

MAY 28 2013

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**412th Test Wing  
Edwards Air Force Base, California**

**Environmental Restoration Program**



**Site 312 Explanation of Significant  
Differences from the Soil and Debris  
Sites Record of Decision**



**Operable Units 4 and 9  
Air Force Research Laboratory  
Detachment 7  
Edwards AFB, California**

**Final**

**May 2013**

**ENVIRONMENTAL RESTORATION PROGRAM**

**SITE 312 EXPLANATION OF SIGNIFICANT DIFFERENCES  
FROM THE SOIL AND DEBRIS SITES RECORD OF DECISION  
OPERABLE UNITS 4 AND 9  
AIR FORCE RESEARCH LABORATORY DETACHMENT 7  
EDWARDS AIR FORCE BASE  
CALIFORNIA**

**MAY 2013**

**FINAL**

**Prepared for  
UNITED STATES AIR FORCE  
412th TEST WING/ENVIRONMENTAL RESTORATION (412 TW/CEVR)  
EDWARDS AIR FORCE BASE, CALIFORNIA 93524-8060**

**and**

**U.S. AIR FORCE CIVIL ENGINEER CENTER (AFCEC/CZRW)  
LACKLAND AIR FORCE BASE, TEXAS 78236-9853**

**AUTHORIZING SIGNATURES AND REGULATORY AGENCY ACCEPTANCE  
OF THE REVISED REMEDY**

The United States Air Force (USAF) and United States Environmental Protection Agency, Region 9; with concurrence from California Environmental Protection Agency, Department of Toxic Substances Control and the California Regional Water Quality Control Board, Lahontan Region, are in agreement with the revised cleanup remedy presented in the Site 312 Explanation of Significant Differences.

  
\_\_\_\_\_

Date 17 MAY 2013

MICHAEL T. BREWER  
Brigadier General, USAF  
Commander, 412th Test Wing  
Edwards Air Force Base, California

  
\_\_\_\_\_

Date 28 June 2013

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Assistant Director  
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California Environmental Protection Agency, Department of Toxic Substances Control and the California Regional Water Quality Control Board, Lahontan Region had the opportunity to review and comment on the Site 312 Explanation of Significant Differences, and our concerns are addressed.

  
\_\_\_\_\_

Date 7/16/13

ALLEN WOLFENDEN  
Branch Chief  
San Joaquin/Legacy Landfills Office  
California Department of Toxic Substances Control

  
\_\_\_\_\_

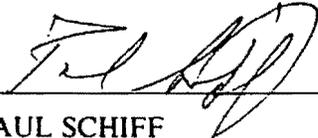
Date 7/31/13

PATRICIA Z. KOUYOUMDJIAN  
Executive Officer  
California Regional Water Quality Control Board  
Lahontan Region

LAURI KEMPER  
ACTING EXECUTIVE OFFICER

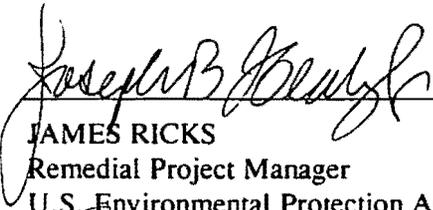
**AUTHORIZING SIGNATURES AND REGULATORY AGENCY ACCEPTANCE  
OF THE REVISED REMEDY (Continued)**

We the undersigned, having worked on development of the Site 312 Explanation of Significant Differences, hereby concur with the remedy modification proposed in this document.



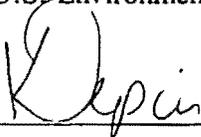
Date 22 MAY 13

PAUL SCHIFF  
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412 TW/CEVR  
Edwards Air Force Base, California

for 

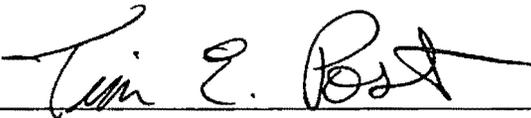
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Date 7/19/13

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### APPENDIX A SUPPORTING DOCUMENTATION

#### A.1 Documents on Compact Disk (CD)

Soil and Debris Sites Feasibility Study Report

CERCLA Proposed Plan for Cleanup at the Soil and Debris Sites

Soil and Debris Sites Record of Decision

Soil and Debris Sites Remedial Action Work Plan

Soil and Debris Sites Remedial Action Complete Report

EPA Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents

#### A.2 Revised Site 312 ARARs

### APPENDIX B PHOTOGRAPHIC LOG

## LIST OF ABBREVIATIONS AND ACRONYMS

412 TW/CEVR	412th Test Wing/Environmental Restoration
$\mu\text{g}/100\text{ cm}^2$	micrograms per 100 square centimeters
§	Section
AFB	Air Force Base
AFCEC/CZRY	Air Force Civil Engineer Center
AFRL	Air Force Research Laboratory Detachment 7
am	ante meridian
AOC	area of concern
ARAR	Applicable or Relevant and Appropriate Requirement
Ave	Avenue
Bldg	Building
Blvd.	Boulevard
CA	California
Cal-EPA	California Environmental Protection Agency
CBr	competent bedrock
CD	compact disk
CE	Civil Engineering
CFR	Code of Federal Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chemical of concern
cy	cubic yard
DTSC	Department of Toxic Substances Control
EAFB	Edwards Air Force Base
EM	Environmental Management
Fri	Friday
ESD	Explanation of Significant Differences
FS	feasibility study
ft	feet
LUC	land use control
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
Mgt.	management
Mon	Monday
NASA	National Aeronautics and Space Administration
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ODCs	other direct costs
OU	Operable Unit
PCB	polychlorinated biphenyl
PIRA	Precision Impact Range Area
pm	post meridian
PPE	personal protective equipment
PRP	potentially responsible party
RA	remedial action

## LIST OF ABBREVIATIONS AND ACRONYMS *(Continued)*

RACER	Remedial Action Cost Engineering and Requirements
RACR	Remedial Action Complete Report
RAO	remedial action objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
Res/Sens	residential/sensitive use
RI	remedial investigation
ROD	Record of Decision
Sat	Saturday
Thurs	Thursday
TSCA	Toxic Substances Control Act
TSDf	treatment, storage, and disposal facility
Tues	Tuesday
TX	Texas
U.S.	United States
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USC	United States Code
USEPA	United States Environmental Protection Agency
USGS	United States Geological Society
UU/UE	unlimited use and unrestricted exposure
VIP	vapor intrusion pathway
Wed	Wednesday

## 1.0 INTRODUCTION

**Site Name:** Site 312-- Test Area 1-14 Polychlorinated Biphenyls (PCBs) Spill Area.

**Site Location:** Electrical Substation 11, Air Force Research Laboratory Detachment 7 (hereafter referred to as AFRL), Operable Unit (OU) 4 (Figure 1-1), Soil and Debris Sites, Edwards Air Force Base (AFB), California.

**Lead Agency:** United States Air Force (USAF).

**Supporting Agency:** United States Environmental Protection Agency (USEPA), Region 9.

**Concurring Agencies:** California Environmental Protection Agency (Cal-EPA), Department of Toxic Substances Control (DTSC) and the Regional Water Quality Control Board, Lahontan Region (Water Board).

**Statement of Purpose:** This Explanation of Significant Differences (ESD) presents modifications to the remedy selected for Site 312 in the *Soil and Debris Sites Record of Decision (ROD)* (USAF 2008), signed in May 2008. An ESD is necessary because the remedial action at Site 312, conducted between August and December 2010, did not achieve all remedial action objectives (RAOs) as listed below:

1. Prevent exposures (inhalation, ingestion, and dermal) by hypothetical residential receptors to soil and concrete containing PCBs above the Toxic Substances Control Act (TSCA) exposure limits for residential use. NOT ACHIEVED.
2. Prevent exposures (inhalation, ingestion, and dermal) by industrial receptors to soil and concrete containing PCBs above the TSCA exposure limits for industrial substation use. ACHIEVED.
3. Prevent exposure (inhalation, ingestion, and dermal) by construction workers to soil and concrete containing PCBs above the TSCA exposure limits for industrial substation use. ACHIEVED.

The remedy selected in the ROD for Sites 312 included excavation and removal of impacted soil, gravel, and concrete to achieve RAOs/cleanup goals for PCBs that are protective of hypothetical residential receptors, and allow unlimited use and unrestricted exposure (UU/UE). These RAOs were

more stringent than those required to adequately protect human health and the environment under current and anticipated future use of Site 312 (i.e., industrial).

The remedial action achieved RAOs/cleanup goals for PCBs that are protective of industrial receptors, but due to access (time and equipment) constraints did not achieve soil cleanup goals protective of hypothetical residential receptors.

This ESD documents the change in final RAOs/cleanup goals for the Site 312 remedy to be protective of industrial receptors (current and anticipated future use receptors). This change in the ROD does not change the protectiveness status of the selected remedy under current and anticipated future use, and the ROD remains protective and continues to meet applicable or relevant and appropriate requirements (ARARs). The *Soil and Debris Sites ROD* includes a non-selected alternative for remediating the substation to cleanup levels that would allow industrial use, with land use controls (LUCs) to prevent residential exposures. This ESD establishes that closure to industrial standards is replacing clean closure to UU/UE as the remedy for Site 312. As detailed in Section 3, the remedy modifications described in this ESD significantly change, but do not fundamentally alter, the remedy selected in the ROD with respect to scope, performance, or cost.

**Regulatory Framework:** This ESD is issued in accordance with Section (§) 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 United States Code (USC) § 9617(c); and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) § 300.435(c)(2)(i). The ESD was prepared in accordance with the guidelines presented in *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (USEPA 1999, see Appendix A.1), and includes all items listed in Highlight 7-2 of that document: Sample Outline and Checklist for ESDs and ROD Amendments (see Table 1-1 for a summary of this checklist).

**Document Availability:** As required by 40 CFR § 300.825(a)(2), the ESD will be incorporated into the administrative record maintained by 412th Test Wing, Environmental Restoration (412 TW/CEVR). If you wish to view the administrative record, please contact Mr. Gary Hatch at:

## 412 TW/CEVR

5 East Popson Ave, Bldg 2650A

Edwards AFB, CA 93524

(661) 277-1454

Hours of availability:

8 am - 4:30 pm (Mon - Fri) by appointment only

Additionally, a subset of the data and documents contained in the administrative record file, and a complete listing of all documents contained in the administrative record file, are available for public review at information repositories located in the cities of Lancaster and Rosamond, as well as at Edwards AFB as follows:

### Edwards AFB Library

5 West Yeager Blvd.

Building 2665

Edwards AFB, CA 93524

(661) 275-2665

Hours of availability:

9 am - 5 pm (Mon, Wed, and Fri)

11 am - 7 pm (Tues and Thurs)

10:30 am - 6 pm (Sat)

### Kern County Public Library

Wanda Kirk Branch

3611 West Rosamond Blvd.

Rosamond, CA 93560

(661) 256-3236

Hours of availability:

11 am - 7 pm (Wed)

9 am - 5 pm (Fri and Sat)

### Los Angeles County Public Library

601 West Lancaster Blvd.

Lancaster, CA 93534

(661) 948-5029

Hours of availability:

10 am - 8 pm (Tues - Thurs)

10 am - 6 pm (Fri and Sat)

## 1.1 SITE HISTORY

Between December 2009 and December 2010, the USAF implemented remedial actions for the OUs 4 and 9 soil and debris sites (Sites 6, 13, 36, 113, 115, 167, 312, and 318; shown in red on Figure 1-2). In the *Soil and Debris Sites ROD*, remedies for these sites were selected by the USAF and USEPA, with concurrence from Cal-EPA, DTSC and the Water Board. Additional CERCLA documents for the soil and debris sites include the *Soil and Debris Sites Feasibility Study (FS)* (Earth Tech 2006), the *Soil and Debris Sites Proposed Plan* (USAF 2007), the *Soil and Debris Sites Remedial Action Work Plan (RAWP)* (AECOM 2009), and the *Soil and Debris Sites Remedial Action Complete Report (RACR)* (AECOM 2011). These documents are available in the Administrative Record and are included in this ESD on a compact disk (CD) in Appendix A.1.

Site 312 is located in Test Area 1-14 at the crest of the southwestern portion of Leuhman Ridge. The site includes Electrical Substation 11 (Figure 1-3), located in a paved and fenced area approximately 100 feet northeast of Building 8620. The substation, built in 1965, formerly housed two electric transformer

units and a voltage regulator on a 15-foot by 38-foot concrete pad; all three units used oils containing PCBs (see Photograph 1-1 in Appendix B). The concrete pad is surrounded by a margin of gravel (4 feet to 8 feet wide), beyond which the ground is paved. The gravel is completely surrounded by a concrete curb that varies in height from 0.5 foot to 2 feet. In 1991, an estimated 1 pint of PCB oil was spilled onto the concrete pad during the retro-filling of one of the former transformers. Moreover, oil stains formerly visible on the concrete pad indicate that there were likely leaks or spills from all three units. The transformer units and voltage regulator were removed as a pre-ROD action in 1998 and replaced with a single non-PCB transformer. Photograph 1-2 in Appendix B shows the substation as it looked before the Site 312 remedial action was performed.

## 1.2 SITE CHARACTERIZATION SAMPLING

In 1994, 2000, and 2006, surface soil and concrete wipe sampling was conducted at Site 312 as part of the remedial investigation [RI]. Results of the sampling are summarized below, and are more fully described (including sampling methods and rationale) in the *Soil and Debris Sites ROD* (see Appendix A.1). Following the RI, PCBs were the only chemicals of concern (COCs) retained for soil and concrete at Site 312.

### 1.2.1 CONCRETE SURFACE WIPE SAMPLING

Surface wipe samples were collected from the concrete pad in 1994 and 2006 and analyzed for PCBs. Figure 1-3 shows how the 2006 sampling results compared with TSCA limits for residential land uses (older data are also shown where not superseded by results from 2006 samples). Aroclor 1260, a commercial mixture of PCBs, was detected at concentrations up to 380 micrograms per 100 square centimeters ( $\mu\text{g}/100\text{ cm}^2$ ). Per 40 CFR § 761.125(c)(2)(i) and 40 CFR § 761.125(c)(4)(iv), the TSCA cleanup concentrations for PCBs for concrete are  $100\ \mu\text{g}/100\text{ cm}^2$  for industrial use in fenced, outdoor, electric substations (hereafter referred to as “industrial substation” use) and  $10\ \mu\text{g}/100\text{ cm}^2$  for UU/UE (residential use). Table 1-2 shows the TSCA action levels for concrete and soil in both residential and industrial settings. As shown in orange on Figure 1-3, approximately 120 square feet of concrete exhibited PCBs above TSCA limits for both residential ( $10\ \mu\text{g}/100\text{ cm}^2$ ) and industrial ( $100\ \mu\text{g}/100\text{ cm}^2$ ) uses.

### 1.2.2 SURFACE SOIL SAMPLING

Surface soil samples were collected from locations surrounding the concrete pad in 2000 and 2006; PCBs (largely Aroclor 1260 with trace amounts of Aroclor 1254) were detected at a maximum concentration of 490 milligrams per kilogram (mg/kg). Note that shallow granitic competent bedrock (CBr), ranging in depth from less than 1 foot to 3 feet, and the substation infrastructure prevented deeper soil sampling. Per 40 CFR § 761.125(c)(2)(ii), the TSCA industrial substation limits for soil are 50 mg/kg if signs warning of the PCB hazard are posted, and 25 mg/kg without signs (refer to Table 1-2). Also, per 40 CFR § 761.125(c)(4)(v), the TSCA soil limits for residential use are 1.0 mg/kg PCBs (without clean soil cap over PCB-impacted soil) or 10 mg/kg PCBs (if capped with at least 10 inches of clean soil). As shown in both yellow and green on Figure 1-3, approximately 660 square feet of soil (or 73 cubic yards, assuming a depth to CBr of 3 feet) exhibited total PCBs in excess of the 1.0 mg/kg TSCA limit for residential use. Of this total area, approximately 275 square feet (shown only in green) also exhibited total PCBs in excess of the 10 mg/kg TSCA limit for capped residential use.

### 1.3 SELECTED REMEDY

In compliance with the RAOs listed in Section 1.0, the USAF and USEPA (with concurrence from DTSC and the Water Board) chose clean closure of the electrical substation for UU/UE (ROD Alternative 3) by excavation and removal of impacted soil, gravel, and concrete. However, because the USAF plans to use the facility at Site 312 as an industrial substation for the foreseeable future, the selected cleanup standards were more stringent than those required to adequately protect human health and the environment under current and anticipated future use of Site 312.

The cleanup standards for Site 312 were the TSCA residential limits of 1.0 mg/kg of PCBs for soil/gravel (without clean soil cap) and 10  $\mu\text{g}/100\text{ cm}^2$  for concrete. Results of the January 2006 soil sampling (Figure 1-3) indicated that most of the soil in the substation required excavation to meet this criterion. The remedy also involved cutting the concrete pad and removing for off-site disposal the portions exhibiting surface contamination in excess of the 10  $\mu\text{g}/100\text{ cm}^2$  TSCA limit for residential use. A description of the remedial action conducted at Site 312, and the technical challenges that limited its success, are provided in Section 2.

## 2.0 BASIS FOR THE ESD

### 2.1 DESCRIPTION OF SITE 312 REMEDIAL ACTION

In accordance with Section 3.2.2 of the *Soil and Debris Sites RAWP* (see Appendix A.1), PCB-contaminated soil and concrete were excavated from Site 312 in August 2010 (Figure 2-1). The following is a brief summary of the remedial action; a more detailed account is presented in the *Soil and Debris Sites RACR* (Appendix A.1).

As stated in Section 1.3, the goal of the Site 312 excavation was to achieve UU/UE conditions. However, there were technical obstacles to meeting this goal, primary among them the need to minimize electrical substation down time. Mission-critical operations at Test Area 1-14 allowed only a narrow 9-day time window in which the Site 312 substation could be powered down. This time constraint made it necessary to leave critical portions of the substation infrastructure (overhead gantries and much of the concrete transformer support pad) intact. Because the gantries limited vehicle access inside the substation, only small excavators and hand-portable power equipment could be used to accomplish the work. Remediation to clean closure could not be achieved within these constraints because:

1. Vertical excavation below the soil/CBr contact (less than 3 feet in depth) was not possible using small excavators and hand tools. Removal of all traces of soil from the CBr contact would have required fine work with hand shovels and brooms, adding at least 1 day to the project.
2. Lateral excavation beyond the substation fence line would have required demolition and replacement of the concrete curbing, fence line, and asphalt paving, adding 4 to 5 days to the substation down time.
3. Lateral excavation under the concrete pad (beyond the section slated for removal) would have required at least a partial dismantling and rebuilding of the substation's structures, and replacement of critical portions of the pad; this would have added 5 to 10 working days to the project duration, depending on the extent of contamination below the pad.

Given the constraints, vertical excavation beyond the shallow CBr contact and lateral excavation below the non-removed sections of the concrete pad and curbing were not requirements for the remedial action. Regardless, the remedial action required the full 9 working days to complete, including one day for the USAF to re-energize the substation and restore the facilities to normal operations.

### 2.1.1 CONCRETE REMOVAL

After a section of fencing was removed to allow access (Photograph 2-1 in Appendix B), the 18-inch thick concrete pad was saw-cut in preparation for removing the section containing PCBs above the TSCA residential limit of  $10 \mu\text{g}/100 \text{ cm}^2$  (Photograph 2-2 in Appendix B). To simplify the removal process, the cut encompassed a larger area than originally planned (see cross-hatched area shown on Figure 2-1). Using the hydraulic hammer and mini-excavator, the cut portion of the concrete pad was broken apart (Photograph 2-3 in Appendix B) and removed to an on-site, plastic-lined waste soil staging area. Approximately 7 cubic yards of concrete were removed.

### 2.1.2 SOIL/GRAVEL EXCAVATION

Using a combination of hand tools, portable power tools, and the mini-excavator, the soil/gravel-filled margin between the concrete pad and the facility curbing was excavated to the underlying granite CBr contact (Photograph 2-4 in Appendix B). As expected, the small equipment was not capable of excavating into the CBr, which exhibited almost no weathering. Excavation also included the soil below the removed section of concrete. Previous sampling results indicated that most of the soil in the southwestern end of the facility already met the 1.0 mg/kg cleanup standard; however, given the low volume of additional soil this area represented, it too was excavated.

As shown color coded on Figure 2-1, the depth to CBr (and the vertical limits of excavation) ranged as follows:

1. From 0.5 foot to 1.0 foot in the southwestern end of the facility (blue shading).
2. From 1.5 to 2.0 feet north of the concrete pad and near the southwest corner of the facility (red shading).
3. From 2.0 feet to 3.0 feet in the area south and immediately east of the concrete pad (green shading).

A total of 86 cubic yards of soil and gravel were excavated and staged on-site prior to characterization and off-site disposal. Although the entire unpaved area within the fence line was excavated to the limit of the equipment's capability (CBr contact), a small quantity of soil remained on the floor of the excavation pit.

### 2.1.3 CONFIRMATION SAMPLING

Prior to backfilling and compaction operations, confirmation samples were collected from the excavation. However, because no deeper excavation (into the CBr) could be accomplished with the small equipment capable of accessing the substation, the confirmation sampling was intended only to characterize the small quantity of residual soil, not to assess if additional excavation was required. The samples were sent to an off-site laboratory for PCBs analysis by Method 8082.

As shown on Figure 2-1, Samples 312-EX01 through 312-EX14 were collected from the residual bottom soil in a grid pattern. Additionally, Samples 312-EX15 through 312-EX18 were collected from the excavation's interior sidewalls (those adjacent to the remaining sections of the concrete pad); and Samples 312-EX19 through 312-EX22 were collected from the exposed soil on the sidewalls of the excavation adjacent to the fence line. Replicate samples were collected at the locations of 312-EX07, 312-EX13, and 312-EX20. Note that because previous sampling showed that soil removal in the southwestern end of the facility was optional, no confirmation samples were collected from this area. Also, because only concrete was exposed on the northwestern wall, sidewall samples could not be collected at this location.

Analytical results for PCBs (detected as Aroclor 1260) are detailed in the *Soil and Debris Sites RACR* (Appendix A.1), and are summarized on Figure 2-1. PCB concentrations in the bottom samples ranged from below the reporting limit of 0.035 mg/kg to a high of 9.9 mg/kg (in 312-EX05). Although concentrations in five bottom samples exceeded the remedial action goal of 1.0 mg/kg (based on the TSCA limit for residential use with no cap) documented in the ROD, it is important to note that these samples were collected from the small amount of soil (estimated at less than 1 cubic yard [cy]) that could not be removed without extensive (and time-consuming) detail work. Given that the remediation at Site 312 was impacting the AFRL mission (much of Test Area 1-14 was without power), complete removal of all traces of soil was not a goal of the excavation. Although not a cleanup goal for the remedial action, TSCA allows residential land use where PCB soil concentrations range between 1 mg/kg and 10 mg/kg, if the impacted soil is capped by at least 10 inches of clean soil. In none of the bottom samples did PCBs exceed the 10 mg/kg TSCA limit for residential use, and all of the bottom residual soil was later covered by clean soil ranging in thickness from 18 inches to 36 inches (see Section 2.1.4).

Of the interior sidewall samples (those adjacent to the concrete pad), only Sample 312-EX16 (at 17 mg/kg) exhibited a PCB concentration that exceeded the 1.0 mg/kg PCB target concentration. Although PCBs in this sample also exceeded the 10 mg/kg TSCA limit for residential use with a soil cap, additional excavation below the concrete pad could not be conducted without risking damage to the pad and overhead power conduits. As described in Section 2.1, digging under the non-removed sections of the concrete pad was not a goal of the remedial action. Assuming PCBs did not migrate laterally more than 2 feet beneath the concrete pad, the volume of contaminated soil beneath the pad is estimated at less than 3 cy (2 feet wide, 19 feet long, and 2 feet deep).

Of the outside sidewall samples (those adjacent to the fence), only the replicate sample at 312-EX20 (10 mg/kg) exhibited a PCB concentration that exceeded the 1.0 mg/kg PCB target concentration. The normal sample from 312-EX20 (at 0.39 mg/kg) exhibits 25 times less contamination than the replicate; this level of variability is not uncommon with replicate samples, and likely represents typical contaminant heterogeneity in soil. The location of Sample 312-EX20 (which did not exceed the TSCA limit for residential use with a soil cap) was later covered by at least 24 inches of clean soil. As described in Section 2.1, lateral excavation beyond the substation fence line was not a goal of the remedial action. Assuming PCBs did not migrate laterally more than 2 feet beneath the concrete curb and asphalt, the volume of contaminated soil outside the fence line is estimated to be less than 6 cy (2 feet wide, 25 feet long, and 3 feet deep).

The concentrations of PCBs in all confirmation soil samples were less than cleanup standards based on TSCA criteria for industrial substation use (25 mg/kg with no warning signs and 50 mg/kg with warning signs). Therefore, the residual concentrations of PCBs in Site 312 soil are protective of potential industrial receptors.

#### **2.1.4 BACKFILL AND COMPACTION**

The excavated area was backfilled with clean soil sourced from a borrow pit located within the AFRL (see Figure 1-2). The backfill was compacted in several lifts, each no more than 1 foot in thickness (Photograph 2-5 in Appendix B). A 4-inch layer of self-compacting, clean white gravel (commercially obtained) was laid on top of the final lift of compacted soil, providing a hard, erosion-resistant surface (Photograph 2-6 in Appendix B). The potential for contaminated water runoff from the site is

precluded by the concrete curbs surrounding the remaining pad on which the active transformer is located; and because the remaining contaminated soil is covered by compacted clean soil overlain by clean gravel.

#### **2.1.5 RESTORE SITE TO USE AND INSTALL WARNING SIGNS**

On 25 August 2010, the chain-link fence fabric was re-hung on the fence posts, the surrounding area was cleaned, and power was restored to the substation (Photograph 2-7 in Appendix B). Because the Site 312 excavation did not remove all PCBs above 1.0 mg/kg (for UU/UE), warning signs were posted on the fence (Photograph 2-8 in Appendix B) as a precaution until a revised remedy is approved in this ESD. The warning signs read as follows:

**WARNING, RESTRICTED ACCESS; BURIED CONTAMINANTS PRESENT; BEFORE  
ENTERING, CONTACT ENVIRONMENTAL MANAGEMENT (661) 277-1401.**

#### **2.1.6 WASTE SOIL AND CONCRETE DISPOSAL**

Between 10 and 13 December 2010, 112 tons of waste soil and 14 tons of waste concrete from Site 312 were disposed of as a non-Resource Conservation and Recovery Act (RCRA) hazardous waste at the licensed US Ecology treatment, storage, and disposal facility (TSDF) in Beatty, Nevada (Photograph 2-9 in Appendix B). Characterization sampling results, waste profile sheets, and shipping manifests are included in the *Soil and Debris Sites RACR* (Appendix A.1).

#### **2.1.7 COST OF THE COMPLETED REMEDIAL ACTION**

Total cost of the remedial action completed at Site 312 (including RAWP, excavation, and RACR) was \$165,000, including \$127,000 in direct labor and \$38,000 in subcontractor and other direct costs (ODCs). This total is approximately \$22,000 (15 percent) higher than the \$143,000 rough estimate included in the FS report; note however, that the FS estimate did not include preparation of a RAWP and RACR.

## 2.2 NEED FOR THIS ESD

Although the Site 312 concrete pad removal achieved its remedial objectives in that the remaining portions of concrete exhibit concentrations less than  $10 \mu\text{g}/100 \text{ cm}^2$ , the soil removal did not achieve all RAOs in that post-excavation samples indicate residual soils contain PCBs at concentrations up to 17 mg/kg, above both the excavation goal of 1 mg/kg for residential use (TSCA without a clean soil cap), and the TSCA 10 mg/kg limit for residential use with a clean soil cap. Consequently, the site is not suitable for UU/UE status. Figure 2-2 presents a media-pathway flow diagram for potential exposure at Site 312 in its present state. All exposure pathways are incomplete to current and future industrial receptors, to terrestrial and aquatic ecological receptors, and to groundwater as a receptor. The site's small area (approximately 1,375 square feet inside a locked, chain-link fence), location adjacent to a building inside a test area with considerable disturbance, and pavement either by concrete pad or river gravel over shallow granitic bedrock, provide justification for excluding burrowing animals as potential ecological receptors. However, the inhalation (from dust), ingestion, and dermal contact pathways are potentially complete for future construction and future (hypothetical) residential receptors. Because additional excavation to chase the residual contamination is not feasible while the substation remains in service, a revised site remedy must be implemented as described in Section 3.

### 3.0 SIGNIFICANT CHANGES TO THE 312 REMEDY

#### 3.1 DESCRIPTION OF THE REVISED REMEDY

Although not selected in the *Soil and Debris Sites ROD*, Alternative 2 (cleanup to industrial land use criteria with LUCs) is herein selected as the revised remedy for Site 312. This alternative represents the minimum remedial action required under TSCA to allow the continued restricted use of the electrical substation. The revised remedy requires that soil exhibits PCB contamination below the 50 mg/kg TSCA limit for fenced electric substations with warning signs; no warning signs are required if concentrations are below 25 mg/kg (refer to Table 1-2). The revised remedy also requires that the concrete pad exhibits surface PCB contamination less than the 100  $\mu\text{g}/100\text{ cm}^2$  TSCA limit for industrial substation use.

#### 3.2 SUMMARY OF SIGNIFICANT DIFFERENCES AND SIMILARITIES BETWEEN SELECTED AND REVISED REMEDIES

The following subsections detail the significant differences and similarities between the original remedy selected in the ROD, and the revised remedy presented in this ESD.

##### 3.2.1 SITE 312 APPROVED LAND USE

The most significant difference relates to the change in approved land use following the remedial action. Originally, it was planned that the Site 312 remedy would return the substation to UU/UE status for hypothetical future residential use. Under the revised remedy however, the site will be limited to its current industrial use. As detailed in Highlight 7-1 of *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (USEPA 1999, included in Appendix A.1), a change in land use between remedies constitutes a significant, but not fundamental, difference. Furthermore, because of the existing engineering controls (see Section 3.2.3) that the Air Force has implemented at the site over the past 5 years since the ROD was signed, no impact to remedy protectiveness is anticipated due to the delay in certification that the Site 312 remedy is functional and operational. This certification will be completed in an addendum to the existing RACR, upon adoption of this ESD.

### 3.2.2 CONSTRUCTION

With respect to remedial construction, there are no significant differences between the original remedy selected in the ROD and the revised remedy selected in this ESD. Although the soil and gravel excavation conducted as part of the Site 312 remedial action did not achieve residential clean closure under TSCA, post-excavation sampling results meet the requirements for the revised remedy. All contaminated gravel was removed and the remaining soil exhibits PCBs at concentrations no greater than 17 mg/kg, below the 50 mg/kg limit allowed by TSCA for industrial substation use with warning signs, and below the 25 mg/kg limit allowed by TSCA for industrial substation use without warning signs. Furthermore, the remaining concrete pad exhibits PCBs at concentrations less than 10  $\mu\text{g}/100\text{ cm}^2$ , below the 100  $\mu\text{g}/100\text{ cm}^2$  limit allowed by TSCA for industrial substation use. Therefore, no additional excavation or concrete removal is needed at Site 312 to meet the requirements of the revised remedy.

### 3.2.3 LAND USE CONTROLS

The significant change in land use requires that LUCs be implemented under the revised remedy. Although the State of California requirement for LUCs was listed as an ARAR (Item 12) in Table B-1 of the *Soil and Debris Sites ROD*, LUCs were not originally to be applied to Site 312 given that the goal of the remedial action was to achieve UU/UE status. However, under the revised remedy, LUCs will be instituted at Site 312. The revised list of ARARs specific to Site 312 is provided on Table A.2-1 in Appendix A.2. As detailed in Highlight 7-1 of *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (USEPA 1999, included in Appendix A.1), changes in land use controls and ARARs constitute significant, but not fundamental, differences.

The implementation and general requirements of LUCs at the AFRL are detailed in Section 3 of the *Soil and Debris Sites RAWP* (Appendix A.1). The following describes elements of the engineering and administrative LUCs that are specific to Site 312. Existing engineering controls, in the form of a chain-link fence with locked gates surrounding the substation, prevent unauthorized access. The keys to the gates will be held by designated representatives from Environmental Management (EM) and Civil Engineering (CE); a sign-out policy will ensure the keys are returned after each use. Because the residual soil exhibits PCBs below 25 mg/kg, no warning signs are required by TSCA for industrial use

at Site 312; however, the signs installed during the remedial action will remain in place, and are to be inspected and maintained as part of the annual LUCs monitoring..

The administrative LUC compliance boundary, which will extend vertically from the surface to a depth of 6 feet (includes a 3-foot buffer zone below the shallow CBr contact), is shown on Figure 2-1. The boundary encompasses the northeastern half of the substation, and incorporates at least a 5-foot safety buffer beyond the confirmation soil samples that exhibit residual PCBs in excess of the TSCA residential use limit of 1.0 mg/kg (shown in yellow or orange on Figure 2-1). Note that the 5-foot safety buffer could not be implemented on the northwest side because there is a vertical drop-off on this side where the ground surface is at least 10 feet lower than the substation. The specific administrative LUCs for Site 312 are as follows:

- A. Consistent with RAO No. 1 (see Section 1.0), the land within the LUC boundaries will be used only for industrial purposes, and not for residential, commercial, or agricultural uses; access to the site by residential receptors will be prohibited.
- B. Consistent with RAO No. 2, access to the site by industrial workers will not be prohibited since levels of PCBs in the surface soil are below the TSCA exposure limits for industrial substation use.
- C. Consistent with RAO No. 3, activities that would expose construction workers to the contaminated soil and concrete will be authorized only for individuals who (1) are involved in authorized activities; (2) are trained in hazardous waste operations; and (3) are wearing appropriate personal protective equipment (PPE). No construction of buildings or other inhabited structures will be permitted within the LUC boundaries.
- D. To facilitate long-term protectiveness of the remedy, annual inspections and maintenance of the fence and gates will be conducted; an inspection and maintenance checklist is provided as Figure 3-1. The Site 312 annual LUC inspections, maintenance, and reporting; as well as 5-year reporting; will be synchronized with those for the other Soil and Debris Sites with LUCs already in place (Sites 6, 13, 36, 113, 115, 167, and 318).

It is anticipated that changing the Site 312 remedy will have minimal near-term cost impact, outside the costs to prepare this ESD and addendum to the May 2011 RACR, funds for which are already contracted. Although there are annual costs associated with maintaining LUCs, the USAF is already maintaining long-term LUCs at AFRL Soil and Debris Sites 6, 13, 36, 113, 115, 167, and 318. The incremental cost of adding LUCs inspection, maintenance, and reporting for Site 312 is expected to be minimal (approximately \$3,000 to \$5,000 per year).

### **3.3 STATUTORY DETERMINATIONS**

The USAF (as lead agency) has determined that the remedy as changed pursuant to this ESD complies with the NCP and statutory requirements of CERCLA § 121, remains protective of human health and the environment, and continues to comply with all ARARs identified in the ROD. Additionally, the revised remedy is cost effective.

## 4.0 PUBLIC PARTICIPATION

### 4.1 ORIGINAL SITE 312 REMEDY

Copies of the *Soil and Debris Sites Proposed Plan* and a brief (four-page) *Fact Sheet* were posted to the repositories listed in Section 1.0 on 30 March 2007, and notices of the document's availability were published in the Antelope Valley Press on 01 April 2007, the Mojave Desert News on 05 April 2007, and Desert Wings (a Base newspaper produced by the Edwards AFB Public Affairs Office) on 06 April 2007. The *Soil and Debris Sites Proposed Plan* presented three remedial alternatives for Site 312 including: (1) no action, (2) cleanup to industrial land use levels with warning signs and LUCs, and (3) clean closure by excavation and removal of impacted soil and concrete (preferred remedy). A public comment period for the proposed plan was held from 01 April through 15 May 2007; no public comments regarding the Site 312 remedy were received.

Two public availability sessions were held at different times and locations on 01 May 2007 to present the *Soil and Debris Sites Proposed Plan*. Only five AFRL workers attended the first session, held in the AFRL lunchroom from 11 am to 12 pm. The second session, held at West Boron Elementary School from 5:30 pm to 7:30 pm, received no public attendance.

### 4.2 REVISED SITE 312 REMEDY

Consistent with the NCP 40 CFR § 300.435(c)(2)(i), the final ESD, supporting information, and a brief fact sheet will be made available to the public in the administrative record and the information repositories detailed in Section 1.0. Additionally, the USAF will publish a notice that briefly summarizes the ESD, including the reasons for such differences, in the local newspapers listed in Section 4.1. As stated in Section 7.3.2 of *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (USEPA 1999, included in Appendix A.1):

In some cases an additional public comment period or public meeting may be held voluntarily on a planned ESD (NCP §300.825(b)). This may be useful where there is considerable public or potentially responsible party (PRP) interest in the matter.

Because the *Soil and Debris Sites Proposed Plan* in general, and specifically the Site 312 remedy, garnered little public participation (see Section 4.1), no public meetings or comment periods are planned for the Site 312 ESD.

## 5.0 REFERENCES

- AECOM. 2009. *Environmental Restoration Program, Soil and Debris Sites Remedial Action Work Plan, Operable Units 4 and 9, Air Force Research Laboratory, Edwards Air Force Base, California*. Prepared for 95 ABW/EMR, Edwards AFB, CA and AFCEE/EXEW, Brooks City-Base, TX. Orange, CA. September.
- . 2011. *Environmental Restoration Program, Soil and Debris Sites Remedial Action Complete Report, Operable Units 4 and 9, Air Force Research Laboratory, Edwards Air Force Base, California*. Prepared for 95 ABW/CEVR, Edwards AFB, CA and AFCEE/EXW, Lackland AFB, TX. Orange, CA. May.
- Earth Tech. 2006. *Environmental Restoration Program, Feasibility Study Report, Soil and Debris Sites, Air Force Research Laboratory, Operable Units 4 and 9, Edwards Air Force Base, California*. Prepared for 95 ABW/CEVR, Edwards AFB, CA and AFCEE/ISM, Brooks City-Base, TX. Long Beach, CA. August.
- USAF. 2007. *Environmental Restoration Program, CERCLA Proposed Plan for Cleanup at the Soil and Debris Sites, Operable Units 4 and 9, Air Force Research Laboratory, Edwards AFB, California*. Prepared for 95 ABW/CEVR, Edwards AFB, CA and AFCEE/ICE, Brooks City-Base, TX. Long Beach, CA. March.
- . 2008. *Environmental Restoration Program, Record of Decision, Air Force Research Laboratory Soil and Debris Sites, OUs 4 and 9, Edwards Air Force Base, California*. Prepared for 95 ABW/CEVR, Edwards AFB, CA and AFCEE/EXEW, Brooks City-Base, TX. Long Beach, CA. May.
- USEPA. 1999. *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*. EPA 540-R-98-031. Washington, D.C. July.
- United States Geological Survey. 2004. *Pre-Scoping Ecological Risk Assessment OU4, Environmental Restoration Program, Edwards Air Force Base*. United States Geological Survey Biological Resources Division, Western Ecological Research Center, Davis, CA. November.

## **LIST OF TABLES**

- 1-1 USEPA Checklist for ESDs
- 1-2 TSCA PCB Action Levels for Concrete and Soil

**TABLE 1-1. USEPA CHECKLIST FOR ESDs**

<b>Component</b>	<b>ESD Checklist Item</b>	<b>Where Item is Addressed in the Site 312 ESD</b>
Introduction to the Site and Statement of Purpose	Site name and location.	Section 1.0, "Site Name" and "Site Location"
	Identification of lead and support agencies.	Section 1.0, "Lead Agency" and "Supporting Agency"
	Citation of CERCLA §117(c) and NCP §300.435(c)(2)(i).	Section 1.0, "Regulatory Framework"
	Include date of ROD signature.	Section 1.0, "Statement of Purpose"
	Summary of circumstances that led to the need for an ESD.	Section 1.0, "Statement of Purpose"
Site History, Contamination, and Selected Remedy	Statement that ESD will become part of Administrative Record file (NCP 300.825(a)(2)).	Section 1.0, "Document Availability"
	Address of location where the file is available and hours of availability.	Section 1.0, "Document Availability"
	Brief summary of contamination problems and site history.	Sections 1.1, 1.2, 1.2.1, and 1.2.2
Basis for the Document	Present the Selected Remedy, as originally described in the ROD.	Section 1.3
	Summarize information that prompted and supports significant differences from the Selected Remedy, including the results of the treatability studies or other information developed or provided during the remedial design process.	Section 2 (all subsections).
Description of Significant Differences or New Alternatives	Reference any information in the Administrative Record file that supports the need for the change.	A list of pertinent CERCLA documents contained in the Administrative Record is presented in Section 1.1.
	Describe the significant differences between the remedy as presented in the ROD and the action now proposed, highlighting scope, performance, and cost.	Section 3 (all subsections except 3.3)
Support Agency Comments	Describe any changes in Expected Outcomes that will result from the ESD	
	Include a summary of support agency comments on the ESD.	There are no outstanding support agency comments on this document.
Statutory Determinations	State that the modified remedy satisfies CERCLA §121.	Section 3.3
Public Participation Compliance	Document that the public participation requirements set out in NCP §300.435(c)(2)(i) have been met.	Section 4.2

*Notes:*

Components and checklist items are from Highlight 7-2 of *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (USEPA 1999)

§ Section

CERCLA Comprehensive Environmental Response, Compensation, and Liability Act

ESD Explanation of Significant Differences

NCP National Oil and Hazardous Substances Pollution Contingency Plan

ROD Record of Decision

USEPA United States Environmental Protection Agency

**TABLE 1-2. TSCA PCB ACTION LEVELS FOR CONCRETE AND SOIL**

<b>Exposure Scenario</b>	<b>Concrete</b>	<b>Soil</b>
Residential (UU/UE) <b>Remedy Selected in the ROD</b>	<b>10 <math>\mu\text{g}/100 \text{ cm}^2</math></b>	<b>1.0 mg/kg</b>
Residential (with 10-inch soil cap)	NA	10 mg/kg
Industrial (fenced outdoor electric substation) <b>Revised Remedy</b>	<b>100 <math>\mu\text{g}/100 \text{ cm}^2</math></b>	<b>25 mg/kg</b>
Industrial (fenced outdoor electric substation with warning signs posted)	100 $\mu\text{g}/100 \text{ cm}^2$	50 mg/kg

*Notes:*

TSCA action levels are presented in 40 CFR § 761.125(c)(2)(i) and 40 CFR § 761.125(c)(4)(iv)

§ Section

$\mu\text{g}/100 \text{ cm}^2$  micrograms per 100 square centimeters

mg/kg milligrams per kilogram

PCB polychlorinated biphenyl

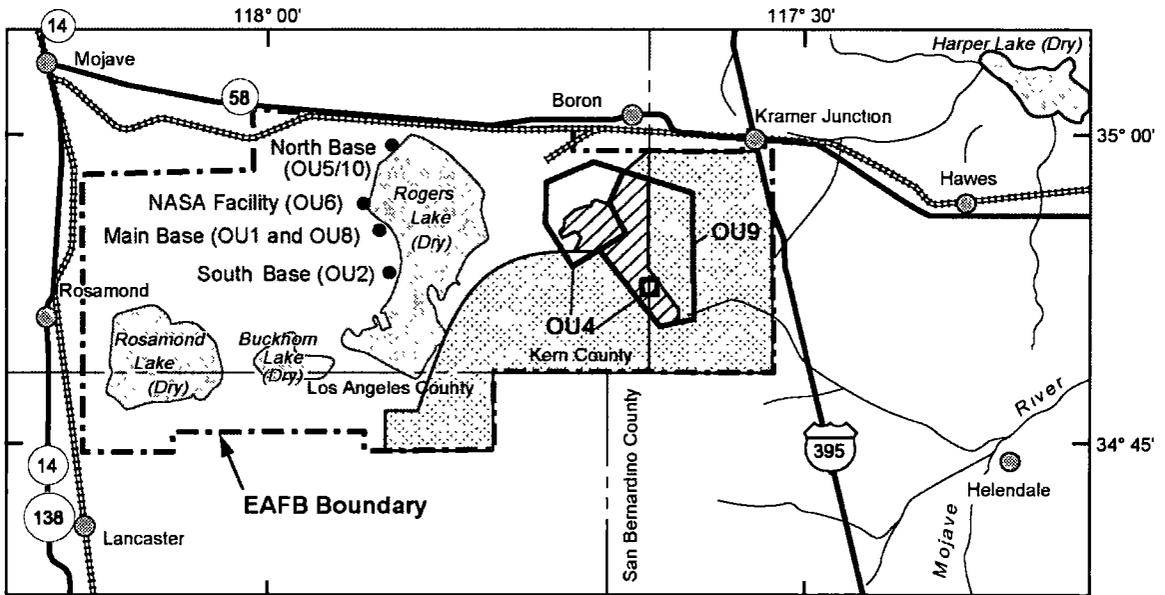
ROD Record of Decision

TSCA Toxic Substances Control Act

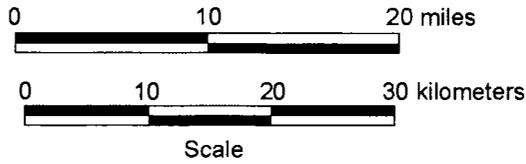
UU/UE unlimited use and unrestricted exposure

## **LIST OF FIGURES**

- 1-1 Edwards Air Force Base Location Map
- 1-2 Site Locations and Borrow Pit
- 1-3 Site 312 Pre-RA Map Showing PCB Sampling Data Compared to Residential TSCA Limits
- 2-1 Site 312 Excavation Depths, Post-Excavation PCB Sampling Results, and Land Use Controls Compliance Boundary
- 2-2 Site 312 Media-Pathways Flow Diagram
- 3-1 Inspection and Maintenance Checklist and Log – Site 312



Base from United States Geological Survey State of California (South Half) 1:500,000



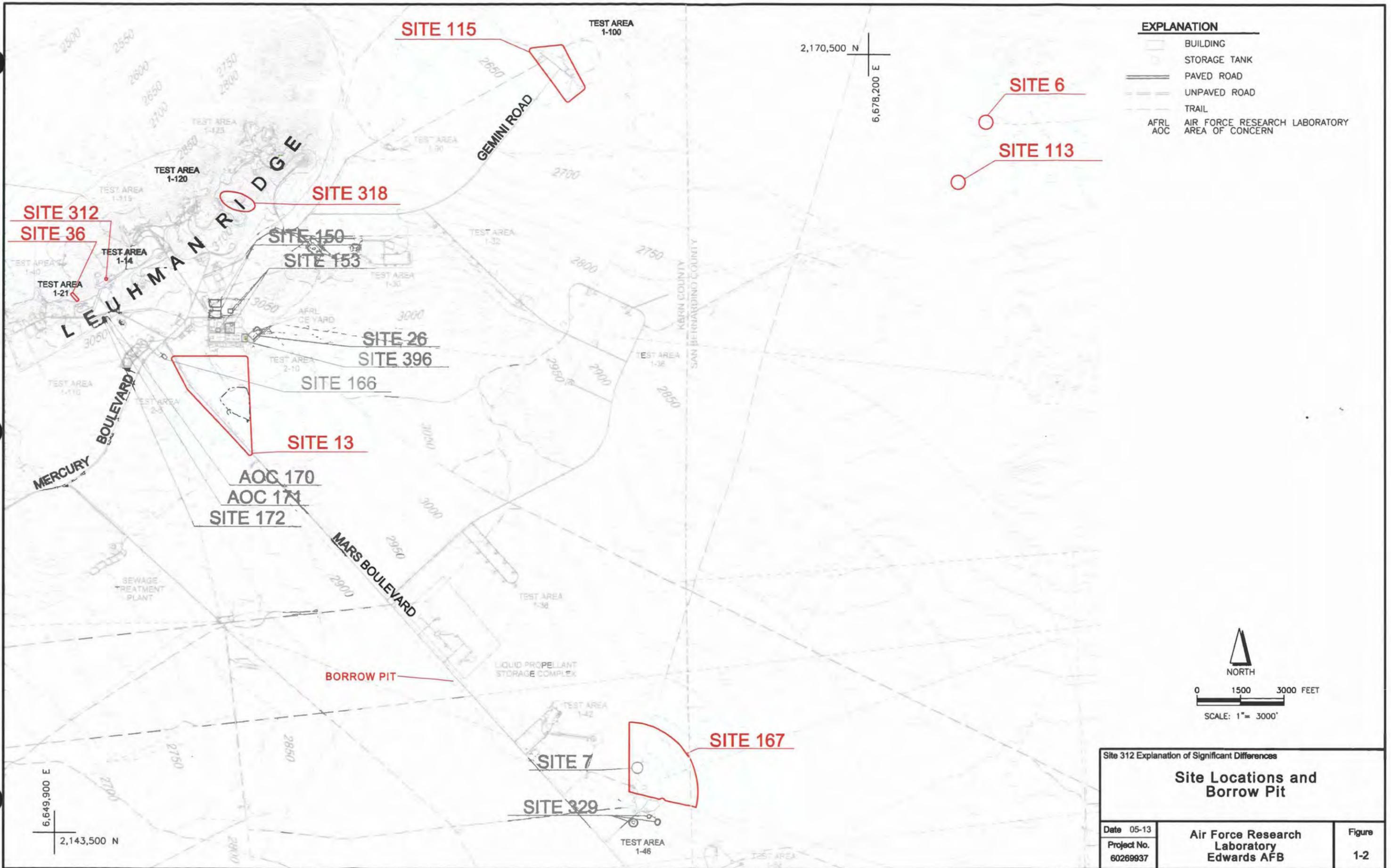
**Explanation**

- AFB Air Force Base
- AFRL Air Force Research Laboratory
- EAFB Edwards Air Force Base
- NASA National Aeronautics and Space Administration
- OU Operable Unit
- Air Force Research Laboratory Area
- Precision Impact Range Area (PIRA)
- Cities
- Railroads
- County Lines
- Rivers

Note: OU3 and OU7, which are not shown, consist of base-wide water wells and miscellaneous/individual sites located outside other OUs, respectively.

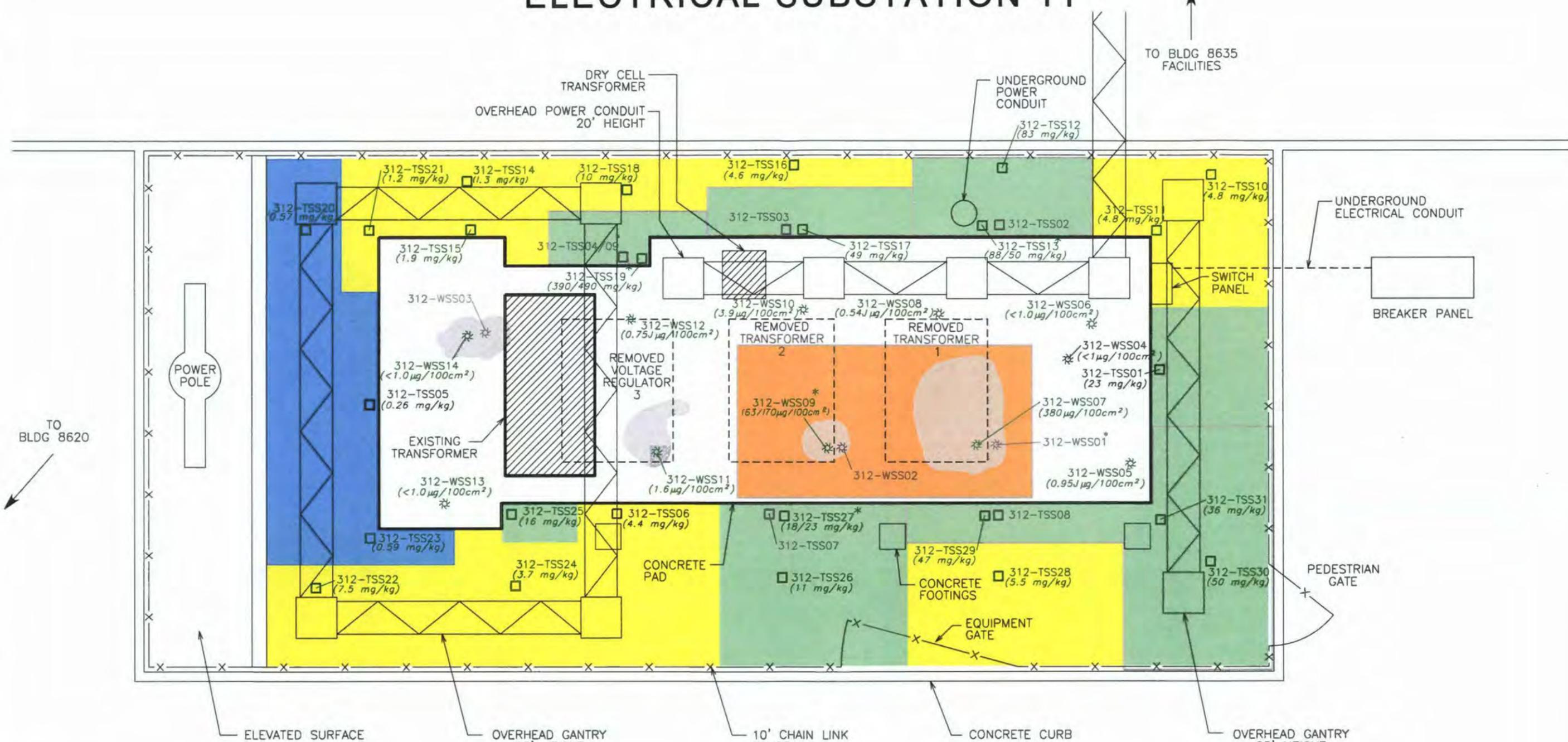
**Edwards Air Force Base  
Location Map**

Date 05-13	Air Force Research Laboratory Edwards AFB	Figure 1-1
Project No. 60269937		



Site 312 Explanation of Significant Differences		
<b>Site Locations and Borrow Pit</b>		
Date 05-13	Air Force Research Laboratory Edwards AFB	Figure
Project No. 60269937		1-2

# ELECTRICAL SUBSTATION 11



### EXPLANATION

- ☼ PCB WIPE SAMPLE (6/94)
  - ☼ PCB WIPE SAMPLE (1/06)
  - SURFACE SOIL SAMPLE (3/00)
  - SURFACE SOIL SAMPLE (1/06)
  - \* REPLICATE SAMPLE COLLECTED
  - CONCRETE STAINS AS SEEN ON PHOTOS DATED 1994 OR 2000
- DATA SHOWN ARE TOTAL PCB CONCENTRATIONS (AROCOR 1254 + AROCOR 1260). ONLY LATEST AVAILABLE DATA AS OF JANUARY 2006 ARE SHOWN.

- PCBs IN SOIL BELOW TSCA LIMIT OF 1.0 mg/kg (RESIDENTIAL USE; NO CAP)
  - PCBs IN SOIL EXCEEDED TSCA LIMIT OF 1.0 mg/kg (RESIDENTIAL USE; NO CAP)
  - PCBs IN SOIL EXCEEDED TSCA LIMIT OF 10 mg/kg (RESIDENTIAL USE WITH CAP)
  - PCBs IN CONCRETE EXCEEDED TSCA LIMIT OF 10 μg/100 cm<sup>2</sup> (RESIDENTIAL USE)
- μg/100 cm<sup>2</sup> MICROGRAMS PER 100 SQUARE CENTIMETERS  
 mg/kg MILLIGRAMS PER KILOGRAM  
 BLDG BUILDING  
 PCB POLYCHLORINATED BIPHENYL  
 RA REMEDIAL ACTION  
 TSCA TOXIC SUBSTANCES CONTROL ACT

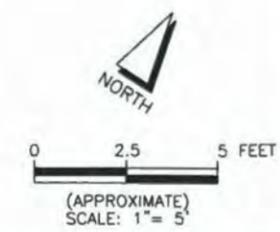
### LABORATORY DATA QUALIFIER

- J RESULT IS AN ESTIMATED CONCENTRATION DETECTED BELOW THE REPORTING LIMIT

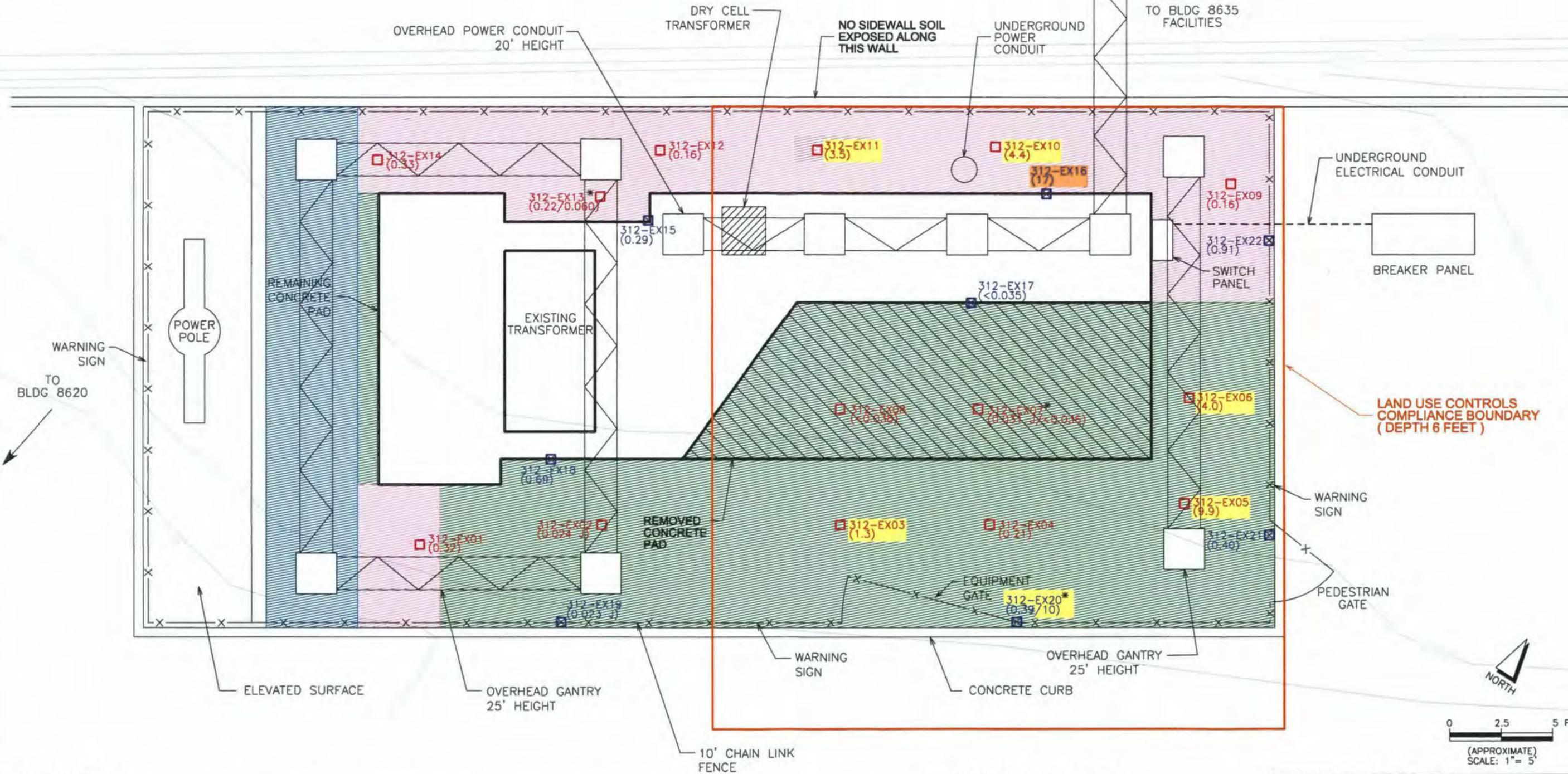
Site 312 Explanation of Significant Differences

**Site 312**  
**Pre-RA Map Showing**  
**PCB Sampling Data**  
**Compared to Residential TSCA Limits**

Date 05-13	Air Force Research Laboratory Edwards AFB	Figure 1-3
Project No. 60269937		



# ELECTRICAL SUBSTATION 11



## EXPLANATION

	SOIL GRAB SAMPLE FROM BOTTOM OF EXCAVATION (AROCOR 1260 CONCENTRATION IN mg/kg)		REMOVED CONCRETE	mg/kg	MILLIGRAMS PER KILOGRAM
	SOIL GRAB SAMPLE FROM EXCAVATION SIDEWALL (AROCOR 1260 CONCENTRATION IN mg/kg)		SOIL SAMPLE RESULT EXCEEDS THE 1.0 mg/kg TSCA LIMIT FOR RESIDENTIAL USE WITHOUT A SOIL CAP	BLDG	BUILDING
	DEPTH OF EXCAVATION 0.5 FOOT TO 1.0 FOOT		SOIL SAMPLE RESULT EXCEEDS THE 10 mg/kg TSCA LIMIT FOR RESIDENTIAL USE WITH A 10-INCH (MINIMUM) SOIL CAP	PCB	POLYCHLORINATED BIPHENYL
	DEPTH OF EXCAVATION 1.5 FOOT TO 2.0 FEET			TSCA	TOXIC SUBSTANCES CONTROL ACT
	DEPTH OF EXCAVATION 2.0 FEET TO 3.0 FEET			*	REPLICATE SAMPLE COLLECTED

## LABORATORY DATA QUALIFIER

J RESULT IS AN ESTIMATED CONCENTRATION DETECTED BELOW THE REPORTING LIMIT

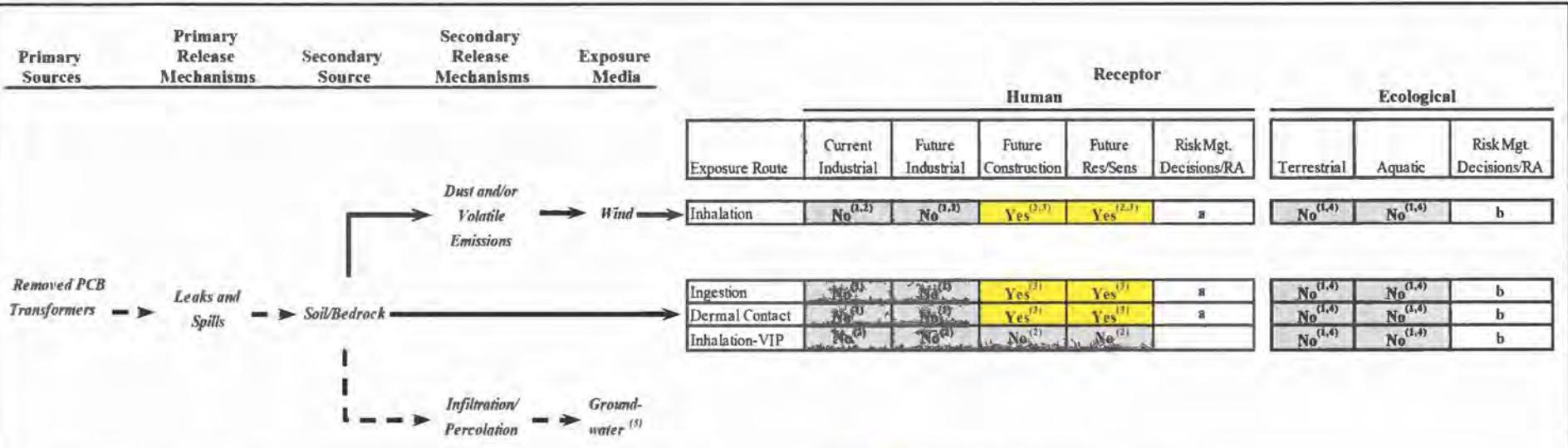
## NOTE

- NO SAMPLE RESULTS EXCEEDED THE 25 mg/kg TSCA LIMIT FOR FENCED INDUSTRIAL SUBSTATIONS (NO WARNING SIGNS), OR THE 50 mg/kg LIMIT FOR FENCED INDUSTRIAL SUBSTATIONS (WITH WARNING SIGNS).

## Site 312 Explanation of Significant Differences

**Site 312 - Excavation Depths, Post-Excavation PCB Sampling Results, and Land Use Controls Compliance Boundary**

Date	05-13	Air Force Research Laboratory Edwards AFB	Figure
Project No.	60269937		2-1



Notes:  
 Current and Future, as used in this figure, are defined relative to the revised remedy included in this ESD.

"Yes" means the exposure pathway is complete or potentially complete;  
 "No" means the pathway is incomplete. A complete pathway is characterized by (a) the presence of site-related chemicals in environmental media, which (b) potential receptors may contact, ultimately resulting in (c) intake of the chemical(s). A pathway is incomplete if it is missing one or more of the elements (a-c) needed for a complete pathway, and is not anticipated to result in exposure to receptors.

<sup>1</sup> The leaking transformers, part of the concrete pad, and surrounding soils were removed where feasible. Residual PCBs in soil and concrete are below TSCA criteria for industrial use, but are above criteria for UU/UE. All PCBs exceeding UU/UE criteria are covered by clean soil/gravel (at least 2 feet thick) or concrete.  
<sup>2</sup> VIP is considered to be incomplete: PCBs do not meet volatility requirements for this exposure pathway.  
<sup>3</sup> Potential pathway if digging or concrete removal is performed without mitigation measures.  
<sup>4</sup> Soil/concrete cover makes exposure by terrestrial aquatic receptors unlikely.  
<sup>5</sup> This pathway is considered incomplete because 1) PCBs exhibit low mobility, 2) depth to groundwater over 200 feet, and 3) groundwater not impacted by PCBs.

Yellow highlights indicate pathway retained.  
 Gray shading indicates pathways not retained either because pathway does not exist or risks are within acceptable limits.  
 Pathway does not exist as described in footnote 5.

Risk Mgt. Decision/RA:  
 a. Land use controls pending.  
 b. No ecological receptors identified in Operable Unit 4 Pre-Scoping Ecological Risk Assessment (USGS 2004). The site is fenced and the land has been paved or covered with gravel.

- ESD Explanation of Significant Differences
- Mgt. Management
- PCB Polychlorinated Biphenols
- RA Remedial Action
- Res/Sens Residential/Sensitive use
- TSCA Toxic Substances Control Act
- USGS United States Geological Survey
- UU/UE Unlimited Use/Unrestricted Exposure
- VIP Vapor Intrusion Pathway

Site 312 Explanation of Significant Differences		
<b>Site 312 Media - Pathways Flow Diagram</b>		
Date 05-13	Edwards AFB	Figure
Project No. 60269937		<b>2-2</b>



## **APPENDIX A**

### **SUPPORTING DOCUMENTATION**

- A.1 Documents on CD
- A.2 Revised Site 312 ARARs

## A.1 Documents on CD

- Soil and Debris Sites Feasibility Study Report
- CERCLA Proposed Plan for Cleanup at the Soil and Debris Sites
- Soil and Debris Sites Record of Decision
- Soil and Debris Sites Remedial Action Work Plan
- Soil and Debris Sites Remedial Action Complete Report
- EPA Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents

## UNSCANNABLE MEDIA

To use the unscannable media document # 2279355  
contact the Region IX Superfund Records Center

( 1 OF 2 )

## A.2 REVISED SITE 312 ARARs

- Table A.2-1. ARARs for Site 312, Edwards AFB, CA

TABLE A.2-1. ARARs FOR SITE 312 - EDWARDS AFB, CA

(Page 1 of 3)

Item No.	Requirement	Citation	Federal or State Requirement	Description	ARAR Determination	Comments
<b>Chemical-specific ARARs</b>						
1	Toxic Substances Control Act (TSCA) -- Treatment, Storage, Disposal, and Cleanup of PCBs	40 CFR Part 761, Sections: 761.61 761.125(c)(2)(i and ii) 761.125 (c)(4)(iv and v) 761.130	Federal	<p><b>Section 761.61 - PCB Remediation Waste</b>                      PCB waste with &gt; 50 ppm PCBs must be disposed of within 1 year after being placed in storage. Storage areas must be constructed to meet certain storage requirements. Containerized PCB wastes can be stored temporarily for 30 days in facilities that do not comply with PCB storage requirements. PCB wastes containing &gt; 500 ppm PCB are to be incinerated; ≥ 50 ppm but &lt; 500 ppm are to be disposed of in a RCRA hazardous waste landfill; &lt; 50 ppm can be disposed of in a permitted municipal solid waste facility.</p> <p><b>Section 761.125 - Requirements for PCB Spill Cleanup</b>                      (c) <i>Requirements for cleanup of high-concentration spills</i>                      (2) <i>Requirements for decontaminating spills in outdoor electrical substations.</i>                      Conformance to the cleanup standards under paragraphs (c)(2)(i) and (ii) of this section shall be verified by post-cleanup sampling as specified under §761.130.                      (i) Contaminated solid surfaces shall be cleaned to a PCB concentration of 100 µg/100 cm<sup>2</sup> (as measured by standard wipe tests).                      (ii) Soil contaminated by the spill will be cleaned either to 25 ppm PCBs by weight, or to 50 ppm PCBs by weight provided that a label or notice is visibly placed in the area.                      (4) <i>Requirements for decontaminating spills in non-restricted access areas.</i>                      Conformance to the cleanup standards at paragraphs (c)(4) (i) through (v) of this section shall be verified by post-cleanup sampling as specified under §761.130.                      (iv) Low-contact, outdoor, non-impervious solid surfaces shall be either cleaned to 10 µg/100 cm<sup>2</sup> or cleaned to 100 µg/100 cm<sup>2</sup> and encapsulated.                      (v) Soil contaminated by the spill will be decontaminated to 10 ppm PCBs by weight provided that soil is excavated to a minimum depth of 10 inches. The excavated soil will be replaced with clean soil, i.e., containing less than 1 ppm PCBs, and the spill site will be restored (e.g., replacement of turf).</p> <p><b>Section 761.130 - Sampling Requirements</b>                      Post-cleanup sampling is required to verify the level of cleanup under §761.125(c) (2) through (4). The responsible party may use any statistically valid, reproducible, sampling scheme (either random samples or grid samples) provided that the requirements of paragraphs (a) and (b) of this section are satisfied.                      (a) The sampling area is the greater of (1) an area equal to the area cleaned plus an additional 1-foot boundary, or (2) an area 20 percent larger than the original area of contamination.                      (b) The sampling scheme must ensure 95 percent confidence against false positives.</p>	<p>Applicable</p> <p>TBC that has been adopted for Site 312</p> <p>Applicable</p>	<p>Federal facilities have regulatory responsibilities under TSCA, including waste storage, sampling and cleanup of PCB spills. Site 312 is a PCB spill area and the storage, disposal, and cleanup levels are ARARs.</p>

TABLE A.2-1. ARARs FOR SITE 312 - EDWARDS AFB, CA

(Page 2 of 3)

Item No.	Requirement	Citation	Federal or State Requirement	Description	ARAR Determination	Comments
<b>Location-specific ARARs</b>						
2	California Endangered Species Act (CESA)	California Fish and Game Code, Div. 3, Ch. 1.5, Article 1, Sections 2050-2055; Article 3, Section 2080.  14 CCR Div. 1, Subdiv. 3, Ch. 6, Article 1, Sections 670.1, 670.5, and 783 et seq	State	Establishes species, subspecies, and varieties of native California plants or animals as endangered, threatened, or rare. Prohibits the taking, importation, or sale of any species, or any part thereof, of an endangered species or a threatened species. Prohibits releases and/or actions that would have a deleterious effect on species or their habitat. Contains provisions concerning CDFG coordination and consultation with state and federal agencies and with project applicants.  14 CCR Section 670.1 provides a listing of the plants of California to be declared endangered, threatened, or rare.  14 CCR Section 670.5 provides a listing of the animals of California to be declared endangered or threatened.  14 CCR Section 783 et seq provides the implementation regulations for the California Endangered Species Act.	Relevant and Appropriate	Relevant and Appropriate if there are endangered or threatened species in the area that could be affected if actions are not taken to conserve the species, and where State law has a listing that is more stringent than the Federal Endangered Species Act and Migratory Bird Treaty Act.  As stated in Air Force Instruction 32-7064, dated 17 September 2004, State authority will be contacted if conflicts arise to determine if any conservation measures can be feasibly implemented to avoid or mitigate impacts.
3	Endangered Species Act of 1973, Section 7 (c)	50 CFR Parts 200 and 402	Federal	Requires formal consultation with the USFWS if activities have the potential to alter the natural environment of listed endangered and threatened species.	Relevant and Appropriate	Endangered or threatened species and/or critical habitat are found at Edwards AFB. Site 312 is not considered to be critical habitat.
4	Migratory Bird Treaty Act	50 CFR Parts 10 and 20 (16 USC Section 703 et seq.)	Federal	Prohibits unlawful taking, possession, and sale of almost all species of native birds in the United States	Relevant and Appropriate	Edwards AFB has over 200 species of birds; however the small and fenced Site 312, which encloses a concrete pad, does not currently provide attractive habitat.
<b>Action-specific ARARs</b>						
5	Land Use Controls	22 CCR, Div. 4.5, Ch. 39, Section 67391.1, Civil Code, Div. 3, Part 1, Title 3, Section 1471 (a) through (f)	State	Requires that if a remedy will result in hazardous substances remaining on a property at levels unsuitable for unrestricted use and unlimited exposure, the limitations or controls are clearly set forth and defined in the remedial action decision document, and that the decision document include an implementation and enforcement plan.  If property not cleaned to UU/UE status is transferred, requires the State to enter into restrictive Land Use Covenants with land-owners and their successors, with exceptions for Federal-to-Federal property transfers.	Relevant and appropriate	Institutional controls (ICs), limiting exposure to contaminated soil and/or concrete pad, are required at Site 312 until hazardous substance concentrations in soil and/or the concrete pad are suitable for unrestricted use. Institutional controls will be required at Site 312 as long as PCBs in soil remain above TSCA criteria for residential use (UU/UE).  Although it is not contemplated that property at Site 312 will be transferred, in the event that such property is transferred without first achieving UU/UE status, the AF and the State have agreed to follow the procedure laid out in the Basewide Land Use Control Implementation Plan.  USEPA agrees that the substantive portions of the regulation referenced are ARARs. USEPA specifically considers sections (a), (d), (e) and (f) of 22 CCR, Section 67391.1 to be ARARs for the Site 312 ESD. The Cal/EPA DTSC position is that all of the State regulation is an ARAR.

TABLE A.2-1. ARARs FOR SITE 312 - EDWARDS AFB, CA

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Notes:

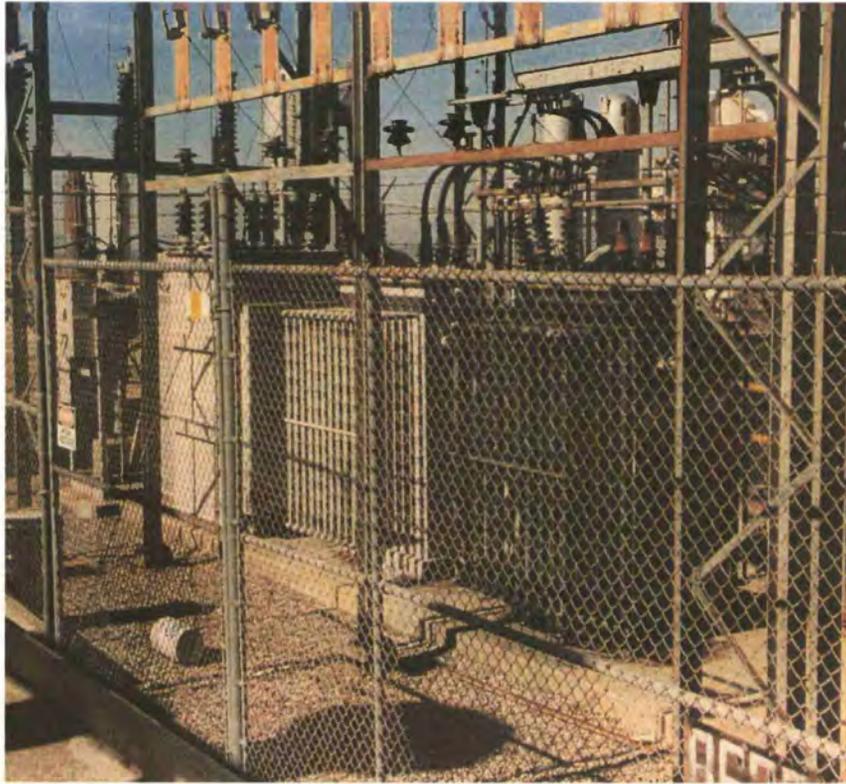
\*California hazardous waste (as used in this table) is the same as non-RCRA hazardous waste as defined in Section 66261.101 of CCR Title 22.

§	Section
%	percent
<	less than
>	greater than
≥	greater than or equal to
µg	microgram
AF	Air Force
AFB	Air Force Base
ARAR	Applicable or Relevant and Appropriate Requirement
CA	California
Cal/EPA	California Environmental Protection Agency
CAMU	Corrective Action Management Unit
CCR	California Code of Regulations
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
Ch.	chapter
cm <sup>2</sup>	square centimeters
Div.	division
DTSC	Department of Toxic Substances Control
e.g.	exempli gratia (for example)
ESD	Explanation of Significant Differences
et seq.	et sequentes (and the following)
IC	institutional control
No.	number
OU	Operable Unit
PCB	polychlorinated biphenyl
PHC	principal hazardous constituent
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
Subdiv.	subdivision
TBC	to be considered
TSCA	Toxic Substances Control Act
USC	United States Code
USFWS	United States Fish and Wildlife Service
USEPA	United State Protection Agency
UU/UE	unlimited use and unrestricted exposure

**APPENDIX B**  
**PHOTOGRAPHIC LOG**

**PHOTOGRAPH 1-1. SITE 312 ORIGINAL CONFIGURATION**

**(Viewing west)**



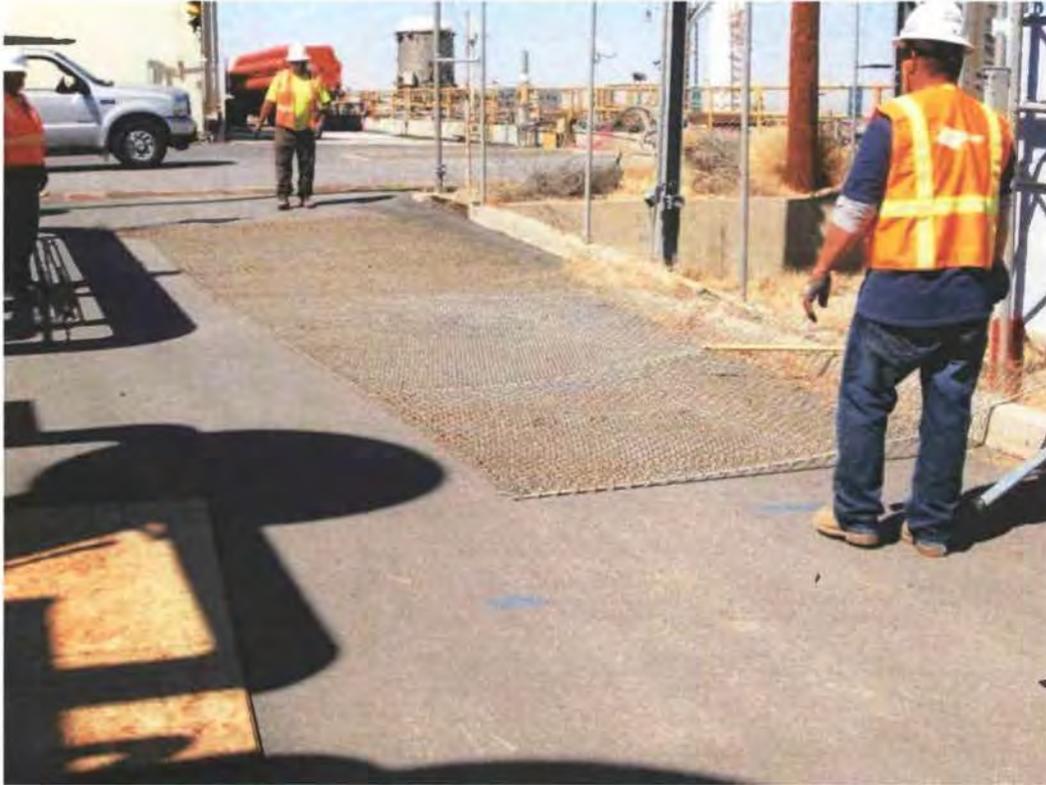
**PHOTOGRAPH 1-2. SITE 312 PRE-REMEDIAL ACTION**

**(Viewing west)**



**PHOTOGRAPH 2-1. FENCE REMOVAL AT SITE 312**

**(Viewing southwest toward Building 8260)**



**PHOTOGRAPH 2-2. CONCRETE CUTTING AT SITE 312**

**(Northeast end of concrete pad, viewing west)**



**PHOTOGRAPH 2-3. CONCRETE REMOVAL AT SITE 312**

**(Viewing southwest toward Building 8260)**



**PHOTOGRAPH 2-4. SOIL AND GRAVEL EXCAVATION AT SITE 312**

**(Viewing northeast toward Building 8635)**



**PHOTOGRAPH 2-5. BACKFILL AND COMPACTION AT SITE 312**

**(Viewing northeast toward Building 8635)**



**PHOTOGRAPH 2-6. REPLACEMENT GRAVEL AT SITE 312**

**(Viewing northeast toward Building 8635)**



**PHOTOGRAPH 2-7. SITE 312 POST-REMEDIAL ACTION**

**(Viewing northeast toward Building 8635)**



**PHOTOGRAPH 2-8. SITE 312 POST-REMEDIAL ACTION (SHOWING WARNING SIGN)**

**(Viewing west)**



**PHOTOGRAPH 2-9. SITE 312 OFFSITE INVESTIGATION-DERIVED WASTE DISPOSAL**

**(Viewing northeast)**



## UNSCANNABLE MEDIA

To use the unscannable media document # 2279355  
contact the Region IX Superfund Records Center

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