This section outlines the components of the Group 3 RI/FS Work Plan that will be used to complete the RI/FS process, develop the RI/FS report, and support an Army remedial action decision. This section also provides a summary of the data needs and information gathering tools that will be used during the RI/FS. The major decision points to be addressed during development of the RI/FS process are as follows:

- Is the site characterization data of known and sufficient quality to adequately characterize the nature and extent of MEC contamination?
- Is the site characterization data of known and sufficient quality to support completion of an explosives safety risk assessment?
- What are the remedial action alternatives, and which alternative(s) meet the nine CERCLA criteria, making it appropriate to mitigate explosives safety risks?

Based on the initial evaluation provided in the SEDR, as summarized in Section 3.0 of this work plan, the following sections describe the RI/FS approaches and data needs for Group 3.

4.1 Summary of the Approach for Group 3

The Army has previously conducted investigations and removal actions within the Interim Action Ranges, MOUT Site, Laguna Seca Parking, and DRO/Monterey MRAs. The data obtained during previous Army actions were reviewed during the development of the SEDR. The initial evaluation of previous munitions response actions within the MRAs indicated that the existing data are of sufficient quantity to characterize the MRAs. Therefore, additional field data will not be collected to complete the RI for these MRAs. Data quality review will be performed during the RI for the MRAs to confirm that the munitions response data are usable for the purposes of the risk assessment and FS.

Additionally, a Residential Quality Assurance (RQA) Pilot Study is being conducted in the Seaside and California State University Monterey Bay (CSUMB) Off-Campus MRAs to assess the potential residual risk, if any, posed by undetected MEC, following MEC removal actions, in a portion of the areas planned for future residential development. The RQA Pilot Study work plan was presented in Volume 2 of the Final Group 1 RI/FS Work Plan, which was submitted for the Group 1 MRAs (ESCA RP Team 2008b). Although residential development is not planned for the Group 3 MRAs, the results of the RQA Pilot Study may be incorporated into the Group 3 RI/FS report as a part of the discussion concerning the effectiveness of previous removal actions.

4.2 Data Quality Objectives

The RI/FS process requires the collection of data for regulatory compliance and decision-making purposes. The data collected must have sufficient quality and quantity to support decision making.

The DQO process developed by EPA was employed as a systematic planning tool to establish criteria for data quality and for guiding data collection. The results of that planning process are included in the following sections of this Group 3 RI/FS Work Plan.

4.3 Validation of Existing Data

The SEDR identifies and summarizes existing data for the Group 3 MRAs, including the results of previous investigations and removal actions. The validation of existing data is necessary to establish that the data are of known and sufficient quality to be usable in the RI/FS to support completion of an explosives safety risk assessment and the evaluation of remedial alternatives.

Existing data generally fall into the following three categories:

- Physical Setting and Land Use
- Historical Records and Military History
- MEC Response Actions

The physical setting and land use category data are well understood. Validation efforts will consist of verifying that the information is up to date, accurate, and complete. Historical records, military history, and MEC investigations and removal actions data will be reviewed and validated as described below.

4.3.1 Historical Records and Military History

The Army researched historical records and documented the military history of Fort Ord in a series of Archive Search Reports. The Army historical records and military history for the Group 3 MRAs will be reviewed to determine if the munitions found during previous munitions response actions are consistent with the initial evaluation of each MRA. The following information will be reviewed, as appropriate:

- Historical Records
 - Archive Search Reports
 - Non-military history of the former Fort Ord
 - Specific military training / use of each MRA
- Military History / Field Manuals
 - Training practices by era
 - Munitions types and use in various operations, during various time periods

4.3.2 MEC Investigations and Removal Actions

The previous munitions response actions that have been performed will be evaluated in order to assess the quality of the response actions and resulting data, using the criteria presented in the following subsections.

4.3.2.1 *Equipment Evaluation*

An evaluation of the equipment used during previous munitions response actions will focus on how the equipment was employed and maintained. The evaluation will involve checking and reviewing the following items:

- Manufacturer calibration and operating procedures
- Calibration documentation, including frequency and null points
- Calibration records or logs
- Operator training records
- Quality assurance/quality control (QA/QC) of equipment calibration and usage
- Historical evaluations of equipment detection capabilities (i.e., geophysical prove-outs, seeding operations, etc.)

4.3.2.2 *Adequacy of Removal Approach*

Items that will be evaluated to assess the adequacy of previous removal approaches will include depth of sampling/removal and future land use. In addition, the depth at which items were found will be compared with maximum calculated penetration depths and calculated detection depth limits. Documentation that will be used to evaluate the previous operations includes:

- munitions response reports and associated maps
- reconnaissance and sampling data
- site work plans
- FORA ESCA RP database and/or MMRP database
- field logs and field maps

Additional items not listed above may be reviewed, if they are relevant to the evaluation of past removal actions.

4.3.2.3 *Collection and Management of Field Data*

The Army has evaluated the collection and management of field data for previous munitions response actions. The evaluation conducted by the Army will be used to support the

validation of data collected by the Army and its contractors, which included the following activities:

- Data quality assurance (QA; if there was no evidence that data QA was conducted, a 10 percent QA effort was performed).
- Parsons, under contract with the Army, performed a 100 percent quality control (QC) review of the data in the MMRP database previously generated from work conducted by prior munitions response contractors. The review followed an approved Standard Operating Procedure (SOP). This evaluation included a review of the field grid records and the MMRP database. It also included a review of Human Factors Application, Inc. (HFA) data provided in the after-action report (HFA 1994). The USACE implemented a QA review of 10 percent of the data reviewed by Parsons. The QA review included a comparison of the data set with the data set reported in the contractor's after-action reports. The requirements of the USACE QA review are described in the SOP. The purpose of the QC data review was to complete 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 then researched and appropriate corrections were made in the MMRP database.
- Parsons used a digital process for field data collection, which reduced the data issues associated with the use of grid sheets (such as human errors, inconsistent munitions nomenclature, etc.). Parsons' data were managed in accordance with the quality procedures outlined in its Programmatic Work Plan (Parsons 2004b) and had to meet the standards of the MMRP database, managed by USACE, prior to loading the data into the database.

4.3.2.4 Completeness of Existing Records and Data Gaps

The completeness of existing records and the identified data gaps will be evaluated. The records will be 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.

4.3.2.5 Accuracy of Site Boundaries

Site boundaries are of particular importance to the completion of the RI/FS. Site boundaries were first presented as part of the 1993 Archives Search Report (USACE 1993). These boundaries served as a foundation for the initial investigation under the MMRP. Since that time, site boundaries have been modified based on results of MEC investigations and to support property transfer. The evaluation of previous work will include an evaluation of existing information to determine whether the establishment of site boundaries is accurate, based on historical information and removal data, and whether the surveying method used to delineate the site boundaries was accurate.

4.4 Incorporation of the RQA Pilot Study Results

The Group 1 RI/FS Work Plan included an RQA Pilot Study work plan, which was presented in Volume 2 of the Group 1 RI/FS Work Plan (ESCA RP Team 2008b). It is recognized that a MEC removal action may not successfully acquire and recover all MEC at the site. The regulatory agencies have expressed concern regarding the residual risk that remains after MEC removals have taken place, particularly in areas that are planned for residential development (i.e., unrestricted land use). In an effort to satisfy regulatory concerns, a QA process was developed that will allow the regulators to gain comfort with the acceptability of a parcel, where MEC removal was conducted, for residential use (and other sensitive uses). The relevance and usefulness of this RQA process will be tested during the RQA Pilot Study. Although residential development is not planned for the Group 3 MRAs, the results of the RQA Pilot Study may be incorporated into the Group 3 RI/FS report as a part of the discussion concerning the effectiveness of previous removal actions.

4.5 Data Analysis

It is necessary to analyze data to continuously update the CSMs as needed and characterize the Group 3 MRAs. The following questions will be answered during the RI/FS development:

- Is there a clear understanding of current/future land use and current physical characteristics of the area?
- Does historical information indicate that military munitions may have been used within the MRA?
- Are MEC and MEC-related materials being found consistent with the documented historical usage of the area?
- Was the MEC removal completed in the appropriate area of the site?
- Do MEC found at the site indicate undocumented historical munitions use at the site?
- Should the MRA be subdivided into separate units or areas?
- Were the geophysical instruments used during the investigations and removal actions able to detect the suspected MEC items at the expected depths of penetration?
- Can the removal data be used to support an evaluation of alternatives for the FS?
- Can the removal data be used to support explosives safety risk management decision making?

If the results of the above analysis present a strong weight of evidence to support that the existing data are usable for defining the nature and extent of contamination, as determined by the project team (EPA, DTSC, FORA, and the Army), the MRA will proceed to the risk assessment phase and an explosives safety risk assessment and FS will be prepared.

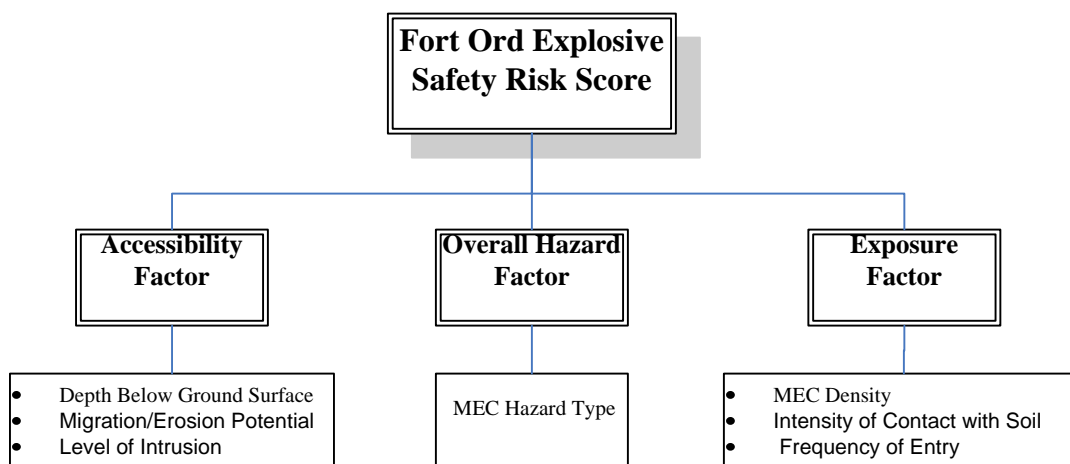
4.6 Explosives Safety Risk Assessment

The Fort Ord Ordnance and Explosives Risk Assessment Protocol (“the Protocol”) will be used to assess the hazards posed by MEC for receptors based on future land use (Malcolm Pirnie 2002). Unlike typical risk assessments that evaluate potential exposures to hazardous substances in environmental media, the Protocol does not calculate a numerical probability of adverse effects or a hazard index. Rather, it relies on an assumption that any encounter with MEC will result in an adverse effect, and provides a qualitative description of the explosives safety risk, based on the likelihood of encountering an MEC item combined with the potential of the item to cause a serious injury if it functions. Because the Protocol was designed to be applied to Track 2- and Track 3-type MRSs at the former Fort Ord, it is applicable for areas where MEC are present or was removed. In areas where there is no history of military munitions use or where remedial investigation supports the absence of unacceptable levels of explosive hazard, risk assessment is not required.

The Protocol will be used to assess the baseline risk for portions of Group 3, based on SEDR and RI data and future land use as identified in the Final Fort Ord Reuse Plan, in order to provide an estimate of the risks posed by current site conditions and assess whether a past (or planned) removal or remedial action was (or will be) effective in reducing those risks.

The Protocol is used to develop and perform a comparative evaluation of various remedial alternatives during the FS. Two matrices combine six of the input factors into overall scores for Accessibility and Exposure. A third matrix combines the scores for Accessibility and Exposure with the seventh input factor, Overall Hazard, to produce a qualitative score for estimating explosives safety risk.

The seven inputs to the explosive safety score are outlined below.



Data needs for the explosives safety risk assessment will be documented in the RI and will include:

- Physical site characteristics

- MEC types, distribution, and previously identified hazard categories
- MEC penetration depths
- Land use (Current/Future)
- Receptors (types/subpopulations, sensitivities, numbers/density, locations, activity levels/patterns)

4.7 Identification of ARARs

Overall, three types of applicable or relevant and appropriate requirements (ARARs) are defined by the EPA (EPA 1988a) and will be considered in the Group 3 RI/FS:

- Chemical-specific or ambient ARARs - Health- or risk-based numerical values for specific hazardous substances or contaminants
- Action-specific ARARs - Technology-based requirements triggered by the type of remedial action under consideration. This category also includes performance- and design-specific requirements, such as restrictions on the appearance of or noise from a remedial system
- Location-specific ARARs - Impose restrictions on certain types of activities or contaminant concentrations in certain environmentally sensitive areas such as wetlands, flood plains, and historic sites

4.7.1 Initial Identification of Potential ARARs

The Army has previously conducted a detailed evaluation and identification of potential ARARs and to-be-considered criteria (TBC) requirements potentially applicable to munitions response actions at the former Fort Ord. The list of potential ARARs was based on existing/previous Army decisions regarding munitions response actions (MACTEC 2007; Harding ESE 2002a; Army 2002). The ESCA RP Team reviewed these previously identified ARARs and selected ARARs for consideration during the Group 3 RI/FS process. This initial list of potential ARARs is included in Table 1. A more detailed analysis will be conducted as part of the Group 3 RI/FS.

4.7.2 Solicitation of ARARs

On behalf of the Army and FORA, the ESCA RP Team will solicit and communicate with the DTSC regarding the identification of State of California ARARs and TBC for the Group 3 RI/FS. In accordance with 40 CFR 300.400(g), the state will identify those chemical-, location-, and action-specific ARARs or TBC that are: applicable to the release or remedial action being contemplated; otherwise relevant and appropriate; or advisories, criteria, and guidance useful in developing the remedy.

In addition, ESCA RP Team will identify federal ARARs and, on behalf of FORA, will obtain a review of the ARARs from the EPA and the Army.

The identification of ARARs or TBC can be an iterative process; therefore, ARARs may be updated throughout the Group 3 RI/FS process, as necessary, and will become final only when the ROD is signed. At a minimum, the initial list of potential ARARs in Table 1 will be reviewed after the initial screening of alternatives has been completed, but before initiation of the detailed analysis of alternatives that will be conducted as part of the FS.

4.8 Identifying Appropriate Remedial Actions to Mitigate Risks

Based on the EPA's "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b), the preliminary remedial action objectives (RAOs) for Group 3 will be to achieve the EPA's threshold criteria of "Overall Protection of Human Health and the Environment" and "Compliance with ARARs."

Using the results of the RI, explosives safety risk assessment, and potential ARARs, risk management alternatives will be developed and evaluated to support the intended land use.

The AOC indicates that the evaluation of alternatives should consider, at a minimum, the following:

- A no-action alternative
- An alternative that reduces or eliminates the hazard, toxicity, mobility, or volume of contaminants (including treatment)
- An alternative that considers land use controls
- An alternative that considers unrestricted use
- Consideration of innovative technologies

Based on RI/FSs previously developed by the Army for portions of the former Fort Ord, remedial alternatives would likely include one or more of the following:

- No further action
- Land use controls (e.g., administrative and engineering controls)
- Surface clearance
- MEC removal to depth, as required by future land use or other applicable standards
- Construction support
- MEC recognition training
- Combinations of the above

These potentially applicable response actions will be evaluated, screened, and developed into remedial alternatives that will be evaluated using the following nine CERCLA criteria:

1. Overall protection of human health and the environment
2. Compliance with ARARs

3. Long-term effectiveness and permanence
4. Reduction in toxicity, mobility, or volume through treatment
5. Short-term effectiveness
6. Implementability
7. Cost
8. State (or support agency) acceptance
9. Community acceptance

4.9 Community Relations

Community relations activities for Group 3 are intended to keep communities informed of MEC-related activities at the former Fort Ord, and help supporting agencies respond to community concerns. Community relations activities for the ESCA RP are described in the Community Involvement and Outreach Program (CIOP) Plan (ESCA RP Team 2008c). The CIOP Plan has been approved by the EPA in consultation with the DTSC, and is an addendum to the Army's Community Relations Plan (CRP) Update No. 3 (Army 2006).

The CIOP Plan outlines communication techniques that will be used to keep the affected communities informed throughout the RI process at Group 3. Public participation activities, including fact sheets, public notices, and press releases, will be conducted in accordance with CERCLA.

The following sections summarize the approach outlined for community relations activities in the CIOP Plan that will be used during the RI process.

4.9.1 Community Involvement

The CIOP Plan summarizes the community profile surrounding the former Fort Ord as described in the CRP. The community is considered to consist of:

- residents both on the former Fort Ord and in nearby communities
- present business owners and employees on the former Fort Ord property
- elected local representatives and public agencies
- environmental and special interest groups
- students, faculty, and staff at the CSUMB campus
- recreational users including runners, hikers, bikers, and equestrians

Continuing community involvement will be achieved through a combination of communication, participation, and outreach to all affected stakeholders. To achieve this, FORA will use newsletters, community involvement workshops, fact sheets, project announcements, public notices, and website updates to provide information about the RI

process. In addition, a dedicated phone line has been established for the FORA ESCA RP. Callers will be able to get project updates and leave messages regarding questions or comments.

4.9.2 Community Relations Approach

Implementation of community relations for the RI will focus on providing information regarding the timeline, reporting, field activities, and scheduling of RI work. As outlined in the CIOP Plan, several objectives for the CIOP apply to the RI. FORA will do the following:

- Provide timely and accurate FORA ESCA RP information
- Provide opportunities for the public to comment and provide input on technical documents
- Provide transparency in decision making and respect for all viewpoints
- Meet all regulatory requirements
- Address community concerns in a collaborative fashion through workshops and scheduled meetings

4.9.3 Implementation of Community Relations Activities

Specific community relations activities related to conducting the Group 3 RI include:

- Publish articles in the quarterly newsletters. Newsletters will be mailed to interested parties in the adjacent communities of Del Rey Oaks, Monterey, Seaside, Marina, Spreckles, Sand City, and the Highway 68 corridor of unincorporated Monterey County. In addition, FORA will provide CSUMB with relevant project and field information to be distributed to the campus community as appropriate. Additional interested parties on the FORA ESCA RP mailing list will receive the newsletters. The newsletters will also be posted on the FORA ESCA RP website (<http://www.fora-esca-rp.com>). A hyperlink to the newsletters posted on the FORA ESCA RP website will also be provided on the Army's Fort Ord Cleanup website (<http://www.fortordcleanup.com/community/factsheet.asp>).
- Hold public meetings as necessary to satisfy regulatory requirements.
- Provide briefings and/or updates at Army quarterly Community Involvement Workshops. The Workshops are scheduled for the second Wednesday in January, April, July, and October.
- Provide updates at the Technical Review Committee (TRC) quarterly meetings. The TRC is composed of representatives of local agencies, city governments, and institutions, as well as federal and state agencies with an interest in the cleanup.
- Publish fact sheets distributed by direct mail to local residents, community leaders, minority community organizations, and those who have requested to be on the CIOP mailing list. Fact sheets will also be provided at community involvement activities and

posted on the FORA ESCA RP website. A hyperlink to the newsletters posted on the FORA ESCA RP website will also be provided on the Army's Fort Ord Cleanup website.

- Provide quarterly updates to regional elected officials through FORA Board meetings.
- Provide monthly updates to city managers through FORA Administrative Committee meetings.
- Provide monthly updates to regional emergency service providers through FORA ESCA Emergency Service Providers meetings.
- Publish public notices in local newspapers, and provide press releases to the media announcing the availability of RI-related documents and opportunities for public comment.
- Respond to comments and inquiries from the community on the RI process or related documents.
- Deliver RI-related documents to the information repositories and Administrative Record.

4.9.4 Roles of Federal, State, and Local Authorities

Federal, state, and local government cooperation has included regulatory agency involvement throughout the ESCA RP. FORA and its contractors continue to meet regularly with the regulatory agencies and local jurisdictions with respect to the ongoing munitions response activities.

4.9.5 Public Education

The Army conducts a public education program. The program includes general information related to the hazards associated with MEC, and site-specific information on the history and current status of the property related to MEC. In addition, the USACE developed a school safety program.

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5.0 GROUP 3 RI/FS TASKS

This section outlines standard RI/FS tasks that will be performed to make decisions regarding risk and remedial actions during the Group 3 RI/FS, as defined by the AOC. The AOC tasks presented below are consistent with those provided in the EPA's current RI/FS guidance document (EPA 1988b).

5.1 Task 1 Project Planning

Task 1 includes efforts related to initiating the project and scoping project activities. The majority of project planning will occur during the scoping phase of the Group 3 RI/FS, and include both site planning and project planning. The initial project planning process is documented in the SEDR and this work plan.

5.2 Task 2 Community Relations

Task 2 includes efforts related to the preparation and implementation of the CIOP Plan (ESCA RP Team 2008c). Community relations activities serve to keep stakeholders informed of activities at the former Fort Ord and help the supporting agencies respond to community concerns. The MEC-related community relations programs implemented at the former Fort Ord have been described in the CRP (Army 1998), the CRP Update Number 1 (Army 2000), and the CRP Update Number 2 (Army 2001). The CIOP Plan is an addendum to the Army's former Fort Ord CRP Update Number 3 (Army 2006). Community relations activities began at the start of the ESCA RP and will continue throughout the duration of the ESCA RP.

5.3 Task 3 Field Investigation

Task 3 incorporates efforts related to fieldwork undertaken to fill identified data gaps, in order to complete the RI at Group 3 in accordance with Task 4.1 of the AOC. However, no additional field investigation activities are anticipated for the Group 3 MRAs; therefore, this task is not applicable to this Group 3 RI/FS Work Plan, unless further evaluation of the data quantity or quality reveals data gaps. In this event, an addendum to this work plan will be prepared and circulated for approval.

5.4 Task 4 Sample Analysis/Validation

Task 4 includes efforts relating to 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. The Group 3 RI/FS will evaluate past munitions response activities to support completion of a risk assessment and FS for the area. Specific items to be addressed during the evaluation are provided in the munitions response activity evaluation checklist (Appendix E).

5.5 Task 5 Data Evaluation

Task 5 includes refining and updating the CSMs for Group 3, if needed, to document site characterization results, including physical characteristics, MEC source characteristics, and the nature and extent of contamination in accordance with Task 4.1 of the AOC. If applicable, areas where there is no history of military munitions use, and areas where remedial investigation supports the absence of unacceptable levels of explosive hazard, will be identified. The results of this task will be presented to the regulatory agencies and the Army in a technical memorandum, and/or in a regulatory meeting for review and concurrence prior to proceeding to the risk assessment. Specific items to be addressed during the evaluation are provided in the munitions response activity evaluation checklist (Appendix E).

5.6 Task 6 Risk Assessment

Task 6 includes efforts related to assessing risks to human health and the environment in accordance with Task 4.2 of the AOC. In general, the objectives of a baseline risk assessment or risk evaluation will be attained by identifying and characterizing the following:

- Potential human and environmental receptors
- Potential exposure routes and extent of actual or expected exposure
- Extent and likelihood of expected impact or threat
- Level of uncertainty associated with the above items

The main purpose of the risk evaluation portion of the Group 3 RI/FS is to provide an estimate of the risks posed by site conditions (i.e., MEC) and to assess whether a past (or planned) removal or remedial action at a site was (or will be) effective in reducing those risks. Risk assessment will be performed for areas of the MRAs where MEC hazard is identified. In areas where there is no history of military munitions use or where remedial investigation supports the absence of unacceptable levels of explosive hazard (e.g., contiguous areas where no MEC items were found), risk assessment is not required to be performed. The results of this task will be presented to the regulatory agencies and the Army in a technical memorandum, and/or in a regulatory meeting for review and concurrence prior to proceeding to the development of screening alternatives.

5.7 Task 7 Treatability Studies

Task 7 includes efforts to plan and conduct pilot, bench, or other treatability studies. Treatability studies are conducted primarily to achieve the following:

- Provide sufficient data to allow treatment alternatives to be fully developed and evaluated during the detailed analysis and to support the remedial design of a selected alternative
- Reduce cost and performance uncertainties for treatment alternatives to acceptable levels so that a remedy can be selected

Sufficient information is available to allow screening and evaluation of potentially applicable remedial actions (Section 4.7); therefore, treatability studies are not required.

5.8 Task 8 Remedial Investigation Reports

Task 8 consists of efforts related to the preparation of the RI findings, once the data have been evaluated. The task includes preparing all draft and final RI reports, as well as task management and QC. The results of the baseline risk assessment will be presented to the regulatory agencies and the Army in a technical memorandum, and/or in a regulatory meeting for review and concurrence prior to proceeding to the development of screening alternatives.

5.9 Tasks 9, 10, and 11 Feasibility Study

Tasks 9, 10, and 11 described below will comprise the FS activities. The FS will be completed using information from the evaluation of munitions response activities. The FS will be conducted in accordance with the EPA's RI/FS guidance document (EPA 1988b) and will use site-specific data to screen, evaluate, and recommend remedial alternatives and long-term risk management measures.

5.9.1 Task 9 Remedial Alternatives Screening

Remedial alternatives screening will be based on the identification of preliminary remediation goals (PRGs) and RAOs in accordance with Task 4.3 of the AOC.

PRGs and RAOs include potential statutory and regulatory requirements, such as ARARs, guidance and advisories (TBC), and risk-based concentrations of chemicals in environmental media that have been brought forward from the risk assessment. Candidate PRGs will be developed during the RI and presented in the FS and ROD. In addition, the National Contingency Plan specifies that RAOs be developed that address: (1) contaminants of concern, (2) media of concern, (3) potential exposure pathways, and (4) remediation goals (40 CFR 300.430(e)(2)(i)).

Numerical cleanup standards are not available for munitions response actions. Therefore, the PRGs for MEC on the surface and in subsurface soil are developed to address detecting MEC using the most appropriate technologies, to ensure protection of the public consistent with the proposed end use of the property. Chemical-specific (i.e., specific to MEC) ARARs, if any, and the Fort Ord Base Reuse Plan will be considered in the development of PRGs.

The Group 3 RI/FS will contain a discussion of the substantive requirements that will be considered as potential ARARs and TBC identified for munitions response, gathered from state and federal sources. The Superfund Amendments and Reauthorization Act of 1986 requires that cleanup alternatives consider and attain ARARs, which are promulgated under federal or state law. ARARs are designed to be protective of human health and the environment, and to be technically achievable with existing remedial techniques.

Based on the EPA's "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b), the preliminary RAOs for Group 3 will be to achieve the EPA's threshold criteria of "Overall Protection of Human Health and the Environment" and "Compliance with ARARs." The final acceptable exposure levels will be determined as part of the FS, on the basis of the results of the risk assessment and the evaluation of the expected exposures and associated risks for each alternative, as discussed in Section 5.9.2.2 of this work plan.

5.9.2 Task 10 Remedial Alternatives Evaluation

The evaluation of remedial alternatives will include the development of alternatives, refinement and documentation of RAOs, identification of potential ARARs, development of general response actions, and a detailed analysis of each alternative as described in the following sections of this work plan.

5.9.2.1 *Development of Alternatives*

During the FS, remedial technologies and their associated implementation, containment, treatment, or disposal requirements will be identified, pre-screened, and then combined into alternatives in accordance with Task 5.1 of the AOC. Information obtained during the RI is considered in developing the list of alternatives for evaluation during the FS. Some technology, implementation, or property use restrictions may become apparent during this step, or may become necessary regardless of which remedy is selected. Evaluation of alternatives should consider, at a minimum, the following:

- A no-action alternative
- An alternative that reduces or eliminates the hazard, toxicity, mobility, or volume of contaminants (including treatment)
- An alternative that considers land use controls
- An alternative that considers unrestricted use
- Consideration of innovative technologies

For any evaluation of response alternatives where a land use control will be imposed, either as a stand-alone response alternative or as one component of a more complex alternative, the evaluation of response alternatives will include the following:

- An analysis of alternative(s) utilizing a land use control
- An analysis at the level of detail appropriate to the size and scope of a response, of alternatives not requiring a land use control (e.g., implementation of a response that allows unrestricted use)

This evaluation will allow consideration of restricted and unrestricted use alternatives in selecting the response action.

For any alternative proposed that includes the use of a land use control, sufficient detail and analysis of the likely control mechanisms that would be used to achieve the objectives will be included in the FS to enable a determination of the long-term effectiveness and reliability of such control mechanisms. Additionally, cost estimates for the establishment, implementation, monitoring, and reporting of the land use controls will be included in the cost estimates for each alternative that includes such controls. If land use controls are a component of the selected remedy, the final types of land use controls will be determined acceptable by FORA, the Army, and EPA, in consultation with the DTSC.

For any alternative proposed that includes additional MEC remediation, sufficient detail and analysis of the impacts that activities associated with the additional MEC remediation (such as extent of vegetation removal, excavation depths, etc.) will have on flora, fauna, cultural resources, and air quality will be considered. Because additional MEC remediation requires the use of geophysical sensing devices that need to be swept over the ground surface, dense vegetation may inhibit this process and vegetation cutting or removal would likely be a component of any additional MEC remediation alternative. A range of vegetation clearance methods that are potentially applicable at the former Fort Ord were described and evaluated in the Evaluation of Vegetation Clearance Methods Technical Memorandum, Ordnance and Explosives Remedial Investigation/Feasibility Study, Former Fort Ord, California (“Vegetation Clearance Technical Memorandum”; Harding ESE 2002b). Table 12 of the Vegetation Clearance Technical Memorandum presents a matrix of vegetation clearance methods that should be retained for further consideration for the range of different plant communities (or types of vegetation) found at the former Fort Ord. The results of the Vegetation Clearance Technical Memorandum would be used when considering any alternatives that involve additional MEC remediation. If additional MEC remediation is a component of the selected remedy, a specific work plan outlining planned vegetation clearance methods and detailed MEC detection and removal methodologies would be prepared and made available for regulatory agency and public review, in accordance with the AOC.

5.9.2.2 Refine and Document RAOs

Based on the explosives safety risk assessment and the results of the RI, site-specific RAOs will be reviewed and modified, if necessary, in accordance with Task 5.2 of the AOC. The modified RAOs will be documented in a technical memorandum, prior to the completion of the FS. The technical memorandum will be reviewed and approved by the EPA, after consultation with the DTSC. These modified RAOs will specify the contaminants and media of interest, exposure pathways and receptors, hazards, and an acceptable contaminant level or range of levels (at particular locations for each exposure route).

5.9.2.3 Identification of Potential ARARs

ARARs, in conjunction with risk-based levels developed in the risk assessment, will be employed in directing response actions and establishing cleanup goals in accordance with Task 5.3 of the AOC. ARARs are used as a "starting point" in determining the protectiveness of a site remedy. Additional guidance on ARARs is found in EPA/540/G-89/006 (EPA

1988a). An initial list of potential ARARs is provided in Table 1 and is based on Army decisions regarding munitions response actions for the former Fort Ord (Section 4.8).

5.9.2.4 Develop General Response Actions

General response actions will be developed for each parcel defining implementation, containment, removal, or other actions, singly or in combination, as appropriate to satisfy the RAOs in accordance with Task 5.4 of the AOC.

5.9.2.5 Detailed Analysis of Alternatives

A detailed analysis of potential alternatives will be developed, which will consist of an evaluation of each option against the nine CERCLA evaluation criteria and a comparative analysis of all options using the same evaluation criteria in accordance with Task 5.5 of the AOC. The nine CERCLA evaluation criteria will be applied to the assembled remedial alternatives to ensure that the preferred remedial alternative(s) will be protective of human health and the environment; will be in compliance with, or include a waiver of, ARARs; will be cost-effective; will utilize permanent solutions and alternative treatment technologies, or resource recovery technologies, to the maximum extent practicable; and will address the statutory preference for treatment as a principal element. The evaluation criteria will include:

1. Overall protection of human health and the environment
2. Compliance with ARARs
3. Long-term effectiveness and permanence
4. Reduction in toxicity, mobility, or volume through treatment
5. Short-term effectiveness
6. Implementability
7. Cost
8. State (or support agency) acceptance
9. Community acceptance

(Note: Criteria 8 and 9 are considered after the Group 3 RI/FS report has been released to the general public and after the proposed plan public comment period.)

The results of the detailed analysis of remedial alternatives will become a major factor in selecting a preferred alternative, after completion of the Group 3 RI/FS. The detailed analysis will include:

- A description of each alternative that outlines the strategy involved and identifies the key ARARs associated with each alternative
- A discussion of the assessment of each alternative against each of the nine CERCLA criteria

A preliminary assessment of Criteria 8 and 9 may be provided at this time, as appropriate, or these will be addressed following the public comment period.

5.9.3 Task 11 Feasibility Study Reports

The results of the data evaluation of previous work, in conjunction with the risk evaluation and FS described above, will serve as the RI/FS for Group 3. Pertinent information that will be documented in the RI/FS report is as follows:

- Summary of the work performed as part of the evaluation of previous munitions response activities
- Results of the evaluation of data collected during previous work
- Conclusions regarding the usability of the data
- Evaluation of explosives safety risks
- FS
- Recommended alternatives
- Long-term explosives safety risk management measures

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6.0 REPORTING AND SCHEDULE

This section provides the general outline of the RI/FS report and anticipated schedule for implementation and completion of the Group 3 RI/FS Work Plan.

6.1 Reporting

The Group 3 RI/FS report will generally be organized as follows:

Volume 1 – Remedial Investigation

This volume provides the results of the Group 3 RI and will likely include the following components:

- **Section 1 – Introduction.** This section will provide the purpose of the report and background information on the Army's MMRP and the FORA ESCA RP.
- **Section 2 – Background.** This section will present the Fort Ord military munitions-related history, physical setting, and background information on the base-wide Munitions Response RI/FS.
- **Section 3 – Group 3 Remedial Investigation.** This section will provide the RI for Group 3 (Interim Action Ranges, MOUT Site, Laguna Seca Parking, and DRO/Monterey MRAs), to include background, updates to the CSMs, and the results and evaluation of the data collected during previous munitions response activities.
- **Section 4 – References.** This section will provide 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, which describes the qualitative and quantitative factors potentially resulting in a receptor encountering an MEC item. The risk assessment is then used to develop and evaluate remedial alternatives during the FS. The Group 3 risk assessment will likely include the following components:

- **Section 1 – Introduction.** This section will provide the purpose and objectives of the risk assessment.
- **Section 2 – Data and Data Usability.** This section will provide an evaluation of the data and data usability to support a risk assessment.
- **Section 3 – Receptors and Reuse Areas.** This section will identify the selected receptors for the various reuse areas of the Group 3 MRAs.
- **Section 4 – Risk Assessment Results.** This section will describe the assumptions and results of risk analysis for each of the reuse areas in the Group 3 MRAs.

- **Section 5 – Uncertainty.** This section will describe the uncertainties related to the data, input components, and future land use and associated receptors.
- **Section 6 – Conclusions.** This section will present a summary of the risk assessment results and the conclusions.
- **Section 7 – References.** This section will provide 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 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 will likely include the following components:

- **Section 1 – Introduction.** This section will describe the purpose and objectives of the FS and present background information on the Group 3 RI/FS process.
- **Section 2 – Remedial Approach.** This section will define the reuse areas for which remedial alternatives will be developed, and will describe the RAOs, application of risk assessment 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 base-wide efforts to promote MEC safety.
- **Section 3 – Identification of Applicable Response Actions.** This section will identify the range of applicable response actions for MEC risk management at the Group 3 MRAs, such as no further action, land use controls, and additional MEC remediation.
- **Section 4 – Development of Remedial Alternatives.** This section will present long-term management measures specific to implementation and management of the remedial alternatives selected for Group 3, and will also include 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 will present an evaluation and comparison of remedial alternatives for each of the reuse areas in the Group 3 MRAs.
- **Section 6 – Identification of the Preferred Remedial Alternative.** This section will present and summarize the preferred remedial alternative for each reuse area.
- **Section 7 – Approval Process.** This section will describe the approval process for documenting the preferred alternative(s) for implementation at each of the Group 3 reuse areas in the proposed plan and ROD.
- **Section 8 – References.** This section will provide a list of references for pertinent documents cited in the report.

6.2 Schedule

An anticipated project schedule has been prepared that identifies the key components of the work in chronological order, including document deliverables. The anticipated project schedule for the RI/FS is presented in Appendix F and is currently scheduled for completion prior to the established AOC milestone date for the Group 3 RI/FS report. For planning and reporting purposes, regulatory review periods are included, but are subject to change based on the level of effort required to incorporate review comments and review period extension requests. A summary of the Group 3 project milestone schedule is provided in Table 2.

The associated tasks and project progress will be tracked monthly on the schedule to show actual project status compared to the initial project schedule in order to better evaluate the reasons for progress variances and to identify overall impact to project duration.

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