
**EXPLANATION OF SIGNIFICANT DIFFERENCES
NO FURTHER ACTION FOR MUNITIONS AND EXPLOSIVES OF
CONCERN, LANDFILL GAS CONTROL, REUSE OF TREATED
GROUNDWATER, DESIGNATION OF CORRECTIVE ACTION
MANAGEMENT UNIT (CAMU) REQUIREMENTS AS APPLICABLE OR
RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs), OPERABLE
UNIT 2, FORT ORD LANDFILLS, FORMER FORT ORD, CALIFORNIA**

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INTRODUCTION AND STATEMENT OF PURPOSE

Site Name and Location

The former Fort Ord is located near Monterey Bay in northwestern Monterey County, California, approximately 80 miles south of San Francisco. The former military installation comprises approximately 28,000 acres adjacent to the cities of Seaside, Sand City, Monterey, and Del Rey Oaks to the south and Marina to the north. The Union Pacific Railroad and California State Route 1 pass through the western portion of the former Fort Ord, separating the beachfront from the rest of the base. Laguna Seca Recreation Area and Toro Regional Park border former Fort Ord to the south and southeast, respectively, as well as several small communities such as Toro Park Estates and San Benancio (Figure 1). Operable Unit 2 (OU2) comprises approximately 150 acres at the surface (the Fort Ord Landfills) and associated groundwater contamination plumes in the northwest portion of the former Fort Ord. The Fort Ord Landfills consisted of Areas A through F. Area A (the north landfill), located north of Imjin Parkway, has been clean closed (i.e., all refuse material has been physically removed) and is no longer considered to be part of the Fort Ord Landfills. Areas B through F (the main landfill) encompass approximately 120 acres and are located south of Imjin Parkway (Figures 1 and 2).

Identification of Lead and Support Agencies

Environmental investigations began at Fort Ord in 1984 at Fritzsche Army Airfield (now the Marina Municipal Airport) under California Regional Water Quality Control Board (RWQCB) cleanup or abatement orders 84-92, 86-86, and 86-135. In 1986, further investigations began at the Fort Ord Landfills, and the preliminary site characterization was completed in 1988. In 1990, Fort Ord was placed on the United States Environmental Protection Agency's (USEPA's) National Priorities List (NPL), primarily because of volatile organic compounds (VOCs) found in groundwater beneath the Fort Ord Landfills. Since that time, environmental investigations and remedial actions at the former Fort Ord have been conducted under the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund, and the Fort Ord Landfills area was designated as OU2. A Federal Facility Agreement (FFA) was signed in 1990 by the U.S. Department of the Army (Army) as lead agency, the USEPA, the Department of Toxic Substances Control (DTSC, a part of the

California Environmental Protection Agency [Cal/EPA] and formerly the Department of Health Services [DHS]); and the RWQCB (also a part of Cal/EPA). The FFA established schedules for performing remedial investigations and feasibility studies and requires that remedial actions be completed as expeditiously as possible.

If the lead agency (the Army) determines that a significant change to the selected remedy, as described in the Record of Decision (ROD), is necessary after the ROD is signed, Section 117(c) of CERCLA and 40 CFR 300.435 (c)(2)(i) require the lead agency to address post-ROD significant changes. The Record of Decision, Operable Unit 2, Fort Ord Landfills (OU2 ROD) was signed by the Army in July 1994 and by the USEPA, the DTSC and the RWQCB in August 1994.

Summary of Circumstances Requiring an Explanation of Significant Differences

The Army has prepared this Explanation of Significant Differences (ESD) to address:

- The potential presence of munitions and explosives of concern (MEC) within the Landfill Parcels¹ (Figure 2) and the conclusion no further action for MEC is required;
- Implementation of landfill gas control measures;
- Reuse of treated groundwater from the OU2 Groundwater Treatment Plant (GWTP) for purposes other than groundwater recharge; and
- Correction to the *Explanation of Significant Differences, Consolidation of Remediation Waste in a Corrective Action Management Unit, Operable Unit 2, Fort Ord Landfills* (CAMU ESD, Army 1997), which is intended to designate CAMU regulations as ARARs for the Fort Ord Landfills, not to designate the Fort Ord Landfills as a CAMU.

This ESD will become part of the Administrative Record for the former Fort Ord and will be available to the public at the following locations:

- Seaside Branch Library, 550 Harcourt Avenue, Seaside, California
- California State University, Monterey Bay (CSUMB) Library Learning Complex, 100 Campus Center, Building 12, Seaside, California
- Former Fort Ord Administrative Record, Building 4463, Gigling Road, Ord Military Community, California.

¹ The Landfill Parcels consist of covered landfill Areas B through F, the land between these Areas and a buffer zone around the outer perimeter of the Areas (Figure 2).

SITE HISTORY, CONTAMINATION AND SELECTED REMEDY

Site History and Contamination Problems

From its opening in 1917, Fort Ord primarily served as a training and staging facility for infantry troops. In the 1940s, major construction of the Main Garrison was performed. From 1947 to 1975 Fort Ord was a basic training center. After 1975, the 7th Infantry Division was assigned to Fort Ord. In 1991 Fort Ord was selected for closure and the post was officially closed in 1994. Since then the former Fort Ord has been going through a property transfer process for public benefit and economic development uses. Remedial investigations and cleanup actions at the former Fort Ord have been performed and documented since 1986.

The Fort Ord Landfills were comprised of two adjacent landfill areas of approximately 150 acres total in the northwest portion of former Ford Ord (Figure 1). Both were used for residential and commercial disposal of waste generated at the former Fort Ord. No waste from outside of the former Fort Ord was placed in the Fort Ord Landfills. The north landfill (Area A, approximately 30 acres) was used from 1956 to 1966. The main landfill (Areas B through F, approximately 120 acres) was operated from 1960 to 1987 and may have received a small amount of chemical waste (such as paint, oil, pesticides, electrical equipment, ink, and epoxy adhesive) along with household and commercial refuse. The main landfill facility stopped accepting waste for disposal in May 1987 as interim closure of the facility began (Shaw, 2005a). From that time to closure of the installation in 1994, waste was transported to and disposed at the Monterey Peninsula Landfill, located in Marina, California.

The Fort Ord Landfills area was designated as Operable Unit 2 (OU2) when a remedial investigation identified the presence of volatile organic compounds (VOCs) associated with landfilled materials in groundwater beneath the site. Based on frequency of detection and measured concentrations, trichloroethene (TCE) was the most significant groundwater contaminant detected during the remedial investigation. Remedial actions have been implemented to address contaminated groundwater and ongoing remediation of groundwater associated with OU2 is being conducted in accordance with the OU2 ROD (Army, 1994) and the Explanation of Significant Differences, Operable Unit 2, Fort Ord Landfills (OU2 ESD; Army, 1995).

In accordance with the OU2 ROD (Army, 1994) and the Explanation of Significant Differences, Area A, Operable Unit 2, Fort Ord Landfills (Area A ESD; Army, 1996), the Army completed removal and consolidation of refuse from the north landfill into the main landfill in October 1998 and installation of an engineered cover system for the main landfill in December 2002 as part of the closure process for the Fort Ord Landfills.

At the Fort Ord Landfills, the perimeter fence line (Figure 2) was initially designated as the boundary for landfill gas (LFG) compliance monitoring in accordance with ARARs² and LFG monitoring probes were installed inside the fence line. Monitoring of these probes commenced in June 2000. Fixed-based laboratory results and field measurements showed methane

² California Integrated Waste Management Board (CIWMB) Regulations for Solid Waste Landfills. Title 14 California Code of Regulations (CCR), Chapter 3, Article 7.8 (this Article was repealed and replaced by Title 27 CCR, Chapter 3, Subchapter 4, Article 6 [Sections 20920 – 20937]).

concentration exceeding the 5% regulatory standard in most probes. The Army performed an additional investigation in August 2000 and sampling results showed that methane was detectable extending out about 70 feet from the fence line on the east side of Area F. All probes were monitored again in September and December 2000, with the results again showing methane concentrations exceeding the 5% standard. In response the Army installed additional probes at locations around the outer parts of the OU2 property beyond the fence line in April and May 2001. Analytical results for these probes indicated that methane concentrations at the property boundary were less than the 5% standard, with the exception of the east side of Area F.

The Army also performed ambient air monitoring in October 2000, November 2000, September 2001 and September 2002 to determine landfill gas dispersion in ambient air on the east side of Area F. The results showed trace concentrations of volatile organic compounds (VOCs) in air between the Fort Ord Landfills and the nearest housing (IT, 2002a; IT, 2002c; Shaw, 2004). These data were used to complete a screening level human health risk assessment (HHRA) for nearby residences³. The HHRA was updated after each monitoring event and attached as an appendix to each ambient air monitoring report. The HHRA concluded that there is a health risk⁴ for long-term exposure⁵ to VOCs in ambient air; however, the Army determined the data evaluated in the HHRA were limited and additional monitoring would be appropriate. Additional ambient air monitoring was conducted on a quarterly basis in 2003 and the HHRA updated to include these data and evaluate specifically landfill-related risk. The updated HHRA indicated the Fort Ord Landfills are not a significant contributor of VOCs in ambient air or risk to downwind receptors (Shaw, 2005b).

Selected Remedy

The following remedies for the Fort Ord Landfills were selected in the OU2 ROD:

- A cover system to (1) prevent rainwater from percolating through the landfilled areas into the underlying aquifers; (2) collect and remove methane offgas (if necessary); and (3) prevent exposure of sanitary waste in the landfills to the surrounding environment.
- Institutional controls (i.e., deed restrictions) to be placed on the property to ensure that the integrity of the cover system is maintained and prevent potential direct exposures of VOCs to the environment or people associated with future use of the site.
- Institutional controls (i.e., deed restrictions) that prevent the use of groundwater within the contaminant plume.
- Groundwater extraction and treatment, to be monitored on a regular basis and adjusted as warranted by the performance data collected during operation. Additionally, treated groundwater will be discharged to the A-aquifer and Upper 180-foot aquifer by means of recharge systems or reused at the surface.

³ California State University Monterey Bay (CSUMB) housing to the east of Area F.

⁴ Health risk was determined by comparison to regulatory thresholds for cancer risk and non-cancer hazards.

⁵ Risk was evaluated under two long-term exposure scenarios: reasonable maximum exposure (30 years) and average exposure (6 years).

Three previous ESDs to the OU2 ROD have been completed:

- *Explanation of Significant Differences, Operable Unit 2, Fort Ord Landfills* (OU2 ESD, Army 1995). The OU2 ESD finalized the cleanup standard for the Upper 180-foot Aquifer to be consistent with those of the A-aquifer to facilitate the coordinated cleanup strategy for both aquifers.
- *Explanation of Significant Differences, Area A, Operable Unit 2, Fort Ord Landfills* (Area A ESD, Army 1996). The Area A ESD addressed excavation and consolidation of refuse from the north landfill (Area A) into the main landfill (Areas B through F).
- *Explanation of Significant Differences, Consolidation of Remediation Waste in a Corrective Action Management Unit, Operable Unit 2, Fort Ord Landfills* (CAMU ESD, Army 1997). The CAMU ESD addressed using remediation waste as foundation layer material instead of “clean” (uncontaminated) soil as described in the OU2 ROD.

BASIS FOR THE EXPLANATION OF SIGNIFICANT DIFFERENCES

The Army has prepared this ESD to address:

- The potential presence of munitions and explosives of concern (MEC) within the Landfill Parcels (Figure 2)⁶;
- Implementation of landfill gas control measures;
- Alternative reuse of treated groundwater; and
- Clarification that the CAMU ESD is intended to designate CAMU regulations as ARARs for the Fort Ord Landfills, but not to designate the Fort Ord Landfills as a CAMU.

NO FURTHER ACTION FOR MUNITIONS AND EXPLOSIVES OF CONCERN

A review of existing records and available information, including the Archives Search Report (ASR), ASR Supplement No. 1 and the draft Revised ASR (*December 1993, November 1994 and December 1997*, respectively), the Literature Review Report (*January 2000*), working maps, Fort Ord Training Facilities Maps, and associated interviews from various ordnance-related community relations activities, indicates the area of the Landfill Parcels was not used for military munitions training. Because the Army does not believe there is significant risk associated with MEC at the Landfill Parcels, no change is proposed for the selected remedy. This ESD affirms that the consideration of the potential for MEC does not change the prior determination that the remedy is protective of human health and the environment. The Army has evaluated the potential presence of MEC within the Landfill Parcels herein.

⁶ The Landfill Parcels consist of covered landfill Areas B through F, the land between these Areas and a buffer zone around the outer perimeter of the Areas (Figure 2).

Munitions Related Information

The reuse of the former Fort Ord following transfer of property increases the possibility of the public being exposed to explosive hazards. In November 1998, the Army agreed to evaluate military munitions at the former Fort Ord in an Ordnance and Explosives Remedial Investigation/Feasibility Study (OE RI/FS)—now termed the Munitions Response RI/FS (MR RI/FS)—consistent with CERCLA. In April 2000, an agreement was signed between the Army, the USEPA, and the DTSC to evaluate MEC at the former Fort Ord subject to the provisions of the Fort Ord FFA.

The Department of Defense has adopted the term MEC in place of two different terms used by the Army in past Military Munitions Response Program documents to indicate explosive munitions items: ordnance and explosives (OE) and unexploded ordnance (UXO). MEC, 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. § 101(e)(5)(A)-(C); (B) Discarded military munitions (DMM), as defined in 10 U.S.C. § 2710 (e)(2); or (C) Munitions constituents (e.g., TNT, RDX), as defined in 10 U.S.C. § 2710 (e)(3), present in high enough concentrations to pose an explosive hazard. For the purposes of the basewide Military Munitions Response Program being conducted for the former Fort Ord and this ESD, MEC does not include small arms ammunition .50 caliber and below.⁷ The Department of Defense has also adopted the term “munitions debris” in place of “OE scrap.” Munitions debris consists of remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, fins) remaining after munitions use, demilitarization, or disposal. Munitions debris does not pose an explosives safety risk.

Discovery of Munitions-Related Items during Landfill Cover Construction

Munitions debris and MEC were found during excavation at Area A, which occurred between July 1996 and January 1997; however, they were removed before excavated materials were consolidated into the main landfill (IT, 2001a). Approximately 585,000 cubic yards (cy) of refuse was excavated from Area A and was placed and compacted as part of the general fill in Areas B, C, D, and F of the Fort Ord Landfills. An additional 376,000 cy of “clean” (uncontaminated) material was excavated and used as backfill at other former Fort Ord remedial action sites, as well as for the vegetative layer and foundation layer of the Fort Ord Landfills. Excavation of perimeters of the main landfill (Areas B through F) began in 1996 and continued intermittently through 2002 during construction of the engineered cover of the main landfill. Additionally, remediation waste placed in the main landfill in accordance with the CAMU ESD was screened for MEC. When excavation and filling was conducted as part of landfill closure operations, a UXO safety specialist provided ordnance avoidance support as specified in work plans and required under U.S. Army Corps of Engineers specifications.

The engineered cover system at the Fort Ord Landfills consists of a foundation layer, a geomembrane and a vegetative layer. The foundation layer covering the refuse is a minimum of

⁷ In accordance with U.S. Army Engineering and Support Center, Huntsville, Ordnance and Explosives Center of Expertise guidance on small arms determinations, small arms ammunition (i.e., caliber .50 and smaller) present a very low risk to the public because: 1) caliber .50 and smaller rarely contain explosive projectiles, and 2) a deliberate effort must be applied (using a tool resembling a firing pin) to a very specific and small point (the primer) to make the round function.

two feet thick and is comprised of soil from Area A, material generated from clearing and grubbing, soil stripped from the existing cover and landfill perimeter, and soil from other former Fort Ord remediation sites. A low hydraulic conductivity geomembrane made of linear low-density polyethylene (LLDPE) was installed over the foundation layer. A two-foot thick vegetative cover was installed over the LLDPE membrane that consists of clean dune sand, clean soil excavated from the site, and grubbed soil from the former landfill covers. The final grade was planted with native plants. The final cover was graded to provide for drainage over the vegetative cover. The cover system will be maintained in perpetuity to prevent exposure of waste material in the landfills to the surrounding environment.

Discovery of Munitions-Related Items during Investigations and Construction Activities Outside of the Landfill Cells

Several invasive studies and construction activities were performed along the perimeter and outside of the landfill cells within the Landfill Parcels. About 306 test pits were advanced in 1994 to determine refuse limits of the Fort Ord Landfills (HLA, 1995). Munitions debris, described as “2-inch by 6-inch inert ordnance debris,” was encountered at about two feet below ground surface in test pit TR-OU2-081, located along the northeastern boundary of Area D.

Extensive trenching was conducted between 1995 and 2000 to install about 5,000 linear feet of conveyance piping within the Landfill Parcels. A UXO safety specialist was present during all trenching activities and munitions debris and MEC were not reported to have been found during trenching activities that occurred in the Landfill Parcels (IT, 2001c; IT, 2002b). Groundwater conveyance piping passes between Areas B and C and extends along the northwest and northern boundary of Area D and exits the Landfill Parcels along the northeast boundary of Area F.

Discovery of Incidental Munitions at the Landfill Parcels

Incidental military munitions⁸ were found at four locations within the Landfill Parcels as shown on Figure 2. One MEC item and three munitions debris items were found by IT/Shaw while working within the Fort Ord Landfills.

- Mine, antitank, practice, M20 (munitions debris), October 3, 2005.
- Detonating cord, PETN (MEC), July 23, 2003.
- Grenade, hand, practice, MKII (munitions debris), February 3, 2000.
- Rocket, 3.5 inch, practice, M29 series (munitions debris), May 6, 1996.

⁸ Incidental munitions are MEC and/or munitions debris that are not indicative of past military munitions training activities at the location where they were found. Examples of incidental munitions include MEC and/or munitions debris that may have been 1) stolen and transported from established range areas, 2) collected at amnesty points, 3) found on roadsides (e.g. DMM), 4) used as souvenirs, door stops, paper weights, etc. and then discarded, 5) the result of training activity in another area, but were transported by wind (e.g. parachute signals), water (e.g. in depressions where stormwater runoff collects), or by other means (e.g. erosion).

The low number and type of items found and their distribution over a large area does not indicate military training involving military munitions occurred in the Landfill Parcels. Additionally, reviews of historical records, including Archives Search Reports (USAEDH, 1993, 1994, 1997) and the OE RI/FS Literature Review (HLA, 2000) indicate the Landfill Parcels area was not used for military munitions related training.

Because of Fort Ord's history as a military base, the Army acknowledges the possibility that military munitions could be encountered anywhere at the former Fort Ord. Because there is no evidence of MEC which would pose a threat to human health and the environment at the Landfill Parcels and the landfill cover system will be maintained in perpetuity, no remedial action is necessary regarding MEC. In the future, should any ordnance-related item be found within the Landfill Parcels, the Army will take an appropriate immediate action (i.e., removing the found item, recording the incident), and within 90 days of the discovery, submit a plan for appropriate follow-on action to the USEPA and the DTSC for consultation, pursuant to Section 7.7(b) of the Fort Ord FFA.

LANDFILL GAS CONTROL

The OU2 ROD states one of the primary remedial objectives for shallow soil and buried waste at the Fort Ord Landfills is to prevent methane offgas generated by decomposition of waste in the landfill (if necessary), through collection and treatment. The OU2 ROD also cites the following regulations as ARARs for the selected remedy as relevant to control of landfill gas (LFG):

- California Integrated Waste Management Board (CIWMB) Regulations for Solid Waste Landfills, Title 14 California Code of Regulations (CCR), Chapter 3, Article 7.8.⁹ The CIWMB Regulations set forth the performance standards and the minimum substantive requirements for LFG monitoring and control as it relates to proper closure, postclosure maintenance and ultimate reuse of solid waste disposal sites to assure that public health and safety and the environment are protected from pollution due to the disposal of solid waste.
- Monterey Bay Unified Air Pollution Control District (MBUAPCD) Regulation II (New Sources) Rule 207 – Review of New or Modified Sources, and Regulation X (Toxic Air Contaminants) Rule 1000 – Permit Guidelines and Requirements for Sources Emitting Toxic Air Contaminants. The MBUAPCD Regulations set forth the standards and requirements for sources emitting or having the potential to emit toxic air contaminants (TACs) and/or carcinogenic toxic air contaminants (CTACs) to assure that public health and welfare are protected.

The LFG monitoring program at the Fort Ord Landfills was established in accordance with the CIWMB Regulations, which state specifically that:

- The concentration of methane gas migrating from the landfill must not exceed five percent by volume in air at the facility property boundary or an alternative boundary.

⁹ This Article was repealed and replaced by Title 27 CCR, Chapter 3, Subchapter 4, Article 6 (Sections 20920 – 20937).

- Trace gases shall be controlled to prevent adverse acute and chronic exposure to toxic and/or carcinogenic compounds.

After consultation with the MBUAPCD, the Army determined Rule 207 and Rule 1000 apply to LFG mitigation, but not to the existing landfill. Under Rule 207, Best Available Control Technology (BACT) is required for any new or modified permit unit with a potential to emit specific VOCs or combustion by-products over the levels specified in Table 4.1.1 of Rule 207. Data collected at the Fort Ord Landfills indicate a low generation rate for LFG and low VOC concentrations; therefore, the Fort Ord Landfills are not anticipated to emit pollutants in quantities exceeding the maximum emission thresholds listed in Table 4.1.1 of Rule 207. Because of the anticipated low emissions of the Fort Ord Landfills and small size of the associated treatment facilities, the permitting is primarily controlled by Rule 1000. The LFG treatment system is a source that has the potential to release very low levels of TACs or CTACs.

Landfill Gas Pilot Test

Based on the results from perimeter probe and ambient air monitoring through May 2001, a LFG extraction and treatment system was implemented as a pilot test on the east side of Area F for three purposes:

- To reduce methane to less than five percent along the landfill perimeter.
- To reduce VOCs in ambient air east of Area F adjacent to residential areas.
- To determine the design requirements for a permanent LFG mitigation system.

Installation and operation of the pilot test system was done in accordance with the *Draft Landfill Gas Pilot Test Work Plan, Contractor Quality Control Plan, Sampling and Analysis Plan, Operable Unit 2 Landfill, Former Fort Ord, California* (IT, 2001b). The pilot test system was started up in June 2001 and has successfully maintained methane concentrations in compliance probes on the east side of Area F at below the five percent standard. Results of the pilot test are presented in the *Draft Final Evaluation Report, Landfill Gas Pilot Test, Operable Unit 2 Landfills, Former Fort Ord, California, Revision 0* (Shaw, 2005d).

The LFG Pilot Test Evaluation Report determined the system could continue to be operated effectively and maintain compliance with Title 27 CCR; however, the report recommended 1) expanding the system to further reduce the risk of VOCs (vinyl chloride, in particular) migrating to groundwater and 2) converting from treatment with granular activated carbon (GAC) and potassium permanganate (KMnO₄) to a thermal treatment unit (TTU) because the TTU would be more effective for treating LFG and may be more cost effective over an extended period of LFG extraction and treatment. This ESD documents the decision to implement these recommendations and to expand or modify the OU2 LFG extraction and treatment system to include other areas of the Fort Ord Landfills, if warranted by future conditions and ARARs.

ALTERNATIVE REUSE OF TREATED GROUNDWATER

Portions of the former Fort Ord will be redeveloped for residential, commercial, and educational uses by property recipients. The construction of these developments will require water for dust control, soil compaction, and other construction activities. This ESD documents the decision to reuse treated groundwater from the OU2 groundwater treatment plant (GWTP) for non-potable construction purposes including, but not limited to, dust control and soil compaction.

DESIGNATION OF CAMU REQUIREMENTS AS ARARS

The CAMU ESD addressed placing excavated soil from remedial investigation sites at the former Fort Ord in the Fort Ord Landfills. The CAMU ESD used the term “designate” to describe the action of the Army, the USEPA, the DTSC and the RWQCB regarding compliance with the CAMU regulations. With this ESD, the Army, the USEPA, the DTSC and the RWQCB agree the intention of the CAMU ESD was to describe the manner in which the disposal component of the remedial action previously selected was being modified, including compliance with the substantive requirements of the CAMU regulations and therefore designate California Code of Regulations and Resource Conservation and Recovery Act (RCRA) regulations regarding CAMUs as ARARs for the management of contaminated soil to be placed in the Fort Ord Landfills. The Army, the USEPA, the DTSC and the RWQCB further agree the incorporation of the soil into the landfill cover complied with the substantive requirements of the CAMU regulations, but the Fort Ord Landfill was not formally designated as a CAMU.

DESCRIPTION OF SIGNIFICANT DIFFERENCES

NO FURTHER ACTION FOR MUNITIONS AND EXPLOSIVES OF CONCERN

Detailed disposal records are not available for the Fort Ord Landfills; however, information gathered during field activities and from other sources indicates that household and on-base commercial refuse, dried sewage sludge, construction debris, and small amounts of chemical wastes (such as paint, oil, pesticides, electrical equipment, ink, and epoxy adhesive) were placed in the landfill. Although MEC was not reportedly disposed of at the Fort Ord Landfills, military munitions items were found during removal actions at the north landfill (Area A) and Installation Restoration Program (IRP) Sites 3, 16, 17, and Site 39 Ranges 24 and 25, which were not part of the Fort Ord Landfills. These military munitions items were removed before excavated materials from these sites were consolidated into the main landfill (Areas B through F). Military munitions were not discovered during soil placement in the landfill and activities associated with the construction of the landfill cover system and OU2 groundwater pipelines, and other surface and intrusive activities, did not result in any evidence of past training activities involving military munitions. Additionally, reviews of historical records, including Archives Search Reports (USAEDH, 1993, 1994, 1997) and the OE RI/FS Literature Review (HLA, 2000) indicate the Landfill Parcels area was not used for military munitions related training.

The OU2 ROD stated that a prime remedial action objective for shallow soil and buried waste at the Fort Ord Landfills was to prevent human and environmental exposure to buried waste through engineering controls that included construction of the landfill cover system. The OU2 ROD also stated that “Institutional controls (i.e., deed restrictions) will be placed on the property

to ensure that the integrity of the cover system is maintained and prevent potential direct exposures of VOCs to the environment or people associated with future use of the site.” Institutional controls will be implemented when the land transfers outside of the Army’s control. Although the engineered cover system and institutional controls implemented under the OU2 ROD remedy are intended to address the presence of VOCs, potential exposure to MEC is also mitigated by the remedy.

Because of Fort Ord’s history as a military base, the Army acknowledges the possibility that MEC could be present in the Fort Ord Landfills; however, the Army has determined that the potential presence of MEC within the Landfills does not pose a significant risk to human and ecological receptors because the landfill refuse is covered by an engineered cover system (cap) consisting of a foundation layer (two feet of compacted soil), a low-hydraulic-conductivity layer (LLDPE geomembrane liner), and a vegetated surface layer (minimum two feet thick). The Army will also place Institutional Controls on the Fort Ord Landfills to maintain the integrity of the landfill cap and warn future owners of the property of the potential presence of MEC by placing a deed restriction on the property. The engineered cap and institutional controls will also prevent potential human exposure to MEC that may be present within the landfill.

LANDFILL GAS CONTROL

Based on the recommendations of the LFG Pilot Test Evaluation Report, the Army proposed expanding the OU2 LFG extraction and treatment system, which included installation of extraction wells around the entire perimeter and in the interior of Area F, and converting from treatment with GAC and KMnO_4 to a TTU. The Army’s proposal was based on available data from OU2. The Army may expand or modify the OU2 LFG extraction and treatment system to include other areas of the Fort Ord Landfills, if warranted by future conditions and ARARs. Design, installation and regulatory requirements of the expanded system is described in the *Draft Final Work Plan, Landfill Gas System Expansion, Operable Unit 2 Landfills, Former Fort Ord, California, Revision 0* (Shaw, 2005c). The expanded system with the TTU began operations in April 2006.

The existing LFG extraction and treatment system on the eastern perimeter of Area F is sufficient to maintain compliance with the regulatory standards for VOC emissions and methane concentrations at the landfill boundary; however, expansion of the system will have the following additional benefits:

- LFG extraction removes VOCs generated in the Fort Ord Landfills, which may otherwise migrate to the underlying groundwater. Removing VOCs via the LFG extraction and treatment system will likely shorten the time required to achieve aquifer cleanup levels (ACLs) for OU2 and reduce long term groundwater treatment costs.
- Increased extraction of LFG will accelerate the depletion of the source and may result in shortened duration of LFG extraction and treatment.
- Replacement of GAC and KMnO_4 treatment with a TTU will increase the destruction efficiency for VOCs.

- Replacement of GAC and KMnO₄ treatment with a TTU will eliminate venting of untreated methane.

The estimated cost for the installation of the expanded system, including installation of the TTU, is \$560,000, and the operations and maintenance (O&M) costs for the TTU are estimated to be \$65,000 per year¹⁰. The projected O&M costs for the existing LFG extraction and treatment system are \$92,000 per year, which includes GAC and KMnO₄ changeouts, sample collection and sample analysis every 300 operating hours. The existing system is relatively O&M intensive because the small GAC and KMnO₄ units require frequent changeouts. The TTU requires no changeouts and can accommodate higher concentrations of VOCs in the influent with no increase in O&M costs.

A cost benefit analysis of the alternatives for LFG extraction and treatment made the following conclusions:

- It is necessary to maintain at least the existing system for regulatory compliance.
- Compared with the existing system, the expanded system using a TTU would pay for itself over ten years because of reduced O&M costs.
- The expanded system with a TTU will remove a significantly higher mass of VOCs and could shorten the duration of OU2 groundwater treatment.
- Extraction and treatment of LFG removes VOCs, including vinyl chloride, before they could potentially migrate to groundwater.
- The cost of removing VOCs from LFG with the expanded system and TTU may be significantly less than removing the same VOCs from groundwater.
- The TTU destroys methane in addition to VOCs.

After completion of start up operations, as described in the LFG System Expansion Work Plan (Shaw, 2005c), the Army will demonstrate to the USEPA that the LFG extraction and treatment system is “operating properly and successfully” in accordance with the USEPA’s Guidance for Evaluation of Federal Agency Demonstrations that Remedial Actions are Operating Properly and Successfully Under CERCLA Section 120(h)(3).

ALTERNATIVE REUSE OF TREATED GROUNDWATER

The OU2 groundwater extraction and treatment system extracts groundwater contaminated with VOCs and conveys it to the OU2 GWTP where it is treated with GAC to remove the VOCs to below the permitted discharge limits.¹¹ The treated water is being sampled and analyzed in accordance with the Final Sampling and Analysis Plan for Operable Unit 1, Operable Unit 2 and Sites 2 and 12, dated March 3, 2004. The treated water discharge limits are less than or equal to

¹⁰ Costs for replacement of major system components are not included in this analysis.

¹¹ The extracted groundwater is only treated for removal of VOCs. There is no treatment for bacteria or other microorganisms.

the Maximum Contaminant Levels for drinking water and, if the concentrations of VOCs approach these discharge limits, the GAC is removed and replaced.

Treated groundwater from the OU2 GWTP will be taken from two locations: the discharge pipeline that conveys the treated groundwater from the OU2 GWTP to the Sites 2 and 12 (2/12) GWTP, where the treated OU2 water is mixed with treated water from Sites 2/12 prior to being piped to the Sites 2/12 infiltration gallery; and the discharge pipeline that conveys the treated groundwater from the OU2 GWTP to injection well IW-OU2-03-180¹². Construction water trucks will be filled with treated water and will transfer it to locations of construction activities and needs as described previously. The treated groundwater will only be used for non-potable purposes and the water users shall comply with all applicable laws and regulation regarding use of non-potable water. Appropriate and sufficient signage, labeling and coloring to indicate the water is non-potable and not for human consumption will be placed on all associated infrastructure and conveyances. Use of this non-potable water will eliminate the need for potable water to be used for these purposes; however, at such time remediation of contaminated groundwater associated with OU2 is complete, treated groundwater will no longer be available for these purposes.

The cost of diverting and transporting the treated groundwater to its end use and all signage, labeling and coloring of such diversion and transport mechanisms will be borne by the water user, not the Army; therefore, there is no anticipated increase in cost for the remedy.

It is anticipated these uses of treated groundwater will not require a continuous supply of water and diversion of a portion of treated groundwater from the OU2 GWTP is expected to have negligible impact on the groundwater extraction and treatment systems at the former Fort Ord; however, to ensure this impact remains negligible, the volume of and flow rates at which treated groundwater that may be diverted for these uses will be determined by the Army, in consultation with the USEPA, DTSC and RWQCB, as specific agreements for use of the water are developed. The diversion of treated water will not:

- Change the rate at which groundwater is extracted and treated at OU2 or Sites 2/12;
- Change the VOC removal efficiency of the GWTP;
- Add or change the sources and concentrations of chemicals in the aquifers; or
- Change the hydraulic control of the groundwater plumes.

DESIGNATION OF CAMU REQUIREMENTS AS ARARs

The substantive requirements of the regulations for CAMUs are ARARs for the remediation of many CERCLA sites, especially those sites where CERCLA remediation involves the management of RCRA hazardous wastes. In the CERCLA context, CAMU requirements designated to be ARARs would be incorporated into CERCLA decision documents, rather than RCRA permits or orders. This flexibility allows for expeditious implementation of protective

¹² IW-OU2-03-180 has not received any treated groundwater since September 2000 because injection at this location did not optimize plume capture.

and cost-effective remedies at CERCLA sites. This includes remediation under CERCLA of RCRA hazardous wastes at Federal facilities on the National Priorities List, such as the former Fort Ord.

This ESD clarifies it is the intent and purpose of the CAMU ESD to designate the substantive requirements for CAMUs, as defined in CCR Title 22 and RCRA, as ARARs for the Fort Ord Landfills. Further, this ESD clarifies it was not the intent of the Army, the USEPA, the DTSC and the RWQCB to designate the Fort Ord Landfills as a CAMU, as suggested by the CAMU ESD. There is no cost associated with this clarification and it will not result in any substantive change to the remedy.

AFFIRMATION OF STATUTORY DETERMINATIONS

With this ESD, the remedy continues to satisfy the requirements of CERCLA Section 121.

No Further Action for Munitions and Explosives of Concern

The potential presence of MEC is not considered to pose a significant risk at the closed Fort Ord Landfills. Institutional controls (deed restrictions) and engineering controls (the landfill cover) will ensure that any potential exposure pathway to human and ecological receptors is eliminated. The Army, the USEPA, and the DTSC believe that the landfill cover and associated institutional controls remain protective of human health and the environment and comply with federal and State ARARs for this remedial action.

Landfill Gas Control

Expansion of the landfill gas extraction and treatment system will maintain compliance with ARARs and potentially accelerate depletion of the sources of VOCs in Area F of the Fort Ord Landfills, which will likely shorten the duration of treatment for both LFG and groundwater at OU2. The Army may expand or modify the OU2 LFG extraction and treatment system to include other areas of the Fort Ord Landfills, if warranted by future conditions and ARARs. Additionally, installation of the TTU will result in more efficient removal of VOCs and methane. The Army, the USEPA, the RWQCB, and the DTSC believe that this approach remains protective of human health and the environment, complies with federal and State ARARs for this remedial action, and is able to be achieved in a cost effective manner.

Alternative Reuse of Treated Groundwater

Reuse of treated groundwater from the OU2 GWTP for non-potable construction purposes will be of significant benefit to the redevelopment and reuse of the former Fort Ord. Such reuse will have negligible impact on the groundwater extraction and treatment systems at the former Fort Ord. The Army, the USEPA, the RWQCB, and the DTSC believe that this approach remains protective of human health and the environment, complies with federal and State ARARs for this remedial action, and is able to be achieved in a cost effective manner.

DESIGNATION OF CAMU REQUIREMENTS AS ARARS

The Fort Ord Landfills will continue to be in compliance with ARARs for CAMUs, as described in the CAMU ESD, but are not designated a CAMU as suggested by the wording of the CAMU ESD. The Army will continue to manage the Fort Ord Landfills in compliance with all applicable regulatory requirements. The Army, the USEPA, the RWQCB, and the DTSC believe that this approach remains protective of human health and the environment, complies with federal and State ARARs for this remedial action, and is able to be achieved in a cost effective manner.

PUBLIC PARTICIPATION

A notification to the public concerning this ESD will be made in a local newspaper after signature. The OU2 ROD and this ESD are available to the public at the following locations:

- Seaside Branch Library, 550 Harcourt Avenue, Seaside, California
- California State University, Monterey Bay (CSUMB) Library Learning Complex, 100 Campus Center, Building 12, Seaside, California
- Former Fort Ord Administrative Record, Building 4463, Gigling Road, Ord Military Community, California.
- Online at www.fortordcleanup.com.

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SIGNATURE PAGE

EXPLANATION OF SIGNIFICANT DIFFERENCES

NO FURTHER ACTION FOR MUNITIONS AND EXPLOSIVES OF CONCERN

LANDFILL GAS CONTROL

REUSE OF TREATED GROUNDWATER

**DESIGNATION OF CORRECTIVE ACTION MANAGEMENT UNIT (CAMU) REQUIREMENTS AS
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)**

**OPERABLE UNIT 2, FORT ORD LANDFILLS
FORMER FORT ORD, CALIFORNIA**

United States Department of the Army



Thomas E. Lederle
Chief, Industrial Conveyance Branch
Base Realignment and Closure (BRAC) Division

5 Sept 2006

Date



Gail Youngblood
BRAC Environmental Coordinator
Fort Ord BRAC Office

15 August 2006

Date

SIGNATURE PAGE

EXPLANATION OF SIGNIFICANT DIFFERENCES

NO FURTHER ACTION FOR MUNITIONS AND EXPLOSIVES OF CONCERN

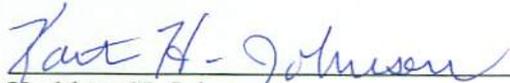
LANDFILL GAS CONTROL

REUSE OF TREATED GROUNDWATER

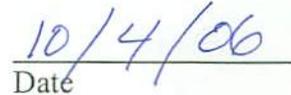
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FORMER FORT ORD, CALIFORNIA**

United States Environmental Protection Agency



Kathleen H. Johnson
Chief, Federal Facilities and Site Cleanup Branch
U.S. Environmental Protection Agency
Region IX


Date

SIGNATURE PAGE

EXPLANATION OF SIGNIFICANT DIFFERENCES

NO FURTHER ACTION FOR MUNITIONS AND EXPLOSIVES OF CONCERN

LANDFILL GAS CONTROL

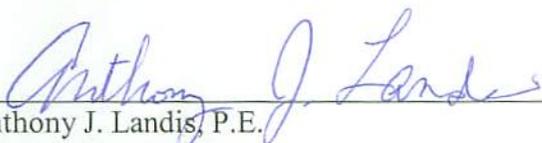
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**OPERABLE UNIT 2, FORT ORD LANDFILLS
FORMER FORT ORD, CALIFORNIA**

**California Environmental Protection Agency
Department of Toxic Substances Control**

The State of California, Department of Toxic Substances Control (DTSC) had an opportunity to review and comment on the ESD and the ESD is consistent with the DTSC's comments.



Anthony J. Landis, P.E.
Chief of Operations
Office of Military Facilities
California Environmental Protection Agency
Department of Toxic Substances Control

8-22-06

Date

SIGNATURE PAGE

EXPLANATION OF SIGNIFICANT DIFFERENCES

LANDFILL GAS CONTROL

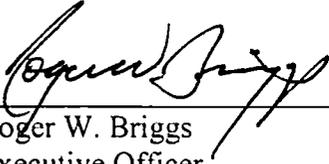
REUSE OF TREATED GROUNDWATER

DESIGNATION OF CORRECTIVE ACTION MANAGEMENT UNIT (CAMU) REQUIREMENTS AS APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

**OPERABLE UNIT 2, FORT ORD LANDFILLS
FORMER FORT ORD, CALIFORNIA**

**California Environmental Protection Agency
Regional Water Quality Control Board, Central Coast Region**

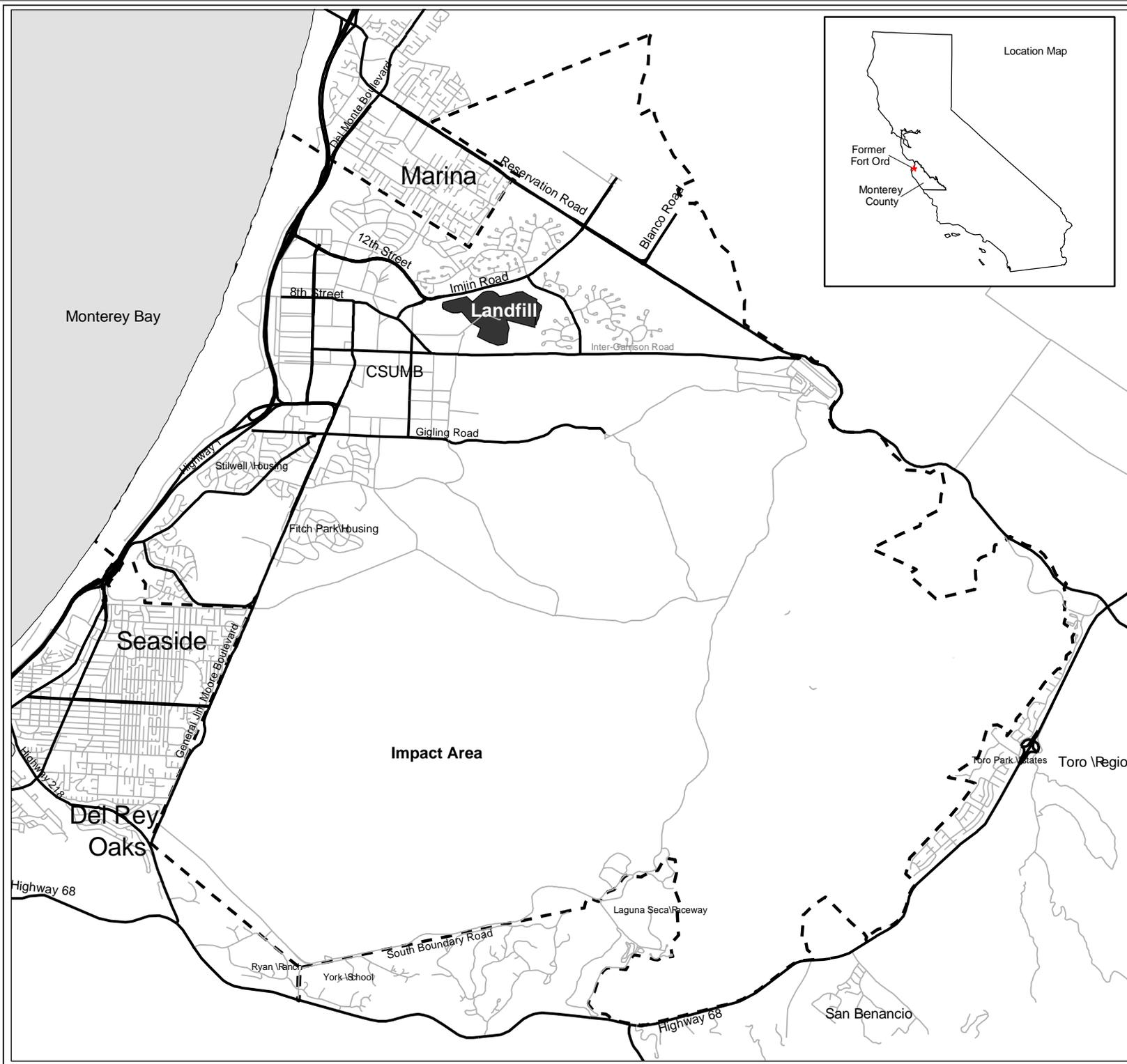
The State of California, Central Coast Regional Water Quality Control Board (RWQCB) had an opportunity to review and comment on the ESD and the ESD is consistent with the RWQCB's comments. Munitions and Explosives of Concern are not within the scope of the RWQCB's authority; therefore, the RWQCB signature is with respect only to Landfill Gas Control, Reuse of Treated Groundwater, and Designation of CAMU Requirements as ARARs.



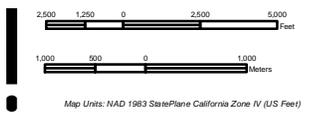
Roger W. Briggs
Executive Officer
California Environmental Protection Agency
Regional Water Quality Control Board, Central Coast Region

8-19-06
Date

OU-2 Landfill Figure 1

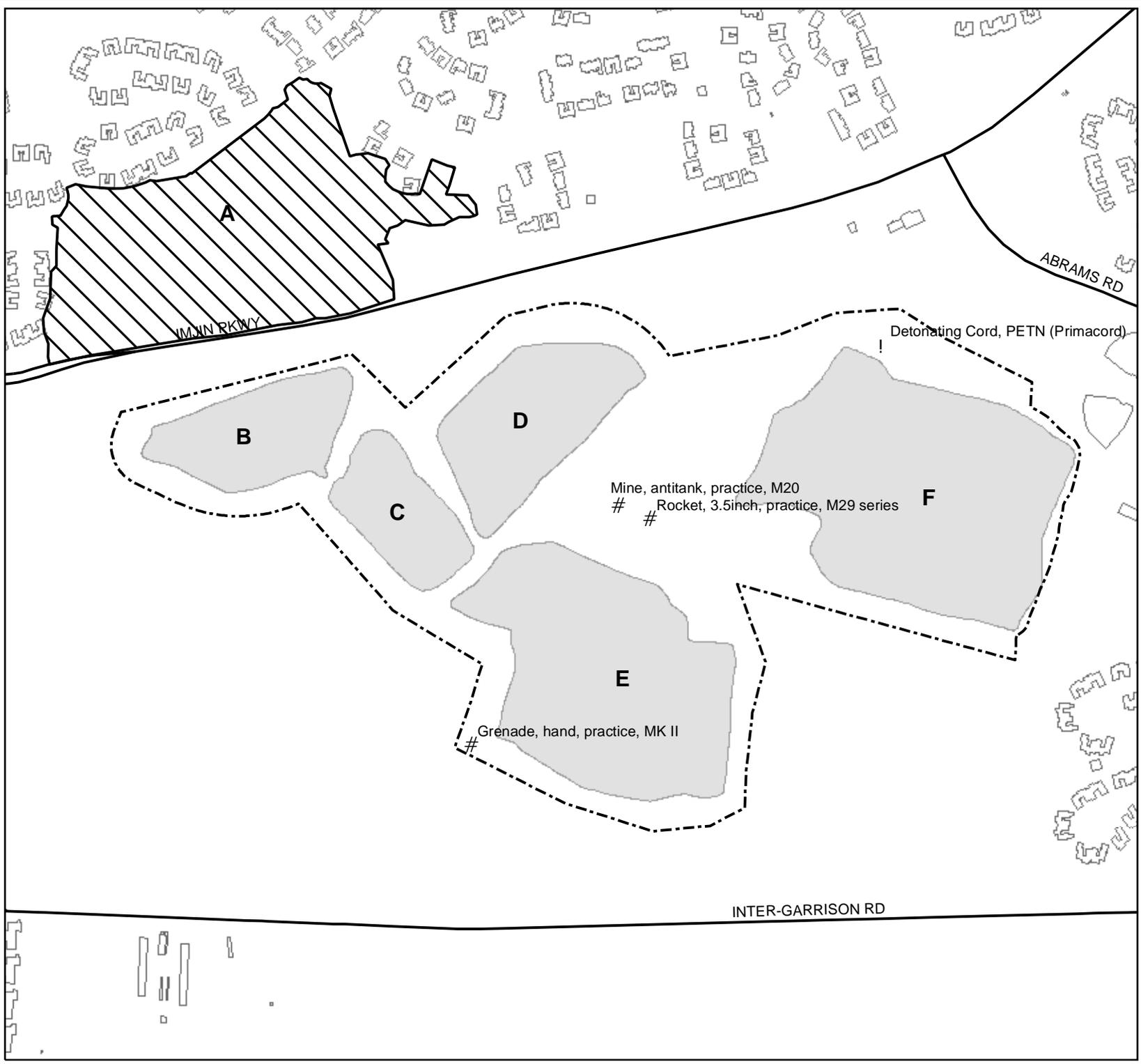


-  Major Roads
-  Minor Roads
-  Ft Ord Boundary
-  OU-2 Landfill



 U.S. ARMY CORPS OF ENGINEERS		FORMER FORT ORD MONTEREY, CALIFORNIA	
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CHECKED BY: CAS	SOURCE OF DATA:		
SUBMITTED BY: CAS			
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OU-2 Landfill ESD Figure 2



- Major Roads
- ⊕ Facilities
- ⊖ Landfill Parcels
- ⊖ Landfill Cells
- Excavation Area**
- ⊖ Clean closed
- Incidental Items within OU-2 Landfill Area**
- # MD
- ! MEC

Note: Some incidental items are approximate based on field observations

