

**Basewide Remedial Investigation/Feasibility Study  
Fort Ord, California**

**Volume II - Remedial Investigation**

**Site 39  
Appendixes**

Prepared for

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No agency comments were received on the Draft Final version of the Site 39 Appendix. No text changes have been made to the Draft Final version of this report.

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**APPENDIX A**

**SELECTED SECTIONS FROM THE DRAFT FINAL DATA SUMMARY AND WORK PLAN,  
SITE 39 - INLAND RANGES**

**FROM: DRAFT FINAL DATA SUMMARY AND WORK PLAN  
 SITE 39 - INLAND RANGES  
 FORT ORD, CALIFORNIA  
 Dated: May 17, 1994**

The following sections of text are reproduced directly from the Site 39 Draft Final Data Summary and Work Plan (HLA, 1994c). These sections provide detailed information regarding the research and results of the preliminary site assessment activities performed prior to the Site 39 remedial investigations. This information is provided in support of the description of activities presented in Section 2.0 of this report.

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### 3.0 INVESTIGATION

This section describes the previous investigations (Section 3.1) and the research performed for this report (Section 3.2) at Site 39.

#### 3.1 Previous Studies

Several ranges in Site 39 have been previously investigated to assess conditions associated with potential sources of ordnance-related chemical residues (Range 36A) or to evaluate the potential for hydrocarbon contamination of soil (Ranges 39, 40, 40A, 41, and 49). Research has also been performed by the U.S. Army Engineer Division, Huntsville (USAEDH) Mandatory Center of Expertise (MCX) regarding potential physical hazards that may exist from unexploded ordnance (UXO) and ordnance and explosive waste (OEW) at Fort Ord. The results of these previous investigations are discussed below.

##### 3.1.1 JMM Investigation of Range 36A (EOD)

Both HLA and James M. Montgomery Consulting Engineers (JMM) have conducted investigations at Range 36A, the Explosive Ordnance Disposal (EOD) area (Plate 1). The JMM investigation is described below; HLA's work at the site is described in Section 3.1.2.1. Range 36A is in the eastern portion of the Inland Ranges and was used until October 1992 for the disposal of various types of commercial explosives and military ordnance and ammunition.

In 1990, JMM installed three monitoring wells and drilled two soil borings at Range 36A (JMM, 1991a). Of the three monitoring wells installed, only one produced enough water for sampling. Groundwater was encountered in this well at approximately 90 feet below ground surface (bgs) and was reported to be from a perched groundwater zone. The one groundwater sample collected was analyzed for explosive compounds and metals; no explosives were detected (JMM, 1991a). Molybdenum was the only metal detected in the groundwater sample, at a concentration of 92 micrograms per liter ( $\mu\text{g/l}$ ).

A total of 24 soil samples was collected from the two soil borings and the three monitoring well boreholes and analyzed for explosive compounds and metals (JMM, 1991a). The explosive compound cyclotrimethylenetrinitramine (RDX) was detected in 5 of the 24 soil samples, with a maximum concentration of 11.88 milligrams per kilogram (mg/kg). Four of the five samples in which RDX was detected were surface samples. The explosive compound cyclotetramethylene tetranitramine (HMX) was detected in 2 of the 24 soil samples, with a maximum concentration of 1.35 mg/kg. Both of the samples in which HMX was detected were surface samples. Other explosive compounds (i.e., tetryl, dinitrobenzene, trinitrobenzene, dinitrotoluene, and trinitrotoluene) were not detected in soil samples collected during that investigation. JMM reported that barium, chromium, copper, nickel, lead, vanadium, and zinc were detected in soil samples at concentrations similar to background concentrations. Beryllium was detected at a concentration above the reported background concentration in only one soil sample.

##### 3.1.2 HLA Investigations

HLA performed investigations at some of the ranges prior to and as part of the current Fort Ord RI/FS. This work included the preparation of a Resource Conservation and Recovery Act (RCRA) closure plan and an evaluation of ordnance-related chemical residues in soil, both for Range 36A. Investigations were also conducted to address potential areas of hydrocarbon contamination at Ranges 39, 40, 40A, 41, and 49. These investigations and proposed work at these sites are described below.

###### 3.1.2.1 Range 36A (EOD)

In 1991, HLA prepared a RCRA closure plan for Range 36A (HLA, 1991f) because the EOD range was listed as a Subpart X Unit in Fort Ord's RCRA Part B Permit Application. The closure plan was submitted to EPA on September 24,

1991; no comments on the plan have been received from EPA:

As proposed in the final RI/FS Work Plan (HLA, 1991c), HLA conducted an investigation at Range 36A (Site 5) (Plate 1) to evaluate the potential impacts from past and present activities at this site (HLA, 1993b). The Site 5 field investigation included drilling and sampling 23 soil borings. The borings were drilled to depths of 15 to 20 feet at the nodes of a 50-foot sampling grid covering the entire site. A total of 69 soil samples was collected from the soil borings and analyzed for priority pollutant metals and ordnance-related chemical residues.

Arsenic was detected in most of the soil samples at concentrations that exceed the preliminary remediation goal (PRG) for arsenic presented in the *Draft Technical Memorandum*, dated June 14, 1993. However, no arsenic concentrations exceeded the maximum background concentration presented in the *Draft Final Basewide Background Soil Investigation Report*, dated March 15, 1993. Beryllium was detected in 11 samples at concentrations that exceed its PRG. Six of the detections exceeded the maximum background soil concentration of 0.56 mg/kg by a maximum of 0.25 mg/kg. Total chromium was detected in 6 samples at concentrations slightly above the maximum background concentration; the maximum exceedance was 10.8 mg/kg. No PRG was developed for total chromium. The explosive compounds RDX and HMX were detected in the surface soil at the site. RDX was detected in 9 surface samples at concentrations ranging from 0.31 to 16.5 mg/kg. HMX was reported in 5 surface samples at concentrations ranging from 0.41 to 1.84 mg/kg. None of the other explosive compounds tested for (nitrobenzene [NB], tetryl, 1,3-dinitrobenzene [1,3-DNB], 1,3,5-trinitrobenzene [1,3,5-TNB], 2,4,6-trinitrotoluene [2,4,6-TNT], 2,4-dinitrotoluene [2,4-DNT], and 2,6-dinitrotoluene [2,6-DNT]) were detected in soil samples from the site.

The soil data collected at Range 36A were sufficient to adequately characterize the site. No further work regarding ordnance-related chemical residues and metals in soil will be performed. Recommendations for the evaluation of

ordnance-related chemical residues and metals in groundwater using existing monitoring wells are presented in Section 5.0 of this report.

### 3.1.2.2 Range 39 (Abandoned Car Dump)

The field investigation at Range 39, Abandoned Car Dump (Site 6) (Plate 1), was performed by HLA in February 1992 (HLA, 1992i). The purpose of the investigation was to evaluate the potential presence of petroleum hydrocarbons and metals from vehicles that were abandoned at the site. Twenty-two borings were drilled to approximately 5 feet bgs. Forty-four soil samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline and diesel, priority pollutant metals, and pH. TPH as diesel was detected in one surface sample at a concentration of 23 mg/kg. Unknown hydrocarbons were detected in six samples, two of which were collected below a drum labeled "fog oil." Concentrations of unknown hydrocarbons ranged from 11 mg/kg (the detection limit) to 19,000 mg/kg. Metals except antimony, lead, and chromium were detected within the range of background soil concentrations presented in the *Basewide Background Soil Investigation Report*. Antimony was not detected in background soil samples but was detected in one soil sample at the site at a concentration of 12.8 mg/kg, which is below the PRG developed for antimony in soil. The lead concentrations, although higher than background, were below the PRGs developed for lead in soil. No PRG was developed for total chromium; chromium concentrations ranged from 5.5 to 48.5 mg/kg. Future work proposed in the report included development of a PRG for fog oil and investigation of the lateral and vertical extent of fog oil contamination in the vicinity of the drums.

Range 39 has been classified as an IA site because it appears to contain a limited volume of impacted soil. Future work at Range 39 will be performed in accordance with the *Fort Ord Interim Action Feasibility Study (IA/FS)* (HLA, 1993c). A detailed discussion of the selection process and the subsequent IA approach is presented in the IA/FS (HLA, 1993c).

### 3.1.2.3 Ranges 40 and 41 (Suspected Fire Demonstration Areas)

Ranges 40 and 41 (Site 7) were investigated to evaluate the presence and locations of trenches that were reportedly used for fire and smoke demonstrations (EA, 1991a). It was reported that the trenches were excavated and flammable materials, mostly gasoline, were placed in the trenches and ignited. HLA subsequently interviewed Roy Durham of Fort Ord Range Control who indicated that Range 40 was a low-crawl course and Range 41 was an antitank weapons range. Mr. Durham suggested that the fire demonstration area referred to by EA was actually Range 40A, the Flame Field Expedient (FFE) Training Area. HLA personnel visited Ranges 40 and 40A in October 1992 to observe the FFE Training Area. Range 40A was investigated as Site 9. Three shallow trenches were identified in the FFE Training Area, and it was apparent from the soil staining that combustible materials were used at the range. Range 41 could not be visited because training activities were in progress. The results of the investigation were presented in the *Site 7 Draft Site Characterization Report (HLA, 1992j)*. HLA personnel returned with Mr. Durham to Range 41 in September 1993 to evaluate the presence of trenches in that area; no evidence of trenches or stained soil was found at that time. HLA concluded that no further investigation related to hydrocarbon contamination was necessary at Ranges 40 or 41. Ranges 40, 40A, and 41, however, will be considered in the evaluation of ordnance-related chemical residues as part of the Site 39 investigation. A discussion of the Range 40A investigation is presented below.

### 3.1.2.4 Range 40A (FFE Training Area)

Range 40A, the FFE Training Area (Site 9) (Plate 1), was an area used for training military personnel in the construction and use of improvised weapons using flammable substances. According to Army personnel at the Nuclear, Biological, and Chemical (NBC) School, the compounds used in this training exercise included gasoline, trinitrotoluene (TNT), M4 thickening compound, and detonation cord.

In the training exercises, a drum containing a gelatinous mixture of gasoline was partially buried so that its top pointed at a selected target. Detonation cord was used to blow off the top of the drum while the TNT charge in the drum ejected the burning material. According to Fort Ord Range Control, the burning material generally fell 75 to 100 meters from the firing point. Three shallow trenches at the site were used for fire and smoke demonstrations. It was recently reported that these trenches were filled with the gelatinous gasoline mixture and ignited to familiarize soldiers with burning obstacles. This recent information is inconsistent with previous reports that trenches at Range 40A were not filled with petroleum hydrocarbons.

HLA performed an investigation at Range 40A in February 1992 (HLA, 1992h). Seven borings were drilled to a depth of approximately 5 feet bgs. Fourteen soil samples were collected and analyzed for TPH as gasoline and diesel, benzene, toluene, ethylbenzene, and xylenes (BTEX), semivolatile organic compounds (SOCs), and total lead. Unknown hydrocarbons were detected at concentrations ranging from 11 to 1,300 mg/kg by the TPH as diesel analysis and tentatively identified compounds were detected by the analysis method for SOC. Discussions with the laboratory indicated that the unknown hydrocarbons detected in the soil samples were possibly fog oil and Stoddard solvent. None of the samples contained lead at concentrations above the PRG for lead presented in the *Draft Technical Memorandum*. Recommendations were made that, prior to additional sampling at Range 40A, the toxicity of fog oil should be investigated. Recommendations for additional characterization of Range 40A are presented in Section 5.0.

### 3.1.2.5 Range 49 (Molotov Cocktail Range)

Range 49, Molotov Cocktail Range (Site 8) is located between Parker Flats Road, Old Parker Flats Road, and Watkins Gate Road (Plate 1). The area was used for training troops in the use of Molotov cocktails and for demolition practice. Glass bottles were filled with a flammable liquid that may have consisted of various mixtures of gasoline, transmission oil, motor oil, and

detergent. The bottles were ignited and thrown at two armored vehicle targets. Stained soil and broken glass are present in the former target areas. Demolition training was limited to the use of 1/4-pound TNT charges.

In May 1992, the surface soil sampling and soil boring program presented in the Fort Ord RI/FS Sampling and Analysis Plan (HLA, 1991b) was reevaluated, and a revised investigation plan was developed. The revised approach, agreed upon by the Army, the regulatory agencies, and HLA, consisted of investigating the site by conducting a limited excavation. Prior to excavation, the Army was requested to characterize the types of contaminants present at the site. One surface soil sample was collected on April 6, 1992, and analyzed for TPH as gasoline and diesel, BTEX, and total lead. An unknown petroleum hydrocarbon was detected in the soil sample at a concentration of 4,200 mg/kg. Total lead was detected at 39.4 mg/kg, well below the PRG of 240 mg/kg presented in the *Draft Technical Memorandum*. Prior to further investigation, Range 49 was incorporated into the IA/FS process and future work at this site will be conducted in accordance with the IA/FS.

### 3.1.3 COE Huntsville Archives Search

The U.S. Army Engineer Division, Huntsville (USAEDH), Mandatory Center of Expertise (MCX) for UXO and OEW, performed an archives search to evaluate potential physical hazards that may exist from UXO and OEW at Fort Ord. The research included an evaluation of the types, quantities, and probable locations of UXO and OEW that may be present at Fort Ord as a result of past activities. USAEDH performed site visits, reviewed information from various archives and records holding facilities, and conducted interviews with personnel associated with Fort Ord and its operations. USAEDH identified 22 sites and provided recommendations for further evaluation of potential physical hazards at many of those sites. The details of the USAEDH research are provided in the *Archives Search Report* (USAEDH, 1993). As appropriate, HLA incorporated information collected by USAEDH into this report and work plan.

## 3.2 HLA Research

The purpose of the research effort for Site 39 was to gather information that would provide a foundation for making key decisions concerning possible future investigation and/or remediation of the site. Specifically, the research effort was performed to meet the following objectives:

- Assess which chemical contaminants may be present in soil and/or groundwater at the site, based on past activities
- Evaluate potential site contaminants with respect to the toxicity, fate, and transport properties
- Develop a work plan to investigate ordnance-related chemical residues in soil, if any, and their concentrations in areas of high use
- Assess the feasibility of remediating potential chemical hazards related to UXO and OEW at the site
- Develop a work plan to evaluate the lateral and vertical extent of hydrocarbon-related soil contamination in previously investigated or newly discovered training ranges.

The research effort, as described below, consisted of site visits and interviews (Section 3.2.1) and a records search and historical map review (Section 3.2.2). The information obtained in those tasks was used to identify areas outside the Inland Ranges that may have been used for ordnance training and training areas within the Inland Ranges that have potential hydrocarbon contamination (Section 3.2.3). Investigation of the chemistry of ordnance components (Section 3.2.4), and an evaluation of toxicity, fate, and transport potential of ordnance chemical constituents (Section 3.2.5) was also performed for this report.

### 3.2.1 Site Visits and Interviews

Six site visits to Fort Ord were conducted during the course of the investigation. The first site visit, from July 6 through 8, 1993, was assisted by Roy Durham of Fort Ord Range Control and

consisted of a tour of Inland Ranges 18 through 48. During this visit, Mr. Lee Stickler, Mr. Durham's predecessor, was also interviewed. Information compiled from Fort Ord files and interviews with Roy Durham and Mr. Stickler was used to identify the range names, types of training activities performed, and types of ordnance used or found in the Inland Ranges. SFC Beardsley, formerly of the 49th EOD unit at Fort Ord, was also interviewed to gain further knowledge about UXO and OEW discoveries on base. Mr. David Thompson of Fort Ord Quality Assurance Specialist Ammunition Surveillance (QASAS) was interviewed on the last day of the first visit. Mr. Thompson identified several military installations and ordnance manufacturers that might be able to provide chemical data regarding the various ordnance identified at Fort Ord.

A helicopter flyover was performed on August 24, 1993, to observe various range features along the perimeter of the Inland Ranges and to identify various target areas within the High Impact Area.

The third site visit, in September 1993 with Roy Durham, was to evaluate potential ordnance training areas outside the Inland Ranges that were identified during the record search and historical map review (Section 3.2.2).

Followup site visits were completed in October and November 1993 to gather additional information regarding selected ordnance training areas, and to identify representative sampling areas within the ordnance training areas. Another followup site visit was performed December 8 and 9, 1993, to further refine sampling strategies and to investigate newly discovered study areas.

### **3.2.2 Records Search and Historical Map Review**

A records search and historical map review at Fort Ord Range Control was completed July 26 through 28, 1993. HLA was allowed access to available files at Range Control regarding range specifications, locations, ordnance used, and correspondence. Several training facilities maps dating from the 1960s through 1980s were also

available for review. Information obtained from Range Control after the initial records search regarding the use of the ranges and areas outside the ranges was reviewed during other site visits and was incorporated in the investigation as it became available. Several historical training facilities maps from the mid 1950s discovered during USAEDH's archives search (*USAEDH, 1993*) were also used in the evaluation of potential additional study areas.

### **3.2.3 Identification of Study Areas**

Information gathered during the literature and record search, historical map review, and interviews indicated that there were a number of areas outside the Inland Ranges that could have potentially been used for ordnance training. Areas within the Inland Ranges with evidence of potential hydrocarbon contamination were also identified. Each of these identified areas was investigated further with a site visit or additional interviews with the appropriate Fort Ord personnel. Recommendations regarding further investigation of these areas were then developed. The results of the investigation of the study areas and recommendations are presented in Section 4.2.

### **3.2.4 Chemistry of Ordnance Components**

The original scope of the research effort for Site 39 included identification of the chemical constituents of ordnance used at Fort Ord. This information was to be used to evaluate the toxicity, fate, and transport potential of ordnance-related chemicals and to develop a list of appropriate analytes for the field investigation. Information gathered during the records search and interviews was used to identify the types of ordnance at Fort Ord and their various functions. The next step in the research was to identify the types and chemical compositions of explosives, propellants, fuzes, and casings that composed each type of ordnance. Readily available sources of information, such as Army training manuals, ordnance chemistry books, and explosives investigation reports from various military installations, did not contain the desired chemical information.

A number of ordnance information resources were contacted, including the Army Environmental Center (AEC), Aberdeen, Maryland, various ammunition manufacturing facilities, and several military installations where remedial investigations are in progress. Specific chemical compositions of the ordnance items could not be determined without the Military Specification Number assigned to each component. A request was made to Fort Ord for a list of the specific ordnance items used at the base and their specification numbers; such information could not be found or did not exist. It became apparent that, based on available information, the identification of each chemical constituent of each type of ordnance was not feasible. Therefore, an alternative approach was developed where potential contamination would be investigated by focusing on the chemical constituents that are expected to be associated with conventional ordnance typically used at Fort Ord. Conventional ordnance generally contains relatively few types of explosive compounds, most of which are easily identifiable using established analytical methods. These common explosive compounds, if present, may act as indicators for less common ordnance-related chemical residues. In addition, the less common (and less easily analyzed) explosive compounds are generally present in significantly smaller quantities.

### **3.2.5 Evaluation of Toxicity, Fate, and Transport Potential of Ordnance Chemical Constituents**

HLA performed an evaluation of the toxicity, fate, and transport potential of selected chemical constituents such as propellants and explosives found in various types of ordnance. Factors affecting fate and transport of metals in soil and groundwater were also identified to address potential ordnance-related metals contamination. As stated above, this evaluation focused on the chemical constituents associated with the conventional explosives that were used at Fort Ord. Available literature regarding degradation products of explosives was also evaluated. This evaluation included identification of physical and chemical characteristics such as solubility, Henry's Law Constants, boiling and melting points, and partitioning coefficients. Persistence factors were also identified, such as chemical half-lives in water and soil and bioconcentration factors. Toxicity parameters were evaluated relative to ingestion and inhalation factors. A discussion of the results of this research is presented in Section 4.4.

## 4.0 RESULTS

### 4.1 Inland Ranges Usage

This section describes the usage of the Inland Ranges, including the configuration of the ranges, types of training performed, ordnance likely to be found in each area, and a discussion of decommissioned ranges. The potential hydrocarbon contamination that may be present at specific ranges is discussed in Section 4.2.2.

The Inland Ranges were closed as part of base closure. Only Range 39, adjacent to Fort Ord Range Control, remains open for civilian use by the Carmel Valley Gun Club.

#### 4.1.1 Current Range Configuration and Distribution of Ordnance

The current range configuration (at the time of base closure) of the Inland Ranges, based on available site maps and interviews with Fort Ord Range Control personnel, is shown on Plate 1. Thirty-seven ranges were active or considered operational at the time of Fort Ord base closure. The ranges are situated approximately along the perimeter such that weapons firing is generally directed toward the center of the Inland Ranges. Each range has specifications assigned to it that identify firing lines, targets or target areas, right and left buffer zones, and maximum range distances based on the weaponry allowed at the range. The types and functions of ordnance used at Fort Ord are listed in Table 1. As shown, each type of ordnance may have multiple functions depending on the application. These may include high explosive, high explosive antitank (HEAT), armor piercing, white phosphorous, smoke, tracer, illumination, and incendiary functions. Practice ordnance may include photo flash (spotting charge), or inert types. Small arms ammunition includes blank, ball (slug), or tracer rounds.

Table 2 lists the Inland Ranges and the types of ordnance found at each range. As stated earlier, the types of ordnance used over time may have changed as some range uses changed. The range

use(s) and dates of use, as available, are also included in Table 2. The distribution of ordnance in a given range is influenced by the placement of targets within the range. The majority of ranges using high explosive ordnance have fixed targets, and ordnance that is fired is expected to have exploded within yards of the intended target. Several ranges used for high explosive ordnance training also utilized additional targets placed further down range in the High Impact Area. This anticipated distribution of ordnance and ordnance-related residues, governed by locations of targets, is the basis for selection of sampling locations discussed later in this report. The distribution of bullets in the small arms ranges, as discussed below, is more random because bullets may pass through or miss the targets and travel hundreds of meters beyond.

The following sections describe the functional areas of the Inland Ranges, including the High Impact Area (Section 4.1.1.1), small arms ranges (Sections 4.1.1.2), high explosive/anti-armor ranges (Section 4.1.1.3), specialty training ranges (Section 4.1.1.4), and nonfiring ranges (Section 4.1.1.5). In addition, ranges that were decommissioned in the past are discussed in Section 4.1.1.6.

##### 4.1.1.1 High Impact Area

The High Impact Area is approximately in the center of the Inland Ranges and covers about 1,100 acres (Plate 1). Its boundaries shown on Plate 1 are based on maximum ordnance trajectory, overlapping range fans, and the extent of restricted air space for Monterey Airport.

The HIA was used as a target area for much of the high explosive ordnance. Targets within the HIA were fired upon using a variety of ordnance from a number of ranges. The HIA was also a target area for onshore naval gunfire and aerial bombing practice. The majority of target locations in the HIA are shown on Plate 2. The targets included trucks, automobiles, tanks, APCs, shipping containers, dumpsters, and

similar available objects. As discussed in Section 4.1.1.3, targets for high explosives practice are also present outside the HIA, but are within specific ranges.

#### **4.1.1.2 Small Arms Ranges**

Small arms ranges were primarily for pistol, rifle, and machine gun practice using ammunition that did not contain explosives. Plate 3 shows a representative small arms target area. Seventeen ranges were identified as strictly small arms use areas (Table 2); however, several of these ranges or areas within the ranges may also have been used in the past for training using other types of ordnance. In addition, ranges used for high explosive/anti-armor may also have experienced small arms use, but for the purpose of this report, such ranges have been classified as high explosive/anti-armor ranges. Small arms training took place primarily in the ranges along the western and southern edges of the Inland Ranges and near Range Control. The ordnance used at these ranges consisted of various caliber blank, ball, and tracer ammunition. Ordnance-related residue in these areas is expected to consist of spent bullets and metal fragments (e.g., bullet casings). Targets at the small arms ranges were usually fixed and pop-up targets with no backstops. Because there were no backstops in these ranges, spent bullets are expected to be scattered over the ranges. High explosive ordnance may also be present in these ranges from past uses, range fan overlap, or misdirected shots.

The distribution of spent bullets in the small arms ranges is currently unknown. The approach for the evaluation of the distribution of spent bullets in these areas is addressed in Section 5.0, Site 39 Work Plan.

#### **4.1.1.3 High Explosive/Anti-Armor Ranges**

High explosive/anti-armor ranges identified at Fort Ord are those where training with rockets, grenades, or artillery has taken place. Sixteen ranges of this type are located within the Inland Ranges. A representative high explosive target area is shown on Plate 3. The high explosive/anti-armor ranges and the ordnance

used or found at them are listed in Table 2. Some small arms training may also have taken place at several of these ranges. Ordnance that may be found in these ranges include those fired from light artillery, recoilless rifles, machine guns, shoulder-fired anti-armor weapons, grenade launchers, and mortar devices. These areas may also contain antitank and antipersonnel ordnance such as mines and hand grenades. Many ordnance have multiple functions; ordnance used in the Inland Ranges and their functions are listed in Table 1. The high explosive/anti-armor targets are located within selected ranges and also in the High Impact Area. Common stationary targets were automobiles, tanks, APCs, metal silhouettes, or similar available objects. Some ranges were equipped with moving targets. The majority of ordnance-related chemical residue is expected to be found at or near targets in the ranges or in the High Impact Area. Contaminants may include chemicals from propellant and explosive residues and metals (e.g., shrapnel and casings). The investigative approach for the evaluation of potential ordnance-related chemical contamination is discussed in Section 5.0.

#### **4.1.1.4 Specialty Training Ranges**

Three ranges were identified where specialty training activities took place. These specialty training areas were used for ordnance live fire and field expedient training; hence, the familiar fan-shaped range configuration does not exist at these ranges. They were identified as Range 33, Demolitions Range; Range 35, Military Operations on Urban Terrain (MOUT) Complex; and Range 40A, FFE Training.

Range 33 (Plate 1) was used by engineering personnel for standard demolition training using conventional explosives and field expedient demolition training using improvised explosives. A detailed discussion of Range 33 is presented in Section 4.2.2.

The Range 35 MOUT Complex (Plate 1) in Wildcat Canyon was used for a variety of training activities and maneuvers. This range included Impossible City, a mock city where training, including climbing and search and infiltration techniques was performed. Several buildings in

the MOUT Complex were authorized for live small arms fire within the confines of their structures. The Tire House, constructed of sand-filled tires, was used for live small arms fire and hand grenade practice. According to Fort Ord Range Control, 40-millimeter high explosive rounds and bazooka rounds were fired into Wildcat Canyon at chosen targets south of Impossible City. Investigation of Range 35 is included with the other inland ranges in the Site 39 Work Plan in Section 5.0.

Detailed discussions of the types of activities that took place at Ranges 40A (FFE Training Area) and 49 (Molotov Cocktail Range) are presented in Sections 3.1.2.4 and 3.1.2.5, respectively.

#### **4.1.1.5 Nonfiring Range**

One nonfiring range, Range 23M, Dragon Tracking Range (Plate 1), was used as a nonfiring training area for laser-aimed Dragon anti-armor weapons. According to Fort Ord Range Control, this area was for nonfiring practice only. However, as shown in Table 2, some high explosive Dragon rounds and fragments of 4.2-inch mortars were found at the range.

#### **4.1.1.6 Decommissioned Ranges**

At least 12 decommissioned ranges were identified in the Inland Ranges from historical training facilities maps and various aerial photos. Decommissioned ranges are those that have not been used in recent times and have subsequently been dismantled or had other ranges built over them. Range 20 (Plate 1) was identified on a 1972 map, although its usage could not be determined. Range 22 was a target detection range that has since been reconstructed. The current Range 22 is a small arms range that accommodates live fire. A rifle grenade range shown on a 1957 map was identified by Mr. Durham as Range 37 before it was changed to its current configuration (Plate 1); the old range location still contains numerous 3.5-inch rockets and other ordnance. Range 44A was listed on a 1977 training facilities map, but no location was shown. Range 44A is thought to have been an alternate firing line for the Range 44 area. A hand grenade training area and rifle training area were shown on a 1957 training

facilities map within the Inland Ranges boundary northeast of Range 35 (Plate 1). Several other unidentified ranges appear as areas of disturbed vegetation on a 1981 aerial photo provided by Fort Ord Range Control. These include an old mortar range near Range 18, a machine gun range near Range 19, two rocket launcher ranges between Ranges 18 and 19, a recoilless rifle range near Range 22 and a rocket launcher range near Range 39 (Plate 1). The 2.36-inch Rocket Range is also a decommissioned range, but because it is outside the Inland Ranges, it is discussed as an additional study area (Section 4.2). The uses of these unidentified ranges are assumptions from Roy Durham of Range Control based on the types of ordnance found and areas that could have contained targets. A few other disturbed areas were seen on aerial photos, but their purposes could not be determined; Mr. Durham thought that these disturbed areas may have been used for training, but no specific ordnance could be identified with the areas. The Wolf Hill Training Area, northeast of Laguna Seca (Plate 1), contained several 37 mm artillery rounds; the specific use of the area is unknown.

## **4.2 Additional Study Areas**

As discussed in Section 3.2, Site 39 research also included the identification of (1) training areas outside the Inland Ranges where known or suspected ordnance-related activities occurred, and (2) areas within the Inland Ranges that were known or suspected to contain hydrocarbon contamination. Available information for each of these areas was evaluated to assess if additional investigation is needed. The results of these evaluations are described below.

### **4.2.1 Areas of Potential Ordnance-Related Activities Outside the Inland Ranges**

Thirty-three types of areas that comprise 55 locations of potential ordnance-related activities outside the Inland Ranges were identified from available historical maps, records, or through interviews with past and present Fort Ord personnel. Table 3 lists these 55 locations; some of the areas are found at multiple locations but are listed only once in Table 3. Further investigation revealed that

many of the areas were practice areas where nonfiring training took place, or were used for firing practice with nonexplosive ordnance. Other areas were found to contain isolated live or practice ordnance that had been disposed by EOD personnel. The purpose of evaluating the 55 sites was to identify areas that were likely to contain ordnance-related chemical residues. In general, most of the areas where live ordnance training took place appear to have had limited use or use over large areas such that detectable concentrations of ordnance-related chemical residues in soil or groundwater are not likely. The results of the evaluation of these 55 locations are presented below. Of the 55 locations investigated, only one area, the 2.36-inch Rocket Range, warranted further investigation for the potential presence of ordnance-related chemical residues. Another study area, Pete's Pond, is being investigated under a separate program. Range 49 - Molotov Cocktail Range, which is also one of the 55 locations, will not be investigated for ordnance-related chemical residues, but it will be investigated for hydrocarbon contamination under the IA implementation process.

It should be noted that, although the remaining 53 areas may not contain potential contamination from ordnance-related chemical residues, they may still contain physical hazards related to UXO. In a separate effort, USAEDH is developing an approach to evaluate such areas for potential physical hazards. If additional areas of potential ordnance-related activities are identified during USAEDH's investigations, the potential for contamination from ordnance-related chemical residues at these additional areas will be evaluated.

### **ASP Grenade Area**

The ASP Grenade Area is east of Barloy Canyon Road approximately between Sandstone Ridge and the southern boundary of the new ammo supply point (ASP) (Plate 1). This area contains numerous metal fragments from pineapple-type grenades and some expended fuzes. The highest fragment concentrations occur in what appears to be an old sandstone quarry. Because grenade fragments are widely distributed and no evidence can be found of a target area, identification of

areas where ordnance-related chemical residues are concentrated is not likely. Therefore, investigation for ordnance-related chemical residues in soil in this area will not be performed.

### **Picnic Canyon Training Area**

The Picnic Canyon Training Area (Range N-1/N-2) is a north-south trending canyon just off Eucalyptus Road between Barloy Canyon Road and Mudhen Lake (Plate 1). The canyon is broad and flat at its entrance and becomes narrower with steeper walls toward the south. This area was used to train troops in ambush techniques and occasionally for firing of practice rounds from helicopters. The area contains evidence of hand grenades, Claymore mines, some 37 mm rounds, and 40 mm practice rounds. The dates of use of this area are unknown, but because this type of training is not currently authorized outside of the Inland Ranges area, it likely was used during or before World War II. This area appears to have had relatively widespread but light use. Therefore, heavy concentrations of ordnance-related chemical residues are not expected at this site, and further investigation is not proposed.

### **2.36-Inch Rocket Range**

The 2.36-inch Rocket Range is northwest of the Range Control office and is bounded by Eucalyptus Road, Watkins Gate Road, and Parker Flats Road (Plates 1 and 4). According to Fort Ord Range Control, this range was probably used as an antitank rocket range during and shortly after WW II. Post WW II training facilities maps identify this area as a recoilless rifle training area in 1964, and as Range 42A, Concurrent Mortar Training Area, in 1977. Roy Durham of Range Control said that "concurrent training" referred to "dry fire" (nonfiring) exercises performed prior to conducting live fire training at the Inland Ranges across Eucalyptus Road.

The range covers an area approximately 400 meters long and 300 meters wide and was used for antitank fire exercises. A low, broad ridge defines the northern extent of the range and the east side is bounded by a manmade berm.

No physical boundary defines the west side of the range. A portion of a narrow gauge railroad track for moving targets is present in the western part of the range. Fort Ord Range Control indicated that the track was longer in the past, but portions were either removed or covered. Approximately one thousand 2.36-inch rockets (WW II bazooka rounds) were removed from the area during ordnance clearance in early 1992. Numerous rockets and components are still present at the site. Because of the heavy concentration of ordnance at this site, this area has been identified for investigation to evaluate the presence of ordnance-related chemical residues in soil. The Site 39 Work Plan (Section 5.0) describes the investigative approach for the site.

#### **Range 50**

Range 50 is located in an old quarry near Leary Hill between Watkins Gate Road and Henneken Ranch Road (Plate 1). Range 50 was identified as an EOD range on training facility maps dated 1968 and 1972. HLA visited the quarry with Roy Durham on September 16, 1993. The quarry is on top of a hill and consists of a semicircular excavation approximately 150 meters wide and 40 feet deep. Items found in the quarry included detonation cord, three 6-volt batteries, and an inert practice land mine. The area did not appear to have been used for ordnance disposal. Mr. Durham suggested that the area was probably used for engineer training where simulated demolition activities occurred. He also stated that some blasting caps may have been used as part of the training exercises. Because the quarry contains only a small amount of ordnance-related material and does not appear to have experienced significant use, evaluation of soil for ordnance-related chemical residues is not warranted.

#### **Naval Round Impact Area**

The Naval Round Impact Area is east of the Inland Ranges and just south of Range P-5 (Plate 1). As discussed in Section 4.1.1.1, the High Impact Area was used as a target area in the past for onshore naval gunfire practice from Monterey Bay. The Naval Round Impact Area contains numerous craters apparently caused by

explosions from 7-inch and 8-inch naval rounds that overshot intended targets in the High Impact Area. The craters are approximately 6 feet in diameter and 2 to 3 feet deep and are scattered across the west slope of Lookout Ridge (Plate 1). No shrapnel from these rounds has been found in the area and it is possible that rounds may have impacted into the hillside to depths up to 10 feet bgs. The craters appear to be scattered over a fairly large area with no distinguishable pattern. Because the craters are scattered over such a large area and because controlled burns are conducted here, it is unlikely that detectable amounts of ordnance-related chemical residues exist in soil at this site. Therefore, evaluation of soil for ordnance-related chemical residues is not warranted.

#### **Range P-5**

Range P-5 is a subcaliber artillery and mortar practice firing area east of the Inland Ranges and is bounded by Barloy Canyon Road and the top of Lookout Ridge (Plate 1). According to Range Control, this area was used solely for subcaliber firing practice with ordnance equipped only with photo flash spotting charges. Because controlled burning is performed at this range every year, it is likely that photo flash charge residues would have ignited during the controlled burns. Because this area covers approximately 100 acres and it is unlikely that detectable ordnance-related chemical residues exist, evaluation of soil for ordnance-related chemical residues is not warranted.

#### **1930s Training Area**

The 1930s Training Area was identified as a possible area of ordnance-related activity by a friend of Colonel Ludwig, formerly of the Fort Ord DEH. During an interview, Colonel Ludwig's friend circled on a map the area he believed to be the training area. The training area was supposedly in the eastern portion of the base just north of Oil Well Road (Plate 1). HLA and Mr. Durham visited the site on September 16, 1993, and found several wooden pilings and some concrete blocks in an elongate depression. A few broad, flat depressions with 1-foot high berms at the site were identified as possible low crawl areas by

Mr. Durham. This area showed no evidence of ordnance use and therefore will not be investigated.

### **Firing Points**

Three firing points north and east of the Inland Ranges were identified on various historical training facilities maps and file drawings (Plate 1). The flagpoles that were used to signal that live fire training was in progress still remain. According to Fort Ord Range Control, these areas experienced light use for approximately 2 to 3 days at a time from about 1978 through 1982. During training events, it was common to fire approximately 60 rounds at targets in the High Impact Area. Spent casings and misfired ordnance were collected after each training event. Because the areas were cleared after each event and ordnance-related chemical residues are only expected at the target zones that were within the High Impact Area, investigation of the firing points to evaluate soil for ordnance-related chemical residues is not warranted.

### **Artillery Positions**

Training facility maps dating from the mid to late 1950s show two artillery positions, one at Mudhen Lake and the other at Laguna Seca (Plate 1). No physical evidence of such an emplacement was found at Mudhen Lake and no information was available to confirm the presence of an artillery position on property comprising Laguna Seca. According to Fort Ord Range Control, it is thought that these positions, if they existed, probably experienced use similar to that at the Firing Points discussed above. Similarly, ordnance-related chemical residues would be expected at the targets rather than at the artillery positions and investigation of the artillery position firing points to evaluate soil for ordnance-related chemical residues is not warranted. No information is available regarding the target areas for these two artillery positions, but they are likely to be within or near the High Impact Area, at the center of the Inland Ranges (Plate 1).

### **Officers' Club Foxhole**

The presence of what appeared to be a foxhole near the former Officers Club (Plate 1) was mentioned by SFC Beardsley, formerly of Fort Ord EOD, in a conversation with HLA on July 7, 1993. He showed on a map the approximate area of a foxhole where he removed some M-1 rifle rounds and a rifle grenade. The Explosive Ordnance Incident Report dated February 20, 1993, reported that the ordnance consisted of 100 .30 caliber ball and tracer rounds and one rifle smoke grenade. The items were removed and placed in a Safe Holding Area for later disposal. No other ordnance was found in the area. Because of the small amount of ordnance found at this site, investigation for ordnance-related chemical residues in soil is unwarranted.

### **100-Pound Bomb Site**

In a discussion with SFC Beardsley of Fort Ord EOD on July 7, 1993, HLA was informed that a 100-pound bomb was found near the Confidence Course, located near Eighth Avenue and Inter-Garrison Road (Plate 1). According to Roy Durham of Fort Ord Range Control, this area was used in the past for emergency and EOD training. The EOD Explosive Ordnance Incident Report indicated that the bomb was an unfused, concrete-filled training device. Found with the bomb were two inert antitank practice mines, one inert antipersonnel practice mine, and one parachute flare. Based on the information provided in the EOD report, there do not appear to be ordnance-related chemical residues associated with this area. Therefore, further investigation of this area is not necessary.

### **Leary Hill Mortar Area**

The Leary Hill Mortar area is north of Eucalyptus Road between Watkins Gate Road and Henneken Ranch Road (Plate 1). Roy Durham of Fort Ord Range Control stated that, to his knowledge, only illumination mortars were found on this hill and their occurrence did not appear to coincide with known ranges in the area. USAEDH reported finding some 81 mm, high-explosive mortars in this area but were unable to determine a firing position (USAEDH, 1993). Because no significant

accumulations of ordnance (indicating a target area) have been found in the approximately 100-acre area, detectable ordnance-related chemical residues are not likely to be present; therefore, this area will not be investigated for those residues.

### **Flame Thrower Ranges 1 and 2**

Two former flame thrower ranges were shown on historical training facilities maps. During the USAEDH archives search for Fort Ord, a map dating from 1957 was discovered that showed a former flame thrower range (Flame Thrower Range 1) in the eastern portion of a fenced depression near Patton Elementary School (Plate 1). An undated map from the files of the Fort Ord Fire Department shows Flame Thrower Range 2 on top of Elliot Hill, north of the intersection of Eucalyptus Road and Henneken Ranch Road (Plate 1). No records confirming the use of flame throwers were found during the archives search, although orders for flame thrower parts were found by USAEDH (USAEDH, 1993). HLA performed a site walk of Flame Thrower Range 1 on November 2, 1993, and Flame Thrower Range 2 on December 8, 1993; no evidence indicating the use of flame throwers (e.g., distressed vegetation, stained soil, old targets, staging areas, or firing positions) was observed. A bulldozed area was observed on top of Elliot Hill, but its use is unknown. The lack of evidence of flame thrower training in these areas indicates that an evaluation of soil chemistry in these areas is not warranted at this time.

### **Range 49 (Molotov Cocktail Range/Demolition Area)**

Range 49 is in a low depression north of Eucalyptus Road between Parker Flats Road and Watkins Gate Road (Plate 1) where Molotov cocktails consisting of gasoline, transmission oil, motor oil, and detergent were thrown at two old armored vehicles. This area was also used for occasional demolition practice which was limited to the use of 1/4-pound TNT charges. HLA's investigation of Range 49 (Site 8) for the Fort Ord NPL Program revealed hydrocarbon-stained soil and large quantities of broken glass. In a USAEDH interview, former Range Control officer

Lee Stickler reported that Range 49 was used as a safe demolition area for munitions disposal. USAEDH subsequently performed a site walk and was only able to confirm the two blackened areas where the two former vehicle targets were located. Range 49 will not be investigated for ordnance-related residue contamination because no evidence (other than Lee Stickler's recollection) has been found indicating this area was used as a munitions disposal area. A discussion regarding hydrocarbon contamination in soil at Range 49 is presented in Section 4.2.2.

### **East Garrison 3.5-Inch Rocket Site**

During an interview with Roy Durham, HLA learned that a 3.5-inch rocket (bazooka round) was found in a tree south of the pistol range at the East Garrison in May 1993 (Plate 1). Review of the Explosive Ordnance Incident Report revealed that the item was an expended 3.5-inch rocket motor that was found near Building 2788 in the vicinity of the Twelfth Street Gate. According to SFC Beardsley, formerly of Fort Ord EOD, the item was discovered in a tree near the East Garrison pistol range and carried to Building 2788. The exact location where the rocket was found could not be confirmed. Because there is no evidence of training using rockets in this area, the East Garrison 3.5-inch rocket site will not be investigated for explosive ordnance-related chemical residue contamination.

### **Fritzsche 3.5-Inch Rocket Site**

The Fritzsche 3.5-inch Rocket Site is approximately one mile east of the intersection of Blanco Road and Reservation Road (Plate 1). According to Chief Fletcher of the Fort Ord Fire Department, a 3.5-inch rocket was found in a bush in this area sometime around 1975 to 1978 and removed by EOD personnel shortly thereafter. No EOD report was available for review. During a discussion with Fort Ord Range Control, HLA was told that this area was not used for ordnance training and that the rocket was most likely removed from one of the ranges and left there. Because this appears to be a single occurrence, ordnance-related chemical residues are not expected and this area will not be investigated further.

### Rifle Grenade Area

The Rifle Grenade Area is slightly southwest of Machine Gun Flats and northeast of the intersection of Henneken and Eucalyptus roads (Plate 1). This area was identified by USAEDH as a possible rifle grenade range based on the presence of rifle grenade fragments. The area was also identified as a possible Fougasse training area based on the presence of drum fragments. Fougasse is a flame field expedient that uses explosives to disperse and ignite flammable material over an area. HLA personnel toured the area on October 19, 1993, with Roy Durham of Fort Ord Range Control, but were unable to find such an area as described by USAEDH. HLA revisited the site on November 2, 1993, and found a clearing that appeared to have been used as a bivouac area. A piece of ordnance that may have been part of a practice rifle grenade was found at that time; a small piece of a steel drum was also found. According to a UXO expert with USAEDH, drums are frequently used for targets at some ranges. The lack of significant accumulations of rifle grenade fragments indicates that the site was probably not used extensively for ordnance-related training. Also, the presence of drum fragments at this site may be a result of their use as targets rather than materials used in Fougasse training. The lack of evidence that flammable materials were used (e.g., stressed vegetation and soil staining) further suggests that Fougasse training did not occur in this area. Therefore, this site will not be investigated for ordnance-related chemical residues or hydrocarbons.

### Sinkhole Practice Mortar Range

The Sinkhole Practice Mortar Range was identified from a map dated July 15, 1957. The range is east of the 4400/4500 block motor pool, east block, and south of Inter-Garrison Road (Plate 1). Based on available information, it is believed that this area was used for firing practice mortars and training troops in nonfiring drills (dry-fire). In a subsequent discussion, Roy Durham stated that he knew of no mortar practice in that area. He also stated that as much as 30 feet of fill was later placed in this area during the construction of the 4400/4500 block motor pools.

Except for small spotting charges, accumulations of ordnance-related chemical residues are not likely to result from practice mortar use. Therefore, investigation of soil for ordnance-related chemical residues at the Sinkhole Practice Mortar Range is not warranted.

### Imjin Road Practice Mortar Range

From maps dating from the mid to late 1950s, the Imjin Road Practice Mortar Range was identified near the intersection of Imjin Road and Abrams Avenue (Plate 1). The exact location of the range was not indicated on the maps. It is believed that this area was used for firing practice mortars, which may contain small spotting charges, or in nonfiring drills (dry-fire). Because significant accumulations of ordnance-related chemical residues are not likely to result from these training exercises, investigation of soil chemistry for those residues at the Imjin Road Practice Mortar Range is not warranted.

### Parker Flats Practice Mortar Range

Parker Flats Practice Mortar Range is north of Range 49 between Old Parker Flats Road and Watkins Gate Road (Plate 1). This range was shown on an undated map supplied by the Fort Ord Fire Department. Its use was most likely similar to that of the Sinkhole and the Imjin Road Practice Mortar Ranges. Ordnance-related chemical residues are not expected to be present. Therefore, no further investigation is proposed for the Parker Flats Practice Mortar Range.

### Antitank Practice Mine Area

During an interview, SFC Grimes of Range Control informed HLA that an inert antitank practice mine had been removed by EOD from the east side of the base near the intersection of Jacks Road and Engineer Canyon Road (Plate 1). A subsequent walkthrough by USAEDH showed no sign of practice mine training in that area. The lack of evidence of ordnance training and the presence of only one inert mine indicates that evaluation of this area for ordnance-related chemical residues is not warranted.

### Storage Yard Landmine

During recent field investigations at Fort Ord, HLA personnel were informed by a subcontractor that a land mine had recently been found at the recreational vehicle storage yard near the intersection of 9th Street and 4th Avenue in the Main Garrison (Plate 1). At HLA's request, Fort Ord Range Control questioned the responding EOD personnel and found that the item was an inert training device. Because no ordnance training took place in this area, it is likely that someone carried it to the storage yard. Therefore, the Storage Yard Landmine site does not warrant investigation for ordnance-related chemical residues.

### CBR Training Areas

Four areas for training troops in chemical, biological, and radioactive (CBR) warfare maneuvers were identified during the review of training facilities maps. The four CBR areas are located north of the Inland Ranges in the open area between the Main Garrison and East Garrison (Plate 1). According to USAEDH's research, classroom training took place in these areas using chemical agents similar to tear gas. Minute amounts of mustard gas, probably part of Chemical Agent Identification Sets (CAIS), were also used to familiarize troops with this substance (USAEDH, 1993). USAEDH toured the CBR areas and found evidence of pyrotechnic use and a suspected washout area. No ordnance was found at any of the areas. Fort Ord Range Control told HLA that the suspected washout area was most likely used by troops practicing vehicle decontamination. On the basis of available information, it does not appear that chemical agents were released to the environment as a result of activities at the CBR training areas. Therefore, further investigation of these areas is unwarranted.

### Mine and Booby Trap Areas

Six mine and booby trap areas were identified on training facility maps from the mid to late 1950s between Intergarrison and Eucalyptus Roads at the locations shown on Plate 1. It is believed that only inert ordnance and practice ordnance such as smoke grenades were used in these areas.

Inert and practice ordnance and booby traps are not expected to contain explosives. These mine and booby trap areas do not warrant investigation relative to ordnance-related chemical residues.

### Pete's Pond

Pete's Pond, located at the intersection of Imjin Road and Eighth Street (Plate 1), is identified as a former uncontrolled landfill and is part of the Fort Ord NPL Site 16/17 investigation. Bazooka (2.36-inch rocket) rounds and a buried empty drum with markings indicating a mustard-type chemical agent were found by HLA during the 1993 site investigation. The 87th EOD from the Presidio of San Francisco removed the bazooka rounds. Potential contamination related to ordnance or other buried items at the site will be addressed as part of the Site 16/17 investigation.

### 75 mm Pack Howitzer Firing Area

The 75 mm Pack Howitzer Firing Area is in the northwest corner of the base (Plate 1). The location was mentioned in an interview with Orville Opaugh, a retired military engineer, who served at Fort Ord. He said he had heard of firing exercises performed in this area when the cavalry was present in the early 1900's at the Presidio of Monterey. It is thought that cavalry troops would set up firing points in this area and fire into the Inland Ranges area. No evidence of such activities could be found during HLA's investigation or USAEDH's archives search. Therefore, further investigation of this area is unwarranted.

### Machine Gun Squares

Seven machine gun (MG) squares were identified at Fort Ord. Five were located in the area between the main entrance, Gigling Road, Eighth Avenue, and First Street; one was north of the intersection of Parker Flats Cutoff and Normandy Road; and one was north of the Leary Hill Mortar Area (Plate 1). The locations were indicated on a 1957 training facilities map and on undated maps supplied by the Fort Ord Fire Department. According to Fort Ord Range Control, machine gun squares are practice areas

where non-live firing exercises take place. Therefore, these areas do not appear to pose a threat relative to chemical residues from explosives and do not warrant further investigation.

#### **Machine Gun Proficiency Training Area**

The Machine Gun Proficiency Training Area, located between Imjin Road and Inter-Garrison Road (Plate 1), was described and sketched in a Fort Ord memorandum dated August 8, 1956, which was provided by Fort Ord DEH. Discussions with Fort Ord Range Control indicate that this area was for dry fire training and possible firing of blank rounds. No further investigation is proposed for this area.

#### **Mortar Squares**

Five mortar squares (Plate 1) were identified on a 1957 training facilities map. Mortar squares are similar to machine gun squares in that only dry fire training and possible firing of blank round occurred in these areas. Therefore, these areas do not appear to pose a threat relative to ordnance-related chemical residues and do not warrant further investigation.

#### **Mortar Position**

A mortar position north of Laguna Seca and east of Barloy Canyon Road (Plate 1) was indicated on an undated training facilities map thought to be from the mid to late 1950s. Although the exact location of the mortar position could not be found, Fort Ord Range Control thought that, because of its remote location, it was most likely used only for practice. Therefore, the mortar position does not appear to pose a threat relative to ordnance-related chemical residues and does not warrant further investigation.

#### **Recoilless Rifle Training Area**

A 1957 training facilities map identifies a recoilless rifle training area near the intersection of Gigling Road and North South Road (Plate 1). Fort Ord Range Control indicated that this training area was probably used for dry-fire training. USAEDH performed a site visit and found no evidence of training of this kind.

Therefore, this area does not appear to pose a threat relative to ordnance-related chemical residues and does not warrant further investigation.

#### **Tank Gunnery Range**

A 1957 training facilities map shows a tank gunnery range in the eastern part of the base on Oil Well Road (Plate 1). According to Fort Ord Range Control, Fort Ord has always been a light infantry installation and has not used tanks. No evidence of tank training was found during the site visit to the 1930s Training Area (discussed earlier in this section), which is in the same location. As stated in the discussion of the 1930s Training Area, this site does not appear to warrant investigation for ordnance-related chemical residues.

#### **Crescent Bluff Field Expedient Area**

The Crescent Bluff Field Expedient Area was shown on a 1957 training facilities map southeast of the East Garrison on Crescent Bluff Road (Plate 1). According to Roy Durham of Fort Ord Range Control, "field expedient" refers to an improvised approach to accomplish a desired task using resources available in the field. This encompasses a wide variety of subjects including cooking, vehicle repair, or warfare items (e.g., flame field expedient). Because the use of the Crescent Bluff Field Expedient Area was unknown, HLA performed a site visit on November 3, 1993. The area contained no evidence of flame field expedient use (such as stained soil or fragmented drums) or ordnance use. Therefore, this area will not be included in the Site 39 investigation.