

GROUP 1

MRS-2

Pete's Pond and Extension

## CONTENTS

2.0	GROUP 1 - MRS-2 – PETE'S POND AND EXTENSION.....	2-1
2.1	Site Description.....	2-1
2.2	Site History and Development.....	2-1
2.3	Potential Military Munitions Based on Historical Use of the Area .....	2-5
2.4	History of MEC, Basewide RI and Basewide Remedial Action Programs .....	2-6
	2.4.1 MEC Investigations .....	2-6
	2.4.2 Basewide RI/FS and Remedial Action .....	2-7
2.5	Conceptual Site Model.....	2-8
	2.5.1 Site Features.....	2-9
	2.5.2 Training Practices .....	2-9
	2.5.3 Potential Sources and Location of MEC.....	2-10
	2.5.4 Potential Exposure Routes .....	2-10
2.6	Site Evaluation.....	2-12
	2.6.1 Literature Review .....	2-12
	2.6.2 Sampling Review .....	2-13
2.7	Conclusions and Recommendations .....	2-17
	2.7.1 Conclusions.....	2-17
	2.7.2 Recommendations.....	2-18
2.8	References.....	2-19

## TABLES

- G1-1 Sampling Operations, MRS-2
- G1-2 Munitions Debris Found During Sampling, MRS-2
- G1-3 Incidental Munitions-Related Items Found, MRS-2 and Vicinity

## PLATES

- G1-1 Location Map, Group 1 Sites
- G1-2 MRS-2; 1956 Aerial Photograph
- G1-3 MRS-2; 1966 Aerial Photograph
- G1-4 MRS-2; 2003 Aerial Photograph
- G1-5 MRS-2; 2003 Aerial Photograph, Basewide RI/FS Geophysical Transects and Exploratory Trenches
- G1-6 Conceptual Site Model, Site MRS-2

## ATTACHMENT

- G1-1 Evaluation of Previous Work Checklists
- G1-2 Military Munitions Potentially Present or Found at the Site
- G1-3 CAIS Diagrams

## 2.0 GROUP 1 - MRS-2 – PETE'S POND AND EXTENSION

Munitions Response Site (MRS) -2 was previously included in the Final Track 1 Ordnance and Explosives Remedial Investigation/Feasibility Study (OE RI/FS) as a site that did not meet the Track 1 criteria at the time the report was finalized, but was retained in the Track 1 process (MACTEC, 2004). This plug-in approval memorandum contains additional information to support the inclusion of MRS-2 into the Track 1 plug-in process.

This summary report consists of two parts. The first part, contained in Sections 2.1 through 2.5, includes a presentation and assessment of archival data. Specific elements include a review of site history and development, evaluation of potential military munitions at the site, a summary of previous munitions and explosives of concern (MEC) 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 2.6). 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 2.6.1) and evaluation of sampling process(es) (Section 2.6.2). These discussions are based on information from standardized literature review and sampling review checklists (Attachment G1-1). Section 2.7 provides conclusions and recommendations for the site. References are provided in Section 2.8.

### 2.1 Site Description

Munitions response site (MRS)-2 consists of approximately 31 acres located in the eastern portion of the Main Garrison (Plate G1-1). It was identified as a MRS on the basis of interviews conducted as part of a Fort Ord archive search (U.S. Army Engineering Division, Huntsville [*USAEDH, 1993*]). The site includes an area designated as Pete's Pond, which is a topographic depression that seasonally fills up with runoff from storm drain discharge (Plate G1-2). This area was suspected to have been a landfill. Just west of MRS-2 is a documented disposal area that reportedly contained medical debris Remedial Investigation (RI) Site 17. Subsequent investigations and remedial actions in these areas confirmed that they were used for disposal of incinerated and non-incinerated debris including glass bottles, metal fragments, wood, asphalt, concrete, medical waste, munitions debris (MD), engine parts, and other miscellaneous refuse (*HLA, 1995*). The refuse associated with the landfill portion of MRS-2 has been completely excavated and Parcels L5.8.2 and L20.17.1, which overlay this area have been addressed in the Track 0 Record of Decision (ROD; *Army, 2002*). The remaining area of MRS-2 is addressed in this approval memorandum as a Track 1 Plug-in candidate.

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

### 1940s Era

MRS-2 lies within a tract of land purchased by the U.S. Army in 1940 from private landowners (*Arthur D. Little Inc. [ADL], 1994*). Interview records indicate the site may have been used as a chemical training area and landmine warfare training area, and also as a horse corral. Review of historical documents indicates there were no active training facilities in the MRS-2 area during the 1940s. The following provides additional detail concerning use of the site in the 1940s:

- An interview was conducted with Mr. Maurice MacBride, a military dependent at Fort Ord from 1933 to 1947. During the interview, Mr. MacBride indicated the Pete's Pond area was used as a chemical training area. Mr. MacBride remembered watching soldiers training with protective masks in an area between the stockade and Imjin Road. The area Mr. MacBride described appears to be located approximately between the intersection of Fifth and Eighth Streets and the intersection of Imjin and Eighth Streets (Plate G1-4). He thought that live agents were probably not being used because the horses were not masked. He also indicated that one area within the site was later used as a landmine warfare training area (*USAEDH, 1993*). The exact area was not indicated.
- Another interview was conducted with Mr. Lee Stickler, who served as a field artillery member from 1940 to 1941 and a range control officer from 1971 through 1989. Mr. Stickler stated that in 1940 and 1941, the area was a horse corral (*USAEDH, 1997*).
- None of the available 1940s Fort Ord training maps identify this area as either a chemical training area or a land mine training area. MRS-2 lies within a larger area identified on a 1945 training facilities map as "Well Area, No Artillery Firing or Demolitions." The Well Area refers to the general area containing the Fort Ord water supply wells, and incorporates the majority of the Main Garrison (*U.S. Army [Army], 1945*).
- A July 25, 1941, aerial photograph shows that the site and vicinity are relatively lacking in vegetation (suggesting there may have been some vegetation clearance work performed by the Army). There is no evidence of a horse corral on this aerial photograph.
- The 1946 Main Garrison Cantonment Land Use Map indicates an area southwest of MRS-2 as a "Horse Drawn Field Artillery Stables." A section of MRS-2 overlies an area designated as "PW Recreational Area" (*Army, 1946*). It is assumed "PW" refers to "prisoners of war", as the recreational area was in an area designated as "P.O.W". There is a stockade area shown west of the site that is off the map view of Plate G1-2.
- Aerial photographs from 1949 and 1956 show disturbed/cleared areas north of Pete's Pond and in the central portion of the site. There is no evidence of a horse corral on these aerial photographs (Plate G1-2).

### 1950s Era

Review of 1950s era documentation including training maps and aerial photographs, indicates several training areas were located adjacent to MRS-2 (Plate G1-2). These areas were used for physical training and education in handling of weapons. Aerial photographs and subsequent investigation of the site as part of the Fort Ord Basewide Remedial Investigation/Feasibility Study (RI/FS) indicate that the southwest portion of the site (Pete's Pond and Pete's Pond Extension) appears to have been used as a disposal area in the early 1950s. The following provides additional detail concerning use of the site in the 1950s:

- A 1954 training area map shows two “Rifle Instruction Circles” — “(RIC) 1” and “RIC 3,” and a “Confidence Course” south of the site (*Army, 1954*).
- A “Survey Training Area” is shown north of Pete’s Pond on a 1956 training map (*Army, 1956*).
- Training and facilities maps from 1956, 1957, and 1958, show rifle instruction circles “RIC 1” and “RIC 3” south and southwest of the site. A “Pole Orchard” is shown south of the site and LN-1 training area is shown southeast of the site on a 1957 map (*Army, 1956, 1957 and 1958*). It is assumed that “LN” refers to a “land navigation” training area.
- 1951 aerial photographs show grading/earthmoving activities at the Pete’s Pond area and Pete’s Pond extension in the southwest corner of the site (Plate G1-2). The photograph also shows an elongated north-south oriented trench immediately east of the site. There is also a stained area at the southern tip of the site, and cleared/disturbed areas in the central portion of the site and just north of Pete’s Pond. The area is transected by dirt roads.
- On the 1956 aerial photograph, the site appears similar to conditions shown on the 1951 aerial photograph. Additional buildings and a circular cleared area (possible rifle instruction circle) appear south of the site.
- Trenching activities performed in 1993 as part of the site characterization activities at RI Sites 16 and 17 indicated that debris including munitions debris (MD; “bazooka rounds” [inert 2.36-inch practice rockets], “parts to rifle and smoke grenades”, a “smoke grenade”, and “bullet shell casings” [expended small arms ammunition cartridges]), as well as incinerated debris and other refuse were disposed in the southwestern portion of the site (Pete’s Pond and Pete’s Pond Extension). These are non-technical terms used by the field geologist to describe the MD found while trenching as part of the site characterization activities associated with the Basewide RI program. At the time that these items were found there were no established protocols for documenting the make and model of the munitions-related items encountered. The descriptions provided in the text are the only information available concerning these items. Although the disposition of the “bazooka rounds” was not documented at the time of the discovery, because other 2.36-inch rockets found buried in the vicinity were determined to be inert practice rockets (Section 2.4.2), it is assumed that these rockets were inert practice items also. Throughout the remainder of the Group 1 discussion references to the “bazooka rounds” and “bullet shell casings” found in 1993 will be described as inert 2.36-inch practice rockets and expended small arms ammunition cartridges, respectively. A 55-gallon drum resembling the type used to store mustard agent was also found. Vapor tests of the drum were negative for chemical mustard or mustard degradation compounds. The drum is reportedly similar to drums used to feed heating oil systems. Dated debris (e.g., bottles and newspapers) encountered during trenching had dates ranging from 1935 through 1955 (*HLA, 1995*). Based on dated material found in the trenches and evidence of grading/earthmoving activities in the 1951 aerial photograph, it is believed that the area was used as a landfill in the early 1950s. The area was excavated as part of a remedial action at RI Site 16 to remove the landfill debris. During the 1997 Basewide soil removal program, fifty inert 2.36-inch practice rockets were found in discrete piles to a depth of 4 feet below ground surface (bgs), indicating they had been placed there for disposal (*IT Corporation [IT], 1999b*).

### *1960s and 1970s Era*

Review of 1960s and 1970s era documentation, including training maps and aerial photographs, shows several training areas adjacent to the site. These areas were used for physical training and education in the handling of weapons. The following provides additional detail concerning use of the site in the 1960s and 1970s:

- A 1961 map shows “LN 1” southeast of the site (*U.S. Army Corps of Engineers [USACE], 1961*).
- 1964 and 1965 maps show a “HHCA 2” and PCPTA west of the site. HHCA is an abbreviation for “Hand to Hand Combat Area.” It is not known what the abbreviation “PCPTA” represents. A pole orchard and obstacle course are south of the site (*Army, 1965*).
- A 1966 aerial photograph shows three distinct cleared areas within the site boundary near the center of the site (Plate G1-3). Two of the areas were rectangular and one area was circular.
- The 1967 and 1972 maps show HHCA 2, PCPTA, and pole orchard west and south of the site. Additionally, the 1967 and 1972 maps show a “DSS ITT course” east of the site and a “REC Shops” west of the site (*Army, 1967 and 1972*). “DSS ITT” is an abbreviation for Division Support Services Individual Tactical Training, and “REC” refers to recreation.

### *1980s to Present*

Review of 1980 through present documentation, including training maps and aerial photographs, indicates the site and vicinity were no longer used for training. The following provides additional detail concerning use of the site since the 1980s:

- The 1980 and 1984 training maps show no training areas in the MRS-2 vicinity (*USACE, 1980, 1984*).
- The 2003 aerial photograph (Plate G1-4) shows a cleared or disturbed area (lacking vegetation) in the central portion of the site and another area with scarce vegetation just north of Pete’s Pond.
- Following completion of the MEC sampling, construction activities related to Imjin Parkway were performed and no MEC or MD were found during construction.
- The southern portion of the site that includes Pete’s Pond (landfill) was excavated as part of the Fort Ord Basewide Cleanup. This portion of MRS-2 has been designated as Track 0 (*Army, 2002*).
- An interview conducted in 1993 with a staff sergeant as part of the archives search is quoted as follows “SSG Davis also knew of chemical agent training kits (containing a 10% solution HD) which had been buried along Imjin Road” (*USAEDH, 1993*). It should be noted that with regards to the “mustard” components of chemical agent identification sets (CAISs) available during WWII, including the K941, K951/K952, K955, contents are described as ampoules containing: (1) 3 ½ ounces of mustard, and (2) 2 ml. H in 38 milliliters (ml.) chloroform [5 percent in chloroform], and 25 ml. of mustard on 90 cubic centimeters (cc) of charcoal, respectively. None of the CAIS ampoules are described as containing 10 percent solutions of mustard. As a follow-up to the statement made by Staff Sergeant Davis, the Department of the Army contacted SSG Davis, who stated that the burial of CAISs was not known to him personally and that he could not specifically identify a location where CAISs might be buried. It is not known at what period of time that these items were buried. No CAISs have been identified during subsurface investigation activities in this area (*HLA, 1995 and IT, 1999a*).

### *Proposed Future Land Use*

MRS-2 lies on property that is designated for development and will be used for public parking, a road right-of-way, and public transit support (*USACE, 1997a*).

## 2.3 Potential Military Munitions Based on Historical Use of the Area

The following presents a summary of documented use of the site and types of military munitions that may have been used at MRS-2.

Historical training maps indicate the site area was used as a survey training area. Military munitions would not have been used during survey training.

Results of an aerial photograph review and remedial investigations and remedial actions indicate the southwestern portion of the area was used as a landfill. Subsurface investigations and remedial actions at the site determined that the following munitions-related items were disposed at the landfill at MRS-2:

- Inert 2.36-inch practice rockets (1993);
- Parts to a rifle grenade (1993) – it is not known if these were parts to a practice, smoke, or high explosive grenade;
- M18 Smoke grenade (1993) – it is not known if the grenade was expended;
- Expended small arms ammunition cartridges (1993); and
- Fifty inert 2.36-inch practice rockets (1997).

Grid sampling by an MEC removal contractor found two pieces of munitions debris (MD); an inert practice grenade and a practice bomb. The exact location and depth that these items were found was not provided in the Human Factors Applications, Inc. (HFA) report (*HFA, 1994*). Practice military munitions are manufactured for training and generally do not contain a full payload. However, some practice military munitions may contain energetic components, such as spotting charges, bursters, and propulsion charges.

Based on documented training practices, these munitions-related items were likely to have been transported to the site for disposal and were not used for training at MRS-2. No CAIS or land mines were found at the site during the subsurface investigations and removal programs. Attachment G1-2 provides a description of the types of munitions-related items that were found during previous sampling programs.

Documented training activities in the site vicinity indicate that adjacent areas were used as a disposal area, pole orchard, rifle instruction circles (RICs), hand-to-hand combat training, land navigation course, confidence course, DSS ITT course, and REC shops. Pole orchards were used to practice climbing poles and installing communication lines. The RICs were used in the practice of aiming/sighting rifles. No evidence has been found that would support the use of live ammunition at the RICs (*HLA, 2000a*). Based on these training practices, no military munitions are expected to have been used in these adjacent areas.

Interview records indicate the site may have been used for chemical training, landmine warfare training, and as a horse corral. There are no training maps or records that indicate that the site was used for chemical or landmine warfare training. The presence of a horse corral at MRS-2 is consistent with the presence of horse-drawn field artillery stables south of the site (as shown on a 1946 map). Based on recollections of the persons interviewed, it is unlikely that live chemical agents were used because horses at the site were not masked and because of the proximity of the site to the P.O.W. recreation area. In addition, during subsurface investigation and military munition sampling programs, no CAISs or landmines were found.

Information from document reviews and literature searches indicated no munitions-related chemical warfare materiel (CWM) was stored or used at Fort Ord. Chemical agents were used at Fort Ord in the form of CAISs, which were used to train soldiers to recognize and protect themselves from chemical agents (*Army, 1999*). These CAISs contain dilute solutions of chemical agents in small (1-ounce), hermetically sealed ampoules (glass containers). Landmine warfare training in the 1940s likely used practice training mines. A description of CAIS and training mines that may have been used during the 1940s is presented in Attachment G1-2, and diagrams of CAISs are provided in Attachment G1-3.

## 2.4 History of MEC, Basewide RI and Basewide Remedial Action Programs

The following summarizes munitions response, and Basewide RI, and Basewide Remedial Action investigations conducted at the site that provided information on past use of the site and the potential presence of MEC.

### 2.4.1 MEC Investigations

The following describes the munitions response investigations that have been conducted at MRS-2.

#### *1993 Archives Search Report (ASR)*

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

Based on an interview with a military dependent located at Fort Ord from 1933 to 1947, MRS-2 was identified as a possible chemical training area and landmine warfare area. The ASR indicated that Staff Sergeant Davis, an Explosive Ordnance Disposal (EOD) team leader stated that chemical agent training kits containing a 10 percent solution of sulfur mustard (HD) had been buried along Imjin Road (Plate G1-4). The ASR recommended further investigation of the area along Imjin Road to ascertain whether any of the buried training kits might be uncovered (*USAEDH, 1993*). The 1993 ASR also noted that several 2.36-inch rockets were found just east of Pete's Pond during trenching activities completed as part of the site characterization activities. Because subsequent discoveries of confirmed inert 2.36-inch practice rockets were made within MRS-2 and in the site vicinity, it is believed that the 2.36-inch rockets described in the ASR were also inert practice rockets.

#### *1994 HFA*

In 1994, HFA conducted an MEC sampling investigation at the site. As part of the investigation, twenty 100- by 100-foot grids were 100 percent sampled (all anomalies detected were excavated). The grids were placed primarily within the southern portion of the site, which included the area along Imjin Road where interview records indicate that CAISs may have been buried (Plate G1-4). Four of the grids were located outside of the site boundary to the southeast of the site. The number of anomalies detected at the site was not specified in the HFA report. The sample grids were surveyed using a Schonstedt Model GA-52/C or GA-72/Cv magnetometer along a maximum 5-foot wide search lane. Two munitions-related items (an inert practice grenade [MD] and a practice bomb [MD-E]) were found and removed during grid



sampling. The exact location and depth of burial of these items was not documented in the HFA report. On the basis of the sampling results, no further action was recommended (*HFA, 1994*). A summary of the sampling operations at MRS-2 is provided in Table G1-1. Munitions-debris found during HFA sampling is listed in Table G1-2.

The scope of work for HFA indicated that detailed accounting of all MEC and MD encountered would be performed. However, grid records providing this information are no longer available. Existing information regarding items found is summarized in the text of the HFA OE Sampling and OE Removal Report (*HFA, 1994*). The report itemized inert munitions debris found. Some cultural debris was also removed and turned in at the end of the project.

### *1997 Phase I EE/CA*

The Phase I Engineering Evaluation/Cost Analysis (EE/CA) confirmed the presence of the horse corral at MRS-2 on a map from 1943-1944. No further action was recommended for MRS-2 (*USACE, 1997b*).

### *1997 Archives Search Report*

The 1997 ASR summarized the results of the 1993 ASR and included the following additional information. HFA sampled 20 grids in 1994 (Plate G1-4). Two munitions debris items, an inert training grenade and a practice bomb, were discovered during sampling. As part of the Fort Ord Basewide Remedial Action, 2.36-inch rockets were found during excavation of the Pete's Pond Extension on the side of the hill near the Directorate of Logistics (DOL) maintenance yard (*IT, 1999a*). These rockets were destroyed by detonation and determined to be inert wax-filled practice rockets. Because the debris in the area was excavated and removed and sampling yielded no evidence to support that the area was used for chemical training or landmine training, the site was recommended for no further investigation in accordance with the Phase I EE/CA (*USAEDH, 1997*).

## 2.4.2 Basewide RI/FS and Remedial Action

### *1991-1994 Basewide RI/FS*

As part of the Basewide RI/FS, geophysical surveys were conducted in the Pete's Pond Area and Pete's Pond Extension which comprise RI Site 16, and in the adjacent Disposal Area (RI Site 17). Ground penetrating radar (GPR), M-scope, and electromagnetic (EM) measurements were taken along transects shown on Plate G1-5. One large 80- by 200-foot anomaly was identified in the eastern corner of Pete's Pond and five smaller anomalies were detected further to the west. The EM response indicated the presence of shallow buried metal. The survey also identified two large anomalies approximately 50- by 250-feet and 50- by 120-feet on the hillside area south of Pete's Pond. High amplitude EM in-phase and M-scope responses indicated large amounts of shallow buried metal.

Four small anomalies were detected in the northwest portion of RI Site 17, located west of MRS-2. EM responses indicated small amounts of buried metal at these locations. A large oval shaped anomaly measuring 250- by 500-feet was identified in the northeast area of RI Site 17. Geophysical responses across the area indicated a mix of fill types, metallic and non-metallic debris, and more conductive pore fluids. Responses indicated foreign or disturbed materials in shallow soils and at deeper depths. This feature was identified as the likely location of the disposal area.

The subsurface anomalies identified during the geophysical study were explored by excavating shallow test pits using a backhoe or similar equipment and by drilling and sampling shallow soil borings and monitoring well pilot holes. A summary of these investigation activities is provided below.

Thirty-four soil borings were drilled at Pete's Pond; no munitions-related items were found during the drilling investigation. Forty exploratory trenches/test pits were excavated at Pete's Pond in August 1993 and April 1994. The test pit locations are shown on Plate G1-5. Material encountered in the test pits included incinerated and non-incinerated debris including glass bottles, metal fragments, wood, asphalt, concrete, medical waste, munitions-related items, engine parts, ammunition boxes, and miscellaneous refuse. Munitions-related items were found in six of the trenches and consisted of a 3.5-inch practice rocket, 2.36-inch practice rockets, parts to a rifle grenade, a smoke grenade, and expended small arms ammunition cartridges. It is not known what parts to rifle grenades were found, what caliber bullets were found, if the smoke grenade was expended, or if the 3.5-inch practice rocket was inert. Because other 2.36-inch rockets found buried in the vicinity subsequent to this investigation were determined to be inert practice rockets, it is unlikely that complete 2.36-inch rockets with live propellant, igniter fuze, warhead were found in the test pits.

A 55-gallon drum resembling the type used to store mustard agent was also found. Vapor tests of the drum were negative for chemical mustard or its degradation compounds. The drum is reportedly similar to drums used to feed heating oil systems (*HLA, 1995*). Table G1-3 lists the incidental munitions-related items found in the vicinity of MRS-2.

Four soil borings were drilled at Site 17 west of MRS-2 (*HLA, 1995*). A 60mm mortar canister was encountered at about 14 feet bgs in one of the borings (Boring SB-17-08). Twenty exploratory trenches were excavated at Site 17. With the exception of ammunition boxes in one trench, no munitions-related items were found.

### *Fort Ord Basewide Remedial Action*

In 1997, as part of the Fort Ord Basewide Remedial Action, buried debris and contaminated soil identified during the Basewide RI were excavated and removed at RI Site 16 (Pete's Pond and Pete's Pond Extension; Plate G1-4). Fifty 2.36-inch inert (M7 Series wax-filled) practice rockets were found at Pete's Pond Extension in discrete piles at a depth of 4 feet bgs (*IT, 1999a*). Table G1-3 lists these incidental munitions-related items. It should be noted that another 418 practice rockets were found in the Disposal Area (RI Site 17) just west of MRS-2. Because the practice rockets were buried in discrete piles within this area, the practice rockets are believed to be the result of disposal and are not related to military munitions use at MRS-2.

The rockets from MRS-2 and all but 79 of the 418 rockets from the adjacent area (RI Site 17) were detonated in place by Conventional Munitions Systems, Inc. (CMS) on the same day they were discovered. When the rockets were detonated, there were no secondary explosions, indicating that the rockets were not live. Inspection of the rockets confirmed that they were practice items that had been filled with wax (training devices). The 79 remaining 2.36-inch rockets were transported by CMS to an alternate disposal area. Although there is no information confirming the filler in these 79 rockets, it is reasonable to conclude that the 79 rockets were also wax-filled (*IT, 1999b*). Because the 2.36-inch practice rockets were buried in discrete piles or mixed with landfill debris, they are believed to be the result of disposal and not related to munitions use at MRS-2. The portion of MRS-2 that was excavated, backfilled, and regraded was determined to be a Special Case Track 0 area (*Army, 2002 and 2005c*).

## 2.5 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 MEC), and exposure routes (potential scenarios that may result in contact with MEC).

The CSM for MRS-2 is based on currently available site-specific and general information including the ASR (*USAEDH, 1993*), Literature Review Report (*HLA, 2000b*), review of aerial photographs, training maps, sampling results, field observations, and technical manuals. The CSM was developed to help evaluate the adequacy of the investigation completed to date and to identify potential release and exposure pathways. Plate G1-5 presents a site conceptual model.

### 2.5.1 Site Features

MRS-2 contains a topographic depression corresponding to the Pete's Pond area and cleared areas in the center of the site and immediately north of Pete's Pond. Review of a 1951 aerial photograph shows that the Pete's Pond area had been graded, supporting reports that the area may have been used as a landfill. The area was also reportedly used for chemical warfare training and landmine warfare training. There are no site features that would suggest a likely location for chemical or landmine training.

### 2.5.2 Training Practices

Training practices that are known or suspected to have occurred at MRS-2 are discussed below to provide information on the potential types and distribution of military munitions that may have been used at the site, and whether potential areas of concern remain at the site.

#### *Chemical Warfare Training*

As described in Section 2.2, the suggestion that chemical warfare training took place at MRS-2 is based on an interview (*USAEDH, 1993*) and no corroborative evidence has been found. In addition, the description and location of supposed CAIS kit burials and the apparent burial location at the site by a former staff sergeant is vague, unsubstantiated, and hearsay; there was no direct knowledge of the burials. However, a brief description of typical chemical warfare training is provided below for information purposes.

A Fort Ord Yearbook from 1955 shows a typical chemical warfare training scenario with soldiers entering and exiting gas houses with gas masks (*Army, 1955*). The gas houses were filled with an irritating agent; current practice is to use tear gas (CS). CAISs were also used for training soldiers in identification of the odors and effects of chemical agents. The recommended method of training was to detonate the glass vials with blasting caps to atomize the chemicals and form a small aerosol cloud. The trainees were positioned downwind prior to the detonation and were instructed to allow the cloud to envelop them or to walk into the cloud and smell it just to recognize the odor, and to walk out of the cloud and exhale. Normally, four gases were detonated in succession with an interval between detonation of each of the gases, and the trainees were graded on their ability to identify the gases (*Committee on Review and Evaluation of the Army Non-Stockpile Material Disposal Program, 1999*). After the demonstration, the detonation pits were decontaminated with bleach and the holes filled in (*Army, 1942*). Because of the proximity of the site to the P.O.W. recreational area and horse corral, it does not seem likely that CAISs would have been detonated in this area. Toxic gas sets (sets containing two dozen or more glass bottles) were also used for training in decontamination. War gas identification sets were used for outdoor training (*Committee on Review and Evaluation of the Army Non-Stockpile Material Disposal Program, 1999*). Information concerning CAISs is contained in Attachments G1-2, G1-3, and in Section 2.5.3 of this report.

### *Mine Training*

There is no available information about how, or if, landmine training was performed in this area in the 1940s. No evidence other than an interview indicates that landmine training may have occurred in this area. According to current field manuals, practice and inert mines or explosive booby trap simulators were used in training 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 simulator 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*).

Information concerning emplacement of minefields in Army training manuals serves as a guide as to how the site vicinity may have been used for mine training (FM20-32, Chapter 13 and DA PAM 350-38; *Army, 1997*). Current training in mine warfare tasks 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.

#### 2.5.3 Potential Sources and Location of MEC

The only reported training practice that may have used military munitions was landmine warfare training. As part of the training, practice mines may have been set up and shallowly buried at the site. It should be noted that mines have not been found during subsurface investigations at the site and no training maps show that the area was used for landmine training.

Aerial photograph review and subsurface investigations at the site indicate that the area in and around Pete's Pond and Pete's Pond Extension was used as a landfill. Based on results of previous investigations and soil removal actions, various munitions-related items were disposed in the landfill. It has been the Army's general practice to prohibit disposal of MEC in landfills.

According to the interview with a former Fort Ord resident (*USAEDH, 1993*), chemical warfare training occurred at MRS-2. This type of training could involve the use of CAISs. As described in Section 2.5.2, the recommended method of training was to detonate selected glass vials with blasting caps to atomize the contents and form a small aerosol cloud. However, because of the proximity of the site to the P.O.W. recreational area and horse corral, it is unlikely that CAISs would have been used with blasting caps in this area. Accordingly, blasting caps used for CAIS detonation would not be expected at the site. There was also an unconfirmed report that CAISs were buried along Imjin Road (*USAEDH, 1993*).

#### 2.5.4 Potential Exposure Routes

The former landfill/disposal areas containing buried munitions-related items (RI Site 16 [southern portion of MRS-2] and RI Site 17) were excavated as part of the Basewide Remedial Action program. The only information suggesting munitions-related training occurred in the northern portion of MRS-2 consists of unconfirmed reports of chemical warfare training and landmine training in the 1940's. If this training

actually occurred at the site, then the possibility would exist for some munitions-related material, including MEC, to remain at the site. If MEC existed at the site, it may be uncovered when digging for possible future construction or utility maintenance activities. Potential exposures to MEC, although not expected, could result from encountering practice mines and mine fuzes. Exposure to buried CAISs is also possible. A description of practice mines used during World War II is provided in Attachment G1-2, and diagrams of CAIS are provided in Attachment G1-3.

For each of the munitions-related 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 G1-2.

**Antitank Practice Mines (M1, M1A1) and Fuzes (M1A1, M1A2).** The mine, antitank, practice M1 and M1A1 was designated to simulate the M1 and M1A1 HE antitank mines. The M1 practice mine was available during World War II. The M1 series mine may be used with the M1A1 or the M1A2 fuze. They were used for training in the proper methods and precautions to be observed in the care, handling, laying, boobytrapping, arming and disarming of the M1 and M1A1 antitank mines. The mine is functioned by applying pressure (200 to 500 pounds) to the pressure plate, which fires the Activator, Antitank Mine: Practice, M1, which contained a small detonator (2.34 grains) and 20 grains of smoke composition. The activator operates when the action of a firing device initiates the igniter charge, which, in turn, ignites the smoke charge, releasing a puff of white smoke with accompanying noise (*Army, 1977a; Navy, 1947*). The mine could be caused to function by incidental contact by applying sufficient force to the pressure plate of the mine. The mine, being antitank by type, requires more weight than a large person can apply by just stepping on the pressure plate. It would require a vehicle to generate the necessary pressure to activate the M1 activator.

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

**Hand Grenade, 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, 1977a*). 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.

**Chemical Agent Identification Set (CAIS):** CAISs potentially used or disposed at the site may have contained glass containers with small amounts of chemical agents or dilute solutions of chemical agents (See Attachment G1-2). Two K951 CAISs were found buried at another site at Fort Ord during a munitions removal action. Because they were available in the 1940s, they are used as an example of what may be contained in CAIS kits potentially used at the site. The K951 contains glass ampoules containing mustard (H), chloropicrin (PS), lewisite (M-1), and simulated phosgene (CG). Mustard and lewisite are blister agents (vesicants), phosgene is a choking agent, and chloropicrin is a severe respiratory irritant (USAPMCD, 1997).

## 2.6 Site Evaluation

The available data (e.g., archival and reconnaissance data) regarding MRS-2 was 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 G1-1. 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.

### 2.6.1 Literature Review

#### *Type of Training and Military Munitions Expected*

Interviews with persons formerly living or stationed at Fort Ord indicate that the site was used for chemical training and landmine warfare training in the 1940s. It should be noted that no confirming evidence could be found indicating that either of these activities occurred in this area. Beginning in the 1950s, a portion of the site was also used as a landfill. Review of historical maps indicate that areas adjacent to the site in the 1950s were used for a pole orchard (used to practice climbing for installation of communication equipment), rifle instruction circles, hand-to-hand combat training, land navigation course, a confidence course, a DSS individual tactical training course, and recreation shops.

Based on the review of available information, CAISs and practice mines could have been used at the site if chemical warfare and/or landmine warfare training actually occurred. However, no practice mines or CAISs have been found during previous subsurface investigations in or around the site. Remedial investigations found munitions-related items were disposed in the Landfill area. Contaminated soil and debris, including munitions debris, were removed from the Landfill area. Military munitions are not expected to have been used as part of the 1950s training activities. In summary, information regarding landmine and chemical warfare training within or in the vicinity of MRS-2 cannot be confirmed; the indication that either training occurred is based only on an interview, and the indication of potential buried CAIS kits at the site is based on second-hand information and hearsay with no physical evidence to confirm the accuracy of the statement.

#### *Subsequent Use of the Area*

The site is currently undeveloped and is no longer used for training.

### *Establishment of Site Boundaries*

Site boundaries were established in the ASR and are defined by existing roads. A “Survey Training Area,” shown on a 1956 map, is the only designated training area within the ASR site boundary. This overlaps with but does not fall completely within the site boundaries.

### *Summary of Literature Review Analysis*

Based on a review of site literature, the only information source indicating that MRS-2 was used as a chemical training area or as a landmine training area is an interview record. Subsurface investigations and removal programs indicate that munitions debris (MD) was disposed in the landfill located in the western portion of the site.

#### 2.6.2 Sampling Review

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

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

Munitions-related items have been found and removed from the site during previous RI fieldwork, MEC sampling programs, and the Basewide Remedial Action program. Munitions debris found during HFA sampling are listed in Table G1-2; Table G1-3 lists incidental munitions-related items found during the RI and soil removal programs.

#### *Site Boundaries Review*

Sixteen out of twenty of the grids were sampled by HFA within the site boundary. The munitions-related items discovered during the investigation were found buried and are considered to be associated with the landfill. None of the items found supports use of the site for chemical training or landmine warfare training and therefore, cannot be used to assess whether the boundaries of the site are accurate.

#### *Equipment Review*

Schonstedt GA-52/C or GA-72/Cv magnetometers were used by HFA in the 1994 survey and sampling effort. The Schonstedt instruments are passive dual flux-gate magnetometers, which are highly sensitive magnetic locators that detect ferrous (iron) metal objects; however, they cannot detect non-ferrous metal objects (e.g., lead, brass, copper, and aluminum). Magnetometers make passive measurements of the earth's natural magnetic field; ferrous metal objects (and rocks) are detected because they produce localized distortions (anomalies) in the magnetic field. The Schonstedt magnetometers 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/C or the GA-72/Cv are especially sensitive to smaller, near-surface ferro-metal objects (*Breiner, 1973*).

The performances of the Schonstedt GA-52/C and GA-72/Cv magnetometers were evaluated as part of the Ordnance Detection and Discrimination Study (ODDS) (*Parsons, 2001b*). As part of ODDS, studies were performed to evaluate:

- Signatures of inert munitions-related 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 munitions-related items buried at various depths (seeded tests)
- Geophysical instrument performance at actual munitions response 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 MRS-2; therefore, differences in field conditions, if applicable, should be considered when using information from the ODDS.

The 2.36-inch rockets and grenades were evaluated as part of the ODDS. For the purposes of comparison to the seeded and field trials tests, it is assumed that buried munitions-related items at MRS-2 would be buried at depths of up to 4 feet bgs, which would correspond to Type V in the ODDS. This depth is based on the depth that the 2.36-inch rockets were buried in the landfill.

Mines were not specifically evaluated as part of the ODDS. However, other non-penetrating items (signal flares and hand grenades [ODDS Type I]) were evaluated, as were penetrating items estimated to be located at depths of 2 feet bgs (ODDS Type II). ODDS Type II items included 2.36-inch and 3.5-inch rockets, rifle grenades, and 14.5mm projectiles. Type I and II seeded test results were used for comparison purposes in evaluating the performance of the geophysical equipment used in identifying potential mines, and Type V seeded tests results were used to evaluate the potential performance of the geophysical equipment in finding buried items at this site.

During the seeded tests, the Schonstedt Model GA-52/C located between 56 percent (search radius of 1.6 foot and lane width of 5 feet) and 59 percent (search radius of 3.3 feet and lane width of 5 feet) of the Type I items buried at depths ranging from just below the ground surface to 1 foot bgs. The Schonstedt Model GA-72/Cv located between 63 percent (search radius of 1.6 foot and lane width of 5 feet) and 78 percent (search radius of 3.3 feet and lane width of 5 feet) of the Type I items. The detection rate for Type II items for the Schonstedt Model GA-52/C ranged from 44 percent (search radius of 1.6 foot and lane width of 5 feet) to 49 percent (search radius of 1.6 foot and lane width of 5 feet). The detection rate for Type II items with the Schonstedt Model GA-72/Cv ranged from 41 percent (search radius of 1.6 foot and lane width of 5 feet) to 51 percent (search radius of 1.6 foot and lane width of 5 feet). For Type V items, the detection rates for the Schonstedt Model GA-52/C ranged from 34 percent (search radius of 1.6 feet and search lane width of 5 feet) and 53 percent (search radius of 3.3 feet and search lane width of 5 feet); and from 38 percent (search radius of 1.6 feet and search lane width of 5 feet) and 44 percent (search radius of 3.3 feet and search lane width of 5 feet) for the Schonstedt Model GA-72/Cv.

Although not evaluated in the ODDS, practice mines that may contain energetic material generally contain a larger amount of ferrous material than the Type I items evaluated in the ODDS. This should result in a detection rate that would equal or exceed the detection rate for the Type I items. The detection rate percentages presented in the ODDS varied according to the search radius, which ranged from 1.6 to 3.3 feet, and the search lane width, which was 3 to 5 feet wide. A 5-foot wide search lane was used during the MEC sampling program at the site. Results for the 3-foot wide search lanes were not included in the detection percentages presented above because 3-foot search lanes were not used during the site investigations. A standard search radius for investigation of anomalies was not specified in work plans or reports, therefore, the detection range for the different search radii are presented above. The anomalies were excavated until a metal object was found.



The seeded test detection rates are considered conservative because 1 foot was added to the item's calculated penetration depth to allow for soil deposition over time. Because the field conditions at the seeded test site and orientation of the subsurface item may not be comparable to MRS-2 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 are the same as used in the seeded tests.

Results of the ODDS Field Trial Sites (FTS) were also reviewed for potential use in evaluating instrument performance at the site. Detection rates were calculated for four of the six test sites; the remaining sites did not have enough munitions-related items detected to allow calculation of site statistics. The calculated detection rates for the combined sites ranged from 52 to 96 percent for the Schonstedt Model GA-52/C and 64 to 98 percent for the Schonstedt Model GA-72/Cv, depending on the search radius used for the calculation. The lower detection rates were for a 1.6-foot search radius and the higher detection rates were for a 3.3-foot search radius. It should be noted that the ODDS field trial sites were selected to represent areas with high MEC density. In comparison, Track 1 sites, such as MRS-2, are expected to have very low densities of munitions-related items. Therefore, the field trial results may not be directly applicable to MRS-2.

Although not directly comparable to MRS-2, the results of the ODDS indicate that the Schonstedt Models GA-52/C and -72/Cv are capable of detecting the ferrous surface and subsurface items expected at this site. However, the equipment used at this site may be limited by the depth of burial of the munitions-related items. It should be noted that these magnetometers are not capable of detecting non-ferrous items such as plastic training mines or individual glass vials in CAISs. However, if the CAISs were contained in their metal packing container, they could be detected by the magnetometers, and if any landmine training occurred in this area during the 1940s, the landmines that were used during that period are expected to be types that contain ferrous iron such as the M1 practice antitank mine (Section 2.5.4). Two CAISs were detected at MRS-13B at Fort Ord using a magnetometer.

### *Sampling Methods Discussion*

According to the work plan, the center of MRS-2 and the outer boundaries of the site were located and marked (HFA, 1993). Twenty survey grids were located randomly and marked within the site boundaries. The grid dimensions were 100- by 100-feet and were separated by at least 200 feet. The grids were inspected visually and investigated electronically using a Model GA-52/C or GA-72/Cv magnetometer along a maximum 5-foot wide search lane. Surface items were plotted on a map and then removed. Subsurface contacts and anomalies were marked with yellow flags for excavation and identification. Subsurface contacts were uncovered using hand tools (HFA, 1993 and 1994). The general approach to investigation of the anomalies was to dig down to metal, remove the metal, and check the excavated area with the Schonstedt. If the Schonstedt indicated that there was no buried ferrous material, no further digging was performed. If the Schonstedt continued to indicate buried ferrous items, the area was excavated to at least 4 feet bgs. All anomalies identified were investigated. Two MD items (a practice grenade and a practice bomb) were found and removed. The locations and depths that these items were found were not documented in the HFA report. In addition, the number of anomalies found was not documented in the HFA report.

### *Quality Assurance/Quality Control*

The QA/QC procedures used during sampling and data management are described below.

## Field Sampling QA/QC

Specific information concerning operational procedures was not documented in the HFA final report (HFA, 1994). The following describes field procedures specified in the work plan. According to the HFA work plan, equipment was to be inspected by the Senior UXO Supervisor (SUXOS) and Quality Control/Site Safety Officer (QC/SS) prior to placing it in service. Magnetometers were to be inspected and tested daily on a buried piece of military munitions (test source) to ensure that the magnetometers were calibrated and operating within specification. The buried test source (inert munitions item) was to be magnetically similar to a 2.36-inch rocket and buried at a depth of 3 feet. Information in the final report indicated that a solid steel 81 mm mortar, buried at 4 feet bgs was used. The magnetometers were to be tested before starting munitions response operations in the morning and when operations resumed after lunch. Magnetometers that failed the inspection and test were determined to be in need of repair and were to be removed immediately from service. Random checks were to be performed by the QC/SS and/or the SUXOS during daily operations. The QC/SS was to inspect all records bi-weekly to ensure that they were kept and maintained. After surface and subsurface clearance of each site and prior to removal of grid markers, the QC/SS was to perform the standard minimum 10 percent QC check. If MEC or MD was detected during the QC check, the grid was searched again to ensure no other MEC or MD was present. All grids were to be left in place until the Army Corps of Engineers Huntsville Division (CEHND) Safety Specialist completed QA procedures. No QA records for this sampling effort are available. QC reports that included descriptions and results of the QC checks were to be completed daily.

### *Data Management QA/QC*

Parsons, the current MEC contractor, performed a 100 percent QC review of the data associated with the site. This review followed the guidelines presented in the Standard Operating Procedures in Appendix A of the Track 1 OE RI/FS (MACTEC, 2004). This evaluation included a review of field grid records (if available) and the database created by the MEC contractor. The USACE (Sacramento District) followed up with a 10 percent Quality Assurance (QA) review of the Parsons data review. The requirements of this data review are described in the SOP provided as Appendix B of the Track 1 OE RI/FS (MACTEC, 2004). The purpose of the data review was to complete a 100 percent check of all available grid records to identify discrepancies between the after action reports and the grid records. Discrepancies were then researched and corrections made, if appropriate, prior to loading the data into the project database.

### *Data Quality Conclusions*

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

- The data collected by HFA were useful in providing information concerning the type of munitions-related items present at the site.
- The grids were located primarily in the southern portion of the site, which included areas along Imjin Road where a former staff sergeant indicated that CAISs had been buried.
- Coordinate data were not collected for locations and depths of found items.
- The probability of detecting MEC or MD buried in pits at depths of 4 feet or more has not been evaluated and is unknown (Equipment Review, Section 2.6.2 – Sampling Review).
- No QA records for this sampling effort are available.

## 2.7 Conclusions and Recommendations

This section presents conclusions and recommendations for MRS-2 that are based on review of historical information and sampling data collected from the site.

### 2.7.1 Conclusions

#### *Site Use and Development*

- The site is part of property that is designated for development and will be used for public parking, a road right-of-way, and public transit support (*USACE, 1997a*).
- It is not anticipated that MEC will be found at MRS-2. However, there is a potential for MEC to be present at the site because MEC were used throughout the history of Fort Ord.
- The southern portion of the site that includes Pete's Pond (landfill) was excavated as part of the Fort Ord Basewide Remedial Action program. This portion of MRS-2 has been designated as Track 0 (*Army, 2002*).
- Based on an interview record, the site was reportedly used for chemical training and landmine warfare training. MEC sampling results, results of subsurface investigation, and removal programs conducted as part of the Basewide RI and Basewide Remedial Action programs, as well as earthmoving and grading performed during road construction activities along Imjin Road do not support this past site usage.
- An unconfirmed report indicated that CAIS had been buried at the site along Imjin Parkway (formerly Imjin Road). MEC sampling was performed along portions of Imjin Parkway, where the CAISs were reportedly buried. If the CAISs were buried in their metal cans, they would have been detected by the magnetometer. No CAISs were found during sampling or during other intrusive activities in and around the site. The report of CAIS burials could not be verified.
- If CAISs were disposed at the site, it is reasonable to assume based on the discovery at MRS-13B that they would have been buried within their steel container to avoid breaking the glass ampoules. Direct exposure (i.e., not dispersed as per standard practice) to chemicals contained in the ampoules by someone digging them up and breaking them open could cause adverse health effects. However, reports of CAIS burial at MRS-2 could not be verified, and no evidence of their presence was found during MEC investigations or other removal activities.
- Results of the aerial photograph review and subsurface investigations verify that the western portion of the site was used as a landfill. Munitions-related items have been found during subsurface investigations in the landfill area and are assumed to have been disposed in this area rather than used as part of military training. If the unconfirmed training actually occurred at MRS-2, then the possibility would exist for some munitions-related material, including MEC, to remain at the site.
- Items potentially present based on reported past use include potential CAISs disposed in burial pits and training mines. None of these items have been found at the site to date. If the CAISs are present at the site, are unearthed and broken open, depending on the exposure scenario, the chemicals in the CAISs could cause adverse health effects.

### *Sampling Adequacy and Data Quality*

- Sixteen of twenty sampling grids were located within the site boundary at the location of a cleared/disturbed area and the apparent location of the landfill.
- 100 percent grid sampling was performed at the site in which all of the anomalies in a grid were excavated and identified. The equipment used was limited by the potential depth of burial at the site.
- Schonstedt GA-52/C and GA-72/Cv magnetometers were used during previous investigations. These instruments were evaluated as part of the ODDS and with the exception of items buried at depths of 4-feet or greater, are capable of detecting the type of MEC or MD (WWII practice mines) expected at this site.
- The data collected by HFA were useful in providing information concerning the type of munitions-related items present at the site. However, coordinate data were not collected for locations and depths of found items and the probability of detecting MEC or MD buried at depths of 4 feet or deeper has been evaluated and is unknown. The magnetometers used by HFA during sampling are not capable of detecting non-ferrous items such as plastic training mines or individual glass vials in CAISs. However, if the CAISs were contained in their metal packing container, they could be detected by the magnetometers as would metallic practice mines.
- Although the previous MEC sampling efforts performed at MRS-2 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.
- Although sampling conducted at MRS-2 did not include all of the site, the quantity and quality of the information generated is sufficient to make an informed decision regarding the site. The investigation was sufficient to assess the potential presence of MEC or MD. Additionally, the MEC potentially remaining at MRS-2 pose and acceptable risk if encountered.
- Based on available information regarding MRS-2, it is unlikely that MEC is present at the site. However, if items expected to have been used during past training remain at the site, they are considered to pose an acceptable risk if encountered, because they: (1) would have to contain a live fuze and active detonator, (2) were designed to be triggered by the weight of a vehicle, and (3) these components would have been exposed to moisture, degradation, and weathering for many years, which could decrease their effectiveness. Additional information is provided in Attachment G1-2.

#### 2.7.2 Recommendations

Based on review of existing information, MEC is not expected to be found at MRS-2, and No Further Action related to MEC is required for this site. MRS-2 meets the Track 1 Category 3 criteria. Although there are unconfirmed reports that this site was used for chemical warfare and landmine training, no mines or chemical warfare materials have been found during sampling and site walks conducted at MRS-2 and the site vicinity. MEC items that may be present at the site based on past site use likely consist of practice mines and mine fuzes. In the unlikely event that a MEC item is found of the type possibly used at MRS-2, it is not expected that it could be caused to function through casual contact (i.e., inadvertent and unintentional contact). The MEC types potentially present at MRS-2 have been exposed to moisture, degradation, and weathering for many years which could prevent many of them from functioning.

For MRS-2, digging or underground "intrusive" activities are planned for the proposed site reuse and development. No actionable risk was identified through the remedial investigation process. However, in

the interest of safety, reasonable and prudent precautions should be taken when conducting intrusive operations at this site. As a basewide effort to promote safety and because of Fort Ord's history as a military base, the Army provides "ordnance recognition and safety training" to anyone who requests that training. Construction personnel involved in intrusive operations at the former Fort Ord may attend the Army's "ordnance recognition and safety training" to increase their awareness of and ability to identify MEC items. Section 1.3.1 (Description of the Remedy) of the Track 1 ROD (*Army, 2005a*) describes the scope of the safety training. If MEC is discovered during future development activities at MRS-2, trained construction personnel should immediately stop any intrusive or ground-disturbing work in the area or in any adjacent areas and should not attempt to disturb, remove or destroy the MEC item, but should immediately notify the local law enforcement agency having jurisdiction on the parcel. The local law enforcement agency will arrange for an appropriate agency (e.g., an explosive ordnance disposal [EOD] unit) to respond.

For MRS-2, the Army recommends construction personnel involved in intrusive operations attend the Army's ordnance recognition and safety training. The Army will request notice from future landowners of planned intrusive activities, and in turn will provide ordnance recognition and safety training to construction personnel prior to the start of intrusive work. The Army will provide ordnance recognition and safety refresher training as appropriate. MRS-2 should be added to the list of Track 1 sites with management controls shown in the *Munitions Response Site (MRS) Security Program (Army, 2005b)*. This document presents the elements of the ordnance recognition and safety training, notification procedures, and Army and local law enforcement responsibilities. In accordance with the Track 1 ROD (*Army, 2005a*), the Army will assess whether the education program should continue. If information indicates that no MEC items have been found in the course of development or redevelopment of the site, it is expected that the education program may, with the concurrence of the regulatory agencies, be discontinued, subject to reinstatement if a MEC item is encountered in the future.

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