DEFENSE ENVIRONMENTAL RESTORATION BOARD

FINAL

RECORD OF DECISION

UMATILLA CHEMICAL DEPOT
SITE 39 (QUALITY ASSURANCE FUNCTION RANGE)

MAY 2005

THIS DOCUMENT IS INTENDED BY THE ARMY TO COMPLY WITH THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 (NEPA).

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ACRONYMS AND ABBREVIATIONS

ADA	Ammunition Demolition Activity
AOC	Area of Concern
AOPC	Area of Potential Concern
ARAR	Applicable or Relevant and Appropriate Requirement
ARPA	Archaeological Resource Protection Act
ATI	American Technologies, Inc.
BGEPA	Bald and Golden Eagle Protection Act
BGS	Below Ground Surface
Blackhawk	Blackhawk GeoServices, Inc.
BCT	BRAC Cleanup Team
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CENWS	Corps of Engineers, Seattle District
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of U.S. Federal Regulations
CLP	Contract Laboratory Program
DDESB	Department of Defense Explosives Safety Board
DOD	Department Of Defense
DOT	Department Of Transportation
EE/CA	Engineering Evaluation/Cost Analysis
EM	Electromagnetic
ESA	Endangered Species Act
FFA	Federal Facility Agreement
FS	Feasibility Study
FWCA	Fish and Wildlife Coordination Act
HRS	EPA's Hazard Ranking System
HTRW	Hazardous, Toxic, and Radiological Waste

LUC	Land Use Control
MBTA	Migratory Bird Treaty Act
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
MTADS	Multi-sensor Towed Array Detection System
NAGPRA	Native American Graves Protection and Repatriation
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NFA	No Further Action
NHPA	National Historic Preservation Act
NPL	National Priorities List
ODEQ	Oregon Department of Environmental Quality
OE	Ordnance and Explosives
ORS	Ordnance Related Scrap
OSHA	Occupational Safety and Health Administration
PAA	Preservation of American Antiquities
QA	Quality Assurance
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
TAL	Target Analyte List
TBC	To Be Considered
TRC	Technical Review Committee
TDEM	Time Domain Electromagnetic
UMDA	Umatilla Depot Activity
UMCD	Umatilla Chemical Depot
USACE	US Army Corps of Engineers

USAESCH	US Army Engineering and Support Center, Huntsville
USC	United States Code
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
UXB	UXB International, Inc.
UXO	Unexploded Ordnance

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1.0 DECLARATION OF RECORD OF DECISION

Site Name and Location

Umatilla Chemical Depot
Site 39, Quality Assurance Function Range
Hermiston, Oregon 97838-9544

Statement of Basis and Purpose

This decision document presents the selected response action for Site 39, Quality Assurance (QA) Function Range, Umatilla Chemical Depot (UMCD), Hermiston, Oregon. This response action has been chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and is consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The decision is based on the administrative record for this site.

Assessment of the Site

Munitions and Explosives of Concern[1] (MEC) potentially exist at a closed military range in approximately 176 acres of the approximately 640-acre site. A release or substantial threat of release of the potentially existing MEC may present an imminent and substantial endangerment to public health or safety, welfare, or the environment. The response action selected in the Record of Decision (ROD) will protect the public and the environment from the danger of an actual or substantial threat of a release of a pollutant or contaminant into the environment.

Description of the Selected Remedy

The selected remedy for Site 39 includes a response action consisting of a MEC clearance to a depth of 2 feet in two areas (Test Pad Area and Rifle Range Area) and a MEC clearance to a depth of 6 feet in one area (Test Pit Area). Combined, all three areas that would receive a MEC clearance would total approximately 176 acres. For the remaining approximately 464 acres, these areas have no documented historical use of QA function testing activities or physical evidence of munitions testing. Therefore, the 464 acres are not considered to potentially contain MEC, and the selected remedy is No Further Action (NFA).

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[1] Munitions and Explosives of Concern (MEC). This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means: (a) Unexploded Ordnance (UXO, as defined in 10 U.S.C. 2710 (e) (9); (b) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710 (e) (2); or (c) Munitions constituents (e.g. TNT, RDX) present in high enough concentrations to pose an explosive hazard. The term "MEC" replaces the term "ordnance and explosives" that was used in previous documents pertaining to Site 39, UMCD.

The Land Use Controls (LUC) objective for this site is to prevent and minimize exposure risk of munitions to humans. The remedial design will be prepared with a LUC component of the overall remedial action work plan and submitted in accordance with the FFA schedule. The RD/RA shall address all LUC implementation and maintenance actions, including possible periodic inspections. The Army is responsible for implementation, maintenance, and enforcement of the LUC. The Army may transfer these LUC responsibilities to the transferee and its successors; however, the Army retains ultimate responsibility for remedy integrity.

The major components of the selected remedy for the approximately 176 acres of Site 39 (Test Pad Area, Rifle Range Area, and Test Pit Area) include the following activities:

- Reacquisition of Category 1 and Category 2 anomalies in the Test Pad, Rifle Range, and Test Pit areas using geophysical methods.

- Excavation and clearance of geophysical anomalies in the Test Pad and Rifle Range areas to a depth of 2 feet and excavation and clearance of geophysical anomalies in the Test Pit Area to a depth of 6 feet. Backfill excavations and reseed excavated areas with native grass.

- Sifting of soil in the vicinity of the former QA function test pads to a depth of 2 feet in areas where obstructions prevented geophysical mapping.

- Collection of metallic debris (miscellaneous metal debris and ordnance related scrap) found during excavation of individual anomalies and soil sifting and transport to an off-site scrap-metal recycler with a smelter.

- Disposal of live MEC items found (if any) during the clearance of individual anomalies and the sifting of soil. MEC items that are acceptable to move will be moved to the Ammunition Demolition Activity (ADA) at the UMCD where there already exists a MEC disposal area. MEC items that are unsafe to move will be detonated in place within Site 39.

- Prior to initiation and completion of MEC clearance. Maintain existing fencing and signage to restrict access. Continue monitoring access restrictions through Umatilla Depot Security Patrol.

- After clearance is complete and until property is transferred. No new LUCs are required for the CERCLA actions. The existing fences and signage will be maintained as part of overall security at the Umatilla Depot until the property is transferred.

- At time of transfer. Deed notice will be required to inform re-users that the property was used for testing of munitions. Cleanup was completed to meet the expected future agricultural use. This notification will meet the requirements for

State of Oregon real property deed notifications. This information will be included in the transfer documents and will be recorded at the time of transfer.

Statutory Determinations

The selected remedy is protective of public safety and the environment, complies with federal and state requirements that are legally applicable, or relevant and appropriate to the response action, and is cost-effective. This remedy utilizes permanent solutions and satisfies the statutory preference for remedies that reduce the toxicity (safety hazard), mobility, and volume through treatment (destruction of MEC through excavation and detonation) as a principal element.

This remedy is intended to provide sufficient cleanup of the site for the expected future agricultural use of Site 39. This remedy would allow for agricultural use of the 640-acre site, as well as incidental residential use (e.g. farm house and barns/utility buildings). The current state of the art for geophysical investigations and retrieval of MEC items is such that the potential exists that some MEC items may remain below the ground surface after the selected remedial action is completed. Therefore, the effectiveness of the Site 39 final remedial actions will be included in the DOD Recurring Review and the CERCLA Five-Year Review process for the Umatilla Chemical Depot, as needed, to ensure the final remedial actions remain protective.

Record of Decision
Umatilla Chemical Depot
Site 39, Quality Assurance Function Range

Signature sheet for the Record of Decision for Site 39, Quality Assurance Function Range final action at the Umatilla Chemical Depot between the U. S. Army and the United States Environmental Protection Agency, with concurrence by the Oregon Department of Environmental Quality.

Glynn D. Ryan
Chief, Atlanta Field Office
Headquarters Department of the Army
Base Realignment and Closure

2 May 05
Date

Record of Decision
Umatilla Chemical Depot
Site 39, Quality Assurance Function Range

Signature sheet for the Record of Decision for Site 39, Quality Assurance Function Range final action at the Umatilla Chemical Depot between the U. S. Army and the United States Environmental Protection Agency, with concurrence by the Oregon Department of Environmental Quality.

Daniel D. Oplaski, Director
Environmental Cleanup Office
U. S. Environmental Protection Agency, Region 10

6/1/05
Date

Record of Decision
Umatilla Chemical Depot
Site 39, Quality Assurance Function Range

Signature sheet for the Record of Decision for Site 39, Quality Assurance Function Range final action at the Umatilla Chemical Depot between the U. S. Army and the United States Environmental Protection Agency, with concurrence by the Oregon Department of Environmental Quality.

Joni Hammond
Eastern Region Division Administrator
Oregon Department of Environmental Quality

5-27-05
Date

Note: The Oregon Department of Environmental Quality Letter of Concurrence is appended to this Record of Decision.

Acceptance of the Record of Decision
Umatilla Chemical Depot
Site 39, Quality Assurance Function Range

Signature sheet for the foregoing Record of Decision for Site 39, Quality Assurance Function Range final action at the Umatilla Chemical Depot between the U. S. Army and the United States Environmental Protection Agency, with concurrence by the Oregon Department of Environmental Quality.

Mark E. Daugherty
BRAC Environmental Coordinator
Umatilla Chemical Depot

2 May 2005
Date

The UMCD is a high security military installation in part due to the current storage and future planned destruction of chemical munitions at the newly constructed incinerator in K Block. For this reason all access to the UMCD, including Site 39 is restricted. Access to the UMCD is not permitted without first obtaining a security clearance and wearing required security badges. Additionally, visitors to the UMCD must be accompanied by a security escort at all times.

Site 39 is an approximately 640-acre rectangular parcel of land (see Figure 2) located outside northern security fence of the UMCD. Access to Site 39 is through a locked security fence along North Patrol Road. The site was the location of a former quality assurance (QA) function range used for the testing of conventional munitions. Chemical munitions were not tested at Site 39. There are no habitable structures at Site 39, except for a shed and an observation post located near the former rifle range. Site 39 is fenced with chain-link fencing (southern and eastern boundaries) and barbed wire fencing (northern and western boundaries). Access to Site 39 as well as the entire UMCD is tightly controlled due to the mission of the installation. The entire perimeter is patrolled by roving security guards. Therefore, additional fencing around the Site would not likely provide any additional measure of access restriction or protectiveness until the MEC clearance is completed.

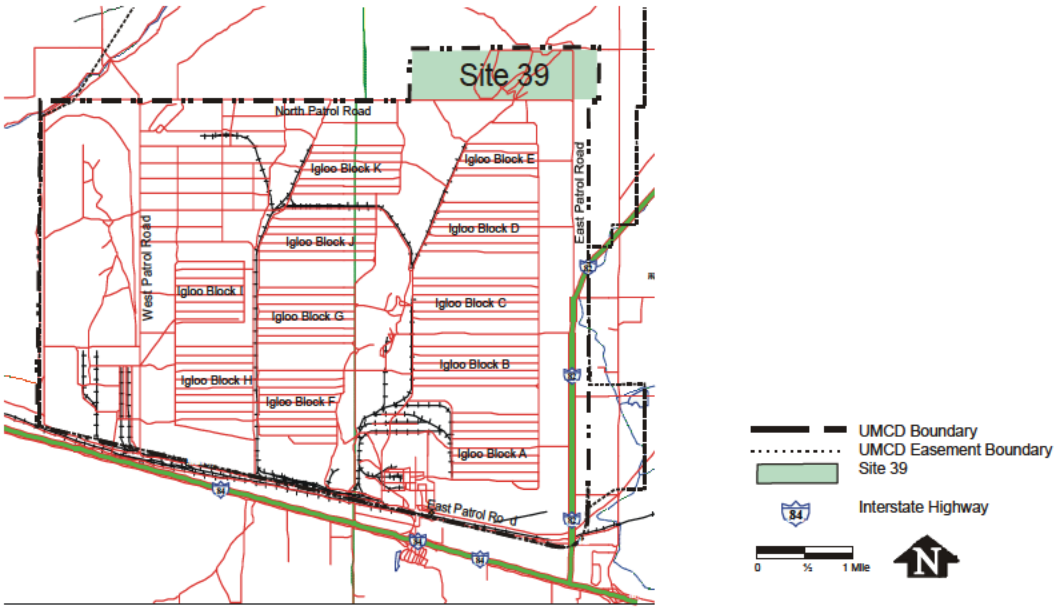

Figure 2. Location of Site 39, Quality Assurance Function Range

The terrain within Site 39 is relatively flat except for the bank of a "coulee" (a steep-sided ridge) that traverses the middle portion of the site from the southeast to northwest. This geomorphologic feature, referred to as the "Coyote Coulee," diagonally traverses the site and exhibits a topographic relief of approximately 50 feet. The bedrock units underlying the alluvial soils at the UMCD vary from an unweathered to moderately weathered basalt consistent with the make up the great lava plateaus of the Columbia River area in the Pacific Northwest. At Site 39, the topsoil consists of fine to medium-grained, poorly to well-graded sands (except where nonnative fill has been imported). Due to the sandy nature of the topsoil at Site 39, the prevailing winds contribute to windblown erosion where insufficient vegetation exists. The UMCD is known for having persistent winds that have contributed to the topography of the landscape.

Vegetation at the UMCD is typical of a high plains arid region with dry-tolerant shrubs with a grassy understory. Sagebrush and grasses are the predominant vegetation at Site 39 with the Coyote Coulee and eastern portion of the site having somewhat denser brush than the western lowland, which is predominantly grassland. The arid climate of the region is due to the Coast Ranges and Cascade Range that effectively block the influence of winter storms creating a "rain shadow" effect.

Temperatures vary considerably between winter and summer months. During July and August, afternoon temperatures frequently exceed 100 degrees Fahrenheit, although during November, December, January, and February subzero temperatures are possible with up to a 2-foot subsurface frost line.

Most of the precipitation in the Hermiston area occurs as rainfall and to a lesser extent as snow. Average annual precipitation is approximately 9 inches occurring from November through March. No sources of surface water exist at Site 39 and it is estimated that the depth to groundwater at Site 39 is approximately 140 feet, although no wells exist within Site 39.

The region surrounding the UMCD is primarily used for irrigated agriculture. The 2000 census (US Census Bureau) estimates the population of Umatilla County at 70,548 persons. Hermiston is the closest community to the UMCD and has a population of 13,154 persons.

2.2 Site History and Enforcement Activities

The federal government first purchased parcels of land now known as the UMCD in 1941 from various owners including Umatilla and Morrow Counties, the Northern Pacific Railroad, and private owners. Parcels were also transferred from the Bureau of Land Management to the Army. From 1942 until the present, the ammunition storage and renovation mission at the UMCD has involved a variety of industrial type activities. To support the UMCD's mission, approximately 1,000 storage igloos were constructed along with an internal rail system, most of which are now abandoned. Administrative buildings, maintenance shops, on-base housing, security posts, and fire and medical facilities were also constructed along the southern perimeter of the UMCD near the main entrance.

Storage of chemical munitions at the UMCD, such as nerve agents and the blistering agent mustard, began in 1962. However, the testing, manufacturing, or use of chemical munitions has never occurred at the UMCD. Rather, the UMCD conducted operations to test, rework, burn, disassemble, and dispose by demolition an array of conventional munitions. These types of operations took place at various locations throughout the UMCD including Site 39, the former Quality Assurance (QA) Function Range.

The 640-acre parcel referred to as Site 39, was acquired by the U.S. Army for use as a QA function range for various types of conventional weapons, munitions, and related materials, such as test flares, photo flash grenades, illumination and smoke canisters, and mines. Chemical weapons were never tested at Site 39, only conventional weapons were tested at the site. Records indicate munitions were function tested in the QA testing area (see Figure 3) from the late 1940's through the mid-1970's. The Rifle and Pistol Range (small arms testing area) in the western portion of Site 39 (see Figure 3) was operated from the late 1940's through the 1960's. Function testing of MEC also occurred in the vicinity of the Rifle and Pistol Range, although specific dates of use are not available.

Since becoming a BRAC facility in 1988, the UMCD conventional ordnance storage mission has been transferred to another installation. The U.S. Army under the Department of Defense (DOD) Base Realignment and Closure Act, may eventually vacate the UMCD and transfer ownership of all properties to other government agencies or private interests. If the property is transferred to a private interest, then most likely the property would be used for agricultural purposes. Land to the west, north and east of Site 39 is currently being farmed. The predominant agricultural crops grown in the vicinity of the UMCD are potatoes, alfalfa, and corn.

The UMCD was proposed for listing as a National Priorities List (NPL) site in 1987, for the Explosives Washout Lagoons, which were evaluated using EPA's Hazard Ranking System (HRS) and received a score of 28.5. The lagoons were formally listed on the NPL on July 22, 1987. Notification of the listing was published in 49 Fed. Reg. 27620 based on the HRS score and the results of the installation Resource Conservation and Recovery Act (RCRA) Facility Assessment.

On October 31, 1989, a Federal Facility Agreement (FFA) was executed by the UMCD, the Army, Environmental Protection Agency (EPA) Region X, and the Oregon Department of Environmental Quality (ODEQ). The FFA identified the Army as the lead agency for initiating response actions at the UMCD. One of the purposes of the FFA was to establish a framework for developing and implementing appropriate response actions at the UMCD in accordance with CERCLA, the NCP, and Superfund guidance and policy. Appropriate response actions for potentially occurring contaminated soil and munitions and explosives of concern (MEC) at Site 39 were considered part of this framework.

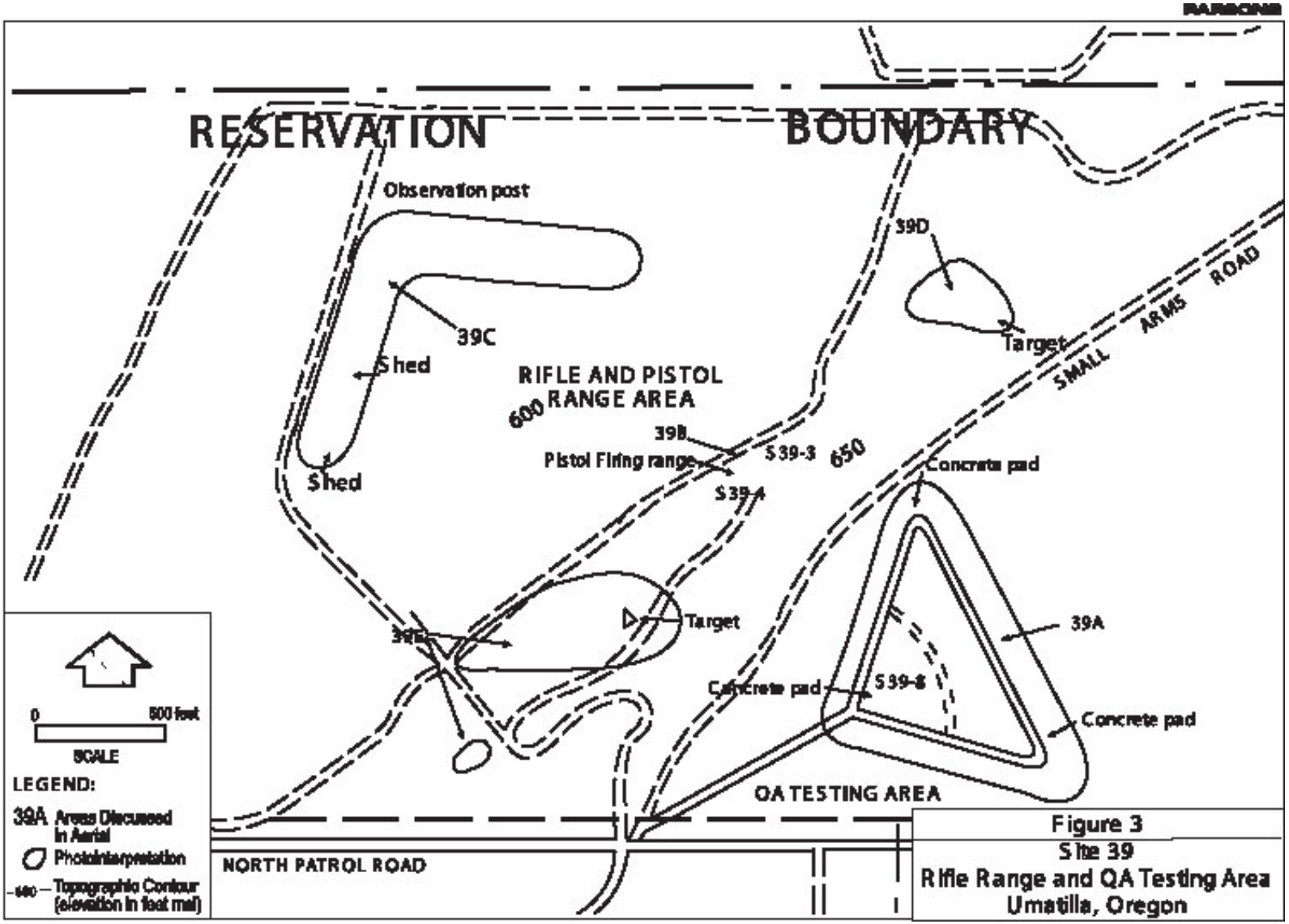

Figure 3. Rifle Range and QA Testing Area

In 1990, a remedial investigation and feasibility study (RI/FS) was initiated by Dames and Moore of miscellaneous sites at the UMCD to determine the nature and extent of soil and groundwater contamination and to identify alternatives to clean up the UMCD where needed. The Dames and Moore RI (1992) included an evaluation of Site 39 (*Final Remedial Investigation Report for the Umatilla Activity, Vols 1-6)*. The RI discusses a site visit to Site 39 in 1989, during which a disposal site containing metal banding was noted in the rifle and pistol area along the coulee. Additionally, brass shells were observed along the coulee, apparently in the direction that rifles were fired from the rifle and pistol range. During the site visit, some empty flare canisters were observed near a concrete pad in the QA testing area. Northwest of the rifle range, a pit approximately 15 feet long and 10 feet wide was identified. The purpose of the pit could not be determined, but there was no evidence of any disposal or storage operations in the pit.

Dames and Moore also conducted a review of historical aerial photographs for the QA Function Range. Their review of photographs dating from 1950 to 1988 indicated several areas of activity, which they referred to as 39A, 39B, 39C, 39D, and 39E (see Figure 3). The QA functional testing area is identified as 39A, 39B is the pistol firing range, 39C is the rifle firing area, and 39D and 39E are the rifle and pistol range target areas located on the coulee. The photographs revealed considerable ground scarring and some earth moving operations in the vicinity of the identified sub-areas including the construction of roads, structures, and targets.

To evaluate the potential for MEC at Site 39, in 1996 a 100 percent surface clearance was conducted by UXB International Inc. (UXB) on 345 acres in the eastern portion of Site 39. The 345 acres included Sites 39A, 39B, 39C, 39D, and 39E that were identified in the RI. The results of UXB's surface clearance are presented in *Final Report, Site 39 Ordnance Removal and Survey, Umatilla Chemical Depot, Oregon, 1996.*

To further evaluate MEC at Site 39, in 1999 an Engineering Evaluation/Cost Analysis (EE/CA) was initiated to characterize the nature of MEC, and its distribution and likely occurrence. The EE/CA provides a description of the MEC related problems affecting human use of the site and identifies and analyzes reasonable risk management alternatives for use in the final decision making associated with future transfer of the property from the Department of the Army. The EE/CA, which was prepared by Parsons (2003), and determined by EPA to be equivalent to an RI/FS in terms of content and evaluations, included a review of existing documents, a MEC surface clearance, the collection of geophysical data to identify potential buried MEC, and subsurface investigation of selected anomalies. With this information, Parsons developed an OE (MEC) risk evaluation for Site 39, and alternative response actions for cleaning up Site 39.

The outline for the OE risk evaluation including details regarding the approach to the EE/CA investigation were cooperatively developed by members of the BRAC Cleanup Team (BCT) which include the US Environmental Protection Agency (USEPA), the Oregon Department of Environmental Quality (ODEQ), and the UMCD, with assistance from the US Army Corps of Engineers, Seattle District (CENWS) and the US Army

Engineering and Support Center, Huntsville (USAESCH). This cooperation was fostered by BCT recognition that Site 39 was part of the Umatilla Chemical Depot NPL Site and agreement that a CERCLA ROD would be the appropriate decision document to issue. Compliance with the requirements of a CERCLA ROD would support the framework to transfer the NPL property from the federal government to a non-federal entity.

In order to meet the CERCLA requirements for supporting information in an Administrative Record, the BCT agreed that a document equivalent to a RI/FS, which included the National Contingency Plan (NCP) nine criteria analysis would need to be developed, reviewed, and approved by USEPA and ODEQ, and be included in the Administrative Record. Information regarding the findings of the EE/CA including the NCP nine criteria analysis and OE Risk Evaluation are presented in subsequent sections of this ROD.

2.3 Highlights of Community Participation

In 1988, the UMCD assembled a Technical Review Committee (TRC), composed of elected and appointed officials and other interested citizens from surrounding communities. Quarterly meetings provide an opportunity for the UMCD to brief the TRC on installation environmental restoration projects and to solicit input from the TRC. In December 1993, the TRC was changed to a Restoration Advisory Board (RAB) with similar functions. The response received for the TRC and the RAB was positive and the members showed particular interest and support for the remedial activities. The RAB continued meeting, but due to an increasing lack of public participation, the RAB became inactive in December 1996. The Site 39 EE/CA report and Proposed Plan were released to the public on October 20, 2003 at the following locations: Building 32, UMCD; the Hermiston Public Library, Hermiston, Oregon; and the ODEQ office in The Dalles, Oregon. The notice of public comment period, public meeting, and availability of the Proposed Plan was published in the *Hermiston Herald*, the *Tri-City Herald,* and the *East Oregonian* on October 31, 2003. The public comment period started on that date and ended on December 1, 2003.

A public meeting was held at the Umatilla Chemical Depot Outreach Office in Hermiston, Oregon, on November 5, 2003, to inform the public of the preferred alternative and to seek public comments. At this meeting, representatives from the UMCD, the U.S. Army Corps, Seattle District, the U.S. Army Engineering and Support Center, Huntsville (USAESCH), EPA, ODEQ, and Parsons (an environmental consultant to USAESCH) answered questions about the site and response action alternatives under consideration. Responses to comments received at this meeting and during the 30-day comment period are included in Section 3.0, Responsiveness Summary.

2.4 Scope and Role of Response Action

Response actions are discrete actions that constitute incremental steps towards a final overall remedy. They can be actions that completely address a geographic portion of a site or a specific problem, or can be on of many actions that will be taken at the site. At the UMCD response actions have been directed at eight different areas identified as "operable units" based on the findings of the RI that was prepared in 1992. The eight operable units (OUs) are as follows:

- Inactive Landfills
- Active Landfill
- Explosives Washout Lagoon Soils
- Explosives Washout Lagoon Ground Water
- Explosives Washout Plant
- Deactivation Furnace (and surrounding soils)
- Ammunition Demolition Activity (ADA)
- Miscellaneous Sites

In the Miscellaneous Sites OU, there are 32 miscellaneous sites spread throughout the UMCD. The miscellaneous sites relate to a variety of facilities that supported the UMCD's mission including administrative areas, sewage treatment and storm water discharges, pesticide storage, paint spray and removal area, disposal pits, laundry wastewater discharge areas, etc.

Site 39 was grouped into the Miscellaneous Sites OU because of its unique support function to the UMCD as a quality assurance function range. In 1994, a ROD was prepared for the Miscellaneous Sites OU for which a recommendation of No Further Action was recorded for soils contamination at Site 39. However, the 1994 ROD did not address MEC at Site 39.

The following sections of this ROD provide an overview of the investigative process that was implemented at Site 39 to characterize the distribution of MEC and how the results of the investigation were used to assess the safety risk to the public. The overview also presents a summary of the process by which various response action alternatives were evaluated using the nine NCP criteria.

2.5 Site Characteristics

2.5.1 Current and Future Use of Property

The UMCD currently manages Site 39 on behalf of the Army in terms of restricting entrance to the property through the locked gate located along the North Patrol Road. However, the barbed wire fence along the northern boundary of Site 39 has not always been an adequate barrier to restrict occasional trespassers, such as hikers and hunters, from entering the site. Security of the site consists of: (1) periodic security patrols of the 640 acres within the site to enforce "no trespassing" and escort trespassers off the site; (2)

maintenance of existing "Restricted Area" signs along the Site 39 perimeter fence and posting of additional signs along the fence (as necessary) to warn the public of possible ordnance within Site 39; and (3) maintenance of existing fences surrounding Site 39. At present, there is no specific use of Site 39 that is authorized by the U.S. Department of the Army other than for site characterization activities.

The U.S. Department of the Army anticipates that at some time in the future, all 640 acres of Site 39 will be transferred to private interests or a government agency. It is highly probable that once the site is cleared, it will be sold or leased for agricultural purposes. Agricultural operations border Site 39 on the west, north, and east sides. Predominant crops in the vicinity of the UMCD include potatoes, alfalfa, and corn.

Hiking and hunting are also reasonable anticipated future uses of the property. Although it is not intended that the future use of the property will be for residential purposes, there may be limited residential uses (e.g. farm house, barn, etc.) associated with the anticipated future agricultural use of the property.

2.5.2 Results of Soils Investigations

As part of the RI performed by Dames and Moore (1992), a total of nine (9) shallow soil samples including one duplicate sample were collected from Site 39 and analyzed for Contract Laboratory Program (CLP) Target Analyte List (TAL) metals, explosives, and nitrate/nitrite. Two samples were collected from each of the two rifle range impact areas; two samples were collected from the pistol range impact area; and three samples were collected from the QA testing area (one sample collected from each of the three concrete pads). Analytical results indicated limited metals contamination. Nitrate/nitrite[1] was also detected in some of the samples but not at elevated concentrations. No explosives constituents were detected in any of the samples.

Soil characterization data from Site 39 and other miscellaneous sites that was collected during the RI was used to develop a human health baseline risk assessment and recommendations for the feasibility study. The absence of soil contamination at Site 39 indicated the potential risk associated with exposure to soil contamination by future residents is within or below the acceptable carcinogenic risk range, noncarcinogenic hazard level, and action level for lead. For this reason, the feasibility study for soil contamination at Miscellaneous Sites (Arthur D. Little, Inc., 1993), recommended no further action for Site 39 for soil contamination, a recommendation that was later recorded and accepted in the Final ROD for Umatilla Depot Activity Miscellaneous Sites Operable Unit (July 19, 1994).

[1] Soil sampling and analytical testing was conducted in the QA function testing area and the southwestern rifle impact area in 1991 as part of the RI (Dames and Moore, 1992). The results indicated that no elevated levels of nitrate/nitrite were detected in any samples, and no explosives were detected. Levels of nitrate/nitrite in the southwestern rifle range varied from 1.59 to 5 μg/g and in the test pad area varied from 1.36 to 2.92 μg/g. The soil screening comparison criterion was 9.9 μg/g.

2.5.3 Results of Clearance Actions

In 1996, a 100 percent surface clearance was conducted by UXB International Inc. (UXB) on 345 acres in the eastern portion of Site 39. The surface clearance was conducted by establishing 377, 220' x 200' grids in the areas of Sites 39A, 39B, 39C, 39D, and 39E that were identified in the 1992 RI by Dames and Moore, which included the functional test pad area, the rifle and pistol range, and the target area for the rifle and pistol range located on the coulee. Grids were then subdivided into 5-foot search lanes and unexploded ordnance (UXO)-qualified team members then visually inspected the ground with the aid of a magnetometer.

Following the surface clearance, UXB also performed a 13 percent (approximately 32 acres) surface sampling of 255 acres of the westernmost portion of Site 39 in areas west of the rifle and pistol range. The sampling involved the random placement of 33 grids over the area being investigated and each grid was surface cleared.

During the surface clearance of the eastern portion of the site, two MEC items and five ordnance-related items were found. The two MEC items that were found and considered live and functional were an M16 mine and a ground signal. The material potentially presenting an explosive hazard[1] (MPPEH) that was found included inert components of 5 ground signals. UXB reported that MEC and MPPEH were found around the function test pads and that no additional evidence of munitions fragments or components could be found in other parts of Site 39. UXB noted during their surface clearance a large trench filled with rusted banding material near the Coyote Coulee. UXB removed the rusted banding material to ensure that no ordnance items or residue was located in the trench. UXB found no ordnance items in the trench.

Over six hundred pounds of metal debris was removed from Site 39 during UXB clearance operations; the majority from the trench located along the Coyote Coulee. UXB found no evidence of ordnance disposal pits or MEC burial trenches at the site and indicated all ordnance and ordnance related items were removed from the eastern portion of the site. No MPPEH was found in the western portion of the site, west of the coulee. Additionally, UXB found no indication of any subsurface ordnance contamination at the site and concluded the areas within Site 39 do not appear to be contaminated with explosive hazards and there is no reason to suspect additional MEC on the property. The UXB determination was based on Schonstedt magnetometer-aided visual inspection.

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[1] Material Potentially Presenting an Explosive Hazard (MPPEH). Material potentially containing 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 contaminated with a high enough concentration of explosives (e.g., the holding tanks, piping, and ventilation ducts associated with munitions production, demilitarization or disposal operations). Excluded from MPPEH are munitions within DOD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions. The term "MPPEH" replaces the term "Ordnance-Related Scrap (ORS)" that was used in previous documents pertaining to Site 39, UMCD.

2.5.4 Results of Geophysical Investigations

In 2001, Parsons conducted geophysical mapping of Site 39 for the purpose of preparing an EE/CA for potential MEC at the site. Parsons subcontractor, American Technologies Inc. (ATI) performed a 100 percent visual surface clearance of the site along with brush clearing. Following the brush clearing, a 100 percent geophysical mapping effort was performed by Parsons' subcontractor Blackhawk GeoServices (Blackhawk). Blackhawk used a Multi-sensor Towed Array Detection System (MTADS) to map the relatively flat areas of the site (approximately 597 acres) and a dual towed EM-61 (EM–electromagnetic) unit to map the relatively steep areas of the site (approximately 43 acres). The purpose of the geophysical mapping was to identify anomalies that could potentially represent buried MEC.

The geophysical technology in both the MTADS and EM-61 uses the time domain electromagnetic (TDEM) method, a technology that was tested at Site 39 during a "prove-out" prior to the geophysical mapping of the site. During the prove-out, the detection capabilities of the EM-61 and MTADS were tested over a known grid where 31 metallic items that simulated MEC had been buried (seeded anomalies). Both the EM-61 and MTADS were successfully tested during the geophysical prove-out with detection rates varying from 89 to 96 percent for the seeded anomalies.

Using the MTADS and a dual-towed EM-61, geophysical mapping of the 640-acre site yielded approximately 24,000 geophysical anomalies, based on a threshold[1] of 7 mV for the MTADS data and 3 mV for the EM-61 data.

Subsequent to the geophysical mapping, but prior to the reacquisition of anomalies, the site was further divided into seven areas of potential concern (AOPCs) based on past or current use, topography, distribution of the detected anomalies, and proximity to the existing perimeter fence (see Figure 4). The AOPCs were identified as:

- Coulee Area;
- East of the Coulee Area (excluding the Test Pad Area);
- West of Coulee Area (excluding the Rifle Range Area);
- Test Pad Area;
- Rifle Range Area;
- East Perimeter Area (east of the east perimeter fence); and
- Fence Line Area.

After removing anomalies from the data set that were associated with cultural features[2], multiple picks, single point anomalies, and modeling results of lower magnitude (7 mV to 8 mV) MTADS anomalies; a total of 16,890 anomalies remained for evaluation within

[1] Threshold – The level or values at which anomalies that are equal to or greater than are selected for further investigation.

[2] Cultural features – Man-made features that may cause interference with the geophysical signal response.

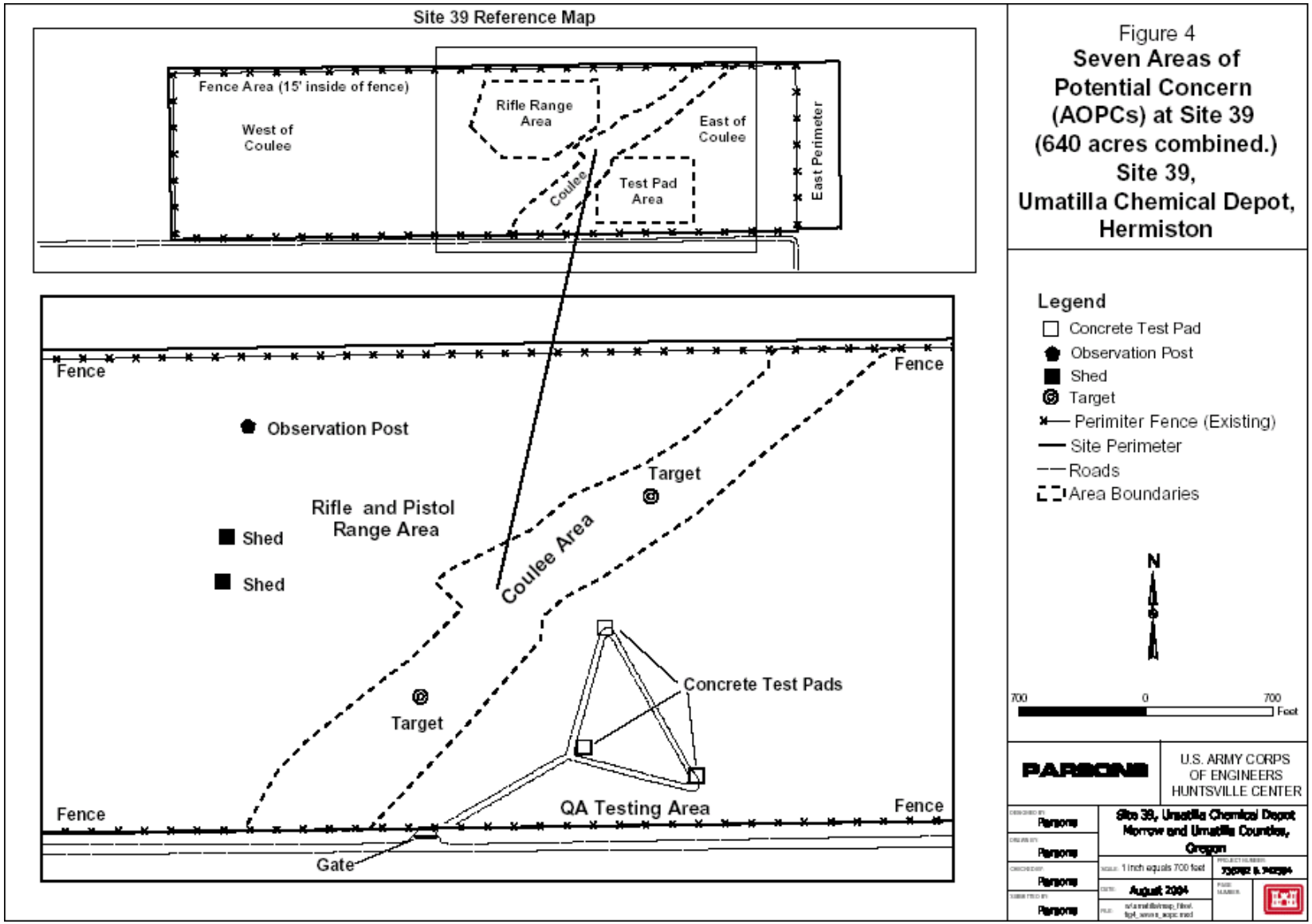

Figure 4. Seven Areas of Potential Concern (AOPCs) at Site 39.

the legal boundary of the site as well as the area within the perimeter fence. A total of 16,328 anomalies were identified within the legal boundary excluding a 15-foot zone around the perimeter fence. Within the perimeter fence (but excluding a 15-foot offset from the fence), a total of 15, 856 anomalies were identified.

In an effort to reduce the number of false positives[1], Parsons further reviewed the geophysical data to assign different ranks to the anomalies. The ranking aimed to identify anomalies that would more likely be associated with buried metallic items (potential MEC items) versus anomalies that would more likely be associated with topography or geologic features. The ranking process was based on the comparison and analysis of several anomaly characteristics, including: comparing the detected anomaly responses to geophysical response of the items seeded in the prove-out grid; comparing the anomaly responses to background levels. The criteria for the anomaly ranking process was as follows:

- Category 1 Anomalies were selected using the thresholds required to detect the majority of the seeded anomalies at the prove-out grid. These anomalies are considered to have the highest potential to represent MEC at this site.

- Category 2 Anomalies were selected using thresholds that are less than those required to detect the majority of the seeded anomalies at the prove-out grid. These anomalies are considered to represent small pieces of metal fragments that may be MEC related scrap but are not considered to represent potential MEC anomalies.

- Category 3 Anomalies were selected using thresholds that are significantly less than those required to detect seeded anomalies at the prove out grid. These anomalies are considered to primarily represent geologic noise, instrument noise, and topographic variations at the site. These anomalies are not considered to represent MEC related scrap or potential MEC.

These ranking criteria take into consideration the possible range of sources that each anomaly may be associated with, while placing greater importance on larger amplitude anomalies, which are more likely to be associated with buried metallic items. These criteria also take into consideration that an anomaly may have characteristics typical of geologic features, terrain conditions, or instrument noise.

Based on the above-mentioned criteria, the anomalies identified within the seven AOPCs were subdivided into three categories based on the signal response of the MTADS and EM-61 data as follows:

[1] False positive – An anomaly at which no observed source was determined as the cause of the geophysical signal response.

TABLE 1. INSTRUMENT RESPONSE (MV) FOR RANKING CATEGORY 1, CATEGORY 2 AND CATEGORY 3 ANOMALIES AT SITE 39

Category	MTADS	Dual/Single EM61
1	Greater than 40 mV	Greater than 10 mV
2	Between 20 and 40 mV	Between 5 and 10 mV
3	Between 8 and 20 mV	Between 3 and 5 mV

Prior to the intrusive investigation, several BCT meetings were held to develop a strategy for intrusively investigating a select number of the Category 1, Category 2, and Category 3 anomalies at Site 39. As a result of these discussions, Parsons was directed to conduct the intrusive investigation of 890 anomalies (608 Category 1, 231 Category 2, and 51 Category 3) as listed in Table 2.

Geophysical maps of the site also revealed that some areas of the site had Category 1 anomalies that were clustered so closely together that they were not distinguishable as individual anomalies. Anomaly clusters were evident near two of the test pads in the Test Pad Area and at three locations along the Coyote Coulee. To determine the cause of the clustered anomalies, two trenches totaling 240 feet in length and up to 4 feet in depth were proposed for the Test Pad Area, and three test pits were proposed at locations of clustered anomalies along the Coulee Area.

2.5.5 Results of Intrusive Sampling of Geophysical Anomalies

In 2002, following an extensive evaluation of the geophysical data collected in 2001, Parsons returned to Site 39 to reacquire and intrusively investigate the 890 anomalies that had been agreed upon by the BCT. Of the 890 anomalies investigated during the EE/CA, the results included 4 MEC items (two MEC items were at a single anomaly location), 342 MPPEH items, 479 non-MPPEH items, and 66 intrusive investigations no finds. Stained soil, possibly indicative of Hazardous, Toxic, and Radiological Waste (HTRW), was not observed in any of the 890 individual anomaly excavations, although the high iron content of soil is suspected to be the cause of many clustered anomalies in the Test Pad Area. In addition, test pits excavated along the Coyote Coulee revealed buried metal debris. No burial pits were found at the areas of clustered anomalies.

Of the four MEC items that were found, two were found in the Test Pad Area and the other two were found in the Rifle Range Area. The two MEC items found in the Test Pad Area consisted of a partially exposed M33 fragmentation grenade and a pyrotechnic flare found at a depth of 3 inches below ground surface (bgs). The two MEC items found in the Rifle Range Area (found at a single anomaly location) consisted of remnants of two ground signal devices and rifle grenade flares found at a depth of 16 inches bgs. All four MEC items were unfused, which allowed them to be moved to the secure bunker at the Ammunition Demolition Activity for subsequent disposal.

Of the 342 MPPEH items found in the seven AOPCs investigated, the majority were found in the Test Pad Area (187 MPPEH items) and the Rifle Range Area (109 MPPEH items). The remaining 46 MPPEH items were found near the fringes of the Rifle Range AOPC and the Test Pad AOPC, but within the boundaries of the Coulee AOPC, the East of Coulee AOPC, the West of Coulee AOPC, and the Fenceline AOPC.

MEC/MPPEH in Test Pad AOPC

Of the 187 MPPEH items identified in the Test Pad Area, the majority were components of 3.5-inch rockets. The second most prevalent MPPEH items were components of various types of grenades followed by various types of flare components. The deepest of the MPPEH items were found at a depth of 24 inches and included: seven 3.5-inch motors, five fuses, six partial illumination war heads, three fin assemblies, and ten separate fins. The second deepest MPPEH was at a depth of 18 inches and was a rifle smoke grenade. Only 5 of the 187 MPPEH items (3 %) were at a depth of 12 inches or more, leaving remainder of the MPPEH found (97%) at a depth of less than 1-foot. Most of the MPPEH, 176 of the 187 MPPEH items (94%), were found at a depth of 6 inches or less.

MEC/MPPEH in Rifle Range AOPC

Of the 109 MPPEH items identified in the Rifle Range Area, the majority were components of various types of flares. The second most prevalent MPPEH items were aluminum fragments followed by various types of grenade components. The deepest of the MPPEH was found at two locations (both 24 inches below ground surface) and both were trip flare bases. Otherwise the remaining 107 MPPEH items (98%) were found at a depth of 12 inches or less, and 90 of the 109 MPPEH items (83%) were found at a depth of 6 inches or less.

TABLE 2. SELECTED ANOMALIES FOR INTRUSIVE INVESTIGATION -- SITE 39 QUALITY ASSURANCE FUNCTION RANGE, UMATILLA CHEMICAL DEPOT

	Total Number of Anomalies				Selected Anomalies			Agreed to Number of Anomalies from December 2001 Meeting		
	Category 1	Category 2	Category 3	Total	Category 1	Category 2	Category 3	Category 1	Category 2	Category 3
Total Area										
Total Anomalies	1397	2277	13216	16890						
Anomalies Excluding 15' Buffer around Perimeter Fence	1238	2183	12907	16328						
Total Anomalies 15' Inside Perimeter Fence	1129	2111	12616	15856						
Fence Area	109	72	291	472	40		1	(33)		
East Perimeter Area					20	8		(20)	(10)	
Coulee Area	141	85	66	292	147	37		100%	50%	
East of Coulee - Exclusive of Test Pad Area	91	306	1679	2076	21	21		(21)	(22)	
West of Coulee-Exclusive of Rifle Range Area	248	664	6026	6938	30	11	50	(30)	(5-10)	(25-50)
Test Pad Area	450	512	1498	2460	250	104		50%	20%	
Rifle Range Area	199	544	3347	4090	100	50		50%	10%	
					608	**231**	**51**			

Definition of Categories

Category	MTADS	Dual/Single EM61
1	40 mV < x	10 mV < x
2	20 mV < x < 40 mV	5 mV < x < 10 mV
3	8 mV < x < 20 mV	3 mV < x < 5 mV

MPPEH in Other AOPCs

Of the 46 remaining MPPEH items found in other AOPCs, 21 were small arms MPPEH items (.50 caliber bullets). The remaining 25 MPPEH items were found near the fringes of the Test Pad AOPC and Rifle Range AOPC and near the area of the Test Pit –1 in the Coulee AOPC. Excluding small arms, MPPEH in these other AOPCs included flare casings, aluminum and metal fragments, smoke canister, illumination canister, and fins from a 3.5-inch rocket.

Based on historical records and the results of the geophysical mapping and intrusive investigation, it was determined that the majority of the 640-acre site had no evidence of past munitions activity. AOPCs that had no evidence of munitions activity totaled approximately 464 acres. The remaining 176 acres, which had discoveries of MEC or evidence of MPPEH were largely part of the Test Pad Area, the Rifle Range Area and a small area near one of the test pits that was excavated at the base of the Coyote Coulee. Upon reviewing the results of the intrusive investigation, the boundaries of the AOPCs were redrawn into three areas of concern (AOCs) that included locations where MEC or MPPEH had been found. The three AOCs referred to as the Test Pad Area (68 acres), the Rifle Range Area (107 acres), and the Test Pit Area (1 acres) are shown in Figure 5.

A summary of the MEC and MPPEH items found at Site 39 (not including 13 MPPEH items that were 50 caliber bullets found outside the three AOCs) is as follows:

Test Pad AOC (68 acres)

Depth of 2 MEC items:	1 at 0 inches 1 at 3 inches	**Depth of 203 MPPEH items:**	100% ≤ 24”

Rifle Range AOC (107 acres)

Depth of 2 MEC items:	1 at 16 inches 1 at 16 inches	**Depth of 122 MPPEH items:**	100% ≤ 24”

Test Pit AOC (1 acre)

No MEC found	**Depth of 4 MPPEH items**	100% ≤ 24”

inches

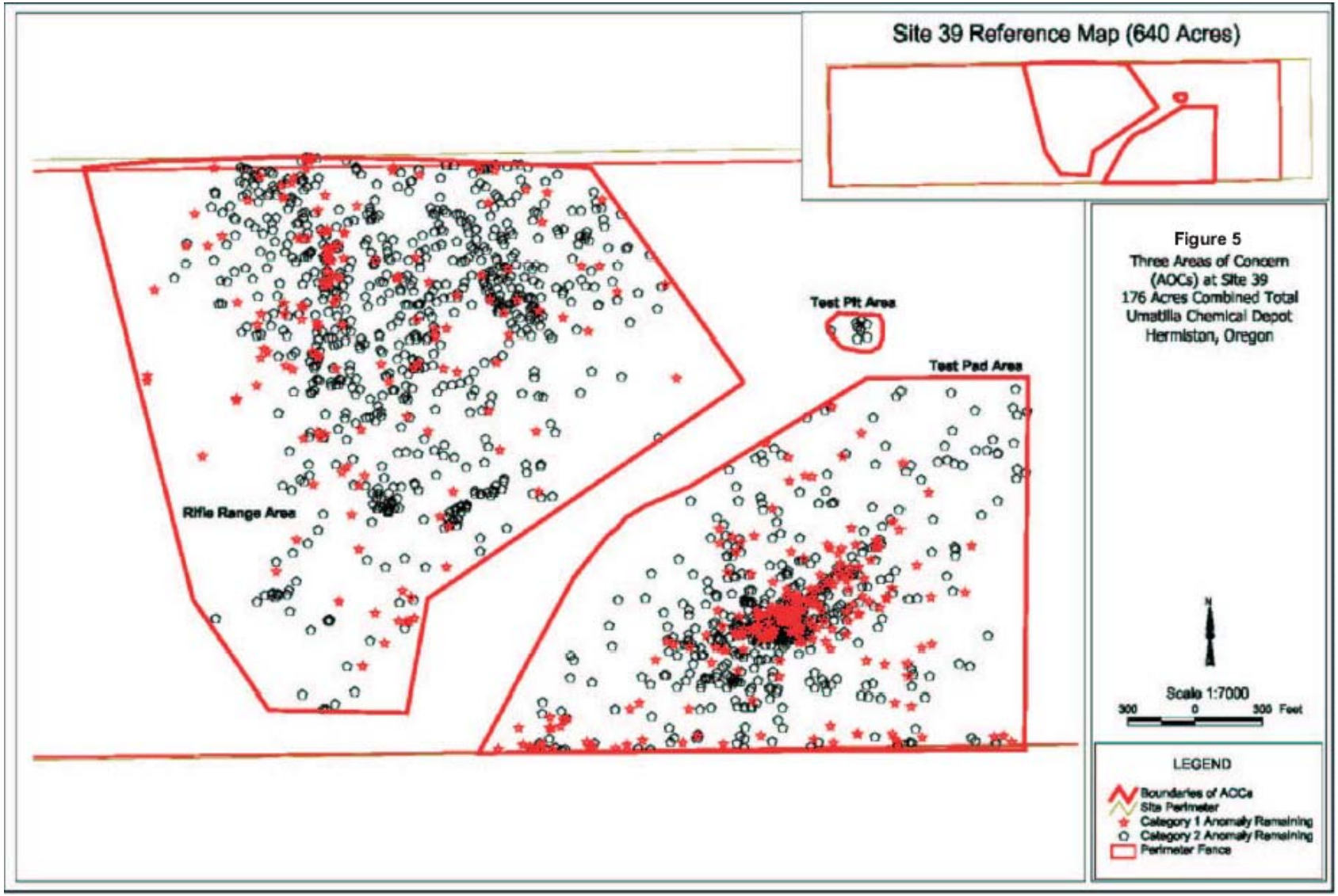

Figure 5. Site 39 Reference Map.

2.6 Summary of Site Risks

This section summarizes the public safety risks associated with exposure to MEC at Site 39 and potential environmental impacts associated with implementation of MEC response action alternatives.

2.6.1 Public Safety Risks

2.6.1.1 MEC (OE) Risk Evaluation

A qualitative risk evaluation was conducted using the OE Risk Impact Assessment (OE RIA) for MEC EE/CA Evaluations Interim Guidance document (USACE, 2001) to assess explosive safety risk to the public at Site 39. The purpose of the risk evaluation was to communicate the magnitude of the risk at the site and the primary causes of that risk, and to aid in the development, evaluation, and selection of MEC response alternatives. As such, the site conditions following land transfer were evaluated to provide a baseline risk in the absence of any actions to control or mitigate that risk.

The risk evaluation was based on the site characterization findings along with three critical explosive safety risk elements: (1) a source (presence of MEC), (2) a receptor or person, and (3) interaction between the source and receptor (such as picking up the item or disturbing the item by plowing). There is no risk if any one element is missing.

The exposure route for MEC to a receptor is primarily direct contact as a result of some human activity. Agricultural or construction activities involving subsurface intrusion are examples of human activities that will increase the likelihood for direct contact with buried MEC. An MEC item will tend to remain in place unless disturbed by human or natural forces, such as wind erosion or frost heave. Movement of the MEC may increase the probability for direct human contact but not necessarily result in a direct contact or exposure.

For the risk evaluation, the potential risk posed by MEC was characterized qualitatively by evaluating three primary risk factors. The three primary risk factors include: 1) presence of an MEC source, 2) site characteristics that affect the accessibility or pathway between the source and human receptor, and 3) human factors that define the number of receptors and type of activities that may result in direct contact between a receptor and OE source. The relation of these factors is shown in Figure 6.

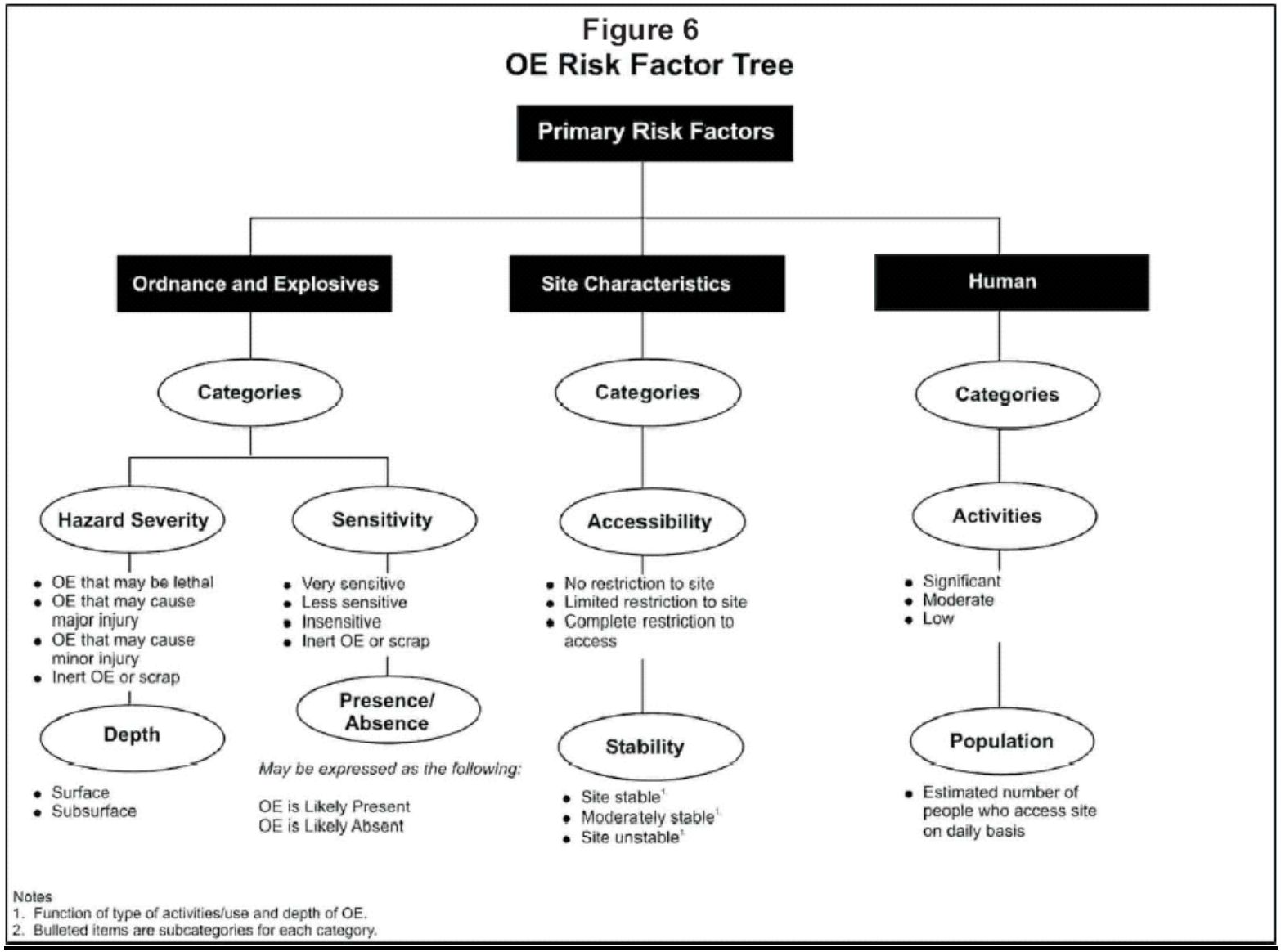

Figure 6. OE Risk Factor Tree.

Ordnance and Explosives Risk Factor. There are four categories that are evaluated within the presence of the OE risk factor. These include the MEC hazard severity, MEC sensitivity, MEC presence/absence, and MEC depth distribution. A summary of these categories is as follows:

- **Hazard Severity**. The MEC hazard severity affects the likelihood of injury and the severity of exposure. If multiple MEC items are identified in an area, that item which poses the greatest risk to public health is selected for risk evaluation.

- **Sensitivity.** MEC sensitivity affects the likelihood of detonation and the severity of exposure. The factors considered in evaluating sensitivity include the presence or absence of fusing and the type of fusing. There are four potential subcategories of MEC sensitivity. The category of sensitivity is based on the results of the EE/CA field investigation as well as the results of prior surface Removal Action. When multiple subcategories of MEC hazard severity are discovered in an area, the highest risk subcategory is used in the risk evaluation.

- **Presence/Absence.** MEC Presence/Absence affects the likelihood that an individual will be exposed to MEC. There exists a direct relationship between presence/absence of MEC and potential for harm. For example, the more ordnance items identified the greater the likelihood of exposure to an MEC item and thereby an opportunity to create an incident. MEC Presence/Absence can be estimated either qualitatively or quantitatively.

- **Depth Distribution.** The MEC depth distribution refers to where the MEC is located vertically in the subsurface. The MEC depth distribution and site-specific intrusive activities below the ground surface affects the likelihood that an individual will be exposed to MEC. There exists a direct relationship between the depth at which MEC are found and the likelihood of exposure to the MEC. That is, the greater the depth where the MEC are found, and the lesser the depth of intrusive activities, the lower the risk of exposure. There are two subcategories within the MEC depth distribution category: surface and subsurface. The surface subcategory includes those items that are visible at the surface of the ground including those items protruding from the ground. The subsurface subcategory includes those items recovered from greater than 0 inches below ground surface (bgs). Assessment of this risk category reflects the findings of the EE/CA field investigation.

Site Characteristics. There are two categories that are evaluated in the site characteristics risk factor. These are site accessibility and site stability.

- **Site Accessibility.** The accessibility of an AOC affects the likelihood of encountering MEC. Natural or physical barriers can limit the accessibility. Natural barriers can include the terrain or topography of the site as well as the vegetation. Physical barriers can include walls and fences that limit the public's

accessibility to the AOC. Both the physical and natural barriers found at an AOC are considered when evaluating this category. Site accessibility has three subcategories.

- **Site Stability.** This category relates to the probability of being exposed to MEC by natural processes. These natural processes include recurring natural events (e.g., frost heave, sand movement, erosion) or extreme natural events (e.g., tornadoes, hurricanes). The local soil type, topography, climate, and vegetation affect stability of the site. The soil type and climate primarily affects the depth of penetration of the MEC. Over time, the soil type and climate will also affect the degree of erosion that takes place at a site. Topography and vegetation in the area will also affect the rate of erosion that takes place in an area. Site stability has three subcategories.

Human Factors. There are two categories that are evaluated in the primary human risk factor. These include activities and population.

- **Site Activity.** The types of activities conducted at a site affect the likelihood of encountering MEC. The types of activities may be generally classified as recreational and occupational. This category examines whether the impact from an activity on MEC is significant, moderate or low. First, the type of activity should be identified. Then, the depth of the activity must also be considered. For example, at a site where MEC is at the surface, all activities that can impact MEC at the surface are considered activities that have significant impact. Conversely, if all MEC is located at depths greater than 1 foot and only surface impact activities are being performed, then the activities are considered as moderate or low impact. After the type of activity and depth of MEC are identified, then a score of significant, moderate or low may be assigned.

- **Population.** This category refers to the number of people that potentially access the AOC on a daily basis. The number of people accessing the AOC affects the likelihood of encountering MEC. A direct relationship exists between the number of people and the risk of exposure. An estimate of the number of people that will access each AOC in the future on a weekly basis was made using best professional judgment based on knowledge of the type of site, land use, and site accessibility.

2.6.1.2 Risk Assessment Summary

A summary of the results of the risk evaluation based on the factors described above is presented in Table 4. The information in Table 4 was largely based on the results of the data collected during the geophysical mapping and intrusive investigation. Although geophysical mapping was completed in 100 percent of the AOCs, only a representative portion of geophysical anomalies identified from the geophysical mapping were intrusively investigated. Despite the intrusive investigation, a residual risk still remains

because not all geophysical anomalies were intrusively investigated and limitations in geophysical data acquisition, processing, and analysis (see Table 3).

TABLE 3. GEOPHYSICAL ANOMALY SUMMARY FOR THE THREE AOCS AT SITE 39, UMATILLA CHEMICAL DEPOT, HERMISTON, OREGON

Area of Concern (AOC)	Number of Anomalies Identified during EE/CA	Number of Anomalies Removed during EE/CA	Number of Anomalies Remaining
Test Pad Area			
Category 1 Anomalies	498	250	248
Category 2 Anomalies	603	104	499
Category 3 Anomalies	2042	0	2042
Rifle Range Area			
Category 1 Anomalies	254	100	154
Category 2 Anomalies	772	50	722
Category 3 Anomalies	3765	14	3751
Test Pit 1 Area			
Category 1 Anomalies	31	31	0
Category 2 Anomalies	16	7	9*
Category 3 Anomalies	3	0	3*
Total	**7984**	**556***	**7428**

* The 556 anomalies investigated and removed during the EE/CA investigation from the three AOCs include some anomalies that were within other AOPCs (e.g., Coulee Area, West of Coulee Area, Fenceline Area, and East of Coulee Area) before the boundaries of the AOCs were redrawn. Consequently the number of anomalies in the Rifle Range and Test Pad AOPCs (see Table 2) are not the same as the number of anomalies in the Rifle Range AOC and Test Pad AOC.

The risk evaluation concluded the greatest risk of finding MEC was primarily in two AOPCs (the Rifle Range Area and the Test Pad Area) where MEC and MPPEH had been previously found. A much smaller risk of finding MEC also existed at the base of the Coyote Coulee (near Test Pit 1) where MPPEH had been found buried with other metal debris, but not MEC.

Based on this information, three Areas of Concern (AOCs) were established for the risk evaluation and response action alternative evaluation. These three AOCs included the Rifle Range Area, the Test Pad Area, and a small portion of the Coulee Area near Test Pit 1. The boundaries of these three areas were established based on previous finds of MEC and MPPEH.

The redrawing of the boundaries of the seven AOPCs into three AOCs was conducted by representatives from the US Environmental Protection Agency, the Oregon Department of Environmental Quality, and the Umatilla Chemical Depot working cooperatively with representatives from the US Army Corps of Engineers, Seattle District and the US Army Engineering and Support Center, Huntsville during a BCT meeting held on January 8,

2003. The BCT was able to effectively evaluate the extensive geophysical and intrusive sampling data collected from the AOPCs (along with historical information) and conclude that the data supported a recommendation of "no further action" on 464 acres of the 640 acres within Site 39.

The BCT's conclusion of no further action was partly based on the fact that the 464 acres had no documented history or physical evidence suggesting past munitions use. The no further action recommendation, however, was largely based on the results of the EE/CA investigation during which the 464 acres were 100 percent mapped by geophysics and a representative sample of the anomalies identified on the geophysical maps were intrusively investigated. None of the anomalies that were investigated within the 464 acres were found to be MEC or MPPEH, which further confirmed the 464 acres were not affected by QA function testing activities, which occurred in adjacent areas.

During the redrawing of the boundaries of the Rifle Range AOPC, Test Pad AOPC, and the area near Test Pit 1 on the Coyote Coulee, the BCT agreed to adjust the boundaries to incorporate anomaly locations where MEC and MPPEH were found, but also to exclude anomaly locations where 0.50 caliber rounds were found. Although 0.50 caliber rounds are technically considered MPPEH, they are not considered a safety hazard and consequently did not warrant inclusion into the three AOCs. Combined, the three AOCs consisted of approximately 176 acres. Figure 5 shows the location of the boundaries of the AOCs and the category 1 and category 2 anomalies remaining in the AOCs.

The remaining 464 acres of Site 39 were not evaluated as part of the MEC risk evaluation because there is no historical or physical evidence of munitions testing in these areas. Consequently, there is little if any safety risk from MEC in the remaining 464 acres of the site.

TABLE 4. SUMMARY OF RISK EVALUATION FOR LIKELY FUTURE USE OF SITE 39

Area of Concern (acres)	Munitions and Explosives of Concern Factors					Site Characteristics Factors		Human Factors	
	Type[1]	**Hazard Severity**	**Sensitivity (Fuse)[2]**	**MEC Presence/Absence**	**MEC/MPPEH by Depth (Max/Min)**	**Accessibility**	**Stability**	**Contact Level / Activities**	**Population**
Rifle Range Area – 106.9	**2002 EE/CA: (2) partial candles in rifle grenade flare, unfused; MPPEH grenade spoons 1996 Surface Clearance:** non-MPPEH	Most Severe, Possibly Lethal	Less Sensitive	**MEC are likely present** 2002 EE/CA: 2 MEC found in 150 anomalies investigated 1996 Surface Clearance: 0 MEC and 0 MPPEH found.	2 MEC at 16 in. bgs during EE/CA and MPPEH 0 to 24 in. bgs.	Limited Restriction[3]	Moderately Stable[4]	Significant Agricultural, Trespassing (hiking, hunting)	0 to 2 daily
Test Pad Area – 68.5	**2002 EE/CA**: (1) unfused M33 grenade; (1) unfused flare cartridge **1996 Surface Clearance: (1) functional M16 AP mine;** (1) ground signal flare	Most Severe, Possibly Lethal	Very Sensitive	**MEC are likely present** 2002 EE/CA: 2 MEC found in 353 anomalies investigated. 1996 Surface Clearance: 2 MEC found and MPPEH found.	1 MEC at surface and 1 MEC at 3 in. bgs during EE/CA and MPPEH from 0 to 24 in. bgs 2 MEC items at surface during 1996 Surface Clearance	Limited Restriction[3]	Moderately Stable[4]	Significant Agricultural, Trespassing (hiking, hunting)	0 to 2 daily

[1] Denotes items found during the EE/CA and 1996 Clearance Action, as indicated. The bolded MEC or MPPEH items were used to establish the Category.

[2] Selection for this factor based upon types of MEC and/or found at the site.

[3] In the future, existing fencing along the southern boundary of Site 39 (part of perimeter fence for UMCD) will probably still exist. However, existing fencing on the northern, western, and eastern boundaries of Site 39 may or may not exist.

[4] The site is subject to moderate soil erosion by winds. Frost heave to 2 feet bgs. Low potential for soil erosion by water.

For the 176 acres where MEC may still exist, the potential for an explosive safety risk depends on three critical elements: a source (the presence of MEC), a receptor (a person), and interaction between the source and the receptor (such as picking up the MEC item or disturbing the MEC item by plowing the soil). Agricultural or construction activities involving disturbing the soil are examples of human activities that will increase the likelihood for direct contact with buried MEC. A MEC item will tend to remain in place unless disturbed by human or natural forces, such as wind erosion or frost heave. Such movement of the MEC item may increase the likelihood for direct human contact, but may not necessarily result in human contact.

In summary, the MEC risk evaluation, which is presented in the EE/CA Report, found that the explosive safety risk is low in the Test Pit Area due to the likely absence of MEC. However, the explosive safety risk in the Test Pad Area and the Rifle Range Area is moderate given there is a low to moderate likelihood that additional MEC may still be present in these two areas (see Table 4). Given that these two areas would be readily accessible to the public following land transfer, unrestricted access and potential future agricultural activities would contribute greatly to the explosive safety risk unless the MEC was removed from these areas.

2.6.2 Environmental Evaluation

As part of the EE/CA investigation for Site 39, biological and cultural resources that may be present within Site 39 were evaluated with attention to those resources that could be adversely impacted by ground-disturbing MEC operations and MEC detonation. Potential environmental resource impacts to sensitive biological resources and unknown archeological sites could result from driving vehicles across the site, brush clearing, inadvertent brush fires, geophysical surveys, excavating soil, and disposing of MEC in place.

Vegetation at the UMCD is typical of a high plains arid region with dry-tolerant shrubs with a grassy understory. There are 43 federal candidate plant species that may be found at the UMCD (Parsons, 2002). Potential impacts to the two federally listed species that may exist at Site 39, the Bald Eagle and peregrine falcon, should be negligible for the response action alternatives. The minimal impact to these two species may result from vegetation disturbance thus causing a reduction in the foraging habitat and a decrease in prey populations.

Wetlands do not exist within the boundaries of Site 39 or the UMCD. Site 39 does not contain any surface water bodies, creeks, or rivers and is not located within a 100-year or 500-year flood plain. Additionally, the site is not part of wilderness area or wildlife refuge.

Except for the *Old Emigrant Wagon Road* that traverses the southwest corner of Site 39, no cultural resources have been identified within the 640-acre site. Also, there are no

historic buildings within Site 39. Impacts to the *Old Emigrant Wagon Road* would only occur as a result of MEC excavation or MEC detonation activities[1].

2.6.3 Response Action Goals

The ultimate goal of a selected response action alternative for Site 39 is public safety, which can be achieved by reducing the explosive threat posed by MEC that potentially remains on the property. This goal can be achieved by evaluating the appropriateness of a particular response action alternative in terms of minimizing the public's exposure to MEC and successful implementation to meet this goal.

None of the areas investigated within Site 39 were identified as warranting an immediate (time-critical) MEC response action, and consequently, only remedial MEC response actions were evaluated for their applicability in reducing the potential exposure to MEC. The goal of a remedial MEC response action is to achieve public safety. Therefore, the public safety goal will be achieved by determining the appropriateness of various response action alternatives that minimize the public's exposure to MEC, and implementing the response actions selected in this ROD.

To reduce the MEC explosive safety risk, the evaluation looked at four alternatives; three response actions and a "no further action" alternative (consideration of the "no further action" alternative is required by law). The four alternatives that were evaluated for the 176 acres potentially containing MEC within Site 39 are as follows:

Alternative 1: No further action.

Alternative 2: Land Use Controls (LUCs). Includes land use restrictions, fencing, signs, educational awareness programs, and deed restrictions *c*onsistent with State of Oregon property laws. Alternative 2 includes permanent LUCs and no MEC clearance. Interim LUCs would not be a part of this alternative.

Alternative 3: Subsurface clearance of MEC to a depth of 2 feet in the Rifle Range Area and Test Pad Area and to a depth of 6 feet in the Test Pit Area, along with soil sifting to a depth of 2 feet near the test pads in an area where high density of geophysical anomalies was found. Also includes interim LUCs and post property transfer LUCs (see Section 2.7.3).

Alternative 4: Subsurface clearance of MEC to a depth of 4 feet in the Rifle Range Area and Test Pad Area and to a depth of 6 feet in the Test Pit Area, along with soil sifting to a depth of 2 feet near the test pads. Also includes interim LUCs and post property transfer LUCs (see Section 2.7.4)."

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[1] The *Old Emigrant Wagon Road* is located within a No Further Action Area of Site 39 where MEC is not suspected to exist. This cultural feature is located approximately one-quarter mile from the Rifle Range Area. Consequently, no subsurface clearance involving excavation is planned in the vicinity of this cultural feature, and for this reason coordination with the SHPO has not been implemented.

Alternatives 1 and 2 do not involve the clearance of MEC from Site 39. The difference between Alternative 1 and Alternative 2 is that Alternative 2 focused public awareness on the potential safety risk at Site 39 and places restrictions on public access to 176 acres of the 640 acres within Site 39 that potentially contain MEC. Alternative 1 does not include these measures.

Alternatives 3 and 4 both involve clearance of potential MEC from 176 acres of the 640 acres. Alternative 4 involves the excavation of anomalies up to 4 feet deep in the Rifle Range Area and Test Pad Area, whereas under Alternative 3 excavations would be up to 2 feet deep. Investigation results presented in the EE/CA found very few metallic items below 2 feet, and no MEC items were found below 2 feet. Metallic items were found in the Test Pit up to six feet bgs.

During the evaluation process, a number of factors were considered. The response action alternative had to first of all be protective of human health and the environment. The response action alternatives also had to meet the requirements set forth in applicable and relevant and appropriate requirements (ARARs) while still being feasible and achievable in terms of cost. Additionally, the response action alternatives had to be effective and implementable. With these goals, the proposed response alternatives were evaluated against the nine criteria established in the NCP. The nine NCP evaluation criteria are as follows:

Overall Protection of Human Health (Public Safety) and the Environment;
Compliance with ARARS;
Long-term Effectiveness and Permanence;
Reductions in Toxicity (Safety Hazard), Mobility, and Volume through Treatment ;
Short-term Effectiveness;
Implementability;
Cost;
State Acceptance; and
Community Acceptance.

2.7 Description of Alternatives

The following subsections provide descriptions of the No Further Action Alternative, the Land Use Controls Alternative, the Clearance to 2 feet Alternative, and the Clearance to 4 feet Alternative. Where present worth is calculated it is based on 20 years with a 7 percent discount rate. The accuracy of the costs are estimated to be within + 50 percent and –30 percent. Where applicable, actual costs for performing the MEC work during the EE/CA investigation were used as a basis for estimating future MEC clearance work.

2.7.1 Alternative 1: No Further Action

Evaluation of the No Further Action alternative for the entire 640 acres is required under CERCLA and serves as a common reference point against which other alternatives can be evaluated. Alternative 1 is for the government to take No Further Action (NFA) in

regards to locating, removing, and disposing of any potential MEC present within the 176 acres where MEC is suspected to exist at Site 39. The NFA alternative assumes continued use of the 176 acres in its present state. The existing public access restrictions would continue as long as the Army operates the UMCD.

For the 176 acres potentially containing MEC (see Figure 5), a course of no further action would do nothing to reduce the safety risk to the public and for this reason this alternative does not meet the protectiveness criteria established under CERCLA.

For the remaining 464 acres not suspected of containing MEC (see Figure 5), no potential hazards were found that are incompatible with the expected future agricultural development of the area.

Capital Cost: $0

Present Worth O&M Cost: $0

Present Worth Recurring Reviews: $0

Total Cost: $0

Months to Implement: None

Recurring Reviews: No

2.7.2 Alternative 2: Land Use Controls

This alternative reduces the safety risk to the public through behavior modification resulting from physical controls, management controls, and legal controls. Physical controls would include the installation, inspection, and repair of 10,000 feet of 6-foot high chain link fencing (in addition to the existing fencing) to surround the 176 acres that may still contain MEC. The fence would include warning signs at the gated entrance and signs every 100 feet along the fence.

If the property is transferred, implement a deed notification to make future property owners aware of the past history of the property including its proximity to the 176 acre former quality assurance function range potentially containing MEC. The deed notification will include the results or previous investigations of the property known as Site 39. If the property is leased, provide a similar notification in the lease agreement.

Beyond the information communicated during RAB meetings and public workshops, MEC awareness training would be provided to persons that access the area (e.g. agricultural workers) if the 176 acres of Site 39 were leased for agricultural purposes. If the 176 acres of Site 39 property was transferred or leased, a deed or lease restriction consistent with State of Oregon property laws would be implemented at the time of

transfer to make the future owner or lease holder aware of the past military history of the property and potential safety risk from potentially existing MEC, and include any appropriate land use restrictions. A deed or lease restriction would only be implemented if the 176 acres of Site 39 property was transferred for reuse or leased by the Army.

Capital Cost: $216,500

Present Worth O&M Cost: $15,900

Present Worth Recurring Reviews: $63,900

Total Cost: $296,300

Months to Implement: 12

Recurring Reviews: Yes (over a 20-year period)

2.7.3 Alternative 3: Clearance to 2 Feet in Depth

This alternative involves the clearance of MEC to a depth of 2 feet in the Rifle Range Area (107 acres) and in the Test Pad Area (68 acres), and a clearance to a depth of 6 feet in the Test Pit Area (1 acre), totaling approximately 176 acres (see Figure 5). It also includes the sifting of soil to a depth of 2 feet in the vicinity of the former concrete test pads where a high density of geophysical anomalies was found.

Although Alternative 3 is referred to as a 2-foot subsurface clearance, a 6-foot clearance would be included in the vicinity of Test Pit 1. The decision to perform a 6-foot clearance at this location was based on the extensive metallic debris and a piece of MPPEH found at this location. During the excavation of the test pit, debris was laterally widespread and observed to a depth of four feet, which may suggest the metallic debris is actually buried somewhat deeper. Given that MPPEH was found at this location, there still may be the potential for finding MEC at this location.

A MEC clearance is a process by which the ground surface is mapped using geophysical instruments to detect buried metal anomalies (a process similar to searching for buried items using a metal detector). The anomalies are then excavated by teams with specialized training in the field of munitions and explosives. These teams are referred to as UXO personnel.

Based on previous investigations at the site, it is anticipated that most of the geophysical anomalies to be dug by the UXO personnel would be debris or scrap metal. However, given the past military use of the property for the testing of munitions, a significant portion of these anomalies would likely be ordnance-related scrap (nearly 70 percent of the anomalies dug in the Test Pad Area and Rifle Range Area during the EE/CA investigation were found to be ordnance-related scrap).

During a clearance to 2 feet in depth, ordnance-related scrap from the excavations would be collected, certified as free of explosive residue, and shipped to a scrap-metal recycler with a smelter.

Based on the results of the EE/CA investigation, a much smaller percentage of the anomalies have the potential of being a live MEC item (less than 2 percent). If the UXO personnel determine that the metallic item is a live ordnance item, then it would either be (disposed) detonated in place or if it could be safely moved, it would be moved to the Ammunition Demolition Activity (ADA) at the UMCD, where there already exists an area setup for the purpose of detonating munitions. In either case, UXO personnel would implement extensive safety measures including the establishment of an exclusion zone to prohibit public access to the area where MEC would be detonated.

Within the 176 acres, geophysical instruments have identified approximately 1,700 anomalies that have strong enough signals to potentially be buried MEC items. Under Alternative 3, Category 1 and Category 2 anomalies identified during the EE/CA investigation would be excavated by UXO personnel to determine if they present a safety hazard. Excavated items that are found to present a safety hazard would be treated (detonated) as described above.

Alternative 3 would include the implementation of Land Use Controls (LUCs). LUCs would be implemented as follows:

- LUCs prior to completion of the clearance of the 176 acres. These would consist of: (1) periodic security patrols of the 640 acres within Site 39 to enforce "no trespassing" by the public; (2) maintenance of existing "Restricted Area" signs along the Site 39 perimeter fence and posting of additional signs along the fence (as necessary) to warn the public of possible ordnance and ordnance removal within Site 39; and (3) maintenance of existing fences surrounding Site 39 (see Figure 7).

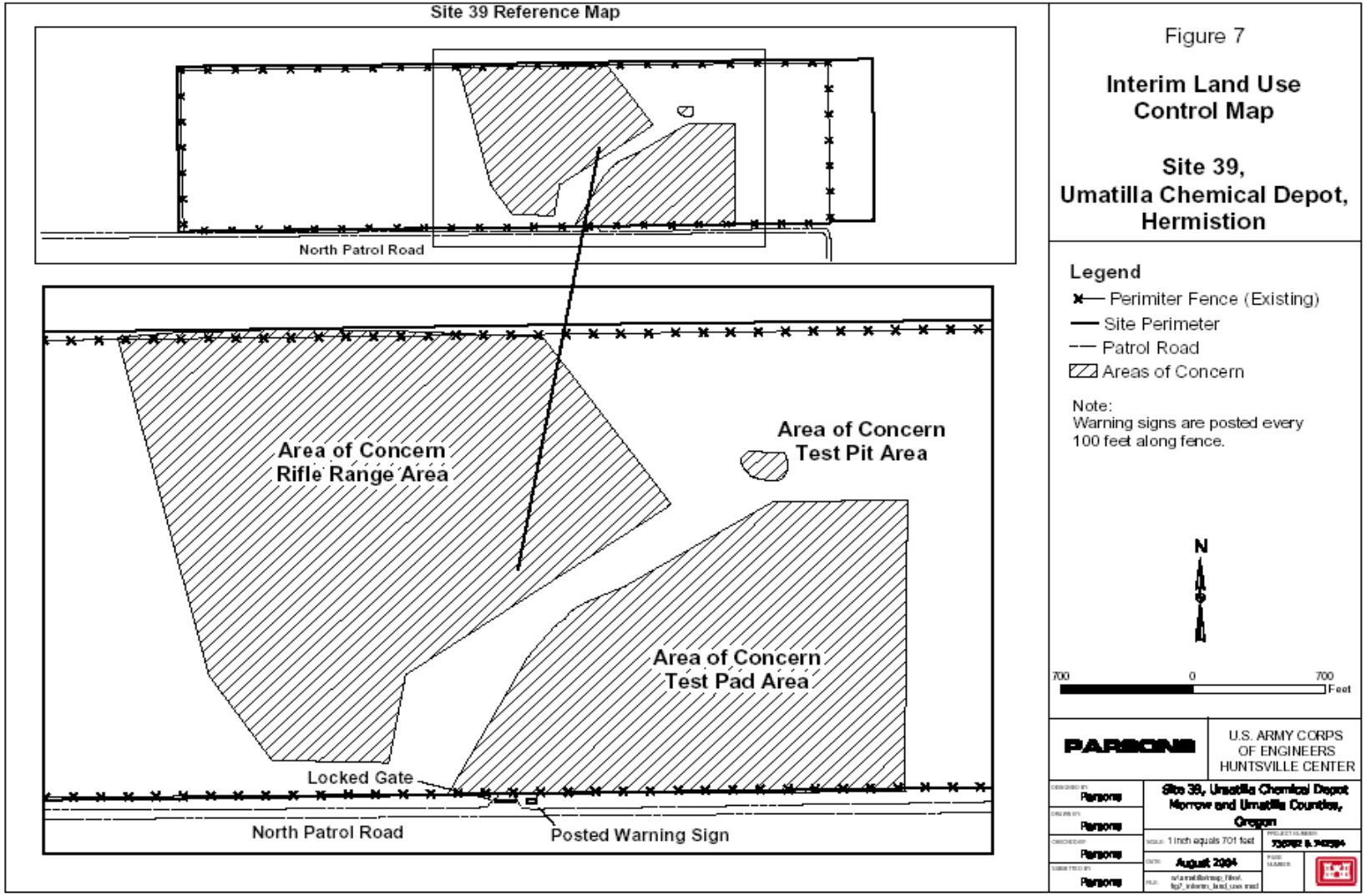

Figure 7. Interim Land Use Control Map, Site 39.

- LUCs subsequent to the completion of the final clearance of the 176 acres, but prior to the transfer of the 640-acre property would include the same LUCs that were implemented prior to the completion of the final clearance. Existing "Restricted Area" signs would remain in place along the perimeter of Site 39 as long as UMCD security requirements prohibited public access to the 640 acres.

- LUCs post transfer of the 640 acres would only be deed notifications. However, the deed notification for the 176 acres would be different from the deed notification for the 464 acres. For the 464 acres, the deed notification would indicate the area is not suspected of containing MEC, but is adjacent to an area that was used for munitions testing. The deed notification for the 176 acres would explain the history of the former QA function range, the results of past investigations performed at the site, the results of the clearance activities performed, and agencies to be contacted in the event that MEC is found on the property. These notifications would meet the requirements for State of Oregon real property transfer deed notifications for institutional controls.

Implementation of this alternative would support the anticipated future agricultural use of the property. Given that security patrols already monitor Site 39 and warning signs already exist along the perimeter fence, there would be no additional capital cost for the interim LUCs.

Capital Cost: $1,013,000

Present Worth O&M Cost: 0

Present Worth Recurring Reviews: $30,000

Total Cost: $1,043,000

Months to Implement: 24

Recurring Reviews: Yes (Until MEC clearance is completed)

2.7.4 Alternative 4: Clearance to 4 Feet in Depth

This alternative involves the clearance of MEC to a depth of 4 feet in the Rifle Range Area (107 acres) and in the Test Pad Area (68 acres), and a clearance to a depth of 6 feet in the Test Pit Area (1 acre), totaling approximately 176 acres. It also includes the sifting of soil to a depth of 2 feet in the vicinity of the former concrete test pads where a high density of geophysical anomalies was found.

Although Alternative 4 is referred to as a 4-foot subsurface clearance, a 6-foot clearance would be included in the vicinity of Test Pit 1. The decision to perform a 6-foot clearance at this location was based on the extensive metallic debris and a piece of

MPPEH found at this location. During the excavation of the test pit, debris was laterally widespread and observed to a depth of four feet, which may suggest the metallic debris is actually buried somewhat deeper. Given that MPPEH was found at this location, there still may be the potential for finding MEC at this location.

The methodology for conducting the clearance would be similar to that discussed under Alternative 3 except that the assumption is that all of the excavations at the anomaly locations would be 4 feet below ground surface in the Test Pad and Rifle Range Area. However, given that all of the ordnance-related items and MEC were found at depths less than 2 feet and that approximately 97% were found at less than 1 foot bgs, it is unlikely that the 4-foot clearance option is necessary. Therefore, excavation to 4 feet does not necessarily provide greater reduction in the safety risk than performing a 2-foot clearance since no MEC items were found below this level.

Similar to the 2-foot clearance, all MEC items found in excavations would be either detonated in place or transported to the ADA where they would be detonated. Additionally, all certified explosive-free ordnance-related scrap would be transported to a scrap metal recycler with a smelter.

Alternative 4, like Alternative 3, would include the implementation of Land Use Controls (LUCs). LUCs would be implemented as follows:

- LUCs prior to completion of the clearance of the 176 acres. These would consist of: (1) periodic security patrols of the 640 acres within Site 39 to enforce "no trespassing" by the public; (2) maintenance of existing "Restricted Area" signs along the Site 39 perimeter fence and posting of additional signs along the fence (as necessary) to warn the public of possible ordnance and ordnance removal within Site 39; and (3) maintenance of existing fences surrounding Site 39 (see Figure 7).

- LUCs subsequent to the completion of the final clearance of the 176 acres, but prior to the transfer of the 640-acre property would include the same LUCs that were implemented prior to the completion of the final clearance Existing "Restricted Area" signs would remain in place along the perimeter of Site 39 as long as UMCD security requirements (e.g. Chemical Demilitarization Security Requirements) prohibited public access to the 640 acres.

- LUCs post transfer of the 640 acres would only be deed notifications. However, the deed notification for the 176 acres would be different from the deed notification for the 464 acres. For the 464 acres, the deed notification would indicate the area is not suspected of containing MEC, but is adjacent to an area that was used for munitions testing. The deed notification for the 176 acres would explain the history of the former QA function range, the results of past investigations performed at the site, the results of the clearance activities performed, and agencies to be contacted in the event that MEC is found on the

property. These notifications would meet the requirements for State of Oregon real property transfer deed notifications for institutional controls.

Implementation of this alternative would support the expected future agricultural use of the property. Given that security patrols already monitor Site 39 and warning signs already exist along the perimeter fence, there would be no additional capital cost for the interim LUCs.

Capital Cost: $1,060,900

Present Worth O&M Cost: 0

Present Worth Reviews: $30,000

Total Cost: $1,090,900

Months to Implement: 24

Recurring Reviews: Yes (Until MEC clearance is completed)

2.8 Summary of Comparative Analysis of Alternatives

CERCLA requires that the ROD address and support the specific statutory requirements, emphasize long-term effectiveness, and encourage the evaluation of innovative technologies. The nine evaluation criteria in the NCP provide the basis for determining which alternative provides the "best balance" among the alternatives to meet the nine criteria. The nine criteria are grouped into three categories based on the role of each during remedy selection.

Threshold Criteria
- Overall protection of Human Health and the Environment
- Compliance with ARARs and TBCs

Balancing Criteria
- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, and volume through treatment
- Short-term effectiveness
- Implementability
- Cost

Modifying Criteria
- State acceptance
- Community acceptance

This section presents a description of each of the criteria and the evaluation of the four identified remedial alternatives based on the nine criteria.

2.8.1 Threshold Criteria

Overall Protection of Human Health (Public Safety) and the Environment.
This criterion addresses whether each alternative provides adequate protection of human health and the environment and describes how risks, or explosive safety hazards, through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, and/or institutional controls. The overall protection of human health and the environment reflects the level of relative residual hazard remaining after the alternative has been implemented, compliance with ARARs/TBCs, and long-term and short-term effectiveness.

The overall protectiveness of the four alternatives was evaluated using a qualitative risk assessment. The risk assessment examined the level of protectiveness at the site if a particular alternative were to be implemented under a likely future use scenario (e.g. agricultural use, hiking, hunting, etc.). For comparative purposes, the risk assessment also presented the explosive safety risk under the current use of the property (baseline condition). A summary of the qualitative risk assessment for the four alternatives as implemented at the Test Pad Area, Rifle Range Area, and Test Pit Area is shown in Tables 5, 6, and 7.

The qualitative risk assessment indicated that Alternatives 3 and 4, both subsurface clearances, provide the best potential for protecting public safety and the environment. Because MEC is not likely to exist at depths greater than 2 feet below ground surface, both the 2-foot and 4-foot clearance are equally protective in terms of removing the source of the safety hazard since all MEC and MEC related items have been found in the top 2 feet of soil

Alternative 2, Land Use Controls, would be less protective than a subsurface clearance because it does not remove the source of the safety hazard, but rather focuses on restricting public access to the property (e.g. installation of 6-foot chain-link fencing) or making the public more aware of the safety hazard (e.g. warning signs and deed restrictions). Alternative 2 is only minimally protective if there were to be future agricultural use of the 176 acres. Because Alternative 1, the "no further action" alternative, is not protective of public safety and the environment, it cannot be considered as an appropriate option for Site 39.

With regard to protection of the environment, Alternative 1 would have no impact and Alternative 2 would have very minimal impact that would occur only during installation of fences and signs. Alternatives 3 and 4 would have slightly more impact due to excavation and MEC disposal activities, although they would probably still be considered minimal impacts because intrusive excavations typically are not larger than 2 feet in diameter and the backfilled excavations are reseeded with grass to minimize soil erosion.

TABLE 5. SUMMARY RISK ASSESSMENT -- AOC: RIFLE RANGE AREA, SITE 39

Baseline Condition Under Current Use or Response Action Alternative Under Likely Future Use	Munitions and Explosives of Concern Factors					Site Characteristics Factors		Human Factors		Overall Rank [1]
	Type	Hazard Severity[2]	Sensitivity (Fuse)	MEC Presence/Absence[3]	MEC/MPPEH by Depth (Max/Min)	Accessibility	Stability	Contact Level/ Activity	Population	
Baseline Condition[4]	**2002 EE/CA: (2) partial candles in rifle grenade flare, unfused; MPPEH grenade spoons** 1996 Surface Clearance: non-MPPEH	Most Severe, Possibly Lethal	Less Sensitive	**MEC are likely present** 2002 EE/CA: 2 MEC found in 150 anomalies investigated 1996 Surface Clearance: 0 MEC and MPPEH found.	2 MEC at 16 in. bgs during EE/CA and MPPEH 0 to 24 in. bgs.	Limited Restriction[5]	Moderately Stable	Moderate to Low[6] Trespassing (hiking, hunting), escorted visit MPPEH with UXO personnel	0-2 weekly	
No Further Action [7]	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	Impact: Significant[8] Agricultural, Trespassing (hiking, hunting)	Impact: 0 to 2 daily	3
Land Use Controls [7, 9]	No Impact	No Impact	No Impact	No Impact	No Impact	Impact: 6-Foot Fence Largely Restricts Trespassing	No Impact	Impact: Significant for Agricultural, Low for Trespassing	Impact: 0 to 2 monthly	2
Clearance to 2 ft bgs [7]	Impact: MEC are likely absent	Impact: No Injury	Impact: Fuses are likely absent	Impact: MEC are likely absent	Impact: MEC (0 to 2 ft bgs) removed	No Impact	No Impact	Impact: Low Agricultural, Trespassing (hiking, hunting)	Impact: 0 to 2 daily	1
Clearance to 4 ft bgs[7]	Impact: MEC are likely absent	Impact: No Injury	Impact: Fuses are likely absent	Impact: MEC are likely absent	Impact: MEC (0 to 2 ft bgs) removed	No Impact	No Impact	Impact: Low Agricultural, Trespassing (hiking, hunting)	Impact: 0 to 2 daily	1

[1] Overall Ranking of Response Alternatives. Rank assigned each response action alternative based on relative reduction of site hazards. Rank of 1 assigned to alternatives with greatest hazard reduction.

[2] Selection for this factor based upon types of MEC found at the site.

[3] This column asks whether MEC is there or not (i.e., has MEC been found in the past or not).

[4] Baseline condition describes current use scenario at Site 39.

[5] There currently exists a fence at the site that is not effective in eliminating trespassing. The existing fence may or may not be removed under future use scenarios.

[6] Moderate to low chosen based on the potential for contact given the current activities of casual trespasser/hiker/hunter, and escorted visitors with UXO personnel and non-agricultural use.

[7] Assumes reasonably anticipated future land use to be agricultural under each alternative. Deed notification is part of each alternative and would convey information on past site history, investigations, actions, and government contact information if MEC is found in the future.

[8] Significant chosen based on the potential for contact with trespasser/hiker/hunter, and agricultural workers.

[9] Land use controls are assumed to be 6-foot chain link fence surrounding area and signage installation and maintenance responsibility by future owner of site. Also includes MEC awareness training provided by future owner to agricultural workers.

TABLE 6. SUMMARY RISK ASSESSMENT -- AOC: TEST PAD AREA, SITE 39

Baseline Condition Under Current Use or Response Action Alternative Under Likely Future Use	Munitions and Explosives of Concern Factors					Site Characteristics Factors		Human Factors		Overall Rank[1]
	Type	Hazard Severity[2]	Sensitivity (Fuse)	MEC Presence/Absence[3]	MEC/MPPEH by Depth (Max/Min)	Accessibility	Stability	Contact Level/ Activities	Population	
Baseline Condition[4]	**2002 EE/CA**: (1) unfused M33 grenade; (1) unfused flare cartridge. **1996 Surface Clearance: (1) functional M16 AP mine; (1) ground signal flare**	Most Severe, Possibly Lethal	Very Sensitive	**MEC are likely present** 2002 EE/CA: 2 MEC found in 353 anomalies investigated. 1996 Surface Clearance: 2 MEC found and MPPEH found.	1 MEC at surface and 1 MEC at 3 in. bgs during EE/CA and MPPEH from 0 to 24 in. bgs 2 MEC items at surface during 1996 Surface Clearance	Limited Restriction[5]	Moderately Stable	Significant[6] Trespassing (hiking, hunting), escorted visit MPPEH with UXO personnel	0-2 weekly	
No Further Action[7]	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	Impact: Significant[6] Agricultural, Trespassing (hiking, hunting)	Impact: 0 to 2 daily	3
Land Use Controls[7, 8]	No Impact	No Impact	No Impact	No Impact	No Impact	Impact: 6-Ft Fence Largely Restricts Trespassing	No Impact	Impact: Significant[6] for Agricultural, low for Trespassing	Impact: 0 to 2 monthly	2
Clearance to 2 ft bgs[7]	Impact: MEC are l kely absent	Impact: No Injury	Impact: Fuses are likely absent	Impact: MEC are likely absent	Impact: MEC (0 to 2 ft bgs) removed	No Impact	No Impact	Impact: Low[9] Agricultural, Trespassing (hiking, hunting)	Impact: 0 to 2 daily	1
Clearance to 4 ft bgs[7]	Impact: MEC are l kely absent	Impact: No Injury	Impact: Fuses are likely absent	Impact: MEC are likely absent	Impact: MEC (0 to 2 ft bgs) removed	No Impact	No Impact	Impact: Low[9] Agricultural, Trespassing (hiking, hunting)	Impact: 0 to 2 daily	1

[1] Overall Ranking of Response Alternatives. Rank assigned each response action alternative based on relative reduction of site hazards. Rank of 1 assigned to alternatives with greatest hazard reduction.

[2] Selection for this factor based upon types of MEC found at the site.

[3] This column asks whether MEC is there or not (i.e., has MEC been found in the past or not).

[4] Baseline condition describes current use scenario at Site 39.

[5] There currently exists a fence at the site that is not effective in eliminating trespassing. The existing fence may or may not be removed under future use scenarios.

[6] Significant chosen based on the potential for contact with trespasser/hiker/hunter, and agricultural workers.

[7] Assumes reasonably anticipated future land use to be agricultural under each alternative. Deed notification is part of each alternative and would convey information on past site history, investigations, actions, and government contact information if MEC is found in the future.

[8] Land use controls are assumed to be 6-foot chain link fence surrounding area and signage installation and maintenance responsibility by future owner of site. Also includes MEC awareness training provided by future owner to agricultural workers.

[9] Low chosen based on the potential for contact given the current activities of casual trespasser/hiker/hunter, and escorted visitors with UXO personnel and non-agricultural use.

TABLE 7. SUMMARY RISK ASSESSMENT -- AOC: TEST PIT AREA, SITE 39

Baseline Condition Under Current Use or Response Action Alternative Under Likely Future Use	Munitions and Explosives of Concern Factors					Site Characteristics Factors		Human Factors		Overall Rank[1]
	Type	Hazard Severity[2]	Sensitivity (Fuse)	MEC Presence/Absence[3]	MEC/MPPEH by Depth (Max/Min)	Accessibility	Stability	Contact Level/ Activities	Population	
Baseline Condition[4]	**2002 EE/CA:** MPPEH **1996 Surface Clearance**: non-MPPEH	Inert MPPEH/ minor to no Injury	Less sensitive to inert	**MEC are likely absent** 2002 EE/CA: 0 MEC found at clustered anomalies in Test Pit-1 1996 Surface Clearance: 0 MEC found	MPPEH: Aluminum fragments at 18 in. bgs. near Test Pit-1, Metal debris to 48 in. bgs.	Limited Restriction[5]	Moderately Stable	Moderate to Low[6] Trespassing (h king, hunting), escorted visit MPPEH with UXO personnel	0-2 weekly	
No Further Action[7]	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	Impact: Significant[8] Agricultural, Trespassing (h king, hunting)	Impact: 0 to 2 daily	3
Land Use Controls[7, 9]	No Impact	No Impact	No Impact	No Impact	No Impact	Impact: 6-Foot Fence Largely Restricts Trespassing	No Impact	Impact: Low Agricultural, Trespassing (hiking, hunting)	Impact: 0 to 2 monthly	2
Clearance to 6 ft bgs[7]	Impact: Potential MPPEH are likely absent	Impact: No Injury	Impact: Fuses are likely absent	Impact: Potential MPPEH are likely absent	Impact: Potential MPPEH (0 to 2 ft bgs) removed	No Impact	No Impact	Impact: Low Agricultural, Trespassing (hiking, hunting)	Impact: 0 to 2 daily	1

[1] Overall Ranking of Response Alternatives. Rank assigned each response action alternative based on relative reduction of site hazards. Rank of 1 assigned to alternatives with greatest hazard reduction.

[2] Selection for this factor based upon types of MEC found at the site.

[3] This column asks whether MEC is there or not (i.e., has MEC been found in the past or not).

[4] Baseline condition describes current use scenario at Site 39.

[5] There currently exists a fence at the site that is not effective in eliminating trespassing. The existing fence may or may not be removed under future use scenarios.

[6] Moderate to low chosen based on the potential for contact given the current activities of casual trespasser/hiker/hunter, and escorted visitors with UXO personnel and non-agricultural use.

[7] Assumes reasonably anticipated future land use to be agricultural under each alternative. Deed notification is part of each alternative and would convey information on past site history, investigations, actions, and government contact information if MEC is found in the future.

[8] Significant chosen based on the potential for contact with trespasser/hiker/hunter, and agricultural workers.

[9] Land use controls are assumed to be 6-foot chain link fence surrounding area and signage installation and maintenance responsibility by future owner of site. Also includes MEC awareness training provided by future owner to agricultural workers.

Compliance with ARARs.

This criterion evaluates whether a remedial action meets state and federal environmental laws and regulations pertaining to the site. For explosive safety hazards, the primary TBC is the DOD Explosives Safety Standards (DOD 6055.9-STD) for clearance for property transfer. These standards establish policies and procedures necessary to provide protection to personnel as a result of DOD ammunition, explosives, or chemical agent contamination of real property currently or formerly owned, leased, or used by DOD. Comparison of the alternatives with ARARs described in Section 2.10.2 indicated the Alternatives 2, 3 and 4 equally comply. However, regarding TBCs, only Alternatives 3 and 4 meet DOD 6055.9-STD. Alternative 2, does not meet DOD 6055.9-STD, because this alternative does not include an action to remove potential MEC from the site. Alternative 1 also does not comply with DOD 6055.9-STD because no potential MEC would be removed from the site.

There are no chemical-specific ARARs for the clearance response actions for Site 39. A previous ROD for this site selected "no action required" for chemicals. Furthermore, soil analytical results from soil samples taken in the Test Pad Area during the intrusive investigation in 2002 were non-detect for munitions chemical constituents. Soil sample analytical results for metals were within acceptable limits and/or background concentrations.

2.8.2 Primary Balancing Criteria

Long-Term Effectiveness and Permanence.

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup levels have been met. Alternatives 3 and 4 rank equally reliable in terms of providing the best long-term effectiveness for reducing the safety risk to the public. Both alternatives would reduce the number of potentially buried MEC that could become exposed on the ground surface due to wind erosion, frost heave, or tilling of the soil. Neither Alternative 1 nor Alternative 2, would reduce the number of buried MEC that could become exposed due to wind erosion, frost heave, or tilling of the soil.

Reduction of Toxicity (Safety Hazard), Mobility and Volume through Treatment (Response Action).

This criterion evaluates the use of treatment to reduce the harmful effects of the principal contaminants, the ability for them to move in the environment, and the amount of residual contamination remaining after the remedial action has been completed. Alternatives 3 and 4 rank equally best in the resulting reduction in safety hazard and mobility of MEC. Both alternatives would reduce the amount of MEC present through treatment by detonation.

Alternative 2, Land Use Controls, ranked lower under this criterion because the 6-foot chain-link fencing, deed restrictions, and MEC awareness training would minimally reduce the potential safety hazard, but would not reduce the number of MEC.

Short-Term Effectiveness.

This criterion considers how fast a remedial action reaches the cleanup goals, and any risks or hazards associated with the activities required by the remedial action to workers, residents, and the environment. It also considers approaches to eliminate or mitigate those risks or hazards.

Alternative 2, Land Use Controls, ranked the best in terms of short-term effectiveness. The greatest short-term safety risk is to UXO personnel performing the 2-foot or 4-foot clearances causing Alternatives 3 and 4 to rank lowest. However, worker safety issues for munitions response sites have been successfully addressed at many such sites, including previous work at Site 39. Additionally, Alternatives 3 and 4 would take the longest time (approximately 2 years) to implement, although, Alternatives 2, 3, and 4 ranked equally in terms of not affecting the community during implementation. Alternatives 3 and 4 do have some short-term environmental impacts as a result of excavation and in-place demolition of MEC. However, none of these impacts would threaten sensitive flora and fauna that may exist at Site 39 (flora and fauna that were described in the Environmental Protection Plan prepared as part of the EE/CA investigation). Mitigation measures to minimize environmental impacts to flora and fauna have been successfully implemented during the surface clearance and EE/CA investigation, and would be similarly implemented during a 2-foot or 4-foot MEC clearance

Implementability.

This criterion addresses the technical and administrative feasibility of remedy implementation from design through construction and operation. Factors such as the availability of services and materials and coordination with other governmental entities are evaluated. Alternative 2, Land Use Controls (e.g., installation of fencing and warning signs, and implementing deed restrictions) would be easier to implement than activities associated with performing a 2-foot or 4-foot clearance under Alternatives 3 or 4. There are no extraordinary technical requirements or materials constraints for any of the alternatives.

Cost. The estimated capital, O&M, and recurring review in present worth costs for each response action alternatives are as follows:

Alternative	Capital Cost	O&M Cost	Recurring Review	Total Cost
1	$0	$0	$0	$0
2	$216,500	$15,900	$63,900	$296,300
3	$1,013,000	$0	$30,000	$1,043,000
4	$1,060,900	$0	$30,000	$1,090,900

Note: Recurring reviews for Alternative 2 will occur over a 20-year period. For Alternatives 3 and 4 they will occur until MEC clearance is completed.

2.8.3 Modifying Criteria

State Acceptance. The State of Oregon concurs with the Army and EPA in the selection of Alternative 3 for the cleanup of approximately 176 acres potentially containing MEC (see State of Oregon Concurrence Letter in Appendix B). In addition, the state is satisfied that no further action is warranted at the remaining approximately 464 acres of Site 39 where site characterization and historical records indicate that MEC is not likely present.

In addition, the state is satisfied that the CERCLA process was followed in relation to site characterization and the evaluation of response action alternatives for reducing the public safety risk at Site 39. The selected remedy for Site 39 will be considered complete after a clearance of MEC to a depth of 2 feet (Alternative 3) has been completed for the approximately 176 acres of Site 39 and a final report describing the clearance action has been reviewed and accepted by the state.

Public Acceptance. Based on the absence of any negative comment from the public, it is assumed that the public supports the selection of Alternative 3. A summary of the comments received from the public is presented in the Responsiveness Summary, Section 3.0 of the ROD.

2.9 Selected Remedy

The selected remedy to reduce the safety risk to the public at Site 39 is Alternative 3. This alternative was selected because it is protective, feasible, cost-effective, and meets the preference of CERCLA for treatment. Although this alternative is more costly and has some short-term impacts, it meets the statutory preference for reducing or eliminating the safety hazard by physically removing potential MEC, rather than restricting public access to the site or providing increased safety awareness to those that may use the site.

The LUC objective for this site is to prevent and minimize exposure risk of munitions to humans. The remedial design will be prepared with a LUC component of the overall remedial action work plan and submitted in accordance with the FFA schedule. The RD/RA shall address all LUC implementation and maintenance actions, including possible periodic inspections. The Army is responsible for implementation, maintenance, and enforcement of the LUC. The Army may transfer these LUC responsibilities to the transferee and its successors; however, the Army retains ultimate responsibility for remedy integrity.

The major components of the selected remedy at Site 39 include the following:

For the approximately 176 acres suspected of containing MEC:

- Acquire and mark the locations of Category 1 and Category 2 geophysical anomalies within the Rifle Range Area, Test Pad Area, and Test Pit Area that have been identified during the geophysical mapping of the site during the EE/CA investigation;

- Excavate soil at the locations of the geophysical anomalies to find and remove the metallic item causing the geophysical anomaly, and then backfill and reseed the excavations;

- Sift soil in the vicinity of the former QA function test pads to a depth of 2 feet (in areas where obstructions prevented geophysical mapping) and collect metallic debris;

- Collect metallic debris (miscellaneous metal debris and ordnance related scrap) found in the excavations and soil sifting and transport to an off-site scrap-metal recycler with a smelter. If a live MEC item is found in any of the excavations, then it will be safely detonated. All certified explosive-free ordnance-related scrap will be transported to a scrap metal recycler with a smelter;

- Prior to initiation and completion of MEC clearance. Maintain existing fencing and signage to restrict access. Continue monitoring access restrictions through Umatilla Depot Security Patrol.

- After clearance is complete and until property is transferred. No LUCs required for CERCLA actions. Fences and signage will be maintained as part of overall security at the Umatilla Depot until the property is transferred.

- At time of transfer. Deed notification will be required to inform re-users that the property was used for testing of munitions. Cleanup was completed to meet the expected future agricultural use. This notification will meet the requirements for State of Oregon real property deed notifications. This information will be included in the transfer documents and will be recorded at the time of transfer.

For the approximately 464 acres not suspected of containing MEC:

- No further action for investigation and clearance; and

- If the property is transferred, implement a deed notification[1] to make future property owners aware of the past history of the property including its proximity to the former quality assurance function range and the results or previous investigations of the property known as Site 39. If the property is leased, provide a similar notification in the lease agreement.

Soil and groundwater have not been found to be affected by MEC activities at Site 39 and are not considered as requiring cleanup under this ROD. Soil contamination at Site 39 has already been addressed under the UMCD Miscellaneous Sites Operable Unit ROD (July 19, 1994) and No Further Action was selected for Site 39.

2.10 Statutory Determinations

The selected remedy satisfies the requirements under Section 121 of CERCLA to:

- Protect human health (public safety) and the environment;
- Comply with ARARs;
- Be cost-effective;
- Utilize permanent solutions and alternative treatment (response action) technologies or resource recovery technologies to the maximum extent practicable; and
- Satisfy the preference for treatment (response action) as a principal element. The statutory preference for treatment (response action) is satisfied by detonation of MEC items containing explosives, and by recycling metal scrap that has been certified as free of ordnance constituents.

2.10.1 Protection of Human Health (Public Safety) and the Environment

The selected remedy, Alternative 3, will reduce risks to future users of Site 39 through a clearance of MEC to a depth of 2 feet. This remedy will accomplish the following goals:

- Public safety risks associated with exposure to MEC that currently remains in place within approximately 176 acres at Site 39 will be reduced or eliminated to a depth of two feet to support future agricultural purposes with limited residential use associated with agricultural use.
- The mobility of the MEC in the soil and potential exposure to the public, which may result due to frost heave or erosion of the soil by wind, will be reduced or eliminated through a clearance of MEC to a depth of 2 feet. Potential exposures to MEC will be reduced by disposal of MEC by detonation and recycling of the ordnance-related scrap.

[1] The deed notification for the 176 acres would be different from the deed notification for the 464 acres. For the 464 acres, the deed notification would indicate the area is not suspected of containing MEC, but is adjacent to an area that was used for munitions testing. The deed notification for the 176 acres would explain the history of the former QA function range, the results of past investigations performed at the site, the results of the clearance activities performed, and agencies to contact in the event that MEC is found in the future."

- Environmental protection is achieved by backfilling the excavations where geophysical anomalies are investigated and reseeding the disturbed soil with native grass seed to limit erosion of the topsoil by wind.

2.10.2 Compliance with ARARs

Pursuant to CERCLA and the NCP, existing cleanup authorities and programs will be used in the risk and hazard reduction actions. The risk or hazard reduction actions will comply with ARARs/TBCs. Applicable requirements are defined by the NCP (40 CFR 300.5) as those cleanup standards; standards of control; and other substantive requirements, criteria, or limitations promulgated under federal or state environmental and facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances at a CERCLA site. Relevant and appropriate requirements are requirements, criteria, or limitations promulgated under federal or state environmental and facility-siting laws that, while not applicable to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances found at a CERCLA site, address problems or situations sufficiently similar to those encountered at CERCLA sites and their use is well suited to a particular site.

A requirement that is relevant and appropriate must be complied with to the same degree as if it were applicable. In addition to ARARs, the lead agency may, as appropriate, identify other advisories, criteria, or guidance as "to be considered" (TBCs). Only those state standards that are identified by the state in a timely manner and that are more stringent than federal requirements may be considered ARARs (40 CFR 300.400[g][4]).

Although no activities are planned to occur outside of the boundary of the Umatilla Depot, any off-site activities must comply with all necessary federal, state, and local requirements. Occupational Safety and Health Administration (OSHA) requirements are not considered ARARs pursuant to EPA's adopted final rule on the NCP. The NCP identified specific OSHA requirements that must be complied with during all CERCLA response actions (i.e. 29 CFR 1910 and 1926).

The selected remedy complies with all ARARs and TBCs of DOD, EPA, and the State of Oregon. A description of how the ARARs and TBCs will be met is presented below.

Chemical-specific ARARs. The selected remedy includes no chemical specific activities. Thus there are no chemical-specific ARARs for the selected remedy.

Location-specific ARARs. The selected remedy includes brush clearing, soil excavation, sifting and backfilling; clearance of MEC items; and removal, inspection and disposal of metallic debris. There are several location-specific ARARs for the selected remedy with most of these pertaining to protection of water quality, biological resources, and archaeological resources. Site 39 does not contain wetlands, floodplains, or historic sites. Mitigation measures implemented during the selected remedy (mitigation measures

similar to those implemented during the EE/CA investigation) would cause the selected remedy to comply with the following requirements:

<u>*Applicable:*</u>

1. National Historic Preservation Act (NHPA), 36 CFR Part 65, and 800.
   - *During Clearance action, any material that may be considered historic will be reported pursuant to requirements.*

2. Endangered Species Act (ESA), 16 USC 1531-1544; 50 CFR 17, 401-424, 450-453.
   - *Requires that authorized actions do not jeopardize the continued existence of endangered or threatened species, or their habitats.*

3. Migratory Bird Treaty Act (MBTA), 16 USC 701-712.
   - *Requires project field activities to minimize affects on migratory patterns.*

4. Native American Graves Protection and Repatriation Act (NAGPRA), 25 USC Section 3001.
   - *During excavation activities, prohibits disturbance of Native American remains and funerary objects. Provides a process for reparation of remains and objects.*

6. Bald and Golden Eagle Protection Act (BGEPA), 16 USC Section 668.
   - *Prohibits the transport, import, export, taking, selling, purchasing or barter of any bald or golden eagle including feathers of other parts, nest eggs, or products, except as allowed by permit. "Take" includes pursue, shoot, shoot at, poison, wound kill, capture, trap, collect, or disturb. The bald Eagle is a common winter visitor to the UMCD. Provisions of this Act should be followed.*

7. National Historic Preservation Act (NHPA), Archaeological Resource Protection Act (ARPA), 16 U.S.C. Section 470.
   - *Requires action to be taken to locate, identify, evaluate, and protect historic properties. Prohibits disclosing of locations of sensitive archaeological resources and damaging those resources. If properties are uncovered or affected by MEC clearance, conditions of the NHPA and the ARPA must be followed.*

Relevant and Appropriate:

1. Archaeological Resource Protection Act (ARPA), 43 CFR Part 7 (also: 36 CFR Part 296, 32 CFR Part 229, and 18 CFR Part 1312-same regulations).
   - *Requires a permit to excavate, remove, or otherwise alter any archaeological resource if an archaeological site discovered during clearance activities.*

2. Preservation of American Antiquities (PAA), 43 CFR Part 3.
   - *Requires a permit for the examination of ruins, excavation of archaeological sites and gathering of objects of antiquity if an archaeological site is discovered during clearance activities.*

3. Fish and Wildlife Coordination Act (FWCA), 16 USC Section 470.
   - *Prohibits actions, including pollution from harming fish or wildlife. Clearance activities are projected to occur in areas populated with wildlife and provisions of this act should be followed.*

(Note: Statutes applicable to protection of surface water or wetlands are not listed, because no surface water or wetlands exist at Site 39. Additionally, statutes applicable to protection of groundwater resources are not listed because the proposed response actions would not impact local groundwater.)

Action-specific ARARs. The selected remedy has several action-specific ARARs generally pertaining to cleanup of ordnance sites and requirements for excavation, transportation, storage, and disposal of hazardous material as they may relate to ordnance. These ARARs include the following:

Applicable:

1. Department of Transportation Hazardous Materials Transportation Regulations (for offsite actions), 49, CFR Part 107, 171-177, 100-199.
   - *Applicable for offsite actions. Regulates transportation of hazardous materials such as ordnance.*

2. Department of Transportation Hazardous Materials Manifesting Regulations (for offsite actions), 40 CFR 262, 263.
   - *Applicable for offsite actions. Manifests for transportation of ordnance items may be required pursuant to RCRA.*

3. Storage of Hazardous Waste, 40 CFR 265, 250.

   - *Specifies requirements hazardous waste stockpile and storage areas. ARAR for onsite stockpiling of MEC.*

4. Department of Transportation Hazardous Materials Transportation Regulations (for offsite actions), 49 CFR Part 172.101.

   - *Applicable for offsite action. Details DOT classification of hazardous material. The DOT considers MEC a "hazardous material" for manifesting purposes under the US DOT regulations. Transportation of explosives to be used in the detonation of MEC as a means of on site disposal must comply with DOT regulations. UXO-qualified personnel must inspect the loading of the explosives, and the transport vehicle must be appropriately placarded.*

5. Treatment of Hazardous Waste, 40 CFR 265.370.

   - *Specifies requirements for the thermal treatment of hazardous waste. ARAR when detonating MEC.*

6. RCRA Management of Military Munitions (for offsite actions), 40 CFR Parts 260 through 265 and 270.
   - *Applicable to offsite actions. Amendments to hazardous waste identification and management rules for military munitions and definition of explosive emergencies. ARAR during MEC/MPPEH disposal and transport.*

7. Department of Transportation Packaging Requirements regarding regulated hazardous waste and materials, 49 CFR 173.

   - *DOT packaging requirements regarding regulated hazardous waste and materials. ARAR for onsite packaging of MEC/MPPEH.*

8. Guidelines for the transportation of hazardous materials, 49 USC 1803, 1804, 1808.

   - *Establishes guidelines for the transport of Hazardous materials. ARAR for MEC/MPPEH that is transported off site.*

9. Requirements for Disposal of Ordnance Items, 40 CFR 264, Subpart X.
   - *Established ordnance disposal requirements.*

10. RCRA, Subpart M (Military Munitions Rule), 40 CFR Part 266.

    - *Identifies when military munitions become a solid waste, and if these wastes are hazardous, and the management standards that apply. MEC left undisturbed and recovery, collection, and on range destruction of MEC and MPPEH are not subject to hazardous waste regulations or permits.*

Discovered MEC in burial pits or trenches could be considered solid waste in accordance with this rule.

11. Regulations for Open Burning of Waste Explosives, 40 CFR 265.382.
    - *Regulations for treatment of explosives while burning.*

<u>*Relevant and Appropriate:*</u>

1. Department of Transportation Hazardous Materials Transportation Regulations (for onsite actions), 49, CFR Part 107, 171-177, 100-199.
    - *For onsite actions, regulates transportation of hazardous materials such as MEC.*

2. Department of Transportation Hazardous Materials Manifesting Regulations (for onsite actions), 40 CFR 262, 263.
    - *For onsite actions, manifests for transportation of ordnance pursuant to RCRA.*

3. Department of Transportation Hazardous Materials Transportation Regulations (for onsite actions), 49 CFR Part 172.101.
    - *For onsite actions, details DOT classification of hazardous material. The DOT considers MEC a "hazardous material" for manifesting purposes under the US DOT regulations. Transportation of explosives to be used in the detonation of MEC as a means of on site disposal must comply with DOT regulations. UXO-qualified personnel must inspect the loading of the explosives, and the transport vehicle must be appropriately placarded.*

4. RCRA Management of Military Munitions (for onsite actions), 40 CFR Parts 260 through 265 and 270.
    - *For onsite actions, amendments to hazardous waste identification and management rules for military munitions and definition of explosive emergencies. ARAR during MEC disposal and transport.*

5. Federal Clean Air Act (CAA), 40 CFR Part 50 et. seq.
    - *Establishes primary and secondary air quality standards necessary to protect health, welfare plant and animal life. Brush burning is not expected to occur during the clearance action, but if brush burning does become necessary, emissions must not exceed federal standards.*

To Be Considered:

1. Department of Defense Ordnance Safety Standards, DOD 6055.9-STD.
   - Requires specialized personnel be employed in the detection, removal, and disposal of MEC/MPPEH.
   - Provide process guidance on determining site-specific clearance depths to support land use(s).
   - Provides instructions on safe conduct of investigation and disposal of MEC items, including the development, submission, and approval of Explosive Safety Submissions.

2.10.3 Cost Effectiveness

The selected remedy provides overall effectiveness proportionate to its costs. The resulting costs of implementing Alternative 3 to remove MEC from Site 39 would be approximately $1,043,000, which is about 5 percent less than Alternative 4, which meets the same cleanup criteria to allow agricultural and some associated residential future use of the property. Alternatives 1 and 2 do not provide overall effectiveness as related to cost, and therefore, do not meet the future goal of allowing agricultural and some associated residential future use of the property.

2.10.4 Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

The selected remedy is a permanent solution since it permanently removes MEC from Site 39, and then disposes of the MEC by detonation thereby eliminating the public safety hazard. Following disposal of the MEC, the ordnance-related scrap will be taken to a scrap metal recycler with a smelter where the certified explosive free material will be melted and recycled for other purposes.

2.10.5 Preference for Treatment as a Principal Element

The statutory preference for treatment is satisfied by performing a clearance of MEC to a depth of 2 feet as the primary means of addressing MEC potentially existing at Site 39. Moreover, the detonation of MEC items during the clearance and the recycling of metal scrap that has been certified as free of ordnance constituents meets the statutory preference for a permanent treatment that is irreversible.

2.11 Documentation of Significant Changes

The selected remedy was the preferred alternative presented in the Proposed Plan. No changes have been made.

3.0 RESPONSIVENESS SUMMARY

The final component of the ROD is the Responsiveness Summary, which serves two purposes. First, it provides the agency decision makers with information about community preferences regarding the remedial alternatives and general concerns about the site. Second, it demonstrates to members of the public how their comments were taken into account as part of the decision-making process.

Historically, community interest in the UMCD installation has centered on the impacts of installation operations on the local economy. Interest in the environmental impacts of UMCD activities has typically been low. Only the proposed chemical demilitarization program, which is separate from CERCLA remediation programs, has drawn substantial comment and concern.

As part of the installation's community relations program, the UMCD assembled in 1988 a Technical Review Committee (TRC), composed of elected and appointed officials and other interested citizens from the surrounding communities. Quarterly meetings provided an opportunity for UMCD to brief the TRC on installation environmental restoration projects and to solicit input from the TRC. In December 1993 the TRC was changed to a Restoration Advisory Board (RAB) with similar functions. The response received from the TRC and RAB was positive; the members showed particular interest in and support for the remedial activities. The RAB continued meeting but due to an increasing lack of public participation the RAB became inactive in December 1996.

The Engineering Evaluation/Cost Analysis and Proposed Plan for the Site 39, Quality Assurance Function Range were released to the public on October 20, 2003. Notice of public comment period, public meeting, and availability of the Proposed Plan was published in the Hermiston Herald, the Tri-city Herald, and the East Oregonian on October 31, 2003. The public comment period started on that date and ended on December 1, 2003.

The EE/CA and Proposed Plan were made available to the public at the following locations: Building 32, UMCD; the Hermiston Public Library, Hermiston, Oregon: and the Oregon Department of Environmental Quality in The Dalles, Oregon.

A public meeting was held at the Umatilla Chemical Depot Outreach Office, Hermiston, Oregon, on November 5, 2003, to inform the public of the preferred alternative and to seek public comments. At this meeting, representatives from UMCD, USACE, EPA, ODEQ, and Parsons presented the proposed remedy. Two people from the public attended the meeting. There were two comments made during the informal question and answers period. No written comments were received during the comment period. The two comments are listed below:

Comment One

Name: (b) (6)
Occupation: Retired

(b) (6) expressed concern that areas around UMCD may contain bomb fragments from an incident involving an explosion of a storage igloo in 1945. (b) (6) referred to an Army investigation report, which stated bomb fragments were blown as far as 5000 feet away from the igloo and questioned whether any bomb fragments were found at Site 39. He asked if the detection depth of the geophysical instruments was sufficient for the cleanup at Site 39.

(b) (6) stated perhaps the Army should delay the cleanup of Site 39 a few years until the technology to clean up the site improved. He also expressed concern over the high cost to clean up the site and suggested the Army should put a fence around the site until the actual clean up occurs.

(b) (6) questioned the soils testing methods that had been performed in the Test Pad area. (b) (6) asked what the test pads were used for and if the Army activities contribute to regional groundwater nitrate problems.

Army Response

After reviewing the 1945 Army investigation report, the igloo is more than 8,000 feet from the southern boundary of Site 39. During the intrusive investigation no bomb fragments were found at the site. All items found and collected during the investigation were no deeper than 2 feet and these items verified that Site 39 was used for surface testing only. The detection depth of the geophysical instruments was tested before Site 39 investigation work started and testing continued daily during the investigation. The instruments were found capable of detecting items buried at a depth of more than three feet.

State-of–the-art technology was used at Site 39. In keeping with the kinds of ordnance tested and the way the site was used, the intrusive investigation found the ordnance to be within the two feet of the surface. The initial and daily testing verified the detection depth of the geophysical instruments to be a suitable technology for future cleanup at Site 39. The industry is developing other instruments but they are still in experimental testing and will likely take several years to be ready for use. The Army has a good plan at a good price for the ordnance cleanup. To put a fence around the site and delay cleanup would increase the future price.

The test pads were used for surface testing of signal flares and smoke signal devices. The pads were also used to surface test grenades and mines. To verify the soil had not been contaminated, approved EPA methods were used to test the soil. Some trenching and soil sampling was conducted in the vicinity of the test pads to determine the cause of

anomalies in that area. The soil in that area has a high iron content, which is probably the cause of the anomalies. Also previous soil sampling in the Test Pad Area did not find any evidence of hazardous waste. Therefore, there is no indication that Army activities are contributing to the regional groundwater nitrate problems.

Comment Two

Name: (b) (6)
Occupation: Scrap Dealer

(b) (6) asked what the Army intended to do with the scrap metal removed during the Site 39 cleanup and also the scrap metal from the chemical munitions incineration project.

Army Response

Once the scrap metal from Site 39 is certified as free of explosive residue it will be shipped to a metal recycler for smelting. Since the activities at the chemical munitions incineration project are not included in the Site 39 work the Army provided a point of contact for (b) (6) to call for information on the scrap metal from that project.

Appendix A - Site Investigation and Assessment Documents

The following documents contain the results of the site investigations and assessments of the Quality Assurance Function Range, Site 39, Umatilla Chemical Depot. These documents were made available to the public at the information repositories located at Building 32 UMCD; the Hermiston Public Library, Hermiston, Oregon; and the ODEQ office in The Dalles, Oregon.

Arthur D. Little, Inc. 1993. *Feasibility Study/RCRA Corrective Measures Study for Umatilla Army Depot Activity (UMDA), Oregon, Final Feasibility Study for Miscellaneous Sites (OU5).* Prepared for the U.S. Army Environmental Center. Contract DAAA15-91-D-0016, Delivery Order 2.

Dames & Moore. 1992. *Final Remedial Investigation Report for the Umatilla Depot Activity, Hermiston, Oregon. Volumes 1 through 6.* Prepared for the U.S. Army Toxic and Hazardous Materials Agency. Contract No. DAAA15-88-D-0008, Delivery Order 3.

Defense Environmental Restoration Program. *Final Record of Decision, Umatilla Depot Activity, Miscellaneous Sites Operable Unit.* June 30, 1994.

Parsons, September 2002. *Revised Final, Revision 02, Work Plan Ordnance and Explosive (MEC) Engineering Evaluation/Cost Analysis (EE/CA), Site 39 (Quality Assurance Function Range), Umatilla Chemical Depot (UMCD), Hermiston, Oregon.* Prepared for the US Army Corps of Engineers, Huntsville Center and U.S. Army Corps of Engineers, Seattle District.

Parsons, September 2003. *Final Engineering Evaluation/Cost Analysis (EE/CA), Site 39, Umatilla Chemical Depot (UMCD), Morrow and Umatilla Counties, Oregon.* Prepared for the US Army Corps of Engineers, Huntsville Center and U.S. Army Corps of Engineers, Seattle District.

UXB International, Inc., 1996. *Final Report, Site 39 Ordnance Removal and Survey, Umatilla Chemical Depot, Oregon.* Prepared for the US Army Corps of Engineers, Huntsville Center and U.S. Army Corps of Engineers, Seattle District.

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Appendix B - State of Oregon Letter of Concurrence

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Oregon
Theodore R. Kulongoski, Governor

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Suite 330
Pendleton, OR 97801
(541) 276-4063 Voice/TTY
FAX (541) 278-0168

May 4, 2005

Michael D. Nelson, P.E.
US Army Corps of Engineers
Attn: CENWS-PM-HW
P.O. Box 3755
4735 East Marginal Way South
Seattle, WA 98134-2385

RE: Record of Decision, Area 39, Quality Assurance Function Range, Umatilla Chemical Depot, Hermiston Oregon.

Dear Mr. Nelson,

The Oregon Department of Environmental Quality (ODEQ) has reviewed the final Record of Decision (ROD) for the Area 39 Quality Assurance (QA) Function Range Operable Unit at the U.S. Army's Umatilla Chemical Depot (UMCD). Based upon review of the ROD, response to ODEQ's comments, and the acknowledgement of the ability to address some of the State's concerns in the Remedial Design/Remedial Action (RD/RA) process, ODEQ concurs with the remedy recommended by EPA and the Army.

The major components of the remedy include Munitions and Explosives of Concern (MEC) clearance to a depth of 2 feet in two areas (Test Pad Area and Rifle Range Area) and a MEC clearance to a depth of 6 feet in one area (Test Pit Area). Combined, all three areas that would receive a MEC clearance would total approximately 176 acres. For the remaining approximately 464 acres, these areas have no documented historical use of QA function testing activities nor physical evidence of munitions testing. Therefore, these 464 acres are not considered to potentially contain MEC, and the selected remedy is No Further Action (NFA).

The major components of the selected remedy for the approximately 176 acres of Site 39 (Test Pad Area, Rifle Range Area, and Test Pit Area) include the following activities:

- Maintain existing fencing and signage to restrict access with continued monitoring access restrictions through Umatilla Depot Security Patrol;

- After clearance is complete and until property is transferred: No new land use controls (LUCs) are required for the CERCLA actions. The existing fences and signage will be maintained as part of overall security at the Umatilla Depot until the property is transferred; and

- At time of transfer: Deed notification will be required that the property was used for testing of munitions and, cleanup was completed to meet the expected future agricultural use. This notification will meet the guidance requirements for State of Oregon real property deed notifications. This information will be included in the transfer documents and will be recorded at the time of transfer.

I find that this remedy is protective, and to the maximum extent practicable is cost effective, uses permanent solutions and alternative technologies, and is effective and implementable. Accordingly, it satisfies the requirements of ORS 465.315 , and OAR 340-122-040 and 090.

If you have any questions concerning this matter, please contact David Anderson of DEQ's Land Quality Division at (541) 388-6146 x258 or via e-mail at anderson.david@deq.state.or.us.

Sincerely,

Joni Hammond
Administrator
Eastern Region

Cc: Site File
Mark Daugherty, UMCD BRAC Coordinator
Kevin Oates, EPA Project Manager
David Anderson, ODEQ Project Manager

DEQ-DCI