Site OE-24D

(Booby Traps)

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## PLATES



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## 3.24D Site OE-24D (Booby Traps)

This summary report consists of two parts. The first part, contained in Sections 3.24D.1 through 3.24D.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 3.24D.6). The Site Evaluation was conducted in accordance with the 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 3.24D6.1) and evaluation of sampling process(es) (Section 3.24D.6.2 ). These discussions are based on information from standardized literature review and sampling review checklists (Attachment 24D-A1). Section 3.24D.7 provides conclusions and recommendations for the site. References are provided in Section 3.24D.8.

## 3.24D.1 Site Description

Site OE-24D is 1.8 acres and is located in the west-central portion of the former Fort Ord south of the Main Garrison and approximately 2,700 feet north of the Multi-Range Area (MRA; Plate 24D-1). The site is within the boundaries of the Fitch Park military housing complex. Site OE-24D was identified through a review of a 1946 historical map as part of the supplement to the Fort Ord Archive Search Report (ASR*; U.S. Army Engineer Division, Huntsville [USAEDH], 1994*).

## 3.24D.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 misalignments of some map features with respect to the aerial photographs.

### *1940s Era*

Site OE-24D lies within a land tract purchased from private landowners by the U.S. Army (Army) after July 1940 (*Arthur D. Little, Inc. [ADL], 1994*). Review of 1940s era documentation, including historical maps, indicates that the area was used for booby trap training. The 1945 and 1946 maps show a rectangular area that is considered to define the boundary of Site OE-24D. However, there are no cleared areas, structures, or fences visible on 1941 and 1949 aerial photographs that would indicate a possible location for the booby trap training area.

- There is a disturbed area (area with little vegetation) north of digitized boundary of OE-24D in a 1941 aerial photograph. This disturbed area is in the general vicinity of Site OE-24E.

- A "Booby Traps" training area is shown on a 1945 training facilities map and a 1946 master plan (*Army, 1945 and 1946*). Located adjacent to the northwest corner of the site is the Practice Rifle Grenade training area (Site OE-24E). Live Grenade (Site OE-24C) and Practice Hand Grenade (Site OE-24B) training areas are also shown on the 1945 and 1946 training maps. These were located approximately 1,200 feet southeast and 2,300 feet east of the Booby Trap training area, respectively (Plate 24D-2). There are no range fans shown on the 1945 and 1946 maps for these training areas.

- A 1949 aerial photograph shows a cleared area slightly south and east of the digitized boundary of the site in the general vicinity of the location shown on the 1945 Training Facilities map. It is not known whether this would have been the area used for booby trap training as the training may have been performed in a more highly vegetated area which would have provided more opportunities for booby trapping.

### *1950s Era*

Review of 1950s era documentation including training maps, aerial photographs, and grading plans, indicates that booby trap training ended sometime prior to 1954. Grading plans indicate that the area was developed as military housing by 1959. The following summarizes the results of the historical map and aerial photograph review:

- On a 1951 aerial photograph, a cleared/disturbed area is visible slightly south and east of the site boundary (Plate 24D-2).

- The Booby Trap training area (OE-24D) is not shown on the circa 1954 map or on maps after that date (*Army, 1954*).

- The 1956 training facilities map labels the general site area as "SQ PAT AREA" (*Army, 1956*). It is believed that this is an abbreviation for "squad patrol area."

- Grading plans dated 1957 available for this area show a planned housing development. These plans also show 1959 as-built revisions (U.S. Army Corps of Engineers [*USACE], 1959*). The copies of the plans available for review are difficult to read. However, original contour lines and final grade contours can be read for the portion of the site west of Sicily Road. In this area, it appears that 2 to 4 feet of soil was removed from the northern portion of the site and approximately 2 feet of soil was added to the southern portion of the site. The plans do not indicate whether soil was imported or soil was exported from the site.

- Aerial photographs from 1959 (*USACE, 1960*) and 1966 (Plate 24D-3) show completed residential housing. Based on the 1951 aerial photograph, it appears that the areas in the site vicinity that were cleared of vegetation were covered with housing or fill material by 1959.

### *1960s To Present*

Military housing was completed in 1959 and was occupied from the 1960s to present. The closest training areas used from the 1960s until present are inside the MRA, approximately 2,700 feet south of the site. It should be noted that the MRA range fans nearest OE-24D point south (away from the site) into the interior of the MRA (Plate 24D-1). The following provides additional information from the literature review:

- No training sites are present in the OE-24D area on training maps from 1957 through 1988.

- A 1999 aerial photograph shows continued residential housing in the site vicinity (Plate 24D-4).

- The only reported OE found in the Fitch Park Housing area were 40mm practice projectiles. The 40mm projectiles were found in the area in 1997 and 1999, and reported to Presidio of Monterey police. According to a CMS Environmental, Inc. (CMS) incident report dated August 5, 1997, two 40mm M781 TP inert projectile grenades were found in the woods behind the housing area, approximately 1,300 feet north of Site OE-24D (*CMS, 1997*). On July 14, 1999, an inert 40mm M576 canister multiple projectile (MP), which was "bashed down" into a cartridge case from a "782", was found at Fitch Park approximately 500 feet north of the OE-24D boundary (*CMS, 1999*). It should be noted that the M781 and M576 were not available for use in the 1940s. During a follow-up call with Stan Ryley, CMS Senior Unexploded Ordnance (UXO) Supervisor (SUXOS), concerning the 1997 incident, Mr. Ryley indicated that he believed that the items had not been used at the site but had been brought to the area from Range 45 by children (*Ryley, 1999*). Range 45 is a grenade launcher range approximately 5,500 feet southeast of the site (Plate 24D-1).

### *Proposed Future Land Use*

The proposed reuse of this area is continued military housing.

## 3.24D.3 Potential Ordnance Based on Historical Use of the Area

This section identifies the types of ordnance that may have been used in this area. Based on historical information, the area was used for squad patrol training and for booby trap training.

### 3.24D.3.1 Squad Patrol Activities

It is unlikely that squad patrol activities would involve the use of high explosive, low explosive, or live ammunition. Squad patrol training may have included use of smoke and illumination signals; however, no evidence of these items has been found during sampling in the site vicinity.

### 3.24D.3.2 Booby Traps

Most booby traps are actuated when a trip wire is pulled, or a plate or rod is pressed by someone or something passing through an area. Most booby traps use trip wires, which release cocked striker-type firing devices. Many triggering devices are used in booby traps. They include fuzes, igniters, and firing devices. Standard firing devices have a standard base coupling by which they may be readily attached to a variety of charges. Explosives, blasting caps, with detonating cords are not used with firing devices in booby trap training areas because of the risk of injury. Charges and blasting caps are only used in disposal areas; and therefore, are not expected to have been used at OE-24D (*Hall, 2003b*). In training, firing devices could be attached to practice mines or simulated explosive devices to provide realistic training in setting and disarming booby traps (*Hall, 2003a*).

There is no specific information about what booby trap firing devices were used for training at Fort Ord in 1940s. A description of firing devices potentially used at the site is provided in Attachment 24D-A2.

## 3.24D.4 History of OE Investigations

The following describes the OE investigations that have been conducted at Site OE-24D.

### 1994 Archives Search Report Supplement 1

The purpose of the Archives Search was to identify sites, gather and review historical information to determine the types of munitions used at Fort Ord, identify possible disposal areas, identify unknown training areas and recommend follow-up actions. The Archives Search was conducted in accordance with U.S. Army Corps of Engineers guidance (*USAESCH, 1995*). The Archives Search included a Preliminary Assessment/Site Investigation (PA/SI) consisting of interviews with individuals familiar with the sites, visits to previously established sites, reconnaissance of newly identified training areas, and the review of data collected during sampling or removal actions. Requirements for preparation of an ASR are described in Section 2.0 of this report.

Site OE-24D was identified through a review of Fort Ord historic records completed for the Fort Ord ASR (*USAEDH, 1994*). A total of 10 acres in the Site OE-24 area were recommended for sampling after a piece of a high explosive grenade was found during a visit to the area. The site vicinity was described as being in the vicinity of FR 06836 53857/N 36° 37' 33.9", W 121° 48' 18.5' which were the coordinates of where the piece of the grenade was found. The ASR site boundary is northwest of the area shown on the 1945 training map as "Booby Traps." It is not known why there is a discrepancy between the ASR site boundary and the area identified as "Booby Traps" on the 1945 training map. The method for determining site boundaries was not discussed in the ASR. The original site boundary was identified based on less information and fewer tools (e.g., no geo-referenced aerial photographs, GIS maps, or databases) than are currently available.

### 1994 UXB International Land Survey

UXB International, Inc. (UXB) performed a land survey of the site boundary, and may have cut brush at the site as part of their land survey effort (*USA Environmental Inc. [USA], 1999*). No sampling or intrusive activities were completed and no OE discoveries were documented. The surveyed site boundary is shown on Plate 24D-4 and is offset to the north of the ASR site and is northwest of the area shown on the 1945 training map as "Booby Traps". The UXB report (*UXB, 1995*) referenced the ASR report concerning the site location and therefore, it is assumed that the maps and coordinate information provided in the ASR were used to establish the site boundary. It is not known why there is an offset between the digitized ASR and the UXB-surveyed site boundaries. Some of the offset may be related to discrepancies between copies of source maps and interpretation of features shown on maps relative to what is present in the field.

### 1997 Archives Search Report

This report updated information contained in the 1993 ASR report. In the 1997 ASR, Site 24 was subdivided into Sites 24A through 24E, based on training areas identified on a 1946 map (*USAEDH, 1997*). Site OE-24D was identified as being 1.8 acres and was recommended for further investigation and random sampling.

### 1997 CMS Environmental

Site OE-24D was sampled in 1997 by CMS to assess the necessity of further OE removal (*USA, 1999*). Contract requirements for the scope of work performed by CMS are described in Section 2.0 of this report. After the sampling was performed, CMS became known as USA Environmental and the Final After Action Report (AAR) was issued under USA letterhead. According to grid records in the AAR, two 2,500 square-foot grids (identified as 24D 1 and 24D 2 on grid records) were sampled using the SiteStats/GridStats (SS/GS) sampling program (*USA, 1999*). SS/GS statistically calculates the number of

grids and the percentage of anomalies at a site that require sampling. Although only two grids were reportedly sampled, a plate in the AAR shows three grids (two labeled D3 and one labeled D2). One grid is outside and two grids are within the ASR site boundary (Plate 24D-4). The grid located outside of the ASR boundary is located within the UXB-surveyed site boundary. It is not known which two of the three grids on the plate were the grids that were sampled. Because the AAR text indicates that one of the sample grids was outside the CMS site boundary, it is likely that only one of the grids shown within the site boundary was sampled. The grids do not fall within the area identified as "Booby Traps" on the 1945 training map but one of the grids appears to be located in the area identified on the 1945 map as "Practice Rifle Grenade" area. It therefore, appears that the area sampled may be a portion of the Practice Rifle Grenade training area. The CMS report referenced the ASR and therefore, it is assumed that the maps and coordinate information provided in the ASR were used to establish the site boundary.

Both grids sampled had non-standard dimensions because of terrain and structures within the site. A total of 331 anomalies were located using the Schondstedt Model GA-52/Cx magnetometer. Because the SS/GS grid sampling approach (described in Section 3.24D.6.2) was used, 120 anomalies (or approximately 31.5% of the anomalies in each grid) were excavated. Using the SS/GS sampling approach, the other 111 anomalies were not investigated. One OE-related item (identified as "frag") was found at a depth of 6 inches during grid sampling. Non-OE scrap items found during sampling included items such as nails, metal scrap, wire, rocks, a dog collar, toy gun, and a metal plate. Table 24D-1 summarizes site sampling operations and Table 24D-2 lists OE scrap found during sampling. On the basis of the sampling results, no further OE response was recommended in the AAR.

## 3.24D.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. CSMs usually incorporate information regarding the physical features and limits of the area of concern (the site), 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-24D 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 24D-5 presents a site conceptual model.

### 3.24D.5.1 Training Practices

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

#### *Squad Patrol Training*

It is unlikely that squad patrol activities would involve the use of high or low explosive or live ammunition. It is possible that blank small arms ammunition could have been used. Photographs from a 1959 yearbook show squad patrol training where soldiers are carrying rifles and traveling on foot (*Army, 1959*). Squad patrol training may also have included use of pyrotechnic items such as smoke and illumination signals. However, no evidence of these pyrotechnic items was found during sampling in the site vicinity.

### *Booby Trap Training*

No Fort Ord-specific information is available for booby trap training in the 1940s. Information presented below is based on current training manuals (*Army, 1997*).

Booby traps are placed in a variety of locations, some of which can include:

- In and around buildings, installations, and field defenses
- In and around road craters or any obstacle that must be cleared
- In natural, covered, resting places along routes
- In likely assembly areas
- In the vicinity of stocks of fuels, supplies, or materials
- At focal points and bottlenecks in road or rail systems.

When setting booby traps, the commander establishes a control point that serves as a headquarters and material holding area. Each setting party works in a clearly defined area. Entry to these areas is strictly controlled. The locations of booby traps are recorded. The traps are inspected for safety and camouflage before they are armed.

Based on these general field practices, it would be expected that as well as setting the traps, personnel would also practice neutralizing and removing the traps.

If the training was in setting or disarming the traps, it is very likely that actual booby trap firing devices were used with a standard coupling base (sometimes referred to as a base coupling) used to provide an energetic report to indicate that the trap had been successful. Only rarely would any reason exist to connect these firing devices to explosives, blasting caps, or detonating cord, and this would have to be done in a demolition area properly sited for the explosives quantities used (*Hall, 2003a*). Training may also have included booby trapping practice mines.

## 3.24D.5.2 Site Features

The booby traps could have been set up anywhere in the site vicinity and would likely be buried or camouflaged. Training areas, however, are often cleared of vegetation, to reduce the possibility of fires caused by use of pyrotechnic materials. Aerial photographs show a few areas with disturbed or partially cleared vegetation that may have been used as training locations.

## 3.24D.5.3 Potential Sources and Location of OE

Some firing devices used in booby traps could have been discarded at the site and could be present at the ground surface or potentially buried during site grading operations. It is also possible that training mines could have been booby trapped as part of training.

## 3.24D.5.4 Potential Exposure Routes

Potential exposures to OE, although unlikely, could result from encountering coupling bases from firing devices or practice mines used in booby trap training. It is unlikely that booby trap firing devices or

practice mines are still present on the surface of the site, because they would most likely have been discovered during site development, or while the area was occupied by families. Any booby trap firing devices or practice mines present, therefore, are likely to be covered with soil. The booby trap firing devices or practice mines could potentially be unearthed while digging during future construction or landscaping activities.

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 24D-A2.

**Booby Trap Firing Devices.** The firing devices shown in the table below are all issued with a coupling base firing device consisting of a metal or plastic body and an internal percussion primer (similar to the primer in a small arms cartridge), and are designed to be used to set up booby-traps. They could also be used as a secondary firing device (booby-trap) for most anti-personnel and antitank mines. The firing devices could be set up to fire if a trip wire was pulled, pressure was released as in a weight being removed, or if a line under tension were cut. In each case, triggering the device would cause the spring-loaded firing pin to strike the percussion primer initiating the explosive train. As these items were used in training, no high explosives were used. The percussion primer provided sufficient noise to denote a detonation for training (*Army, 1994*). It is unlikely that a set-up booby trap, which includes one or more of the above firing devices, would remain in operational condition after many years of exposure. These devices are not sealed units. They are designed to be set up in the field quickly to provide temporary area denial or separation of forces. Many booby trap firing devices require trip wires to activate them, which are composed of a thin wire that will not survive long exposure to the elements. The firing devices themselves are not sealed to protect them from exposure to the environment. In the unlikely event that one of these armed devices were made to function, they would likely produce a shock, noise, and flash. They are not likely to cause injury by themselves.

| Nomenclature | Type by function | Lbs. Required to function |
|---|---|---|
| Firing Device, M1 | Pull | 3 to 5 |
| Firing Device, M1 | Pressure Release | 3 |
| Firing Device, M1 and M1A1 | Pressure | 20 |
| Firing Device, M1 | Chemical Delay | 6 to 1130 minute delay |
| Firing Device, M3 | Pull or Release | 6 to 10 of Pull & any release of tension |
| Firing Device M5 | Pressure Release | Approx. 5 |
| Coupling Base, Firing Device, M2 | Non-metallic | NA |
| Coupling Base, Firing Device | Metallic | NA |

**Summary:** It is unlikely that a person through casual contact could cause an armed booby trap firing device fitted with a coupling base to function if one were found at the site, and be exposed to the shock, noise, and flash of the coupling base. Booby trap firing devices were designed to be functioned by a thin trip wire or release of pressure that would release a cocked spring loaded firing pin. These small,

unsealed, metal parts have been exposed to moisture, degradation, and weathering for many years, which could decrease their effectiveness.

**Antipersonnel Practice Mines (M8, M8A1) and Fuzes (M10, M10A1).** The mine, antipersonnel, practice, M8 and M8A1 was designed to simulate the M2 (bounding) series of antipersonnel mines. They were used for training in the proper methods and precautions to be observed in the care, handling, laying, booby-trapping, arming and disarming of the M2 and M15 series mines. The fuze firing mechanism is activated by applying pressure (8 to 20 pounds) on any of the three prongs on the M10 or M10A1 combination fuze, or a pull of 3 to 10 pounds of pressure on the trip wire. The fuze firing train ignites the delay element in the projectile, and also propels it about 2 meters into the air. The delay initiates the spotting charge, which explodes with a loud report and emits smoke. The M8A1 mine with the M10A2 fuze functions the same except that the fuze firing train ignites the yellow smoke pellets through a 4 to 5 second delay, expels a plastic plug into the air, allowing the yellow smoke to be emitted from the top of the container (*Army, 1994*). Assuming that a mine was left emplaced and armed, and that it survived many years of degradation from exposure, it could be functioned by incidental contact by applying sufficient pressure to any of the prongs or trip wire on the M10, M10A1, or M10A2 combination fuze by stepping upon the fuze or tripping on the trip wire. If caused to function, the type of injury that could be sustained from the M8 mine would be burns from the 170-grain black powder spotting charge, and possible injury from falling parts. If caused to function, the M8A1 would propel a plastic plug into the air, allowing yellow smoke to be emitted from the container. Because the spotting charge is black powder, it will function if it dries out after being exposed to moisture.

**Summary:** It is unlikely that a person would be able to trigger the practice antipersonnel mine through casual contact if one were found at the site and be burned or exposed to smoke or falling parts, because the mine: (1) would have to contain a live fuze, and (2) these components would have been exposed to moisture, degradation, and weathering for many years, which could decrease their effectiveness.

**Antitank Practice Mines (M1, M1A1) and Fuzes (M1A1, M1A2).** The mine, antitank, practice M1 and M1A1 was designated to simulate the M1 and M1A1 HE antitank mines. The M1 series mine may be used with the M1A1 or the M1A2 fuze. They were used for training in the proper methods and precautions to be observed in the care, handling, laying, boobytrapping, arming and disarming of the M1 and M1A1 antitank mines. The mine is functioned by applying pressure (200 to 500 pounds) to the pressure plate, which fires the Activator, Antitank Mine: Practice, M1, which contained a small detonator (2.34 grains) and 20 grains of smoke composition. The activator operates when the action of a firing device initiates the igniter charge, which, in turn, ignites the smoke charge, releasing a puff of white smoke with accompanying noise (*Army 1994; Navy, 1947*). The mine could be caused to function by incidental contact by applying sufficient force to the pressure plate of the mine. The mine, being antitank by type, requires more weight than a large person can apply by just stepping on the pressure plate. It would require a vehicle to generate the necessary pressure to activate the M1 activator.

**Summary:** It is unlikely that a person would be able to trigger a practice antitank mine through casual contact if one were found at the site and be exposed to smoke and noise, because the mine: (1) would have to contain a live fuze and active detonator, (2) was designed to be triggered by the weight of a vehicle, and (3) these components would have been exposed to moisture, degradation, and weathering for many years, which could decrease their effectiveness.

## 3.24D.6 Site Evaluation

The available data (e.g., archival and reconnaissance data) regarding Site OE-24D 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 24D-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.

### 3.24D.6.1 Literature Review

#### *Type of Training and OE Expected*

Review of 1940s era documentation, including historical maps and aerial photographs, indicates that the area was used for booby trap training. It is possible that booby trap training may have involved the use of booby trap firing devices, or possibly, practice mines. A description of booby trap firing devices is provided in Attachment 24D-A2. A 1956 training map identifies that the site area as a "SQ PAT AREA." Assuming that this indicates that the area was used for squad patrol training, it is unlikely that live ammunition or explosives were used during this time period. After 1959, training in the area ceased as the area was occupied by residential housing. The closest training area was the MRA, approximately 2,700 feet south of the site. Based on the type of training conducted in this area, it does not appear that the area was an impact area or that high explosive (HE) items were used.

#### *Subsequent Use of the Area*

Aerial photographs indicate that the site area was covered with housing or fill material by 1959. After 1959, the site has been used for military housing. Reuse as housing suggests that the area would have been cleared of potential OE prior to construction of the housing.

#### *Establishment of Site Boundaries*

A 1945 training facilities map and 1946 Master Plan map identify a rectangular area as "Booby Traps." This rectangular area defines the boundaries of Site OE-24D. The ASR boundary is northwest of the area identified as "Booby Traps" on the 1945 training facilities map. Aerial photographs show cleared areas in the vicinity of the site.

#### *Summary of Literature Review Analysis*

Based on the ASR and subsequent review of historical maps and aerial photographs, there was sufficient historical evidence to warrant sampling of this site. The historical information indicated that this area was used as a booby trap training area in the 1940s.

### 3.24D.6.2 Sampling Review

This section describes the items that were found during sampling at the site and how these items support historical information concerning past use of the site. The review includes a comparison of sampling locations relative to site boundaries, a review of the equipment used during sampling, a discussion on the sampling methods used, and the quality control measures used during the investigation.

#### *Sampling Results (Items Found)*

In 1997, OE-24D was sampled by CMS (*USA, 1999*). One unidentified fragment was found at a depth of 6 inches during sampling (Table 24D-2). Therefore, the sampling results do not provide additional

information concerning past use of the site. There was no evidence that training involved using the site as an impact area.

Incidental OE found in the site vicinity included:

- Two 40mm M781 TP inert projectile grenades that were found in the woods behind the housing area, approximately 1,300 feet north of Site OE-24D.
- One inert 40mm M576 canister MP, which was "bashed down" into a cartridge case from a "782", was found at Fitch Park approximately 500 feet north of the OE-24D boundary.

These incidental OE-items are believed to have been brought to the site from other ranges (*Ryley, 1999*). Incidental OE items are listed in Table 24D-3.

### *Site Boundaries Review*

The AAR indicates that two sample grids appear to be within the ASR site boundary and that one grid is north of the site (*USA, 1999*). However, the areas identified as "Booby Traps" on the 1945 and 1946 training map are southeast of the current site boundary that is based on the 1997 ASR. There is also an offset between the UXB site boundary and the digitized ASR site boundary. In addition, the ASR site boundary appears to overlap with the area identified as "Practice Rifle Grenade" on the 1945 training map. On the basis of the digitization of these features, it appears that the sampling was performed in a portion of the former Practice Rifle Grenade training area and not the former Booby Trap training area. The data collected during sampling do not provide evidence that could be used to determine the site boundary because only one unidentified fragment was found.

### *Equipment Review*

The Schondstedt Model GA-52/Cx was used by CMS during the 1997 geophysical survey and sampling. The Schondstedt instruments are passive dual flux-gate magnetometers that are highly sensitive magnetic locators that detect ferrous (iron) metal objects; however, they cannot detect non-ferrous metal objects (e.g., lead, brass, copper, and 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 Schondstedt 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 Schondstedt Model GA-52/Cx is especially sensitive to smaller, near-surface ferro-metal objects *(Breiner, 1973)*.

The performance of the Schondstedt Model GA-52/Cx magnetometer was evaluated as part of the Ordnance Detection and Discrimination Study (ODDS; *Parsons Infrastructure & Technology Group, Inc. [Parsons], 2001*). As part of 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 Schondstedt tools were not evaluated during the static tests; therefore, only the seeded test results and the field trial tests are discussed herein. It is recognized that the ODDS study areas may not represent the same field conditions as site OE-24D; therefore, differences in field conditions, if applicable, should be considered when using information from the ODDS.

Firing devices were not specifically evaluated as part of the ODDS. However, other non-penetrating items (signal flares and hand grenades [ODDS Type I]) were evaluated as were penetrating items (2.36-inch and 3.5-inch rockets, rifle grenades, and 14.5 mm projectiles [ODDS Type II]). Therefore, the Type I seeded test results were used for comparison purposes in evaluating the performance of the geophysical equipment used at this site.

During the seeded tests, the Schonstedt Model GA-52/Cx located between 67 (search radius of 1.6 foot and lane width of 5 feet) and 78 (search radius of 3.3 feet and lane width of 5 feet) percent of the Type I items buried at depths ranging from just below the ground surface to 1 foot bgs. The detection rate percentages presented in the ODDS varied according to the search radius, which ranged from 1.6 to 3.3 feet and the search lane width which was 3 to 5 feet wide. A 5-foot wide search lane was used during the OE sampling programs at the site. Results for the 3-foot wide search lanes were not included in the detection percentages presented above because 3-foot wide search lanes were not used during the OE investigations. A standard search radius for investigation of anomalies was not specified in work plans or reports; therefore, the detection rates for the different search radii are presented above.

The seeded test detection rates are considered conservative because 1 foot was added to the item's calculated penetration depth to allow for soil deposition over time. Because the field conditions at the seeded test site and orientation of the subsurface item may not be comparable to Site OE-24D conditions, the results should only be used as an indication that the equipment is capable of detecting the same types of items at depths equivalent to those used in the seeded tests.

Results of the ODDS Field Trial Sites (FTS) were also reviewed for potential use in evaluating instrument performance at the site. Detection rates were calculated for four of the six 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 97 to 100 percent for the Schonstedt Model GA-52/Cx, depending on the search radius used for the calculation. As previously discussed, a standard search radius for investigation of anomalies was not specified in work plans or reports; therefore, the detection rates for the different search radii are presented above. The lower detection rates were for a 1.6-foot search radius and the higher detection rates were for a 3.3-foot search radius. It should be noted that the ODDS field trial sites were selected to represent areas with high OE density. In comparison, Track 1 sites, such as OE-24D, are expected to have very low densities of OE scrap. Therefore, the field trial results may not be applicable to OE-24D.

Although not directly comparable to Site OE-24D, the results of the ODDS indicate that the Schonstedt Model GA-52/Cx is capable of detecting the ferrous surface and subsurface OE expected at this site. The Schondstedt could potentially be influenced by underground utilities or other structures associated with residential housing at the site. The grids sampled were in areas between or behind homes. The AAR did not include any discussion of the potential effects of subsurface utilities or buildings on the sampling program.

### *Sampling Methods Discussion*

In 1997, Site OE-24D was sampled by CMS using QuantiTech's SS/GS Based Methodology (*USA, 1999*). SS/GS is a computer program that is used to statistically estimate the ordnance density of a site or grid during field investigations. It estimates the number or 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. When using SS/GS, the first step is to divide the site into homogeneous sectors with the same ordnance characteristics, terrain, and past ordnance use. The area of the sector is input into the program to calculate the number of grids necessary to characterize that sector. The size and shape of the grids can vary from 50- by 50-feet to 100- by 200-feet. The grids are inspected visually and investigated electronically using a magnetometer and identified anomalies are located, marked, and recorded. The grids are investigated using maximum 5-foot wide search lanes. The technician walks the lane while moving the magnetometer in a sweeping motion across the width of the lane. SS/GS requires that if a grid has 20 or fewer anomalies, then all of the anomalies should be investigated. If a grid has more than 20 anomalies, 20 anomalies plus 37 percent of all identified anomalies over 20 will be investigated. No grid had less that 5 percent and no more than 40 percent of its anomalies investigated. Excavation of anomalies 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 *(NERL, 2000*). Several problems were identified as a result of the review. The primary conclusions were that 1) the statistical procedures were vague and not well documented, 2) conclusions about site homogeneity were not consistent, 3) the stopping rules were faulty, and 4) the methodology was not able to identify OE clusters at a site. Although these problems associated with the statistical evaluation portion of the program were identified, the information obtained during sampling was useful in identifying the presence and type of OE at the site.

Two 2,500-square-foot grids were sampled using the SS/GS sampling program. Both grids sampled had non-standard dimensions because of terrain and structures within the site. A total of 331 anomalies were located using the Schondstedt Model GA-52/Cx magnetometer. Approximately 31.5 percent of the anomalies in each grid were investigated (a total of 120 anomalies). The general approach to investigation of the anomalies was to dig down to metal, remove the metal, and check the excavated area with the Schondstedt. If the Schondstedt indicated no buried ferrous items, no further digging was performed. If the Schondstedt continued to indicate buried ferrous items, the area was excavated to at least 4 feet bgs. Because booby trap-related equipment would have been discarded at the surface or shallowly buried, it is likely that the depth of investigation was adequate to find any booby traps remaining at the site. It should be noted that because some anomalies were not excavated using the SS/GS investigative approach, some buried OE or OE scrap may still be present within the sampling grids.

It should be noted that the sampling was performed in areas adjacent to residential housing and therefore, did not include areas underlying existing buildings. Grid locations were specifically selected in open areas where there were no buildings.

## *Quality Assurance/Quality Control*

### Field Sampling QA/QC

Throughout operations, CMS performed daily operational checks and Quality Control (QC) inspections. Because of the nature of the SS/GS sampling, Quality Assurance (QA)/QC was limited to inspections of operational activities and documentation. No deficiency reports were written during inspections (*USA, 1999*). 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. The Army Corps of Engineers Huntsville Division (CEHND) safety specialist also performed a periodic QA review of equipment and methods used by CMS during the SS/GS sampling (*Huckins, 2002*). Based on concerns regarding the SS/GS statistical program discussed previously, it is not possible to statistically evaluate the adequacy of the sampling performed at this site.

### Data Management QA/QC

Parsons, the current OE contractor, performed a 100 percent QC review of the data associated with the site. This review followed guidelines presented in the Standard Operating Procedures (SOP) provided as Appendix A of this report. This evaluation included a review of field grid records (if available) and the database created by the OE contractor. The USACE followed the QC review with a 10 percent QA of the Parsons' data review. The requirements of the QA review are described in the SOP provided as Appendix B of 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.

### Data Quality Conclusions

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

- Grids were surveyed, but only one of the grids was located within the ASR site boundary. Three grids are shown on the plate in the CMS report, but according to the report, only two grids were sampled. It is not clear from the plate, which two of the three grids were investigated. None of the CMS grids were located within the digitized boundary of the area identified as "Booby Traps" on the 1945 and 1946 maps.

- Because some anomalies were not excavated using the SS/GS investigative approach, some subsurface OE or OE scrap may still be present within the sampling grids.

- Review of the SS/GS methodology indicated that the statistical procedures used were vague and not well documented, conclusions about site homogeneity were not consistent, stopping rules were faulty, and the methodology was not able to identify potential OE clusters.

## 3.24D.7 Conclusions

### *Site Use and Development*

- Based on the literature review, the site appears to have been used for booby trap and squad patrol training. The site is currently occupied by residential housing.

- The area is adjacent to a former practice rifle grenade area. To the east are former practice hand grenade and live grenade training areas, and to the south is the MRA.

- Items potentially present at the site include coupling bases for firing devices and practice mines. Based on the presence of residential housing at the site, these items are likely buried.

- The only OE item found during sampling was an unidentified fragment. No OE (grenades or firing devices) were found during sampling. Other incidental OE-items (two inert 40mm M781 practice and one inert M576 multiple projectile rifle grenades) found in the site vicinity and reported to Presidio of Monterey police are believed to have been brought to the site from other ranges.

- Based on historical use of the site, reuse as residential housing, and materials found at the site, it is unlikely that OE are still present at the site.

### *Sampling Adequacy and Data Quality*

- The literature review suggests that the location of past booby trap training was southeast of the area sampled. Residential housing now covers these areas.

- The ASR site boundary was northwest of the area shown as Booby Traps on 1945 and 1946 training maps. The reason for this discrepancy is not known. However, the original site boundaries were identified based on less information and fewer tools (e.g., no geo-referenced aerial photographs, GIS maps, or databases) than are currently available.

- SS/GS sampling methodology was used for the site. As previous discussed, concerns have been raised regarding the statistical methods used with the SS/GS program. In addition, because not all of the anomalies are investigated using this approach, some buried OE or OE scrap may still be present within the sampling grids. This sampling method, however, is useful in identifying the potential presence of OE at the site.

- Schondstedt GA-52/Cx magnetometers were used by CMS (now referred to as USA) during previous investigations. This instrument was evaluated as part of the ODDS and is capable of detecting the type of ferrous OE items expected at this site. A numerical value for detection of items cannot be calculated for an individual site.

- Grids were surveyed and there was coordinate and depth information concerning items found. However, only one of the grids was located within the ASR site boundary. It is not clear from the CMS report, which two of the three grids shown on the plate were investigated. In addition, none of the CMS grids were located within the digitized boundary of the area identified as "Booby Traps" on the 1945 and 1946 maps.

- Based on historical use of the site, subsequent reuse as residential housing, and materials found at the site, it is unlikely OE is present at the site. However, the following OE-related items, if present at the site, are considered to pose an acceptable risk, if encountered, for the following reasons:

  **Booby Trap Firing Devices.** It is unlikely that a person through casual contact could cause an armed booby trap firing device fitted with a coupling base to function if one were found at the site, and be exposed to the shock, noise, and flash of the coupling base. Booby trap firing devices were designed to be functioned by a thin trip wire or release of pressure that would release a cocked spring loaded firing pin. These small, unsealed, metal parts have been exposed to moisture, degradation, and weathering for many years, which could decrease their effectiveness.

**Antipersonnel Practice Mines (M8, M8A1) and Fuzes (M10, M10A1).** It is unlikely that a person would be able to trigger the practice antipersonnel mine through casual contact if one were found at the site and be burned or exposed to smoke or falling parts, because the mine: (1) would have to contain a live fuze, and (2) these components would have been exposed to moisture, degradation, and weathering for many years, which could decrease their effectiveness.

**Antitank Practice Mines (M1, M1A1) and Fuzes (M1A1, M1A2).** It is unlikely that a person would be able to trigger a practice antitank mine through casual contact if one were found at the site and be exposed to smoke and noise, because the mine: (1) would have to contain a live fuze and active detonator, (2) was designed to be triggered by the weight of a vehicle, and (3) these components would have been exposed to moisture, degradation, and weathering for many years, which could decrease their effectiveness.

- Although the previous OE sampling efforts performed at Site OE-24D are not consistent with requirements in place today, the quantity and quality of available information is sufficient to make an informed decision regarding the site, and further effort to refine the 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.

## 3.24D.8 Recommendations

Based on the review of existing data:

- It is not anticipated that OE will be found at Site OE-24D. However, there is potential for OE to be present at the site because OE were used throughout the history of Fort.

- This site qualifies as a Track 1, Category 3 site because it was used for training. OE items that potentially remain pose an acceptable risk based on site-specific evaluations conducted in the RI/FS.

- No further OE-related investigation is recommended.

These conclusions and recommendations are based on the following:

- The literature review and sampling provide no evidence that high explosives were used at the site or that the site was used as an impact area.

- No OE was found during the OE sampling programs.

The U.S. Army Corps of Engineers completed ordnance investigations at Site OE-24D. 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 (no further OE-related investigation), Site OE-24D 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-24D 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.

## 3.24D.9 References

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# ATTACHMENT OE-24D - A2

# POTENTIAL ORDNANCE USED AT SITE OE-24D

The following information was obtained from Department of the Army Field Manual FM 5-31, Booby Traps, dated September 1965 and represent the types of firing devices that may have been used at Fort Ord in the 1950s when the area was used for mine and booby trap training.

## *Firing Devices*

M5 Pressure Release Firing Device – The M5 firing device consists of a protective cap, standard base, cap, gasket, activator, locking safety pin, interceptor pin, firing pin, release plate or pressure base. The M5 is activated by release of pressure. Lifting or removing a restraining weight releases the striker or firing pin to fire the cap (*Army, 1998*).

M1A1 Pressure Firing Device – The internal action of the M1A1 pressure firing device is a spring-driven striker with a keyhole slot release. It contains a safety clip and positive safety pin. 20 pounds of pressure on the pressure cap moves the trigger pin downward until the striker spindle passes through the keyhole slot. This releases the striker to fire the percussion cap.

M1 Pull Firing Device – The internal action of the M1 pull firing device is mechanical with a split head striker release. It has locking and positive safety pins. It is initiated by a 3 to 5 pound pull on a trip wire, which withdraws the tapered end of the release pin from the split head of the striker. This frees the striker to fire the percussion cap.

M3 Pull/Release Firing Device – The internal action of the M3 pull/release firing device is mechanical with spreading striker head release. A pull of 6 to 10 pounds on a taut trip wire raises the release pin until the shoulder passes the constriction in the barrel of the device. The striker jaws then spring open, releasing the striker to fire a percussion cap. The device can also be actuated by a release of tension (cutting a taut trip wire) permitting the spring driven striker to move forward firing the percussion cap.

M1 Pressure Release Firing Device – The internal action of this firing device is mechanical with a springed latch release. It has a safety pin and hole for interceptor pin. Lifting or removing a restraining weight unlatches a lever, releasing the striker to fire a percussion cap.

## *Practice Mines*

Practice mines may have been booby trapped at the site. Information concerning mines and fuzes potentially used at the site was obtained from technical manuals (*Army, 1977a*) and the American Arsenal (*Hogg, 2001*).

M1 Antitank Practice Mine – M1 antitank practice mines were used in World War II and are identical in appearance to the M1A1 and M4 mines with the exception of five one-inch holes equally spaced around the body. According to Headquarters Munitions Command data cards, these mines were produced between 1941 and 1945. The M1 consists of a mine body, spider, black powder charge, smoke charge, detonator, firing pin assembly, safety fork, fuze, shear pins, and steel filler ring. The steel filler ring is inserted in the mine body so that the M1 will equal the weight of the M1A1 and M4 mines. The fuze consists of a striker assembly and a body that contains the detonator. The firing pin is normally held away from the detonator by two steel balls. When pressure is applied to the fuze head, it moves

downward shearing the pins and aligning grooves into which the two steel balls move. The firing mechanism spring then is free to throw the firing pin forward, striking the primer of the detonator. When the fuze is inserted and the spider attached, a pressure of 250 pounds on the spider is sufficient to activate the fuze. In the M1, the fuze sets off a smoke–puff charge; the charge produces smoke which escapes from the mine through the holes. The charge consists of 60 grains of army black powder which ignites 100 grains of red phosphorous. The complete assembly weighs 10.67 pounds and is 8.2 inches in diameter and 4.25 inches high (*Hogg, 2001*).

M10 Antitank Practice Light Mine – According to Headquarters Munitions Command data cards, the M10 antitank practice mine was produced between 1946 and 1947. The M10 antitank practice mine consists of a rectangular steel container that is loaded with sand in the field. A primary fuze well for the practice fuze is located in the top center of the mine. The smoke charge is contained in the fuze. A secondary fuze well is provided in one end of the mine for insertion of a secondary fuze for booby trapping purposes. It is tapped to take a threaded firing device and closed with a plug to which the mine-carrying cord is attached. The sand loading port is closed with a twist lock cap. The M10 practice mine is mounted in the top of the mine and covered by the movable striker plate of the mine and is directly activated by an external force of 120 to 240 pounds. The M10 practice mine can be booby trapped with a regular firing device threaded directly into the secondary fuze well. Functioning of the fuze ignites a smoke charge that emits a cloud of smoke and creates a noise. When booby trapped, the mine is activated by a pull wire (*Army, 1977a, b*).

M8 (M8A1) Antipersonnel Practice Mine – According to Headquarters Munitions Command data cards, the M8 antipersonnel practice mines were produced between 1944 and 1960. The M8 mine uses a cardboard projectile containing a delay and a spotting charge of black powder, which bursts in the air. The M8A1 uses a smoke pellet that is discharged from the top of the main body of the mine to indicate activation of the mine. The fuze firing mechanism on both models is activated by an applied load of 8 to 20 pounds on any of the prongs or by a pull of 3 to 10 pounds of the trip wire. In the M8, the fuze firing train ignites the delay element in the projectile and propels it about 2 meters into the air. The delay initiates the spotting charge that explodes with a loud report and emits smoke. In the M8A1 the fuze firing train ignites the yellow smoke pellet through a 4 to 5 second delay. The plastic plug is propelled into the air allowing the yellow smoke to be emitted from the top of the mine.

## *Projectiles*

According to CMS incident reports dated August 5, 1997, and July 14, 1999, two 40mm M781 TP inert projectile grenades and one inert 40mm M576 canister multiple projectile were found approximately 1,300 and 500 feet north of Site OE-24D, respectively. The following provides additional information concerning these projectiles from an Army Training Manual (*Army, 1977c*).

40mm, M781 Practice – This cartridge is a fixed practice-type ammunition designed to be fired from a 40mm grenade launcher. It consists of a fixed round of ammunition with a plastic ogive that is filled with a high visibility yellow-orange dye. A 0.38 blank cartridge provides the gas pressure needed to propel the projectile through the launcher barrel. Upon impact with a target, the ogive ruptures and releases the dye, causing a puff of yellow orange smoke. The propellant consists of 340 milligrams (mg) of M2.

40mm, M576 Multiple Projectile – This cartridge was designed to be fired from a 40mm grenade launcher like a shot gun round. The cartridge is a fixed round of ammunition consisting of a multiple projectile assembly and a cartridge case assembly. A plastic pellet cup filled with 20 metal pellets is fitted into the center cavity and is covered by a snap-on cap. The cartridge case contains a 0.45 caliber primer and 186 mg of M2 propellant.

ATTACHMENT

24D – A1

## ATTACHMENT 24D-A1
## EVALUATION OF PREVIOUS WORK: SITE OE-24D
## EVALUATION CHECKLIST PART 1: LITERATURE REVIEW

### TYPE OF TRAINING AND OE EXPECTED

| | 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 or other launched ordnance)?*** | | No | |

**Sources reviewed and comments**
There is no evidence to support the past use of the site as an impact area. This site was identified as "Booby Traps" on a 1945 Training Facilities map. The site is in an area that includes four hand and rifle grenade training locations as identified on the 1945 Training Facilities map and 1946 Master Plan. This site is not identified on available training maps after 1946 (e.g., Circa 1954 map or after).
**References:**
Army 1945, 1946.

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

**Sources reviewed and comments**
Practice mines may have been used as part of booby trap training. Practice mines may contain smoke charges (LE).
**References**
Army 1945, 1946; USAEDH 1997.

| | | | |
|---|---|---|---|
| **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?*** | Yes | | |

**Sources reviewed and comments**
Its possible based on the historical use of the site as a booby trap training area that firing devices and practice mines may have been used at the site. Some practice mines contain smoke charges.
**References:**
Army 1945, 1946; USAEDH 1997.

## ATTACHMENT 24D-A1
## EVALUATION OF PREVIOUS WORK: SITE OE-24D
## EVALUATION CHECKLIST PART 1: 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?*** | | No | |

**Sources reviewed and comments**
Housing was constructed in this area in the late 1950s.
**References:**
Army, 1967.

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

**Sources reviewed and comments**
The area is bordered by a live grenade area, practice rifle grenade and the multi-range area to the south, practice hand grenade and live grenade training areas to the east, a practice rifle grenade area adjacent, a training area to the west (later a golf course to the west) and OE sites (Site OE-39 and OE-49)/development to the north. The training area to the west does not have any OE sites within its boundaries. No OE was found during sampling the two OE sites to the north.

| | | | |
|---|---|---|---|
| **ESTABLISHMENT OF SITE BOUNDARIES** | | | |
| **6.** ***Is there evidence of training areas on aerial photographs that could be used to establish*** | | | Inconclusive |

**Sources reviewed and comments**
Cleared/disturbed areas are visible in the vicinity of the site on 1941 and 1951 aerial photographs.

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

**Sources reviewed and comments**
A 1945 training facilities map and 1946 Master Plan map identify a rectangular area as “Booby Traps”. This rectangular area defines the boundaries of Site OE-24D.
**References:**
Army 1945, 1946.

## ATTACHMENT 24D-A1
## EVALUATION OF PREVIOUS WORK: SITE OE-24D
## EVALUATION CHECKLIST PART 1: LITERATURE REVIEW

| | Yes | No | Inconclusive |
|---|---|---|---|
| **8. *Should current boundaries be revised?*** | | | Inconclusive |

**Sources reviewed and comments**

The ASR boundaries are northwest of the area shown as "Booby Traps" on a 1945 training map. However, this area is currently occupied by residential housing and no OE have reportedly been found in that area.

## RESULTS OF LITERATURE EVALUATION

| | | | |
|---|---|---|---|
| ***Does the literature review provide sufficient evidence to warrant further investigation?*** | | No | |

**Comments**
Based on historical use of the site, reuse as residential housing, and materials found at the site, there is low probability that OE are still present at the site.

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1941 and 1951 aerial photos

## ATTACHMENT 24D-A1
## EVALUATION OF PREVIOUS WORK: SITE OE-24D
## EVALUATION CHECKLIST PART 2: 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**
area. One unidentified scrap item was found during sampling. Other incidental OE-items (40mm M781 practice projectile and M576 multiple projectile grenades) found in the site vicinity are believed to have been brought to the site from other ranges.
**References:**
USAEDH 1997; Army 1945, 1946; USA, 1999; Ryley, 1999.

| | | | |
|---|---|---|---|
| **2.** ***Is there evidence that training involved use of High Explosive (HE) or Low Explosive (LE) items?*** | | No | |

**Sources reviewed and comments**
Only 1 unidentified scrap item was found during sampling. Other incidental OE-items (one 40mm M576 multiple projectile and two 40mm M781 practice projectile grenades) found in the site vicinity are believed to have been brought to the site from other ranges.
**References:**
USA, 1999; Ryley, 1999.

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

**Sources reviewed and comments**
One of the incidental OE-items included 40mm M781 practice projectile grenades which produce smoke upon impact. However, it is believed that the M781 was brought to the site from another range.
**References:**
USA, 1999; CMS;1997; Army, 1977c.

## ATTACHMENT 24D-A1
## EVALUATION OF PREVIOUS WORK: SITE OE-24D
## EVALUATION CHECKLIST PART 2: SAMPLING EVALUATION

| | Yes | No | Inconclusive |
|---|---|---|---|
| **4.** ***Was sampling and/or reconnaissance performed within the appropriate area?*** | | | Inconclusive |

**Sources reviewed and comments**
The After Action Report indicates that two sample grids appear to be within the digitized site boundaries. However, the areas identified as "Booby Traps" on the 1945 and 1946 training map are southeast of the current digitized boundaries.
**References:**
USA, 1999.

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

**Sources reviewed and comments**
Only 1 unidentified scrap item was found during sampling. Other OE-items (40mm M781 practice projectile and M576 multiple projectile grenades) found in the site vicinity are believed to have been brought to the site from other ranges.
**References:**
USA, 1999; Ryley, 1999.

| | Yes | No | Inconclusive |
|---|---|---|---|
| **6.** ***Were the type(s) of items found consistent with the type of training identified for the site?*** | | No | |

**Sources reviewed and comments**
Only 1 unidentified scrap item was found during OE sampling. Two 40mm practice projectile (rifle) grenades and one 576 multiple projectile rifle grenade were found in the Fitch Park Area by residents. Projectiles are inconsistent with booby trap training. These projectile grenades are believed to have been brought to the site from Range 45, the grenade launcher range.
**References:**
USA, 1999; CMS, 1997, 1999; Ryley, 1999.

## ATTACHMENT 24D-A1
## EVALUATION OF PREVIOUS WORK: SITE OE-24D
## EVALUATION CHECKLIST PART 2: SAMPLING EVALUATION

| | Yes | No | Inconclusive |
|---|---|---|---|
| **7.** ***Were the type(s) of items found consistent with the era(s) in which training was identified?*** | | | Inconclusive |

**Sources reviewed and comments**
The scrap item was unidentified. Two 40mm practice grenades and one multiple projectile grenade were found in the Fitch Park Area by residents. The models of projectiles found are not of the era (1940s) when neighboring training areas were used for grenade practice and the site was used for booby trap training. These projectile grenades are believed to have been brought to the site from Range 45, the grenade launcher range.
**References:**
USA, 1999; CMS, 1997, 1999; Ryley, 1999.

| | | | |
|---|---|---|---|
| **8.** ***Was HE fragmentation found?*** | | | Inconclusive |

**Sources reviewed and comments**
Scrap item was unidentified. Two inert training projectile grenades and one inert multiple projectile grenade were
**References:**
USA, 1999; CMS, 1997, 1999.

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

**Sources reviewed and comments**
No HE was found. Only 1 unidentified scrap item was found during sampling. Incidental OE includes two inert training projectile grenades and one inert multiple projectile grenade.
**References:**
USA, 1999; CMS, 1997, 1999.

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

**Sources reviewed and comments**
found during sampling. Incidental OE includes two inert training projectile grenades and one inert multiple projectile grenade.
**References:**
USA, 1999; CMS, 1997, 1999.

## ATTACHMENT 24D-A1
## EVALUATION OF PREVIOUS WORK: SITE OE-24D
## EVALUATION CHECKLIST PART 2: SAMPLING EVALUATION

| | Yes | No | Inconclusive |
|---|---|---|---|
| **11.** ***Were pyrotechnics found?*** | | No | |

**Sources reviewed and comments**
No pyrotechnics were found.
**References:**
USA, 1999.

| | Yes | No | Inconclusive |
|---|---|---|---|
| **12.** ***Were smoke producing items found?*** | | | Inconclusive |

**Sources reviewed and comments**
No live smoke producing items were found. However, the M781 can contain a dye that produces smoke.
**References:**
USA, 1999; CMS, 1999; Army, 1977c.

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

**Sources reviewed and comments**
No explosive items were found. Only 1 unidentified scrap item was found during sampling. Other incidental OE were inert.
**References:**
USA, 1999; CMS, 1997, 1999.

| | Yes | No | Inconclusive |
|---|---|---|---|
| **14.** ***Do items found in the area indicate training would have included use of training items with energetic components?*** | | | Inconclusive |

**Sources reviewed and comments**
potentially present at the site include firing devices and simulators that contain blasting caps and pyrotechnic charges. Incidental OE found in the site vicinity include projectiles which have a propellant when live. These projectiles, however, are believed to have been brought to the site from another range.
**References:**
Army, 1977b, 2001; Army, 1977c; Ryley, 1999.

## ATTACHMENT 24D-A1
## EVALUATION OF PREVIOUS WORK: SITE OE-24D
## EVALUATION CHECKLIST PART 2: SAMPLING EVALUATION

| | Yes | No | Inconclusive |
|---|---|---|---|
| **15.** ***Were items found in a localized area (possibly the remnants of a cleanup action)?*** | | No | |

**Sources reviewed and comments**
Only 1 unidentified scrap item was found during sampling. Three incidental OE-related items were found 500 and 1300 feet north of the site.
**References:**
USA, 1999

| | | | |
|---|---|---|---|
| **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**
The site was not divided into sectors.
**References:**
USA, 1999; CMS, 1997, 1999.

| | | | |
|---|---|---|---|
| **17.** ***Should current site boundaries be revised?*** | | | Inconclusive |

**Sources reviewed and comments**
The ASR boundaries are northwest of the area shown as "Booby Traps" on a 1945 training map. However, this area is currently occupied by residential housing and no OE have reportedly been found in that area.
**References:**
Army, 1945, 1946.

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

**Sources reviewed and comments**
The equipment used (Schondstedt magnetometers) can only detect ferrous items. For the purposes of comparison to the ODDS seeded and field trials tests, it is assumed that firing devices and simulators potentially discarded or left at the site would be at the surface or potentially buried at depths of up to 2 feet bgs. Schondstedt GA-52/Cx magnetometers were used by USA during previous investigations. Based on the ODDS study, these instruments should detect at least 67 percent of the items buried at depths of 1 foot bgs and at least 44 percent of items buried at 2 feet bgs.
**References:**
Parsons, 2001.

## ATTACHMENT 24D-A1
## EVALUATION OF PREVIOUS WORK: SITE OE-24D
## EVALUATION CHECKLIST PART 2: SAMPLING EVALUATION

| | Yes | No | Inconclusive |
|---|---|---|---|
| **19.** ***Was equipment used capable of detecting the types of items (e.g., non-ferrous) suspected at the site?*** | | No | |

**Sources reviewed and comments**
Equipment used cannot detect non-ferrous items.
**References:**
Parsons, 2001.

| | Yes | No | Inconclusive |
|---|---|---|---|
| **20.** ***Do the results of the ODDS indicate that items suspected at the site would have been detected by the instrument used at the time of investigation?*** | | | Inconclusive |

**Sources reviewed and comments**
Firing devices and simulators were not listed as items of study in the ODDS. Although not directly comparable to site OE-24D, results of the ODDS indicate that the equipment used is capable of detecting the type of ferrous OE items expected at this site.
**References:**
HFA, 1994a; USA, 2000; Parsons, 2001.

| | Yes | No | Inconclusive |
|---|---|---|---|
| **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?*** | Yes | | |

**Sources reviewed and comments**

OE items present at the site would be at the surface or covered with less than 1 foot of soil. Although not directly comparable to Site OE-24D, results of the ODDS indicate that the equipment used is capable of detecting the type of ferrous OE items expected at this site at depths of less than 1 foot.
**References**
Parsons, 2001.

## ATTACHMENT 24D-A1
## EVALUATION OF PREVIOUS WORK: SITE OE-24D
## EVALUATION CHECKLIST PART 2: SAMPLING EVALUATION

| | Yes | No | Inconclusive |
|---|---|---|---|
| **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**
Throughout operations at Site OE-24D CMS performed daily operational checks and Quality Control (QC) inspections of its work
**References:**
USA, 1999.

| | | | |
|---|---|---|---|
| **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?*** | | | Inconclusive |

**Sources reviewed and comments**
Site Stats/Gridstats was used to design and implement 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 the 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 OE density estimate, and if so provide total area investigated and the OE density estimate.*** | | | Inconclusive |

| | | |
|---|---|---|
| | Total Area: 5,000 sq ft | |
| | OE Density: | Not Applicable |

**Sources reviewed and comments**
5000 square feet (approximately 0.11 acres) were sampled by CMS based on 2 non-standard sized grids of 2,500 square feet each. One of the two grids was established outside of the Site OE-24D boundary due to terrain and structures within the site. Only one inert OE-fragment was found by OE sampling contractors. Three incidental OE items were also found 500 and 1300 feet north of the site.
**References**
USA, 1999; CMS, 1997, 1999.

## ATTACHMENT 24D-A1
## EVALUATION OF PREVIOUS WORK: SITE OE-24D
## EVALUATION CHECKLIST PART 2: SAMPLING EVALUATION

| | Yes | No | Inconclusive |
|---|---|---|---|
| **25.** ***What percentage of the anomalies were intrusively investigated?*** | Total % of anomalies investigated | | 36% |

**Sources reviewed and comments**
331 anomalies identified and 120 anomalies or 36% were excavated.
**References**
USA, 1999.

| | | | |
|---|---|---|---|
| **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.

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

**Sources reviewed and comments**
The grids which were sampled in Sites OE-24D were not subject to formal Quality Control (QC) inspections because of the nature of the SiteStats/GridStats procedures. Throughout operations at Site OE-24D CMS performed daily operational checks and QC inspections of its work. No deficiency reports were written during inspections of the SiteStats/Gridstats sampling work done on this site. A 100 percent review of the data was completed by Parsons Engineering prior to submittal of the data for use in this evaluation. The methods used to complete this review are documented in Appendix A.
**References**
USA, 1999.

## ATTACHMENT 24D-A1
## EVALUATION OF PREVIOUS WORK: SITE OE-24D
## EVALUATION CHECKLIST PART 2: SAMPLING EVALUATION

**Result of Sampling Evaluation**

| | Yes | No | Inconclusive |
|---|---|---|---|
| ***Does the sampling evaluation provide sufficient evidence to warrant further investigation?*** | | No | |

**Comments**

Several discrepancies were noted between the Grid Sampling Summary Data and the Grid Operations Record. Map from the AAR shows three grids, two within and one outside of the site boundary. According to the Grid Records two grids were sampled. Three Grids, labeled as D-3, D-2, and D-3 are shown on map 01-S24 in the AAR. Table 2-1 shows two grids and states that one of the two grids was "established outside of the site and with non-standard dimensions because of terrain and structures within the site." Grid D-1 - SiteStats/GridStats list shows frag in subgrid 32. The Grid Operations Record indicates 2 lbs. of scrap were removed. The Grid Operations Record does not give any specifics on the type of scrap. The OE database does not show any scrap items found at Site OE-24D. The established boundary appears to be in the correct location based on the 1951 aerial photo.

**REFERENCES**


Army, 1977. Department of the Army Headquarters, Technical Manual, Army Ammunition Data Sheets: Military Pyrotechnics (Federal Supply Class 1370), TM 43-0001-37. February 18.

Army, 2001. Booby Traps and Expedient Device, FM 20-32. Chapter 13. (Date Accessed: March 6, 2002)

CMS, 1997. CMS Incident Report. August 5.

CMS, 1999. CMS Incident Report. July 14.

Ryley, 1999. Personal Communication with Jeffery Fenton, Harding Lawson Associates. August 9.

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

USA, 2000. Ordnance Detection And Discrimination Study, Seeded Test Technical Memorandum, Former Fort Ord, California, Presidio of Monterey, California. In Cooperation with US Army Corps of Engineers Sacramento District and Parsons Engineering Science, Inc. October 23.

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.

ATTACHMENT

24D – A2

# ATTACHMENT OE-24D - A2

# POTENTIAL ORDNANCE USED AT SITE OE-24D

The following information was obtained from Department of the Army Field Manual FM 5-31, Booby Traps, dated September 1965 and represent the types of firing devices that may have been used at Fort Ord in the 1950s when the area was used for mine and booby trap training.

## *Firing Devices*

M5 Pressure Release Firing Device – The M5 firing device consists of a protective cap, standard base, cap, gasket, activator, locking safety pin, interceptor pin, firing pin, release plate or pressure base. The M5 is activated by release of pressure. Lifting or removing a restraining weight releases the striker or firing pin to fire the cap (*Army, 1998*).

M1A1 Pressure Firing Device – The internal action of the M1A1 pressure firing device is a spring-driven striker with a keyhole slot release. It contains a safety clip and positive safety pin. 20 pounds of pressure on the pressure cap moves the trigger pin downward until the striker spindle passes through the keyhole slot. This releases the striker to fire the percussion cap.

M1 Pull Firing Device – The internal action of the M1 pull firing device is mechanical with a split head striker release. It has a locking and positive safety pins. It is initiated by a 3 to 5 pound pull on a trip wire which withdraws the tapered end of the release pin from the split head of the striker. This frees the striker to fire the percussion cap.

M3 Pull/Release Firing Device – The internal action of the M3 pull/release firing device is mechanical with spreading striker head release. A pull of 6 to 10 pounds on a taut trip wire raises the release pin until the shoulder passes the constriction in the barrel of the device. The striker jaws then spring open, releasing the striker to fire a percussion cap. The device can also be actuated by a release of tension (cutting a taut trip wire) permitting the spring driven striker to move forward firing the percussion cap.

M1 Pressure Release Firing Device – The internal action of this firing device is mechanical with a springed latch release. It has a safety pin and hole for interceptor pin. Lifting or removing a restraining weight unlatches a lever, releasing the striker to fire a percussion cap.

## *Practice Mines*

Practice mines may have been booby trapped at the site. Information concerning mines and fuzes potentially used at the site was obtained from technical manuals (*Army, 1977a*) and the American Arsenal (*Hogg, 2001*).

M1 Antitank Practice Mine – M1 antitank practice mines were used in World War II and are identical in appearance to the M1A1 and M4 mines with the exception of five one-inch holes equally spaced around the body. According to Headquarters Munitions Command data cards, these mines were produced between 1941 and 1945. The M1 consists of a mine body, spider, black powder charge, smoke charge, detonator, firing pin assembly, safety fork, fuze, shear pins, and steel filler ring. The steel filler ring is inserted in the mine body so that the M1 will equal the weight of the M1A1 and M4 mines. The fuze consists of a striker assembly and a body that contains the detonator. The firing pin is normally held away from the detonator by two steel balls. When pressure is applied to the fuze head it moves

downward shearing the pins and aligning grooves into which the two steel balls move. The firing mechanism spring then is free to throw the firing pin forward, striking the primer of the detonator. When the fuze is inserted and the spider attached, a pressure of 250 pounds on the spider is sufficient to activate the fuze. In the M1, the fuze sets off a smoke–puff charge; the charge produces smoke which escapes from the mine through the holes. The charge consists of 60 grains of army black powder which ignites 100 grains of red phosphorous. The complete assembly weighs 10.67 pounds and is 8.2 inches in diameter and 4.25 inches high (*Hogg, 2001*).

M10 Antitank Practice Light Mine – According to Headquarters Munitions Command data cards, the M10 antitank practice mine was produced between 1946 and 1947. The M10 antitank practice mine consists of a rectangular steel container that is loaded with sand in the field. A primary fuze well for the practice fuze is located in the top center of the mine. The smoke charge is contained in the fuze. A secondary fuze well is provided in one end of the mine for insertion of a secondary fuze for booby trapping purposes. It is tapped to take a threaded firing device and closed with a plug to which the mine-carrying cord is attached. The sand loading port is closed with a twist lock cap. The M10 practice mine is mounted in the top of the mine and covered by the movable striker plate of the mine and is directly activated by an external force of 120 to 240 pounds. The M10 practice mine can be booby trapped with a regular firing device threaded directly into the secondary fuze well. Functioning of the fuze ignites a smoke charge that emits a cloud of smoke and creates a noise. When booby trapped, the mine is activated by a pull wire (*Army, 1977a, b*).

M8 (M8A1) Antipersonnel Practice Mine – According to Headquarters Munitions Command data cards, the M8 antipersonnel practice mines were produced between 1944 and 1960. The M8 mine uses a cardboard projectile containing a delay and a spotting charge of black powder which bursts in the air. The M8A1 uses a smoke pellet that is discharged from the top of the main body of the mine to indicate activation of the mine. The fuze firing mechanism on both models is activated by an applied load of 8 to 20 pounds on any of the prongs or by a pull of 3 to 10 pounds of the trip wire. In the M8, the fuze firing train ignites the delay element in the projectile and propels it about 2 meters into the air. The delay initiates the spotting charge that explodes with a loud report and emits smoke. In the M8A1 the fuze firing train ignites the yellow smoke pellet through a 4 to 5 second delay. The plastic plug is propelled into the air allowing the yellow smoke to be emitted from the top of the mine.

## *Projectiles*

According to CMS incident reports dated August 5, 1997, and July 14, 1999, two 40mm M781 TP inert projectile grenades and one inert 40mm M576 canister multiple projectile were found approximately 1,300 and 500 feet north of Site OE-24D, respectively. The following provides additional information concerning these projectiles from an Army Training Manual (*Army, 1977c*).

40mm, M781 Practice – This cartridge is a fixed practice-type ammunition designed to be fired from a 40mm grenade launcher. It consists of a fixed round of ammunition with a plastic ogive that is filled with a high visibility yellow-orange dye. A 0.38 blank cartridge provides the gas pressure needed to propel the projectile through the launcher barrel. Upon impact with a target, the ogive ruptures and releases the dye, causing a puff of yellow orange smoke. The propellant consists of 340 milligrams (mg) of M2.

40mm, M576 Multiple Projectile – This cartridge was designed to be fired from a 40mm grenade launcher like a shot gun round. The cartridge is a fixed round of ammunition consisting of a multiple projectile assembly and a cartridge case assembly. A plastic pellet cup filled with 20 metal pellets is fitted into the center cavity and is covered by a snap-on cap. The cartridge case contains a 0.45 caliber primer and 186 mg of M2 propellant.

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.