

SITE OE-13A

PRACTICE MORTAR RANGE

CONTENTS

SITE OE-13A - PRACTICE MORTAR RANGE.....	3.13A-1
3.13A Site OE-13A (Practice Mortar Range).....	3.13A-1
3.13A.1 Site Description	3.13A-1
3.13A.2 Site History and Development.....	3.13A-1
3.13A.3 Potential Ordnance Based on Historical Use of the Area	3.13A-4
3.13A.4 History of OE Investigations	3.13A-5
3.13A.5 Conceptual Site Model	3.13A-6
3.13A.5.1 Training Practices	3.13A-7
3.13A.5.2 Site Features.....	3.13A-8
3.13A.5.3 Potential Sources and Location of OE.....	3.13A-8
3.13A.5.4 Potential Exposure Routes	3.13A-8
3.13A.6 Site Evaluation.....	3.13A-10
3.13A.6.1 Literature Review.....	3.13A-10
3.13A.6.2 Sampling Review.....	3.13A-11
3.13A.6.3 Reconnaissance Review.....	3.13A-16
3.13A.7 Conclusions and Recommendations.....	3.13A-16
3.13A.7.1 Conclusions	3.13A-16
3.13A.7.2 Recommendations	3.13A-18
3.13A.8 References.....	3.13A-19

TABLES

13A-1	Incidental OE Items Found, Site OE-13A and Vicinity
13A-1A	Incidental OE Items Found during Area A Landfill Excavation
13A-2	Sampling Operations, Site OE-13A
13A-3	OE Scrap Found During Sampling, Site OE-13A

PLATES

13A-1	Site OE-13A Location Map – Former Fort Ord
13A-2	Site OE-13A; 1956 Aerial Photo
13A-3	Site OE-13A; 1966 Aerial Photo
13A-4	Site OE-13A; 1978 Aerial Photo
13A-5	Site OE-13A; 1999 Aerial Photo
13A-6	Conceptual Site Model, Site OE-13A
13A-7	Conceptual Site Model, Site OE-13A

ATTACHMENTS

13A – A1	Evaluation of Previous Work Checklists
13A – A2	Potential Ordnance Used At Site OE-13A

SITE OE-13A - PRACTICE MORTAR RANGE

3.13A Site OE-13A (Practice Mortar Range)

This summary report consists of two parts. The first part, contained in Sections 3.13A.1 through 3.13A.5 includes a presentation and assessment of archival data. Specific elements include a review of site history and development, evaluation of potential ordnance at the site, a summary of previous ordnance and explosives (OE) investigations, and a conceptual site model. The above-mentioned information was used to support the second part of this report, which is the Site Evaluation (Section 3.13A.6). The Site Evaluation was conducted in accordance with procedures described in the *Final Plan for Evaluation of Previous Work (Harding Lawson Associates [HLA], 2000)* and may restate some information presented previously. The Site Evaluation discusses the evaluation of the literature review process (Section 3.13A.6.1), and evaluation of sampling process(es) (Section 3.13A.6.2). These discussions are based on information from standardized literature review and sampling review checklists (Attachment 13A-A1). Section 3.13A.7 provides conclusions and recommendations for the site. References are provided in Section 3.13A.8.

3.13A.1 Site Description

Site OE-13A is approximately 61 acres in size and is located in the northern part of the former Fort Ord's Abrams Housing Area (Plate 13A-1). The site was identified based on review of training maps from the middle to late 1950s in the Archives Search Report (ASR; *U.S. Army Engineer Division, Huntsville [USAEDH], 1993*).

3.13A.2 Site History and Development

The following presents a summary of the site history and development that is based on archival research and review of historical training maps and aerial photographs. Plates have been prepared that present pertinent features digitized from historical training maps and scanned aerial photographs reviewed by Harding ESE. It should be noted that minor discrepancies between source maps, combined with the natural degradation of older source maps and photographs, has resulted in misalignment of some map features. In addition, camera angle and lens distortion introduced into older aerial photographs combined with changes in vegetation and site features over time may contribute to misalignment of some map features with respect to the aerial photographs.

1940s Era

This site lies within a tract of land purchased from private landowners by the government after July 1940 (*Arthur D. Little, Inc. [ADL], 1994*). Review of 1940s era documentation including historical maps and aerial photographs indicates no specific training sites were in use in the area adjacent to OE-13A. The following identifies the results of the historical review:

- No specific training area is designated on the August 1945 Training Facilities map (*U.S. Army [Army], 1945, 1946*). A "Wire Entanglement Area" was shown approximately 200 ft north of Site OE-13A.
- Aerial photographs from 1949 do not show disturbed ground in the area near OE-13A.

1950s Era

A former Practice Mortar Range was identified for investigation as part of the Archives Search Report (*USAEDH, 1993*). The site was identified based on review of training maps from the middle to late 1950s. These maps represent the first and only reference to mortar training sites in this area. The ASR provided a single point location and a potential area to be investigated based on the review of training maps. Approximate site boundaries were assigned as part of the ASR and the area was identified as Site OE-13A. The following identifies the results of the historical and aerial photograph map review.

- A practice mortar area (Plate 13A-2) is identified on circa 1954, 1956, 1957, and 1958 training maps (*Army, 1954, 1956, 1957, and 1958*). The maps also identify bleachers in the area. No range fan is depicted in this area. This range is within an area identified as Restricted Fire Area on the 1956 training map (*Army, 1956*), prohibiting the use of artillery or demolitions.
- Two mortar ranges (with range fan delineation) identified for the use of 60mm and 81mm mortars are present within the Multi-Range Area (MRA) on 1950s training facilities maps.
- An approximately 600 by 900 foot disturbed area is evident on a 1956 aerial photograph in the Practice Mortar Range area.
- Based on recent review of the historical data, it appears that part of the range may extend just to the north of the current OE-13A site boundary into a small portion of Reuse Parcel E4.3.1 (*Army, 2001*). A 1956 aerial photograph shows the disturbed vegetation area within site boundaries and extending north of the Site (Plate 13A-2).
- The 1958 training map shows a MRCC (abbreviation unknown) in the southwest corner of the site. A “ST-11” (abbreviation unknown) is shown approximately 300 feet southeast of the site boundary.
- No evidence of other training ranges was identified on available training maps from the 1950s or on aerial photographs from the 1950s. Rocket launcher ranges and mortar ranges are identified south of the site within the Multi Range Area on the 1956 through 1958 training maps (*Army, 1954, 1956, 1957, 1958*)

1960s Era

Review of documentation available for the 1960s indicates that practice mortar training was no longer being conducted in this area. The area southeast of Site OE-13A was designated as field communication crewman area. Sanitary landfill operations were conducted in the 1960s in the western part of the site. The following identifies the results of recent interviews and review of historical maps and photographs available from the 1960s:

- Discussions with Mr. John Robotti who served as Chief of Logistics at Fort Ord from 1958 through 1961, and then provided Logistics Support until present indicated that field communication/crewman areas were used for practicing the layout of communication wires (*Robotti, 2001*).
- The area southeast of OE-13A is designated as a field communication/crewman area on the 1964 Field Training Map (*Army, 1964*) and as a Wireman Area on the Back Country Roads map (*Army, 1967*).

- Landfill operations are identified on a 1960 aerial photograph with topographic overlay (*U.S. Army Corps of Engineers [USACE], 1960*). Landfill operations are also evident west of the OE-13A area in the 1966 aerial photographs (Plate 13A-3).
- Housing construction approximately 1000 feet north of the area is evident in the 1966 aerial photograph. It is not shown on Plate 13A-3 due to the scale of the plate.
- Imjin Road is evident on the 1960s aerial photographs

1970s Era to 1994

Review of historical maps and aerial photographs indicates this area had no specific training activities. The area was identified as Training Area A on 1970s maps. Housing was constructed in the late 1970s and early 1980s.

- Training Area A is identified on the 1976 training map (*USACE, 1976*).
- Abrams Park housing was constructed in the mid-1970s. A large portion of Site OE-13A (approximately 28 acres) was cut, graded, and contoured during housing construction. This construction and grading is evident on the 1978 aerial photograph (Plate 13A-4). During construction up to 25 feet of soil and landfill material were removed from various areas (*USACE, 2000*).
- Housing was occupied from 1978 until 1994. Additional construction related to Imjin Road also occurred. A road cut of 25 to 30 feet was completed as part of the road construction.

1994 to Present

The western portion of Site OE-13A overlies part (approximately 14 acres) of a Former Fort Ord landfill (Area A of Operable Unit 2 [OU 2]). All landfill material in the western portion of Site OE-13A was excavated (removed) and transported to the main landfill south of Imjin Road. In addition, several pipelines were installed within the site boundaries as part of the groundwater treatment system. A process was in place for visual monitoring during removal of the landfill material. Unexploded Ordnance personnel were on site and used a portable field x-ray unit to determine whether any of the suspect OE items found during removal activities were live or inert rounds. The OE items were then either destroyed in place or taken to a safe holding area on the same day they were found. Several OE scrap items and three unexploded ordnance (UXO) items were identified within and adjacent to Site OE-13A during the above activities (Table 13A-1). These items are shown on Plate 13A-5 and are listed below:

- Three slap flares and loose pyrotechnic material (live), no models reported
- Three hand grenade primer detonators (inert)
- Two 40mm signal cartridges (inert)
- Fin assembly for 3.5-inch rocket (inert), no model reported
- Live rifle grenade, no model reported
- Miscellaneous projectiles (See Table 13A-1A)
- Two 3.5-inch rocket motors (inert), model unknown

All items with the exception of one of the 3.5-inch rocket motor were found within or adjacent to the landfill excavation boundaries during construction activities associated with remediation at the landfill, or during housing construction, and were most likely placed in the landfill. The 3.5-inch rocket motor discovered within the site boundaries was outside the landfill boundaries. It was discovered within a trench at a depth of 2 feet. The rocket was found adjacent to Imjin Road which was constructed in the mid 1960s. The current topographic contour lines are shown on Plate 13A-5. These topographic contours indicate a road cut of 25 to 30 feet for Imjin road. It is possible that grading for the road resulted in burial of the rocket motor. It should be noted that inert 3.5-inch rocket motors were also discovered in the landfill material excavated as part of the Area A removal.

Proposed future land use

Future land use includes residential development.

3.13A.3 Potential Ordnance Based on Historical Use of the Area

Practice Mortar Range

This section describes the types of training devices that could have been used at a practice mortar range in the 1950s. In a conversation with Mr. John Robotti, he indicated that no live firing of any kind occurred at the Practice Mortar Range. Mr. Robotti was Deputy Director of Logistics at Fort Ord from 1958 through 1961 then provided Logistics support until the present. He stated that the area was a concurrent training area, where troops would practice loading practice items, cleaning items, etc., while waiting to use the live fire ranges in the MRA located in the southern part of the base. He stated that this was a non-firing area and no firing of live items would have occurred (*Robotti, 2001*).

If other types of practice mortar training occurred (although not expected after discussions with Mr. Robotti), information obtained from the St. Louis District Corps of Engineers indicated that training cartridges, Models M68 (for the 81mm mortar) and M69 (for the 60mm mortar) could have been used at a practice mortar range in the 1950s. Both the M68 and M69 practice mortars consist of a cast iron pear-shaped body. Both mortars were assembled by attaching a fin assembly that contained an ignition cartridge, similar to a shotgun cartridge, which was used to propel the inert portion of the mortar. If the ignition cartridge did not function, the mortar would not be fired. Therefore, it is not possible for a live practice mortar to be found downrange as a result of firing. Both the M68 and M69 projectiles are inert and contain no energetic material; therefore, no explosive hazard is associated with these items. Descriptions of these training cartridges are provided in Attachment 13A-A2. This information was obtained from Mr. Gregg Kocher of the St. Louis District Corps of Engineers via phone conversation with Bruce Wilcer of Harding ESE (*Kocher, 2001*).

Incidental OE Items

Ordnance items identified within the landfill material removed as part of the Area A excavation include various signals, 2.36-inch rockets, 3.5-inch rocket motors, rifle grenades, hand grenades, and mortars. Items were mostly OE scrap. However, 4 live flares, 2 live rifle smoke grenades, a 40mm smoke grenade, and one live 2.36-inch rocket (burst tube) were identified with the landfill material. These items were all removed and properly disposed of. These items would not be expected to have been used at the practice mortar range and are therefore attributed to the fill material that was removed from the site. It should be noted that there were inert 3.5-inch rocket motors found within the landfill; therefore, it is possible that the 3.5-inch rocket motor found to the south east of the landfill was also related to transportation of materials to the landfill.

It should be noted that no documentation prohibiting the placement of OE-scrap items into a landfill has been identified.

Training and Maneuver Area

Because this area was within an area identified for training and maneuvers, the possibility exists that blank small arms, pyrotechnics and smoke producing items may be present at this site, if they were used previously.

3.13A.4 History of OE Investigations

The following describes the OE investigations performed at this site.

1993 Archives Search Report (ASR)

The purpose of the archives search conducted at Fort Ord was to gather and review historical information to determine the types of munitions used at the site, identify possible disposal areas, identify unknown training areas and recommend follow-up actions. The 1993 archives search was conducted following a scope of work provided to the St. Louis Corps of Engineers by the Huntsville Corps of Engineers. The archives search included a Preliminary Assessment/Site Investigation (PA/SI) consisting of interviews with individuals familiar with the sites, site visits to previously established sites, site reconnaissance on newly identified training areas, and the review of data collected during sampling or removal actions.

Site OE-13A was identified in the ASR as a Practice Mortar Range based on reviews of 1950s training maps. Random spot sweeps were recommended (*USAEDH, 1993*). Requirements for preparation of an ASR are described in Section 2.0 of this report.

1994 Human Factors Applications, Inc. (HFA)

HFA completed the initial investigation of Site OE-13A in 1994. The site boundary was provided by the USACE, Huntsville Division. The scope of work for the project identifies the site as adjacent to the Abrams Park Housing Area. Requirements for sampling and documentation of sampling for the sites included in HFA's contract are discussed in Section 2.0 of the report. Information specific to Site OE-13A is provided here. Twenty 100- by 100-foot grids were 100 percent sampled (all anomalies detected were investigated) using either the Schonstedt Model GA-52/C or the Schonstedt Model GA-72/Cv magnetometer with a maximum search lane width of 5 feet. Half of the sample grids (10) were placed in an open area on the eastern end of the site. The remaining sample grids were spread out in open areas located approximately 1,600 to 5,600 feet southeast of Site OE-13A and are not shown on Plate 13A-5. The sample grids located outside of the site boundary were placed in what was assumed to be downrange of the practice range (Plate 13A-5). No OE-related items were found during the grid sampling (*HFA, 1994*). Table 13A-2 presents a summary of the sampling operations.

The scope of work for HFA indicated that detailed accounting of all OE items/components/scrap encountered would be performed. However, grid records providing this information are no longer available. Existing information regarding items found is summarized in the text of the HFA OE Sampling and OE Removal Report (*HFA, 1994*). The HFA report itemized inert OE-scrap items found at each OE site, if any. The report also indicated that "some non OE scrap" was removed and turned in at the end of the project. The non-OE scrap statement was not related to a specific OE site.

1997 Engineering Evaluation/Cost Analysis (EE/CA) Phase I

The Phase 1 EE/CA indicated that the locations of some of the HFA grids were uncertain, and that additional confirmatory sampling should be performed at the site. The Site OE-13A site map presented in the Phase 1 EE/CA, showed five sample grids. These grids are shown in red on Plate 13A-5. Based on discussions with Mr. A. R. Smith, USACE UXO Safety Specialist, the grids in the EE/CA most likely represent the resurveyed HFA grids located by CMS Environmental Inc. (CMS).

1997 USA Environmental (USA/CMS)

In 1997, while the Phase 1 EE/CA was being prepared, CMS resurveyed the 1994 OE site boundaries and corner grid stakes with a Global Positioning System (GPS) using the existing corner stakes left in the site by HFA. Fourteen acres of the site are covered with roads and houses and the western portion of the site (Area A landfill) was being remediated (excavated) at that time. The 10 HFA sample grids located within the site boundary were clustered in an open area between housing in the east-central portion of the site. Based on this information, it was determined that two additional grids positioned on the eastern end and outside of the site boundary would be necessary to confirm whether any additional sampling or removal work would be needed (Table 13A-2).

CMS was directed to conduct additional sampling at the site using the SiteStats/GridStats (SS/GS) sampling program. In September 1997, two 100- by 200-foot sample grids were established just outside of the site boundaries in vacant areas considered least likely to have been disturbed by development of the Abrams housing area (Plate 13A-5). The grids were established outside of the site boundaries because the area within the site boundaries was highly developed. According to the CMS work plan the grids were surveyed using a maximum 5-foot search lane with a Schonstedt GA-52/Cx magnetometer. Following the survey, anomalies were selected for sampling following the SS/GS procedures. Based on the program, 22.5 percent of the identified anomalies were sampled. Two OE scrap items (an expended grenade fuze and expended illumination signal) were found at depths of 4 and 5 inches below ground surface, respectively, and removed (Table 13A-3). Grenade fuzes would not be expected at a practice mortar range.

On the basis of these sampling results, the results of previous sampling, and ground-disturbing activities conducted at Site OE-13A (housing construction and landfill remediation), no further OE response was recommended in the after action report (*USA Environmental Inc. [USA], 2000*).

2004 Site Walk

A site walk was conducted at Site OE-13A on January 27, 2004. The site walk location was selected to fill data gaps in reconnaissance and sampling efforts conducted previously at this site. The site walk was conducted by a three-person team which included a UXO Safety Specialist. The team swept the path walked using a Schonstedt Model GA-52/Cx magnetometer. The path was also recorded using a GPS unit. The position of any anomaly detected by the Schonstedt GA-52/Cx was recorded with the GPS. The items found during the site walk included a M69 training mortar (OE scrap), small arms ammunition clips, and expended small arms ammunition. A description of the site walk is included as an attachment to Appendix C of this report.

3.13A.5 Conceptual Site Model

Conceptual site models (CSMs) are generally developed during the preliminary site characterization phase of work to provide a basis for the sampling design and identification of potential release (functioning of the OE item; e.g., detonation) and exposure routes. It is provided to help evaluate the

adequacy of the investigations completed to date and to identify potential release and exposure pathways. CSMs usually incorporate information regarding the physical features and limits of the area of concern (the site), the nature and source of the contamination (in this case OE), and exposure routes (potential scenarios that may result in contact with OE).

The CSM for Site OE-13A is based on currently available site-specific and general information including a literature review, review of aerial photographs, training maps, sampling results, field observations, and technical manuals. The CSM was developed to help evaluate the adequacy of the investigation completed to date and to identify potential release and exposure pathways. Plate 13A-6 presents a conceptual site model for the practice mortar training. Plate 13A-7 presents a site conceptual model for the training and maneuver area. A CSM for field communication training is not presented because it is not anticipated that OE would have been used during the training.

3.13A.5.1 Training Practices

Training practices are discussed below to provide information on the types of OE that may have been used at the site and the possible location of OE potentially remaining at the site.

Practice Mortar Training

Based on interviews with Mr. Robotti, this Practice Mortar area was used for dry fire training (only inert training devices were used). He stated that this area was a concurrent training area, where troops would practice loading items, cleaning items, etc.

If, however, the area were used for practice mortar range training using projectiles, information obtained from the St. Louis District Corps of Engineers indicates that training cartridges, Models M68 and M69, could have been used at a practice mortar range. These mortars had a range of 235 and 310 yards, respectively. Both mortars consist of an iron pear-shaped body, which was of a size and weight that simulated the high explosive (HE) version of the 60mm or 81mm mortar. The mortars were assembled by attaching a fin assembly that contained an ignition cartridge. The ignition cartridge, similar to a shotgun cartridge was used to propel the inert portion of the mortar. If the ignition cartridge failed to function, the mortar would not be fired; therefore, it would not be possible for a live practice mortar to be found downrange as a result of firing. Both the M68 and M69 projectiles were reusable and could be collected and reused by inserting a new ignition cartridge. No M68 or M69 mortars were found during sampling at the site. However, a M69 training mortar (OE scrap) was found at Site OE-13A during the site walk conducted in January 2004.

Field Communication/Crewman Training

Discussions with Mr. Robotti, who served as Chief of Logistics at Fort Ord from 1961 until 1999, indicated that field communication/crewman areas were used for practicing the layout of communication wires. It is not expected that the ordnance would be used as part of this training.

Training and Maneuver Areas

A training and maneuver area may have included using the site for squad patrols. Infantry platoons and squads conduct three types of patrols: reconnaissance, combat, and tracking (*Army, 1992*). Each patrol includes specific objectives using infantry troops, sometimes with engineer support, to gather information and conduct simulated combat operations. Combat patrols would include the use of blank small arms ammunition, and possibly pyrotechnics and smoke producing items (e.g., signals, flares, and smoke grenades). The expended M205 grenade fuze and expended M19 series illumination signal found by

CMS during sampling could have been used in a training and maneuver area. This training is represented in Plate 13A-7. It should be noted that during most of the 1960s and 1970s, the area was identified as a field communication area and use of OE would not be anticipated.

3.13A.5.2 Site Features

Site OE-13A was identified by a symbol on 1954 through 1958 training maps (*Army, 1954, 1956, 1957, 1958*). An approximately 200- by 300-yard disturbed area is evident on the 1956 aerial photograph. The size of this disturbed area appears to correspond with the ranges of the M68 and M69 practice mortars. It is expected that a dry fire training area would also be cleared of vegetation for access and to allow for better viewing of the training exercises. Landfill operations were evident in the western portion of the site in the 1966 aerial photograph. This landfill material was removed in 1995. Extensive grading of the area was performed in the mid 1970s prior to construction of the housing.

3.13A.5.3 Potential Sources and Location of OE

Site OE-13A was identified as a practice mortar range on mid 1950s training maps. Based on interviews with Mr. John Robotti, it is expected that this area was a dry fire area, and that no live OE items would have been used. If, however, training using practice mortars did occur, it is not likely that live mortars would remain, because as stated above the mortar would not be fired if the cartridge failed to function.

Two OE scrap items, an expended M205 hand grenade fuze and an expended M19 series illumination signal, were found during sampling performed by USA within grids located outside the site boundaries. The M205 hand grenade fuze was used in the M30 Practice Hand Grenade and the M62 Practice Hand Grenade. These practice grenades are used for training in care, handling and throwing of fragmentation hand grenades, models M26A1, M26, and M61, respectively. The M19 series illumination signals are used for signaling during night operations. Both the practice grenades and illumination signals, by design, are non-penetrating and if still present would be located at or near the ground surface. These items are not consistent with use of a practice mortar range, but may indicate use of the area as a general training area or that the items were discarded within the area. A M69 training mortar (OE scrap) was found during the site walk performed in January 2004. This mortar was used for training in the loading and firing of 60mm mortars. The maximum calculated depth of penetration in sand of the M69 mortar is 0.2 feet below ground surface. Additional information on these items is provided in Attachment 13A-A2.

It is suspected that the items found during landfill remediation activities, including the live rifle grenade, were placed in the landfill when it was active. Based on the finding of several inert 3.5-inch rocket motors within the landfill material and the lack of historical evidence that the area was used for rocket training, it is suspected that the inert 3.5-inch rocket motor identified in the far south eastern portion of the site is also related to landfill activities, and could have been discarded or accidentally dropped on the way to the landfill. Review of the 1960 aerial photograph map identifies what appears to be the present-day Imjin Road as Sanitary Fill Road.

3.13A.5.4 Potential Exposure Routes

Access to the site is currently unrestricted and has been open to the public for housing since the late 1970s. Because no OE items were discovered during sampling or reported previously, it is unlikely that OE exists at the surface in this area. Therefore, it is unlikely that a receptor would come in contact with an OE item on the surface. The two OE scrap items located during sampling were found at depths of 4 and 5 inches below ground surface (bgs). It should be noted that EOD records from the mid 1980s until base closure were available for review. Limited records from the 1970s were also available for review. Records of discoveries after base closure were also available and were reviewed. Because residents were

occupying the housing in this area since the late 1970s, it is reasonable to assume that the available records, although limited, would contain some mention of OE discoveries if any occurred.

Although no OE items were found at OE-13A a brief discussion of the potential injuries that could result from contact with live M19 series illumination signals, M205 grenade fuzes either within or separate from the practice grenade, and an M69 mortar is provided below. These items were selected for discussion, because an expended M19 series item and expended M205 grenade fuze were identified during sampling and an M69 mortar was found during reconnaissance. Additional details regarding these items are provided in Attachment 13A-A2.

For each of the OE items potentially remaining at the site, the following discussions provide information on: (1) how the item was designed to function, (2) the likelihood the item would function if found onsite and handled, and (3) the type of injury the item could cause if it functions. Additional information on these items is provided in Attachment 13A-A2.

Signal Illumination, Ground, Green Star, Parachute: M19 Series. These signals, illuminating, ground: green star, parachute were designed for signaling during night operations. They consist of a single green star illuminant candle with parachute and expelling charge in a cylindrical aluminum case. An aluminum fuse housing is crimped to the base of the cylinder. The fuse housing contains a smokeless powder propelling charge with a retaining disk, and a circular time train groove filled with black powder. A felt setback wad containing a quick match separates the fuse housing and the illuminating candle. The signals are fired using a rifle. Flash from the M64 grenade-launching cartridge passes through the stabilizer to ignite the propelling charge, which propels the signal in flight. The burning propellant ignites the 5.5-second black powder delay element. Near the top of the trajectory, the black powder element ignites the expelling charge and the quick match is ignited. The expelling charge blows the illuminant candle and parachute assembly out through the top of the container, and the illuminant candle is ignited by the quick match. The parachute opens to lower the candle slowly. The signal produces a minimum of 5000-candle power for 20 to 30 seconds (*Army, 1994*). These would be difficult to be caused to function by incidental contact. They would require preparation and a flash through the stabilizer to ignite the propelling charge. If caused to function, the type of injury that could be sustained would be burns from the propelling charge.

Summary: It is unlikely that a person could cause a signal to function through casual contact if one were found at the site and be burned, because it: (1) would require precise assembly to function, and (2) would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

M205A1 and M205A2 Fuze: Pyrotechnic Delay Igniting. The fuzes differ in body construction only. The fuzes contain a M42 primer and an igniter containing a small amount of zirconium nickel alloy, potassium perchlorate barium chromate and black powder (*Army 1994; Navy, 1947*).

Summary: It is possible that a person could cause a fuze to function through casual contact if one were found at the site and be burned or exposed to metal fragments, but the fuze would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

Cartridge, 60mm, Training Mortar: M69 and Cartridge, 81mm, Training Mortar: M68. The M69 60mm training cartridge was used for training in the loading and firing of M2 and M19 60mm mortars. The M68 81mm training cartridge was used for training in the loading and firing of 81mm mortar. The complete round consists of an inert projectile, a fin assembly, an ignition cartridge, and a percussion primer. The pear-shaped, cast iron projectile has no provision for a fuze and is internally threaded at the base to accept the fin assembly. When the cartridge is loaded, it slides down the mortar tube until the

Final

percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer detonates the ignition cartridge. The gases from the ignition cartridge expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight once the cartridge has been fired, and is inert because the propellant has been expended. Because the projectile is inert (contains no fuze, booster, nor spotting charge), there is no detonation upon impact and the projectile may be recovered for reuse. The M68 and M69 are unlike other mortar ammunition in that the components are issued separately so that damaged components can be replaced so the M69 and M68 can be reused repeatedly. An unfired M68 or M69 mortar will contain an unfired percussion primer and an ignition cartridge that are built into the fin assembly (*Army, 1994*). An unfired percussion primer and ignition charge could be caused to function only if the percussion primer was struck sharply with a relatively sharp, hard object with sufficient force. If caused to function, the type of injury that could be sustained could be burns because of the gases from the ignition charge. Although these items have been exposed to the elements for many years, an unfired fin assembly should be expected to function if properly struck.

Summary: It is very unlikely that a person through casual contact would be able to cause an unfired cartridge to function and be burned because it would require a hard, precise blow to the primer to function. A person could not be injured by a fired cartridge if one were found at the site, because it has no parts that function explosively, produce smoke, or burn.

3.13A.6 Site Evaluation

The available data (e.g., archival and sampling data) regarding Site OE-13A were reviewed and evaluated according to procedures described in the *Final Plan for Evaluation of Previous Work (HLA, 2000)*. The evaluation process is documented through the completion of a series of checklists. Copies of the checklist are provided as Attachment 13A-A1. This section presents a summary of the results of the checklist evaluation. It is divided into two sections, an assessment of the literature review, and an assessment of the sampling performed at the site.

3.13A.6.1 Literature Review

Type of Training and OE Expected

According to training maps Site OE-13A was used a Practice Mortar Range during the 1950s. The range is not present on the 1958 Ranges & Training Facilities map or any available maps thereafter. All the available 1950s era maps up to 1958 identify the area as a practice mortar range; no range fans are shown. Mortar ranges within the MRA in the same era are shown with a range fan. There is no evidence that training at this site involved any pyrotechnic and/or smoke-producing items or 2.36 or 3.5-inch rockets.

Subsequent Use of the Area

Landfilling activities began in this area, including the western portion of Site OE-13A in 1956 continuing until this portion of the landfill was closed in 1966. During the 1960s the area, including the eastern portion of Site OE-13A was used for field communications training. The area was identified as Training Area A in 1976, and housing was constructed in the late 1970s. Aerial photographs from 1978 indicate that much of the site was graded prior to construction of the housing. If OE was used in the 1950s or 1960s, it is expected that any OE found during housing construction would have been removed. A telephone interview with Mr. Ron Lear of the USACE documented that several OE items, including “little blue rockets” (possibly 22mm subcaliber rounds), were found at the edge of the landfill area during construction of the Abrams housing. Mr. Lear indicated that EOD personnel responded to the incident. Subsequent evaluation of this information indicated that 22mm subcaliber rounds were not available for use in the 1950s; therefore, these items would not have been related to the practice mortar range. It

appears these items were within the landfill material. The City of Marina farmland/residential property is approximately 1200 feet from Site OE-13A. This farmland/residential area was in use prior to the establishment of the practice mortar range. This neighboring area had houses constructed from 1978 to 1982.

Establishment of Site Boundaries

Site OE-13A was identified from the review of Fort Ord Training facilities maps conducted by the USACE as part of the archives search. The HFA site boundaries were established based on information provided in the contract scope of work that indicated that the site was adjacent to the Abrams Park Housing Area and was approximately 255 acres. This boundary was established prior to removal of landfill material. Following the initial OE sampling of the site by HFA, USACE personnel, including the UXO Safety Specialist, evaluated the area boundary using the sampling results, site walk information, Fort Ord training maps, and aerial photographs. Based on the follow-up evaluation, the 1997 ASR Site OE-13A boundary was established as part of the archives search. No documentation is available on why the boundary was not modified to exclude the western portion of the site after the landfill material was removed.

Summary of Literature Review Analysis

Site OE-13A was identified from the review of Fort Ord Training facilities maps conducted by the USACE as part of the archives search. Additional information about training at this site was obtained through interviews conducted as part of the Fort Ord OE Remedial Investigation/Feasibility Study (OE RI/FS) program. Historical training maps show that this area was used as a practice mortar range in the 1950s. Two mortar ranges dedicated to the firing of 60mm and 81mm mortars were present in the MRA at the same time that the practice mortar range was active. On the basis of information gathered subsequent to the ASR through interviews, that indicated that the area was a concurrent training area, no further OE-related investigation is warranted at Site OE-13A.

3.13A.6.2 Sampling Review

This section describes the results of the sampling conducted at the site. The review includes a comparison of sampling locations relative to site boundaries, a review of the equipment used, a discussion of the sampling methods used, and the quality control measures used during the investigation.

Sampling Results (Items Found)

The initial investigation of Site OE-13A was completed in 1994 by HFA. Twenty 100- by 100-foot grids were 100 percent sampled (all anomalies detected were investigated). Half of the sample grids (10) were placed in an open area on the eastern end of the site. Plate 13A-5 shows the 10 grids as plotted on a map by HFA and 5 grids that were shown in the 1997 Phase 1 EE/CA. It is assumed that the 5 grids shown in the Phase 1 EE/CA were original HFA grids that were resurveyed for location by CMS during the later site investigation described below. The remaining sample grids were spread out in open areas located approximately 1600 to 5600 feet southeast of the Site OE-13A boundary. The sample grids located outside of the site boundary were placed in what was assumed to be downrange of the practice range. No OE items were found during the grid sampling (HFA, 1994).

In 1997, CMS resurveyed the 1994 OE site boundary with a GPS using the existing corner stakes left in the site by HFA. CMS was directed to sample the resurveyed site using the SS/GS sampling program. In September 1997, two 100- by 200-foot sample grids were established just outside of the site boundaries in

vacant areas considered least likely to have been disturbed by development of the Abrams housing area (USA, 2000).

Two OE scrap items (an expended M205 hand grenade fuze and an expended illumination signal) were found and removed. The items that were found at this site are not consistent with the type of training (Practice Mortar Range) that had been historically identified for the site. Both of the OE scrap items were found in a grid that is outside of and adjacent to the current site boundary. It is unknown if the OE scrap items found were used for training in this area. The area is identified as Area A on 1976 through 1984 training maps. No documentation of the training conducted in this area is available. However, based on the OE scrap items identified, it is possible that practice hand grenades and pyrotechnic items could have been used in the area.

Based on the sampling that was done, there is no evidence that the site was used as an impact area. However, the discovery of a grenade fuze and a ground illumination flare provide evidence to show that training in Area A may have involved the use of low explosives and pyrotechnics, respectively.

Site Boundaries Review

In 1997, CMS resurveyed the 1994 OE site boundary with a GPS using the existing corner stakes left in the site by HFA. The 1994 sampling was conducted in what was believed to be the site boundary. The 1997 sampling was conducted in areas least likely to have been disturbed by housing development, because it is anticipated that any OE found during housing construction would have been removed. Neither the 1994 or 1997 sampling was conducted in the 1950s “cleared area” seen on aerial photos that appears to have been used for practice mortar training; however, the 1950s cleared area falls within the area excavated as part of the landfill remediation and/or in areas of existing housing. The practice mortar range appears to extend to the north of the current site boundaries; however, the site boundaries will not be revised to include the area interpreted as the training area on historical maps and aerial photographs, because no ordnance containing energetic material is expected from historical training activities. No additional investigation within the expanded area is considered necessary. Because scrap OE items have been identified within the site boundaries and adjacent to the site, no reductions in the boundaries of the site are recommended. It does appear that the scrap OE items found within and adjacent to the current site boundaries may be related to landfill operations or general training within Training Areas identified on 1970s and 1980s training maps.

Equipment Review

The Schonstedt Models GA-52/C or GA-72/Cv magnetometers were used by HFA in the 1994 geophysical investigation and sampling effort. USA used the Schonstedt GA-52/Cx to conduct the geophysical investigation at each grid during the 1997 sampling program. During both sampling efforts, a maximum search lane width of 5 feet was used during sampling. The Schonstedt instruments are passive dual flux-gate magnetometers -- highly sensitive magnetic locators that detect ferrous (iron) metal objects; however, they cannot detect non-ferrous metal objects (e.g., lead, brass, copper, aluminum). Magnetometers make passive measurements of the earth’s natural magnetic field; ferrous metal objects (and rocks) are detected because they produce localized distortions (anomalies) in the magnetic field. The Schonstedt magnetometers actually detect slight differences in the magnetic field (the “gradient”) by means of two sensors mounted a fixed distance apart within the instruments’ staff. Because the magnetic response falls off (changes) greatly even over a short distance, a gradient magnetometer like the Schonstedt GA-52/Cx is especially sensitive to smaller, near-surface ferro-metal objects (Breiner, 1973).

The performance of the Schonstedt GA-52/C, GA-52/Cx and GA-72/Cv magnetometers was evaluated as part of the Ordnance and Detection and Discrimination Study (ODDS) (*Parsons Infrastructure & Technology Group Inc., [Parsons], 2001*). As part of the ODDS, studies were performed to evaluate:

- Signatures of inert OE items suspended in air at varying orientations and distances from the geophysical sensor (static tests)
- The ability of various geophysical instruments to detect and discriminate between different OE items buried at various depths (seeded tests).
- Geophysical instrument performance at actual OE sites (field trial site testing).

The Schonstedt tools were not evaluated during the static test; therefore, only the seeded test results and the field trial tests are discussed here. It is recognized that the ODDS study areas may not represent the same field conditions as Site OE-13A; therefore, differences in field conditions, if applicable, should be considered when using information from the ODDS.

Of the OE scrap items found at Site OE-13A, grenade fuzes were not specifically evaluated as part of the ODDS seeded test; however, signal-illumination flares were evaluated as part of the ODDS study. Both these items are considered surface items. During the seeded test, depending on the Schonstedt model used, between 56 and 78 percent of the Type I items (surface) buried at depths ranging from just below the surface to 1 foot would have been identified. The detection rate percentages presented in the ODDS vary according to search radius used (either 1.6 or 3.3 feet) for the analysis, and assume a 5-foot wide search lane. Results for the 3-foot search lane, also evaluated as part of the ODDS, were not included in the detection percentages presented above, because the 3-foot wide search lanes were not used during the HFA or CMS investigations. A standard search radius for investigating anomalies was not specified in the HFA or CMS work plans or after action reports; therefore, the detection “range” based on the two search radii is presented above. These detection rates are considered conservative because an additional 1-foot was added to the items’ calculated penetration depth to allow for soil deposition over time. Results of the seeded tests were also reviewed for potential use in evaluating instrument performance in detection of the 81mm mortar. Depending on the Schonstedt model used, between 9 and 45 percent of the Type IV items (items that penetrate up to 4 feet, including the 81mm mortar) could be detected up to the item’s maximum calculated depth of penetration. These detection rates are considered to be conservative because items were buried up to 1 foot below the maximum calculated penetration depths for the purposes of the test. In addition, 81mm mortars were detected at 4 feet at Site OE-3 by Schonstedt model GA-52/Cx (*USA, 2000*).

The results of the ODDS field trials were also reviewed for potential use in evaluating instrument performance at Site OE-13A. Detection ranges for the Schonstedt Models were calculated for 4 of the 6 test sites; the remaining sites did not have enough OE detected to allow calculation of site statistics. The calculated detection rates for the combined sites ranged from 52 to 100 percent depending on the search radius used for the calculation. A standard search radius for investigating anomalies was not specified in the HFA or CMS work plans or after action reports; therefore, the detection “range” based on the two search radii (1.6 and 3.3 feet) is presented above. It should be noted that the ODDS field trial sites were selected to represent areas with high ordnance density. In comparison, Track 1 sites, such as OE-13A are expected to have very low densities of OE scrap; therefore, the field trial results may not be applicable to Track 1 sites.

Although not directly comparable to Site OE-13A, the results of the ODDS indicate that all models of the Schonstedts used at this site are capable of detecting the ferrous surface and subsurface OE expected at the site.

Sampling Methods Discussion

In 1994, HFA used 100 percent sampling at this site. This method requires that 100 percent of the anomalies detected in the sampling grids be excavated. Either the Schonstedt GA-52/C or the GA-72/Cv magnetometers were used to identify the anomalies. A maximum lane width of 5 feet was used during the geophysical survey. According to the HFA work plan, survey grids were randomly located. The grid dimensions were 100 by 100 feet and were separated by at least 200 feet. Each grid was given a 100 percent visual surface inspection and a subsurface inspection using a Schonstedt Model GA-52/C or GA-72/Cv magnetometer. Surface item locations were plotted on a map and then the items were removed. Subsurface contacts anomalies were marked with yellow flags for excavation and identification. Subsurface contacts were uncovered using hand tools (*HFA, 1993, 1994*) to a maximum depth of 3 feet. No OE or OE scrap items were identified during sampling. Field records for the HFA sampling are not available; therefore, the number of anomalies detected and excavated, the depths of excavation, and the type of non-OE scrap items located are not available. Accurate grid location information is also not available; however, 5 of the grids were relocated by CMS during additional investigation. The exact locations of the remaining grids are not known. It appears that OE scrap items identified during the HFA sampling effort were classified and reported because this information is presented in the after action report (*HFA, 1994*). It is expected that if OE scrap items were identified at Site OE-13A, this information would have been presented in the after action report.

In 1997, sampling was performed by CMS as part of the Site OE-13A investigation using QuantiTech's SS/GS Based Methodology (*USA, 2000*). SS/GS is a computer program used to statistically estimate the ordnance density of a site or grid during field investigations. It estimates the number of ordnance items at a given site or grid and can be used to assess whether a site has been characterized adequately. This program was designed so that there were equal chances of finding OE and non-OE related items. Excavation of anomalies identified with a magnetometer is performed in accordance with direction of the program; generally 32 to 40 percent of the flagged anomalies are investigated using this technique (*CMS, 1995*). The SS/GS methodology was reviewed by the EPA's Federal Facilities Restoration and Reuse Office. The Technical Support Center, EPA National Exposure Research Laboratory (NERL) in Las Vegas, Nevada also provided statistical assistance in reviewing the SS/GS methodology. Several problems were identified as a result of the review. The primary conclusions were: 1) the statistical procedures are vague and not well documented, 2) conclusions about site homogeneity are not consistent, 3) the stopping rules are faulty, and 4) the program was not able to identify UXO clusters at a site. Although these problems associated with the statistical evaluation portion of the program were identified, the information obtained during sampling is useful in identifying the presence of and type of OE scrap present at the site.

Two 100- by 200-foot grids were sampled using the SS/GS sampling program. A total of 440 anomalies were located using the Schonstedt Model GA-52/Cx magnetometer and 99 anomalies were excavated. As noted above, two OE scrap items were discovered at depths of 4 and 5 inches during sampling. Non-OE scrap items found during sampling included wire, clips, rebar, and spark plugs, and were found at depths of 1 to 12 inches. Because no OE was identified, OE densities were not calculated.

Quality Assurance/Quality Control

Field Sampling

HFA and CMS (later USA) performed field sampling. The Quality Assurance/Quality Control (QA/QC) procedures are described below.

HFA Sampling

Specific information concerning operational procedures was not documented in the HFA after action report. The following describes field procedures specified in the work plan. According to the HFA work plan, equipment was to be inspected by the Senior UXO Supervisor (SUXOS) and Quality Control/Site Safety Officer (QC/SS) prior to placing it in service. Magnetometers were to be inspected daily on a buried piece of inert ordnance to ensure that the magnetometers were calibrated and operating within specification. The buried ordnance test source was to be magnetically similar to a 2.36-inch rocket and buried at a depth of 3-feet. The magnetometers were to be tested before starting UXO operations in the morning and when operations resumed after lunch. Magnetometers that did not pass the daily inspection and test were determined in need of repair and were to be removed immediately from service. Random checks were to be performed by the QC/SS and/or SUXOS during daily operations. The QC/SS was to inspect all records bi-weekly to ensure that they were kept and maintained. After surface and subsurface clearance of each site and prior to removal of grid markers, the QC/SS was to perform the standard minimum 10 percent QC check. If UXO was discovered during the QC check, the grid was searched again. All grids were to be left in place until the Corps of Engineers UXO Safety Specialist completed a 10 percent QA check of the previously checked grid. QC reports that included descriptions and results of the QC checks were to be completed daily. No QA records for this sampling effort are available.

USA Sampling

Throughout operations, CMS (later known as USA Environmental) performed daily operational checks and QC inspections. Because of the nature of the SS/GS sampling, QA/QC was limited to inspection of operation activities and documentation. No deficiency reports were written during inspections (*USA, 2000*). In accordance with the CMS work plan (*CMS, 1995*), all instruments requiring maintenance and/or calibration were to be checked prior to the start of each workday. Batteries were to be replaced as needed and the instruments were to be checked against a known source. The QC specialist was responsible for ensuring that personnel perform operational checks and make appropriate log entries. The QC specialist also was to perform random unscheduled checks of the various sites to ensure the personnel perform the work as specified in the work plan.

Data Management

Parsons, the current OE contractor, performed a 100 percent QC review of the data associated with the site. This review followed the guidelines presented in the Standard Operating Procedures (Appendix A). This evaluation included a review of the SS/GS record, field grid records, and the database created by the OE contractor. The USACE followed the QC review with a 10 percent QA review of the Parsons' data review. The requirements of the QA review are described in the SOP provided as Appendix B in this report. The purpose of the data review was to complete a 100 percent check of all available grid records to identify discrepancies between the after action reports and the grid records. Discrepancies were then researched and corrections made, if appropriate, prior to loading the data into the project database. No discrepancies between the after action reports and the grid records were identified for this site.

For this site the following conclusions can be made regarding the quality of the data:

HFA Sampling

- The data collected by HFA were useful in identifying areas where OE is not likely present based on completed sampling

- Because no OE items were found, the absence of location and depth information does not impact data quality.
- There appears to be poor survey control for the HFA grid locations. However, the grids were resurveyed by CMS and 5 of the grids were relocated indicating that the grids are in the vicinity of the locations shown on the HFA maps.
- No QA records for this sampling effort are available.

CMS Sampling

- There was coordinate and depth information concerning the OE scrap items found
- The data collected are useful in providing information concerning the type of OE scrap items present at the site
- Because some anomalies were required to be excavated during sampling using the SS/GS investigative approach, some OE scrap may still be present within the sampling grids.
- Because no OE was found through the investigation of 99 randomly selected anomalies out of 440 total, it is reasonable to assume that the remaining anomalies are also not OE.
- The SS/GS program has problems in that there have been some issues raised concerning the statistical methods used (*NERL, 2001*).

3.13A.6.3 Site Walk Review

This section describes the items that were found during the site walk investigation and the implications for the site history. One site walk has been conducted at Site OE-13A. The site walk, conducted in January 2004, involved a three-person team, which included a UXO Safety Specialist. The investigation involved the team walking a portion of the site, surveying the path walked using a Schonstedt Model GA-52/Cx. The Schonstedt was used in an attempt to detect subsurface anomalies that might indicate that further investigation was warranted. The team also carried a GPS to record the path of the site walk and the locations of any anomalies identified with the Schonstedt. The items found during the site walk included a M69 training mortar (OE scrap), small arms ammunition clips, and expended small arms ammunition. A summary of the results of the site reconnaissance is provided in the attachment to Appendix C of this report.

3.13A.7 Conclusions and Recommendations

The following section presents conclusions and recommendations for this site based on the review and analysis of the data associated with historical information and sampling activities.

3.13A.7.1 Conclusions

- Based on the literature review, the site appears to have been used for practice mortar training in the 1950s. Residential housing now covers most of the site area.
- If practice rounds were used, they would have been reusable and, at most, contained an ignition cartridge similar to a shotgun cartridge.

- The western portion of Site OE-13A (approximately 14 acres) was used as a landfill in the 1960s. The excavation and removal of the landfill material (including any OE that may have been present within that portion of Site OE-13A) was conducted in the 1990s. Several OE scrap items and live items were found during the removal of the landfill material and adjacent to the landfill.
- The area was extensively graded in the 1970s and housing built. OE found during housing construction would have been removed prior to occupation of the housing. Interview records do indicate that OE found during housing construction was removed.
- Based on the historical use of the site, including training that did not involve the use of OE, and subsequent use as residential housing, it is not expected that OE related to use as a practice mortar range would remain at the site. The M68 and M69 practice mortars are inert items designed for reuse. There is a small ignition charge and primer, similar in size to a 12 gage shot gun cartridge without the shot contained in the fin assembly, however, these items would not be expected downrange, because the item would not be downrange unless the ignition charge and primer functioned.
- Items found at grids located outside the site boundaries indicate that training using practice grenades and pyrotechnic items may have occurred east of the site.
- Based on historical use of the site, subsequent reuse as residential housing, it is unlikely OE is present at the site. However, the following OE items, if present at the site, are considered to pose an acceptable risk if encountered for the following reasons:

Signal Illumination, Ground, Green Star, Parachute: M19A2. It is unlikely that a person could cause a signal to function through casual contact if one were found at the site and be burned, because it: (1) would require precise assembly to function, and (2) would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

M205A1 and M205A2 Fuze: Pyrotechnic Delay Igniting. It is possible that a person could cause a fuze to function through casual contact if one were found at the site and be burned or exposed to metal fragments, but the fuze would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

Cartridge, 60mm, Training Mortar: M69. It is somewhat unlikely that a person would be able to cause an unfired cartridge to function through casual contact if one were found at the site and be burned, because it would require a hard, precise blow to the primer to function. A person could not be injured by a fired cartridge if one were found at the site, because it has no parts that function explosively, produce smoke, or burn.

Sampling Adequacy and Data Quality

- Based on review of the site data it appears that the 1950s practice mortar area may not be within the ASR site boundaries and that no sampling was performed within the 1950s practice mortar area; however, no further sampling is recommended in the practice mortar range area because no OE with energetic materials would be expected to remain based on review of historical data.
- The site boundaries changed throughout the OE sampling program. The reasons for the boundary changes were not well documented. The current site boundaries include a portion of the area identified on historical maps and aerial photographs as the location of the practice mortar range.

- Data collected by HFA is useful because it indicates that no OE items were found in the 20 grids that were sampled. Because no OE items were found, the absence of depth, location, and accurate grid location information for this site is not considered a data gap that significantly affects the interpretation of this site.
- Both SS/GS and 100 percent sampling methodologies were used at this site. SS/GS sampling is useful in identifying the presence of OE at a site, if it is encountered. Because problems with the statistics have been identified, it cannot be used to evaluate the adequacy of the sampling conducted.
- Schonstedt models GA-52/C or GA-72/Cv were used by HFA during sampling. The Schonstedt Model GA-52/Cx was used later by CMS. The results of the seeded test indicate that the instruments are capable of detecting the types of items expected at the site. Detection rates for the instruments cannot be calculated for a site because of the differences in site conditions between the ODDS sites and Site OE-13A.
- The sampling efforts completed to date were not designed to detect ordnance that could be related to the landfill area or training that may have occurred east of the site boundaries.
- Although the previous OE sampling efforts performed at Site OE-13A are not consistent with requirements in place today, the quantity and quality of the available information is sufficient to make an informed decision regarding the site. The entire site was not sampled. However, historical information indicates that OE hazards would not be expected from the past use of the site as a practice mortar range. OE associated with the landfill, and general training that may have occurred in the 1970s and 1980s would be expected to be very limited in occurrence. Further efforts to refine site boundaries or conduct 100 percent sampling of the site would not add significantly to the understanding of the site or change the conclusions of this report.
- The data collected and observations made during the site walk at Site OE-13A are useful because a M69 training mortar (OE scrap) was the only ordnance related item found, further supporting the conclusion that Site OE-13A was used for practice mortar training only and no further OE-related investigation is necessary.

3.13A.7.2 Recommendations

Based on the review of existing data:

- It is not anticipated that OE will be found at Site OE-13A as a result of practice mortar training that occurred in the 1950s. However, because OE were used throughout the history of Fort Ord and incidental OE items have been identified that appear to be related to the landfill material placed at the site in the 1960s and training that may have occurred in this area in the 1970s and 1980s, the potential for OE to remain at Site OE-13A cannot be ruled out.
- This site qualifies as a Track 1, Category 2 site because the site was used for training, but the OE items used do not pose an explosive hazard, or potentially remaining OE items do not pose an explosive hazard.
- No further OE-related investigation is recommended.

The U.S. Army Corps of Engineers completed ordnance investigations at Site OE-13A. The Army, with regulatory oversight from the U.S. Environmental Protection Agency (USEPA) and the California Department of Toxic Substance Control (DTSC), conducted a systematic investigation and no explosive

material was found. The investigation was specifically designed to assess the nature of the past military training activities at the site. Even though no actionable risk was identified through the remedial investigation process, in the interest of safety the Army recommends reasonable and prudent precautions be taken when conducting intrusive operations at the site. Construction personnel involved in intrusive operations at the site should attend the Army's "ordnance recognition and safety training" to increase their awareness of and ability to identify OE items. Trained construction personnel will contact an appropriate local law enforcement agency if a potential OE item is encountered. The local law enforcement agency will arrange a response by the Army. To accomplish that objective, the Army will request notice from the landowner of planned intrusive activities, and in turn will provide ordnance recognition and safety training to workers prior to the start of intrusive work. Additionally, while these intrusive activities are ongoing, the Army will conduct weekly site visits and provide refresher education as appropriate.

Upon approval of the proposed remedy for Site OE-13A (no further OE-related investigation), Site OE-13A will be incorporated into the Basewide OE RI/FS 5-year review schedule. The purpose of the 5-year review is to determine whether the remedy at Site OE-13A continues to be protective of human health and the environment. The 5-year review will also document any newly identified site-related data or issues identified during the review, and will identify recommendations to address them as appropriate. At the time of the next 5-year review, the Army will assess whether the education program should continue. If experience indicates that no explosive items have been found in the course of development or redevelopment of the site, it is anticipated that the education program may, in consultation with the regulatory agencies, be discontinued, subject to reinstatement if an explosive item is encountered in the future.

3.13A.8 References

Arthur D. Little, Inc. (ADL), 1994. *Final Community Environmental Response Facilitation Act (CERFA) Report, Fort Ord Monterey, California*. Real Estate Fort Ord (Military Reservation). April 1994.

Breiner, 1973. Applications Manual for Portable Magnetometers.

CMS Environmental (CMS), 1995. Site-Specific Work Plan. July 21.

Harding Lawson Associates (HLA), 2000. *Plan for Evaluation of Previous Work, Ordnance and Explosives Remedial Investigation/Feasibility Study, Former Fort Ord, California*. December 4.

Human Factors Applications, Inc. (HFA), 1993. *Ordnance and Explosive Waste (OEW) Site Operations, Fort Ord-Phase I Work Plan and Accident Prevention Plan*. December.

_____, 1994. *OEW Sampling and OEW Removal Action. Ft. Ord Final Report*. December 1.

Kocher, G., 2001. Telephone Interview with Bruce Wilcer, MACTEC Engineering & Consulting, Inc.

Lear, R. 2001. Telephone Interview with Bruce Wilcer, MACTEC Engineering & Consulting, Inc.

National Exposure Research Laboratory (NERL), 2000. Evaluation of U.S. Army Corps of Engineers Statistical UXO Sampling and Characterization Methodologies. July.

Navy, 1947. *NAVSEA OP 1664, U.S. Explosive Ordnance*. Published by Direction of Commander, Naval Sea Systems Command. May. Changed 15 January 1969.

Robotti, J., 2001. Telephone Interview with Bruce Wilcer, MACTEC Engineering & Consulting, Inc. April 24.

- Parsons Infrastructure & Technology Group Inc. (Parsons), 2001. *Draft Final Ordnance Detection and Discrimination Study (ODDS), Former Fort Ord, Monterey, County, California*. December.
- USA Environmental Inc. (USA), 2000. *Final, After Action Report OE Gridstats Sampling, Inland Range Contract Former Fort Ord, California Site OE-13A*. December 28.
- U.S. Army (Army), 1945. *Training Facilities, Fort Ord and Vicinity, California*. Revised August 1945.
- _____, 1946. *Master Plan, Fort Ord, California*. April 5.
- _____, 1954. *Training Areas That Cannot Be Used At Same Time: (As Presented In Use)*. Circa 1954.
- _____, 1956. *Map of Fort Ord Training Areas & Facilities. Enclosure I to Annex "O."* Revised: 20 December 1956.
- _____, 1957. *Map of Fort Ord Training Areas & Facilities. Enclosure I to Annex "H"*. Revised: 15 July 1957.
- _____, 1958. *Map of Fort Ord Training Areas & Facilities. Enclosure 1 to Appendix 1 to Annex "H"*. Revised: 10 January 1958.
- _____, 1964. *Field Training Areas & Range Map, Fort Ord. Appendix 2, Annex O*. April 27.
- _____, 1967. *Back Country Roads, Field Training Area and Range Map, Fort Ord, California*. January.
- _____, 1977. *Department of the Army Headquarters, Technical Manual, Army Ammunition Data Sheets for Land Mines (FSC 1345), TM 43-0001-36*. February 14.
- _____, 1992. *Field Manual FM 7-8, Infantry Rifle Platoon and Squad*. April 22. Change 1, 1 March 2001.
- _____, 1994. *Technical Manual TM 43-0001-29 Army Ammunition Data Sheets for Grenades*. June.
- _____, 1994. *Technical Manual, TM 43-0001-37*. January.
- _____, 2001. *Technical Memorandum, Support Documentation, Potential OE Issues, Parcel E4.3.1, Finding of Suitability for Early Transfer, Housing Areas and Former Garrison Parcels, Former Fort Ord, California*. July 9.
- U.S. Army Corps of Engineers (USACE), San Francisco District, 1960. *Fort Ord Aerial Photo Contour Map Main Garrison*. March 21 (Aerial Photograph taken in 1959).
- _____, 1976. *Training Facilities Plan, Future Development, Master Plan*. December.
- _____, 2000. *Memorandum from David Eisen to: BRAC Cleanup Team (BCT) Meeting*. July 2000.
- U.S. Army Engineering Division, Huntsville (USAEDH), 1993. *Archives Search Report Fort Ord California, Monterey County, California*. Prepared by U.S. Army Corps of Engineers St. Louis Division. December.
- _____, 1995. *Procedures for Conducting Preliminary Assessments at Potential Ordnance Response Sites*. April.

_____, 1997. Revised Archives Search Report Fort Ord California, Monterey County, California. December. Prepared by U.S. Army Corps of Engineers St. Louis Division. December.

TABLES

**Table 13A-1. Incidental OE Items Found, Site OE-13A and Vicinity
Ordnance and Explosives Remedial Investigation/Feasibility Study
Former Fort Ord, California**

Site or Area	Activity	OE Item	Status	Date Encountered	Comments
None*	Area A landfill excavation	Misc projectiles	Inert	Misc.	Items found during landfill construction activities at Area A. Records indicate some items were live and some were scrap.
None	OU 2 pipeline installation	Hand grenade primer detonators (3), 40mm signal cartridges (2)	Inert	08/16/95	Abrams Drive between Third and Old Baldy, near former landfill and Site OE-13A. Items removed by Federal Police.
None	OU 2 pipeline installation	Hand grenade, primer det., small arms cartridge	Inert	08/18/95	Abrams Drive between Old Baldy and Inchon Court, near former landfill and Site OE-13A. Items removed by Federal Police.
None	OU 2 pipeline installation	Rifle grenade (live)	UXO	08/24/95	250' West of Inchon, along Abrams Drive, near former landfill and Site OE-13A. Live item detonated in place by the 87th EOD.
None	OU 2 pipeline installation	"Slap flare", 3.5 inch rocket motor	UXO	03/16/96	Live items found near Imjin at a depth of 6 feet. Detonated in place by the 87th EOD.
OE-13A	Not available	40mm signal cartridge	Inert	12/01/99	Removed by Corps Safety Specialist.
None	OU 2 pipeline installation	3.5 inch rocket motor	Inert	02/28/00	Removed by Corps Safety Specialist. This item may be within Site OE-13A.
None	OU 2 pipeline installation	"Slap flares" (3), loose pyrotech material	UXO	02/29/00	Removed by Corps Safety Specialist. Location described as corner of Third and Abrams, not located on map.

**Table 13A-1. Incidental OE Items Found, Site OE-13A and Vicinity
Ordnance and Explosives Remedial Investigation/Feasibility Study
Former Fort Ord, California**

Site or Area	Activity	OE Item	Status	Date Encountered	Comments
None	OU 2 pipeline installation	3.5 inch rocket motor	Inert	05/01/00	"350' West of the Gas Station on East side of Imjin Road" Removed by Corps Safety Specialist.
None	Working along side of road	Fin Assembly for 3.5" Rocket	OE Scrap	11/27/00	

*Not within an OE-site boundary.

Table 13A-1A. Incidental OE Items Found During Area A Landfill Excavation

OE Item	Quantity	Characterization	Date Encountered	Comments
M3 practice mine	1	Expended	3/18/96	Area A Test Pit
Slapflare – M73	3	Live	3/21/96	Area A Test Pit
3.5-inch rocket	1	Expended	3/21/96	Area A Test Pit
½ of an illumination grenade	1	Expended	3/21/96	Area A Test Pit
2.36-inch rocket nose cone	1	Expended	3/21/96	Area A Test Pit
40mm illumination cartridge	1	Expended	3/27/96	Area A soccer field
MK2 hand grenade	1	Expended	3/29/86	OU2 Landfill off Imjin
3.5-inch rocket motor	1	Expended	6/17/96	Area A excavation
3.5-inch rocket motor	28	Expended	6/18/96	Area A excavation
90mm signal cartridges	19	Expended	6/18/96	Area A excavation
3.5-inch rocket motor	1	Expended	6/18/96	Area A excavation
M9 rifle grenade	2	Expended	6/18/96	Area A excavation
105mm practice	1	Expended	7/17/96	Area A soccer field
2.36-inch rocket	1	Practice	7/22/96	Area A excavation
2.36-inch rocket	1	Practice	7/23/96	Area A excavation
4-inch stokes mortar	1	Practice	7/30/96	Area A excavation
2.36-inch rocket	1	Practice	8/5/96	Area A excavation
M23 rifle grenade (smoke)	1	Live	8/5/96	Area A excavation
2.36-inch rocket	4	Practice	8/5/96	Area A excavation
M23 rifle grenade (smoke)	1	Live	8/7/96	Area A excavation
2.36-inch rocket	1	Practice	8/8/96	Area A excavation
2.36-inch rocket	2	Practice	8/14/96	Area A excavation
40mm smoke	1	Live	8/14/96	Area A excavation
2.36-inch rocket	1	Practice	8/15/96	Area A

Table 13A-1A. Incidental OE Items Found During Area A Landfill Excavation

OE Item	Quantity	Characterization	Date Encountered	Comments
Mk1 illumination grenade	1	Live	8/27/96	excavation Area A
2.36-inch rocket (burster tube)	1	Live	9/4/96	excavation Area A
Smoke pot 5lb	1	Expended	9/11/96	excavation Area A
Slap flare	1	Live	9/11/96	excavation Area A
Rifle grenade (smoke)	6	Expended	9/19/96	excavation Area A
3.5-inch rocket motor	1	Expended	9/26/96	excavation Area A
106mm heat (wax filled)	1	Practice	9/16/96	excavation Area A
2.36-inch rocket (practice)	1	Practice	9/30/96	excavation Area A

Information taken from Draft Remedial Action Confirmation Report and Post-Remediation Risk Evaluation, Area A Operable Unit 2 Landfill prepared by IT Corporation in April 2000.

Table 13A-2. Sampling Operations, Site OE-13A
Track 1 Ordnance and Explosives Remedial Investigation/Feasibility Study
Former Fort Ord, California

Site	Grid ID	Operation Type	Contractor	Geophysical Instrument Used	Grid Completion Date
OE-13A -- Practice Mortar Range	D3E2F6-01	Sampling	HFA	SCHONSTEDT GA-72CV or GA-52C	Not available
OE-13A -- Practice Mortar Range	D3E2G7-01	Sampling	HFA	SCHONSTEDT GA-72CV or GA-52C	Not available
OE-13A -- Practice Mortar Range	D3E2G9-01	Sampling	HFA	SCHONSTEDT GA-72CV or GA-52C	Not available
OE-13A -- Practice Mortar Range	D3E2H4-01	Sampling	HFA	SCHONSTEDT GA-72CV or GA-52C	Not available
OE-13A -- Practice Mortar Range	D3E2I0-01	Sampling	HFA	SCHONSTEDT GA-72CV or GA-52C	Not available
OE-13A -- Practice Mortar Range	D3E2I7-01	Sampling	HFA	SCHONSTEDT GA-72CV or GA-52C	Not available
OE-13A -- Practice Mortar Range	D3E2I9-01	Sampling	HFA	SCHONSTEDT GA-72CV or GA-52C	Not available
OE-13A -- Practice Mortar Range	D3E2J4-01	Sampling	HFA	SCHONSTEDT GA-72CV or GA-52C	Not available
OE-13A -- Practice Mortar Range	D3E2J7-01	Sampling	HFA	SCHONSTEDT GA-72CV or GA-52C	Not available
OE-13A -- Practice Mortar Range	D3E2J8-01	Sampling	HFA	SCHONSTEDT GA-72CV or GA-52C	Not available
OE-13A -- Practice Mortar Range	D3E3H1-01	Sampling	HFA	SCHONSTEDT GA-72CV or GA-52C	Not available
OE-13A -- Practice Mortar Range	D3F2A6-01	Sampling	HFA	SCHONSTEDT GA-72CV or GA-52C	Not available
OE-13A -- Practice Mortar Range	D3F2A8-01	Sampling	HFA	SCHONSTEDT GA-72CV or GA-52C	Not available
OE-13A -- Practice Mortar Range	D3F2A9-01	Sampling	HFA	SCHONSTEDT GA-72CV or GA-52C	Not available
OE-13A -- Practice Mortar Range	D3F2B7-01	Sampling	HFA	SCHONSTEDT GA-72CV or GA-52C	Not available
OE-13A -- Practice Mortar Range	OE-13A_13A1	SS/GS	USA	SCHONSTEDT GA-52CX	9/16/1997
OE-13A -- Practice Mortar Range	OE-13A_13A2	SS/GS	USA	SCHONSTEDT GA-52CX	9/17/1997

Site = OE Site Number and Name.

Sampling = 100 percent of the anomalies detected were excavated to a minimum depth of 4 feet. Deeper anomalies were investigated if directed by the USACE.

SS/GS = Sitestats/Gridstats sampling performed, selected anomalies were excavated.

HFA = Human Factors Applications Inc.

USA = USA Environmental

Note: Fields with annotation of "not available" is a null field in the OE database.

**Table 13A-3. OE Scrap Found During Sampling, Site OE-13A
Track 1 Ordnance and Explosives Remedial Investigation/Feasibility Study
Former Fort Ord, California**

Site	Grid	OE Items	Status	Depth (in)	Quantity
OE-13A -- Practice Mortar Range	OE-13A_13A2	Practice hand grenade fuze, M205 series	Inert	4	1
OE-13A -- Practice Mortar Range	OE-13A_13A2	Ground illumination signal, parachute, rifle, M19 series	Inert	5	1

Site = OE Site Number

Grid = Grid in which item was found.

Status = Condition of item, either live or inert. Inert indicates no OE hazard (OE scrap)

Depth = inches below ground surface that item was found.

Quantity = Number of like items found.

PLATES

Disclaimer

The following plates have been prepared to present pertinent features digitized from historical training maps and scanned aerial photographs. It should be noted that minor discrepancies between source maps, combined with the natural degradation of older source maps and photographs, has resulted in misalignment of some map features. In addition, camera angle and lens distortion introduced into older aerial photographs, combined with changes in vegetation and site features over time may contribute to misalignments of some map features with respect to the aerial photographs.

ATTACHMENT

13A-A1

ATTACHMENT OE-13A - 1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: SITE 13A, PRACTICE MORTAR RANGE
LITERATURE REVIEW

Yes No Inconclusive

TYPE OF TRAINING AND OE EXPECTED

1. Is there evidence that the site was used as an impact area (i.e., fired OE such as mortars, projectiles, rifle grenades or other launched ordnance)?

Yes		
-----	--	--

Sources reviewed and comments

This area was first identified as a "Practice Mortar Range" on 1) Training Areas That Can Not Be Used At the Same Time, Circa 1954; 2) Map of Fort Ord Training Areas & Facilities, Revised December 20, 1956; 3) Map of Fort Ord Training Areas & Facilities, Revised July 15, 1957; 4) Map of Fort Ord Training Areas & Facilities, Revised January, 10, 1958. Based on the type of training identified for this area, no high explosive items would be expected to impact the site. It is possible that the inert practice mortars could impact the ground surface. Area not identified on next available training map, Basic Information, Ranges & Training Facilities, Revised December 31, 1958, or any other available maps thereafter.

2. Is there historical evidence that training involved use of High Explosive (HE) or Low Explosive (LE) items?

Yes		
-----	--	--

Sources reviewed and comments

Possible ignition cartridges associated with practice mortars. All maps identify the area as a practice mortar range. No range fans are shown. Mortar ranges within the multi-range area (MRA) are shown with a range fan (USAEDH, 1997; Review of Fort Ord facilities and training maps).

3. Is there historical evidence that training involved use of pyrotechnic and/or smoke producing items (e.g., simulators, flares, smoke grenades) but not explosives?

	No	
--	----	--

Sources reviewed and comments

USAEDH, 1997; Review of Fort Ord facilities and training maps.

ATTACHMENT OE-13A - 1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: SITE 13A, PRACTICE MORTAR RANGE
LITERATURE REVIEW

Yes No Inconclusive

DEVELOPMENT AND USE OF THE SURROUNDING AREA

4. Does subsequent development or use of the area indicate that OE would have been used at the site?

		X
--	--	---

Sources reviewed and comments

Two scrap items (expended rocket motor and 40mm signal cartridge) have been found as the result of construction activities (OU 2 pipeline) at the site (IT, 2000).

5. Does use of area surrounding the site indicate that OE would have been used at the site?

	No	
--	----	--

Sources reviewed and comments

Site OE-13A is approximately 1200 feet from City of Marina (farmland/residential) property. The farmland/residential was in existence prior to the establishment of the practice mortar range. Housing was constructed in this area (Abrams Housing) beginning in 1978 and continued through 1982. It continues to be occupied by residents.

ESTABLISHMENT OF SITE BOUNDARIES

6. Is there evidence of training areas on aerial photographs that could be used to establish boundaries?

Yes		
-----	--	--

Sources reviewed and comments

A cleared area is visible on the 1956 aerial photograph that could be used to establish a site boundary.

7. Is there evidence of training on historical training maps that could be used to establish boundaries?

Yes		
-----	--	--

Sources reviewed and comments

Based on the site maps in combination with military personnel familiar with practice mortar ranges. Maps reviewed that include the "Practice Mortar Range" 1) Training Areas That Can Not Be Used At the Same Time, After 1953; 2) Map of Fort Ord Training Areas & Facilities, Revised December 20, 1956; 3) Map of Fort Ord Training Areas & Facilities, Revised July 15, 1957; 4) Map of Fort Ord Training Areas & Facilities, Revised January, 10, 1958;

ATTACHMENT OE-13A - 1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: SITE 13A, PRACTICE MORTAR RANGE
LITERATURE REVIEW

Yes No Inconclusive

8. Should current boundaries be revised?

	No	
--	----	--

Sources reviewed and comments

Boundary does not include the suspected practice mortar range; however, based on the literature review it does not appear that the area was used for OE training.

RESULT OF LITERATURE REVIEW ANALYSIS

Does the literature review provide sufficient evidence to warrant further investigation?

	No	
--	----	--

Comments

The results of the literature review indicate that the site was not used for training that involved the use of OE.

References

USAEDH, 1997. Revised Archives Search Report, Former Fort Ord, California, Monterey County, California. Prepared by U.S. Army Corps of Engineers St. Louis District.

HLA, 2000. Literature Review Report, Ordnance and Explosives Remedial Investigation/Feasibility Study. Former Fort Ord California. January 4.

IT, 2000. OE Related Items Found in Areas Other Than the MRA and the OU2 Landfill. June 15.

ATTACHMENT 13-A - 1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: SITE 13A, PRACTICE MORTAR RANGE
SAMPLING EVALUATION

Yes No Inconclusive

1. Is there evidence that the site was used as an impact area (i.e., fired OE such as mortars, projectiles, rifle grenades and other launched ordnance)?

	No	
--	----	--

Sources reviewed and comments

No evidence of the site being used as an impact area based on the results of sampling conducted by HFA and USA (After Action Reports - HFA 1994a; USA 2000).

2. Is there evidence that training involved use of High Explosive (HE) or Low Explosive (LE) items?

Yes		
-----	--	--

Sources reviewed and comments

Expended grenade fuze (LE) found by USA (Grid 13A-02). Grid is outside of and adjacent to the current site boundary; (After Action Reports - HFA 1994a; USA 2000)

3. Is there evidence that training involved use of pyrotechnic and/or smoke producing items (e.g., simulators, flares, smoke grenades) but not explosives?

Yes		
-----	--	--

Sources reviewed and comments

Expended ground illumination signal (pyrotechnic) found by USA (Grid 13A-02). Grid is outside of and adjacent to the current site boundary; (After Action Reports - HFA 1994a; USA 2000)

4. Was sampling and/or reconnaissance performed within the appropriate area?

	No	
--	----	--

Sources reviewed and comments

Sampling: No, however, at the time sampling was performed samples were collected from within the site boundary. Based on the review of maps from the 1950s it appears that the practice mortar area was west of the ASR site boundaries. This area has been either excavated or is covered with housing; therefore sampling of the area west of the site is not recommended.

ATTACHMENT 13-A - 1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: SITE 13A, PRACTICE MORTAR RANGE
SAMPLING EVALUATION

	Yes	No	Inconclusive
5. Does sampling indicate OE and/or ordnance-related scrap are present at the site?	Yes		

Sources reviewed and comments
Yes, but OE scrap found within grid outside of the current site boundary (USA Grid 13A-02); (After Action Reports - HFA 1994a; USA 2000)

6. Were the type(s) of items found consistent with the type of training identified for the site?			Inconclusive
---	--	--	--------------

Sources reviewed and comments
No practice mortars have been found. Illumination signals found could have been used for night time mortar practice. The grenade fuze does not appear to be consistent with a practice mortar range.

7. Were the type(s) of items found consistent with the era(s) in which training was identified?			Inconclusive
--	--	--	--------------

Sources reviewed and comments
Site was identified as a "Practice Mortar Range" on maps from the 1950s (Revised Archives Search Report [ASR], 1997). Only items found during sampling were a grenade fuze and an illumination signal.

8. Was HE fragmentation found?		No	
---------------------------------------	--	----	--

Sources reviewed and comments
No evidence of HE fragmentation was found during the OE sampling of the site (After Action Reports - HFA 1994a; USA 2000).

9. Was HE found?		No	
-------------------------	--	----	--

Sources reviewed and comments
(After Action Reports - HFA 1994a; USA 2000)

10. Were LE found?		No	
---------------------------	--	----	--

Sources reviewed and comments
Only expended items found outside of the site boundary (USA Grid 13A-02). (After Action Reports - HFA 1994a; USA 2000)

ATTACHMENT 13-A - 1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: SITE 13A, PRACTICE MORTAR RANGE
SAMPLING EVALUATION

	Yes	No	Inconclusive
11. Were pyrotechnics found?		No	

Sources reviewed and comments

Expended illumination signal found by USA (Grid 13A-02). This grid is outside of and adjacent to the current site boundary; (After Action Reports - HFA 1994a; USA 2000)

12. Were smoke producing items found?		No	
--	--	----	--

Sources reviewed and comments

(After Action Reports - HFA 1994a; USA 2000)

13. Were explosive items found (e.g. rocket motors with explosive components, fuzes with explosive components)?		No	
--	--	----	--

Sources reviewed and comments

Only expended grenade fuze (LE) found by USA (Grid 13A-02). This grid is outside of and adjacent to the current site boundary; (After Action Reports - HFA 1994a; USA 2000) The rocket motor did not contain explosive components.

14. Do items found in the area indicate training would have included use of training items with energetic components?	Yes		
--	-----	--	--

Sources reviewed and comments

Expended items found outside of the site boundary may be related to training activities or the result of disposal. After Action Reports - HFA, 1994a; USA, 2000

15. Were items found in a localized area (possibly the remnants of a cleanup action)?			Inconclusive
--	--	--	--------------

Sources reviewed and comments

Items were found in the same grid (After Action Reports, USA 2000).

ATTACHMENT 13-A - 1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: SITE 13A, PRACTICE MORTAR RANGE
SAMPLING EVALUATION

	Yes	No	Inconclusive
16. Has the site been divided into sectors to focus on areas of common usage, similar topography and vegetation, and/other unique site features?		No	

Sources reviewed and comments
 After Action Reports - HFA, 1994a; USA, 2000

17. Should current site boundaries be revised?		No	
---	--	----	--

Sources reviewed and comments
 On the basis of the sampling evaluation no modification to the site boundary is required.

18. Was equipment used capable of detecting items suspected at the site at the maximum expected depth?	Yes		
---	-----	--	--

Sources reviewed and comments
 Yes, based on penetration analysis provided by USAESCH. The surface items, the mortars, and the 3.5-inch rockets would be expected to be found by the Schonstedt model used based on the penetration study (USAESCH).

19. Was equipment used capable of detecting the types of items (e.g., non-ferrous) suspected at the site?	Yes		
--	-----	--	--

Sources reviewed and comments
 Design OE is the 81mm Practice Mortar with a maximum calculated penetration depth of 2.7 feet and a maximum calculated detection depth of 2.8 feet (USAESCH, 1997). Schonstedt models GA-52/C and GA-72/Cv. These items contain ferrous material.

ATTACHMENT 13-A - 1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: SITE 13A, PRACTICE MORTAR RANGE
SAMPLING EVALUATION

20. Do the results of the ODDS indicated that items suspected at the site would have been detected by the instrument used at the time of investigation?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

The results of the ODDS and OE removals at Site OE-3, indicate that the Schonstedt models used at the site are capable of detecting the ferrous OE items expected at this site. A site specific numerical detection rate cannot be calculated for an individual site based on the results of the ODDS.

21. Do results of the investigation indicate that suspected items could be detected with a high level of confidence at observed and expected depth ranges?

		Inconclusive
--	--	--------------

Sources reviewed and comments

No practice mortars were identified at the site.

22. Were all the instruments used to evaluate the site maintained and calibrated in accordance with associated work plan and manufacturer's specifications?

Yes		
-----	--	--

Sources reviewed and comments

As stated in the After Action Reports, "Each magnetometer was tested each morning and field tested after lunch to determine that it was operating correctly," (HFA, 1994a);

CMS performed daily operational checks and QC inspections of its work. No deficiency reports were written during QA inspections of the work at Site OE-13A (USA, 2000)

ATTACHMENT 13-A - 1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: SITE 13A, PRACTICE MORTAR RANGE
SAMPLING EVALUATION

23. Based on the anticipated target density (UXO items per acre) has the minimal amount of sampling acreage been completed in accordance with the scope of work or contractor work plan?

Yes	No	Inconclusive
		Inconclusive

Sources reviewed and comments

SiteStats/GridStats was used to design and implement the 1997 sampling at this site. Subsequent to this work, the use of this program has been questioned. It appears that the data are of good quality, however, it is not possible to statistically evaluate the adequacy of sampling at this site.

24. Based on sampling procedure (e.g., grids, transects, and/or random walks) was a percentage of the site completed to provide 95% confidence in a UXO density estimate, and if so provide total area investigated and the UXO density estimate.

		Inconclusive
--	--	--------------

Sources reviewed and comments

Within the current boundary, 100,000 square feet (approximately 2.3 acres) were investigated by HFA. Outside the current boundary, 100,000 square feet (approximately 2.3 acres) were investigated by HFA.
 Outside of the current boundary, 40,000 square feet (0.92 acres) investigated by CMS.
 Additionally approximately 9 acres (landfill area) were completely removed by IT.
 Approximately 14 acres of the site are covered by roads and housing. It is not possible to calculate OE density because no OE was found.

Total Area:	140,000	
UXO Density:		Not Calculated

25. What percentage of the anomalies were intrusively investigated?

Sources reviewed and comments

HFA: 100% sampled (Don't know number of anomalies)
 CMS: 99 of 440 anomalies sampled (22.5%)
 After Action Reports - HFA, 1994a; USA, 2000

Total % of anomalies investigated	HFA: 100% CMS: 22.5%
-----------------------------------	-------------------------

26. Was the appropriate data processing scheme used for the site, how was the data processed?

		Not Applicable
--	--	----------------

Sources reviewed and comments

Not applicable, no digital geophysical data were collected.

ATTACHMENT 13-A - 1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: SITE 13A, PRACTICE MORTAR RANGE
SAMPLING EVALUATION

27. Has the field data been collected and managed in accordance with quality control standards established for the project?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

"The project was completed without QC discrepancy," (HFA, 1994a)

CMS performed daily operational checks and QC inspections of its work. No deficiency reports were written during QA inspections of the work at Site OE-13A (USA, 2000)

Result of Sampling Evaluation

Does the sampling evaluation provide sufficient evidence to warrant further investigation?

	No	
--	----	--

Comments

Based on the review of existing site data, it is not anticipated that OE would remain at the site. The current site boundaries do not encompass the entire 1950s practice mortar range; however, the area has been excavated or is covered by housing. No further OE-related investigation is recommended.

References

HFA, 1994a. Human Factors Applications, Inc. Explosive Ordnance Disposal Division, OEW Sampling And OEW Removal Action, FT. ORD FINAL REPORT. December 1, 1994.

HFA, 1994b. Human Factors Applications, Inc. Explosive Ordnance Disposal Division, OEW Site Operations Fort Ord-Phase III Work Plan and Site Specific safety and Health Plan. February 22.

USA, 2000. USA Environmental, Inc., After Action Report, OE GridStats Sampling, Inland Range Contract, Former Fort Ord, California, Site OE-13A. April 4, 2000.

USAESCH, 1997. Penetration of Projectiles Into Earth, An Analysis of UXO Clearance Depths at Ft. Ord. September 10. Appendix F of the Phase 2 EE/CA.

Harding data review 10/12/00.

ATTACHMENT

13A-A2

ATTACHMENT 13A - A2

POTENTIAL ORDNANCE USED AT SITE OE-13A

M68 and M69 Training Mortars – The two training mortars that were available for use in the 1950s were the M68 for the 81mm and the M69 for the 60mm. Both rounds were developed for training in loading and firing the mortar. As stated in the April 1967 Army Technical Manual (*Army, 1967*) the projectiles without the ignition cartridge are completely inert and have no fuze. Both the 60mm and the 81mm consist of a cast iron pear-shaped body. Both mortars were assembled by attaching a fin assembly that contained an ignition charge. The ignition cartridge, similar to a shotgun cartridge, was used to propel the inert portion of the mortar. If the ignition cartridge did not function, the mortar would not be fired; therefore, it is not possible for a live practice round to be found downrange. Both the M68 and M69 were reusable projectiles and could be collected and reused by inserting a new ignition cartridge. The effective range of the M69 is listed at 235 yards. The effective range of the M68 is listed at 310 yards.

M30 Practice Hand Grenade, Delay

The information provided below is from TM 43-0001-29, Army Ammunition Data Sheets for Grenades (*Army, 1994*).

The M30 grenade is used for training in care, handling and throwing of fragmentation grenades M26A1 and M26. The body is not loaded with a high explosive filler but may have a small, separate black powder charge. Hand grenade fuzes M205A1 and M205A2 are pyrotechnic delay-igniting fuzes. They differ in body construction only. The body contains a primer and a pyrotechnic delay column. Assembled to the body are a striker, striker spring, safety lever, safety pin with pull ring, and an igniter assembly. The split end of the safety pin has an angular spread or a diamond crimp.

Removal of the safety pin permits release of the safety lever. When the safety lever is released, it is forced away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its axis and strikes the percussion primer. The primer emits a small, intense spit of flame, igniting the delay element. The delay element burns for 4 to 5 seconds, then sets off the igniter. The igniter initiates the black powder charge (when installed). The stopper (when installed) is forced from the base of the body. A loud report, like that of a firecracker, and a puff of white smoke follow.

After use the grenade body may be recovered, and reloaded with a new fuze, and black powder charge and stopper, if used.

M62 Practice Hand Grenade, Delay

The information provided below is from TM43-0001-29. Army Ammunition Data Sheets for Grenades (*Army, 1994*).

The M62 delay practice grenade is used for training in care, handling and throwing of fragmentation hand grenade M61. The grenade body is of cast iron. The body is not loaded with a high explosive filler but may have a small, separate black powder charge. The grenade fuzes M205A1 and M205A2 are pyrotechnic delay-igniting fuzes. They differ in body construction only. The body contains a primer and a pyrotechnic delay column. Assembled to the body are a striker, and an igniter assembly. The split end of the safety pin has an angular spread or a diamond crimp.

The hand grenade safety clip is designed to keep the safety lever in place, should the safety pin be unintentionally removed from the grenade. It is an additional safety device used in conjunction with the safety pin. The hand grenade safety clip is shaped in a special configuration for installation on the grenade. It consists of a clamp, which fits around the fuze body and over the safety lever. It serves to prevent release of the grenade safety lever if the safety pin is accidentally released.

Release of the safety clip, and removal of the safety pin, permits release of the safety lever. When the safety lever is released, it is forced away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its axis and strikes the percussion primer. The primer emits a small, intense spit of flame, igniting the delay element. The delay element burns for 4 to 5 seconds, and then sets off the igniter. The igniter initiates the black powder charge (when installed). The stopper (when installed) is forced from the base of the body. A loud report, like that of a firecracker, and a puff of white smoke follow.

After use, the M62 grenade body may be recovered, and reloaded with a new fuze, and black powder charge and stopper, if used.