SITE OE-32A

OIL WELL ROAD TRAINING AREA

CONTENTS

TABLES

PLATES

ATTACHMENT

3.32A Site OE-32A - Oil Well Road Training Area

A summary report for Site OE-32A is provided below. This report consists of two parts. The first part, contained in Sections 3.32A.1 through 3.32A.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 3.32A.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 3.32A.6.1), and an evaluation of the sampling process(es) (Section 3.32A.6.2). These discussions are based upon information from standardized literature review and reconnaissance review checklists (Attachment 32A-A1). Section 3.32A.7 provides conclusions and recommendations for the site. References are provided in Section 3.32A.8.

3.32A.1 Site Description

Site OE-32A is approximately 38 acres in size and is located in the southeastern portion of the former Fort Ord (Plate 32A-1). The surrounding area is undeveloped open space. Site OE-32A is part of a larger OE Site, OE Site 32 (Oil Well Road Training Area), which has been subdivided into three separate sites, 32A, 32B and 32C. Site OE-32 was identified during interviews conducted during the Preliminary Assessment/Site Investigation (PA/SI) phase of the Fort Ord Archives Search Report (ASR; *U.S. Army Engineer Division, Huntsville [USAEDH], 1997*).

3.32A.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 the misalignment of some map features with respect to the aerial photographs.

Pre-1940s

This site lies within a tract of land purchased from private landowners by the government after July 1940 (*Arthur D. Little, Inc. [ADL], 1994*). During that time the area would have been utilized by troops stationed at the Presidio of Monterey and training at nearby Camp Huffman (*HLA, 2000a*).

1940s Era

Documentation of 1940s era use of this area by the Army for training is presented in training facilities and topographic maps of the area. Topographic maps of the area from 1944 through 1946 were reviewed. No training areas or other features were identified within this area. An “Anti-Tank” range and a “Bazooka

Demonstration" area were noted within the Multi-Range Area (MRA), on the 1945 and 1946 training facilities maps (*U.S. Army [Army], 1945 and 1946*). The MRA is located to the west of Site OE-32A (Plate 32A-1).

1950s Era

Review of 1950s-era documentation including historical maps and aerial photographs indicates that the Oil Well Road Training Area was present in this location beginning in the mid 1950s.

- The "Oil Well Road Training Area" is shown on the circa 1954 Training Areas map (*Army, 1954*). The boundary is shown as a large circular area with a dashed boundary. The "Oil Well Road Training Area" is also shown on a training map from 1956 (*Army, 1956*). The boundary is shown as a large rectangular area in 1956.

- A "Tank Gunnery Range" is shown on the 1956 map just west of the Oil Well Road Training Area. The Oil Well Road Training Area is not identified on training maps from 1957 and 1958 (*Army, 1957 and 1958*). The Tank Gunnery Range, however, is still present and the probable location of what would have been the firing line for the range is located within the former location of the Oil Well Road training area.

- No aerial photographic coverage of this area until the 1960s.

- Ranges used for the firing of antitank weapons, including rockets, bazookas, and recoilless rifles, were present within the MRA and are shown on the 1946, circa 1954, 1956, 1957, 1958, 1961 and the 1964 training maps.

1960s Era

Review of 1960s era documentation including training maps and aerial photographs indicates that no specific training site is defined in this area.

- An area identified as "RWD 3, 4" (*Army, 1964*), is within the footprint of the "Oil Well Road Training Area" identified on 1950s training maps. The activity associated with "RWD 3, 4" is unknown. No specific training site is identified in this area on any 1960s maps after this time.

- OE Site-32A lies within a larger training area identified on training maps in the late 1960s. On a March 1968 map the site falls within a large area identified as a Training and Maneuver Area (*U.S. Army Corps of Engineers [USACE], 1968*).

- An "aviation training area" and a "helipad" are identified on training maps from 1964 through 1968, south of Site OE-32A.

1970s To Present

Review of 1970s and 1980s era documentation including training maps and aerial photographs indicates that no specific training site is defined in this area.

- From 1976 to 1988 the site lies within a large area defined as Training Area N. Training Area N includes several training sites, but nothing specific to the Oil Well Road Training Area (*USACE, 1976; Army, 1988*).

Proposed Future Land Use

A small portion of Site OE-32A lies on property that was transferred to the Bureau of Land Management (BLM) in 1996 and will be maintained as habitat reserve (*USACE, 1997*). The remainder of the site will be transferred to Monterey County to be used as an overflow parking area for the Laguna Seca Raceway.

3.32A.3 Potential Ordnance based on Historical Use of the Area

This section describes the types of training devices that could have been used at a tank gunnery or antitank range in the 1950s. Information on tank weaponry in use immediately following World War II was obtained from *The American Arsenal, The World War II Official Standard Ordnance Catalog of Small Arms, Tanks, Armored Cars, Artillery, Antiaircraft Guns, Ammunition, Grenades, Mines, etcetera* (*Hogg, 2001*). Information on antitank weapons used in the 1950s and 1960s was obtained from Field Manual (FM) 23-11 (*Army, 1965*), from Army Regulation (AR) 385-63 (*Army, 1983*), The American Arsenal (*Hogg, 2001*) and interviews (*Stoner, 2002*).

Tank weaponry in use at the end of World War II included 75mm, 76mm, and 90mm guns. Ordnance fired may have included target practice, high explosive (HE), HE antitank (HEAT), smoke, armor-piercing (AP), and AP Capped (APC).

Shoulder-launched projectiles, (antitank weapons) in use in the 1950s included the 3.5-inch rocket and recoilless rifles.

The M20 3.5-inch rocket launcher is a two-piece, smooth bore, open-tube weapon that is fired electrically. The weapon can be fired from a sitting, kneeling, standing, or prone position. A magneto-type firing device in the trigger grip provides the current for igniting the rockets. Ordnance fired from the M20 included the M28A2 HEAT rocket, M29A2 practice rocket, and the M30 white phosphorous (WP), smoke rocket.

Recoilless rifles are portable antitank weapons that were either shoulder- or ground-fired and in some cases could be fired by either method. The recoilless rifle was developed during WW II, and saw limited action by war's end. The weapon was used extensively during the Korean War. Recoilless rifles in use by the Army in the mid 1950s include the M18 57mm, the M20 75mm, the M40 106mm, and the truck-mounted M27 105mm (*Stoner, 2002*). The M18 and M67 could be fired from the shoulder (*Hall*, 2003). Explosive ammunition used in the M18 and M67 recoilless rifles included HEAT, WP smoke, and canister (antipersonnel) in the M18 and HEAT, high explosive plastic (HEP), and APERS (flechette antipersonnel) in the M67. Additionally, target practice (TP) or drill rounds were also used in all models of recoilless rifles.

The projectiles that may have been fired at this site would have been fired roughly parallel to the surface and would be expected to be located at or near the surface.

Additionally, because this area was within a larger troop training and maneuver area, the possibility exists that blank small arms ammunition and pyrotechnics may be present at this site.

3.32A.4 History of OE Investigations

The following describes the OE investigations that have been conducted at Site OE-32A.

1993 Archives Search Report (ASR)

The purpose of the archives search conducted at Fort Ord was to gather and review historical information to determine the types of munitions used at the site, identify possible disposal areas, identify unknown training areas and recommend follow-up actions. Guidance for conducting archives searches did not exist prior to 1995. The 1993 ASR was completed based on the Scope of Work provided to the St. Louis Corps of Engineers by the Huntsville Corps of Engineers and on archive search reports completed at other military installations. 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.

The site was identified in the 1993 ASR as a possible tank gunnery range and included features identified on 1950s training maps as the Oil Well Road Training Area and possibly a tank maneuver area. The 1993 ASR recommended further investigation into these areas (*USAEDH, 1993*). Requirements for preparation of an ASR are described in Section 2.0 of this report.

UXB International Investigation

Sampling of Site OE-32A was conducted in 1994 by UXB International Inc. (UXB) using site boundaries provided by the USACE, Huntsville Division. The UXB sampling methodology is discussed in Section 3.32A.6.2. Site OE-32A was subdivided into 100- by 100-foot grids and 17 were selected at random for 100 percent sampling (all anomalies detected were investigated). The grids were geophysically investigated along search lanes of a maximum 5-foot width using either the Schonstedt Model GA-52/C or the GA-72/Cv magnetometer. All magnetic anomalies were excavated using hand tools by the UXB UXO Safety Specialist until an item was located, the magnetic signal was lost, or a depth of 3 feet was achieved. Three OE scrap items (two expended rifle-fired illumination signals [M19 Series] and one expended hand smoke grenade [M18 Series]) and live small arms blanks were found and removed. No information regarding the depths at which the illumination signals or the smoke grenade were found was provided in the UXB after action report. Information regarding the location of where the items were found within the girds was documented by UXB; however, the orientation of the grids (with respect to north and south) was not provided so the accuracy of the location of the items found is to the sample grid only. No OE associated with a tank gunnery range (including shoulder-launched projectiles, rifle grenades, or mortars) was found during sampling at Site OE-32A. All sample grids were placed within the site boundaries. On the basis of the sampling results no further action was recommended (*UXB, 1995b*). The surveyed site boundaries are presented on Plate 32A-2. A summary of the sampling operations conducted at Site OE-32A is provided in Table 32A-1. Other operations, including laying out grids on Oil Well Road (thirty-four 100- by 50-foot grids), were conducted near Site OE-32A. The specific location on Oil Well Road where the grids were completed is not known. No OE or OE scrap was found within the Oil Well Road sample grids. Contract requirements for the scope of work performed by UXB are discussed in greater detail in Section 2.0 of this report.

CMS Investigation

CMS Environmental, Inc. (CMS) did not sample Site OE-32A, but did conduct sampling in 1995 and 1996 and a limited removal action in 1997 at adjacent Site OE-32C. Site OE-32C lies within the footprint of the Tank Gunnery Range as depicted on Fort Ord Training Facilities maps from the 1950s. No evidence of OE (e.g., projectile fragments) associated with a tank gunnery range was found during the sampling of Site OE-32C (*USA Environmental [USA], 2000*).

1997 Revised Archives Search Report

The site was identified in the 1997 Revised ASR as the Oil Well Road Training Area and includes Sites OE-32A, -32B, and -32C. These sites are immediately adjacent to and partially surround Site OE-27U (Training Site 21). The sites were identified on training maps from the mid 1950s first as the Oil Well Road Training Area (circa 1954) and as a Tank Gunnery Range (1956, 1957, and 1958). Interviews conducted as part of the archives search indicated that the area includes targets for shoulder-launched projectiles and armor-piercing projectiles (*USAEDH, 1997*). The revised ASR included a review of the sampling investigation conducted in 1994 by UXB. Based on the sampling results (no OE found), the 1997 revised ASR recommended no further OE-related investigation at Site OE-32A (*USAEDH, 1997*). The Revised ASR was completed in accordance with U.S. Army Corps of Engineers guidance (*USAESCH, 1995*).

3.32A.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-32A is based on currently available site-specific and general information including literature reviews, sampling results, aerial photographs, maps, technical manuals, field observations, and the information shown on Plate 32A-2. It is provided to help evaluate the adequacy of the investigation completed to date and to identify potential release and exposure pathways. Two models were developed for this range, one for use as a Tank Gunnery Range (Plate 32A-3) and one for shoulder-launched weapons, including recoilless rifles and rockets (Plate 32A-4). A description of the range design for the weapons that may have been used is below.

3.32A.5.1 Training Practices

A description of range design and training practices associated is discussed below to provide information on the types of OE that may have been used at the site and the possible location of OE potentially remaining at the site.

Tank Gunnery Range

A tank gunnery range used for direct fire from a static position includes an impact area around the target and ricochet areas to either side of the target. The minimum direct fire distance to a target (impact) for a 90mm gun is 550 meters. Direct fire distances are the minimum required to protect exposed personnel from hazardous fragments resulting from the firing of high explosive projectiles at hard or fragment producing targets (*Army, 1983*). The maximum extent of the range safety fan displayed on the 1950's training areas maps is not large enough to accommodate the minimum direct fire distance requirements for a 90mm tank gun (550 meters). One possible explanation for the presence of the Tank Gunnery Range is that it was used for firing tank mounted .30 caliber and/or .50 caliber machine guns rather than tank guns.

Recoilless Weapons Range

Safety design requirements for a recoilless weapons range are presented in the *Policies and Procedures For Firing Ammunition for Training, Target Practice, and Combat* (*Army, 1983*). The surface danger zone for a recoilless weapons range is composed of an impact area (primary danger area), a ricochet area (provided to contain ricochet projectiles), a secondary danger area paralleling the impact area laterally (to contain fragments on the right or left edge of the impact area), a secondary danger area on the downrange side of the impact area (to contain fragments from items exploding on the far edge of the impact area), and a rear danger zone impacted by the effects of the weapon being fired. Depending on the model of the recoilless weapon used, range safety requirements include a minimum distance to impact of 250 to 300 meters, and a maximum range of approximately 2,200 to 8,600 meters. The minimum distance to impact may be reduced by 75 percent if firing non-explosive projectiles from unprotected positions (*Army, 1983*).

3.5-inch Rocket Range

A 3.5-inch rocket range includes an impact area, ricochet areas to the side and behind the impact area, secondary danger zones located outside of the ricochet areas and designed to contain fragments from items exploding or ricocheting on the right or left edge and on the far edge of the impact area and the area immediately to the rear of a weapon endangered by the effects of the weapon being fired. Minimum distance to impacts is 250 meters and range length from firing point to the end of the impact area is 950 meters (*Army, 1983*).

3.32A.5.2 Site Features

Site OE-32A was identified on historical training maps (circa 1954 and 1956) as the "Oil Well Road Training Area." A Tank Gunnery Range is also shown on the 1956 map immediately to the west of the training area. The Oil Well Road Training Area is not identified on the 1957 and 1958 training maps. However, the Tank Gunnery Range is shown on the 1957 and 1958 maps and what would have been the firing line for the range is located within the former location of Oil Well Road Training Area. No specific training area is shown in this location on the 1964 or subsequent training maps. The former location of the Oil Well Road Training Area and the Tank Gunnery Range lie within larger Training And Maneuver Areas identified on training maps from the late 1960s, the 1970s and 1980s.

The possible location of the firing position for the Tank Gunnery Range illustrated on the map was located along Oil Well Road. From the firing point the terrain slopes gently to the northeast with the range fan pointing toward a ridge to the west-northwest that rises approximately 170 to 200 feet above the firing point. The MRA is located approximately 8,000 feet beyond the firing point. There is no developed land between the Tank Gunnery Range firing point and the MRA.

3.32A.5.3 Potential Sources and Location of OE

A portion of Site OE-32A was reportedly used as a Tank Gunnery Range in the 1950s and the site may also have been used for firing of shoulder-launched projectiles (*USAEDH, 1997*). Based on site use the types of OE that may be expected include projectiles (57mm, 75mm, 3-inch, and 90mm) and rockets (3.5-inch). Based on the design and use of these items, they would normally be found at the surface. No OE or evidence of tank or shoulder-launched projectiles (fragments) or shell casings was found at this site or in surrounding sites (OE-32B and OE-32C) during sampling. The range safety distance requirements needed for the firing of tank and/or shoulder launched projectiles are not met by the dimensions of the

range safety fan depicted on the 1950s era facilities training maps. OE scrap (pyrotechnics) and live small arms blank rounds were found indicating that the site was used for troop training and maneuvers.

Two expended M19 Series illumination signals and one expended M18 Series smoke grenade were found during sampling at Site OE-32A. The illumination signals are used for signaling during night operations and the smoke grenade is used for ground-to-air or ground-to-ground signaling. Both items by design are non-penetrating and if still present would be located at or near the ground surface. Additional information on these items is provided in Attachment 32A-A2.

3.32A.5.4 Potential Exposure Routes

A small portion of this site is within land transferred to the Bureau of Land Management (BLM) and is open to the public for hiking, biking, and horseback riding. Use is restricted to marked trails. The public has had access to this area for approximately 6 years. To date, no instances of OE items being found in this area have been reported. The remainder and majority of the site will be transferred to Monterey County and used as an overflow parking area for the Laguna Seca Raceway. Because no OE items were discovered during sampling or reported previously, it is unlikely that OE exists at the surface in this area. However, because the site was not 100 percent investigated and non-penetrating OE scrap was found during sampling, the possibility exists (although unlikely) that a recreational user or future construction worker could come into contact with surface OE.

Although no OE items were found at Site OE-32A a brief discussion of the potential injuries that could result from contact with illumination and smoke signals are provided below. These items were selected for discussion, because a scrap illumination signal (M19 Series) and a scrap smoke signal (M18 Series) were found during sampling.

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 32A-A2.

Signal Illumination, Ground, Green Star, Parachute: M19 Series. These signals, illuminating, ground, green star, parachute were designed for signaling during night operations. They consist of a single green star illuminant candle with parachute and expelling charge in a cylindrical aluminum case. An aluminum fuse housing is crimped to the base of the cylinder. The fuse housing contains a smokeless powder propelling charge with a retaining disk, and a circular time train groove filled with black powder. A felt setback wad containing a quick match separates the fuse housing and the illuminating candle. The signals are fired using a rifle. Flash from the M64 grenade-launching cartridge passes through the stabilizer to ignite the propelling charge, which propels the signal in flight. The burning propellant ignites the 5.5-second black powder delay element. Near the top of the trajectory, the black powder element ignites the expelling charge and the quick match is ignited. The expelling charge blows the illuminant candle and parachute assembly out through the top of the container, and the illuminant candle is ignited by the quick match. The parachute opens to lower the candle slowly. The signal produces a minimum of 5000-candle power for 20 to 30 seconds (*Army, 1977a*). These would be difficult to be caused to function by incidental contact. They would require preparation and a flash through the stabilizer to ignite the propelling charge. If caused to function, the type of injury that could be sustained would be burns from the propelling charge.

Summary: It is unlikely that a person could cause a signal to function through incidental contact if one were found at the site and be burned, because it: (1) would require precise assembly to function, and

(2) would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

Grenade, Hand, Smoke, M18. The M18 is a colored smoke hand grenade used for ground-to-air or ground-to-ground signaling. The grenades may be filled with any one of four smoke colors: red, green, yellow, or violet. Each grenade will emit smoke for 50 to 90 seconds. The grenade body is of thin sheet metal and is filled with smoke composition and topped with a starter mixture. The hand grenade fuze M201A1 is a pyrotechnic delay igniting fuze. The body contains a primer, first-fire mixture, pyrotechnic delay column, and ignition mixture. Assembled to the body are a striker, striker spring, safety lever, and safety pin with pull ring. The grenade weighs 19 ounces and contains 11.5 ounces of smoke composition. It was functioned when a soldier removed the safety pin from the safety lever and threw the grenade allowing the safety lever to fly free, releasing the spring-loaded striker to strike the primer. The percussion primer ignited the first fire mixture. The fuze delay element, which burns for 0.7 to 2 seconds, ignition mixture, and grenade starter mixture and filler, are ignited by the preceding component. The pressure sensitive tape is blown off the emission holes from which the colored smoke emits (*Army, 1977b*). Assuming an M18 smoke grenade was discovered in an unfired condition and caused to function, the type of injuries that could be sustained would be burns from the burning smoke composition. Due to the heat generated, it is unlikely that a person who found a grenade and caused it to function would hold onto it after ignition. Given that these items have been exposed to the elements for many years, moisture can penetrate and degrade the pressure sensitive tape, the smoke composition, and the condition of the sheet metal case of the grenade.

Summary: It is possible that a person could cause the smoke grenade to function if one were found at the site and be burned, but it 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.

3.32A.6 Site Evaluation

The available data (e.g., archival and reconnaissance data) regarding Site OE-32A 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 checklist are provided as Attachment 32A-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.

3.32A.6.1 Literature Review

Type of Training and OE Expected

As discussed previously, Site OE-32A was identified as the "Oil Well Road Training Area" on training maps from the mid 1950s. A Tank Gunnery Range was also delineated in this vicinity on 1956, 1957, and 1958 training maps. The range fan for the Tank Gunnery Range portrayed on the 1956 training map indicates that the firing point would have been located within Site OE-32A with firing directed away from the site toward the northwest. The UXB After Action Report states that this area was used as impact area for 7- and 8-inch naval gun projectiles. Based on evidence indicating use of the site for a Tank Gunnery range, it is possible that projectiles and rockets might have been used for firing. The Data Summary and Work Plan Site 39 – Inland Ranges indicates that the impact area for the 7- and 8-inch projectiles was approximately 7,000 feet to the west of Site OE-32A (*HLA, 1994*). Site OE-32A is included within larger training and maneuver areas on training maps dating from the 1960s. OE scrap items found to date at the

site (expended illumination signals, expended smoke grenades), and the presence of live blank small arms ammunition, support use of the site as a maneuver area.

As part of the archives search an interview was conducted with Mr. Fred Stephani. Mr. Stephani served as a Fort Ord fire fighter from 1942 until 1944 at which time he left the Fort Ord fire department and joined the Army. Mr. Stephani returned to the Fort Ord fire department in 1947 where he worked until he retired as Fire Chief in 1978. Mr. Stephani stated that shoulder launched projectiles were fired in a canyon in the area. The firing direction was reported to have been "from north to south." The location identified for this training roughly corresponds to the location of Site OE-27U (Training Site 21), approximately 1000 feet to the northeast of Site OE-32A. The Revised Archives Search Report also discusses the area to the south of Site OE-27U. This area is identified as "Area S" in interviews conducted during the archives search. The area was reported to have included "many target areas for shoulder fired projectiles, armor piercing projectiles, and possibly mortar. The firing points were located along the Oil Well Road Extension and along the south edge of the area." The activity was reported to have taken place in the early 1950s. Area S is located partially within the current boundary of Site OE-32C and does not include any portion of the boundary of Site OE-32A. However, according to the description provided in Revised Archives Search Report, the firing points associated with Area S may have been located within Site OE-32A.

Subsequent Use of the Area

A portion of the land that includes Site OE-32A was transferred to the BLM in 1996 and will remain undeveloped. The land is open to the public for recreational use such as hiking, biking, and horseback riding. The majority of the site will be used as a parking area for the Laguna Seca Raceway.

Establishment of Site Boundaries

Site OE-32A was identified from the review of Fort Ord training facility maps conducted by the USACE as part of the archives search. Additional information about training in areas adjacent to Site OE-32A was acquired through interviews. Following initial sampling of the site USACE personnel, including the Unexploded Ordnance (UXO) Safety Specialist, developed the final site boundary. No additional information was found as a result of the literature review to warrant changes to the current boundary of Site OE-32A. Site OE-32A is located in the general vicinity of what would have been the approximate location of the firing point(s) for the range. The boundary of Site OE-32A does not include portions of the Tank Gunnery Range that would have included the range targets.

Summary of Literature Review Analysis

Based on a review of site literature there was sufficient historical evidence to warrant sampling of this site. The historical information indicates that a portion of Site OE-32A is within the location of the former Tank Gunnery Range shown on 1956, 1957, and 1958 training maps. Based on the range fan location presented on the training maps it appears that Site OE-32A would have included at least a portion of the firing line, but not the target locations associated with the Tank Gunnery Range. Training maps indicate that the direction of fire would have been toward the west. One possible explanation for the use of the Tank Gunnery Range was that it may have been used for firing tank mounted .30 caliber and/or .50 caliber machine guns.

3.32A.6.2 Sampling Review

This section describes the items that were found during sampling and how these items support historical information concerning past use of the site. Site boundaries are associated in terms of the items found. There is also a discussion regarding sampling equipment, methods, and quality control measures used during prior OE sampling.

Sampling Results (Items Found)

UXB conducted sampling conducted at Site OE-32A in 1994. Three OE scrap items (two expended illumination signals and one expended hand smoke grenade) and live blank small arms ammunition were found and removed (*UXB, 1995b*). The three OE scrap items (two ground illumination signals and hand smoke grenade) were found in Grids 05C, 08H, and 11F, respectively (Plate 32A-2). The hand grenade was a colored smoke Model M18 Series used for ground-to-air or ground-to-ground signaling (*Army, 1977b*). The illumination signals were rifle grenade launched Model M19 Series parachute, used for signaling during night operations (*Army, 1977a*). Additionally, live blank ammunition (.30 cal, 5.56mm, and 7.62mm) were found on the ground surface in Grids 08B, 08E, 13G, and 15B. All sample grids were placed within the site boundaries. No evidence of practice or high explosive projectiles was found within the boundary of Site OE-32A. No evidence was found during sampling to suggest that Site OE-32A was used for firing tank or antitank weapons. The items found during sampling (scrap pyrotechnics) are consistent with use as a training and maneuver area. A summary of the sample results for Site OE-32A is provided in Table 32A-2.

Site Boundaries Review

The site boundary was provided by the U.S. Army Corps of Engineers, Huntsville Division and documented in the ASR (*USAEDH, 1997*). A review of the sampling results indicates that the OE scrap and blank small arms rounds found were scattered throughout the site. The sampling results provide evidence that Site OE-32A was part of a larger troop training and maneuver area. No evidence of tank firing was found at Site OE-32A. All grids were completed within the Site OE-32A boundaries. Based on the results of sampling no modification of the Site OE-32A boundary is necessary.

Equipment Review

UXB used the Schonstedt Models GA-52/C or the GA-72/Cv magnetometers to conduct the geophysical investigation of Site OE-32A. These magnetometers are hand held and swung from side to side, generating a maximum search lane width of 5 feet. 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, gradient magnetometers like the Schonstedt GA-52/C and the GA-72/Cv are especially sensitive to smaller, near-surface ferro-metal objects *(Breiner, 1973)*.

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

- Signatures of inert OE items suspended in air at varying orientations and distances from the geophysical sensor (static tests).

- The ability of various geophysical instruments to detect and discriminate between different OE items buried at various depths (seeded tests).

- Geophysical instrument performance at actual OE sites (field trial site testing).

The Schonstedt tools were not evaluated during the static test; therefore, only the seeded test results and field trial tests are discussed herein. It is recognized that the ODDS study areas may not represent the same field conditions as Site OE-32A; therefore, differences in field conditions, if applicable, should be considered when using information from the ODDS.

During the seeded test the Schonstedt Model GA-52/C located between 34 and 53 percent of the Type III and V items (75mm and 90mm projectiles) which may have been used at the site, and buried at depths approaching the item's maximum calculated depth of penetration (up to 4 feet for the 75mm projectile). At the same depths the Schonstedt Model GA-72/Cv located between 38 and 59 percent of the Type III and V items. For non-penetrating Type I items (signal flares) found at the site, between 56 and 67 percent were detected by the same instruments buried at depths ranging from just below the surface to 1 foot. The detection rate percentages presented in the ODDS vary according to the search radius used for the analysis (either 1.6 or 3.3 feet) and assume a 5-foot wide search lane (the search lane width used by UXB at Site OE-32A). A standard search radius for investigating anomalies was not specified in the OE contractor work plan or the after action report; therefore detection ranges for the different search radii are presented above. Results for the 3-foot wide search lane also evaluated as part of the OODS, were not included in the detection percentages presented above, because 3-foot search lanes were not used during the geophysical investigation of Site OE-32A. The detection rates discussed above are considered conservative because in addition to the calculated penetration depth of the item, 1 foot was added to the depth to allow for the deposition of soil with time. Because the field conditions at the seeded test site and orientations of buried items may not be comparable to the Site OE-32A conditions, the results should be used to indicate that in general, the equipment is capable of detecting the same types of items at depths exceeding the items maximum calculated depth of penetration.

Results of the ODDS field test trials were also reviewed for potential use in evaluating instrument performance at Site OE-32A. Detection rates for the Schonstedt GA-52/C and GA-72/Cv were calculated for 4 of the 6 test sites; the remaining sites did not have enough OE detected to allow calculation of site statistics. The calculated detection rates for the combined sites ranged from 52 to 98 percent depending on the search radius used for the calculation. A standard search radius for investigating anomalies was not specified in the OE contractor work plan or the after action report; therefore detection ranges for the different search radii (1.6 and 3.3 feet) are 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 densities of OE scrap. Therefore, the field trial results may not be applicable to Track 1 sites.

Results of the ODDS field test trials for the field test site closest in OE item density (FTS-3) to Site OE-32A were also reviewed. Five OE items were located during the investigation. No additional OE 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. Similar results could be expected at other sites, such as Site OE-32A, after survey and clearance using the Schonstedt GA-52/C and GA-72/Cv magnetometers.

Although not directly comparable to Site OE-32A, the results of the ODDS indicate that all models of the Schonstedts used at this site are capable of detecting the ferrous surface and subsurface OE expected at this site. Small arms ammunition is non-ferrous and cannot be detected with a magnetometer.

Sampling Methods Discussion

Approximately 4 acres were sampled at Site OE-32A including 17 100- by 100-foot grids. To provide maximum dispersion of the sample grids, the grids were spaced no closer than 200 feet from one another. Site perimeters and grid separation could be modified by the U.S. Army Corps of Engineers Huntsville Division (CEHND) Safety Specialist if needed. Once the sample grid locations were established each grid was divided into 5-foot wide search lanes. Each lane was investigated visually while simultaneously searching for subsurface anomalies. The sampling method used was 100 percent grid sampling, all magnetic anomalies detected were marked (flagged) and excavated using hand tools up to a depth of 3 feet (*UXB, 1995a*). As noted above, the only OE items identified were expended illumination signals, an expended smoke grenade and blank small arms ammunition (all non-penetrating).

Quality Assurance/Quality Control

The Quality Assurance/Quality Control (QA/QC) procedures are described below.

Field Sampling

UXB conducted sampling at Site OE-32A from September 14, 1994 through September 21, 1994. QA/QC was performed by UXB throughout field sampling effort and is documented in the Site OE-32A Final Primary Report and the Final After Action Report (*UXB, 1995a and 1995b*). According to the reports, to insure that OE sampling was done properly, QC checks were performed by UXB QC specialists on each sample grid. QC checks were performed on 10 percent of each grid after all OE operations were complete. Sample grids were required to cover at least 10 percent of the total area of the site to be sampled. Following the completion of QC checks, the U.S. Army Corps of Engineers Huntsville Division (CEHND) Safety Specialist conducted a QA check. The QA check included a 10 percent check of the site (sampled grids), using the Mark 26 Forester Magnetometer, prior to acceptance of the sample data.

Magnetometers were inspected and tested daily to ensure that the magnetometers were operating within specification. A seeded test area was established by burying an inert (OE scrap) item (81mm mortar) at a depth of 4 feet. This area was used by teams to check their magnetometer and by the QC officer to randomly QC teams on their procedures (*UXB, 1995a*).

Data Management

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. 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 USACE SOP provided as Appendix B in this report. The purpose of the QC/QA 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. During the QC/QA review, one discrepancy between the field grid records and the after action report was identified. On this basis, the model number of one of the two expended illumination

signals found at Site OE-32A, was changed from a Model M125A1 (*UXB, 1995b*) to a Model M19 Series.

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

- The sample data collected by UXB are useful in providing information concerning the type of items present and in identifying areas where OE is not likely at Site OE-32A
- Following sampling, UXB performed QC checks on at least 10 percent of each of the sample grids. Following completion of the QC, the CEHND Safety Specialist conducted a 10 percent QA inspection
- Depth information was not reported by UXB
- The location of any items found was reported within an accuracy of 5 feet, however, QC of the data indicates that the orientation of the grid in relationship to north and south was not documented resulting in a location accuracy that is to the grid only
- One discrepancy between the after action report and the grid records was identified.

3.32A.7 Conclusions and Recommendations

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

3.32A.7.1 Conclusions

Site Use

On the basis of training maps Site OE-32A may have been used as a tank gunnery range in the 1950s. Based on the training maps, tank target locations would have been located to the northwest and outside of the site boundary. No indication of tank firing or impact down range was found within Site OE-32A during sampling (e.g., shell casings and OE fragments). It is possible that the Tank Gunnery Range was used for firing tank mounted .30 caliber and/or .50 caliber machine guns. Based on interviews conducted as part of the archives search, shoulder-launched projectiles were used in this area in the 1950s and 1960s; however, no evidence of the use of shoulder-launched projectiles was found within Site OE-32A during sampling. Based on the sampling results and on the review of Fort Ord training maps, Site OE-32A was used as a troop training and maneuver area from the 1950s through the 1980s.

Sampling Adequacy and Data Quality

- The Schonstedt Models GA-52/C and GA-72/Cv were used for the geophysical investigation of Site OE-32A. These instruments were evaluated as part of the ODDS and are capable (with the exception of non-ferrous small arms ammunition) of detecting the type of OE items expected at this site. A numerical value for detection of items cannot be calculated for an individual site.
- Sampling and evaluation of previous work followed published work plans and SOPs.
- The data collected by UXB are useful in providing information concerning the type of items present at Site OE-32A. The presence of the expended illumination signal, expended smoke grenades and

live small arms blank ammunition is consistent with the types of items authorized for use in training and maneuver areas. The specific location of where these items were found was not provided so the accuracy of the location of the items found is limited to the sample grid only. Additionally, the depth at which the items were found was not recorded. However, all anomalies were excavated up to a depth of 3 feet.

- Based on historical use of 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.

  Signal Illumination, Ground, Green Star, Parachute: M19 Series. It is unlikely that a person could cause a signal to function through casual contact if one were found at the site and be burned, because it: (1) would require precise assembly to function, and (2) would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

  Grenade, Hand, Smoke, M18. It is possible that a person could cause the smoke grenade to function if one were found at the site and be burned, but it 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.

- Although the previous OE sampling efforts performed at Site OE-32A are not consistent with requirements in place today, the quantity and quality of the available information is sufficient to make an informed decision regarding the site. The entire site was not sampled, however, the sampling methods were sufficient to confirm the types of OE items used. Additionally, because there was no OE found in previous investigations and the OE items potentially remaining at Site OE-32A pose an acceptable risk if encountered, 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.

3.32A.7.2 Recommendations

Based on the review of existing data:

- It is not anticipated that OE will be found at Site OE-32A and no further OE-related investigation is recommended. However, because OE were used throughout the history of Fort Ord and because OE scrap was found during sampling, the potential for OE to remain at Site OE-32A cannot be ruled out.

- 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.

Upon approval of the proposed remedy (no further OE-related investigation), Site OE-32A 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-32A 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.

3.32A.8 References

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TABLES

Table 32A-1. Sampling Operations, Site OE-32A
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-32A -- Oil Well Road I	OE-32A_(02 B)	Sampling	UXB	SCHONSTEDT GA-72CV or GA-52C	9/20/1994
OE-32A -- Oil Well Road I	OE-32A_(02 E)	Sampling	UXB	SCHONSTEDT GA-72CV or GA-52C	9/20/1994
OE-32A -- Oil Well Road I	OE-32A_(02 H)	Sampling	UXB	SCHONSTEDT GA-72CV or GA-52C	9/20/1994
OE-32A -- Oil Well Road I	OE-32A_(02 L)	Sampling	UXB	SCHONSTEDT GA-72CV or GA-52C	9/20/1994
OE-32A -- Oil Well Road I	OE-32A_(05 C)	Sampling	UXB	SCHONSTEDT GA-72CV or GA-52C	9/21/1994
OE-32A -- Oil Well Road I	OE-32A_(05 F)	Sampling	UXB	SCHONSTEDT GA-72CV or GA-52C	9/21/1994
OE-32A -- Oil Well Road I	OE-32A_(05 J)	Sampling	UXB	SCHONSTEDT GA-72CV or GA-52C	9/21/1994
OE-32A -- Oil Well Road I	OE-32A_(08 B)	Sampling	UXB	SCHONSTEDT GA-72CV or GA-52C	9/20/1994
OE-32A -- Oil Well Road I	OE-32A_(08 E)	Sampling	UXB	SCHONSTEDT GA-72CV or GA-52C	9/21/1994
OE-32A -- Oil Well Road I	OE-32A_(08 H)	Sampling	UXB	SCHONSTEDT GA-72CV or GA-52C	9/21/1994
OE-32A -- Oil Well Road I	OE-32A_(11 C)	Sampling	UXB	SCHONSTEDT GA-72CV or GA-52C	9/20/1994
OE-32A -- Oil Well Road I	OE-32A_(11 F)	Sampling	UXB	SCHONSTEDT GA-72CV or GA-52C	9/20/1994
OE-32A -- Oil Well Road I	OE-32A_(13 G)	Sampling	UXB	SCHONSTEDT GA-72CV or GA-52C	9/20/1994
OE-32A -- Oil Well Road I	OE-32A_(14 E)	Sampling	UXB	SCHONSTEDT GA-72CV or GA-52C	9/21/1994
OE-32A -- Oil Well Road I	OE-32A_(15 B)	Sampling	UXB	SCHONSTEDT GA-72CV or GA-52C	9/21/1994
OE-32A -- Oil Well Road I	OE-32A_(16 D)	Sampling	UXB	SCHONSTEDT GA-72CV or GA-52C	9/20/1994
OE-32A -- Oil Well Road I	OE-32A_(17 G)	Sampling	UXB	SCHONSTEDT GA-72CV or GA-52C	9/20/1994

Site = OE Site Number
Grid ID = Only the portion of the grid ID within parenthesis is posted on Plate 32A-2.
Sampling = 100 percent of the anomalies detected were excavated to a minimum depth of 3 feet. Deeper anomalies were investigated if directed by the USACE.
UXB = UXB International, Inc.

Table 32A-2. OE Scrap Found During Sampling, Site OE-32A
Track 1 Ordnance and Explosive Remedial Investigation/Feasibility Study
Former Fort Ord, California

Site	Grid ID	OE Items	Status	Depth (in)	Quantity
OE-32A -- Oil Well Road I	OE-32A_(05 C)	Signal, illumination, ground, parachute, rifle, M19 series	Inert	Not available	1
OE-32A -- Oil Well Road I	OE-32A_(08 H)	Signal, illumination, ground, parachute, rifle, M19 series	Inert	Not available	1
OE-32A -- Oil Well Road I	OE-32A_(11 F)	Grenade, hand, smoke, M18 series	Inert	Not available	1

Site = OE Site Number
Grid = Grid in which item was found. Only the portion of the grid ID within parenthesis is posted on Plate 32A-2.
Status = Condition of item, either live or inert. Inert indicates no OE hazard (i.e., OE Scrap).
Depth = inches below ground surface that item was found.
Quantity = Number of like items found.

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

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 32-A1

ATTACHMENT 32A – A1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: Site OE-32A
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
The general area (Sites OE-32A, OE-32B and OE-32C) is referenced as an impact area in the After Action Report which states "7 and 8 inch naval gun projectiles were also suspected to have impacted in this area" (UXB, 1995a). However, information gathered as part of the Data Summary and Work Plan, Site 39 - Inland Ranges (HLA, 1994) indicates that impact area for the naval gun projectiles was on the "west slope of Lookout Ridge" approximately 7000 feet west of Site OE-32A. Interviews conducted as part of the Archives Search (USAEDH, 1997) indicated that a canyon within Site OE-32 was used in the 1950s and 1960s as a firing area for "shoulder launched projectiles and rifle grenades." The Oilwell Road Training Area first appears on the circa 1954 map. The boundary is a large circular area with a dashed boundary. The Oilwell Road Training Area is shown as a large rectangular area on the '56 map. A Tank Gunnery Range also is shown on this map just west of the training area.

The Oilwell Road Training Area does not appear on the maps from 1957 and 1958. The Tank Gunnery Range however is still present and what would have been the firing line for the ranges is located within the former location of the training area. No specific training site defined in 1964, however does include "RWD 3,4" location. No specific training area defined on any maps after this time (1964). The Oilwell Road area is included in larger training areas. March 1968 the area falls within a large area identified as "Training Maneuver Area." From 1976 to 1988 the Oilwell Road area lies within a large area defined as Training Area N which includes several training sites.

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

Sources reviewed and comments

Interview records and training maps indicate potential use of HE and LE items; however, sampling results presented in the After Action Report indicates no evidence of HE within this site. Live blank small arms ammunition found during sampling. An 81mm illuminating mortar was found within adjacent Site OE-32C during sampling. Contained the firing line for the Tank Gunnery Range. Revised Archives Search Report (ASR), USAEDH 1997; Review of Fort Ord facilities and training maps and UXB, 1995a.

ATTACHMENT 32A – A1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: Site OE-32A
LITERATURE REVIEW

	Yes	No	Inconclusive
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
Two illumination signals and one expended smoke grenade found during sampling (Revised Archives Search Report (ASR), USAEDH 1997; Review of Fort Ord facilities and training maps, After Action Reports - UXB, 1995a, 1995b, USA, 2000).

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
No development or use of the site has occurred

5. ***Does use of area surrounding the site indicate that OE would have been used at the site?***		No	

Sources reviewed and comments
A 1956 map shows a Tank Gunnery Range adjacent to the site. No evidence of OE associated with the firing of tanks or antitank weapons was found during the sampling of Sites OE-32A, -32B, or 32C (UXB, 1995a, 1995b, USA, 2000).

ESTABLISHMENT OF SITE BOUNDARIES

6. ***Is there evidence of training areas on aerial photographs that could be used to establish boundaries?***		No	

Sources reviewed and comments
No aerial coverage of this area until Oilwell Road Training Area was no longer in use.

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

Sources reviewed and comments
Oil Well Road Training Area boundary defined on the Circa 1954 map and the 1956 map.

8. ***Should current boundaries be revised?***		No	

Sources reviewed and comments
It appears that the majority of the Oilwell Road Training Area is covered by one of the three Oilwell Road OE sites (32A, 32B,or 32C).

ATTACHMENT 32A – A1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: Site OE-32A
LITERATURE REVIEW

RESULTS OF LITERATURE EVALUATION

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

Comments

Results of the literature review indicate that this site was used for training that included the use of OE; however, no OE items associated with tank or shoulder-launched projectiles were found during sampling. Most of the former training site is included in the existing site boundary for Site OE-32A, -32B, and -32C. No further OE-related investigation of Site OE-32 is warranted.

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ATTACHMENT 32A – A1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: Site OE-32A
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

Two illumination signals and one expended smoke grenade were found during sampling (After Action Report - UXB, 1995a, Revised Archives Search Report (ASR), USAEDH 1997).

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

Sources reviewed and comments
LE items including two illumination signals, one expended smoke grenade and live blank small arms ammunition found during sampling (After Action Report - UXB, 1995a, Revised Archives Search Report (ASR), USAEDH 1997).

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

Sources reviewed and comments
Two illumination signals and one expended smoke grenade found during sampling (After Action Report - UXB, 1995a, Revised Archives Search Report (ASR), USAEDH 1997).

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

Sources reviewed and comments
If you combine all three Oil Well Road sites (32A, 32B, and 32C) sampling covers the training area as was depicted on the circa 1954 map (After Action Reports - UXB, 1995a, 1995b, USA, 2000).

5. ***Does sampling indicate OE and/or ordnance-related scrap are present at the site?***	Yes		

Sources reviewed and comments
OE scrap, including two illumination signals and one expended smoke grenade were found during sampling (After Action Report - UXB, 1995a, Revised Archives Search Report (ASR), USAEDH 1997).

ATTACHMENT 32A – A1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: Site OE-32A
SAMPLING EVALUATION

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

Sources reviewed and comments
Specific training in this area unknown, however, OE-related items found to date are consistent with other Fort Ord training areas (e.g. flares, smoke grenades, and small arms). After Action Report - UXB, 1995a.

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

Sources reviewed and comments
Consistent with a training and maneuver area from the 1950s through base closure.

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

Sources reviewed and comments
No HE identified (After Action Report - UXB, 1995a).

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

Sources reviewed and comments
No HE found (After Action Report - UXB, 1995a; Revised Archives Search Report (ASR), USAEDH 1997).

10. ***Were LE found?***	Yes		

Sources reviewed and comments
Live small arms ammunition (blank) (After Action Report - UXB, 1995a; Revised Archives Search Report (ASR), USAEDH 1997).

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

Sources reviewed and comments
Only OE scrap including, two illumination signals were found during sampling (After Action Report - UXB, 1995a, Revised Archives Search Report (ASR), USAEDH 1997).

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

Sources reviewed and comments
Only OE scrap, including one expended smoke grenade was found during sampling (After Action Report - UXB, 1995a, Revised Archives Search Report (ASR), USAEDH 1997).

ATTACHMENT 32A – A1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: Site OE-32A
SAMPLING EVALUATION

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

Sources reviewed and comments
After Action Report - UXB, 1995a; Revised Archives Search Report (ASR), USAEDH 1997.

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

Sources reviewed and comments
Live blank small arms ammunition, scrap illumination signals; After Action Report - UXB, 1995a; Revised Archives Search Report (ASR), USAEDH 1997.

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

Sources reviewed and comments
After Action Report - UXB, 1995a; Revised Archives Search Report (ASR), USAEDH 1997.

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

Sources reviewed and comments
After Action Report - UXB, 1995a; Revised Archives Search Report (ASR), USAEDH 1997.

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

Sources reviewed and comments
In combination with Site OE-32B and OE-32C most of the former training site is covered.

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

Sources reviewed and comments
With the exception of the small arms ammunition. Site was sampled to a depth of 3 feet. Items found are surface items and do not penetrate (Type I, ODDS items). After Action Report - UXB, 1995a; USAESCH, 1997; Parsons, 2001.

ATTACHMENT 32A – A1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: Site OE-32A
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
Schonstedt models GA-52/C and GA-72/Cv were used (After Action Report - UXB, 1995a). Schonstedt not capable of detecting non-ferrous small arms ammunition. Except for small arms ammunition, non-ferrous items were not expected based on the literature review.

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
Site was sampled to a depth of 3 feet. Items found do not penetrate (Type I, ODDS items). To be conservative a foot was added to the 0 penetration depth to account for burial potential as part of the ODDS seeded test study. Although not directly comparable to Site OE-32A, the results of the ODDS indicate that all models of the Schonstedts used at this site are capable of detecting the ferrous surface OE (Type I items) expected at this site. (After Action Report - UXB, 1995a; USAESCH, 1997; Parsons, 2001).

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
If you take out the burial factor (e.g., foot added to the penetration depth in seeded test) the results are better. The results of the field trials indicate that detection rates for the field trials were better than the seeded test.

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
Reports indicate instruments were used according to the workplan (After Action Report - UXB, 1995a).

ATTACHMENT 32A – A1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: Site OE-32A
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?***	Yes		

Sources reviewed and comments
"Sample grids were required to cover at least 10% of the total area of the site to be sampled" (After Action Report - UXB, 1995a). No UXO was detected; therefore, UXO density cannot be calculated.

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
170,000 square feet (approximately 4 acres) sampled based on 17 100x100-foot grids (parking area) and 170,000 square feet (approximately 4 acres) sampled based on 34 100x50-foot grids (road area). After Action Report - UXB, 1995a. No UXO was detected; therefore a UXO density cannot be calculated.

Total Area: 340,000 sq ft
UXO Density: Not calculated

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

Sources reviewed and comments
"Every magnetic anomaly was marked and excavated." After Action Report - UXB, 1995a

Total % of anomalies investigated:	100%

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 was collected.

ATTACHMENT 32A – A1
EVALUATION OF PREVIOUS WORK
EVALUATION CHECKLIST: Site OE-32A
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
Quality Control "(QC) checks were performed on each grid after all UXO operations were complete. UXB QC specialists checked a minimum of 10 percent of each grid to insure that OE removal was done properly. After this QC check the CEHND Safety Specialist performed a QA check of the site prior to accepting it." After Action Report - UXB, 1995a

Result of Sampling Evaluation

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

Comments
The results of the sampling evaluation indicate that the data are usable. Only non-penetrating OE scrap was identified during sampling. No evidence that the site was used for shoulder launched projectile training or a tank gunnery range was identified. The OE scrap items indicate that the site was used as a maneuver and training area. Because no UXO was detected during 10% sampling, no further evaluation of Site OE-32A is recommended.

References
UXB, 1995a. Final Report for Ordnance and Explosives Removal Action Fort Ord, California Oil Well Road I (OWR1) November 1.
UXB, 1995b. Final Report for Ordnance and Explosives Removal Action Fort Ord, California Oil Well Road II (OWR2) November 1.
USA, 2000. After Action Report Limited Removal, Inland Range Contract, Former Fort Ord, California Site OE-32C (OW3). January 31.
USAEDH, 1997. Revised Archives Search Report, Former Fort Ord, California, Monterey County, California. Prepared by US Army Corps of Engineers St. Louis District.
Parsons, 2001. Draft Final Ordnance Detection And Discrimination Study, Volume I Text, Former Fort Ord, California, Presidio of Monterey, California. Prepared for US Army Corps of Engineers Sacramento District. December.
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 32-A2

ATTACHMENT OE-32A – A2

EXPENDED ORDNANCE FOUND AT SITE OE-32A

Pyrotechnic Ground Signals (Green Star Cluster)

M19A2 and M19A2B2 Green Star Cluster Ground Illumination Signals – The M19A2 and M19A2B2 Green Star Cluster Pyrotechnic Signals are designed for nighttime signaling. The signal consists of a single green star illuminant candle with parachute and expelling charge in a cylindrical aluminum case. An aluminum fuse housing is crimped to the base of the cylinder. The fuse housing contains a smokeless powder propelling charge with a retaining disk, and a circular time train groove filled with black powder. A felt setback wad containing a quickmatch separates the fuse housing and the illuminant candle. The quickmatch connects the black powder expelling charge with a first fire charge at the base of the illuminant candle. A stabilizer tube with a circular tail fin is threaded to the fuse housing. The hollow tube is closed prior to firing with a cork plug and removal tape.

Flash from the M64 grenade cartridge passes through the stabilizer to ignite the propelling charge, and the burning propellant ignites the black powder 5.5 seconds delay train. Near the top of the trajectory, the time train ignites the expelling charge and the quickmatch is ignited. The expelling charge blows the illuminant candle and parachute assembly out through the top of the container. The illuminant is ignited by the quickmatch and the parachute opens to lower the candle slowly. The signal produces a minimum of 5000 candlepower for 20 to 30 seconds (*Army, 1977a*).

M18 Colored Smoke Hand Grenade – The M18 colored smoke hand grenade is used for ground-to-air or ground-to-ground signaling. The grenades may be filled with any one of four smoke colors: red, green, yellow or violet. Each grenade will emit smoke for 50 to 90 seconds. The grenade body is of thin sheet metal and is filled with red, green, yellow, or violet smoke composition. The filler is topped with a starter mixture.

The hand grenade fuze M201A1 is a pyrotechnic delay-igniting fuze. The body contains a primer, first-fire mixture, pyrotechnic delay column, and ignition mixture. Assembled to the body are a striker, striker spring, safety lever, and safety pin with pull ring. The split end of the safety pin has an angular spread. Safety clips are not required with these grenades.

Removal of the safety pin permits release of the safety lever. When the safety lever is released, it is forced away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its own axis and strikes the percussion primer. The primer initiates the first fire mixture. The fuse delay element, ignition mixture, and grenade starter mixture and filler are initiated in turn by the preceding component. The pressure sensitive tape is blown off the emission holes and the colored smoke emits from these holes (*Army, 1977b*).