Site OE-39

Mine and Booby Trap Area

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3.39 Site OE-39 (Mine and Booby Trap Area)

This summary report consists of two parts. The first part, contained in Sections 3.39.1 through 3.39.5, 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 3.39.6). The Site Evaluation was conducted in accordance with the procedures described in the *Final Plan for Evaluation of Previous Work* (*Harding Lawson Associates [HLA], 2000b*) and may restate some information presented previously. The Site Evaluation discusses the evaluation of the literature review process (Section 3.39.6.1) and evaluation of sampling process(es) (Section 3.39.6.2). These discussions are based on from information from standardized literature review and sampling review checklists (Attachment 39-A1). Section 3.39.7 provides conclusions and recommendations for the site. References are provided in Section 3.39.8.

3.39.1 Site Description

Site OE-39 is approximately 12.1 acres and is east of General Jim Moore Blvd. and south of Gigling Road in the Marshall Park housing area (Plate 39-1). This site was first identified on the 1957 and 1958 Fort Ord Training Areas & Facilities maps that were reviewed as part of the former Fort Ord Archives Search (ASR; *U.S. Army Engineer Division, Huntsville [USAEDH], 1997*).

3.39.2 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 MACTEC. 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 aerial photographs.

Pre-1940s Era

This site lies within a tract of land acquired by the government in 1917 (*Arthur D. Little, Inc. [ADL], 1994*). Documentation related to the use of this area by the U.S. Army (Army) for training prior to 1940 is limited to a 1918 Geologic Survey map (*Department of Interior [DOI]*, 1918) and a Terrain Map (*Army, 1933*). The only features identified on the maps are Parker Flats Road, which is close to the site area.

1940s Era

A review of 1940s Ford Ord training maps indicates no evidence that Site OE-39 and the nearby vicinity were used for training in the 1940s.

- On the 1945 training map, the site is within a larger training area "G-2" (*Army, 1945*). No range fans or specific training areas are identified within area G-2.

- On the 1946 Main Garrison, a plant nursery is approximately 600 feet southeast of the site boundary (*Army, 1946*).

1950s Era

Review of aerial photographs and Fort Ord training maps indicates that mine and booby trap training activities began in the site area in the early 1950s. More specific information is provided below:

- A 1951 aerial photograph shows buildings in the southern portion of the site and a large disturbed/cleared area in the northern portion of the site (Plate 39-2).

- The 1956 training map identifies bleachers, a circular area identified as "CC" and "CM" is within the site area. No definitions are provided for "CC" and "CM" on the training maps. However, "CC" is typically used as an abbreviation for Confidence Course and "CM" may stand for Counter Mine (*Kelly, 2002*). To the east across Parker Flats Road are Physical Training Areas (PTA) and a "Map Reading Area" (*Army, 1956*).

- The plant nursery is still shown near the site area on the 1956 Main Garrison Layout map (*U.S. Army Corps of Engineers [USACE], 1956*).

- On the 1957 and 1958 training maps, Mine and Booby Trap Area (MBA) # 4, CC, and CM are in the site area (*Army, 1957 and 1958*). On the 1958 training map (*Army, 1958),* Machine Gun Square (MG SQ) # 1 is located approximately 700 feet east of the site (Plate 39-2).

1960s Era to Present

Review of 1960s Fort Ord training maps indicates that mine and booby trap training ended sometime prior to 1964 when housing was built. More specific information is provided below:

- The aerial photograph from 1959 shows that housing was not yet built in the Site OE-39 area. Shown west of the Site are "Telephone building" and the "Post Chapel" building (*USACE, 1960*).

- A 1964 map shows the site area as the "East NCO (Non Commissioned Officers)" housing area (*Army, 1964*). Housing was built over the areas depicted on the 1958 Training Areas and Facilities map for Machine Gun Square #1 and "MBA 4."

- The 1966 aerial photograph shows housing built over the Site OE-39 area (Plate 39-3). The 1967 Back Country Roads Map identifies the housing area as the George C. Marshall Park (*Army, 1967*).

Proposed Future Land Use

Housing within and adjacent to Site OE-39 will continue to be used as military housing.

3.39.3 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 training maps, mines and booby traps may have been used in this area. These items are briefly described below.

3.39.3.1 Mines and Booby Traps

Mines are usually buried and designed to function upon contact. The mine and booby trap area is not identified as a practice area on training maps or other historical documentation. However, due to the proximity of the site area to main roads, General Jim Moore Boulevard, and other nearby facilities, it is expected that the site was used as a practice mine and booby trap practice area and was not used for training with high explosives. No mines or fuzes were found during sampling. The sampling results from various investigations conducted from 1994 through 1998 for a suspected 1950s era mine and booby trap area near Sites OE-1 and OE-6 include the following items:

- M1 Antitank practice mine
- M8 Antipersonnel practice mine
- The M604 fuze.

Because OE-39 was also identified as a mine and booby trap area on 1950s era maps, it is possible that the same types of practice items could have been used at this site. Detailed descriptions of these mines are provided in Attachment 39-A2.

3.39.3.2 Booby Traps

Booby traps are actuated when an object is moved and triggers a firing device. Most booby traps use trip wires, which release cocked striker-type firing devices (personal communication with *Hugh Sease of OER, Inc, 2002*). Booby traps are actuated when a trip wire is pulled or when a plate or rod is pressed by someone or something. 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 cord 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 ordnance disposal areas; therefore, are not expected to have been used at OE-39 (*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*). Booby trap simulators may also have been used during training.

Based on review of a 1959 Fort Ord yearbook, booby trapping of mines appears to have been taught at Fort Ord. However, there is no specific information about what booby traps, firing devices, or simulators were used for training in Fort Ord in 1950s. Firing devices that may have been used as part of booby trap training in the 1950 at Fort Ord include the M5 Pressure Release Firing Device, M1A1 Pressure Firing Device, the M1 Pull Firing Device, M3 Pull/Release Firing Device, and the M1 Pressure Release Firing Device (See FM 5-31 Boobytraps, September 31, 1965). These firing devices contain no energetic materials (e. g., pyrotechnic charges), unless the coupling base is attached. As stated above, in training, firing devices are likely to be connected to practice mines or coupling bases.

3.39.4 History of OE Investigations

The following describes the OE investigations performed at this site.

1997 CMS Environmental, Inc.

CMS Environmental, Inc. (CMS) conducted sampling of Site OE-39 in 1997. Contract requirements for the scope of work performed by CMS are described in Section 2.0 of this report. The USACE, Huntsville

Division, established the site boundary. Four 100- by 200-foot sample grids were established (80,000 square feet) and sampled using the SiteStats/GridStats (SS/GS) sampling program (Plate 39-4). According to the CMS work plan the sample grids were surveyed using a maximum 5 foot wide search lane. Two thousand nine hundred ninety-seven anomalies were detected using the Schonstedt Model GA-52/Cx magnetometer and three hundred four of the anomalies were excavated. The excavated anomalies were selected by the SS/GS sampling program. The remaining anomalies were not excavated. No OE or OE scrap items were found during sampling. Non-OE items identified included wires, pipes, nails, and other non-OE items. On the basis of the sampling results from CMS (later known as USA Environmental, Inc. [USA]) no further OE response was recommended in the USA After Action Report (*USA, 2000*). A summary of the sampling operations conducted at Site OE-39 is provided in Table 39-1.

1997 Archives Search Report

The purpose of the Archives Search Report 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 archives search was conducted in accordance with U. S. Army Corps of Engineers guidance (*USACE, 1995*). 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 review of data collected during sampling or removal actions.

Site OE-39 was identified in the ASR as a Mine and Booby Trap Area based on the presence of the site as Mine and Booby Trap Area (MBA #4) on the "Map of Fort Ord Training Areas and Facilities" in 1957 (*Army, 1957*). No further OE-related action was recommended in the ASR based on the OE sampling conducted by CMS. Requirements for preparation of an ASR are described in Section 2.0 of this report.

3.39.5 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-39 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. It is provided to help evaluate the adequacy of the investigation completed to date and to identify potential release and exposure pathways. Plate 39-5 presents a site conceptual model.

3.39.5.1 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 potentially remaining at the site.

Mine Training

There is no specific information about how training was performed in this area in the 1950s. According to current field manuals, practice and inert mines, or explosive booby trap simulators are used to train personnel in the precautions and proper methods to be observed in the care and handling, arming, booby trapping, and disarming of mines (*Army, 1997*). High explosive mines are not normally used in training,

except for demonstration purposes. The 1997 training manuals indicate that live mines are used as part of current training practices, but that live mine training and simulators training will not take place concurrently at the same location in order to preclude a live mine being mistaken for an inert mine *(Army, 1997*). Because of the proximity of Site 39 to Parker Flats, Gigling, and North South Roads, it is unlikely that high explosive mines were used at this site.

Information concerning emplacement of minefields in Army training manuals serves as guidance as to how the site vicinity may have been used for mine and booby trap training (*Army, 1997 and 2001*). Current training in mine warfare includes installation and removal of antipersonnel and antitank mines and anti-handling devices. Training also includes installation, recovery, or transfer of a hasty protective minefield as well as emplacement of tactical minefields, and row, standard pattern, and scatterable minefields. Training also includes breach of minefields (including use of explosives) as well as mine awareness training.

Based on practices described in field manuals, it is likely that during training, the trainees would learn to mark mine locations as well as practice mine removal operations. It is also likely that the trainees would practice clearing a path or lane through the minefield by probing, marking, and possibly destroying the mines with explosives or grappling hooks. Based on the proximity of Site OE-39 to main Fort Ord roads, it is unlikely that the mines would have been destroyed with explosives during training.

Booby Trap Training

No Fort Ord-specific information is available for booby trap training in the 1950s. Information presented below is based on current training manuals (*Army, 1997*) and from personal communication (*Hall, 2003a*).

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 the 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 explosive quantities used (*Hall, 2003a*).

If the training was in detecting/avoiding booby traps, the booby trap simulators would provide a training environment similar to that provided by the actual firing devices and could thus be used in lieu of the actual firing devices (*Hall, 2003a*). The functioning of these items is discussed in Attachment 39-A2.

3.39.5.2 Site Features

The mines and 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 such as simulators in practice items. However, areas used for booby trap training would likely contain some vegetated areas to provide locations for setting booby traps. On a 1951 aerial photograph, a cleared area is evident in the site area prior to the beginning of mine and booby trap training. Bleachers, a circular area identified as "CC" and "CM," are identified on training maps in the site area. A machine gun square is identified on the 1958 training map, however a 1960 aerial photograph shows no evidence of a cleared area that would indicate the presence of a machine gun square.

3.39.5.3 Potential Sources and Location of OE

Inert training aids and practice personnel and antitank mines could still be present at the site. Inert mines and inert mine fuzes do not contain any explosives and do not pose a safety hazard. Practice mines and/or their fuzes contain a small low explosive charge or a smoke-producing element. These mines would likely have been buried close to the surface, but may have been more deeply buried when the site was graded for housing construction. Some firing devices used to activate booby traps could have been discarded at the site and could be present at the ground surface, or nailed to a tree, or potentially buried during site grading operations. It is unlikely that booby trap firing devices or simulators would still be present in trees at the site, because the area has been occupied as housing for over 40 years. Firing devices do not contain energetic materials unless the coupling base is attached.

3.39.5.4 Potential Exposure Routes

Potential exposures to OE, although unlikely, could result from encountering practice mines and mine fuzes, coupling bases from firing devices, and booby trap simulators. It should be noted that no OE items were found during sampling. It is unlikely that practice mines and firing devices are still present on the ground surface subsequent at the site because they would have likely been discovered during site development or while the area was occupied by families. No incident reports have been found in EOD records from the late 1980s through 1990s that document that OE items were found by persons living at the Marshall Park Housing. Any OE-items present, therefore, are likely to be beneath the ground surface. Because the site was graded prior to construction of the housing, it is possible that OE, including fuzes (M604 antitank practice mine fuze, and M8 antipersonnel mine), firing devices, and booby trap simulators that may have been identified at Sites OE-1 and OE-6 (other 1950s Mine and Booby Trap Areas) could be present below the ground surface. It is possible, although not likely that future construction workers could come in contact with OE during excavation 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 39-A2.

Antitank Practice Mines (M12, M12A1, M20) and Fuzes (M604). The fuze, mine, antitank, practice (M604) was designed for use in the M12, M12A1, and the M20 antitank practice mines. The fuze is an instantaneous, mechanical, pressure-activated type fuze consisting of a steel body containing the firing pin assembly, cover assembly, primer and smoke charge and a safety fork. The fuze is issued separately and assembled to the mine in the field. After it is fired and the mine is recovered a new fuze can be installed and the mine reused. A minimum force of 140 to 240 pounds depressed the pressure plate that caused the Belleville spring to snap into reverse, driving the firing pin into the primer. The primer ignites the smoke composition, which flashes emitting a cloud of smoke and creating a noise. The primer contains 1.62 grains of primary explosive and 2.96 grains of black powder, and the smoke composition weighs 262.3 grains or 0.6 ounces (*Army, 1994a*). The mine was designed to be triggered by the weight of a vehicle, and would require more weight than a large person can apply by just stepping on the pressure plate to trigger it. If caused to function, the type of injuries that could be sustained would be a burn injury from the 262.3 grains of smoke composition.

Summary: It is highly unlikely that a person would be able to trigger a fuze through casual contact if one were found at the site and sustain a burn injury, because the fuze: (1) was designed to be triggered by the weight of a vehicle, 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.

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, 1994a*). 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.

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, 1994b*). 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.

Simulator, Explosive Booby-trap: Flash, M117; Illuminating, M118; Whistling, M119. The booby-trap simulators are designed to be used as safe booby traps during maneuvers and in troop training to teach the installation, detection and use of booby traps, and to instill caution in troops exposed to traps set by an enemy. They consist of a cylindrical outer tube (made of Kraft paper), and a flat metal nailing bracket extending from one end of the tube. Located within the outer tube are an initiating charge assembly and an inner tube containing a pyrotechnic charge. Running through the initiating assembly is a length of pull cord. One end of the cord is covered with a friction composition, the other end is coiled with a strip of tape. The M117 simulator has a dimple in the mounting bracket for additional identification at night. Issued with each simulator is a spool of tripwire, an extension spring, three staples, and four nails for booby trap installation. They were nailed against trees with a trip wire attached to the pull cord. It was functioned when a soldier applied pressure to the trip wire pulling the cord through the ignition composition assembly, which produces a flash. The flash is transmitted through a flash tube, which ignites the pyrotechnic charge (*Army, 1994b*). It is unlikely that a paper-bodied simulator would survive years of exposure in the field. In the unlikely event that an unfired simulator was discovered and functioned, the type of injuries that would be sustained would be burns and lacerations to the hand from the exploding pyrotechnic charge, if it was being held when it functioned.

Summary: It is unlikely that a person could cause a booby trap simulator to function through casual contact if one were found at the site and be burned or lacerated, because it was made from paper that would have been exposed to moisture, degradation, and weathering for many years, which could decrease its effectiveness.

3.39.6 Site Evaluation

The available data (e.g., archival and sampling data) regarding Site OE-39 were reviewed and evaluated according to procedures described in the *Final Plan for Evaluation of Previous Work* (*HLA, 2000b*). The evaluation process is documented through the completion of a series of checklists. Copies of the checklists are provided as Attachment 39-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.

3.39.6.1 Literature Review

Type of Training and OE Expected

As discussed in section 3.39.2, "Mine and Booby Trap # 4" is identified on the 1957 and 1958 training maps and falls within the site OE-39 boundary. The 1958 training map identifies "Machine Gun Square #1" just east of the site, "CC," "CM," and "bleachers." Machine gun squares were used to practice setting up and aiming weapons or dry fire training (*HLA, 2000a*). No evidence has been found that would indicate that live ammunition was used at the machine gun squares. Based on review of historical documents, practice mines and booby traps could have been used in this area. Based on training activities, no impact area would be expected. It is possible that pyrotechnic items could have been used in conjunction with the mine and booby trap training.

Subsequent Use of the Area

Housing (Marshall Park) was constructed in this area in the early 1960s. It is not known whether OE items were found during the construction. Reuse as housing suggests that any OE found during housing construction would have been removed prior to occupation of the housing; however there is no documentation that the site was cleared of OE prior to construction. No incident reports have been found in EOD files from the late 1980s and early 1990s documenting the discovery of OE by residents of Marshall Park. It should be noted that incident reports prior to the late 1980s were not available, possibly not retained by the EOD.

Establishment of Site Boundaries

The 1951 aerial photographs show a large cleared area within the site area. Historical training maps from 1957 and 1958 show MBA # 4 and several roads in this area that allows accurate placement of historical MBA #4. Based on training maps and aerial photographs, the current site boundaries appear accurate.

Summary of Literature Review Analysis

Based on review of site literature, the site appears to have been used for mine and booby trap training in the late 1950s. Sampling was warranted for this site to investigate for OE related to the mine and booby trap training. Due to the proximity of the site to roads and facilities, it is expected that inert and/or practice items were used for training.

3.39.6.2 Sampling Review

This section describes the items that were found during sampling and the types of fillers that would be used in the items. The review includes a comparison of sampling locations relative to site boundaries, a review of the equipment used during sampling, a discussion of the sampling methods used, and the quality control measures used during the investigation.

Sampling Results (Items Found)

In 1997, CMS conducted SS/GS sampling at Site OE-39. No OE items were found during sampling. Items found include nails, pipes, wires, and other non-OE items. There was no evidence that training involved using the site as an impact area.

Site Boundaries Review

No evidence of mines or booby traps was found at Site OE-39. All grids were completed within the Site OE-39 boundaries established by the USACE. The sample grids covered the cleared area evident on the 1951 aerial photograph. None of the grids are within the 1957 digitized site boundaries; however, housing and a road completely cover the 1957 digitized site area. Sample grid M03 is within 50 feet of the 1957 digitized site boundary. Based on the results of sampling, no modification of the Site OE-39 boundary is necessary.

Equipment Review

CMS used the Schonstedt Model GA-52/Cx magnetometer during sampling activities in 1997 at Site OE-39. A maximum search lane 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 GA-52/Cx magnetometer was evaluated as part of the Ordnance Detection and Discrimination Study (ODDS; *Parsons Infrastructure & Technology Group, Inc. [Parsons], 2001b*). 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 Schonstedt 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-39; therefore, differences in field conditions, if applicable, should be considered when using information from the ODDS.

For the purpose of evaluating the geophysical equipment used at this site, it is assumed that practice mines, potentially discarded or left at Site OE-39 would be located at the surface or potentially buried at depths of up to 2 feet below ground surface (due to grading activities associated with housing construction). Mines were not specifically evaluated as part of the ODDS study, however, other non-penetrating items (Type I) were evaluated (signal flares and hand grenades) as were penetrating items

(Type II, listed below). Therefore, the Type I and II seeded test results from the ODDS were used for comparison purposes in evaluating the performance of the geophysical equipment at this site.

During the seeded test the Schonstedt Model GA-52/Cx located between 67 and 96 percent of the Type I items buried at depths ranging from just below the surface to 1 foot. The detection rates for Type II items (e.g., 2.36- and 3.5-inch rockets, rifle grenades, and 14.5mm projectiles) ranged from 64 to 85 percent using the Schonstedt Model GA-52/Cx. Although not evaluated in the ODDS, practice mines that may contain energetic material generally contain a larger amount of ferrous material than the Type II items evaluated in the ODDS. This should result in a detection rate that would equal or exceed the detection rate for the Type II items evaluated. The detection rate percentages presented in the ODDS vary according to the search radius and assume a 5-foot wide search lane. Results for the 3 foot search lane, also evaluated as part of the ODDS, are not included in the detection percentages presented above, because the 3-foot wide search lanes were not used during the investigation. A standard search radius for investigating anomalies was not specified in the CMS work plan or after action report, therefore, the detection range for the different search radii (1.6 and 3.3 feet) is 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 orientations of buried items may not be comparable to the Site OE-39 conditions, the results should only be used as an indication that the equipment is capable of detecting the same types of items at depths that equal the items assumed burial depth.

Results of the ODDS Field Trial Sites (FTS) were also reviewed for potential use in evaluating instrument performance at Site OE-39. Detection rates for the Schonstedt GA-52/Cx 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 97 to 100 percent depending on the search radius used for the calculation. A standard search radius for investigating anomalies was not specified in the CMS work plan or after action reports; therefore, the detection ranges for the different 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 are expected to have very low ordnance densities of OE scrap. Therefore, the field trial results may not be applicable to Site OE-39.

Results of the ODDS field trials for the field test site closest in OE item density to Site OE-39 (FTS-3) were also reviewed. Five OE items were located during the investigation. No additional items were found during sifting of 10 percent of each grid (final Quality Control [QC] sampling). This indicates that it is unlikely that OE items would remain at FTS-3 within the grids sampled. Similar results could be expected at other sites, such as Site OE-39, after survey and clearance using the Schonstedt GA-52/Cx magnetometer.

Although not directly comparable to Site OE-39, 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. Small arms ammunition is non-ferrous and cannot be detected with a magnetometer.

Sampling Methods Discussion

In 1997, Site OE-39 was sampled by CMS using the SS/GS Statistical Sampling 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 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 EPAs Federal Facilities Restoration and Reuse Office. The Technical Support Center, EPA National 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 that 1) the statistical procedures are vague and not well documented, 2) conclusions about homogeneity are not consistent, and 3) the stopping rules are faulty and 4) the methodology was not able to identify UXO clusters at a site (*NERL, 2000*). Although these problems were identified, the information obtained during sampling is useful in identifying the presence of and type of OE potentially present at the site.

Four 100- by 200-foot grids were sampled using the SS/GS sampling program. A total of 2,997 anomalies were located using the Schonstedt Model GA-52/Cx magnetometer and 304 anomalies were excavated until found or to a maximum of 4 feet. Because mine- and 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 mines and booby traps remaining at the site (*USA, 2000*).

Quality Assurance/Quality Control

The QA/QC procedures used by CMS during sampling are described below.

Field Sampling QA/QC

Throughout operations, CMS performed daily operational checks and Quality Control (QC) inspections. Quality Assurance (QA)/QC performed throughout the field sampling is documented in the After Action Report (AAR; *USA, 2000*). Because of the nature of the SS/GS sampling, QA/QC was limited to inspections of operational 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 QA/QC

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 SOP provided in Appendix A *(Parsons, 2001a*). 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 Parsons' data review. The requirements of the contractors' QA review are described in the SOP provided as Appendix B to the Track 1 Remedial Investigation (RI). The purpose of the data review was to complete a 100 percent check of all available grid and SS/GS records to identify discrepancies between the after action reports and the grid records, if any. 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.

The following summarizes the usability of the data collected at Site OE-39.

- Sampling was conducted within the site boundaries. Sampling within the digitized 1957 site boundaries was not possible due to the presence of housing roads, and associated utilities within the boundary.

- Grids were surveyed and the grids were located within the 1997 ASR site boundaries.

- 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 methodology was not to identify potential OE clusters.

- The instruments used cannot be used to find non-metallic practice mines. However, the instruments should be effective in detecting ferrous OE items such as practice mines that may contain energetic material.

3.39.7 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.

3.39.7.1 Conclusions

Site Use and Development

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

- The area is bordered General Jim Moore Blvd. to the west and Gigling Road to the north. Because of the proximity of the site to roads and facilities present in the 1950s, it is expected that mine and booby trap training involved inert and/or practice items.

- Items potentially present at Site OE-39 are pyrotechnics (ignition cartridges, smoke charges from training mines, fuzes from training mines, coupling bases from firing devices, and booby trap simulators). If the training mines were still fuzed, the fuze still functioned, and was triggered, the low explosive spotting charge could cause burns or injuries from falling parts. The hazard presented by booby trap simulators is similar to that of common fireworks (severe burn and laceration to the hand) and triggering a coupling base could cause very minor burn injuries. Based on the presence of residential housing at the site, these items, if present, are likely to be below the ground surface.

- No OE items were found during sampling.

Sampling Adequacy and Data Quality

- The evidence from literature review suggests that the location of the past mine and booby trap training area was in the area sampled for OE. Residential housing now covers this area.

- SS/GS sampling methodology was used for the site. There have been problems identified with SS/GS sampling; however, the data are useful in identifying the potential presence of OE. In addition, because not all of the anomalies are investigated using the SS/GS sampling approach, some buried OE or OE scrap may still be present within the sampling grids.

- The Schonstedt Model GA-52/Cx was used for all geophysical surveys. The instrument was evaluated as part of the ODDS and with the exception of small arms ammunition, is capable of

detecting the type of items expected at this site. A numerical value for detection of items cannot be calculated for an individual site.

- The data collected by CMS was useful in providing survey data for the SS/GS sampling grids. The instruments used by CMS cannot be used to find non-metallic mines; however, the instruments used should be effective in detecting ferrous OE items such as practice mines that may contain energetic material.

- 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 items, if present at the site, are considered to pose an acceptable risk if encountered for the following reasons:

  Antitank Practice Mines (M12, M12A1, M20) and Fuzes (M604). It is highly unlikely that a person would be able to trigger a fuze through casual contact if one were found at the site and sustain a burn injury, because the fuze: (1) was designed to be triggered by the weight of a vehicle, 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.

  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.

  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.

  Simulator, Explosive Booby-trap: Flash, M117; Illuminating, M118; Whistling, M119. It is unlikely that a person could cause a booby trap simulator to function through casual contact if one were found at the site and be burned or lacerated, because it was made from paper that would have been exposed to moisture, degradation, and weathering for many years, which could decrease its effectiveness.

- Although the previous OE sampling efforts performed at Site OE-39 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. The entire site was not sampled, however, the sampling methods were sufficient to provide information on the types of scrap metal buried at the site (no OE or OE scrap items were found). Additionally, because the OE-items used at Site OE-39 pose an acceptable risk if encountered, and there was no OE found in previous investigations at OE-39, further effort to conduct 100 percent sampling in an area covered with housing would not add significantly to the understanding of the site or change the conclusions of this report

3.39.7.2 Recommendations

Based on the review of existing data:

- It is not anticipated that OE will be found at Site OE-39. However, there is potential for OE to be present at the site because OE were used throughout the history of Fort Ord.

- 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 explosive (HE) were used at the site or that the site was used as an impact area.

- No live OE was found during the OE sampling programs. OE items found were those used for training purposes only and were inert.

- The site has been occupied by residences for almost 40 years and no OE incident reports have been found indicating that OE was discovered at the site. It should be noted that the reports reviewed were EOD records from the late 1980s and early 1990s; earlier records were not available for review.

The U.S. Army Corps of Engineers completed ordnance investigations at Site OE-39. 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-39 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-39 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.

3.39.8 References

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TABLE

Table 39-1. Sampling Operations, Site OE-39
Track 1 Ordnance and Explosive Remedial Investigation/Feasibility Study
Former Fort Ord, California

Site	Grid ID	Operation Type	Contractor	Geophysical Instrument Used	Grid Completion Date
OE-39 -- Mine and Booby Trap Training Area	OE-39_(M 01)	SS/GS	USA	SCHONSTEDT GA-52CX	8/14/1997
OE-39 -- Mine and Booby Trap Training Area	OE-39_(M 01)	SS/GS	USA	SCHONSTEDT GA-52CX	8/18/1997
OE-39 -- Mine and Booby Trap Training Area	OE-39_(M 02)	SS/GS	USA	SCHONSTEDT GA-52CX	8/12/1997
OE-39 -- Mine and Booby Trap Training Area	OE-39_(M 02)	SS/GS	USA	SCHONSTEDT GA-52CX	8/13/1997
OE-39 -- Mine and Booby Trap Training Area	OE-39_(M 02)	SS/GS	USA	SCHONSTEDT GA-52CX	8/14/1997
OE-39 -- Mine and Booby Trap Training Area	OE-39_(M 03)	SS/GS	USA	SCHONSTEDT GA-52CX	8/18/1997
OE-39 -- Mine and Booby Trap Training Area	OE-39_(M 03)	SS/GS	USA	SCHONSTEDT GA-52CX	8/19/1997
OE-39 -- Mine and Booby Trap Training Area	OE-39_(M 03)	SS/GS	USA	SCHONSTEDT GA-52CX	8/20/1997
OE-39 -- Mine and Booby Trap Training Area	OE-39_(M 04)	SS/GS	USA	SCHONSTEDT GA-52CX	8/20/1997
OE-39 -- Mine and Booby Trap Training Area	OE-39_(M 04)	SS/GS	USA	SCHONSTEDT GA-52CX	8/21/1997

Site = OE Site Number
Grid ID = Only the portion of the grid ID within parenthesis is posted on Plate 39-4.
SS/GS = Sitestats/Gridstats Statistical Sampling Based Methodology.
USA = USA Environmental, Inc.
Grid Completion Date = Work may have been conducted within a particular grid on more than one date.

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 39-A1

ATTACHMENT 39-A1
EVALUATION OF PREVIOUS WORK: SITE OE-39
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
No evidence to support an impact area. A plant nursery was established in this area by 3/20/1946 and was still shown here on the Main Garrison Layout (2/56). First training identified in this area is a circular area labeled CC & CM and includes bleachers (12/20/56). The Mine and Booby Trap Area (MBA #4) first appears on the Map of Fort Ord Training Areas and Facilities (7/15/57). It is located just south of CC & CM. Both MBA #4 and CC & CM appear in this area on maps from January 10, 1958, and December 31, 1958. No training areas are shown on the next available map dated June 30, 1961. Housing is shown constructed in this area on the April 27, 1964 map (East NCO Area).

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

Sources reviewed and comments
If practice mines and booby traps were used, the potential exists for HE and LE to have been components of the training items (USAEDH 1997; Review of Fort Ord facilities and training maps, USA, 2000). Historical information indicates use as above.

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
Practice mines may contain smoke charges. The charges contained black powder and red phosphorous. However, no evidence of pyrotechnic use has been found (USAEDH, 1997; USA, 2000).

ATTACHMENT 39-A1
EVALUATION OF PREVIOUS WORK: SITE OE-39
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?***			Inconclusive
5. ***Does use of area surrounding the site indicate that OE would have been used at the site?***		No	
ESTABLISHMENT OF SITE BOUNDARIES			
6. ***Is there evidence of training areas on aerial photographs that could be used to establish***			Inconclusive
7. ***Is there evidence of training on historical training maps that could be used to establish boundaries?***	Yes		
8. ***Should current boundaries be revised?***		No	

Sources reviewed and comments
Housing (Marshall Park) was constructed in this area in the early 1960s. It is not known if OE-related items were found during the construction.

Sources reviewed and comments
Area is bordered by housing to the west, training areas to the east, and training areas/development to the north and south.

Sources reviewed and comments
A cleared area is visible on the 5/14/56 aerial photos, but this cleared area was also present prior to the establishment of MBA #4 as can be seen on the 6/23/51 aerial photos.

Sources reviewed and comments
MBA #4 is shown on maps from 1957 and 1958. Also several roads are established in this area that allow accurate placement of MBA #4.

Sources reviewed and comments
Based on training maps, current site boundaries appear to be correct.

ATTACHMENT 39-A1
EVALUATION OF PREVIOUS WORK: SITE OE-39
EVALUATION CHECKLIST PART 1: LITERATURE REVIEW

RESULTS OF LITERATURE EVALUATION

	Yes	No	Inconclusive
Does the literature review provide sufficient evidence to warrant further investigation?		No	

Comments

Initial sampling of the site was warranted to investigate the potential for OE-related items associated with the identification of the area as a mine and booby trap training area. No further OE-related investigation is necessary based on the results of the literature review.

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ATTACHMENT 39-A
EVALUATION OF PREVIOUS WORK: SITE OE-39
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
No evidence to suggest that the area was an impact area (Revised Archives Search Report (ASR), USAEDH 1997; Review of Fort Ord facilities and training maps; After Action Report - USA, 2000).

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

Sources reviewed and comments
Revised Archives Search Report (ASR), USAEDH 1997; Review of Fort Ord facilities and training maps; After Action Report - USA, 2000. No OE items were found at this site.

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
Use of this area may have included pyrotechnics (e.g., simulators), however, no evidence of this use was found during sampling. Revised Archives Search Report (ASR), USAEDH 1997; Review of Fort Ord facilities and training maps; After Action Report - USA, 2000.

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

Sources reviewed and comments
All sample grids (4) were within the boundary of the site (After Action Report - USA, 2000).

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

Sources reviewed and comments
Nothing found (After Action Report - USA, 2000).

ATTACHMENT 39-A
EVALUATION OF PREVIOUS WORK: SITE OE-39
EVALUATION CHECKLIST PART 2: SAMPLING EVALUATION

	Yes	No	Inconclusive
6. ***Were the type(s) of items found consistent with the type of training identified for the site?***			Not Applicable

Sources reviewed and comments
Nothing found (After Action Report - USA, 2000).

7. ***Were the type(s) of items found consistent with the era(s) in which training was identified?***			Not Applicable

Sources reviewed and comments
Nothing found (After Action Report - USA, 2000).

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

Sources reviewed and comments
Nothing found (After Action Report - USA, 2000).

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

Sources reviewed and comments
Nothing found (After Action Report - USA, 2000).

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

Sources reviewed and comments
Nothing found (After Action Report - USA, 2000).

11. ***Were pyrotechnics found?***		No	

Sources reviewed and comments
Nothing found (After Action Report - USA, 2000).

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

Sources reviewed and comments
Nothing found (After Action Report - USA, 2000).

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

Sources reviewed and comments
Nothing found (After Action Report - USA, 2000).

ATTACHMENT 39-A
EVALUATION OF PREVIOUS WORK: SITE OE-39
EVALUATION CHECKLIST PART 2: SAMPLING EVALUATION

	Yes	No	Inconclusive
14. ***Do items found in the area indicate training would have included use of training items with energetic components?***			Not Applicable

Sources reviewed and comments
Nothing found (After Action Report - USA, 2000).

	Yes	No	Inconclusive
15. ***Were items found in a localized area (possibly the remnants of a cleanup action)?***			Not Applicable

Sources reviewed and comments
Nothing found (After Action Report - USA, 2000).

	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
Nothing found (After Action Report - USA, 2000).

	Yes	No	Inconclusive
17. ***Should current site boundaries be revised?***		No	

Sources reviewed and comments
Cleared area shown on 1951 aerial photo is mostly captured by the site boundary. One of the grids was placed within the cleared 1951 cleared area. Sampling results provide no evidence to shift the site boundary.

	Yes	No	Inconclusive
18. ***Was equipment used capable of detecting items suspected at the site at the maximum expected depth?***	Yes		

Sources reviewed and comments
Mine and Booby Traps would be expected at or near the surface. Site was sampled to a depth of 4 feet, anomalies detected were excavated until found or down to a maximum of 4 feet. CMS used the Schonstedt GA-52/Cx during sampling. The results of the ODDS study indicate that the Schonstedt GA-52/Cx is capable of detecting ferrous OE expected at this site.

ATTACHMENT 39-A
EVALUATION OF PREVIOUS WORK: SITE OE-39
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?***	Yes		

Sources reviewed and comments
Mines and booby traps would be expected on the surface. The Schonstedt GA-52/Cx used at this site was able to detect ferrous items such as nails, pipes, and wire.

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?***	Yes		

Sources reviewed and comments
Land mines not listed as items of study in the ODDS, but would probably be categorized as Type I (non-penetrating)(USA, 2000). Schonstedt GA-52/Cx magnetometers were used by CMS. Although not directly comparable to Site OE-39, the results of the ODDS indicate that the Schonstedt GA-52/Cx is capable of detecting the ferrous surface OE expected at this site (USA, 2000; CMS, 1997).

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
Yes. The items used at the site are non-penetrating items.

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
According to the USA After Action Report, CMS performed daily operational checks and Quality Control (QC) inspections of its work throughout operations at Site OE-39 (USA, 2000). No deficiency reports were written during inspections of the SS/GS sampling work performed at Site OE-39.

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EVALUATION OF PREVIOUS WORK: SITE OE-39
EVALUATION CHECKLIST PART 2: SAMPLING EVALUATION

	Yes	No	Inconclusive
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
There is no anticipated density of UXO items. Four SiteStats/GridStats grids established on approximately 13% of the site (USA, 2000).

	Yes	No	Inconclusive
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
80,000 square feet (approximately 1.8 acres) of SiteStats/GridStats grids established by CMS based on 4 100x200-foot grids (USA, 2000). Because no UXO was found during sampling, UXO densities were not calculated.

Total Area: 80,000 sq.	
UXO Density:	Not Calculated

25. ***What percentage of the anomalies were intrusively investigated?***

Sources reviewed and comments
2997 anomalies identified and 304 sampled or 10% (USA, 2000)

Total % of anomalies investigated:	10%

	Yes	No	Inconclusive
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 39-A
EVALUATION OF PREVIOUS WORK: SITE OE-39
EVALUATION CHECKLIST PART 2: SAMPLING EVALUATION

	Yes	No	Inconclusive
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-39 were not subject to formal Quality Control (QC) inspections because of the nature of the SiteStats/GridStats procedures. Throughout operations at Site OE-39 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 (USA, 2000). "Because of the nature of SiteStats/GridStats sampling, Quality Assurance and Quality Control tests of SiteStats/GridStats operations was limited to inspections of (1) operational activities and (2) documentation.

Result of Sampling Evaluation

Does the sampling evaluation provide sufficient evidence to warrant further investigation?		No	

Comments
No OE items were located during sampling. The site is currently occupied by residential housing, therefore it is likely that training aids associated with a mine and booby trap training area would have been removed if encountered during construction activities.

References
USA Environmental, Inc., (USA) 2000. After Action Report SiteStats/GridStats OE Sampling, Inland Range Contract, Former Fort Ord, California, Site 24B-E And OE-39. January 4.
CMS Environmental, Inc. (CMS), 1997. Draft Work Plan, Former Fort Ord Base Wide Ordnance And Explosives (OE) Sampling And Removal Action, Fort Ord, California. February 14.
USAEDH, 1997. Revised Archives Search Report, Former Fort Ord, California, Monterey County, California. Prepared by US Army Corps of Engineers St. Louis District.

ATTACHMENT 39-A
EVALUATION OF PREVIOUS WORK: SITE OE-39
EVALUATION CHECKLIST PART 2: SAMPLING EVALUATION

	Yes	No	Inconclusive

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.
HFA, 1994. 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.

ATTACHMENT 39-A2

POTENTIAL ORDNANCE USED AT SITE OE-39

ATTACHMENT 39-A2
POTENTIAL ORDNANCE USED AT SITE OE-39

Mines

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 1-inch holes equally spaced around the body. 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 – 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 and 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 – 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.

The M604 fuze is used to activate the M12, M12A1, and M20 antitank practice mines. The fuze is an instantaneous, mechanical pressure-actuated type. It consists of a steel body containing a firing pin assembly, cover assembly, primer and smoke charge, and safety fork. It is attached to the mine in the field, and after it is fired, it can be replaced. A minimum force of 140 to 240 pounds depresses the pressure plated which causes the Belleville spring to snap into reverse driving the firing pin into the primer. The primer ignites the smoke composition that flashes, emitting a cloud of smoke, and creating a

noise. The M45 primer consists of 1.62 grams of PA #100 and 2.96 grams of black powder (*Army, 1977a).*

Booby Traps – Firing Devices and Simulators

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. Information for the booby trap simulators was obtained from *Technical Manual, Army Ammunition Data Sheets: Military Pyrotechnics (Federal Supply Class 1370), TM 43-0001-37*

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.

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

M117 Flash, M118 Illuminating, and M119 Whistling Explosive Booby Trap Simulators – Explosive booby trap simulators are used during maneuvers and during training exercises to teach the installation, detection, and use of booby traps. The simulators consist of a cylindrical outer tube and a flat metal nailing bracket extending from the end of the tube. Within the outer tube there is a charge initiating assembly and an inner tube containing a pyrotechnic charge. Running through the initiating assembly is a pull cord. One end of the cord is covered with a friction composition. The other end is coiled and secured in the end of the body by a paper cap and tape. A spool of trip wire, extension spring, three staples, and four nails are provided for booby trap installation. Movement of the pull cord produces an ignition flash that is transmitted into the flash tube, igniting the pyrotechnic charge. The M117 produces an instantaneous explosion, flash and, sound on initiation. The M118 produces a 28 second illumination flame, and the M119 produces a 2.5 to 5 second whistle (*Army, 1977b*).