# EXPLANATION OF SIGNIFICANT DIFFERENCES No. 1 OPERABLE UNIT 1, FRITZSCHE ARMY AIRFIELD FIRE DRILL AREA FORMER FORT ORD, CALIFORNIA

United States Department of the Army

June 2010

### INTRODUCTION AND STATEMENT OF PURPOSE

#### Site Name and Location

The former Fort Ord is located near Monterey Bay in northwestern Monterey County, California, approximately 80 miles south of San Francisco. The former military installation comprises approximately 28,000 acres adjacent to the cities of Seaside, Sand City, Monterey, and Del Rey Oaks to the south and Marina to the north. The Union Pacific Railroad and California State Route 1 pass through the western portion of the former Fort Ord, separating the beachfront from the rest of the base. Laguna Seca Recreation Area and Toro Regional Park border former Fort Ord to the south and southeast, respectively, as well as several small communities such as Toro Park Estates and San Benancio. The former Fort Ord included three principal developed areas: the East Garrison, Fritzsche Army Airfield (FAAF, now the Marina Municipal Airport), and the Main Garrison. Operable Unit 1 (OU1) is comprised of the former FAAF Fire Drill Area (FDA) and associated groundwater contamination plume in the northernmost portion of the former Fort Ord (Figure 1). The site was designated as OU1 in 1990 when Fort Ord was placed on the National Priorities List (NPL).

### **Identification of Lead and Support Agencies**

Environmental investigations began at Fort Ord in 1984 at FAAF under California Regional Water Quality Control Board (RWQCB) cleanup/abatement orders 84-92, 86-86, and 86-135. In 1986, further investigations began at the Fort Ord Landfills, and the preliminary site characterization was completed in 1988. In 1990, Fort Ord was placed on the United States Environmental Protection Agency's (USEPA's) NPL, primarily because of volatile organic compounds (VOCs) found in groundwater beneath the Fort Ord Landfills. Since that time, environmental investigations and remedial actions at the former Fort Ord have been conducted under the Federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund. A Federal Facility Agreement (FFA) was signed in 1990 by the U.S. Department of the Army (Army) as lead agency, the USEPA, the Department of Toxic Substances Control (DTSC, a part of the California Environmental Protection Agency [Cal/EPA] and formerly the Department of Health Services [DHS]); and the RWQCB (also a part of Cal/EPA). The FFA established schedules for performing remedial investigations and feasibility studies and requires that remedial actions be completed as expeditiously as possible.

If the lead agency (the Army) determines that a significant change to the selected remedy, as described in the Record of Decision (ROD), is necessary after the ROD is signed, Section 117(c) of CERCLA and 40 CFR 300.435 (c)(2)(i) require the lead agency to address post-ROD

significant changes. The Record of Decision, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area (OU1 ROD) was signed by the USEPA in September 1995, the DTSC and the RWQCB in March 1996, and the Army in May 1996.

### **Summary of Circumstances Requiring an Explanation of Significant Differences**

The Army prepared this Explanation of Significant Differences (ESD) to address:

- A change in the physical area of the response. Specifically, groundwater contaminated by trichloroethene (TCE) migrated outside the capture zone of the original groundwater extraction and treatment system (GWETS). The TCE plume extended downgradient of the former Fort Ord property boundary and under the adjacent property (Armstrong Ranch), which altered the size and configuration of the remedial action; and
- Significant changes in costs from the estimates in the OU1 ROD due to the change in the size of the remedial area.
- After the OU1 ROD was signed, institutional controls regarding contaminated groundwater at the former Fort Ord were developed and implemented.

This ESD will become part of the Administrative Record for the former Fort Ord and will be available to the public at the following locations:<sup>1</sup>

• Seaside Branch Library, 550 Harcourt Avenue, Seaside, California

Hours of availability: Monday – Thursday: 10AM – 8PM

Friday and Saturday: 10AM – 5PM

Sunday: closed

• California State University Monterey Bay (CSUMB), Tanimura & Antle Family Memorial Library Circulation Desk, Building 508, First Floor, Divarty Street, Seaside, California

Hours of availability: Monday - Thursday: 8AM - 11:45PM

Friday: 8AM – 4:45PM

Saturday: closed

Sunday: 2PM – 11:45PM

• Former Fort Ord Administrative Record, Building 4463, Gigling Road, Ord Military Community, California.

Hours of availability: Monday – Friday: 9AM – 4PM

Saturday and Sunday: closed

• http://fortordcleanup.com/docreview/reportsviewdoc.asp?document=ROD-all\_list

<sup>&</sup>lt;sup>1</sup> Hours of availability are as of April 30, 2010.

### SITE HISTORY, CONTAMINATION AND SELECTED REMEDY

### **Site History and Contamination Problems**

From its opening in 1917, Fort Ord primarily served as a training and staging facility for infantry troops. In the 1940s, major construction of the Main Garrison was performed. From 1947 to 1975 Fort Ord was a basic training center. After 1975, the 7<sup>th</sup> Infantry Division was assigned to Fort Ord. In 1991 Fort Ord was selected for closure and the post was officially closed in 1994. Since then the former Fort Ord has been going through a property transfer process for public benefit and economic development uses. Remedial investigations and cleanup actions at the former Fort Ord have been performed and documented since 1986.

The FDA was established in 1962 as a training area for the Fort Ord Fire Department. The FDA consisted of an unlined burn pit, a drum loading area, a storage tank, and underground piping that connected the storage tank to a discharge nozzle (Army, 1995). During training exercises, combustible liquid was piped into the burn pit, ignited, and then extinguished. Training activities at the FDA ceased in 1985. These training activities are believed to have resulted in the release of contaminants to soil and groundwater.

In 1986, approximately 4,000 cubic yards of impacted soil were excavated and removed from the FDA for treatment and disposal. In 1988, a GWETS was installed near the FDA source area. The GWETS consisted of a granular activated carbon (GAC) treatment system and two groundwater extraction wells (Figure 2). This facility is described as the "original" GWETS to distinguish it from the pump and treat systems constructed in 2006 – 2008 (discussed in subsequent paragraphs). VOCs were treated by pumping the extracted groundwater directly through two 1,000-pound GAC vessels connected in a series. The treated groundwater was discharged through a spray irrigation system located in the former FDA to recharge the underlying aquifer.

In 1995, the OU1 ROD was completed and then signed by the Army, USEPA, DTSC and RWQCB. The OU1 ROD established a specific Aquifer Cleanup Goal<sup>2</sup> for each of ten contaminants of concern (COCs), including TCE (the primary COC) at 5.0 micrograms per liter ( $\mu$ g/L). TCE is the contaminant that is detected at the highest concentrations and across the greatest extent of the impacted groundwater at OU1. Because the TCE plume footprint encompasses that of the other nine COCs, TCE concentrations are used to define the boundaries of groundwater contamination within the OU1 area.

Contaminants at OU1 have been detected above their respective Aquifer Cleanup Goals only in the A-Aquifer (HGL, 2007). Since 2002, only benzene and TCE have exceeded their respective Aquifer Cleanup Goals (HGL, 2010).

The ROD also states contaminated soil at the FDA has been remediated and lists extraction and treatment as the selected remedy for groundwater. The primary remediation objectives specified

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<sup>&</sup>lt;sup>2</sup> Aquifer Cleanup Goals are based on federal or state Maximum Contaminant Levels (MCLs), but may be lower than the MCLs based on risk calculations, or may be based on Preliminary Remediation Goals where a MCL is not established.

in the ROD are: (1) hydraulic control and containment of contaminated groundwater, and (2) extraction and treatment of groundwater exceeding Aquifer Cleanup Goals. The ROD states that: (1) the projected operational life of the extraction and treatment is 30 years, (2) modifications may be necessary before the cleanup targets are met, and (3) such modifications may include any or all of the following:

- Discontinuing pumping at individual wells where cleanup goals have been attained
- Alternating pumping wells to eliminate stagnation points
- Pulse pumping to allow aquifer equilibration and to allow adsorbed contaminants to partition into groundwater; and
- Adding additional extraction wells to facilitate or accelerate cleanup of the contaminant plume.

The original GWETS was shut down on February 22, 2006 to conduct a rebound evaluation. Data collected during the rebound evaluation from all monitoring wells within the capture zone of the original GWETS showed groundwater quality met the Aquifer Cleanup Goals specified in the OU1 ROD. The rebound evaluation concluded significant rebound did not occur and the original GWETS should remain shut down (HGL, 2007). Continued Long Term Monitoring (LTM) of groundwater in this area has confirmed that groundwater meets the cleanup targets defined in the ROD.

In 2005, evaluation of data from groundwater monitoring activities in late 2004 indicated the TCE plume had migrated downgradient of the former Fort Ord property boundary and under the adjacent Armstrong Ranch property. In March 2006, seven monitoring wells were installed within the Armstrong Ranch to determine the extent of the plume (Shaw, 2007). Analytical results from groundwater samples collected from these wells indicated the TCE plume extended into the Armstrong Ranch property and potentially under a residential area of the City of Marina downgradient of the Armstrong Ranch (Figure 3).

The Army, USEPA, DTSC and the RWQCB reviewed analytical data from groundwater samples collected at OU1 after 2005 and evaluated it to determine the likelihood of a vapor intrusion pathway in areas with development or proposed development adjacent to or overlying the OU1 plume. This analysis determined 1) concentrations of COCs in groundwater in these areas were, and continue to be, relatively low, and 2) groundwater contamination tends to be stratified in the A-Aquifer with concentrations of COCs being very low or not detectable in the upper or shallower part of the A-Aquifer and relatively higher in the lower or deeper part of the A-Aquifer. Additionally, current data indicates the plume extent with concentrations of COCs exceeding Aquifer Cleanup Goals is entirely within the boundary of the former Fort Ord and a habitat reserve area with no plans for development (HGL, 2010 and Shaw, 2010). Based on these determinations, a vapor intrusion pathway is unlikely in the developed areas and the areas proposed for development adjacent to or potentially overlying OU1.

Based on data indicating the OU1 plume may have been approaching a residential area in the City of Marina, planning for construction and operation of additional GWETS was initiated. The

installation of a full-scale remediation system to capture and treat the OU1 TCE groundwater plume within the former Fort Ord and outside the capture zone of the original GWETS became fully operational in October 2007 (HGL, 2009). This system was constructed in two phases. The first phase was the Hydraulic Control Pilot Project (HCPP), which included four groundwater extraction wells located along the northwest property boundary and a GAC groundwater treatment system. The HCPP was completed in June 2006 and began operating July 1, 2006. After approximately nine months of successful operation, the HCPP facilities were referred to as the Northwest Treatment System (NWTS, Figure 4).

The second phase of the full remediation system is referred to as the Fort Ord Natural Reserve (FONR) System and consists of four additional extraction wells located along the main axis of plume migration in the central portion of the FONR (Figure 4). Pumps and pipelines were installed in the summer of 2007 and the extraction wells became fully operational on October 12, 2007. Treated groundwater from the NWTS is recharged to the A-Aquifer in the central portion of the OU1 plume through infiltration trenches constructed along the northwest Fort Ord boundary, through additional infiltration trenches in the grassland area adjacent to the central portion of the FONR, and through injection at either of two wells in the central FONR (Figure 4).

In August 2008 construction of the Off-Site Groundwater Extraction Pilot Study GWETS (Off-Site System) was completed and operation was initiated. This Off-Site System was constructed in the Armstrong Ranch near the downgradient edge of the OU1 TCE Plume and consisted of groundwater extraction from the A-Aquifer by two extraction wells, aboveground treatment with GAC, and infiltration of the treated water (Figure 4). The Off-Site System operated full-time until February 2009, when analytical data indicated remedial action objectives (RAOs) were achieved. A series of rebound tests starting in February 2009 indicate COC concentrations in the off-site area remain below ACLs (Shaw, 2010). The approximate extent of the OU1 plume in September 2009 is shown on Figure 5.

### **Selected Remedy**

The following remedies were selected in the OU1 ROD:

- No Further Action for Soil. The results of the Remediation Confirmation Study field investigation (HLA, 1994) and subsequent risk assessment indicated the chemicals remaining in the soil do not present an unacceptable risk to human health or to ecological receptors under the proposed land use and do not threaten groundwater quality.
- Groundwater extraction and treatment, to be monitored on a regular basis and adjusted as warranted by the performance data collected during operation.

### BASIS FOR THE EXPLANATION OF SIGNIFICANT DIFFERENCES

The need for a significant expansion of the selected remedy was identified based on groundwater monitoring data from 2004 that indicated migration of the OU1 groundwater contamination plume had extended beyond the originally defined remediation area (HGL, 2005). Subsequent remedial action responses to capture and treat the full extent of the plume in accordance with the

ROD (HGL, 2009 and Shaw, 2010) increased the overall scope and cost of the remedy. Additionally, after the OU1 ROD was signed, institutional controls regarding contaminated groundwater at the former Fort Ord were developed and implemented.

### **DESCRIPTION OF SIGNIFICANT DIFFERENCES**

The Army prepared this ESD to address the:

- Significant differences between the remedy as presented in the OU1 ROD and the current scope of the remedial action;
- Implementation of institutional controls not identified in the OU1 ROD; and
- Changes in expected outcomes that will result from actions described in this ESD.

### **Significant Differences**

The OU1 ROD states the remedial action objective for soil and groundwater at the FDA was to address current or potential significant risks to human health and the environment posed by OU1 at the former Fort Ord, California. Soil remediation was considered complete and no further action was selected. The selected remedy for groundwater was extraction and treatment (via carbon adsorption) of groundwater that contains VOCs from the A-Aquifer at and downgradient of the FDA, and recharge of treated water to the A-Aquifer.

In addition to the remedy selected in the OU1 ROD for groundwater, institutional controls (e.g., deed restrictions and land use controls) are or will be applied to prevent access or use of the groundwater within the OU1 area for any purpose, until Aquifer Cleanup Goals are met, and to maintain the integrity of any current or future remedial or monitoring system including monitoring, extraction, and injection wells.

Property overlying and surrounding OU1 is within the "Prohibition Zone" of the "Special Groundwater Protection Zone." The Prohibition Zone is identified on the Former Fort Ord "Special Groundwater Protection Zone Map," which is on file with the County of Monterey, and shown on Figure 5. County Ordinance No. 04011 (Monterey County Code Title 15, Chapter 15.08.140) prohibits construction of water wells within the Prohibition Zone. As additional institutional controls, a groundwater restriction will be included in the applicable federal deed and a land use covenant prohibiting the use of groundwater in all aquifers will be established between the Army and the State of California (DTSC and RWQCB).

Based on the understanding of the OU1 groundwater plume in 1995, the plume length was approximately 1,163 feet (less than ¼ of a mile; Figure 2) and the OU1 ROD stated the groundwater plume was contained by the original GWETS and contaminated groundwater was not migrating offsite; however, results of groundwater monitoring and an offsite study initiated in 2006 indicated the plume had migrated under the Armstrong Ranch property and was approaching the City of Marina. Based on this information, the plume length was determined to be approximately 3,650 feet, or 5% of a mile (Figure 3), which resulted in a significant difference in the size and configuration of the remedial action.

The cost of construction<sup>3</sup> of the original GWETS in 1988 and annual operations and maintenance costs<sup>4</sup> from 1988 to 1994 was estimated at \$942,000 in the OU1 Remedial Investigation/ Feasibility Study (RI/FS; HLA, 1987). The OU1 ROD estimated the cost of 24 more years of operations and maintenance from 1994 to 2018 to be \$950,000. In 2009 dollars, the total cost of construction and operations and maintenance to completion of the remedial action (with the original GWETS) would be approximately \$3.2 million.<sup>5</sup>

In response to the significant change in the size and configuration of the plume, the Army constructed the NWTS, the FONR System and the Off-Site System. These extraction and treatment systems conform to the selected remedy presented in the OU1 ROD (extraction of groundwater containing VOCs and treatment with GAC); however, their construction, operation, and maintenance costs through 2009 have been approximately \$8.29 million, which is a significant difference from the costs estimated in the OU1 RI/FS and ROD.

### **Changes in Expected Outcomes**

Implementation of institutional controls (deed restrictions, land use controls, etc.) will prevent access or use of the groundwater within the OU1 area for any purpose, until Aquifer Cleanup Goals are met, and will maintain the integrity of current or future remedial or monitoring system, including monitoring, extraction and injection wells.

Based on the estimates presented in the OU1 RI/FS and OU1 ROD, the time to remedy completion with operation of the original GWETS constructed in 1988 was expected to be 30 years (2018) and total costs were expected to be \$3.2 million (in 2009 dollars). These estimates were based on a plume length less than ¼ of a mile; however, the total length of the plume was later determined to be approximately 5/8 of a mile and the plume had migrated beyond the capture zone of the original GWETS and past the boundary of the former Fort Ord. Additional well installation, monitoring, and construction and O&M of the NWTS, the FONR System, and the Off-Site System regained capture of the plume and may reduce the time to remedy completion stated in the ROD by up to 10%. These modifications also resulted in significant cost increases for the remedy; however, they provided the necessary extension of the remedy needed to address the 250% increase in plume length and meet the ROD cleanup goals.

### **AFFIRMATION OF STATUTORY DETERMINATIONS**

The remedy, including the actions described in this ESD, continues to satisfy the requirements of CERCLA Section 121. Per the OU1 ROD, soil remediation at OU1 is considered complete with no further action. The installation and operation of the NWTS is preventing additional migration of the plume offsite and the Off-Site System has remediated the groundwater plume downgradient of the former Fort Ord boundary. The Army, the USEPA, the DTSC and the RWQCB believe the remedy remains protective of human health and the environment and complies with Federal and State Applicable or Relevant and Appropriate Requirements (ARARs).

<sup>&</sup>lt;sup>3</sup> Construction costs include design and engineering, construction services, and startup costs.

<sup>&</sup>lt;sup>4</sup> Operations and maintenance costs include sampling, laboratory analysis and hydraulic capture analysis.

<sup>&</sup>lt;sup>5</sup> Based on rates of inflation from December 1987 through January 2009.

#### **PUBLIC PARTICIPATION**

A notification to the public concerning this ESD will be made in a local newspaper after signature. The OU1 ROD and this ESD are available to the public at the following locations:

- Seaside Branch Library, 550 Harcourt Avenue, Seaside, California.
- California State University Monterey Bay (CSUMB), Tanimura & Antle Family Memorial Library, Building 508, Divarty Street, Seaside, California.
- Former Fort Ord Administrative Record, Building 4463, Gigling Road, Ord Military Community, California.
- http://fortordcleanup.com/docreview/reportsviewdoc.asp?document=ROD-all list.

#### **REFERENCES**

Harding Lawson Associates (HLA), 1987. Remedial Investigation/Feasibility Study of Groundwater Contamination, Fritzsche Army Airfield Fire Drill Area, Fort Ord, California. June 5.

HLA, 1994. *OUI Remediation Confirmation Study, Fritzsche Army Airfield Fire Drill Area, Fort Ord, California.* May.

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HGL, 2007. Draft Rebound Evaluation Report, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. November.

HGL, 2009. Final 2008 Annual and Fourth Quarter Groundwater Monitoring Report, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. December.

HGL, 2010. Draft 2009 Annual and Third Quarter Groundwater Monitoring Report, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. February.

Shaw Environmental, Inc. (Shaw), 2007. Draft Final Well Installation Completion Report, Armstrong Ranch, Operable Unit 1, Former Fort Ord, California. April.

Shaw 2009a. Report of Off-Site Groundwater Extraction Pilot Study and Quarterly Monitoring, Operable Unit 1, July to September 2008, Former Fort Ord, California. January.

Shaw 2009b. Report of Off-Site Groundwater Extraction Pilot Study and Quarterly Monitoring, Operable Unit 1, April to June 2009, Former Fort Ord, California. December.

Shaw 2010. Report of Off-Site Groundwater Extraction Pilot Study and Quarterly Monitoring, Operable Unit 1, July to September 2009, Former Fort Ord, California. February.

U.S. Department of the Army (Army), 1995. <i>Area, Fort Ord, California</i> . July 25.	Record of Decision, Operable Unit 1, Fire Drill

# EXPLANATION OF SIGNIFICANT DIFFERENCES No. 1 OPERABLE UNIT 1, FRITZSCHE ARMY AIRFIELD FIRE DRILL AREA FORMER FORT ORD, CALIFORNIA

### **United States Department of the Army**

Thomas 6	Redelle
Thomas F. Lederle	1

Chief, Industrial Branch

Base Realignment and Closure (BRAC) Division

6 Aug 2010

Date

Gail Younghlood

BRAC Environmental Coordinator

Fort Ord BRAC Office

5 Aug 2010
Date

# EXPLANATION OF SIGNIFICANT DIFFERENCES No. 1 OPERABLE UNIT 1, FRITZSCHE ARMY AIRFIELD FIRE DRILL AREA FORMER FORT ORD, CALIFORNIA

# **United States Environmental Protection Agency**

Michael M. Montgomery

Assistant Director

Federal Facilities and Site Cleanup Branch U.S. Environmental Protection Agency

Region 9

7-14-10

Date

### **EXPLANATION OF SIGNIFICANT DIFFERENCES No. 1**

# OPERABLE UNIT 1, FRITZSCHE ARMY AIRFIELD FIRE DRILL AREA FORMER FORT ORD, CALIFORNIA

### California Environmental Protection Agency Department of Toxic Substances Control

The State of California, Department of Toxic Substances Control (DTSC) had an opportunity to review and comment on the ESD and its concerns were addressed.

Charles B. Ridenour, P.E.

Supervising Hazardous Substances Engineer II Brownfields and Environmental Restoration Program

Sacramento Office

Department of Toxic Substances Control

### **EXPLANATION OF SIGNIFICANT DIFFERENCES No. 1**

### OPERABLE UNIT 1, FRITZSCHE ARMY AIRFIELD FIRE DRILL AREA FORMER FORT ORD, CALIFORNIA

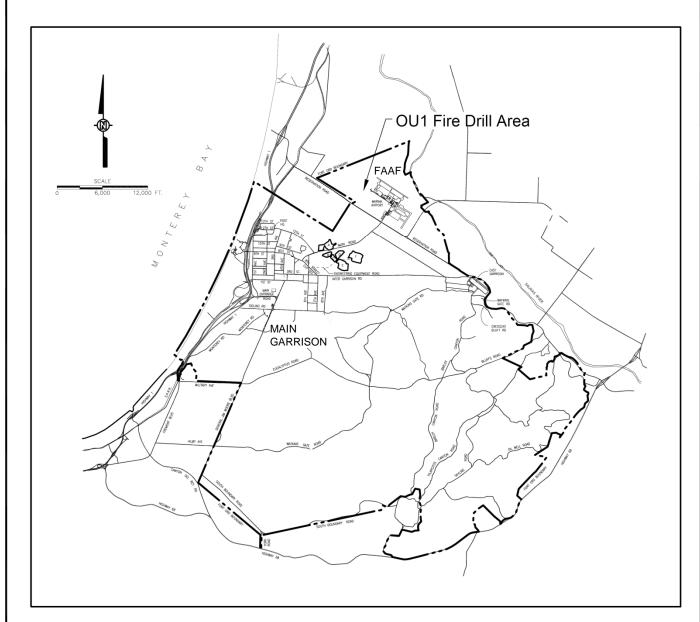
### California Environmental Protection Agency Regional Water Quality Control Board, Central Coast Region

The State of California, Central Coast Regional Water Quality Control Board (RWQCB) had an opportunity to review and comment on the ESD and its concerns were addressed.

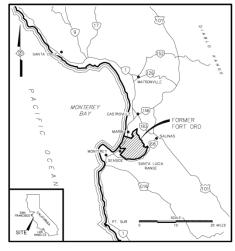
Roger W. Briggs Executive Officer

California Environmental Protection Agency

Regional Water Quality Control Board, Central Coast Region



## SITE LOCATION MAP



**VICINITY MAP** 

DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT, CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA

FIGURE 1. SITE MAP Operable Unit 1 Former Fort Ord, California

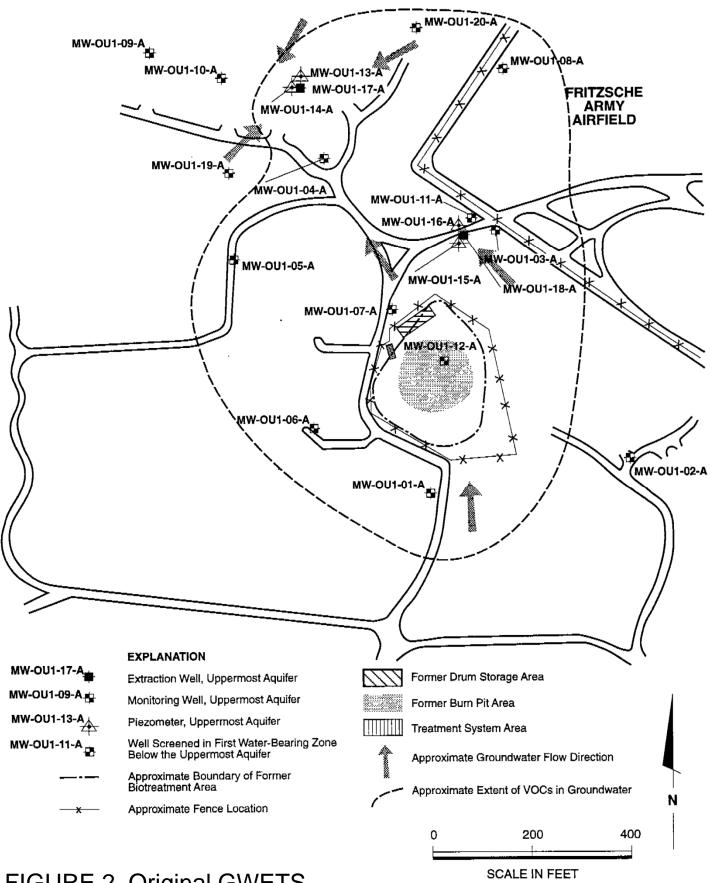


FIGURE 2. Original GWETS Record of Decision, Operable Unit 1 Former Fort Ord, California, 1995



