# Final
# Engineering Evaluation/Cost Analysis Non-Time Critical Removal Action

# Public Works Transformer Storage Pit and High Voltage Shop Storage Area

## Naval Air Weapons Station China Lake, Ridgecrest, California

## September 2008

Prepared for:

**Naval Facilities Engineering Command Southwest**
**San Diego, California**

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**SULT.5104.0148.0020**

## CERTIFICATION STATEMENT

"I certify that the information contained in or accompanying this submittal is true, accurate, and complete. As to those portions of this submittal for which I cannot personally verify the accuracy, I certify that this submittal and all appendices were prepared at my direction in accordance with procedures designed to ensure that qualified personnel properly gathered and evaluated the information submitted. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature: _____

Name: Michael J. Cornell

Title: REMEDIAL PROJECT MANAGER

Date: _____

**FINAL**

# ENGINEERING EVALUATION/COST ANALYSIS
# NON-TIME CRITICAL REMOVAL ACTION
# PUBLIC WORKS TRANSFORMER STORAGE PIT AND HIGH VOLTAGE SHOP STORAGE AREA
## Naval Air Weapons Station China Lake, Ridgecrest, California

July 2008

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Prepared for:
**U.S. DEPARTMENT OF THE NAVY**

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**REVIEW AND APPROVAL**

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| | |
|---|---|
| § | Section |
| µg/L | Microgram per liter |
| 40 CFR | Title 40 of the *Code of Federal Regulations* |
| AM | Action Memorandum |
| ARAR | Applicable or relevant and appropriate requirement |
| bgs | Below ground surface |
| Ca-HSC | California Health and Safety Code |
| Cal. Code Regs. | California Code of Regulations |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| COC | Chemical of concern |
| DFG | California Department of Fish and Game |
| DFG-OSPR | California Department of Fish and Game Office of Spill Prevention and Response |
| DoD | Department of Defense |
| DOT | Department of Transportation |
| DTSC | California Environmental Protection Agency, Department of Toxic Substances Control |
| EC | Engineering control |
| EE/CA | Engineering evaluation/cost analysis |
| EO | Executive Order |
| EPA | U.S. Environmental Protection Agency |
| FFSRA | Federal Facilities Site Remediation Agreement |
| FS | Feasibility Study |
| HASP | Health and safety plan |
| hazmat | Hazardous materials |
| HVSSA | High Voltage Shop Storage Area |
| IC | Institutional control |
| IRP | Installation Restoration Program |
| LUC | Land-use control |
| MCL | Maximum contaminant level |
| mg/kg | Milligram per kilogram |
| mg/L | Milligram per liter |

| | |
|---|---|
| mph | Mile per hour |
| Navy | U.S. Department of the Navy |
| NAWS | Naval Air Weapons Station |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| ng/kg | Nanogram per kilogram |
| NTCRA | Non-time critical removal action |
| O&M | Operation and maintenance |
| PCB | Polychlorinated biphenyl |
| pg/L | Picogram per liter |
| PP | Proposed Plan |
| PPE | Personal protective equipment |
| PRC | PRC Environmental Management, Inc. |
| PRG | Preliminary remediation goal |
| PW | Public Works Compound |
| PW Transformer Storage Pit and HVSSA site | PW Transformer Storage Pit and HVSSA at (NAWS) China Lake, Ridgecrest, California |
| RACER™ | Remedial Action Cost Engineering and Requirements™ software |
| RAO | Remedial action objective |
| RAP | Remedial action plan |
| RAW | Removal action work plan |
| RCRA | Resource Conservation and Recovery Act |
| ROD | Record of Decision |
| RWQCB | Regional Water Quality Control Board |
| TBC | To-be-considered |
| TCDD | Tetrachlorinated-dibenzo-p-dioxin |
| Tetra Tech | Tetra Tech EM Inc. |
| TPH | Total petroleum hydrocarbons |
| TSCA | Toxic Substances Control Act |
| VOC | Volatile organic compound |
| $yd^3$ | Cubic yards |

## EXECUTIVE SUMMARY

This engineering evaluation/cost analysis (EE/CA) identifies proposed removal action alternatives for the cleanup of contaminated soil at the Public Works Compound (PW) Transformer Storage Pit and High Voltage Shop Storage Area (HVSSA) at Naval Air Weapons Station (NAWS) China Lake, Ridgecrest, California (hereafter referred to as the PW Transformer Storage Pit and HVSSA site). This EE/CA summarizes the results of the EE/CA process, characterizes the site, identifies removal action objectives, describes removal action alternatives, contains analysis of these alternatives, and describes the recommended removal action alternative. The Department of Defense (DoD) is performing a non-time critical removal action (NTCRA) pursuant to its authority under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section (§) 104, 42 *United States Code* § 9604, and federal Executive Order (EO) 12580. Furthermore, the U.S. Department of the Navy's (Navy) cleanup response authority for the contaminated soil is consistent with California Health and Safety Code (Ca-HSC) Division 20, Chapter 6.8 and the Federal Facilities Site Remediation Agreement (FFSRA) between the Navy and the State of California.

The PW Transformer Storage Pit and HVSSA site is located in the PW in the main NAWS China Lake Complex. From 1979 to 1990, the PW Transformer Storage Pit was used to store and sample transformers from throughout the NAWS China Lake and Randsburg Wash/Mojave B complexes. The PW Transformer Storage Pit typically held 15 to 20 transformers. Until 1984, transformers were set directly on the ground in the unlined pit. Commercial drip pans were used starting in 1988. Spills were documented during a 1991 Department of Health Services inspection (PRC Environmental Management, Inc. and Morrison Knudsen Corporation 1997). The PW Transformer Storage Pit was excavated and backfilled in approximately 1990 under the oversight of the Department of Toxic Substances Control (DTSC) as a Resource Conservation and Recovery Act (RCRA) corrective action.

The HVSSA is located directly south of the PW Transformer Storage Pit. A review of an historical aerial photograph from 1984 shows that transformers were stored in the HVSSA, along the fence that divides the PW Transformer Storage Pit from the HVSSA. Elevated concentrations of PCB and dioxins/furans were detected in surface and subsurface soils collected from the HVSSA during sampling events held in 2004 (SulTech 2005a). Dioxins/furans were only detected from 1 to 3 feet bgs in only one of the two soil samples selected for additional analysis. Dioxins/furans are not directly addressed in this EE/CA because they are regarded as incidental to the PCB soil contamination. Actions taken to address PCB contamination will also reduce dioxin/furan contamination. Dioxin/furan analyses will be included during confirmation sampling. The PCBs and dioxins/furans are believed to have been released from the transformers that had been stored in the HVSSA, and not from any migration of contamination from the PW Transformer Storage Pit.

CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan ([NCP] Title 40 of the *Code of Federal Regulations* Part 300) define removal actions as the cleanup or removal of released hazardous substances, actions to monitor the threat of release of hazardous substances, and actions to mitigate or prevent damage to public health or welfare or the

environment. Based on the circumstances surrounding the release or threat of release, the U.S. Environmental Protection Agency has classified removal actions as a NTCRA when the on-site action can be taken more than six months after commencement of the planning period.

Land-use controls (LUC) are designed to limit land use and on-site activity that might interfere with the containment of contamination after completion of a response action. The EE/CA and Action Memorandum (AM) cannot implement permanent LUCs such as institutional controls (IC) and engineering controls (EC). These remedies are being evaluated in the Michelson Laboratory / PW Operable Unit Feasibility Study (FS) and will be memorialized in the associated Record of Decision (ROD) and LUC Remedial Design Work Plan. Because the FS and ROD have not been finalized, LUCs are being evaluated within the EE/CA, and removal action alternatives evaluated within the EE/CA that include LUC components also include the costs associated with the LUCs.

Four alternatives were identified and considered in this EE/CA:

- Alternative 1A: Excavate Soils with PCB Concentrations Greater than 1 milligram per kilogram (mg/kg), Backfill and Compact Clean Imported Soil in Excavation Area, and implement LUCs at the Site Following Removal Action Activities (maintains current low-occupancy industrial use)

- Alternative 1B: Excavate Soils with PCB Concentrations Greater than 13.3 mg/kg, Backfill and Compact Clean Imported Soil and Crushed Gravel in Excavation Area to Cover Full Extent of Contaminated Area, and Implement LUCs at the Site Following Removal Action Activities (allows risk-based low-occupancy reuse)

- Alternative 1C: Excavate Soils with PCB Concentrations Greater than 25 mg/kg, Backfill and Compact Clean Imported Soil and Crushed Gravel in Excavation Area to Cover Full Extent of Contaminated Area, and Implement LUCs at the Site Following Removal Action Activities (allows low-occupancy reuse)

- Alternative 2: Excavate Soils with PCB Concentrations Greater than 10 mg/kg, Backfill and Compact Clean Imported Soil in Excavation Area, Construct 6-inch Asphalt Cap over Soils with PCB Concentrations Greater than 1 mg/kg but Less than or Equal to 10 mg/kg, and Implement LUCs at the Site Following Removal Action Activities (allows high-occupancy reuse)

A comparative analysis of the removal action alternatives is presented in the table below:

| Alternative | Excavated Area ($ft^2$) | Estimated Excavation Volume (cy) | Cost Estimate | Effectiveness Rating | Implementability Rating |
|---|---|---|---|---|---|
| 1A | 36,200 | 3,385 | $1,384,000 | High | Moderate |
| 1B | 6,965 | 725 | $891,000 | High | High |
| 1C | 2,060 | 225 | $748,000 | Low | High |
| 2 | 8,875 | 850 | $1,149,000 | High | Low |

Notes:

Detailed cost estimates can be found in Appendix A.

| | |
|---|---|
| cy | Cubic yard |
| ft | feet |
| mg/kg | Milligram per kilogram |
| PCB | Polychlorinated biphenyl |

Based on the analysis performed within this EE/CA, Alternative 1B rates the highest in effectiveness, implementability, and cost.

## REGULATORY AGENCY AND PUBLIC PARTICIPATION

Following submittal of the Draft EE/CA, California regulatory agencies participated in a 60-day review period. Following incorporation of agency comments on the Draft EE/CA, this Draft Final version of the EE/CA will be submitted to the agencies, and an additional 30-day review period will occur. Upon incorporation of any agency comments on the Draft Final EE/CA, the Final EE/CA will be submitted to the agencies and presented to the public.

The Navy will hold a 45-day public comment period for the Final EE/CA and solicit comments from residents of Ridgecrest, CA and other interested members of the public. Notice of the public comment period will be placed in a local newspaper of wide distribution announcing the availability of the EE/CA in a local information repository. Following receipt community input, and considering regulatory agency comments on the draft EE/CA, the Navy will select what it believes to be the most appropriate removal action alternative. This decision will be documented in an AM. The AM will also contain a responsiveness summary discussing all comments received during the public comment period. A second notice will be placed in the same local newspapers announcing the completion of the AM.

# 1.0 INTRODUCTION

This engineering evaluation/cost analysis (EE/CA) identifies proposed removal action alternatives for the cleanup of contaminated soil at the Public Works Compound (PW) Transformer Storage Pit and High Voltage Shop Storage Area (HVSSA) at Naval Air Weapons Station (NAWS) China Lake, Ridgecrest, California (hereafter referred to as the PW Transformer Storage Pit and HVSSA site). The PW Transformer Storage Pit and HVSSA site, located within the footprint of the Michelson Laboratory Operable Unit, is also referred to as "former Installation Restoration Program (IRP) Site 68" and the "Public Works Polychlorinated Biphenyls (PCB) Area" in previous documentation.

## 1.1 DESCRIPTION OF THE NON-TIME CRITICAL REMOVAL ACTION AUTHORITY AND THE PURPOSE OF THE ENGINEERING EVALUATION/COST ANALYSIS

The Department of Defense (DoD) is performing a non-time critical removal action (NTCRA) pursuant to its authority under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section (§) 104, 42 *United States Code* § 9604, and federal Executive Order (EO) 12580. Furthermore, the U.S. Department of the Navy's (Navy) cleanup response authority for the contaminated soil is consistent with California Health and Safety Code (Ca-HSC) Division 20, Chapter 6.8 and the Federal Facilities Site Remediation Agreement (FFSRA) signed by the Navy, the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC), and the Regional Water Quality Control Board in November 2003.

The purpose of an NTCRA under CERCLA is to reduce threats to human health, ecological receptors, or the environment. The planned removal action is intended to address only the PW Transformer Pit and HVSSA and will be consistent with any future remedy for the PW Transformer Pit and HVSSA. Upon completion of the removal action, the primary risk to industrial workers from contaminants at the PW Transformer Pit and HVSSA will be significantly reduced for the current low-occupancy land configuration (see Section 1.2 for details). Any necessary final remedy to address remaining risk will be evaluated and selected through the framework of CERCLA.

CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (Title 40 of the *Code of Federal Regulations* [40 CFR] Part 300) define removal actions to include the following:

> "The cleanup or removal of released hazardous substances from the environment: such actions as may necessarily be taken in the event of the threat of release of hazardous substance into the environment: such actions as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances: the disposal of removed material: or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare of the United States or to the environment, which may otherwise result from a release or threat of release."

The U.S. Environmental Protection Agency (EPA) has classified removal actions into three types, based on the circumstances surrounding the release or threat of release:

- An emergency removal action, where on-site cleanup activities are initiated within hours of the verification of a release or threat of a release and on-site cleanup activities are completed within 30 days.

- A time critical removal action, where based on the site evaluation, a period of six months or less exists before on-site removal activities must be initiated.

- A NTCRA, where the on-site action can be taken more than six months after commencement of the planning period.

The removal of PCB-contaminated soils from the PW Transformer Storage Pit and HVSSA site has been determined to be a NTCRA, since onsite action will be taken more than six months after commencement of the planning period. The Navy has concluded that a NTCRA for chemical-contaminated soil present within the PW Transformer Storage Pit and HVSSA site should be taken to reduce the risk of potential human and ecological exposure to hazardous substances detected in the soil. This decision was based on the site history, success of previous investigations in delineating the locations of contaminants, and the presence of potential threats to human, ecological, and environmental health at the PW Transformer Storage Pit and HVSSA site.

The purpose of this EE/CA is to develop, compare, and evaluate removal action alternatives for an NTCRA. This EE/CA evaluates the implementability, effectiveness, and cost of cleaning up PCB-contaminated soil at the PW Transformer Pit and HVSSA site. This EE/CA evaluates proposed removal action alternatives that are intended to reduce the threat of human and ecological exposure to chemical-contaminated soil in the PW Transformer Pit and HVSSA site.

This EE/CA addresses the implementability, effectiveness, and cost of the NTCRA and addresses applicable regulatory requirements. This EE/CA will be used as the basis for any future CERCLA removal action. The Navy, with state regulatory oversight, is the lead agency for the NTCRA of contaminated soils from the PW Transformer Pit and HVSSA site. As the lead agency, the Navy has final authority to implement the removal action. The Navy is working in cooperation with the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC), and the Lahontan Regional Water Quality Control Board to implement the removal action.

In addition to this EE/CA, the Ca-HSC specifically requires preparation of documentation for planned removal actions. The type of documentation required depends on the projected cost of the removal action. The Ca-HSC requires development of a remedial action plan (RAP) for removal actions that cost $1 million or more, or a removal action work plan (RAW) for removal actions projected to cost less than $1 million. Further, the Ca-HSC authorizes the DTSC to waive RAP requirements in favor of a RAW for removal actions taken in response to an imminent or substantial endangerment determination. DTSC also may waive the RAP

requirements of Ca-HSC § 25356.1(d)(1) through (6) if a RAW document is prepared that meets the requirements of Ca-HSC § 25356.1(h)(3).

The table below summarizes the federal and state decision documents for removal actions:

**CERCLA/NCP AND STATE OF CALIFORNIA SELECTION OF DECISION DOCUMENTS**

| Cost of Action | Planning Period | Document Needed[1] |
|---|---|---|
| * | Emergency * | AM |
| < $ 1 Million | < Six Months | AM/RAW |
| < $ 1 Million | > Six Months | AM/EE-CA/RAW |
| From $ 1 to 2 Million | < Six Months | AM/RAP** |
| From $ 1 to 2 Million | > Six Months | AM/EE-CA/RAP** |
| > $ 2 Million | < Six Months | AM/RAP |
| > $ 2 Million | > Six Months | AM/EE-CA/RAP |

Notes:

[1] Ca-HSC § 25356.1(h)(1) provides that a RAP is not required if imminent and substantial endangerment conditions exist, regardless of costs. In such a case, a RAW would be required.

* For Emergency Removals, regardless of costs of action, the Navy will prepare only an Action Memorandum which will be finalized within 60 days of initiation of on-site removal activity.

** Pursuant to Ca-HSC § 25356.1(h)(3), for removal actions estimated to cost between $1 million and $2 million, the State may waive the RAP content requirements of Ca-HSC § 25356.1(d).

AM Action Memorandum
Ca-HSC California Health and Safety Code
EE/CA Engineering evaluation/cost analysis
RAP Remedial action plan
RAW Removal action work plan

Comments on the draft version of this EE/CA Report were received from regulatory agencies, including California DTSC, the Regional Water Quality Control Board (RWQCB) – Lahontan Region, the Department of Fish and Game (DFG), and the NAWS China Lake Restoration Advisory Board (RAB). A Response to Comments (RTC) document (Appendix B) was prepared in November 2007, and the comments were incorporated into the draft final Report where applicable. A letter dated August 7, 2008, with comments on the draft final EE/CA Report, was received from DTSC staff. The August 7, 2008 DTSC comments on the draft final have been incorporated into this final Report where applicable.

This EE/CA will be issued for public review to facilitate public involvement in the decision making process. The public is encouraged to review and comment on the proposed removal action activities described in this EE/CA. To gain a more thorough understanding of the activities associated with the removal action, the public is encouraged to review the administrative record for this activity available at the following location: 1 Administration Circle, China Lake, California 93555.

## 1.2 TOXIC SUBSTANCES CONTROL ACT OCCUPANCY CRITERION

The current use of the PW Transformer Storage Pit and HVSSA site is limited to infrequent high-voltage equipment repair and maintenance activities in the western portion of the site. Since these activities occur on an occasional basis, the current use of the PW Transformer Storage Pit and HVSSA site is considered to be intermittent. As such, the PW Transformer Storage Pit and HVSSA site meets the definition of a low-occupancy area under Toxic Substances Control Act (TSCA) regulations at 40 CFR 761.3, which state the following:

> "Low occupancy area means any area where PCB remediation waste has been disposed of on-site and where occupancy for any individual not wearing dermal and respiratory protection for a calendar year is: less than 840 hours (an average of 16.8 hours per week) for non-porous surfaces and less than 335 hours (an average of 6.7 hours per week) for bulk PCB remediation waste. Examples could include an electrical substation or a location in an industrial facility where a worker spends small amounts of time per week (such as an unoccupied area outside a building, an electrical equipment vault, or in the non-office space in a warehouse where occupancy is transitory)."

The cleanup levels identified in Alternatives 1A, 1C, and 2 evaluated in this EE/CA are based on TSCA high-occupancy and low-occupancy cleanup levels found in 40 CFR 761.61, identified as potential chemical-specific applicable or relevant and appropriate requirements (ARAR). Additionally, a risk-based cleanup level based on 40 CFR 761.61 (c) was calculated for Alternative 1B. To calculate the risk-based cleanup level, EPA Region IX guidance was used to provide an exposure frequency parameter based upon the definition of low-occupancy (335 hours/year) found within TSCA, 40 CFR 761.3. These potential chemical-specific ARARs are protective of human health and the environment under both the current and planned future uses of the site.

## 1.3 REPORT ORGANIZATION

This report contains the following sections:

- Introduction (Section 1.0)
- Site Characterization (Section 2.0)
- Identification of Removal Action Objectives (Section 3.0)
- Identification and Analysis of Removal Action Alternatives (Section 4.0)
- Comparative Analysis of Removal Action Alternatives (Section 5.0)
- Summary (Section 6.0)
- References (Section 7.0)

Figures and appendices are presented following the References section. Appendices include:

- Appendix A – Detailed Cost Estimates
- Appendix B – Responses to Regulatory Agency and Restoration Advisory Board Comments on the Draft Engineering Evaluation/Cost Analysis Non-Time Critical Removal Action, Public Works Transformer Storage Pit and High Voltage Shop Storage Area, Naval Air Weapons Station China Lake, Ridgecrest, California (July 2007; SULT.5104.0148.0001)
- Appendix C – Evaluation of Applicable or Relevant and Appropriate Requirements
- Appendix D – Risk-Based Cleanup Goals Calculations

## 2.0 SITE CHARACTERIZATION

This section presents site characterization information based on background information from previous reports generated under a Resource Conservation and Recovery Act (RCRA) corrective action, including the following:

- "Site Characterization Report for Former PCB Storage Yard" (Radian 1996)
- "PCB Transformer Storage Pit Soil Sampling Plan, China Lake Weapons Defense Center, China Lake, California" (Dames and Moore 1999)
- "PCB Transformer Storage Pit Sampling Results, China Lake Weapons Defense Center, China Lake, California" (Dames and Moore 2000a)
- "PCB Transformer Storage Pit Sampling Results, China Lake Weapons Defense Center, China Lake, California" (Dames and Moore 2000b)
- "Final Human Health Risk Assessment PCB Transformer Storage Pit, China Lake Weapons Defense Center, China Lake, California" (Dames and Moore 2000c)
- "PCB Transformer Storage Pit Sampling Results, China Lake Weapons Defense Center, China Lake, California" (Dames and Moore 2000d)
- "Contamination Assessment for Polychlorinated Biphenyls, Public Works PCB Site, Naval Air Weapons Station China Lake, California" (SulTech 2005a) (hereafter referred to as the "Contamination Assessment")

### 2.1 SITE DESCRIPTION AND SITE HISTORY

The PW Transformer Storage Pit and HVSSA site is located in the PW Compound in the main NAWS China Lake Complex (Figure 1). The site was used to store and sample transformers

from the NAWS China Lake and Randsburg Wash complexes. Prior to 1984, transformers were set directly on the ground surface without containment. During its use, the PW Transformer Storage Pit was not lined. In 1990, the pit was excavated and backfilled (Radian 1996).

The PW Transformer Storage Pit and HVSSA site is located in the southern portion of the PW Compound approximately 500 feet from the nearest active PW facility (Building 996) and encompasses approximately 70,000 square feet (1.61 acres). From 1979 to 1990, the PW Transformer Storage Pit was used to store transformers from throughout the NAWS China Lake and Randsburg Wash/Mojave B complexes. The PW Transformer Storage Pit typically held 15 to 20 transformers. When the PW Transformer Storage Pit was full, transformers were stored north of the pit, in the area now known as the New Transformer Storage Yard. Until 1984, transformers were set directly on the ground in the unlined PW Transformer Storage Pit. Commercial drip pans were used starting in 1988. Spills were documented during a 1991 Department of Health Services inspection (PRC Environmental Management, Inc. [PRC] and Morrison Knudsen Corporation 1997).

The HVSSA is located directly south of the PW Transformer Storage Pit. A review of an historical aerial photograph from 1984 shows that transformers were stored in the HVSSA, along the fence that divides the PW Transformer Storage Pit from the HVSSA (Figure 2). Elevated concentrations of PCBs found in surface soils in the HVSSA are believed to be from the transformers that were gathered in the HVSSA, and not from any migration of contamination from the PW Transformer Storage Pit.

### 2.1.1 Surrounding Land Use and Proposed Reuse

The use of the land surrounding the PW Transformer Storage Pit and HVSSA site includes additional storage and heavy equipment maintenance areas, and various high-occupancy industrial uses within the PW Compound. The proposed reuse for the PW Transformer Storage Pit and HVSSA site will remain consistent with its current use as a low-occupancy industrial area.

### 2.1.2 Site Geology and Hydrogeology

The site-specific geology and hydrogeology has not been fully characterized at the PW Transformer Storage Pit and HVSSA site; however, the following geological and hydrological conditions are known to exist within the PW Compound as evidenced by investigations at IRP Sites 69, 70, and 71 and the former PW gas station site (Tetra Tech EM Inc. [Tetra Tech] and Washington Group International, Inc. 2002). The PW Compound generally is underlain by poorly sorted, medium-grained sand, with silt and gravel, from the ground surface to approximately 5 feet below ground surface (bgs). From 5 feet bgs to approximately 45 feet bgs, the lithology consists mostly of fine to medium sand and well sorted silty sand. The depth to groundwater is located at approximately 45 feet bgs. Less permeable silts and clays mark the bottom of the shallow hydrogeologic zone/top of the intermediate hydrogeologic zone at approximately 45 to 50 feet bgs.

### 2.1.3 Climate and Meteorology

The climate in the area of the NAWS China Lake complex is semiarid. The complex sits in the Indian Wells Valley which lies in the rain shadow created by the Sierra Nevada mountain range. The Indian Wells Valley watershed covers approximately 860 square miles (approximately 500 square miles in the mountains and hills and approximately 360 square miles in the valley). Temperatures in the Indian Wells Valley often exceed 100°F during the summer months (the longest spell of temperatures exceeding 100°F on record is 85 consecutive days, from July 17 through September 9, 1994) and average about 55°F during the winter months (Indian Wells Valley Water District 2002). Prevailing wind in the Indian Wells Valley is from the southwest, and the average daily wind speed for 2002 was 4.5 miles per hour (mph). However, wind speeds in excess of 25 mph were recorded throughout 2002, and winds speeds in excess of 50 mph are common between October and June (SulTech 2005b).

Average annual precipitation within the Indian Wells Valley watershed varies from approximately four inches per year in the vicinity of Ridgecrest and the China Lake Complex to between five and six inches per year in the surrounding Argus, Coso, and El Paso mountain ranges. More than ten inches of rain falls annually along the crest of the Sierra Nevada mountains. Most of the precipitation occurs between October and March, with January typically being the wettest month. Typical desert thunderstorms occur in the late summer. Precipitation falls in the form of rain, with the exception of occasional snow at the higher mountain elevations during the winter months.

### 2.1.4 Regional Ecology

A site walk was performed by the Navy with DFG personnel in November 2006. DFG personnel characterized the PW Transformer Storage Pit and HVSSA site as a low-quality, disturbed desert scrub habitat.

Approximately 35 species of reptiles and amphibians, 310 species of birds, and 46 species of mammals have been observed at NAWS China Lake; the greatest diversity and density of species occurred in wetland and riparian areas in the China Lake Complex. Larger mammals include the kit fox (*Vulpes macrotis arsipus*), coyote (*Canis latrans*), and bobcat (*Felis rufus*). Nearly all species are migratory or transient species most likely to use wetland and riparian areas and hence are protected as listed species. Four threatened and endangered species at NAWS China Lake are considered management issues: (1) the Mohave tui chub (*Gila bicolor mohavensis*); (2) the desert tortoise (*Gopherus agassizii*); (3) the Inyo California towhee (*Pipilo crissalis eremophilus*); and (4) the Mohave ground squirrel (*Spermophilus mohavensis*) (SulTech 2005b).

## 2.2 HISTORY OF PREVIOUS REMOVAL ACTIONS, INVESTIGATIONS, AND ACTIVITIES

A summarized chronology of previous removal actions, investigations, and activities conducted at the PW Transformer Storage Pit and HVSSA site is presented below.

- The PW Transformer Storage Pit was used for storage of transformers from 1979 to 1990 (Radian 1996).
- In 1981, an aluminum-plated support dock was installed in a fenced area used to store new transformers south of the pit (Radian 1996).
- Until 1984, used transformers were set directly on the ground.
- Navy-constructed containment devices (drip pans) were used from 1984 to 1988 (Radian 1996).
- Commercial drip pans were used starting in 1988 (Radian 1996).
- Spills, improper labeling of transformers, and failure to post a warning sign on the fence outside the storage yard were documented during a 1991 Department of Health Services inspection (Radian 1996).
- In approximately 1990, the PW Transformer Storage Pit was excavated and partially backfilled (Radian 1996).
- In 1990, transformer sampling and storage activities were temporarily transferred from the old pit to the fenced New Transformer Storage Yard, as permitted by the DTSC, for temporary storage and sampling of used transformers. The New Transformer Storage Yard overlies an area on the north rim of the PW Transformer Storage Pit; transformers were stored on drip pans (Radian 1996).
- A preliminary assessment was conducted in the early 1990s (PRC and Montgomery Watson 1996).
- Further characterization, which included collection of four background soil samples and 86 soil samples from 11 locations in and around the pit, from the surface to a depth of 40 feet bgs was conducted in 1996 (Radian 1996).
- A site reconnaissance was conducted in 1996 (PRC and Morrison Knudsen Corporation 1997).
- Soil was excavated and disposed of off site in July 1997, and confirmation samples were collected to verify that the excavation was complete. Based on the initial excavation and analytical results, a second excavation was completed in September 1997.

- A human health risk assessment was conducted in 2000 under the RCRA corrective action. Two surface soil sampling events were conducted in January and April 2000 in support of the risk assessment to evaluate exposures of industrial workers and hypothetical future construction workers to PCBs in soil. Results of the risk assessment are summarized in Section 2.4.1 (Dames and Moore 2000c). The 2000 sampling results formed the basis for the horizontal limits of the removal action.

- A third round of soil samples was collected in August 2000 by the NAWS China Lake Environmental Planning and Management Department (see Figure 3).

- The most recent groundwater and soil sampling event was conducted in January 2004 during the Contamination Assessment. Soil and groundwater sampling locations from the Contamination Assessment are shown on Figure 2. The results of this investigation are discussed in the following section.

## 2.3 SOURCE, NATURE, AND EXTENT OF CONTAMINATION

A human health risk assessment was conducted in 2000 (Dames and Moore 2000c) under the RCRA corrective action. Two surface soil sampling events were conducted in January and April 2000 in support of the risk assessment to evaluate exposures of industrial workers and hypothetical future construction workers to PCBs in soil. Results of the risk assessment are summarized in Section 2.4.1. The 2000 sampling results formed the basis for the horizontal limits of the removal action.

Based on the analytical results obtained during the Contamination Assessment performed at the PW Transformer Storage Pit and HVSSA site at China Lake, PCBs were identified as chemicals of concern (COC) in soil (SulTech 2005a). Soils exhibiting PCB concentrations exceeding the TSCA high-occupancy limit of 1 milligram per kilogram (mg/kg) are widespread and were indicated in over approximately 36,200 square feet of the PW Transformer Storage Pit and HVSSA site. However, contamination levels in the upper two feet of surface soils throughout the site appear to be limited generally to concentrations below 50 mg/kg, except for a limited area of more significant contamination in the vicinity of soil borings ST68-SB02, ST68-SB03, and ST68-SB15 (see Figure 3). Concentrations of PCBs greater than 100 mg/kg were also found in deeper soils, but only in a limited area of approximately 225 square feet to a maximum depth of approximately 5 feet bgs in the immediate vicinity of soil boring ST68-SB02 (see Figure 3).

Dioxins/furans concentrations exceeded both residential and industrial preliminary remediation goals (PRG) in one of two soil samples selected for additional analysis indicating a possible risk to human health. Dioxin/furans were detected in the soil sample collected at location ST68-SB02 from 1 to 3 feet bgs, but not in the sample collected from 5 to 7 feet bgs. Dioxins/furans are not directly addressed in this EE/CA because they are regarded as incidental to the PCB soil contamination. Actions taken to address PCB contamination will also reduce dioxin/furan contamination. Analysis for dioxins/furans will be included during confirmation sampling. Dioxins/furans will be addressed by the selected removal action alternative because dioxin/furan

contamination is co-located with PCB contamination in soil at the PW Transformer Storage Pit and HVSSA site.

### 2.3.1 Analytical Data

During the Contamination Assessment conducted in January 2004, a total of 120 soil samples were collected from 40 sampling locations (Figure 2). During this investigation, the sampling decision criterion of 0.22 mg/kg for total PCBs was used to characterize the horizontal and vertical extent of PCBs in soils.

### 2.3.2 Results for Soil Sampling

Results for soil sampling performed as part of the Contamination Assessment are summarized in the following subsections:

#### *2.3.2.1 PCBs*

The results for ten of the samples exceeded the TSCA high-occupancy cleanup level of 1 mg/kg for PCBs in soil. The analytical results for the ten samples ranged from 3.85 to 206 mg/kg and indicated that Aroclor 1260 was the only PCB found at elevated concentrations. Two of these ten samples also exceeded the TSCA low-occupancy cleanup level of 25 mg/kg for PCBs in soil near soil borings ST68-SB02 and ST68-SB03.

A total of twelve soil samples collected during the sampling event were split and analyzed off-site. The analytical results for three of these confirmation samples indicated concentrations of PCBs that exceeded the high-occupancy cleanup level of 1 mg/kg. The results for PCBs ranged from 0.008 to 3,100 mg/kg.

The majority of the PCBs detected at concentrations above the sampling decision criterion were found between 0 and 5 feet bgs. The highest concentrations of PCBs (3,100 mg/kg) were found in the soil samples collected at 3 feet bgs from location ST68-SB02. One sample collected at 32 feet bgs from location ST68-SB02 contained PCBs at a concentration of 0.92 mg/kg (Figure 2).

Based on soil data obtained from the Contamination Assessment, an area of approximately 36,200 square feet exceeds the high-occupancy action level of 1 mg/kg; an area of approximately 6,965 square feet exceeds the risk-based action level of 13.3 mg/kg; and an area of 2,060 square feet exceeds the low-occupancy action level of 25 mg/kg.

#### *2.3.2.2 Dioxins and Furans*

Of the 12 soil samples collected during the Contamination Assessment, two were further analyzed for metals, dioxins and furans, volatile organic compounds (VOC), and total petroleum

hydrocarbons (TPH). These two samples were collected from location ST68-SB02 at depths of 1 to 3 feet bgs and 5 to 7 feet bgs.

Dioxins/furans concentrations exceeded both residential and industrial PRGs in one of two soil samples selected for additional analysis. Dioxin/furans were detected in the soil sample collected at location ST68-SB02 from 1 to 3 feet bgs, but not in the sample collected from 5 to 7 feet bgs. Toxicity equivalency factors were used to convert the results for all detected non-2,3,7,8-tetrachlorinated-dibenzo-p-dioxin (TCDD) dioxin and furan congeners into equivalent 2,3,7,8-TCDD concentrations. The sum of the values is the toxicity equivalent value. The toxicity equivalent value calculated for the sample was 749 nanograms per kilogram (ng/kg), while the comparison criterion used during the Contamination Assessment for 2,3,7,8-TCDD was 3.9 ng/kg.

#### *2.3.2.3 Arsenic*

Arsenic was the only metal detected above the comparison criterion used during the Contamination Assessment. Arsenic was detected in both samples at concentrations that exceeded the Contamination Assessment sampling decision criterion (0.39 mg/kg): 4.4 mg/kg in the shallower sample and 5.2 mg/kg in the deeper sample. For comparison, the ambient level of arsenic for younger alluvium surface soils at NAWS China Lake is 5.1 mg/kg (Tetra Tech 1998). As a result arsenic was not considered to be a COC for the PW Transformer Storage Pit and HVSSA site.

#### *2.3.2.4 Total Petroleum Hydrocarbons*

Of the two samples sent for additional analysis, TPH (motor oil range) was detected in the shallower sample at a concentration of 450 mg/kg. TPH is not considered to be a COC for the PW Transformer Storage Pit and HVSSA site.

### 2.3.3 Results for Groundwater Sampling

Six grab groundwater samples were collected from temporary well points during the Contamination Assessment, from five sample locations at depths of approximately 45 feet bgs. PCBs were detected in one sample split from ST68-TW02 with a concentration of 2.2 micrograms per liter (µg/L), exceeding the Contamination Assessment sampling decision criterion (tap water PRG) of 0.034 µg/L. The state and federal maximum contaminant level (MCL) for PCBs is 0.5 µg/L. PCBs were not detected in the other groundwater samples.

The sample split from location ST68-TW01 was also analyzed for metals, dioxins and furans, TPH, and VOCs. Metals detected at concentrations above tap water PRGs included aluminum, arsenic, iron, manganese, molybdenum, and vanadium. Octachlorinated dibenzo-p-dioxin was detected at an estimated concentration of 28 picograms per liter (pg/L). The dioxin equivalent concentration of this detection is 0.0028 pg/L, which is less than both the MCL of 30 pg/L and tap water PRG of 0.45 pg/L. TPH was not detected in the sample.

Two VOCs, bromodichloromethane (estimated concentration of 0.4 µg/L) and carbon tetrachloride (1.7 µg/L), were detected in only one of six groundwater samples at concentrations slightly above the tap water PRGs. The detected concentration of carbon tetrachloride was slightly above the California MCL of 0.5 µg/L and the tap water PRG of 0.17 µg/L, but less than the federal MCL of 5.0 µg/L). The detected concentration of bromodichloromethane was slightly above the tap water PRG of 0.18 µg/L. No California or federal MCL currently exists for bromodichloromethane. This EE/CA focuses on soil remediation only. Groundwater issues will be addressed separately under the CERCLA process for the Michelson Laboratory / PW Operable Unit.

Of the six groundwater samples collected during the Contamination Assessment, concentrations of PCBs, carbon tetrachloride, and bromodichloromethane (estimated) were detected above tap water PRGs in only one of the samples. Groundwater in the shallow aquifer underlying the PW Transformer Storage Pit and HVSSA site is not presently used as a drinking water source, thus potential exposure to chemicals in groundwater is limited. Therefore, consumption of groundwater was not considered as a potential exposure pathway. However, as mentioned above, apparent groundwater contamination will be addressed under the CERCLA process for the Michelson Laboratory / PW Operable Unit.

## 2.4 STREAMLINED RISK EVALUATION

Conditions at the PW Transformer Storage Pit and HVSSA site meet the following NCP requirements for a removal action (40 CFR 300.415(b)(2)): (1) high levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate; (2) actual or potential exposure to hazardous substances or pollutants or contaminants by nearby populations, animals, or food chains; and (3) weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released. The basis for the determination of these conditions is summarized in the following subsections.

### 2.4.1 Previous Risk Assessments and Evaluations

A formal, quantitative risk assessment was performed following the surface soil sampling conducted in 2000 (Dames and Moore 2000c). The risk assessment concluded that concentrations of PCBs in the former pit area (Figure 2) are within acceptable levels for the exposures that were evaluated. However, concentrations are elevated for the area as a whole and in the area south of the fence between the PCB transformer storage pit and the HVSSA, resulting in risk and hazard estimates above acceptable levels. In addition, the April 2000 data indicate a trend of increasing concentrations south of the pit area compared to January 2000 data. However, as recommended by the risk assessment, further sampling was conducted in August 2000, and the results were evaluated to delineate the horizontal extent of contamination. The results showed a PCB contamination level similar to the PCB contamination level found during the first round of sampling in January 2000, indicating stabilization of the PCB concentrations in surface soils. The risk assessment recommended further evaluation of site conditions and indicated that remediation may be warranted. As a result of this recommendation, the Contamination Assessment was performed in 2004. The risk assessment

and Contamination Assessment documents are available for review in their entirety in the Administrative Record File for the Site which can be reviewed at 1220 Pacific Highway, San Diego, California 92132.

### 2.4.2 Health Effects Associated with Chemicals of Concern and Threat to Nearby Human Populations and Environment

PCBs are the COC identified for the PW Transformer Storage Pit and HVSSA site. PCBs are a group of chemicals that contain 209 individual compounds (known as congeners) with varying harmful effects. PCBs can enter the body through ingestion, dermal contact, or inhalation pathways. All PCB mixtures are considered to be toxic, and are known to cause cancer in animals. PCBs are likely to be human carcinogens, and they pose a number of non-cancer health hazards to intellectual functions and the nervous, immune, and reproductive systems. PCBs pose special risks to pregnant women and have been linked to premature births and lowered intelligent quotients in children.

In general, fetuses and neonates are potentially more sensitive to PCBs than are adults because the hepatic microsomal enzyme systems that facilitate the metabolism and excretion of PCBs are not fully functional in fetuses and neonates. In addition, infants and young children consume a greater amount of food per kilogram of body weight and therefore have a proportionately greater exposure to PCBs.

### 2.4.3 Documented Exposure Pathways

The primary routes of exposure to PCBs at the PW Transformer Storage Pit and HVSSA site were identified as inhalation of, or dermal contact with, contaminated soils (Dames and Moore 2000c). Routes of exposure to PCBs in the general population involve the consumption of contaminated foods, particularly meat, fish, and poultry. The resistance of these compounds to biodegradation causes PCBs to become more concentrated as they move upward through the food chain. Occupational exposure to PCBs occurs mainly via the inhalation and dermal routes. Exposure can occur via inhalation of contaminated dust particles and, though typically to a lesser extent, inhalation of PCB vapors.

Inhalation exposure of local residents from windblown dust is not considered to constitute a complete risk pathway. Based on the "Final Human Health Risk Assessment, PCB Transformer Storage Pit" dated August 31, 2000 (Dames and Moore 2000c), and as indicated in Section 2.1.3 of this EE/CA, the prevailing wind direction in the PW Transformer Storage Pit and HVSSA site is predominantly from the southwest and therefore away from the residents of Ridgecrest to the west and southwest.

Additionally, although PCBs evaporate slowly at room temperature, their volatility increases dramatically with even a small increase in temperature, which could provide an inhalation pathway. Because of the highly lipophilic nature of PCBs, they can also be absorbed through the skin following contact with contaminated equipment, water, or soil.

### 2.4.4 Sensitive Populations

The primary receptors who may be affected by the PCB contamination at the PW Transformer Storage Pit and HVSSA site are the industrial workers located in the PW Compound. While direct exposure to contaminated soils is limited by the low-occupancy status of the site, industrial workers within the PW Compound could potentially come into direct contact with contaminated soils from the PW Transformer Storage Pit and HVSSA site through the windblown migration of surface soils. Although the PW Transformer Storage Pit and HVSSA site is infrequently occupied (52 hours per year), workers could also be exposed to PCBs by direct dermal contact during their intermittent visits to the area for HVSSA work duties.

The DFG Office of Spill Prevention and Response (OSPR) characterized the PW Transformer Storage Pit and HVSSA site as low-quality, disturbed desert scrub habitat.

## 3.0 IDENTIFICATION OF REMOVAL ACTION OBJECTIVES

This section discusses the following aspects of the planned removal action within the PW Transformer Storage Pit and HVSSA site: (1) the statutory framework; (2) determination of scope; (3) determination of schedule; (4) ARARs; and (5) the remedial action objectives (RAO).

### 3.1 STATUTORY FRAMEWORK

The removal action is taken pursuant to CERCLA § 104, under the delegated authority of the Office of the President of the United States by EO 12580, which provides the Navy with authorization to conduct and finance removal actions. The removal action is considered an NTCRA because a six-month planning period is available between the time the removal action was determined to be necessary and before the initiation of any removal action activity. The requirements for this EE/CA and its mandated public comment period provide an opportunity for public input on the cleanup process. The entire process is also governed by the FFSRA, signed by the Navy, DTSC, and the Regional Water Quality Control Board, and dated November 2003. The removal action will be consistent with the NCP, Ca-HSC, Division 20, Chapter 6.8, and the FFSRA between the Navy and the State of California.

Additionally, the Ca-HSC specifies the preparation of necessary documentation which depends upon the costs of the removal action. The Ca-HSC requires development of either: a RAP for removal actions that costs $1 million or greater; or a RAW for removal actions that cost less than $1 million. Further, the Ca-HSC authorizes DTSC to waive the RAP in favor of a RAW for removal actions when an Imminent and/or Substantial Endangerment determination exists. DTSC may also waive the RAP requirements of Ca-HSC § 25356.1(d)(1) - (6), if a RAP that meets the requirements of Ca-HSC § 25356.1(h)(3) is prepared.

The Navy, with State regulatory oversight, is the lead agency for the removal action. As such, Navy has final approval authority over the recommended alternative and all public participation activities with State concurrence. The Naval Facilities Engineering Command, Southwest, is

the regional manager of the Navy's CERCLA program, and is therefore providing technical expertise to the Navy to conduct activities specific to the preparation of this EE/CA and the execution of the recommended alternative.

This EE/CA complies with the requirements of CERCLA, Superfund Amendments and Reauthorization Act, NCP (40 CFR Part 300), Defense Environmental Restoration Program at 10 *United States Code* §2701, et seq., and EO 12580. This EE/CA is being pursued under the NCP, 40 CFR Part 300.415(b) (2) (i)-(viii).

## 3.2 DETERMINATION OF REMOVAL ACTION SCOPE

This EE/CA identifies and recommends alternatives for removal action at the PW Transformer Storage Pit and HVSSA site. The removal action is intended to reduce possible risks to human and ecological health and the environment from PCB-contaminated soil. The current use of the site meets the definition of a low-occupancy area as defined under TSCA (see Section 2.1.1), and it is expected that the future use of the site will continue to be a low-occupancy area. All alternatives evaluated in this EE/CA will be protective of the current and planned future use of the property. Some alternatives will leave PCB-contaminated soil in place above concentrations that allow for the unrestricted use of the property. If one of these alternatives is selected, it will address long-term residual risk under the framework of CERCLA. Confirmation sampling will be performed following the removal action to confirm that the goals of the NTCRA have been accomplished.

Land-use controls (LUC) are legal and administrative measures designed to limit land use and on-site activity in order to protect human health and environment after completion of a response action. LUCs include engineering controls (EC) and institutional controls (IC). ECs eliminate or reduce exposure to chemical or physical hazards through the use of physical control measures, such as fences and containment caps. ICs are non-engineered instruments such as administrative and/or legal controls designed to minimize the potential for human and ecological exposure to contamination by limiting land or resource use and/or by providing information to help modify or guide human behavior at the site. Future plans to change the use of the PW Transformer Storage Pit and HVSSA site to a residential/commercial type zone are considered highly unlikely because of the continued mission of NAWS China Lake as a Navy Research, Development, Test, and Evaluation installation. Nonetheless, planned implementation of permanent LUCs will be evaluated as part of the Michelson Laboratory / PW Operable Unit Feasibility Study (FS) to meet site conditions after specific remediation activities and to minimize human and ecological exposure to contamination. The FS will also address post-removal cumulative risk posed by residual contamination at the site. The permanent LUCs will be memorialized in the Record of Decision (ROD).

## 3.3 DETERMINATION OF REMOVAL ACTION SCHEDULE

Following submittal of the Draft EE/CA, California regulatory agencies participated in a 60-day review period. Following incorporation of agency comments on the Draft EE/CA, this Draft Final version of the EE/CA will be submitted to the agencies, and an additional 30-day review

period will occur. Upon incorporation of any agency comments on the Draft Final EE/CA, the Final EE/CA will be submitted to the agencies and presented to the public.

The Navy will hold a 45-day public comment period for the Final EE/CA and solicit comments from residents of Ridgecrest, CA and other interested members of the public. Notice of the public comment period will be placed in a local newspaper of wide distribution announcing the availability of the EE/CA in a local information repository. Following receipt community input, and considering regulatory agency comments on the draft EE/CA, the Navy will select what it believes to be the most appropriate removal action alternative. This decision will be documented in an Action Memorandum (AM). The AM will also contain a responsiveness summary discussing all comments received during the public comment period. A second notice will be placed in the same local newspapers announcing the completion of the Action Memorandum. Further documentation necessary for the implementation of the removal action will consist of a work plan/sampling and analysis plan and health and safety plan (HASP).

The removal action and site restoration activities are expected to be completed within three months following award of the removal action contract. However, delays may be experienced as a result of weather (e.g., high winds or substantial precipitation events) or due to funding delays.

## 3.4 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The NCP states, "Removal actions ... shall to the extent practicable considering the exigencies of the situation, attain applicable or relevant and appropriate requirements under Federal environmental or state environmental or facility siting laws" (40 CFR 300.415(i)]).

A detailed evaluation of ARARs for this EE/CA can be found in Appendix C. The following sections provide an overview of the ARARs process and a summary of those ARARs that potentially affect the development of removal action objectives.

### 3.4.1 ARARs Overview

Identification of ARARs is a site-specific determination and involves a two-part analysis: (1) a determination must be made as to whether or not a given requirement is applicable; then (2) if the given requirement is not applicable, if it is relevant and appropriate. A requirement is deemed applicable if the specific terms of the law or regulation directly address a COC, potential removal or remedial action, or the location of the site. If the jurisdictional prerequisites of the law or regulation are not met, a legal requirement may nonetheless be relevant and appropriate if the site's circumstances are sufficiently similar to circumstances in which the law otherwise applies and if the requirement is well-suited to the conditions of the site.

A requirement must be substantive in order to constitute an ARAR for activities conducted onsite. Procedural or administrative requirements such as permits and reporting requirements are not ARARs.

In addition to ARARs, the NCP provides that where ARARs do not exist, agency advisories, criteria, or guidance are "to-be-considered" (TBC) useful "in helping to determine what is protective at a site or how to carry out certain actions or requirements" (55 Federal Register 8745). However, the NCP preamble states that provisions in the TBC category "should not be required as cleanup standards because they are, by definition, generally neither promulgated nor enforceable, so they do not have the same status under CERCLA as do ARARs."

As the lead federal agency, the Navy has the primary responsibility for the identification of Federal ARARs at the PW Transformer Storage Pit and HVSSA site. As the lead State agency, DTSC has the responsibility for identifying State ARARs. A detailed evaluation of ARARs can be found in Appendix C.

### 3.4.2 ARARs Affecting Removal Action Objectives and Alternatives

ARARs are generally divided into three categories: chemical-specific, location-specific, and action-specific. These categories of ARARs affect the development of removal action objectives and are discussed in the following sections.

#### *3.4.2.1 Chemical-Specific ARARs*

Chemical-specific ARARs are health- or risk-based numerical values or methodologies that, when applied to site-specific conditions, result in establishment of numerical cleanup values. These values establish the maximum acceptable concentration of a chemical that may be found in, or discharged to, the ambient environment while still remaining protective of human health or ecological receptors.

The TSCA self-implementing cleanup option under 40 CFR § 761.61(a)(4)(i) and TSCA risk-based cleanup option under 40 CFR § 761.61(c)(2) are potential chemical-specific ARARs that establish cleanup levels for PCB-contaminated soil and are the basis for the removal action objectives (see Section 4.0). Under the self-implementing option under 40 CFR § 761.61(a)(4)(i), the bulk PCB remediation waste cleanup level for unrestricted high-occupancy areas is less than or equal to 1 mg/kg without further conditions. Bulk PCB remediation waste may be left in place at concentrations equal to 10 mg/kg at high-occupancy areas, if the areas are capped. The bulk PCB remediation waste cleanup level for low-occupancy areas is less than or equal to 25 mg/kg. Additionally, the self-implementing option applies to the storage and disposal of PCB remediation waste. The risk-based cleanup option under 40 CFR § 761.61(c)(2) accepts a PCB remediation method that "will not pose an unreasonable risk of injury to health or the environment." According to TSCA low-occupancy criteria (335 hours of exposure per year) and a target cancer risk of $10^{-6}$, the calculated remediation goal for PCBs is calculated to be 13.3 mg/kg (Appendix D). Using this 335-hour exposure duration in the standard industrial PRG equation results in a conservative site-specific cleanup level of 13.3 mg/kg considering that the actual number of hours worked at the PW Transformer Storage Pit and HVSSA site is less than 52 hours per year.

The Navy has also identified the following potential chemical-specific ARARs requiring characterization of waste generated in the performance of the removal action for off-site disposal: The Navy will determine if the waste meets the definition of a RCRA hazardous waste, a non-RCRA state-regulated hazardous waste, or a solid waste regulated by California Code of Regulations (Cal. Code Regs.) Title 27. These potential ARARs are:

- Cal. Code Regs. Title 22, §§ 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100 – for the definition of RCRA hazardous waste.
- Cal. Code Regs., Title 22, §§ 66261.22(a)(3) and (4), § 66261.24(a)(2)–(a)(8), § 66261.101, § 66261.3(a)(2)(C) or § 66261.3(a)(2)(F) – for the definition of a non-RCRA state regulated hazardous waste.
- Cal. Code Regs., Title 27, §§ 20210, 20220 and 20230 – for the definition of designated waste, non-hazardous waste, and inert waste.

#### *3.4.2.2 Location-Specific ARARs*

Location-specific ARARs are restrictions placed on concentrations of hazardous substances or the conduct of activities as a result of the characteristics of the site or its immediate environment. The Navy and DFG personnel performed a site walkthrough in November 2006. The DFG-OSPR has characterized the PW Transformer Storage Pit and HVSSA site as a low-quality, disturbed desert scrub habitat. The DFG has provided potential ARARs at the Navy's request. After evaluation, the Navy accepts the following regulations identified by DFG as potential location-specific ARARs.

- Fish and Game Code §§ 3005, 3503, 3503.5, and 3800, Cal. Code Regs. Tit. 14, § 460, Fish and Game Code § 4150, Fish and Game Code § 4800, Fish and Game Code § 5000

These site-specific ARARs require that actions must be taken to protect wildlife on the remediation site. Hence, standard pre-construction surveys and protective measures for special status species would be carried out at the site prior to and during any removal action in accordance with the substantive requirement of these potential ARARs.

#### *3.4.2.3 Action-Specific ARARs*

Action-specific ARARs are technology- or activity-based requirements or limitations on actions taken with respect to hazardous wastes. These requirements are triggered by the particular remedial activities selected and suggest how a selected removal action alternative should be achieved. These action-specific requirements do not, in themselves, determine the removal action alternative; rather, they indicate how a selected alternative must be conducted. Therefore, because action specific ARARs depend on the action selected, they are identified after

an alternative has been selected. Potential action-specific ARARs are identified for the four alternatives in Appendix C.

### 3.5 REMOVAL ACTION OBJECTIVES

Based on the NCP, the risk-based concentrations established in the risk assessment, and ARARs, the RAOs are as identified as follows:

- Prevent human and ecological exposure to soils containing concentrations of PCBs at levels presenting unacceptable risk;
- Prevent migration to off-site receptors of dust containing contamination remaining at the site after the removal action; and
- Prevent ecological receptors from contacting soil contamination remaining at the site at levels below low-occupancy human receptor levels.

## 4.0 IDENTIFICATION AND ANALYSIS OF REMOVAL ACTION ALTERNATIVES

Based on the RAOs presented in Section 3.5 above, the following four alternatives have been developed for the removal action at the PW Transformer Storage Pit and HVSSA site:

- Alternative 1A: Excavate Soils with PCB Concentrations Greater than 1 mg/kg, Backfill and Compact Clean Imported Soil in Excavation Area, and Implement LUCs at the Site Following Removal Action Activities (Maintains Current Low-Occupancy Industrial Use) (see Section 4.1)
- Alternative 1B: Excavate Soils with PCB Concentrations Greater than 13.3 mg/kg, Backfill and Compact Clean Imported Soil and Crushed Gravel in Excavation Area to Cover Full Extent of Contaminated Area, and Implement LUCs at the Site Following Removal Action Activities (Allows Risk-Based Low-Occupancy Reuse) (see Section 4.2)
- Alternative 1C: Excavate Soils with PCB Concentrations Greater than 25 mg/kg, Backfill and Compact Clean Imported Soil and Crushed Gravel in Excavation Area to Cover Full Extent of Contaminated Area, and Implement LUCs at the Site Following Removal Action Activities (Allows Low-Occupancy Reuse) (see Section 4.3)
- Alternative 2: Excavate Soils with PCB Concentrations Greater than 10 mg/kg, Backfill and Compact Clean Imported Soil in Excavation Area, Construct 6-inch Asphalt Cap over Soils with PCB Concentrations Greater than 1 mg/kg but Less than or Equal to 10 mg/kg, and Implement LUCs at the Site Following Removal Action Activities (Allows High-Occupancy Reuse) (see Section 4.4)

These alternatives have been evaluated based on effectiveness, implementability, and cost.

To evaluate effectiveness, consideration was given to the overall protection of human and ecological health and the environment, compliance with ARARs and other guidance, and both long- and short-term effectiveness of the alternative.

Evaluation of the implementability of each alternative included consideration of technical feasibility, and examination of commercial availability, administrative feasibility, and public acceptance.

Cost evaluations were made based upon estimates for capital costs, and annual operation and maintenance (O&M) costs. Capital costs will include the costs for design, construction, equipment, mobilization, equipment rental, labor, analytical costs, transportation, disposal fees (tippage), and decommissioning. For cost estimating purposes, O&M costs include long-term costs over 30 years for maintenance and inspections. Interim LUCs, which are evaluated as part of the EE/CA removal action Alternatives 1B, 1C, and 2, have also been included in cost estimation.

The disposal options discussed and the associated costs presented in the EE/CA are based on (1) available soil data for the PW Transformer Storage Pit and HVSSA site, including data from the 2004 Contamination Assessment and other previously collected data; and (2) "in place" PCB concentrations currently available. Available soil data for the PW Transformer Storage Pit and HVSSA site, including data from the 2004 Contamination Assessment and other previously collected data, were used to guide the design of initial excavation area(s). Estimated disposal costs and excavation volumes in the EE/CA were refined based on "in place" PCB concentrations currently available. Actual disposal options and costs associated with estimated excavation volumes are subject to change, based on the results of characterization soil sampling conducted during the removal action. The determination of removal action completion will be based upon the results of PCB concentrations in confirmation soil samples taken following excavation of contaminated soils.

Because the alternatives have differing durations to completion, a present (year 2008) worth has been calculated for each based on a 3% annual discount factor. The present worth analysis provides a single figure representing the amount of money that, if invested in the base year and dispersed as needed, would cover all costs associated with the alternative. The present worth calculation normalizes alternatives that have differing operating life times to facilitate comparisons. It must be noted that all "total project duration" numbers are based on the time that the capital equipment is delivered to the site. It is assumed that the period for procurement and design for all potential systems will be similar. Thus, this period, usually 6 to 8 months, was not included in any of the project duration numbers.

## 4.1 ALTERNATIVE 1A: EXCAVATE SOILS WITH PCB CONCENTRATIONS GREATER THAN 1 MG/KG, BACKFILL AND COMPACT CLEAN IMPORTED SOIL IN EXCAVATION AREA, AND IMPLEMENT LUCS AT THE SITE FOLLOWING REMOVAL ACTION ACTIVITIES (MAINTAINS CURRENT LOW-OCCUPANCY INDUSTRIAL USE)

Alternative 1A would involve complete removal and disposal of soils containing PCB concentrations exceeding 1 mg/kg and backfilling of clean imported soil in the excavation area. Restrictions to maintain the use of the site as low occupancy would include the LUCs to be evaluated under the CERCLA framework. PCB concentrations remaining in soil will be less than 1 mg/kg, which is the TSCA high-occupancy criterion. However, contaminants will be left on-site; therefore, after the removal, restrictions to maintain the use of the site as low-occupancy industrial use will be implemented through LUCs.

A total of approximately 3,385 cubic yards ([$yd^3$] bulked) of soil would be excavated (Figure 4). Excavated soils containing PCBs in concentrations less than 50 mg/kg (3,285 $yd^3$) would be transported to and disposed of at an appropriately permitted municipal non-hazardous waste landfill. Excavated soils containing PCBs in concentrations greater than 50 mg/kg (100 $yd^3$) would be transported to and disposed of at a TSCA hazardous waste landfill permitted by the EPA under § 3004 of RCRA, or permitted by a State authorized under § 3006 of RCRA. After the removal, the site would maintain current low-occupancy industrial use because remaining PCB, though at very low concentrations, would remain on-site. Future plans to change the use of the PW Transformer Storage Pit and HVSSA site to a residential/commercial type zone are considered highly unlikely because of the continued mission of NAWS China Lake as a Navy Research, Development, Test, and Evaluation installation. Nonetheless, planned implementation of LUCs as part of the Michelson Lab/Public Works Operable Unit will ensure that future land use remains consistent with current land use, and that buildings and/or structures will not be constructed in the PWTSP/HVSSA in the future.

This alternative would include LUCs with a duration of 30 years. A review of DoD's "A Guide to Establishing Institutional Controls at Closing Military Installations" (DoD 1999) identified the following LUCs for Alternative 1A:

- Restrict land use to the current low-occupancy industrial use;
- Prohibit use of surface water and groundwater;
- Prohibit excavation, construction, drilling, and disturbance of soil; and
- Restrict public access to PW Transformer Storage Pit and HVSSA site through ECs.

ECs would include clean compact soil backfill, site signs, and fencing. LUC language will be added to the China Lake Land Use Management Plan and documented in an LUC Remedial Design (RD) Plan to implement the LUCs through posting and installation of signs, notices, and fencing. The LUC RD will include annual inspections and CERCLA 5-year reviews as part of the remedy selected for the larger Michelson Laboratory/PW Operable Unit. The LUC will

remain in place as long as the contaminants of concern are present at concentrations which preclude unrestricted use of the site.

### 4.1.1 Effectiveness

Under Alternative 1A, removal of soil exhibiting PCB concentrations greater than or equal to 1 mg/kg would be performed. Removal of soil exhibiting PCB concentrations greater than or equal to 1 mg/kg would reduce the risk to human health to between $1x10^{-5}$ and $1x10^{-6}$ for high-occupancy reuse (Appendix D). However, because the PCB contaminated soil would still be left on-site, though at a very low concentration, LUCs will be implemented after the removal action to maintain current low-occupancy industrial land use.

Alternative 1A would thus be protective of overall public health and the environment. This alternative would meet the RAOs for the site and be compliant with ARARs. This alternative would be highly effective in the long term and would result in the reduction of toxicity, because all contaminated soil with PCB concentrations greater than or equal to 1 mg/kg would be removed from the site and either disposed of at a landfill or treated prior to disposal at a landfill, and LUCs will restrict the land use to current low-occupancy industrial use. This alternative would be effective in the short term if all personnel associated with the removal action at the site use PPE and follow procedures outlined in the HASP during the implementation of the NTCRA.

### 4.1.2 Implementability

Excavation and disposal of contaminated soil at a landfill is a common and proven technology that can be easily implemented with the help of readily available equipment. Transportation of contaminated soil across state boundaries (if necessary) for disposal at landfills or for incineration would require compliance with Department of Transportation (DOT) regulations for transportation of hazardous materials (hazmat). This is routinely done, and the permits for this off-site activity can be easily obtained. Backfilling with clean soil should not pose any technical or administrative hurdles. However, excavation of the relatively large area of soils with concentrations of PCBs greater than or equal to 1 mg/kg may require temporary re-location of site equipment and may disrupt the intermittent operations of the HVSSA. Alternative 1A thus has a high degree of technical and administrative feasibility but is considered moderately implementable.

### 4.1.3 Cost

The cost estimate for Alternative 1A is $1,384,000 (see Appendix A). Costs associated with this alternative include site preparation, excavation of about 3,385 $yd^3$ of PCB-contaminated soil, transportation and disposal of excavated material, and backfilling. A detailed cost estimate for Alternative 1A is available in Appendix A.

The total cost for Alternative 1A includes costs for the following activities:

- Excavation of all soils with PCB concentrations greater than 1 mg/kg;
- Transportation and disposal 100 $yd^3$ of soils with PCB concentrations greater than 50 mg/kg at a TSCA-permitted hazardous waste landfill;
- Transportation and disposal of 3,285 $yd^3$ soils with PCB concentrations less than 50 mg/kg at an appropriately permitted Class I municipal landfill; and
- Backfill and compaction of clean, imported soils in the excavation area.
- Implementation of interim LUCs, including ECs and ICs.

The estimated costs for this alternative were calculated using a combination of Remedial Action Cost Engineering and Requirements™ software (RACER™), Means CostWorks 2008 software (Reed Construction Data®) vendor quotations, and engineering judgment. These costs are as follows:

- Estimated Capital Cost: $964,000
- Estimated Annual O&M Cost: $84,000
- Periodic Cost (5-year Reviews): $336,000
- Estimated Duration of Removal: 1 month
- Estimated Total Cost based on 2008 $: $1,384,000

## 4.2 ALTERNATIVE 1B: EXCAVATE SOILS WITH PCB CONCENTRATIONS GREATER THAN 13.3 MG/KG, BACKFILL AND COMPACT CLEAN IMPORTED SOIL AND CRUSHED GRAVEL IN EXCAVATION AREA TO COVER FULL EXTENT OF CONTAMINATED AREA, AND IMPLEMENT LUCS AT THE SITE FOLLOWING REMOVAL ACTION ACTIVITIES (ALLOWS RISK-BASED LOW-OCCUPANCY REUSE)

Alternative 1B would involve excavation and disposal of soils containing PCBs at concentrations greater than 13.3 mg/kg and would provide for a low-occupancy future land use (as defined in 40 CFR §761.3). Alternative 1B would also involve backfilling of clean imported soil and crushed gravel into the excavation area to cover the full extent of the contamination-delineated area following removal action activities. Clean compacted soil and gravel backfill serves the purpose of reducing DTSC's concerns regarding inhalation exposure from vehicular and windblown fugitive dust. Restrictions to maintain the use of the site as low occupancy would include the LUCs to be evaluated under the CERCLA framework.

Alternative 1B would require excavation of a total of 725 $yd^3$ of soil (Figure 5). Excavated soils containing PCBs in concentrations less than 50 mg/kg (625 $yd^3$) would be transported and disposed of at an appropriately permitted municipal non-hazardous waste landfill. Excavated soils containing PCBs in concentrations greater than 50 mg/kg (100 $yd^3$) would be transported and disposed of at a TSCA hazardous waste landfill permitted by the EPA under § 3004 of RCRA, or by a State authorized under § 3006 of RCRA.

This alternative would include LUCs with duration of 30 years. A review of DoD's "A Guide to Establishing Institutional Controls at Closing Military Installations" (DoD 1999) identified the following LUCs for Alternative 1B:

- Restrict land use to the current low-occupancy industrial use;
- Prohibit use of surface water and groundwater;
- Prohibit excavation, construction, drilling, and disturbance of soil; and
- Restrict public access to PW Transformer Storage Pit and HVSSA site through ECs.

ECs would include clean compact soil backfill, gravel cover, site signs, and fencing. LUC language will be added to the China Lake Land Use Management Plan and documented in an LUC RD Plan to implement the LUCs through posting and installation of signs, notices, and fencing. The LUC RD will include annual inspections and CERCLA 5-year reviews as part of the remedy selected for the larger Michelson Laboratory / PW Operable Unit. The LUC will remain in place as long as the contaminants of concern are present at concentrations that preclude unrestricted use of the site.

### 4.2.1 Effectiveness

Alternative 1B would provide overall protectiveness of public health and the environment as long as the site is restricted to "low occupancy" uses. Any change in future land use to high-occupancy use would require further remediation as described in Alternatives 2. The top of the excavation area would be backfilled with crushed gravel to cover the full extent of the contamination-delineated area following removal action activities to mitigate potential exposure of ecological receptors and to reduce DTSC concerns regarding human inhalation exposure from vehicular and windblown fugitive dust from the PW Transformer Storage Pit and HVSSA site. Under the TSCA low-occupancy criterion, the removal of soil exhibiting PCB concentrations greater than or equal to 13.3 mg/kg would reduce the risk to human health to $1x10^{-6}$ based on the conservative exposure duration of 335 hours (Appendix D). Alternative 1B would thus be protective of overall public health and the environment. Alternative 1B would meet the RAOs for the site and would be compliant with ARARs. This alternative would be highly effective in the long term based on the assumption that the site designation does not change from the low-occupancy exposure duration.

This alternative would result in partial removal of contamination from the site; only soils with PCBs in concentrations greater than 13.3 mg/kg would be removed from the site. This alternative would be effective in the short term if all personnel associated with the removal action at the site use PPE and follow procedures outlined in the HASP during the implementation of the NTCRA.

### 4.2.2 Implementability

Excavation and disposal of contaminated soil at a landfill is a common and proven technology and can be easily implemented with readily available equipment. Transportation of contaminated soil across state boundaries for disposal at landfills or for incineration would require compliance with DOT regulations for transportation of hazmat. Required permits for this off-site activity can be readily obtained. Backfilling with clean soil and crushed gravel and maintenance are widely used technologies that should not pose any technical or administrative hurdles. Thus, Alternative 1B is considered to be highly implementable.

### 4.2.3 Cost

The cost estimate for Alternative 1B is $891,000 (see Appendix A). Costs associated with this alternative include site preparation, excavation of about 725 $yd^3$ of PCB-contaminated soil, transportation and disposal of excavated material, backfilling with clean soil and crushed gravel, site restoration (fencing), and implementation of LUCs. A detailed cost opinion for Alternative 1B is available in Appendix A.

The total cost for Alternative 1B includes costs for the following:

- Excavation of all soils with PCB concentrations greater than 13.3 mg/kg;
- Transportation and disposal of 100 $yd^3$ soils with PCB concentrations greater than 50 mg/kg at a TSCA-permitted hazardous waste landfill;
- Transportation and disposal of 625 $yd^3$ soils with PCB concentrations less than 50 mg/kg at an appropriately permitted Class I municipal landfill;
- Backfill and compaction of clean imported soils and crushed gravel in the excavation area; and
- Implementation of interim LUCs, including ECs and ICs.

The estimated costs for this alternative were calculated using a combination of RACER™, Means CostWorks 2008 software (Reed Construction Data®), vendor quotations, and engineering judgment. The costs are as follows:

- Estimated Capital Cost: $471,000

- Estimated Annual O&M Cost: $84,000
- Periodic Cost (5-year Reviews): $336,000
- Estimated Duration of Removal: 3 weeks
- Estimated Total Cost based on 2008 $: $891,000

## 4.3 ALTERNATIVE 1C: EXCAVATE SOILS WITH PCB CONCENTRATIONS GREATER THAN 25 MG/KG, BACKFILL AND COMPACT CLEAN IMPORTED SOIL AND CRUSHED GRAVEL IN EXCAVATION AREA TO COVER FULL EXTENT OF CONTAMINATED AREA, AND IMPLEMENT LUCS AT THE SITE FOLLOWING REMOVAL ACTION ACTIVITIES (ALLOWS LOW-OCCUPANCY REUSE)

Alternative 1C would involve excavation and disposal of soils containing PCBs in concentrations greater than 25 mg/kg and would provide for a low-occupancy future land use (as defined in 40 CFR §761.3). Alternative 1C would also involve backfilling of clean imported soil and crushed gravel to cover the full extent of the contamination-delineated area in the excavation area. The gravel backfill would serve the purpose of reducing DTSC concerns regarding inhalation exposure from vehicular and windblown fugitive dust. Restrictions to maintain the use of the site as low occupancy would include the LUCs to be evaluated under the CERCLA framework.

Alternative 1C would require excavation of a total of 225 $yd^3$ of soil (Figure 6). Excavated soils containing PCBs in concentrations less than 50 mg/kg (125 $yd^3$) would be transported and disposed of at an appropriately permitted municipal non-hazardous waste landfill. Excavated soils containing PCBs in concentrations greater than 50 mg/kg (100 $yd^3$) would be transported and disposed of at a TSCA hazardous waste landfill permitted by the EPA under § 3004 of RCRA, or by a State authorized under § 3006 of RCRA.

The same LUC mechanisms identified for Alternative 1B apply to Alternative 1C.

### 4.3.1 Effectiveness

Alternative 1C would provide overall protectiveness of public health and the environment as long as the site is restricted to "low occupancy" uses. Any change in future land use to high-occupancy use would require further remediation as described in Alternatives 2. Under the TSCA low-occupancy criterion, the removal of soil exhibiting PCB concentrations greater than or equal to 25 mg/kg would reduce the risk to human health to between $1x10^{-5}$ and $1x10^{-6}$ (Appendix D). Covering the full extent of the contamination-delineated area with a layer of crushed gravel following removal action activities would mitigate potential exposure of ecological receptors and significantly reduce the potential for fugitive dust from the PW Transformer Storage Pit and HVSSA site. This gravel cover would serve the additional purpose of addressing DTSC concerns regarding inhalation exposure from vehicular and windblown fugitive dust. However, Alternative 1C would exceed the risk-based cleanup goal

calculated under Alternative 1B. Therefore, Alternative 1C would be considered to exhibit low effectiveness.

### 4.3.2 Implementability

Excavation and disposal of contaminated soil at a landfill is a common and proven technology and can be easily implemented with readily available equipment. Transportation of contaminated soil across state boundaries for disposal at landfills or for incineration would require compliance with DOT regulations for transportation of hazmat. Required permits for this off-site activity can be readily obtained. Backfilling with clean soil and crushed gravel and maintenance are widely used technologies that should not pose any technical or administrative hurdles. Thus, Alternative 1C is considered to be highly implementable.

### 4.3.3 Cost

The cost estimate for Alternative 1C is $748,000 (see Appendix A). Costs associated with this alternative include site preparation, excavation of about 225 $yd^3$ of PCB-contaminated soil, transportation and disposal of excavated material, backfilling with clean soil and crushed gravel, site restoration (fencing), and implementation of LUCs. A detailed cost estimate for Alternative 1C is available in Appendix A.

The total cost for Alternative 1C includes costs for the following:

- Excavation of all soils with PCB concentrations greater than 25 mg/kg;
- Transportation and disposal of 100 $yd^3$ soils with PCB concentrations greater than 50 mg/kg at a TSCA-permitted hazardous waste landfill;
- Transportation and disposal of 125 $yd^3$ soils with PCB concentrations less than 50 mg/kg at an appropriately permitted Class I municipal landfill;
- Backfill and compaction of clean, imported soils and crushed gravel in the excavation area; and
- Implementation of interim LUCs, including ECs and ICs.

The estimated costs for this alternative were calculated using a combination of RACER™, Means CostWorks 2008 software (Reed Construction Data®), vendor quotations, and engineering judgment. The costs are as follows:

- Estimated Capital Cost: $328,000
- Estimated Annual O&M Cost: $84,000

- Periodic Cost (5-year Reviews): $336,000
- Estimated Duration of Removal: 3 weeks
- Estimated Cost based on 2008 $: $748,000

## 4.4 ALTERNATIVE 2: EXCAVATE SOILS WITH PCB CONCENTRATIONS GREATER THAN 10 MG/KG, BACKFILL AND COMPACT CLEAN IMPORTED SOIL IN EXCAVATION AREA, CONSTRUCT 6-INCH ASPHALT CAP OVER SOILS WITH PCB CONCENTRATIONS GREATER THAN 1 MG/KG BUT LESS THAN OR EQUAL TO 10 MG/KG, AND IMPLEMENT LUCS AT THE SITE FOLLOWING REMOVAL ACTION ACTIVITIES (ALLOWS HIGH-OCCUPANCY REUSE)

Alternative 2 would involve excavation and disposal of soils containing PCBs in concentrations greater than 10 mg/kg, backfill with clean imported soil in the excavation area, construction of a 6-inch asphalt cap over all soils exhibiting a PCB concentration of 1 mg/kg or greater but less than or equal to 10 mg/kg as required under 40 CFR § 761.61 (a)(7). Requirements to maintain the cover would include the LUCs to be evaluated under the CERCLA framework.

The estimated area required to be covered by the cap is 36,200 square feet (the same area that would be removed under Alternative 1A). The cap would be constructed in accordance with TSCA's cover requirements under 40 CFR § 761.61(a)(7). TSCA's cover requirements, in turn, require compliance with Cal. Code Regs. Title 22, § 66264.310(a)(1)-(5). A cover constructed in compliance with these potential action-specific ARARs (either 10-inch compacted soil/geotextile or 6-inch-thick asphalt or concrete) would allow high-occupancy reuse as defined in 40 CFR §761.3. Alternative 2 includes a 6-inch asphalt cap due to its lesser maintenance requirements (as compared to compacted soil/geotextile) and its compatibility with likely future reuse scenarios.

Alternative 2 would require excavation of a total of 850 $yd^3$ of soil (Figure 7). Excavated soils containing PCBs in concentrations less than 50 mg/kg (725 $yd^3$) would be transported and disposed of at an appropriately permitted municipal non-hazardous waste landfill. Excavated soils containing PCBs in concentrations greater than 50 mg/kg (100 $yd^3$) would be transported and disposed of at a TSCA hazardous waste landfill permitted by the EPA under § 3004 of RCRA, or by a State authorized under § 3006 of RCRA.

Alternative 2 would meet the RAOs listed in Section 3.5 by preventing exposure to PCB concentrations greater than 1 mg/kg (high-occupancy limit) through the use of ECs such as the engineered cap and the long-term maintenance and inspections of the engineered cap.

This alternative would include LUCs with a duration of 30 years. A review of DoD's "A Guide to Establishing Institutional Controls at Closing Military Installations" (DoD 1999) identified the following LUC mechanisms for Alternative 2:

- Prohibit use of surface water and groundwater;
- Prohibit excavation, construction, drilling, and disturbance of soil; and
- Restrict public access to PW Transformer Storage Pit and HVSSA through ECs.

Signs and notices would be posted to ensure implementation of interim LUCs. The Navy is responsible for funding the inspections and reviews every 5 years. The Navy will evaluate long-term LUCs in the Michelson Laboratory / PW Operable Unit FS and memorialize the findings in the ROD. For cost-estimating purposes interim LUCs were estimated at 30 years.

### 4.4.1 Effectiveness

Although PCBs in soil would not be cleaned up to the TSCA unrestricted high-occupancy cleanup level of 1 mg/kg, the presence of a cap would eliminate the pathway of exposure and ensure that overall, Alternative 2 is protective of public health and the environment under a high-occupancy site reuse scenario, would meet the RAOs for the site, and would be compliant with ARARs. This alternative would be effective in the short term if all personnel at the site use PPE and follow procedures outlined in the HASP. Although the long-term effectiveness of Alternative 2 depends on implementation of LUCs in the remedial design and the proper maintenance and functioning of the cover as an exposure prevention barrier, Alternative 2 is considered highly effective in the long term.

### 4.4.2 Implementability

Excavation and disposal of contaminated soil at a landfill is a common and proven technology and can be easily implemented with readily available equipment. Transportation of contaminated soil across state boundaries for disposal at landfills or for incineration would require compliance with DOT regulations for transportation of hazmat. Permits for this off-site activity can be readily obtained.

Construction of a cap at the site is a widely used technology that should not pose any major technical or administrative hurdles. However, installation of the cap at the PW Transformer Storage Pit and HVSSA site may require temporary re-location of site equipment and may disrupt the intermittent operations of the HVSSA. Implementation of engineering controls such as long-term maintenance and monitoring of the cap will be required to ensure that the cap remains effective over the long term. As a result, Alternative 2 is considered as having low implementability.

### 4.4.3 Cost

The cost estimate for Alternative 2 is $1,149,000 (see Appendix A). Costs associated with this alternative include site preparation, excavation of about 850 $yd^3$ of PCB-contaminated soil, transportation and disposal of excavated material, backfilling, construction of a 6-inch asphalt cap over an area of 36,200 square feet, site restoration (fencing), and design and implementation of LUCs. A detailed cost estimate for Alternative 2 is available in Appendix A.

The total cost for Alternative 2 includes costs for the following:

- Excavation of all soils with PCB contamination greater than 10 mg/kg;
- Transportation and disposal of 100 $yd^3$ soils with PCB contamination greater than 50 mg/kg at a TSCA-permitted hazardous waste landfill;
- Transportation and disposal of 750 $yd^3$ soils with PCB contamination less than 50 mg/kg at an appropriately permitted Class I municipal landfill;
- Backfill and compaction of clean, imported soils in the excavation area;
- Construction of a 6-inch asphalt cap in accordance with 40 CFR 264.310(a) over all soils containing greater than 1 mg/kg but less than or equal to 10 mg/kg PCBs on the site; and
- Implementation of interim LUCs, including ECs and ICs.

The estimated costs for this alternative were calculated using a combination of RACER™, Means CostWorks 2008 software (Reed Construction Data®), vendor quotations, and engineering judgment. These costs are as follows:

- Estimated Capital Cost: $693,000
- Estimated Annual O&M Cost: $84,000
- Periodic Cost (Maintenance): $36,000
- Periodic Cost (5-year Reviews): $336,000
- Estimated Duration of Removal: 2 months
- Estimated Cost based on 2008 $: $1,149,000

# 5.0 COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES

In order to evaluate the relative performance of each of the four alternatives discussed in Section 4.0, the alternatives are compared to each other with respect to the key criteria (effectiveness, implementability, and cost). In addition, the sections below contain discussions on the specific evaluations of the alternatives.

## 5.1 EFFECTIVENESS OF ALTERNATIVES

The low-occupancy RAO for cleanup of soils containing concentrations of PCB found at the PW Transformer Storage Pit and HVSSA site is 25 mg/kg. Alternatives 1A, 1B, 1C, and 2 would result in cleanup of the soils to concentrations of 1, 13.3, 25, and 10 mg/kg, respectively. Alternatives 1B and 1C would require LUCs to restrict future land use to current low-occupancy industrial use. Alternative 1A, though leaving PCB on-site at a very low concentration, would still require LUCs to retain this site at its current low-occupancy industrial use. Alternative 2, however, would allow for high-occupancy reuse because the 6-inch asphalt cap would eliminate the exposure pathway to contaminants, as described under 40 CFR § 761.61(a)(7). Because the Navy has designated the future land use of the site as low-occupancy reuse, Alternatives 1A, 1B, and 2 would be equally effective in meeting the RAOs. Alternative 1C would meet the TSCA-regulated, low-occupancy land use concentration of 25 mg/kg. However, Alternative 1C would leave the PCB on-site at a concentration exceeding the risk-based clean-up concentration of 13.3 mg/kg. Hence, this alternative is considered the least effective among the four alternatives described in this report.

## 5.2 IMPLEMENTABILITY OF ALTERNATIVES

Alternative 1C involves excavation and removal of the smallest volume of soil, and is therefore the most easily implementable alternative of the three. Alternative 1A would require the highest volume of soil to be excavated from the site and disposed of. Although Alternative 2 involves excavation and removal of a smaller volume of soil, it also requires the construction and O&M of an asphalt cap to eliminate the exposure pathway. On the basis of implementability, the alternatives could be ranked as follows:

- Alternatives 1B and 1C: Highly implementable
- Alternative 1A: Moderately implementable
- Alternative 2: Least implementable

## 5.3 COST OF ALTERNATIVES

Alternative 1C ($748,000) is the most cost-effective alternative because it involves the excavation and disposal of only a limited area of soils containing PCBs in concentrations greater than 25 mg/kg. Alternatives 1B ($891,000) and 2 ($1,149,000) would cost more than

Alternative 1C because they address cleanup of a larger volume of soils (containing PCBs at contaminations greater than 1 mg/kg and 13.3 mg/kg, respectively). Alternative 1A ($1,384,000) is the most expensive because it addresses cleanup of a large volume of soils which contain PCBs in concentrations greater than 1 mg/kg. On the basis of cost alone, the alternatives could be ranked as follows:

1. Alternative 1C
2. Alternative 1B
3. Alternative 2
4. Alternative 1A

## 6.0 SUMMARY

This EE/CA identifies, analyzes, and evaluates potential removal action alternatives to address the PCB contamination of soils at the PW Transformer Storage Pit and HVSSA site at NAWS China Lake, to be performed in accordance with the EPA and Navy guidance documents for an NTCRA under CERCLA. The following four alternatives were identified, evaluated, and ranked:

1. Alternative 1B: Excavate Soils with PCB Concentrations Greater than 13.3 mg/kg, Backfill and Compact Clean Imported Soil and Crushed Gravel in Excavation Area to Cover Full Extent of Contaminated Area, and Implement LUCs at the Site Following Removal Action Activities (allows risk-based low-occupancy reuse) (see Section 4.2)
2. Alternative 1A: Excavate Soils with PCB Concentrations Greater than 1 mg/kg, Backfill and Compact Clean Imported Soil in Excavation Area, and Implement LUCs at the Site Following Removal Action Activities (maintains current low-occupancy industrial use) (see Section 4.1)
3. Alternative 2: Excavate Soils with PCB Concentrations Greater than 10 mg/kg, Backfill and Compact Clean Imported Soil in Excavation Area, Construct 6-inch Asphalt Cap over Soils with PCB Concentrations Greater than 1 mg/kg but Less than or Equal to 10 mg/kg, and Implement LUCs at the Site Following Removal Action Activities (allows high-occupancy reuse) (see Section 4.4)
4. Alternative 1C: Excavate Soils with PCB Concentrations Greater than 25 mg/kg, Backfill and Compact Clean Imported Soil and Crushed Gravel in Excavation Area to Cover Full Extent of Contaminated Area, and Implement LUCs at the Site Following Removal Action Activities (allows low-occupancy reuse) (see Section 4.3)

Alternative 1B involves the excavation of all soils containing PCBs in concentrations greater than 13.3 mg/kg. Excavated soils containing PCBs in concentrations less than 50 mg/kg would be transported and disposed of at an appropriately permitted municipal non-hazardous waste

landfill. Excavated soils containing PCBs in concentrations greater than 50 mg/kg would be transported and disposed of at a TSCA hazardous waste landfill permitted by the EPA under § 3004 of RCRA, or by a State authorized under § 3006 of RCRA. Because the PCBs in soil are being remediated to a risk-based concentration of 13.3 mg/kg (calculated using the low-occupancy exposure frequency parameter of 335 hours per year: see Appendix D), the site could only be designated for low-occupancy reuse. Using this 335-hour exposure duration in the standard industrial PRG equation results in a conservative site-specific cleanup level of 13.3 mg/kg, considering that the actual number of hours worked at the PW Transformer Storage Pit and HVSSA site is less than 52 hours per year. LUCs will be memorialized in the ROD, and LUC objectives will be finalized in the LUC RD.

Alternative 1B meets the RAO for low-occupancy reuse of 13.3 mg/kg of PCBs in soil and has the highest implementability, and would be the second cheapest and the most cost-effective of all alternatives evaluated. The PW Transformer Storage Pit and HVSSA site is currently designated for low-occupancy reuse, and this designation is not expected to change in the future. Hence, Alternative 1B would also be effective in the long term.

Before the Navy selects a preferred alternative, regulatory agency and public input are necessary. The public will have an opportunity to review and comment on the EE/CA during a 45-day public comment period. State and community concerns will be evaluated and addressed after the public comment period and will be discussed in an AM documenting the removal action decision.

## 7.0 REFERENCES


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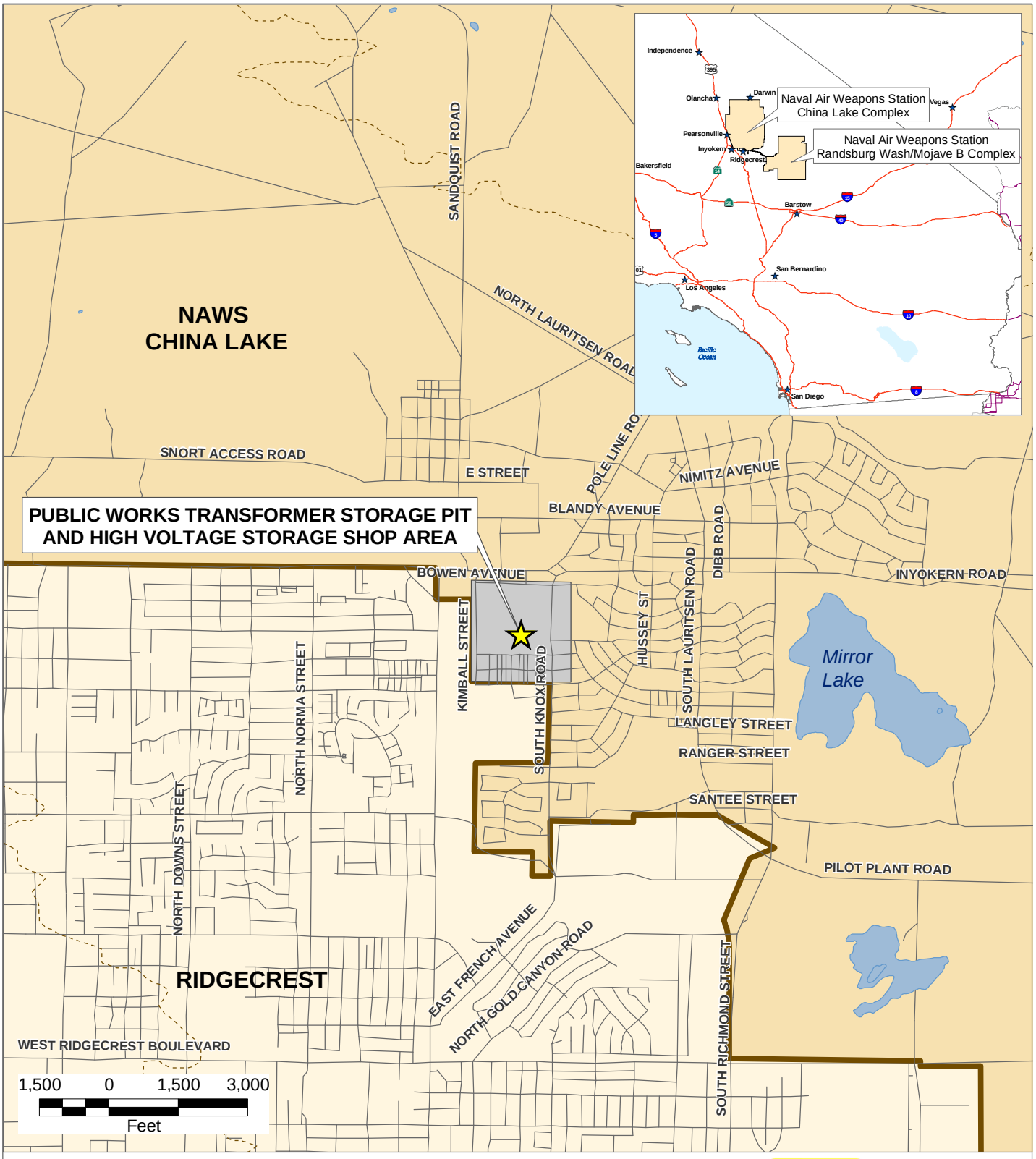
## *FIGURES*




ROAD

TOPOGRAPHIC CONTOUR

DRAINAGE AREA OR PLAYA

RIDGECREST

PUBLIC WORKS COMPOUND

NAWS CHINA LAKE

SulTech

**NAWS China Lake, California**

U.S. Navy, Southwest Division, NAVFAC, San Diego

**FIGURE 1**

**SITE LOCATION MAP**

Engineering Evaluation / Cost Analysis - Public Works
Transformer Storage Pit and High Voltage Storage Shop Area

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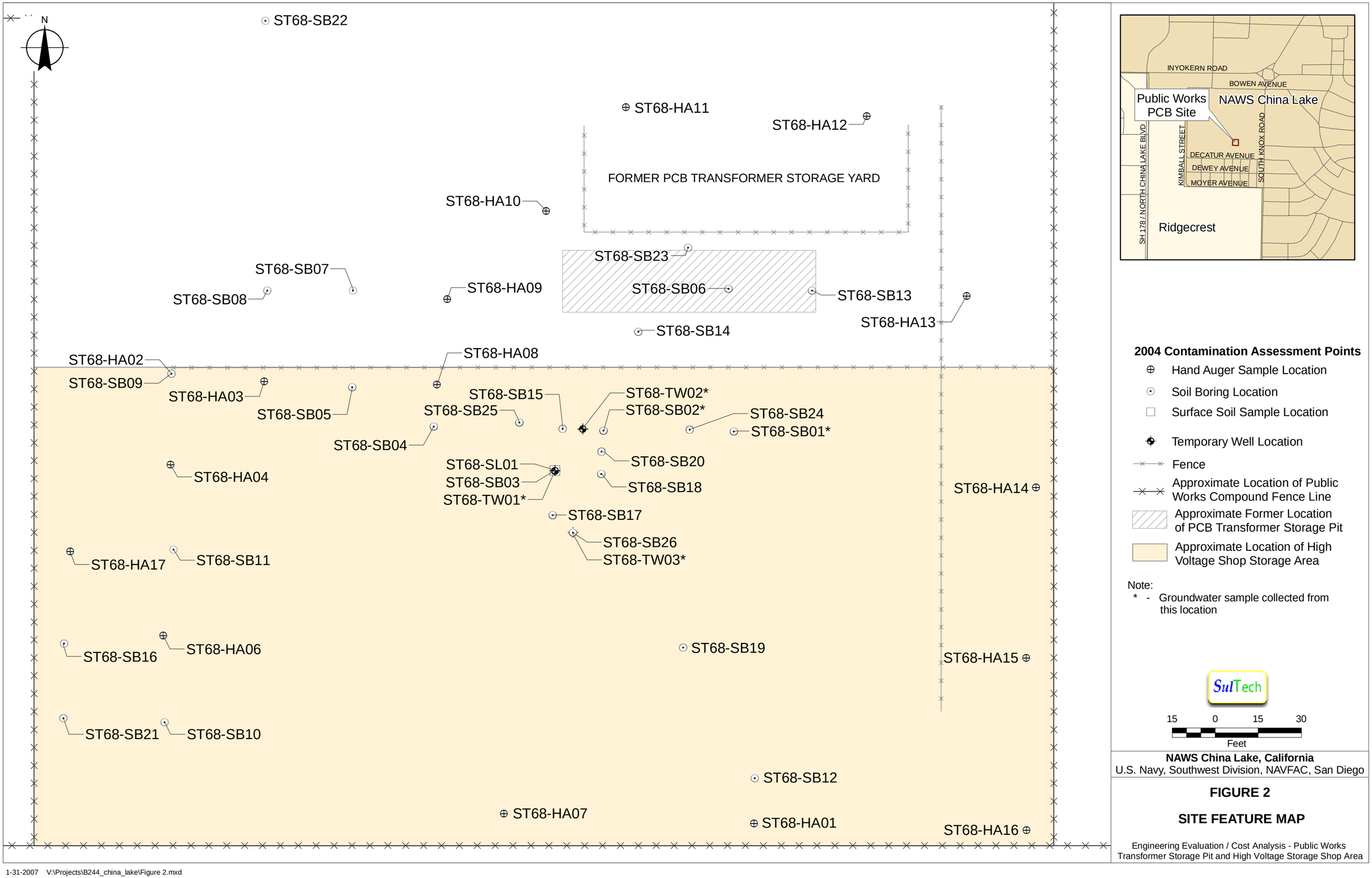





**2004 Contamination Assessment Points**

- Hand Auger Sample Location
- Soil Boring Location
- Surface Soil Sample Location
- Temporary Well Location
- Fence
- Approximate Location of Public Works Compound Fence Line
- Approximate Former Location of PCB Transformer Storage Pit
- Approximate Location of High Voltage Shop Storage Area

Note:
* - Groundwater sample collected from this location

SulTech

15 0 15 30
Feet

**NAWS China Lake, California**
U.S. Navy, Southwest Division, NAVFAC, San Diego

**FIGURE 2**

**SITE FEATURE MAP**

Engineering Evaluation / Cost Analysis - Public Works
Transformer Storage Pit and High Voltage Storage Shop Area

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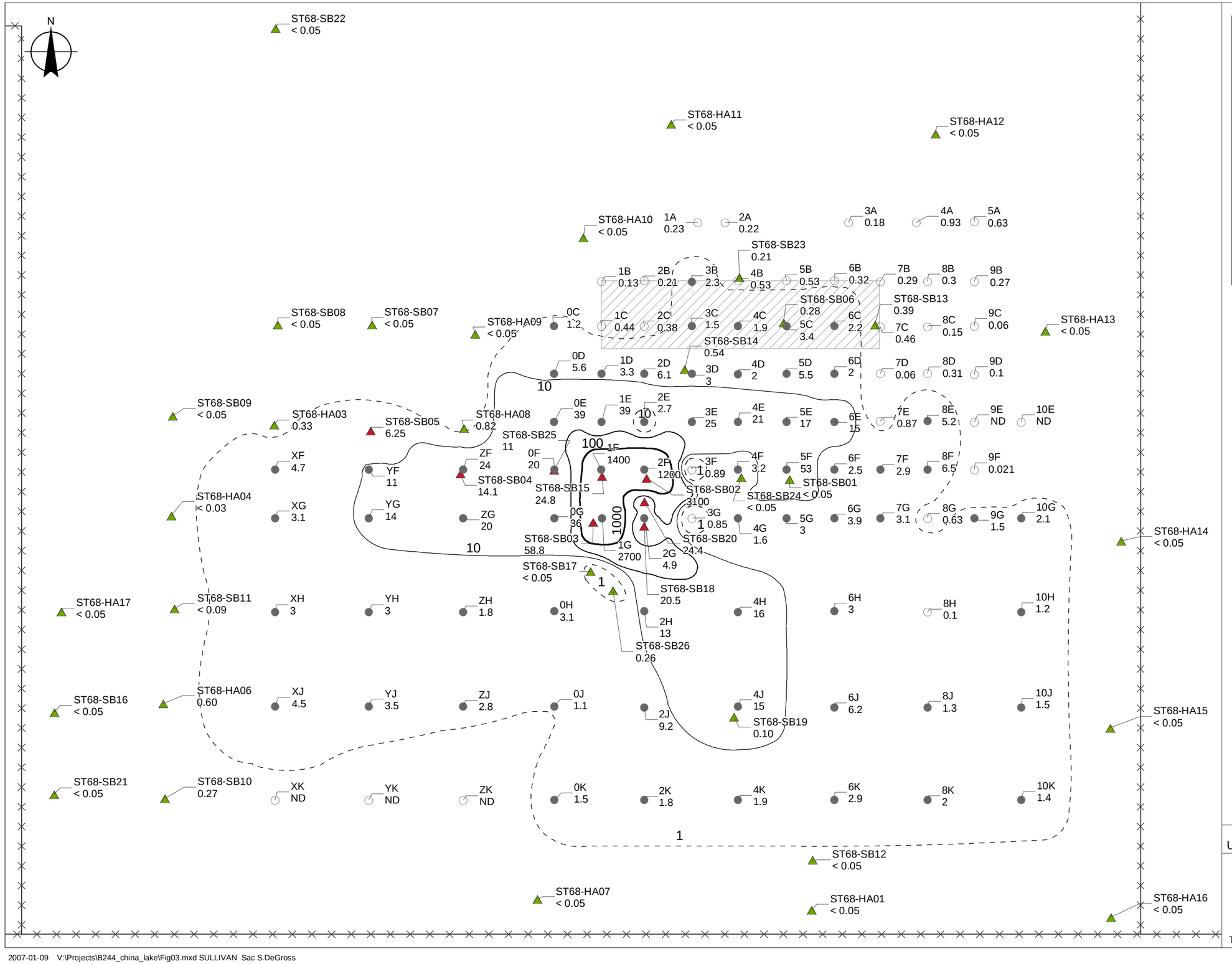
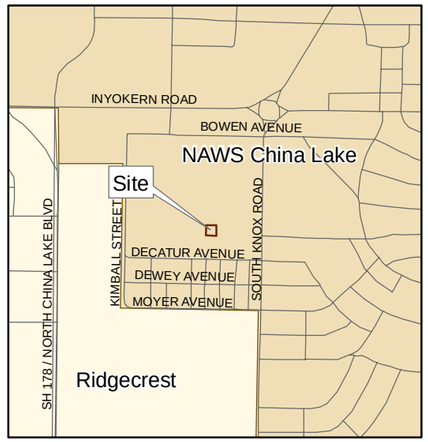



## 2004 Sampling Locations

- Less Than or Equal to 1 mg/kg
- Greater Than 1 mg/kg

## 2000 Sampling Locations

- Less Than or Equal to 1 mg/kg
- Greater Than 1 mg/kg

Approximate Location of Public Works Compound Fence Line

PCB Concentration Contour Line

- 1 mg/kg
- 10 mg/kg
- 100 mg/kg
- 1000 mg/kg

Approximate Location of Former Public Works Transformer Storage Pit

Notes:
All concentrations are given in milligrams per kilogram (mg/kg) and represent the maximum concentration detected in a given soil boring.

SulTech

15 0 15 30
Feet

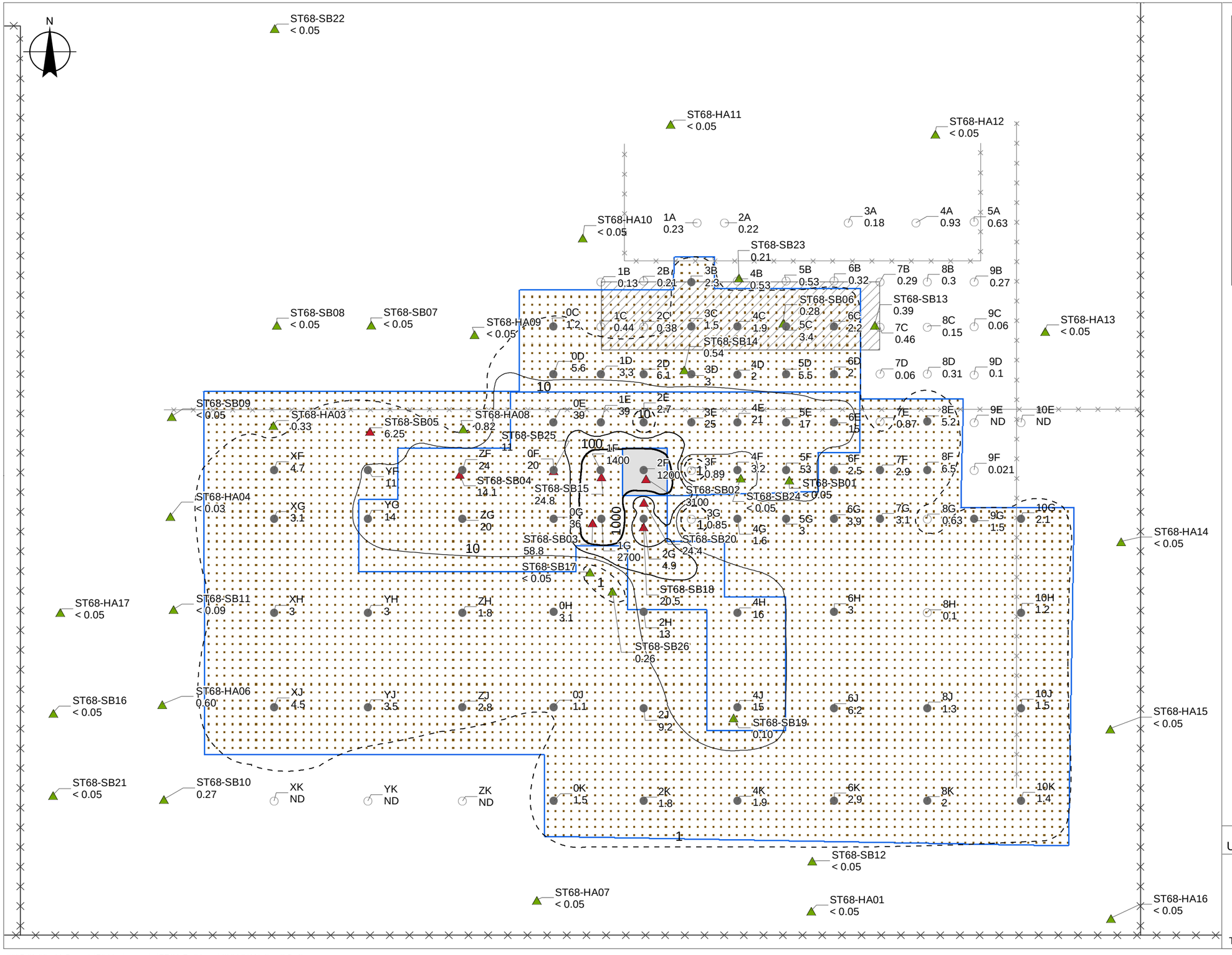
**NAWS China Lake, California**
U.S. Navy, Southwest Division, NAVFAC, San Diego

# FIGURE 3

## HORIZONTAL EXTENT OF PCBS IN SOILS

Engineering Evaluation / Cost Analysis - Public Works Transformer Storage Pit and High Voltage Storage Shop Area

2007-01-09 V:\Projects\B244_china_lake\Fig03.mxd SULLIVAN Sac S.DeGross




## 2004 Sampling Locations

- Less Than or Equal to 1 mg/kg
- Greater Than 1 mg/kg

## 2000 Sampling Locations

- Less Than or Equal to 1 mg/kg
- Greater Than 1 mg/kg

Approximate Location of Public Works Compound Fence Line

PCB Concentration Contour Line

- 1 mg/kg
- 10 mg/kg
- 100 mg/kg
- 1000 mg/kg

Approximate Location of Former Public Works Transformer Storage Pit

Removal Action Alternative 1 Excavation Area (depth to 2 feet)

Excavation Area (depth to 5 feet)

Notes:
All concentrations are given in milligrams per kilogram (mg/kg) and represent the maximum concentration detected in a given soil boring.

SulTech

15 0 15 30
Feet

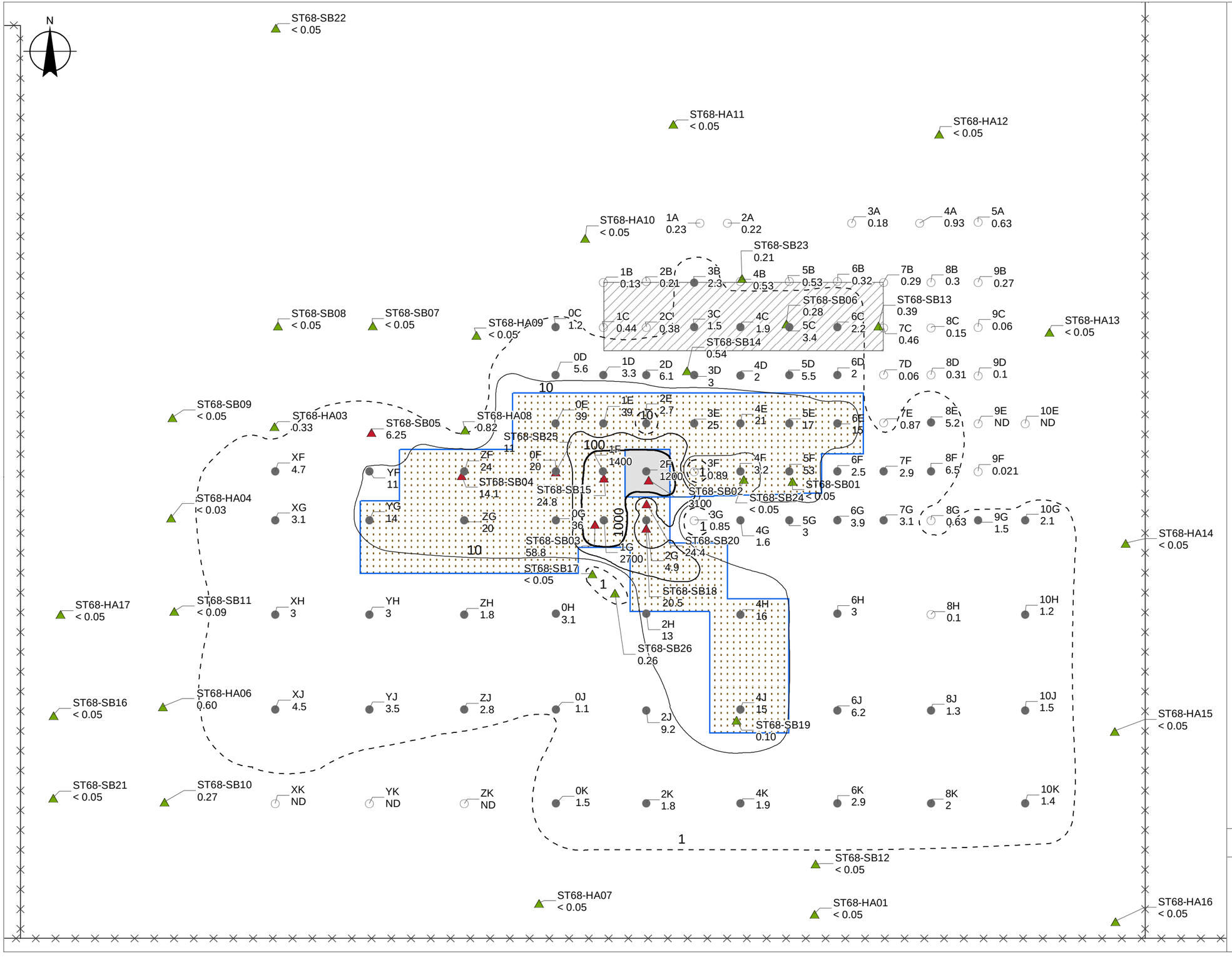
**NAWS China Lake, California**
U.S. Navy, Southwest Division, NAVFAC, San Diego

# FIGURE 4

## PROPOSED EXCAVATION AREA REMOVAL ACTION ALTERNATIVE 1A

Engineering Evaluation / Cost Analysis - Public Works Transformer Storage Pit and High Voltage Storage Shop Area

2007-01-09 V:\Projects\B244_china_lake\EECA\Fig04.mxd SULLIVAN Sac S.DeGross





**2004 Sampling Locations**

- Less Than or Equal to 1 mg/kg
- Greater Than 1 mg/kg

**2000 Sampling Locations**

- Less Than or Equal to 1 mg/kg
- Greater Than 1 mg/kg

Approximate Location of Public Works Compound Fence Line

PCB Concentration Contour Line

- 1 mg/kg
- 10 mg/kg
- 100 mg/kg
- 1000 mg/kg

Approximate Location of Former Public Works Transformer Storage Pit

Removal Action Alternative 1B Excavation Area (depth to 2 feet)

Excavation Area (depth to 5 feet)

Notes:
All concentrations are given in milligrams per kilogram (mg/kg) and represent the maximum concentration detected in a given soil boring.

SulTech

15 0 15 30
Feet

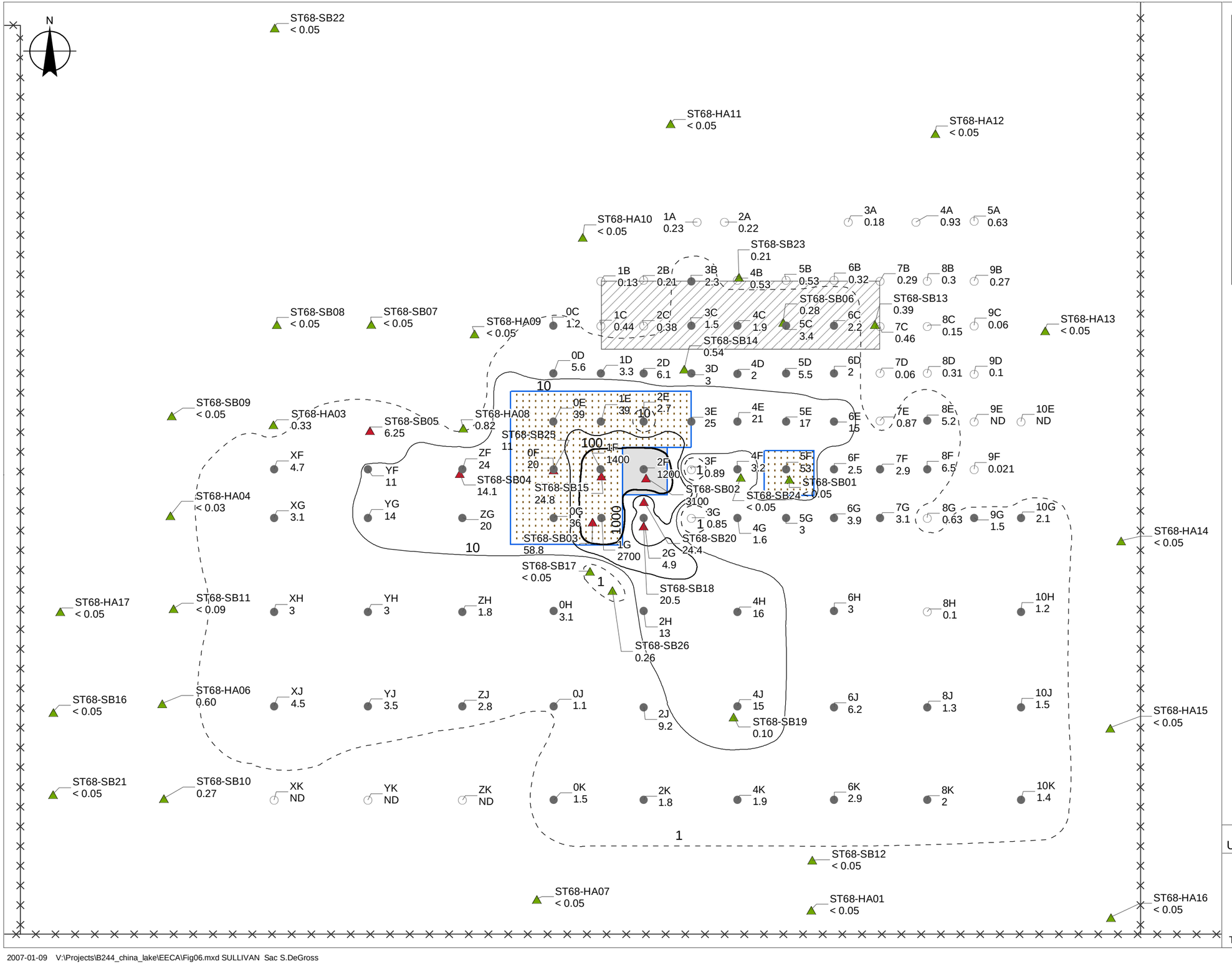
**NAWS China Lake, California**
U.S. Navy, Southwest Division, NAVFAC, San Diego

## FIGURE 5

## PROPOSED EXCAVATION AREA REMOVAL ACTION ALTERNATIVE 1B

Engineering Evaluation / Cost Analysis - Public Works Transformer Storage Pit and High Voltage Storage Shop Area

2007-01-09 V:\Projects\B244_china_lake\eeca\Fig05.mxd SULLIVAN Sac S.DeGross





**2004 Sampling Locations**

- Less Than or Equal to 1 mg/kg
- Greater Than 1 mg/kg

**2000 Sampling Locations**

- Less Than or Equal to 1 mg/kg
- Greater Than 1 mg/kg

Approximate Location of Public Works Compound Fence Line

PCB Concentration Contour Line

- 1 mg/kg
- 10 mg/kg
- 100 mg/kg
- 1000 mg/kg

Approximate Location of Former Public Works Transformer Storage Pit

Removal Action Alternative 1C Excavation Area (depth to 2 feet)

Excavation Area (depth to 5 feet)

Notes:
All concentrations are given in milligrams per kilogram (mg/kg) and represent the maximum concentration detected in a given soil boring.

SulTech

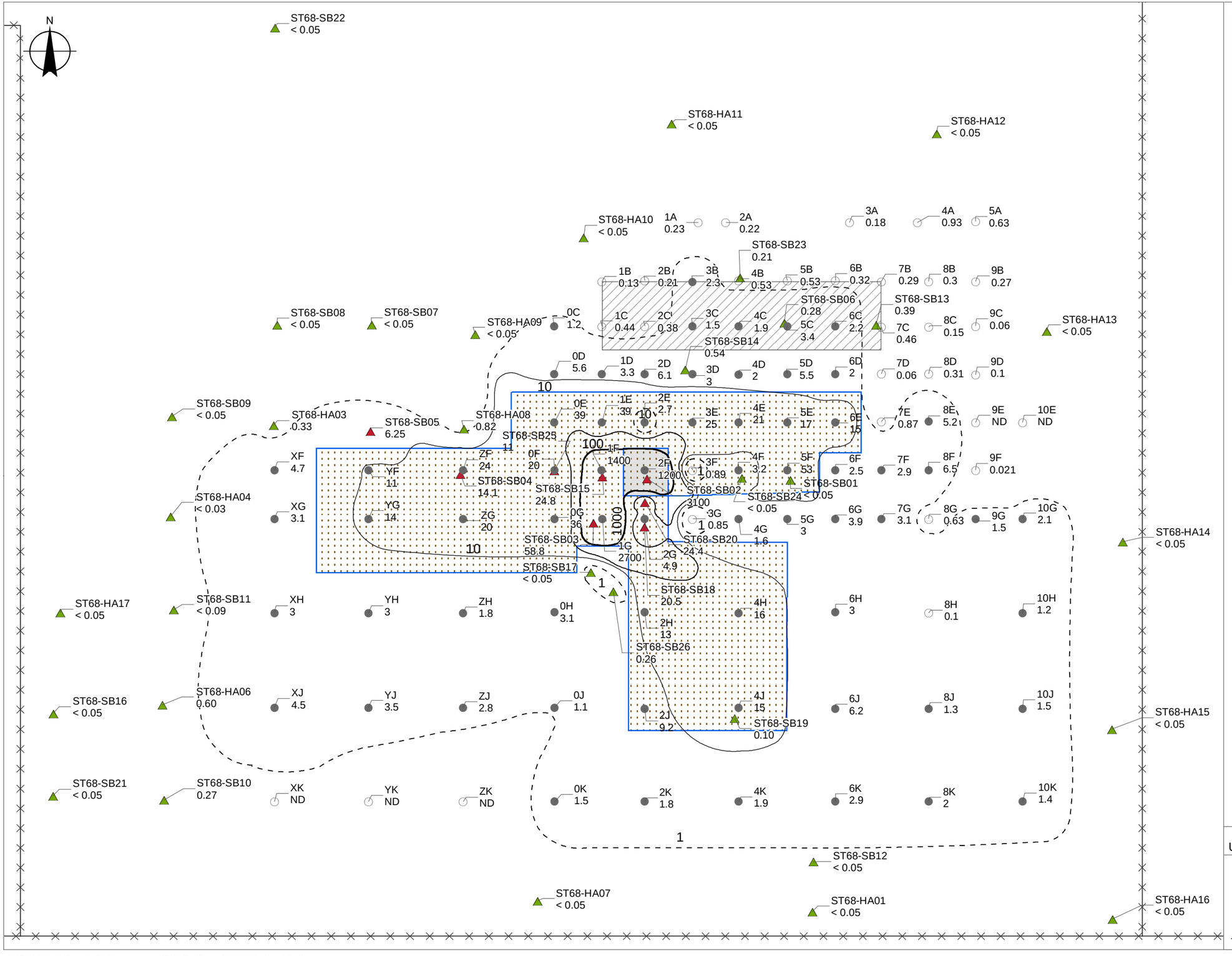
15 0 15 30
Feet

**NAWS China Lake, California**
U.S. Navy, Southwest Division, NAVFAC, San Diego

## FIGURE 6

## PROPOSED EXCAVATION AREA REMOVAL ACTION ALTERNATIVE 1C

Engineering Evaluation / Cost Analysis - Public Works Transformer Storage Pit and High Voltage Storage Shop Area




## 2004 Sampling Locations

- Less Than or Equal to 1 mg/kg
- Greater Than 1 mg/kg

## 2000 Sampling Locations

- Less Than or Equal to 1 mg/kg
- Greater Than 1 mg/kg

Approximate Location of Public Works Compound Fence Line

PCB Concentration Contour Line

- 1 mg/kg
- 10 mg/kg
- 100 mg/kg
- 1000 mg/kg

Approximate Location of Former Public Works Transformer Storage Pit

Removal Action Alternative 2 Excavation Area (depth to 2 feet)

Excavation Area (depth to 5 feet)

Notes:
All concentrations are given in milligrams per kilogram (mg/kg) and represent the maximum concentration detected in a given soil boring.

SulTech

15 0 15 30
Feet

**NAWS China Lake, California**
U.S. Navy, Southwest Division, NAVFAC, San Diego

# FIGURE 7

## PROPOSED EXCAVATION AREA REMOVAL ACTION ALTERNATIVE 2

Engineering Evaluation / Cost Analysis - Public Works Transformer Storage Pit and High Voltage Storage Shop Area

2007-01-09 V:\Projects\B244_china_lake\EECA\Fig07.mxd SULLIVAN Sac S.DeGross

## APPENDIX A
## DETAILED COST ESTIMATES

**TABLE A-1: TOTAL REMEDIAL COST SUMMARY FOR VARIOUS ALTERNATIVES AT PUBLIC WORKS TRANSFORMER STORAGE AREA AND HVSSA**

Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

**TOTAL REMEDIAL COST SUMMARY FOR SOIL**

| | | | |
|---|---|---|---|
| **Site:** | PW Transformer Storage Area Pit and HVSSA | **Base Year:** | 2008 |
| **Location:** | Treasure Island, California | **Date:** | September 2008 |
| **Phase:** | EE/CA | | |

| Description | Alternative 1A<br>Excavation of soils greater than 1 mg/kg PCBs, backfill and compact clean imported soil, and LUCs | Alternative 1B<br>Excavation of soils greater than 13.3 mg/kg PCBs, backfill and compact clean soil and crushed gravel, and LUCs | Alternative 1C<br>Excavation of soils greater than 25 mg/kg PCBs, backfill and compact clean soil and crushed gravel, and LUCs | Alternative 2<br>Excavation of soils greater than 10 mg/kg PCBs, backfill and compact clean soil, construct 6-inch asphalt cap, and LUCs |
|---|---|---|---|---|
| Total Project Duration (year) | 30 | 30 | 30 | 30 |
| Capital Cost | $964,000 | $471,000 | $328,000 | $693,000 |
| Total O&M (LUCs) | $84,000 | $84,000 | $84,000 | $84,000 |
| Periodic Cost - Maintenance | $0 | $0 | $0 | $36,000 |
| Periodic Cost - 5-Year Reviews | $336,000 | $336,000 | $336,000 | $336,000 |
| **Total Cost in 2008 Dollars** | **$1,384,000** | **$891,000** | **$748,000** | **$1,149,000** |

Notes:

Costs in this table are rounded to the nearest $1,000.

The table presents estimated costs. The actual determination of removal action completion and costs associated will be based upon the results of PCE concentrations in confirmation soil samples taken following excavation of contaminated soils.

Escalation rate of 2.6% is based upon third quarter escalation (McGraw Hill Construction 2008)

| | |
|---|---|
| LUC | Land-use control |
| HVSSA | High Voltage Shop Storage Area |
| NAWS | Naval Air Weapons Station |
| NCTRA | Non-Time Critical Removal Action |
| O&M | Operation and maintenance |
| PCBs | Polychlorinated biphenyls |
| PW | Public Works |

**TABLE A-1A: REMOVAL ACTION ALTERNATIVE 1A: EXCAVATION (SOILS > 1 MG/KG) AND OFF-SITE DISPOSAL OF SOIL**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

**COST ESTIMATE SUMMARY**

| | | | |
|---|---|---|---|
| **Site:** | PW Transformer Storage Area Pit and HVSSA | **Description:** | Alternative 1A involves excavating all soils with PCB concentrations greater than 1 mg/kg, |
| **Location:** | NAWS China Lake | | backfilling and compacting clean imported soil in excavation area, |
| **Phase:** | EE/CA | | and LUCs to ensure future low-occupancy site reuse. |
| **Base Year:** | 2008 | | 30 years of LUCs will begin when NTCRA is complete. |
| **Date:** | September 2008 | | Capital costs occur in year 0. |

**CAPITAL COSTS: PCB EXCAVATION (>1 MG/KG), AND OFF-SITE DISPOSAL (Self-Implementing Cleanup per 40 CFR 761.61)**

| DESCRIPTION | Quantity | Unit of Measure | | Material Unit Cost | Labor Unit Cost | Equipment Unit Cost | Extended Cost |
|---|---|---|---|---|---|---|---|
| **Work Plan Addendum** | | | | | | | |
| **Principal Scientist (Risk-Based Cleanup Level Determination)** | 60 | HR | | 0 | 250 | | **$15,000** |
| **SUBTOTAL (2007$)** | | | | | | | **$15,000** |
| **SUBTOTAL (2008$)** | | | | | | | **$15,390** |
| **Excavation of Contaminated Soils** | | | | | | | |
| Temporary Fence | 250 | LF | 8 | 23 | 34 | 6 | $15,843 |
| Site (Security) Signs | 5 | EA | | 47 | 48 | 0 | $475 |
| Excavate and Load, Bank Measure | 4401 | BCY | | 0 | 2 | 2 | $17,602 |
| Disposable Materials per Sample | 90 | EA | | 12 | 0 | 0 | $1,112 |
| Characterization Sampling, Metals (6010) | 20 | EA | | 100 | 0 | 0 | $2,000 |
| Characterization Sampling, PCBs | 50 | EA | | 235 | 0 | 0 | $11,750 |
| Characterization Sampling, Dioxins and Furans (8280) | 20 | EA | | 564 | 0 | 0 | $11,271 |
| Synthetic Covers over Waste Piles | 29986 | SF | | 0 | 0 | 0 | $7,497 |
| Spray Washing, Decontaminate Heavy Equipment | 1 | EA | | 0 | 894 | 0 | $894 |
| **SUBTOTAL (2007$)** | | | | | | | **$68,443** |
| **SUBTOTAL (2008$)** | | | | | | | **$70,222** |
| **Load and Haul Non-TSCA-Contaminated Soil** | | | | | | | |
| Dump Charges | 4271 | CY | | 42 | 0 | 0 | $179,361 |
| 926, 2.0 CY, Wheel Loader | 125 | HR | | 0 | 100 | 58 | $19,724 |
| 20 CY, Semi Dump | 985 | HR | | 0 | 83 | 92 | $172,749 |
| **SUBTOTAL (2007$)** | | | | | | | **$371,834** |
| **SUBTOTAL (2008$)** | | | | | | | **$381,502** |
| **Load and Haul TSCA-Contaminated Soil** | | | | | | | |
| Dump Charges | 130 | CY | | 228 | 0 | 0 | $29,575 |
| 926, 2.0 CY, Wheel Loader | 4 | HR | | 0 | 100 | 58 | $631 |
| 20 CY, Semi Dump | 50 | HR | | 0 | 83 | 92 | $8,769 |
| **SUBTOTAL (2007$)** | | | | | | | **$38,975** |
| **SUBTOTAL (2008$)** | | | | | | | **$39,989** |
| **Confirmation Sampling** | | | | | | | |
| Surface Soil Sampling Equipment | 1 | EA | | 549 | 0 | 0 | $549 |
| Self-Implementing Confirmation Sampling and Analysis, PCBs (8081/808 | 140 | EA | | 235 | 0 | 0 | $32,900 |
| Confirmation Sampling and Analysis, Dioxins and Furans (8280) | 20 | EA | | 564 | 0 | 0 | $11,271 |
| Field Technician | 24 | HR | | 0 | 130 | 0 | $3,120 |
| **SUBTOTAL (2007$)** | | | | | | | **$47,840** |
| **SUBTOTAL (2008$)** | | | | | | | **$49,084** |
| **General Monitoring** | | | | | | | |
| Sample Collection, Vehicle Mileage Charge, Car or Van | 100 | MI | | 0 | 0 | 0 | $49 |
| Project Scientist | 102 | HR | | 0 | 200 | 0 | $20,400 |
| Field Technician | 18 | HR | | 0 | 130 | 0 | $2,340 |
| **SUBTOTAL (2007$)** | | | | | | | **$22,789** |
| **SUBTOTAL (2008$)** | | | | | | | **$23,382** |
| **Site Restoration** | | | | | | | |
| Unclassified Fill, 6-Inch Lifts, Off-site | 4401 | CY | | 9 | 4 | 3 | $66,536 |
| **SUBTOTAL (2007$)** | | | | | | | **$66,536** |
| **SUBTOTAL (2008$)** | | | | | | | **$68,265** |
| **Site Close-Out Documentation** | | | | | | | |
| Sedan, Automobile, Rental | 4 | DAY | | 72 | 0 | 0 | $288 |
| Per Diem (per person) | 4 | DAY | | 194 | 0 | 0 | $776 |
| Project Manager | 60 | HR | | 0 | 230 | 0 | $13,800 |
| Staff Engineer | 130 | HR | | 0 | 180 | 0 | $23,400 |
| Word Processing/Clerical | 36 | HR | | 0 | 100 | 0 | $3,600 |
| Draftsman/CADD | 24 | HR | | 0 | 130 | 0 | $3,120 |
| Regulatory Review | 20 | HR | | 0 | 185 | 0 | $3,695 |
| **SUBTOTAL (2007$)** | | | | | | | **$48,679** |
| **SUBTOTAL (2008$)** | | | | | | | **$49,944** |
| **LUCs - Implementation** | | | | | | | |
| Overnight Delivery, 8-Ounce Letter | 8 | EA | | 19 | 0 | | $148 |
| Project Manager | 40 | HR | | 0 | 230 | | $9,200 |
| Project Engineer | 60 | HR | | 0 | 210 | | $12,600 |
| Staff Engineer | 80 | HR | | 0 | 180 | | $14,400 |
| QA/QC Officer | 16 | HR | | 0 | 250 | | $4,000 |
| Word Processing/Clerical | 60 | HR | | 0 | 100 | | $6,000 |
| Draftsman/CADD | 40 | HR | | 0 | 130 | | $5,200 |
| Computer Data Entry | 60 | HR | | 0 | 95 | | $5,700 |
| Other Direct Costs | 1 | LS | | 1267 | 0 | | $1,267 |
| Construction Signs | 72 | SF | | 18 | 0 | | $1,281 |
| Surveying - Two-Man Crew | 2 | DAY | | 0 | 1587 | | $3,824 |
| Portable GPS Set with Mapping, 5 Centimeters Accuracy | 1 | MO | | 968 | 0 | | $968 |
| **SUBTOTAL (2007$)** | | | | | | | **$64,588** |
| **SUBTOTAL (2008$)** | | | | | | | **$66,267** |

**TABLE A-1A: REMOVAL ACTION ALTERNATIVE 1A: EXCAVATION (SOILS > 1 MG/KG) AND OFF-SITE DISPOSAL OF SOIL (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

**COST ESTIMATE SUMMARY**

| | | | |
|---|---|---|---|
| **Site:** | PW Transformer Storage Area Pit and HVSSA | **Description:** | Alternative 1A involves excavating all soils with PCB concentrations greater than 1 mg/kg, |
| **Location:** | NAWS China Lake | | backfilling and compacting clean imported soil in excavation area, |
| **Phase:** | EE/CA | | and LUCs to ensure future low-occupancy site reuse. |
| **Base Year:** | 2008 | | 30 years of LUCs will begin when NTCRA is complete. |
| **Date:** | September 2008 | | Capital costs occur in year 0. |

**CAPITAL COSTS: PCB EXCAVATION (>1 MG/KG), AND OFF-SITE DISPOSAL (Self-Implementing Cleanup per 40 CFR 761.61)**

| DESCRIPTION | Quantity | Unit of Measure | Material Unit Cost | Labor Unit Cost | Equipment Unit Cost | Extended Cost |
|---|---|---|---|---|---|---|
| **Restoration Advisory Board** | | | | | | |
| Senior Project Manager | 2 | HR | 0 | 250 | 0 | $500 |
| Project Manager | 31 | HR | 0 | 230 | 0 | $7,135 |
| Senior Staff Engineer | 5 | HR | 0 | 200 | 0 | $1,000 |
| Staff Scientist | 7 | HR | 0 | 160 | 0 | $1,120 |
| Secretarial/Administrative | 6 | HR | 0 | 80 | 0 | $480 |
| Word Processing/Clerical | 8 | HR | 0 | 100 | 0 | $800 |
| Draftsman/CADD | 16 | HR | 0 | 130 | 0 | $2,079 |
| Other Direct Costs | 1 | LS | 117 | 0 | 0 | $117 |
| **SUBTOTAL (2007)** | | | | | | **$13,230** |
| **SUBTOTAL (2008$)** | | | | | | **$13,574** |
| **TOTAL WITHOUT PROFESSIONAL LABOR MANAGEMENT (2008$)** | | | | | | **$777,618** |
| **Professional Labor Management** | | | | | | |
| Project Management Labor Cost | | 2.50% | | | | $19,440 |
| Construction Oversight Labor Cost | | 2.75% | | | | $21,385 |
| Reporting Labor Cost | | 0.35% | | | | $2,722 |
| As-Built Drawings Labor Cost | | 0.35% | | | | $2,722 |
| Public Notice Labor Cost | | 0.08% | | | | $622 |
| Contingencies | | 15% | | | | $116,643 |
| Permitting Labor Cost | | 3% | | | | $23,329 |
| **SUBTOTAL (2008$)** | | | | | | **$186,862** |
| **TOTAL CAPITAL COST IN 2008 DOLLARS** | | | | | | **$964,480** |
| **O&M COSTS:** | | | | | | |
| **LUCs - Monitoring and Enforcement** | | | | | | |
| Annual | | | | | | |
| Overnight Delivery, 8-Ounce Letter | 2 | EA | 23 | 0 | | $46 |
| Project Manager | 2 | HR | 0 | 230 | | $460 |
| Project Engineer | 1 | HR | 0 | 210 | | $210 |
| Staff Engineer | 4 | HR | 0 | 180 | | $720 |
| Other Direct Costs | 1 | LS | 1267 | 0 | | $1,267 |
| Contingency | | 15% | | - | | $406 |
| Navy Oversight | | 25% | | - | | $676 |
| Regulatory Involvement | 2 | | | 185 | | $369 |
| **SUBTOTAL (2007$)** | | | | | | **$4,154** |
| **SUBTOTAL (2008$)** | | | | | | **$4,262** |
| **PERIODIC COSTS** | | | | | | |
| **5-Year Reviews** | | **Year** | | | | |
| 5-Year Reviews Year | 5,10,15,20,25,30 | 6 | | | | |
| Project Manager | | 40 | HR | 0 | 230 | $9,200 |
| Project Engineer | | 120 | HR | 0 | 210 | $25,200 |
| Staff Engineer | | 60 | HR | 0 | 180 | $10,800 |
| Draftsman/CADD | | 40 | HR | 0 | 130 | $5,200 |
| Word Processing/Clerical | | 60 | HR | 0 | 100 | $6,000 |
| **SUBTOTAL (2007$)** | | | | | | **$56,400** |
| Contingency | | | 0 | | | $8,460 |
| Navy Oversight | | | 0 | | | $14,100 |
| Regulatory Involvement | | 60 | | 0 | 185 | $11,083 |
| **SUBTOTAL (2007$)** | | | | | | **$90,043** |
| **SUBTOTAL (2008$)** | | | | | | **$92,384** |

**PRESENT VALUE ANALYSIS:**

| Cost Type | Year | Total Cost | Total Cost per Year | Discount Factor[a,b] | Present Value |
|---|---|---|---|---|---|
| Capital Cost | 0 | $964,480 | $964,480 | 1.0 | $964,480 |
| Annual O&M | 1-30 | $127,870 | $4,262 | 19.600 | $83,544 |
| Periodic Cost (5-Year Reviews) | 5, 10, 15, 20, 25, 30 | $554,302 | $92,384 | 3.6 | $336,026 |
| | | $1,646,652 | | | $1,384,050 |

**TOTAL PRESENT (2008) VALUE OF ALTERNATIVE** **$1,384,050**

Notes:
Costs obtained from RACER™ 2006 (Remedial Action Cost Engineering and Requirements™) and Means (Reed Construction Data®). Some costs adjusted based on professional judgment.
According to EPA guidance (EPA 2000), 15% contingency is assumed for capital and O&M costs.
Escalation rate of 2.6% was based upon third quarter escalation (McGraw Hill Construction 2008)

a Discount factor = $\frac{1}{(1+i)^t}$ where i = 0.031 for a 30+ year technology and t = year (i.e., the present value of the dollar paid in year t at 3.0%)

b Multi-year discount factor = $\frac{(1+i)n - 1}{i(1+i)n}$ where i = 0.03 for a 30+ year technology and n = total number of years

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| BCY | Bulk cubic yard | EA | Each | LF | Linear foot | mg/kg | Milligram per kilogram |
| CFR | *Code of Federal Regulations* | EPA | U.S. Environmental Protection Agency | LS | Lump sum | PCB | Polychlorinated biphenyl |
| CY | Cubic yard | HR | Hour | MI | Mile | SF | Square foot |

EPA. 2000. "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study." EPA/540/R-00/002".

**TABLE A-1B: REMOVAL ACTION ALTERNATIVE 1B: EXCAVATION (SOILS > 13.3 MG/KG) AND OFF-SITE DISPOSAL OF SOIL**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

**COST ESTIMATE SUMMARY**

| | | | |
|---|---|---|---|
| **Site:** | PW Transformer Storage Area Pit and HVSSA | **Description:** | Alternative 1B involves excavating soils with PCB concentrations greater than |
| **Location:** | NAWS China Lake | | 13.3 mg/kg; backfilling and compacting clean imported soil and crushed gravel |
| **Phase:** | EE/CA | | in excavation area; and LUCs to ensure future low-occupancy site reuse. |
| **Base Year:** | 2008 | | 30 years of LUCs will begin when NTCRA is complete. |
| **Date:** | September 2008 | | Capital costs occur in year 0. |

**CAPITAL COSTS: PCB EXCAVATION (>13.3 MG/KG), AND OFF-SITE DISPOSAL (Risk-Based Cleanup per 40 CFR 761.61[c])**

| DESCRIPTION | Quantity | Unit of Measure | | Material Unit Cost | Labor Unit Cost | Equipment Unit Cost | Extended Cost |
|---|---|---|---|---|---|---|---|
| **Work Plan Addendum** | | | | | | | |
| Principal Scientist (Risk-Based Cleanup Level Determination) | 60 | HR | | 0 | 250 | | $15,000 |
| **SUBTOTAL (2007$)** | | | | | | | **$15,000** |
| **SUBTOTAL (2008$)** | | | | | | | **$15,390** |
| **Excavation of Contaminated Soils** | | | | | | | |
| Temporary Fence | 175 | LF | 8 | 23 | 34 | 6 | $11,090 |
| Site (Security) Signs | 4 | EA | | 47 | 48 | 0 | $380 |
| Excavate and Load | 943 | BCY | | 0 | 1 | 1 | $2,281 |
| Disposable Materials per Sample | 59 | EA | | 12 | 0 | 0 | $729 |
| Characterization Sampling, Metals (6010) | 12 | EA | | 100 | 0 | 0 | $1,200 |
| Characterization Sampling, PCBs | 35 | EA | | 235 | 0 | 0 | $8,225 |
| Characterization Sampling, Dioxins and Furans (8280) | 12 | EA | | 564 | 0 | 0 | $6,763 |
| Synthetic Covers over Waste Piles | 9000 | SF | | 0 | 0 | 0 | $2,250 |
| Spray Washing, Decontaminate Heavy Equipment | 1 | EA | | 0 | 894 | 0 | $894 |
| **SUBTOTAL (2007$)** | | | | | | | **$33,811** |
| **SUBTOTAL (2008$)** | | | | | | | **$34,690** |
| **Load and Haul Non-TSCA-Contaminated Soil** | | | | | | | |
| Dump Charges | 813 | CY | | 42 | 0 | 0 | $34,125 |
| 926, 2.0 CY, Wheel Loader | 26 | HR | | 0 | 100 | 58 | $4,103 |
| 20 CY, Semi Dump | 210 | HR | | 0 | 83 | 92 | $36,830 |
| **SUBTOTAL (2007$)** | | | | | | | **$75,057** |
| **SUBTOTAL (2008$)** | | | | | | | **$77,009** |
| **Load and Haul TSCA-Contaminated Soil** | | | | | | | |
| Dump Charges | 130 | CY | | 228 | 0 | 0 | $29,575 |
| 926, 2.0 CY, Wheel Loader | 4 | HR | | 0 | 100 | 58 | $631 |
| 20 CY, Semi Dump | 50 | HR | | 0 | 83 | 92 | $8,769 |
| **SUBTOTAL** (2007$) | | | | | | | **$38,975** |
| **SUBTOTAL (2008$)** | | | | | | | **$39,989** |
| **Confirmation Sampling** | | | | | | | |
| Surface Soil Sampling Equipment | 1 | EA | | 549 | 0 | 0 | $549 |
| Self-Implementing Confirmation Sampling and Analysis, PCBs (8081/8082) | 86 | EA | | 235 | 0 | 0 | $20,210 |
| Confirmation Sampling and Analysis, Dioxins and Furans (8280) | 8 | EA | | 564 | 0 | 0 | $4,508 |
| Field Technician | 18 | HR | | 0 | 130 | 0 | $2,340 |
| **SUBTOTAL (2007$)** | | | | | | | **$27,607** |
| **SUBTOTAL (2008$)** | | | | | | | **$28,325** |
| **General Monitoring** | | | | | | | |
| Sample Collection, Vehicle Mileage Charge, Car or Van | 100 | MI | | 0 | 0 | 0 | $49 |
| Project Scientist | 80 | HR | | 0 | 200 | 0 | $16,000 |
| Field Technician | 16 | HR | | 0 | 130 | 0 | $2,080 |
| **SUBTOTAL (2007$)** | | | | | | | **$18,129** |
| **SUBTOTAL (2008$)** | | | | | | | **$18,600** |
| **Site Restoration** | | | | | | | |
| Unclassified Fill, 6-Inch Lifts, Off-site | 943 | CY | | 9 | 4 | 3 | $14,251 |
| **SUBTOTAL (2007$)** | | | | | | | **$14,251** |
| **SUBTOTAL (2008$)** | | | | | | | **$14,621** |
| **Gravel Cover** | | | | | | | |
| Fill, Gravel Fill, Compacted, Under Floor Slabs, 4 Inches Deep | 36200 | SF | | 10,498 | 5,792 | 362 | 21,358 |
| Hauling, Excavated or Borrow Material, 4-Mile Round Trip | 447 | LCY | | 0 | 603 | 1,319 | 2,391 |
| **SUBTOTAL (2008$)** | | | | | | | **$23,749** |
| **Site Close-Out Documentation** | | | | | | | |
| Sedan, Automobile, Rental | 4 | DAY | | 72 | 0 | 0 | $288 |
| Per Diem (per person) | 4 | DAY | | 194 | 0 | 0 | $776 |
| Project Manager | 50 | HR | | 0 | 230 | 0 | $11,500 |
| Staff Engineer | 105 | HR | | 0 | 180 | 0 | $18,900 |
| Word Processing/Clerical | 24 | HR | | 0 | 100 | 0 | $2,400 |
| Draftsman/CADD | 24 | HR | | 0 | 130 | 0 | $3,120 |
| Regulatory Review | 20 | HR | | 0 | 185 | 0 | $3,695 |
| **SUBTOTAL (2007$)** | | | | | | | **$40,679** |
| **SUBTOTAL (2008$)** | | | | | | | **$41,736** |
| **LUCs - Implementation** | | | | | | | |
| Overnight Delivery, 8-Ounce Letter | 8 | EA | | 19 | 0 | 0 | $148 |
| Project Manager | 40 | HR | | 0 | 230 | | $9,200 |
| Project Engineer | 60 | HR | | 0 | 210 | | $12,600 |
| Staff Engineer | 80 | HR | | 0 | 180 | | $14,400 |
| QA/QC Officer | 16 | HR | | 0 | 250 | | $4,000 |
| Word Processing/Clerical | 60 | HR | | 0 | 100 | | $6,000 |
| Draftsman/CADD | 40 | HR | | 0 | 130 | | $5,200 |
| Computer Data Entry | 60 | HR | | 0 | 95 | | $5,700 |
| Other Direct Costs | 1 | LS | | 1267 | 0 | | $1,267 |
| Construction Signs | 72 | SF | | 18 | 0 | 0 | $1,281 |
| Surveying - Two-Man Crew | 2 | DAY | | 0 | 1587 | 325 | $3,824 |
| Portable GPS Set with Mapping, 5 Centimeters Accuracy | 1 | MO | | 968 | 0 | | $968 |
| **SUBTOTAL (2007$)** | | | | | | | **$64,588** |
| **SUBTOTAL (2008$)** | | | | | | | **$66,267** |

**TABLE A-1B: REMOVAL ACTION ALTERNATIVE 1B: EXCAVATION (SOILS > 13.3 MG/KG) AND OFF-SITE DISPOSAL OF SOIL (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

**COST ESTIMATE SUMMARY**

**Site:** PW Transformer Storage Area Pit and HVSSA
**Location:** NAWS China Lake
**Phase:** EE/CA
**Base Year:** 2008
**Date:** September 2008

**Description:** Alternative 1B involves excavating soils with PCB concentrations greater than 13.3 mg/kg; backfilling and compacting clean imported soil and crushed gravel in excavation area; and LUCs to ensure future low-occupancy site reuse. 30 years of LUCs will begin when NTCRA is complete. Capital costs occur in year 0.

**CAPITAL COSTS: PCB EXCAVATION (>13.3 MG/KG), AND OFF-SITE DISPOSAL (Risk-Based Cleanup per 40 CFR 761.61[c])**

| DESCRIPTION | Quantity | Unit of Measure | Material Unit Cost | Labor Unit Cost | Equipment Unit Cost | Extended Cost |
|---|---|---|---|---|---|---|
| **Restoration Advisory Board** | | | | | | |
| Senior Project Manager | 2 | HR | 0 | 250 | 0 | $500 |
| Project Manager | 31 | HR | 0 | 230 | 0 | $7,135 |
| Senior Staff Engineer | 5 | HR | 0 | 200 | 0 | $1,000 |
| Staff Scientist | 7 | HR | 0 | 160 | 0 | $1,120 |
| Secretarial/Administrative | 6 | HR | 0 | 80 | 0 | $480 |
| Word Processing/Clerical | 8 | HR | 0 | 100 | 0 | $800 |
| Draftsman/CADD | 16 | HR | 0 | 130 | 0 | $2,079 |
| Other Direct Costs | 1 | LS | 117 | 0 | 0 | $117 |
| **SUBTOTAL (2007$)** | | | | | | **$13,230** |
| **SUBTOTAL (2008$)** | | | | | | **$13,574** |
| **TOTAL WITHOUT PROFESSIONAL LABOR MANAGEMENT (2008$)** | | | | | | **$373,951** |
| **Professional Labor Management** | | | | | | |
| Project Management Labor Cost | | 2.50% | | | | $9,349 |
| Construction Oversight Labor Cost | | 2.75% | | | | $10,284 |
| Reporting Labor Cost | | 0.35% | | | | $1,309 |
| As-Built Drawings Labor Cost | | 0.35% | | | | $1,309 |
| Public Notice Labor Cost | | 0.08% | | | | $299 |
| Contingencies | | 15% | | | | $56,093 |
| Permitting Labor Cost | | 5% | | | | $18,698 |
| **SUBTOTAL (2008$)** | | | | | | **$97,339** |
| **TOTAL CAPITAL COST IN 2008 DOLLARS** | | | | | | **$471,290** |

**O&M COSTS:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **LUCs - Monitoring and Enforcement** | | | | | | |
| Annual | | | | | | |
| Overnight Delivery, 8-Ounce Letter | 2 | EA | 23 | 0 | - | $46 |
| Project Manager | 2 | HR | 0 | 230 | | $460 |
| Project Engineer | 1 | HR | 0 | 210 | | $210 |
| Staff Engineer | 4 | HR | 0 | 180 | | $720 |
| Other Direct Costs | 1 | LS | 1267 | 0 | | $1,267 |
| Contingency | | 15% | | - | | $406 |
| Navy Oversight | | 25% | | - | | $676 |
| Regulatory Involvement | 2 | | | 185 | | $369 |
| **SUBTOTAL (2007$)** | | | | | | **$4,154** |
| **SUBTOTAL (2008$)** | | | | | | **$4,262** |

**PERIODIC COSTS**

| | | Year | | | | | |
|---|---|---|---|---|---|---|---|
| **5-Year Reviews** | | | | | | | |
| 5-Year Reviews | Year | 5,10,15,20,25,30 | 6 | | | | |
| Project Manager | | | 40 | HR | 0 | 230 | 0 | $9,200 |
| Project Engineer | | | 120 | HR | 0 | 210 | 0 | $25,200 |
| Staff Engineer | | | 60 | HR | 0 | 180 | 0 | $10,800 |
| Draftsman/CADD | | | 40 | HR | 0 | 130 | 0 | $5,200 |
| Word Processing/Clerical | | | 60 | HR | 0 | 100 | 0 | $6,000 |
| **SUBTOTAL (2007$)** | | | | | | | | **$56,400** |
| Contingency | | | | 0 | | | | $8,460 |
| Navy Oversight | | | | 0 | | | | $14,100 |
| Regulatory Involvement | | | 60 | | 0 | 185 | 0 | $11,083 |
| **SUBTOTAL (2007$)** | | | | | | | | **$90,043** |
| **SUBTOTAL (2008$)** | | | | | | | | **$92,384** |

**PRESENT VALUE ANALYSIS:**

| Cost Type | Year | Total Cost | Total Cost per Year | Discount Factor[a,b] | Present Value |
|---|---|---|---|---|---|
| Capital Cost | 0 | $471,290 | $471,290 | 1.0 | $471,290 |
| Annual O&M | 1-30 | $127,870 | $4,262 | 19.6 | $83,544 |
| Periodic Cost (5-Year Reviews) | 5, 10, 15, 20, 25, 30 | $554,302 | $92,384 | 3.6 | $336,026 |
| | | $1,153,462 | | | $890,860 |

**TOTAL PRESENT (2008) VALUE OF ALTERNATIVE** **$890,860**

Notes:
Costs obtained from RACER™ 2006 (Remedial Action Cost Engineering and Requirements™) and Means (Reed Construction Data®). Some costs adjusted based on professional judgment.
According to EPA guidance (EPA 2000), 15% contingency is assumed for capital and O&M costs.
Escalation rate of 2.6% was based upon third quarter escalation (McGraw Hill Construction 2008)

**TABLE A-1C: REMOVAL ACTION ALTERNATIVE 1C: EXCAVATION (SOILS > 25 MG/KG) AND OFF-SITE DISPOSAL OF SOIL**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

**COST ESTIMATE SUMMARY**

| | | | |
|---|---|---|---|
| **Site:** | PW Transformer Storage Area Pit and HVSSA | **Description:** | Alternative 1C involves excavating soils with PCB concentrations greater than 25 mg/kg; backfilling and compacting clean imported soil and crushed gravel in excavation area; and LUCs to ensure future low-occupancy site reuse. |
| **Location:** | NAWS China Lake | | |
| **Phase:** | EE/CA | | |
| **Base Year:** | 2008 | | 30 years of LUCs will begin when NTCRA is complete. |
| **Date:** | September 2008 | | Capital costs occur in year 0. |

**CAPITAL COSTS: PCB EXCAVATION (>25 MG/KG), AND OFF-SITE DISPOSAL (Self-Implementing Cleanup per 40 CFR 761.61)**

| DESCRIPTION | Quantity | Unit of Measure | | Material Unit Cost | Labor Unit Cost | Equipment Unit Cost | | Extended Cost |
|---|---|---|---|---|---|---|---|---|
| **Work Plan Addendum** | | | | | | | | |
| Principal Scientist (Risk-Based Cleanup Level Determination) | 60 | HR | | 0 | 250 | | 0 | $15,000 |
| **SUBTOTAL (2007$)** | | | | | | | | **$15,000** |
| **SUBTOTAL (2008$)** | | | | | | | | **$15,390** |
| **Excavation of Contaminated Soils** | | | | | | | | |
| Temporary Fence | 100 | LF | 8 | 23 | 34 | 6 | | $6,337 |
| Site (Security) Signs | 5 | EA | | 47 | 48 | 0 | | $475 |
| Excavate and Load, Bank Measure | 293 | BCY | | 0 | 1 | 1 | | $708 |
| Disposable Materials per Sample | 30 | EA | | 12 | 0 | 0 | | $371 |
| Characterization Sampling, Metals (6010) | 5 | EA | | 100 | 0 | 0 | | $500 |
| Characterization Sampling, PCBs | 20 | EA | | 235 | 0 | 0 | | $4,700 |
| Characterization Sampling, Dioxins and Furans (8280) | 5 | EA | | 564 | 0 | 0 | | $2,818 |
| Synthetic Covers over Waste Piles | 4857 | SF | | 0 | 0 | 0 | | $1,214 |
| Spray Washing, Decontaminate Heavy Equipment | 1 | EA | | 0 | 894 | 0 | | $894 |
| **SUBTOTAL (2007$)** | | | | | | | | **$18,017** |
| **SUBTOTAL (2008$)** | | | | | | | | **$18,485** |
| **Load and Haul Non-TSCA-Contaminated Soil** | | | | | | | | |
| Dump Charges | 163 | CY | | 42 | 0 | 0 | | $6,825 |
| 926, 2.0 CY, Wheel Loader | 10 | HR | | 0 | 100 | 58 | | $1,578 |
| 20 CY, Semi Dump | 40 | HR | | 0 | 83 | 92 | | $7,015 |
| **SUBTOTAL (2007$)** | | | | | | | | **$15,418** |
| **SUBTOTAL (2008$)** | | | | | | | | **$15,819** |
| **Load and Haul TSCA-Contaminated Soil** | | | | | | | | |
| Dump Charges | 130 | CY | | 228 | 0 | 0 | | $29,575 |
| 926, 2.0 CY, Wheel Loader | 4 | HR | | 0 | 100 | 58 | | $631 |
| 20 CY, Semi Dump | 50 | HR | | 0 | 83 | 92 | | $8,769 |
| **SUBTOTAL (2007$)** | | | | | | | | **$38,975** |
| **SUBTOTAL (2008$)** | | | | | | | | **$39,989** |
| **Confirmation Sampling** | | | | | | | | |
| Surface Soil Sampling Equipment | 1 | EA | | 549 | 0 | 0 | | $549 |
| Self-Implementing Confirmation Sampling and Analysis, PCBs ( | 26 | EA | | 235 | 0 | 0 | | $6,110 |
| Confirmation Sampling and Analysis, Dioxins and Furans (8280 | 9 | EA | | 564 | 0 | 0 | | $5,072 |
| Field Technician | 18 | HR | | 0 | 130 | 0 | | $2,340 |
| **SUBTOTAL (2007$)** | | | | | | | | **$14,071** |
| **SUBTOTAL (2008$)** | | | | | | | | **$14,436** |
| **General Monitoring** | | | | | | | | |
| Sample Collection, Vehicle Mileage Charge, Car or Van | 100 | MI | | 0 | 0 | 0 | | $49 |
| Project Scientist | 60 | HR | | 0 | 200 | 0 | | $12,000 |
| Field Technician | 8 | HR | | 0 | 130 | 0 | | $1,040 |
| **SUBTOTAL (2007$)** | | | | | | | | **$13,089** |
| **SUBTOTAL (2008$)** | | | | | | | | **$13,429** |
| **Site Restoration** | | | | | | | | |
| Unclassified Fill, 6-Inch Lifts, Off-site | 293 | CY | | 9 | 4 | 3 | | $4,423 |
| **SUBTOTAL (2007$)** | | | | | | | | **$4,423** |
| **SUBTOTAL (2008$)** | | | | | | | | **$4,538** |
| **Gravel Cover** | | | | | | | | |
| Fill, Gravel Fill, Compacted, Under Floor Slabs, 4 Inches Deep | 36200 | SF | | 10,498 | 5,792 | 362 | | 21,358 |
| Hauling, Excavated or Borrowed Material, 4-Mile Round Trip, 1.5 Loads/HR, 20-CY Dump Trailer, Highway Haulers, Excludes Loading | 447 | LCY | | 0 | 603 | 1,319 | | 2,391 |
| **SUBTOTAL (2008$)** | | | | | | | | **$23,749** |
| **Site Close-Out Documentation** | | | | | | | | |
| Sedan, Automobile, Rental | 4 | DAY | | 72 | 0 | 0 | | $288 |
| Per Diem (per person) | 4 | DAY | | 194 | 0 | 0 | | $776 |
| Project Manager | 40 | HR | | 0 | 230 | 0 | | $9,200 |
| Staff Engineer | 80 | HR | | 0 | 180 | 0 | | $14,400 |
| Word Processing/Clerical | 24 | HR | | 0 | 100 | 0 | | $2,400 |
| Draftsman/CADD | 24 | HR | | 0 | 130 | 0 | | $3,120 |
| Regulatory Review | 20 | HR | | 0 | 185 | 0 | | $3,695 |
| **SUBTOTAL (2007$)** | | | | | | | | **$33,879** |
| **SUBTOTAL (2008$)** | | | | | | | | **$34,759** |
| **LUCs - Implementation** | | | | | | | | |
| Overnight Delivery, 8-Ounce Letter | 8 | EA | | 19 | 0 | 0 | 0 | $148 |
| Project Manager | 40 | HR | | 0 | 230 | | 0 | $9,200 |
| Project Engineer | 60 | HR | | 0 | 210 | | 0 | $12,600 |
| Staff Engineer | 80 | HR | | 0 | 180 | | 0 | $14,400 |
| QA/QC Officer | 16 | HR | | 0 | 250 | | 0 | $4,000 |
| Word Processing/Clerical | 60 | HR | | 0 | 100 | | 0 | $6,000 |
| Draftsman/CADD | 40 | HR | | 0 | 130 | | 0 | $5,200 |
| Computer Data Entry | 60 | HR | | 0 | 95 | | 0 | $5,700 |
| Other Direct Costs | 1 | LS | | 1267 | 0 | | 0 | $1,267 |
| Construction Signs | 72 | SF | | 18 | 0 | 0 | | $1,281 |
| Surveying - Two-Man Crew | 2 | DAY | | 0 | 1587 | 325 | 345 | $3,824 |
| Portable GPS Set with Mapping, 5 Centimeters Accuracy | 1 | MO | | 968 | 0 | | 0 | $968 |
| **SUBTOTAL (2007$)** | | | | | | | | **$64,588** |
| **SUBTOTAL (2008$)** | | | | | | | | **$66,267** |

**TABLE A-1C: REMOVAL ACTION ALTERNATIVE 1C: EXCAVATION (SOILS > 25 MG/KG) AND OFF-SITE DISPOSAL OF SOIL (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

**COST ESTIMATE SUMMARY**

| | | | |
|---|---|---|---|
| **Site:** | PW Transformer Storage Area Pit and HVSSA | **Description:** | Alternative 1C involves excavating soils with PCB concentrations greater than 25 mg/kg; backfilling and compacting clean imported soil and crushed gravel in excavation area; and LUCs to ensure future low-occupancy site reuse. |
| **Location:** | NAWS China Lake | | |
| **Phase:** | EE/CA | | |
| **Base Year:** | 2008 | | 30 years of LUCs will begin when NTCRA is complete. |
| **Date:** | September 2008 | | Capital costs occur in year 0. |

**CAPITAL COSTS: PCB EXCAVATION (>25 MG/KG), AND OFF-SITE DISPOSAL (Self-Implementing Cleanup per 40 CFR 761.61)**

| DESCRIPTION | Quantity | Unit of Measure | Material Unit Cost | Labor Unit Cost | Equipment Unit Cost | Extended Cost |
|---|---|---|---|---|---|---|
| **Restoration Advisory Board** | | | | | | |
| Senior Project Manager | 2 | EA | 0 | 250 | 0 | $500 |
| Project Manager | 31 | HR | 0 | 230 | 0 | $7,135 |
| Senior Staff Engineer | 5 | HR | 0 | 200 | 0 | $1,000 |
| Staff Scientist | 7 | HR | 0 | 160 | 0 | $1,120 |
| Secretarial/Administrative | 6 | HR | 0 | 80 | 0 | $480 |
| Word Processing/Clerical | 8 | HR | 0 | 100 | 0 | $800 |
| Draftsman/CADD | 16 | HR | 0 | 130 | 0 | $2,079 |
| Other Direct Costs | 1 | LS | 117 | 0 | 0 | $117 |
| **SUBTOTAL (2007$)** | | | | | | **$13,230** |
| **SUBTOTAL (2008$)** | | | | | | **$13,574** |
| **TOTAL WITHOUT PROFESSIONAL LABOR MANAGEMENT (2008$)** | | | | | | **$260,436** |
| **Professional Labor Management** | | | | | | |
| Project Management Labor Cost | | 2.50% | | | | $6,511 |
| Construction Oversight Labor Cost | | 2.75% | | | | $7,162 |
| Reporting Labor Cost | | 0.35% | | | | $912 |
| As-Built Drawings Labor Cost | | 0.35% | | | | $912 |
| Public Notice Labor Cost | | 0.08% | | | | $208 |
| Contingencies | | 15% | | | | $39,065 |
| Permitting Labor Cost | | 5% | | | | $13,022 |
| **SUBTOTAL (2008$)** | | | | | | **$67,791** |
| **TOTAL CAPITAL COST IN 2007 DOLLARS** | | | | | | **$328,227** |

**O&M COSTS:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **LUCs - Monitoring and Enforcement** | | | | | | | |
| Annual | | | | | | | |
| Overnight Delivery, 8-Ounce Letter | 2 | EA | 23 | 0 | - | 0.00 | $46 |
| Project Manager | 2 | HR | 0 | 230 | | 0.00 | $460 |
| Project Engineer | 1 | HR | 0 | 210 | | 0.00 | $210 |
| Staff Engineer | 4 | HR | 0 | 180 | | 0.00 | $720 |
| Other Direct Costs | 1 | LS | 1267 | 0 | | 0.00 | $1,267 |
| Contingency | | 15% | | - | | | $406 |
| Navy Oversight | | 25% | | - | | | $676 |
| Regulatory Involvement | 2 | | | 185 | | | $369 |
| **SUBTOTAL (2007$)** | | | | | | | **$4,154** |
| **SUBTOTAL (2008$)** | | | | | | | **$4,262** |

**PERIODIC COSTS**

| **5-Year Reviews** | | **Year** | | | | | |
|---|---|---|---|---|---|---|---|
| 5-Year Reviews | Year | 5,10,15,20,25,30 | 6 | | | | |
| Project Manager | | | 40 | HR | 0 | 230 | 0 | $9,200 |
| Project Engineer | | | 120 | HR | 0 | 210 | 0 | $25,200 |
| Staff Engineer | | | 60 | HR | 0 | 180 | 0 | $10,800 |
| Draftsman/CADD | | | 40 | HR | 0 | 130 | 0 | $5,200 |
| Word Processing/Clerical | | | 60 | HR | 0 | 100 | 0 | $6,000 |
| **SUBTOTAL (2007$)** | | | | | | | | **$56,400** |
| Contingency | | | | 15% | | | | $8,460 |
| Navy Oversight | | | | 25% | | | | $14,100 |
| Regulatory Involvement | | | 60 | | 0 | 185 | 0 | $11,083 |
| **SUBTOTAL (2007$)** | | | | | | | | **$90,043** |
| **SUBTOTAL (2008$)** | | | | | | | | **$92,384** |

**PRESENT VALUE ANALYSIS:**

| Cost Type | Year | Total Cost | Total Cost per Year | Discount Factor[a,b] | Present Value |
|---|---|---|---|---|---|
| Capital Cost | 0 | $328,227 | $328,227 | 1.0 | $328,227 |
| Annual O&M | 1-30 | $127,870 | $4,262 | 19.6 | $83,544 |
| Periodic Cost (5-Year Reviews) | 5, 10, 15, 20, 25, 30 | $554,302 | $92,384 | 3.6 | $336,026 |
| | | $1,010,400 | | | $747,797 |

**TOTAL PRESENT (2008) VALUE OF ALTERNATIVE** **$747,797**

Notes:
Costs obtained from RACER™ 2006 (Remedial Action Cost Engineering and Requirements™) and Means (Reed Construction Data ®). Some costs adjusted based on professional judgement.
According to EPA guidance (EPA 2000), 15% contingency is assumed for capital and O&M costs.
Escalation rate of 2.6% was based upon third quarter escalation (McGraw Hill Construction 2008)

**TABLE A-1D: REMOVAL ACTION ALTERNATIVE 2: EXCAVATION (SOILS > 10 MG/KG), OFF-SITE DISPOSAL OF SOIL AND CAPPING**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

**COST ESTIMATE SUMMARY**

| | | | |
|---|---|---|---|
| **Site:** | PW Transformer Storage Area Pit and HVSSA | **Description:** | Alternative 2 involves excavating all soils with PCB concentrations greater than 10 mg/kg; |
| **Location:** | NAWS China Lake | | backfilling and compacting clean imported soil in excavation area; |
| **Phase:** | EE/CA | | construction of 6-inch asphalt cap; and LUCs. |
| **Base Year:** | 2008 | | 30 years of LUCs will begin when NTCRA is complete. |
| **Date:** | September 2008 | | Capital costs occur in year 0. |

**CAPITAL COSTS: ENGINEERING AND INSTITUTIONAL CONTROLS, PCB EXCAVATION (>10 MG/KG), AND OFF-SITE DISPOSAL (Self-Implementing Cleanup per 40 CFR 761.61)**

| DESCRIPTION | Quantity | Unit of Measure | Material Unit Cost | Labor Unit Cost | Equipment Unit Cost | Extended Cost |
|---|---|---|---|---|---|---|
| **Work Plan Addendum** | | | | | | |
| Principal Scientist (Risk-Based Cleanup Level Determination) | 60 | HR | 0 | 250 | 0 | $15,000 |
| **SUBTOTAL (2007$)** | | | | | | $15,000 |
| **SUBTOTAL (2008$)** | | | | | | **$15,390** |
| **Excavation of Contaminated Soils** | | | | | | |
| Temporary Fence | 250 | LF | 23 | 34 | 6 | $15,843 |
| Site (Security) Signs | 5 | EA | 47 | 48 | 0 | $475 |
| Excavate and Load, Bank Measure | 1105 | BCY | 0 | 2 | 2 | $4,420 |
| Disposable Materials per Sample | 40 | EA | 12 | 0 | 0 | $494 |
| Characterization Sampling, Metals (6010) | 5 | EA | 100 | 0 | 0 | $500 |
| Characterization Sampling, PCBs | 30 | EA | 235 | 0 | 0 | $7,050 |
| Characterization Sampling, Dioxins and Furans (8280) | 5 | EA | 564 | 0 | 0 | $2,818 |
| Synthetic Covers over Waste Piles | 7904 | SF | 0 | 0 | 0 | $1,976 |
| Spray Washing, Decontaminate Heavy Equipment | 1 | EA | 0 | 894 | 0 | $894 |
| **SUBTOTAL (2007$)** | | | | | | **$34,469** |
| **SUBTOTAL (2008$)** | | | | | | **$35,366** |
| **Load and Haul Non-TSCA-Contaminated Soil** | | | | | | |
| Dump Charges | 975 | CY | 42 | 0 | 0 | $40,950 |
| 926, 2.0 CY, Wheel Loader | 30 | HR | 0 | 100 | 58 | $4,740 |
| 20 CY, Semi Dump | 225 | HR | 0 | 83 | 92 | $39,375 |
| **SUBTOTAL (2007$)** | | | | | | **$85,065** |
| **SUBTOTAL (2008$)** | | | | | | **$87,277** |
| **Load and Haul TSCA Contaminated Soil** | | | | | | |
| Dump Charges | 130 | CY | 228 | 0 | 0 | $29,640 |
| 926, 2.0 CY, Wheel Loader | 4 | HR | 0 | 100 | 58 | $632 |
| 20 CY, Semi Dump | 50 | HR | 0 | 83 | 92 | $8,750 |
| **SUBTOTAL (2007$)** | | | | | | **$39,022** |
| **SUBTOTAL (2008$)** | | | | | | **$40,037** |
| **Confirmation Sampling** | | | | | | |
| Surface Soil Sampling Equipment | 1 | EA | 549 | 0 | 0 | $549 |
| Statistical Confirmation Sampling and Analysis, PCBs | 110 | EA | 235 | 0 | 0 | $25,850 |
| Confirmation Sampling and analysis, Dioxins and Furans | 8 | EA | 564 | 0 | 0 | $4,508 |
| Field Technician | 8 | HR | 0 | 130 | 0 | $1,040 |
| **SUBTOTAL (2007$)** | | | | | | **$31,947** |
| **SUBTOTAL (2008$)** | | | | | | **$32,778** |
| **General Monitoring** | | | | | | |
| Sample Collection, Vehicle Mileage Charge, Car or Van | 100 | MI | 0 | 0 | 0 | $49 |
| Project Scientist | 77 | HR | 0 | 200 | 0 | $15,400 |
| Field Technician | 11 | HR | 0 | 130 | 0 | $1,430 |
| **SUBTOTAL (2007$)** | | | | | | **$16,879** |
| **SUBTOTAL (2008$)** | | | | | | **$17,318** |
| **Construction of 6-Inch Asphalt Cap** | | | | | | |
| Unclassified Fill, 6-Inch Lifts, Off-Site | 1117 | CY | 8 | 3 | 3 | $15,455 |
| Gravel, Delivered and Dumped | 1444 | CY | 28 | 5 | 2 | $50,585 |
| Hydraulic Asphalt Concrete | 4022 | SY | 23 | 0 | 0 | $92,546 |
| 16-Ounce-per-SY Geotextile/Drainage Fabric (170 Mil) | 9074 | SY | 2 | 2 | 0 | $36,932 |
| **SUBTOTAL (2007$)** | | | | | | **$195,519** |
| **SUBTOTAL (2008$)** | | | | | | **$200,602** |
| **Site Close-Out Documentation** | | | | | | |
| Sedan, Automobile, Rental | 4 | DAY | 72 | 0 | 0 | $288 |
| Per Diem (per person) | 4 | DAY | 194 | 0 | 0 | $776 |
| Project Manager | 60 | HR | 0 | 230 | 0 | $13,800 |
| Staff Engineer | 130 | HR | 0 | 180 | 0 | $23,400 |
| Word Processing/Clerical | 36 | HR | 0 | 100 | 0 | $3,600 |
| Draftsman/CADD | 24 | HR | 0 | 130 | 0 | $3,120 |
| Regulatory Review | 20 | HR | 0 | 185 | 0 | $3,695 |
| **SUBTOTAL (2007$)** | | | | | | **$48,679** |
| **SUBTOTAL (2008$)** | | | | | | **$49,944** |

**TABLE A-1D: REMOVAL ACTION ALTERNATIVE 2: EXCAVATION (SOILS > 10 MG/KG), OFF-SITE DISPOSAL OF SOIL AND CAPPING (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

**COST ESTIMATE SUMMARY**

**Site:** PW Transformer Storage Area Pit and HVSSA
**Location:** NAWS China Lake
**Phase:** EE/CA
**Base Year:** 2008
**Date:** September 2008

**Description:** Alternative 2 involves excavating all soils with PCB concentrations greater than 10 mg/kg; backfilling and compacting clean imported soil in excavation area; construction of 6-inch asphalt cap; and LUCs. 30 years of LUCs will begin when NTCRA is complete. Capital costs occur in year 0.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **CAPITAL COSTS: ENGINEERING AND INSTITUTIONAL CONTROLS, PCB EXCAVATION (>10 MG/KG), AND OFF-SITE DISPOSAL (Self-Implementing Cleanup per 40 CFR 761.61)** | | | | | | | |
| **LUCs - Implementation** | | | | | | | |
| Overnight Delivery, 8-Ounce Letter | | | 8 | EA | 19 | 0 | 0 | $148 |
| Project Manager | | | 40 | HR | 0 | 230 | 0 | $9,200 |
| Project Engineer | | | 60 | HR | 0 | 210 | 0 | $12,600 |
| Staff Engineer | | | 80 | HR | 0 | 180 | 0 | $14,400 |
| QA/QC Officer | | | 16 | HR | 0 | 250 | 0 | $4,000 |
| Word Processing/Clerical | | | 60 | HR | 0 | 100 | 0 | $6,000 |
| Draftsman/CADD | | | 40 | HR | 0 | 130 | 0 | $5,200 |
| Computer Data Entry | | | 60 | HR | 0 | 95 | 0 | $5,700 |
| Other Direct Costs | | | 1 | LS | 1267 | 0 | 0 | $1,267 |
| Construction Signs | | | 72 | SF | 18 | 0 | 0 | $1,281 |
| Surveying - Two-Man Crew | | | 2 | DAY | 0 | 1587 | 325 | $3,824 |
| Portable GPS Set with Mapping, 5 Centimeters Accuracy | | | 1 | MO | 968 | 0 | | $968 |
| **SUBTOTAL (2007$)** | | | | | | | | **$64,588** |
| **SUBTOTAL (2008$)** | | | | | | | | **$66,267** |
| **Restoration Advisory Board** | | | | | | | |
| Senior Project Manager | | | 2 | HR | 0 | 250 | 0 | $500 |
| Project Manager | | | 31 | HR | 0 | 230 | 0 | $7,135 |
| Senior Staff Engineer | | | 5 | HR | 0 | 200 | 0 | $1,000 |
| Staff Scientist | | | 7 | HR | 0 | 160 | 0 | $1,120 |
| Secretarial/Administrative | | | 6 | HR | 0 | 80 | 0 | $480 |
| Word Processing/Clerical | | | 8 | HR | 0 | 100 | 0 | $800 |
| Draftsman/CADD | | | 16 | HR | 0 | 130 | 0 | $2,079 |
| Other Direct Costs | | | 1 | LS | 117 | 0 | 0 | $117 |
| **SUBTOTAL (2007$)** | | | | | | | | **$13,230** |
| **SUBTOTAL (2008$)** | | | | | | | | **$13,574** |
| **TOTAL WITHOUT PROFESSIONAL LABOR MANAGEMENT (2008$)** | | | | | | | | **$558,552** |
| **Professional Labor Management** | | | | | | | |
| Project Management Labor Cost | | | | 2.50% | | | | $13,964 |
| Construction Oversight Labor Cost | | | | 2.75% | | | | $15,360 |
| Reporting Labor Cost | | | | 0.35% | | | | $1,955 |
| As-Built Drawings Labor Cost | | | | 0.35% | | | | $1,955 |
| Public Notice Labor Cost | | | | 0.08% | | | | $447 |
| Contingency | | | | 15% | | | | $83,783 |
| Permitting Labor Cost | | | | 3% | | | | $16,757 |
| **SUBTOTAL (2008$)** | | | | | | | | **$134,220** |
| **TOTAL CAPITAL COST IN 2008 DOLLARS** | | | | | | | | **$692,772** |
| **O&M COSTS:** | | | | | | | |
| **LUCs - Monitoring and Enforcement** | | | | | | | |
| Annual | | | | | | | |
| Overnight Delivery, 8-Ounce Letter | | | 2 | EA | 23 | 0 | 0 | $46 |
| Project Manager | | | 2 | HR | 0 | 230 | 0 | $460 |
| Project Engineer | | | 1 | HR | 0 | 210 | 0 | $210 |
| Staff Engineer | | | 4 | HR | 0 | 180 | 0 | $720 |
| Other Direct Costs | | | 1 | LS | 1267 | 0 | 0 | $1,267 |
| Contingency | | | | 15% | | 0 | | $406 |
| Navy Oversight | | | | 25% | | 0 | | $676 |
| Regulatory Involvement | | | 2 | | | 185 | | $369 |
| **SUBTOTAL (2007$)** | | | | | | | | **$4,154** |
| **SUBTOTAL (2008$)** | | | | | | | | **$4,262** |
| **PERIODIC COSTS** | | | | | | | |
| **5-Year Reviews** | | **Year** | | | | | | |
| 5-Year Reviews | Year | 5,10,15,20,25,30 | 6 | | | | | |
| Project Manager | | | 40 | HR | 0 | 230 | 0 | $9,200 |
| Project Engineer | | | 120 | HR | 0 | 210 | 0 | $25,200 |
| Staff Engineer | | | 60 | HR | 0 | 180 | 0 | $10,800 |
| Draftsman/CADD | | | 40 | HR | 0 | 130 | 0 | $5,200 |
| Word Processing/Clerical | | | 60 | HR | 0 | 100 | 0 | $6,000 |
| **SUBTOTAL (2007$)** | | | | | | | | **$56,400** |
| Contingency | | | | 15% | | | | $8,460 |
| Navy Oversight | | | | 25% | | | | $14,100 |
| Regulatory Involvement | | | 60 | | 0 | 185 | 0 | $11,083 |
| **SUBTOTAL (2007$)** | | | | | | | | **$90,043** |
| **SUBTOTAL (2008$)** | | | | | | | | **$92,384** |
| **Cap Maintenance** | | **Year** | | | | | | |
| Direct Cost Maintenance | Year | 10, 20, 30 | | LS | 15000 | 0 | 0 | $15,000 |
| Contingency | | | | 15% | 2250 | | | $2,250 |
| Navy Oversight | | | | 25% | 3750 | | | $3,750 |
| **SUBTOTAL (2007$)** | | | | | | | | **$21,000** |
| **SUBTOTAL (2008$)** | | | | | | | | **$21,546** |

**TABLE A-1D: REMOVAL ACTION ALTERNATIVE 2: EXCAVATION (SOILS > 10 MG/KG), OFF-SITE DISPOSAL OF SOIL AND CAPPING (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

**COST ESTIMATE SUMMARY**

| | | | |
|---|---|---|---|
| **Site:** | PW Transformer Storage Area Pit and HVSSA | **Description:** | Alternative 2 involves excavating all soils with PCB concentrations greater than 10 mg/kg; |
| **Location:** | NAWS China Lake | | backfilling and compacting clean imported soil in excavation area; |
| **Phase:** | EE/CA | | construction of 6-inch asphalt cap; and LUCs. |
| **Base Year:** | 2008 | | 30 years of LUCs will begin when NTCRA is complete. |
| **Date:** | September 2008 | | Capital costs occur in year 0. |

**CAPITAL COSTS: ENGINEERING AND INSTITUTIONAL CONTROLS, PCB EXCAVATION (>10 MG/KG), AND OFF-SITE DISPOSAL (Self-Implementing Cleanup per 40 CFR 761.61)**
**PRESENT VALUE ANALYSIS:**

| Cost Type | Year | Total Cost | Total Cost per Year | Discount Factor[a,b] | Present Value |
|---|---|---|---|---|---|
| Capital Cost | 0 | $692,772 | $692,772 | 1.0 | $692,772 |
| Annual O&M | 1-30 | $127,870 | $4,262 | 19.6 | $83,544 |
| Periodic Cost (Maintenance) | 10, 20, 30 | $64,638 | $21,546 | 1.7 | $36,200 |
| Periodic Cost (5-Year Reviews) | 5, 10, 15, 20, 25, 30 | $554,302 | $92,384 | 3.6 | $336,026 |
| | | $1,439,583 | | | $1,148,542 |

**TOTAL PRESENT (2008) VALUE OF ALTERNATIVE** **$1,148,542**

Notes:
Costs obtained from RACER™ 2006 (Remedial Action Cost Engineering and Requirements™) and Means (Reed Construction Data®). Some costs adjusted based on professional judgement.
According to EPA guidance (EPA 2000), 15% contingency is assumed for capital and O&M costs.
Escalation rate of 2.6% was based upon third quarter escalation (McGraw Hill Construction 2008)

**APPENDIX B**
**RESPONSES TO REGULATORY AGENCY AND RESTORATION ADVISORY BOARD COMMENTS ON THE DRAFT ENGINEERING EVALUATION/COST ANALYSIS NON-TIME CRITICAL REMOVAL ACTION, PUBLIC WORKS TRANSFORMER STORAGE PIT AND HIGH VOLTAGE SHOP STORAGE AREA, NAVAL AIR WEAPONS STATION CHINA LAKE, RIDGECREST, CALIFORNIA (JULY 2007; SULT.5104.0148.0001)**

23 pages

## RESPONSES TO REGULATORY AGENCY AND RESTORATION ADVISORY BOARD COMMENTS

Engineering Evaluation/Cost Analysis, Non Time-Critical Removal Action, Public Works Transformer Storage Pit and High Voltage Shop Storage Area, Naval Air Weapons Station China Lake, California

This appendix presents the Navy's responses to comments received from the California Department of Toxic Substances Control (DTSC), the Regional Water Quality Control Board (RWQCB) – Lahontan Region, and the Department of Fish and Game (DFG) (collectively the state) and the Naval Air Weapons Station (NAWS) China Lake Restoration Advisory Board (RAB). State comments were received via letter correspondence from Laurie Racca of the DTSC on September 13, 2007. Attached to the DTSC comment letter, a memo from Victoria Lake of the DFG Office of Spill Prevention and Response dated August 28, 2007 that provided additional comments on the subject report. Additionally, a memorandum from the Ms. Patty Wong-Yim of the DTSC Human and Ecological Risk Division (HERD) was provided with additional comments by HERD and dated August 30, 2007. NAWS China Lake RAB comments were dated September 12, 2007. The state and RAB comments pertain to the following document:

- Draft Engineering Evaluation/Cost Analysis, Non Time-Critical Removal Action, Public Works Transformer Storage Pit and High Voltage Shop Storage Area, Naval Air Weapons Station China Lake, California (SULT.5104.0148.0001)

## RESPONSES TO THE DTSC (COMMENTS PROVIDED BY LAURIE RACCA, R.G. [DTSC])

### GENERAL COMMENTS:

1. **Comment:** **DTSC agrees that removal of polychlorinated biphenyls (PCB) impacted soils from the site is necessary and appropriate. However, the proposed cleanup alternatives will leave residual soil PCB levels ranging from 1 mg/kg to 25 mg/kg. Even the most aggressive cleanup alternative will leave in place soil PCB concentrations higher than the United States Environmental Protection Agency (USEPA) Residential Soil PRG for PCBs of 0.22 mg/kg and the Industrial Soil Preliminary Remediation Goals (PRG) of 0.74 mg/kg (USEPA, 2004a). In addition, the cleanup alternatives do not address potential inhalation exposure to an offsite industrial worker and local resident to windblown dust. PCBs were also detected in deep soil and groundwater. Degradation and volatilization of degraded PCBs may lead to vapor intrusion concerns, if buildings were ever constructed onsite. Taken together, DTSC does not support the use of the Toxic Substances Control Act (TSCA) cleanup levels proposed in the Engineering Evaluation/Cost Analysis (EE/CA).**

   Response: Under the National Contingency Plan (NCP), the Navy is required to supply (responsible for identifying) the federal applicable or relevant and appropriate requirements (ARARs). Accordingly, the Toxic Substances Control Act (TSCA) was identified by the Navy as relevant and appropriate to the non-time-critical removal action at the Public Works Transformer Storage Pit and High Voltage Shop Storage Area (PWTSP/HVSSA). As such, removal action alternatives identified in the Draft Engineering Evaluation/Cost Analysis (EE/CA) were based on both the published cleanup levels for PCB bulk remediation waste associated with 40 CFR § 761.61 (a) and a risk-based cleanup goal associated with 40 CFR § 761.61 (c).

   As detailed in the May 14, 2007 letter from the Navy to the DTSC and shown in Appendix C of the EE/CA, a risk-based cleanup goal (Alternative 1C) was developed specifically for the PWTSP/HVSSA site by modifying the standard industrial PRG equation to account for actual hours worked at the site. Correspondence with the NAWS China Lake Public Works Department indicates that actual hours worked at the PWTSP/HVSSA are less than 1 hour per week (less than 52 hours per year). However, it was conservatively assumed that an industrial worker would be exposed to the contaminated soils at the low-occupancy threshold exposure duration of 335 hours per year, as specified in 40 CFR § 761.3. Using this exposure duration in the

standard industrial PRG equation resulted in a conservative site-specific cleanup level calculation of 13.3 mg/kg.

As a result, cleanup levels associated with removal action alternatives in the Draft EE/CA (Alternatives 1A, 1B, 1C and 2) will leave in place soil PCB concentrations higher than the USEPA Residential Soil PRG for PCBs of 0.22 mg/kg and the Industrial Soil PRG of 0.74 mg/kg. PRGs, while considered useful as screening tools, are non-promulgated and are generally not used as cleanup goals for removal actions.

However, since Alternative 1C (remove PCB-impacted soils to 25 mg/kg) exceeds the risk-based cleanup goal calculated in Alternative 1B, text, tables, and subsequent removal action alternative rankings will be revised to indicate that Alternative 1C is considered to exhibit low effectiveness. As a result of its low effectiveness, Alternative 1C will be dropped from its current ranking of #2 of four to a ranking of #4 of four. The ranking of the risk based Alternative 1B will remain unchanged as #1 of the four removal action alternatives.

Inhalation exposure to windblown dust by local residents is not considered to constitute a complete risk pathway. Based on the "Final Human Health Risk Assessment, PCB Transformer Storage Pit" dated August 31, 2000 (Dames and Moore, 2000), and as indicated in Section 2.1.3 of the Draft EE/CA, the prevailing wind direction in the PWTSP/HVSSA is predominantly from the southwest and therefore away from the residents of Ridgecrest to the west and southwest.

Additionally, the potential risk to an industrial worker from inhalation of PCBs in fugitive dust is more than three orders of magnitude less than the potential risk from incidental ingestion and dermal contact. For example, if a PCB cleanup goal is estimated using conservative exposure parameters for an industrial worker based on inhalation of fugitive dust as the sole exposure pathway, an exposure frequency of 250 days per year, and a cancer risk of $1 \times 10^{-6}$, the resulting cleanup goal would be 9,000 mg/kg.

However, based on a site walk with the California Department of Fish and Game, it is recognized that low-quality ecological habitat is present at the PWTSP/HVSSA. As such, the text and Appendix B will be revised to indicate that a layer of crushed gravel will be installed to cover the full extent of contamination delineated during previous investigations in Alternatives 1B and 1C. Installation of this layer of crushed gravel will serve to mitigate potential exposure to ecological receptors and significantly reduce the potential for fugitive dust from

the PWTSP/HVSSA where the remaining PCB concentration is higher than 1 mg/kg.

Degradation and volatilization of PCBs are not considered to provide a complete risk pathway due to the low vapor pressure of PCBs and the implementation of land use controls (LUCs) at the site following removal action activities. LUCs for the PWTSP/HVSSA will be evaluated under the CERCLA remedial process.

The EE/CA text and Appendix B will be revised to include LUCs for Alternative 1A (see response to general comment #2). Future plans to change the use of the PWTSP/HVSSA to a residential/commercial type zone are considered highly unlikely, due to the continued mission of NAWS China Lake as a Navy Research, Development, Test & Evaluation installation. Nonetheless, planned implementation of LUCs as part of the Michelson Lab/Public Works Operable Unit will ensure that future land use remains consistent with current land use and that buildings and/or structures will not be constructed in the PWTSP/HVSSA in the future.

**2. Comment: The information presented in the EE/CA also indicates that no land use restrictions would be necessary with a cleanup goal of 1 mg/kg PCBs. This is incorrect. DTSC will require land use restrictions for any concentration of PCBs or other constituents that remain in soil above a residential cancer risk of 1E-06. Please refer to the applicable or relevant and appropriate requirements (ARARs) submitted to the Navy by the State. If the Navy proposes a cleanup goal of 1 mg/kg for total PCBs, there will need to be, at a minimum, deed restrictions and an appropriate cap for this area. Also under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the interim action should be consistent with the final remedy and partial excavation of PCB contaminated soils may not be appropriate.**

Response: While LUCs are currently included in the costs associated with removal action Alternatives 1B, 1C, and 2, the EE/CA text and Appendix B will be revised to include LUC requirements for Alternative 1A as well.

Importation, backfill, and compaction of 2 to 5 feet of clean soil for all alternatives, and placement of crushed gravel following removal action for Alternatives 1B and 1C, will serve as a non-engineered cap for the area of excavation. However, residual concentrations of PCBs (less than 13.3 mg/kg under Alternative 1B) will remain in surface soils at the PWTSP/HVSSA. The additional capping of residual concentrations by the crushed gravel will significantly reduce the potential risk to an

offsite industrial worker from inhalation of PCBs in fugitive dust.

Based upon current and probable future site use, the interim removal action of soils with the highest concentrations of PCBs (greater than 13.3 mg/kg under Alternative 1B) in combination with LUCs is considered to be consistent with the final remedy. Should future change to land use occur at the PWTSP/HVSSA, PCBs would require additional remedial/removal action.

**3. Comment: The investigation and cleanup of the PCBTSP/HVSSA is a corrective action required as condition of the China Lake hazardous waste permit. Section 6 and Section 8 of the Federal Facility Site Remediation Agreement (FFSRA) provide the framework for the Navy to coordinate corrective action under its hazardous waste permit with CERCLA response actions. Specifically, Section 8.2 states, "If the Navy chooses to discharge any of its corrective action obligations through CERCLA response actions, it may submit CERCLA documents equivalent to those required by this section to the State for its review and approval." The terms of the FFSRA require that the proposed removal action for the PCBTSP/HVSSA be <u>equivalent</u> to the corrective action documents required by the state. DTSC has previously notified the Navy that the TSCA cleanup levels were not appropriate or equivalent to state requirements.**

Response: The phrase "equivalent documents" in Section 8.2 of the FFSRA refers to those documents that cover similar stages in the CERCLA and RCRA response action process. The intent is not to replicate RCRA requirements under CERCLA document titles, but to allow the goal of Section 6, "RCRA-CERCLA Coordination," to be met. This goal is stated in the first sentence of Section 6.1: "The Navy may discharge some or all of its RCRA corrective action obligations which relate to the releases or threatened releases of hazardous waste or constituents through CERCLA response actions that meet all the requirements of this Agreement"

The Navy has chosen to discharge its RCRA corrective action obligations for this site through the CERCLA process. As part of the CERCLA process, the Navy is required to evaluate Federal Applicable or Relevant and Appropriate Requirements (ARARs). TSCA contains requirements relevant to this project, and therefore must be evaluated. The purpose of the Navy's TSCA evaluation is not to replace RCRA requirements, but merely to present a complete evaluation of relevant regulatory issues.

## RESPONSES TO THE DTSC (CONT'D)

### SPECIFIC COMMENTS:

**1. Comment: Executive Summary, page ES-3: The draft workplan and soon to be released Action Memorandum are equivalent to the remedy selection step of the corrective action process under the California Hazardous Waste Management Program. The public comment period under the Hazardous Waste Management Program is 45 days. The public comment period should be extended to 45 days to ensure that the current process is equivalent.**

Response: National Contingency Plan (NCP) guidance indicates that the public will be provided "a reasonable opportunity, not less than 30 days, for submission of written and oral comments after completion of the EE/CA pursuant to Section 300.820(a)." However, NCP guidance also indicates that the lead agency may elect to extend the public comment period by a minimum of 15 days. Therefore the Navy will extend the public comment period to 45 days.

**2. Comment: Section 1.1, page 2: Please add the Lahontan Regional Water Quality Control Board to the list of agencies involved with the Navy's efforts at the PCBTSP/HVSSA.**

Response: Text will be revised to reflect the involvement of the Lahontan Regional Water Quality Control Board.

**3. Comment: Section 2.4.3, pages 11 and 12, and Section 3, page 16: For the "non-capping" alternatives, provide information regarding the potential risk of windblown dust containing PCBs to receptors outside of the PCBTSP/HVSSA both on and off the Naval Air Weapons Station (NAWS) property. Please refer to General Comment 1.**

Response: Please refer to response to general comment #1 above. Although the human health risk attributed to inhalation of fugitive dust has been calculated as minimal, installation of a 4-inch layer of crushed gravel following removal action activities for Alternatives 1B and 1C will significantly lessen the potential for fugitive dust and minimize the potential exposure of ecological receptors at the PWTSP/HVSSA, where PCB concentrations remaining on-site would be higher than 1 mg/kg.

## RESPONSES TO THE DTSC (CONT'D)

**4. Comment: Section 4.1, page 18: The statement at the end of the first paragraph describing Alternative 1A, "Thus, no Institutional Controls, further monitoring, or reporting would be necessary at the site," is incorrect and should be deleted. Please refer to General Comment 2.**

Response: Comment noted. LUCs will be added to the EE/CA text and to the costs associated with Alternative 1A. As a result, this statement will be deleted.

**5. Comment: Section 4.1.2, page 18: Please clarify why Alternative 1A is rated as moderate. The PCBTSP/HVSSA area is currently cordoned off and posted as hazardous to restrict access. The area is described by the Navy as "low occupancy" and site use is described as "intermittent." The temporary relocation of site equipment should be a manageable disruption for an area described as low use.**

Response: Implementability of Alternative 1A was judged as moderate due to the significantly increased excavation area in comparison to Alternatives 1B, 1C, and 2. On a comparative basis, disturbance of 36,200 $ft^2$ of site area is considered to pose a greater impact on site operations (regardless of the low-occupancy, intermittent use of the PWTSP/HVSSA) than implementation of Alternatives 1B or 1C, with a maximum disturbed area of approximately 6,965 $ft^2$. The increased excavation area and excavation volume associated with Alternative 1A would require increased truck traffic, increased duration of excavation, and the potential need to relocate site fencing, as compared to Alternatives 1B and 1C. Thus, an implementability rating of moderate for Alternative 1A is considered to be appropriate.

**6. Comment: Section 4.0, and Appendix B (applies to all Alternatives): The TSCA implementing regulations §761.61 PCB Remediation Waste state that "Any person cleaning up and disposing of PCBs managed under this section shall do so based on the concentration at which the PCBs are found." Please clarify if the disposal options discussed and the associated costs are based on "in place" concentrations of PCBs.**

Response: The disposal options discussed and the associated costs presented in the EE/CA are based upon: (1) available soil data for the PWTSP/HVSSA, including data from the 2004 Contamination Assessment and other previously collected data; and (2) "in place" PCB concentrations currently available. Available soil data for the PWTSP/HVSSA, including data from the 2004 Contamination Assessment and other previously collected data, were used to guide the design of initial

excavation area(s). Estimated disposal costs and excavation volumes in the EE/CA were refined based on "in place" PCB concentrations currently available. Actual disposal options and costs associated with estimated excavation volumes are subject to change, based on the results of characterization soil sampling conducted during the removal action. The determination of removal action completion will be based upon laboratory analytical results of PCB concentrations in confirmation soil samples collected following excavation of contaminated soils.

**7. Comment: Appendix A, page A-5: The Navy indicates that the State was not contacted for potential ARARs. This is incorrect. The Navy requested ARARs from the State and the State did provide ARARs. Please include the ARARs previously provided by the State. Please discuss the China Lake NAWS hazardous waste permit requirements for corrective action as well as the land use control requirements for leaving waste in place.**

Response: Comment noted. Text will be revised to indicate that the Navy requested ARARs from the State and the State did provide ARARs.

**8. Comment: Appendix B: The costs of all the alternatives should include the costs for land use controls. Please refer to General Comment 2.**

Response: LUCs are currently included in the costs associated with removal action Alternatives 1B, 1C, and 2. The EE/CA text and Appendix B will be revised to include the LUC requirements for Alternative 1A.

## RESPONSES TO THE CALIFORNIA DEPARTMENT OF FISH AND GAME, OFFICE OF SPILL PREVENTION AND RESONSE (COMMENTS PROVIDED BY VICTORIA LAKE AND BECKYE STANTON, PH.D.)

The California Department of Fish and Game's Office of Spill Prevention and Response (DFG-OSPR) received the EE/CA for the NTCRA at PW Transformer Storage Pit and HVSSA on July 17, 2007, with comments requested by August 20, 2007. The PW Transformer Storage Pit and HVSSA are located in the Public Works Compound of the main China Lake Complex.

### BACKGROUND

General biological information is provided in the NAWS China Lake's Integrated Natural Resources Management Plan. The Public Works Compound consists of significant portions of paved or covered areas surrounded by creosote bush and saltbush scrub habitat. Some of the special-status species with potential to occur in the area include the desert tortoise, Burrowing Owl, and Mohave ground squirrel. Based on observations during a November 30, 2006 site visit, the PW Transformer Storage Pit and HVSSA is characterized by low-quality, sparsely vegetated desert scrub habitat in an industrial area. No obvious burrows were observed.

### SPECIFIC COMMENTS (EXCAVATION WORK PLAN):

**1. Comment:** **Page 2, Section 1.1. In addition to reducing risk to human health, the NTCRA will also reduce risk to ecological receptors. Please include ecological risk in the rationale for implementing the NTCRA and developing the EE/CA.**

Response: Comment noted. Reduction of ecological risk will be included in the rationale for implementing the NTCRA and developing the EE/CA.

**2. Comment:** **Page 6, Section 2.1.4; Page 12, Section 2.4.4; and Page A-14, Section A3.0. The text inaccurately states that DFG-OSPR offered the opinion that "no viable habitat for ecological receptors is present" during the November 30, 2006 site visit. Rather, DFG-OSPR commented that the site is characterized as low quality, disturbed desert scrub habitat. This habitat is still available to plants and species. It is currently sparsely vegetated with plants. During the field visit, Navy representative Jim McDonald stated that the standard pre-construction surveys and protective measures for special-status species would be carried out at the site**

Response: Comment noted. The EE/CA text will be revised to reflect that the site is characterized as low-quality, disturbed desert scrub habitat and that the standard pre-construction surveys and protective measures for special-status species would be carried out at the site prior to and during any removal action.

## RESPONSES TO THE CALIFORNIA DEPARTMENT OF FISH AND GAME (CONT'D)

**3a. Comment:** **Page 17, Section 4.0.**

**The removal action objectives (RAOs) for polychlorinated biphenyls (PCBs) range from 1 to 25 mg/kg based on human health and different levels of human occupancy. These RAOs do not address potential impacts to ecological receptors. If the removal action does not include and achieve cleanup numbers protective of ecological receptors, adequate confirmation sampling and a post-removal action ecological risk assessment will be needed to evaluate potential risk from residual concentrations of PCBs and dioxin/furans.**

Response: Please refer to response to state general comment #1. Although the ecological habitat of the PWTSP/HVSSA is considered to be of low quality, installation of a 4-inch layer of crushed gravel following removal action activities will significantly lessen the potential exposure of ecological receptors at the PWTSP/HVSSA.

**3b. Comment:** **Placement of an asphalt cap over areas with PCB concentrations between 1 and 10 mg/kg would prevent vegetation from re-colonizing the area following the removal action, but, while maintained, would block exposure of ecological receptors to contaminated soil beneath the cap. Regardless, this alternative costs more than removing PCB contamination above 1 mg/kg and ranked the lowest of the four alternatives.**

Response: Comment noted.

**4. Comment:** **Pages 23 to 24, Section 4.4. Please revise the section and subsection headings from Section 4.2 to Section 4.4.**

Response: Comment noted. Section and subsection headings from Section 4.2 will be revised to Section 4.4.

**5. Comment:** **Page A-14, Section A3.0. The location-specific ARARs submitted by DFGOSPR in an April 4, 2007 memorandum to the Department of Toxic Substances Control should be included in this section because of the potential for ecological receptors now and in the future to utilize the site. These ARARs were submitted following the November 30, 2006, site visit based on observations made during the field visit.**

Response: ARARs supplied by the state will be included in Appendix A.

## RESPONSES TO THE DEPARTMENT OF TOXIC SUBSTANCES CONTROL, HUMAN AND ECOLOGICAL RISK DIVISION (HERD) (COMMENTS PROVIDED BY PATTY WONG-YIM, PH.D.)

**Document Reviewed:** In response to your EnviroStor request on July 16, 2007, HERD has reviewed the Draft Engineering Evaluation/Cost Analysis (EE/CA), Non-Time Critical Removal Action (NTCRA), Public Works Transformer Storage Pit and High Voltage Shop Storage Area, Naval Air Weapons Station (NAWS), China Lake, California. The document was prepared by SulTech and dated July 2007.

**Locations and Settings:** The Public Works Transformer Storage Pit (PWTSP) and High Voltage Shop Storage Area (HVSSA) Site encompasses approximately 1.6 acres and is located in the southern portion of the Public Works Compound. Transformers from NAWS China Lake were stored and sampled onsite. When the PWTSP was full, transformers would be stored north of the pit, an area now known as the New Transformer Storage Yard. Prior to 1984, transformers were set directly on the unlined ground surface without containment in the PWTSP. From 1984 to 1988, Navy-constructed containment devices were used onsite and commercial drip pans were used starting 1988. The PWTSP was excavated and partially filled in 1990. During a 1991 Department of Health Services inspection, spills onsite were documented. A preliminary assessment was conducted in the early 1990s and further site characterization was conducted in 1996. Eventually, two soil removal actions were completed in 1997 and a human health risk assessment was conducted in 2000. Recently, soil and groundwater samples were collected during a Contamination Assessment in 2004.

The HVSSA is located directly south of the PWTSP. Transformers were also stored on this area. Elevated polychlorinated chlorinated biphenyl (PCB) levels (Aroclor 1260) were detected in surface soil, probably resulting from the storage of PCB-containing transformers in the HVSSA.

PCBs were widespread in soils at the site with levels exceeding the Toxic Substance Control Act (TSCA) high-occupancy limit (1 mg/kg). Except at certain hotspots where PCB concentrations exceeded 1 g/kg, PCB contamination in the surface soil (0-2 ft below ground surface [bgs]) was generally below 50 mg/kg. PCB concentrations of 3,100 mg/kg and 0.92 mg/kg were detected in collocated soil samples collected at 3 ft bgs and 32 ft bgs, respectively. Dioxin/furan concentrations exceeding both the USEPA Region 9 Residential and Industrial Soil Preliminary Remediation Goals (PRGs) were also detected in a soil sample collected from 1 to 3 ft bgs. Due to the collocation of the dioxin/furan and PCB contamination in soil, actions taken to address the PCB contamination will also reduce the dioxin/furan contamination. In addition to PCB analysis, dioxin/furan analysis will be included in confirmation sampling during the proposed NTCRA. A concentration of PCB (2.2 pg/L) exceeding the Tap Water PRG (0.pg/L, USEPA, 2004a), and the state and federal maximum contaminant level (MCL, 0.5 pg/L), was detected in one of the six grab groundwater samples collected from approximately 45 ft bgs.

Current land use in the areas surrounding the site includes additional storage and heavy equipment maintenance, and various high-occupancy industrial uses. The proposed reuse of the site after completion of the NTCRA will remain consistent with its current use as a low

occupancy industrial area. The depth to first groundwater onsite is located at approximately 45 ft bgs. The bottom of the shallow hydrogeologic zone/top of the intermediate hydrogeologic zone locates at approximately 45 to 50 ft bgs.

**SPECIFIC COMMENTS:**

1. **Comment:** **Scope of Review: HERD primarily confines its review of the Draft EE/CA to those sections concerning risk assessment. We assume that regional personnel have evaluated site characterization, sample analysis, removal action objectives, and removal action alternatives sections. Please clearly identify future changes or additions to the document.**

   Response: Comment noted. Changes or additions to the Draft Final document are noted in this response to comments matrix and included as an Appendix to the Draft Final EE/CA. Comments made as a result of regulatory agency comment on the draft final EE/CA are not included in a comment matrix but where addressed where applicable directly into the Final EE/CA.

2. **Comment:** **Objectives of the Report: The EE/CA evaluates the implementability, effectiveness, and cost of cleaning up the PCB-contaminated soil at the PWTSP and HVSSA site. Removal action alternatives are proposed to reduce the threat of human exposure to chemical-contaminated soils at the site.**

   Response: Comment noted.

3. **Comment:** **Risk-Based Cleanup Goals: According to the TSCA for PCB remediation waste sites (USEPA, internet), the Navy categorized industrial land use as high occupancy (40 hours per week work station) and low occupancy (less than 335 hours per year). Following the User Guide for USEPA Region 9 PRGs (USEPA, 2004b), risk-based soil cleanup goals were derived for these two industrial worker exposure scenarios. Table C-1 summarizes the risk-based cleanup goals for PCBs in soil**

   Response: Comment noted.

## RESPONSES TO THE DEPARTMENT OF TOXIC SUBSTANCES CONTROL, HERD (CONT'D)

**4. Comment:** **3.1 High Occupancy Industrial Land Use Scenario: For the high occupancy industrial land use scenario, the USEPA Region 9 Industrial Worker Soil PRG for PCBs (0.74 mg/kg) was adopted as the risk-based cleanup goal for a target cancer risk of 1 E-6. The risk-based soil cleanup goal corresponding to a target cancer risk of 1E-5 was 7.4 mg/kg. HERD concurs with methodology used in calculating these risk-based cleanup goals. We would like to point out that the industrial worker risk-based soil cleanup goal for a non-cancer hazard quotient of one for PCBs is 11 mg/kg, which is lower than the risk-based cleanup goal (74 mg/kg) for a cancer risk of 1 E-4.**

Response: It is agreed that 11 mg/kg would result in a hazard quotient of 1 for an industrial worker, which would be less than a cleanup goal developed using a cancer risk level of $1 \times 10^{-4}$. However, since a cleanup goal was not used or presented at the cancer risk level of $1 \times 10^{-4}$, this is not considered to pose an issue.

**5. Comment:** **3.2 Low Occupancy Industrial Land Use Scenario: For the low occupancy industrial worker scenario, the default exposure frequency of 250 day per year was substituted by an exposure frequency of 335 hours per year and a conversion factor of 1/24 day per hour. The EE/CA document indicates that the PCB contamination is widespread both laterally and vertically in the soils and potentially impacted the groundwater. The site is in close proximity to the Public Works area, where administrative offices and various industrial activities currently take place. Based on the above information, HERD disagrees with the application of TSCA definition of low occupancy industrial land use for the PCB removal action at this site. Also, we disagree with the use of the exposure frequency of 335 hours per year and the 1/24 day per hour conversion factor.**

Response: The nearest occupied Public Works building is approximately 1,000 feet to the northeast. Removal of soils with concentrations of PCBs that pose a human health risk to site workers who occupy the PWTSP/HVSSA on a low-occupancy basis will significantly reduce the risk to industrial workers in the Public Works Area.

To calculate the risk-based cleanup level, EPA Region IX guidance was used to provide an exposure frequency parameter based upon the definition of low occupancy (335 hours/year) found within TSCA, 40 CFR 761.3. In 40 CFR 761.3 low occupancy area is defined as any area where PCB remediation waste has been disposed of on-site and where

occupancy for any individual not wearing dermal and respiratory protection for a calendar year is: less than 335 hours (an average of 6.7 hours per week) for bulk PCB remediation waste. Examples could include an electrical substation or a location in an industrial facility where a worker spends small amounts of time per week (such as an unoccupied area outside a building, an electrical equipment vault, or in the non-office space in a warehouse where occupancy is transitory). The Navy determined that this site fits the description for low occupancy. A conversion factor of 1 day/24 hours was used to convert 335 hours per year to 13.96 days per year so it could be applied to the PRG equation used to estimate cleanup goals.

It should be noted that the estimate of an exposure frequency parameter of the low occupancy (335 hours/year) maximum is considered to be conservative. As detailed in response to DTSC general comment #1, correspondence with the NAWS China Lake Public Works Department indicates that actual hours worked at the PWTSP/HVSSA are less than 1 hour per week (less than 52 hours per year).

6. **Comment:** **3.3 Potential Receptors Offsite: As mentioned above, adjacent to the site is the Public Works area, where various industrial and administrative activities take place currently. Also, the site is located approximately 1000 feet from the base boundary, which directly borders the City of Ridgecrest. The PCB contamination is widespread on the surface soil onsite. Wind speeds in excess of 25 mph were recorded through 2002 and gusty winds in excess of 50 mph are also commonly recorded from October and June. Although the site is currently designated for industrial use and no change in land use is planned for the future, potential exposure of PCBs via inhalation of windblown dust by the nearby industrial workers and local residents is a concern and should be considered as part of the remediation goals.**

Response: See response to DTSC general comment #1.

## RESPONSES TO THE DEPARTMENT OF TOXIC SUBSTANCES CONTROL, HERD (CONT'D)

**7. Comment: Potential Human Exposure during Soil Excavation: In order to protect excavation workers from exposed to PCB-contaminated soils, HERD recommends that the Navy develops and submits a health and safety plan for review by a DTSC industrial hygienist. In addition, precautionary steps like dust suppression and fenceline monitoring may be necessary to prevent dispersion of the PCB-contaminated soil offsite and hence inhalation exposure to fugitive dust of the current industrial workers at the Public Works area and the local residents.**

Response: A health and safety plan (HASP) will be prepared prior to commencement of removal action activities. Preparation of this HASP is already currently underway. Additionally, common precautionary steps such as dust suppression and fenceline dust monitoring will be performed during the non time-critical removal action to prevent offsite dispersion of the PCB-contaminated dust and to prevent inhalation exposure to fugitive dust by the current industrial workers at the Public Works area and local residents. Review of the HASP will be performed by Navy industrial hygienists as part of standard Navy Environmental Health Center review.

**8. Comment: Exposure Parameters: Table 1C provides the exposure assumptions and default exposure parameters employed in the calculation of risk-based cleanup goals. Basically, the USEPA Region 9 PRG equations were used in the calculations. Skin absorption of PCBs (ABS) and exposed skin surface area (SA) shown in the table were DTSC recommended values, which are different from the USEPA defaults adopted in the PRG calculation. Despite these differences in input parameter, the resulting risk-based soil cleanup goal for the industrial worker at a target risk of 1 E-6 exactly equals the USEPA Region 9 Industrial Soil PRG. Please verify the calculation of all the risk-based cleanup goals.**

Response: Comment noted. Rationales/references listed in Appendix C for exposed skin surface area (SA) and dermal absorption fraction (ABS) listed in Table C-1 are incorrectly described as 2005 DTSC recommended values. These rationales/references will be revised to indicate the correct description of the USEPA defaults adopted in the PRG calculation.

## RESPONSES TO THE DEPARTMENT OF TOXIC SUBSTANCES CONTROL, HERD (CONT'D)

**9. Comment: Cleanup Alternatives: In general, the proposed cleanup alternatives will leave residual soil PCB levels ranging from 1 mg/kg to 25 mg/kg. Even the most aggressive cleanup alternative will leave soil PCB concentrations higher than the USEPA Residential Soil PRG for PCBs of 0.22 mg/kg and the Industrial Soil PRG of 0.74 mg/kg (USEPA, 2004a). A PCB cleanup goal of 13.3 mg/kg will leave a maximum site cancer risk of 1.8E-5 and a non-cancer hazard quotient of 1.2 for industrial workers. A PCB cleanup goal of 25 mg/kg will result in a maximum site cancer risk of 3.4E-5 and a non-cancer hazard quotient of 2.3 for industrial workers. These post-cleanup site risks exceed the point of departure for risk assessment, suggesting an excessive human health risk for industrial worker exposure to residual PCBs in soils at the site. In addition, the cleanup alternatives do not address inhalation exposure of offsite industrial worker and local resident to windblown dust. PCBs were also detected in deep soil and groundwater. Degradation and volatilization of degraded PCBs may lead to vapor intrusion concern, if buildings were ever constructed onsite. Taken together, HERD does not support the cleanup alternatives proposed in the EE/CA, especially since the report states that no institutional controls will be necessary, if the soil cleanup goal of 1 mg/kg for PCBs is chosen.**

Response: As indicated in Section 2.4.4, the PWTSP/HVSSA is visited by industrial workers on a limited and intermittent basis and is not occupied by full-time industrial workers. Therefore, the calculation of human health risk posed to industrial workers using the standard default exposure duration of 25 years is not reflective of site-specific exposure conditions at the PWTSP/HVSSA. As detailed in response to state general comment #1, correspondence with the NAWS China Lake Public Works Department indicates that actual hours worked at the PWTSP/HVSSA are less than 1 hour per week (less than 52 hours per year).

Importation, backfill, and compaction of 2 to 5 feet of clean soil for all alternatives, and placement of crushed gravel for Alternatives 1B and 1C following removal action will serve as a non-engineered cap for the area of excavation. Installation of this layer of crushed gravel will serve to mitigate potential exposure to an offsite industrial worker or local resident and significantly reduce the potential for fugitive dust from the PWTSP/HVSSA where remaining PCB concentrations are higher than 1 mg/kg.

Planned implementation of LUCs as part of the Michelson Lab/Public

Works Operable Unit will ensure that future land use remains consistent with current land use and that buildings and/or structures will not be constructed in the PWTSP/HWSSA in the future. While future construction of buildings within the PWTSP/HVSSA is considered unlikely, departure from the LUCs will require a reassessment and further remediation to acceptable levels of human health risk. Therefore, LUCs will be added as a component of removal action Alternative 1A (excavate to 1 mg/kg) and will now be included for all removal action alternatives proposed within the EE/CA. Please see response to DTSC general comment #1 and #2 for more detail.

**10. Comment:** **Contamination in Groundwater: The cleanup alternatives presented in the EE/CA do not address the presence of PCBs in groundwater (2.2 pg/L, exceeding the Tap Water PRG of 0.034 pg/L). In addition, two volatile organic chemicals (VOCs) were also detected (bromodichloromethane and carbon tetrachloride) in groundwater with concentrations exceeding Tap Water PRGs for these chemicals. Risks from exposure to these VOCs and the degraded PCBs through vapor intrusion into indoor air can potentially alter the cleanup decisions of the site. Please clarify if the contamination in groundwater will be addressed in other processes.**

Response: The non time-critical removal action proposed at the PWTSP/HVSSA is an interim action. Post removal, the Navy will sample and evaluate the cumulative risk of the contaminants of potential concern in the groundwater under the CERCLA process for the Michelson Laboratory/Public Works operable unit.

**DISCUSSION and CONCLUSIONS:** **In general, the report is well written and organized. HERD's comments on the Draft EE/CA, Non-Time Critical Removal Action, Public Works Transformer Storage Pit and High Voltage Shop Storage Area are noted above. HERD does not concur with the calculation of risk-based cleanup goals for the low occupancy industrial worker scenario and the proposed cleanup alternatives. Due to the presence of significant deficiencies in the EE/CA, we cannot accept the report at this time. We recommend that the Navy address our concerns before finalizing the EE/CA.**

Comment noted.

## RESPONSES TO THE RESTORATION ADVISORY BOARD (COMMENTS PROVIDED BY RAY KELSO)

### GENERAL COMMENTS

In conversations with Terry Rogers and fellow board members I discovered a very plausible and realistic issue that may affect every clean-up site not only at China Lake but all cleanup sites worldwide. It is well known that the executive arm of our government has gutted the environmental laws of the U. S. and we all can recite examples to confirm this. I also must say that this issue is way beyond the scope of our RAB Committee. Nonetheless, I feel it is important to share this information with all RAB members. And I do not expect an official response from anyone.

Superfund funding cuts, Homeland Security overriding NEPA, County and City overriding CEQA, are now common occurrences. Staff changes and corporate memory loss may affect what happened and why certain cleanup sites were treated in a certain way when reexamined in the future. As a RAB member I have to consider what this issue means to the cleanup of the sites at China Lake. And what jumps out is the two documents for review at the last RAB Meeting (9-12-07):

1) "Public Works Transformer Storage Pit and High Voltage Shop Storage Area Draft. Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action."
2) Draft "Site Inspection Work Plan. Mojave Aerial Gunnery Range C Target 71, Section 18, California."

Both sites are "Prime Real Estate" locations and very near "High Density" neighborhoods. As these and other sites go forward through the environmental process, alternative cleanup actions will be considered. If lower cost alternatives are chosen, future maintenance funding will be essential. Based on past performance, how can China Lake or the Navy or DoD guarantee or verify, "funding will be there" for the future?

I think it would be wise to emphasize the more comprehensive (and expensive) clean up actions to help eliminate funding risk factors.

### SPECIFIC COMMENTS

**1. Comment: Page ES-2: 4 alternatives were identified with little or no background information. Reader had to search to find explanations.**

Response: Removal action alternatives are described in detail in Section 4 of the EE/CA. Background information was kept to a minimum within the Executive Summary for conciseness.

**2. Comment: Page 1, 1.1: Need explanation as to why "low-occupancy."**

Response: Section 1.1 is intended to describe the non-time critical removal action authority and purpose of the EE/CA. As such, a description and/or justification of "low-occupancy" site use is not considered to be appropriate for Section 1.1. A description of the current "low-occupancy" site use of the PWTSP/HVSSA is currently contained in the following Section 1.2. A reference to Section 1.2 will be inserted in Section 1.1 for additional clarity.

**3. Comment: Page 4, 2.1 Why was the "Pit" not cleaned up in 1990?**

Response: Based on data obtained during the Contamination Assessment of 2004, the PWTSP (the "Pit") was largely remediated by the removal actions occurring in 1990 and 1997. As indicated in Section 2.2, based on available information, it appears that the PWTSP was excavated and partially backfilled in 1990. It was also reported that a preliminary assessment (PA) was conducted in the "early 1990s." It is presumed that PA data indicated that PCB contamination remained in the vicinity of the PWTSP. In 1996, additional characterization was performed in and around the PWTSP, leading to additional soil removal in July and September 1997.

A human health risk assessment conducted for the PWTSP in 2000 (Dames and Moore 2000) indicated a trend of increasing concentrations of PCBs to the south of the PWTSP. As a result, additional soil sampling was performed south of the PWTSP (including the HVSSA) by the NAWS China Lake Environmental Planning and Management Department in August 2000, and by SulTech in January 2004 during the Contamination Assessment.

As indicated in Figure 3, these additional soil sampling rounds confirmed that the removal actions in the vicinity of the PWTSP (the "Pit") had largely removed the PCBs in this area, though minor detections were noted in the area of the PWTSP (generally less than 2 to 3 mg/kg PCBs). However, the presence of elevated concentrations of PCBs in soils was further detected generally south of the PWTSP, resulting in the need for additional removal action.

## RESPONSES TO THE RESTORATION ADVISORY BOARD (CONT'D)

**4. Comment: Page 5, 2.1.3 China Lake has the best weather data collection. Recommend using China Lake data.**

Response: Comment noted. NAWS China Lake weather data may be used in future documentation. However, available data currently described in the document are considered to be sufficient for the purposes of the EE/CA.

**5. Comment: Page 6, 2.1.4 Need stronger statement addressing conclusions of a one-day site walk.**

Response: Please refer to response to DFG Specific Comment #2. The statement addressing the conclusions of the one-day site walk with the DFG will be revised to indicate that ecological habitat, while low-quality, is present at the PWTSP/HVSSA.

**6. Comment: Page 8, 2.3 Need more detailed paragraph to explain analytical results.**

Response: Due to the volume and differing collection dates of available analytical data, reference to Figure 3 is considered to be the most efficient method of conveying analytical results of soil sampling.

**7. Comment: Page 8, 2.3.1 Need more detail.**

Response: Please see response to comment #6 above.

**8. Comment: Page 8, 2.3.1 Need more detail.**

Response: Please see response to comment #6 above.

**9. Comment: Page 9, 2.3.2 Only 12 samples? More detail.**

Response: As indicated in Section 2.3.1, a total of 120 soil samples were collected during the 2004 Contamination Assessment. Of these 120 soil samples, 10%, or a total of 12, were sent to an off-site analytical laboratory for confirmation of on-site mobile analytical laboratory analysis. Section 2.3.2.1 describes the splitting of samples for off-site analytical confirmation. As such, additional detail is not considered to be necessary in Section 2.3.2.

**10. Comment: Page 9, 2.3.2.3 Arsenic is a public attention getter. Needs a stronger statement.**

Response: As indicated in Section 2.3.2.3, arsenic concentrations detected in soil at the PWTSP/HVSSA are within the range of ambient concentrations of arsenic for younger alluvium surface soils at NAWS China Lake (Tetra Tech 1998). Statement of this fact is considered to provide sufficient justification for arsenic not being included as a COC for the site.

**11. Comment: Page 10, 2.3.2.4 Please explain why TPH is not a concern.**

Response: While the state of California does not have a published total petroleum hydrocarbon (TPH) cleanup level, recommended cleanup goals for TPH constituents are related to the Regional Water Quality Control Plan (RWQCB) Human Health Direct Exposure concentrations for shallow soil screening levels (< 3m bgs), residential land use, where potentially impacted groundwater is not a current or potential drinking water source (RWQCB, 2005). The cleanup goal for TPH-D is 400 mg/kg, and the TPH-MO goal proposed is 1,000 mg/kg. Additionally, the total TPH concentrations (sum of concentration of individual fractions for TPH-D plus TPH-MO) cannot exceed 1,000 mg/kg.

Since the maximum concentration of TPH-MO detected at the PWTSP/HVSSA during the Contamination Assessment was 450 mg/kg, TPH is not considered to be a contaminant of concern (COC) for the PWTSP/HVSSA. Additionally, removal action activities to address PCB soil contamination will likely address the majority of existing TPH concentrations in soil, as PCBs and TPH are likely co-located.

**12. Comment: Page 10, 2.3.3 Last paragraph is a weak conclusion.**

Response: Comment noted. Please see response to specific HERD comment #10. Additional text will be inserted to indicate that apparent contamination in groundwater will be addressed under the CERCLA process for the Michelson Laboratory/Public Works operable unit.

**13. Comment: Page 11, 2.4.1 Worth another paragraph to summarize data.**

Response: Please see response to comment #6 above.

**14. Comment: Page 11, 2.4.2 Needs to be in the front to further explain why.**

Response: It is noted that the health effects associated with PCBs are an important component of the justification for the non-time-critical removal action at the PWTSP/HVSSA. However, the organization of the EE/CA follows EPA guidance on conducting non-time-critical removal actions under CERCLA (EPA 1993) and follows the suggested organization of the EE/CA.

**15. Comment: Page 12, 2.4.4 Disagree with conclusion. Was a higher density in the past? Potential for "High Density" in the future.**

Response: Based upon available information, the PWTSP/HVSSA appears to have been a low-occupancy site from its inception. There is no historical evidence of occupied buildings or structures in the PWTSP/HVSSA. As indicated in Section 2.1.1, the proposed reuse of the PWTSP/HVSSA is anticipated to remain consistent with its current use as a low occupancy industrial area. As indicated in response to state general comment #1, LUCs will ensure that future site use remains consistent with current low occupancy site use.

Additionally, revision of site use from low occupancy to a high-occupancy or high-density area is considered to be unlikely. However, in the event that high occupancy site use was to occur, LUCs would ensure that additional remediation be implemented prior to the change in land use. Additional remediation of the PWTSP/HVSSA would be required to provide acceptable human and ecological health risks based on revised site use.

**16. Comment: Page 15, 3.4.2.1 This section explains the whys of decisions in the front of document. Needs to be upfront.**

Response: Please see response to comment #14 above.

## RESPONSES TO THE RESTORATION ADVISORY BOARD (CONT'D)

**17. Comment: Page 21, 4.2.3 Annual O & M costs. Who can verify that the money will "Always" be there?**

Response: Naval Facilities Engineering Command Southwest (NAVFAC Southwest) is responsible for funding environmental liabilities with the NAVFAC Southwest footprint. While the Navy is subject to the funding mechanisms of the U.S. Congress, high priority is given to environmental programs. Review of the remedy at the PWTSP/HVSSA site (including LUCs) will be conducted under the CERCLA process and the need for additional funding will be continually updated based upon the results of this review process.

**18. Comment: Page 22, 4.3.3 Annual O & M costs. Who can verify that the money will "Always" be there?**

Response: Please see response to comment #17 above.

**19. Comment: Page 25, 4.4.3 Annual O & M costs. Who can verify that the money will "Always" be there?**

Response: Please see response to comment #17 above.

**20. Comment: Figure 1 Map shows roads of a past trailer park just south of site. Map does not show new "Business Park" to the west. The Business Park is a "High Density" Area.**

Response: Figure 1 will be revised to show the new business park to the southwest of the PWTSP/HVSSA.

**21. Comment: Summary It is my conclusion that the data should take a more comprehensive look at the potential for "high density."**

Response: Please see response to comment #15 above.

# APPENDIX C
# EVALUATION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

## TABLE OF CONTENTS

## *TABLE OF CONTENTS (Continued)*



## *TABLES*

## *ACRONYMS AND ABBREVIATIONS*

| | |
|---|---|
| § | Section |
| µg/L | Microgram per liter |
| 40 CFR | Title 40 of the *Code of Federal Regulations* |
| ARAR | Applicable or relevant and appropriate requirement |
| Ca-HSC | California Health and Safety Code |
| Cal. Code Regs. | California Code of Regulations |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| DFG | California Department of Fish and Game |
| DTSC | California Environmental Protection Agency, Department of Toxic Substances Control |
| EC | Engineering control |
| EE/CA | Engineering evaluation/cost analysis |
| EP | Extraction procedure |
| EPA | U.S. Environmental Protection Agency |
| FR | *Federal Register* |
| FS | Feasibility Study |
| HVSSA | High Voltage Shop Storage Area |
| IC | Institutional control |
| LUC | Land-use control |
| mg/kg | Milligram per kilogram |
| Navy | U.S. Department of the Navy |
| NAWS | Naval Air Weapons Station |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| PCB | Polychlorinated biphenyl |
| PP | Proposed Plan |
| ppm | Part per million |
| PW | Public Works Compound |
| PW Transformer Storage Pit and HVSSA site | PW Transformer Storage Pit and HVSSA at (NAWS) China Lake, Ridgecrest, California |
| RCRA | Resource Conservation and Recovery Act |

| | |
|---|---|
| ROD | Record of Decision |
| STLC | Soluble threshold limit concentration |
| TBC | To-be-considered |
| TCLP | Toxicity characteristic leaching procedure |
| TTLC | Total threshold limit concentration |
| TSCA | Toxic Substances Control Act |
| $yd^3$ | Cubic yard |

# C1.0 EVALUATION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

This appendix identifies and evaluates potential federal and state of California applicable or relevant and appropriate requirements (ARAR) from the universe of regulations, requirements, and guidance, and sets forth the U.S. Department of the Navy (Navy) determinations regarding those potential ARARs for removal alternatives evaluated in the engineering evaluation/cost analysis (EE/CA) for the Public Works Compound (PW) Transformer Storage Pit and High Voltage Shop Storage Area (HVSSA) at Naval Air Weapons Station (NAWS) China Lake, Ridgecrest, California (hereafter referred to as the PW Transformer Storage Pit and HVSSA site).

This evaluation includes an initial determination of whether the potential ARARs actually qualify as ARARs and a comparison for stringency between the federal and state regulations to identify the controlling potential ARARs. The identification of potential ARARs is an iterative process. The final determination of ARARs will be made by the Navy in an Action Memorandum, after public review, as part of the removal action selection process.

## C1.1 SUMMARY OF COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT AND NATIONAL OIL AND HAZARDOUS SUBSTANCES POLLUTION CONTINGENCY PLAN REQUIREMENTS

Section 121(d) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 *United States Code* Section (§) 9621[d], as amended, states that remedial actions at CERCLA sites must attain (or the decision document must justify the waiver of) any federal or more stringent state environmental standards, requirements, criteria, or limitations determined to be legally applicable or relevant and appropriate. Although Section 121 of CERCLA does not itself expressly require that CERCLA removal actions comply with ARARs, the U.S. Environmental Protection Agency (EPA) has promulgated a requirement in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) mandating that CERCLA removal actions "...shall, to the extent practicable considering the exigencies of the situation, attain applicable or relevant and appropriate requirements under federal environmental or state environmental or facility siting laws" (Title 40 of the *Code of Federal Regulations* [40 CFR] § 300.415[j]) (40 CFR § 300.415[j]). It is Navy policy to follow this requirement. Certain specified waivers may be used for removal actions, as is the case with remedial actions.

Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address the situation at a CERCLA site. The requirement is applicable if the jurisdictional prerequisites of the standard show a direct correspondence when objectively compared with the conditions at the site. An applicable federal requirement is an ARAR. An applicable state requirement is an ARAR only if it is more stringent than federal ARARs.

If the requirement is not legally applicable, then it is evaluated to determine whether it is relevant and appropriate. Relevant and appropriate requirements are those cleanup standards, standards

of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not applicable, address problems or situations similar to the circumstances of the proposed remedial action and are well suited to the conditions of the site (EPA 1988a). A requirement must be determined to be both relevant and appropriate in order to be considered a potential ARAR.

The criteria for determining relevance and appropriateness are listed in 40 CFR § 300.400(g)(2) and include the following:

- The purpose of the requirement and the purpose of the CERCLA action
- The medium regulated or affected by the requirement and the medium contaminated or affected at the CERCLA site
- The substances regulated by the requirement and the substances found at the CERCLA site
- The action or activities regulated by the requirement and the response action contemplated at the CERCLA site
- Any variances, waivers, or exemptions of the requirement and their availability for the circumstances at the CERCLA site
- The type of place regulated and the type of place affected by the release or CERCLA action
- The type and size of structure or facility regulated and the type and size of structure or facility affected by the release or contemplated by the CERCLA action
- Any consideration of use or potential use of affected resources in the requirement and the use or potential use of the affected resources at the CERCLA site

According to CERCLA ARARs guidance (EPA 1988a), a requirement may be "applicable" or "relevant and appropriate," but not both. ARARs must be identified on a site-specific basis and involve a two-part analysis. First, a determination is made about whether a given requirement is applicable. Second, if the requirement is not applicable, a determination is made about whether it is nevertheless both relevant and appropriate. It is important to explain that some regulations may be applicable or, if not applicable, may still be relevant and appropriate. When the analysis determines that a requirement is both relevant and appropriate, such a requirement must be complied with to the same degree as if it were applicable (EPA 1988a).

Tables included in this appendix present each potential ARAR with a determination of ARAR status (that is, applicable, relevant and appropriate, or to-be-considered [TBC]). For the determination of relevance and appropriateness, the pertinent criteria have been examined to determine whether the requirements addressed problems or situations sufficiently similar to the

circumstances of the release or remedial action contemplated, and whether the requirement was well suited to the site.

To qualify as a state potential ARAR under CERCLA and the NCP, a state requirement must be:

- A state law or regulation
- An environmental or facility siting law
- Promulgated (of general applicability and legally enforceable)
- Substantive (not procedural or administrative)
- More stringent than the federal requirement
- Identified in a timely manner
- Consistently applied

To constitute a potential ARAR, a requirement must be substantive. Only the substantive provisions of requirements identified as potential ARARs in the PW Transformer Storage Pit and HVSSA site EE/CA are considered to be potential ARARs. Permits are considered to be procedural or administrative requirements. Provisions of generally relevant federal and state statutes and regulations that were determined to be procedural or nonenvironmental, including permit requirements, are not considered to be potential ARARs. CERCLA 121(e)(1), 42 *United States Code* § 9621(e)(1), states that "No Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely on-site, where such remedial action is selected and carried out in compliance with this section." The term *on-site* is defined for purposes of this ARARs discussion as "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action" (40 CFR § 300.5).

Nonpromulgated advisories or guidance issued by federal or state governments are not legally binding and do not have the status of ARARs. Such requirements may, however, be useful and are TBC. TBC (40 CFR § 300.400[g][3]) requirements complement ARARs but do not override them. They are useful for guiding decisions regarding remediation goals or methodologies when regulatory standards are not available.

Pursuant to EPA guidance (EPA 1988a), potential ARARs are generally divided into three categories: chemical-specific, location-specific, and action-specific requirements. This classification was developed to aid in the identification of potential ARARs; some ARARs do not fall precisely into one group or another. Potential ARARs are identified for each site for response actions where CERCLA authority is the basis for cleanup.

As the lead federal agency, the Navy has primary responsibility for identifying potential federal ARARs at the China Lake Naval Air Weapons Station. The California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) is responsible for identifying potential state ARARs relating to the PW Transformer Storage Pit and HVSSA site. More specific details about the Navy's methodology in identifying potential ARARs for this EE/CA are discussed below.

## C1.2 METHODOLOGY DESCRIPTION

The process of identifying and evaluating potential federal and state ARARs is described in this section.

### C1.2.1 General

As the lead federal agency, the Navy has primary responsibility for identification of potential ARARs for the PW Transformer Storage Pit and HVSSA site. In preparing this ARARs analysis, the Navy undertook the following measures, consistent with CERCLA and the NCP:

- Identified federal ARARs for each alternative addressed in the PW Transformer Storage Pit and HVSSA site EE/CA, taking into account site-specific information
- Reviewed potential state ARARs to determine whether they satisfy CERCLA and NCP criteria that must be met in order to constitute state ARARs
- Evaluated and compared federal ARARs and their state counterparts to determine whether state ARARs are more stringent than federal ARARs or are in addition to the federally required actions
- Reached a conclusion about the federal and state ARARs that are the most stringent or "controlling" for each remedial alternative

Based on the NCP, the risk assessment, and ARARs, the removal action objectives are as follows:

- For high-occupancy reuse, prevent human and ecological exposure to soils containing concentrations of polychlorinated biphenyls (PCB) above 1.0 milligram per kilogram ([mg/kg] does not apply for low-occupancy reuse scenario).
- For low-occupancy reuse, prevent human and ecological exposure to soils containing concentrations of PCBs above 25 mg/kg.

The EE/CA evaluated the following alternatives:

- Alternative 1A: Excavate Soils with PCB Concentrations Greater than 1 mg/kg, Backfill and Compact Clean Imported Soil in Excavation Area, and Implement LUCs at the Site Following Removal Action Activities (maintains current low-occupancy industrial use) (see Section 4.1)

- Alternative 1B: Excavate Soils with PCB Concentrations Greater than13.3 mg/kg, Backfill and Compact Clean Imported Soil and Crushed Gravel in Excavation Area to Cover Full Extent of Contaminated Area, and Implement Land-use Controls (LUC) at the Site Following Removal Action Activities (allows risk-based low-occupancy reuse) (see Section 4.2)

- Alternative 1C: Excavate Soils with PCB Concentrations Greater than 25 mg/kg, Backfill and Compact Clean Imported Soil and Crushed Gravel in Excavation Area to Cover Full Extent of Contaminated Area, and Implement LUCs at the Site Following Removal Action Activities (allows low-occupancy reuse) (see Section 4.3)

- Alternative 2: Excavate Soils with PCB Concentrations Greater than 10 mg/kg, Backfill and Compact Clean Imported Soil in Excavation Area, Construct 6-inch Asphalt Cap over Soils with PCB Concentrations Greater than 1 mg/kg but Less than or Equal to 10 mg/kg, and Implement LUCs at the Site Following Removal Action Activities (allows high-occupancy reuse) (see Section 4.4)

### C1.2.2 Identifying and Evaluating Federal ARARs

The Navy is responsible for identifying federal ARARs as the lead federal agency under CERCLA and the NCP. The final determination of federal ARARs will be made when the Navy issues the AM. The federal government implements a number of federal environmental statutes that are the source of potential federal ARARs, either in the form of the statutes or regulations promulgated thereunder. Examples include the Resource Conservation and Recovery Act (RCRA), the Clean Water Act, the Safe Drinking Water Act, the Toxic Substances Control Act (TSCA), and their implementing regulations. See the preamble to NCP at 55 *Federal Register* (FR) §§ 8764–8765 (1990) for a more complete listing.

The proposed remedial alternatives were reviewed against all potential federal ARARs including, but not limited to, those set forth at 55 §§ FR 8764–8765 (1990), to determine if they were applicable or relevant and appropriate CERCLA and NCP criteria and procedures for ARARs identification by lead federal agencies.

### C1.2.3 Identifying and Evaluating State ARARs

This subsection describes the process of identifying and evaluating potential state ARARs by the state and the Navy.

#### *C1.2.3.1 Solicitation of State ARARs under NCP*

EPA guidance recommends that the lead federal agency consult with the state when identifying state ARARs for remedial actions. The Navy required ARARs from the state agencies by March 2007, and the State DTSC, California Department of Fish and Game (DFG), and Regional Water Quality Control Board (RWQCB) have provided potential ARARs. The Navy has evaluated the state ARARs, and comments on these state ARARs are included in Table C-1.

## C1.3 OTHER GENERAL ISSUES

General issues identified during the evaluation of ARARs for the PW Transformer Storage Pit and HVSSA site are discussed in the following sections.

### C1.3.1 General Approach to Requirements of RCRA

RCRA is a federal statute enacted in 1976 to meet four goals: (1) the protection of human health and the environment, (2) the reduction of waste, (3) the conservation of energy and natural resources, and (4) wherever feasible, the reduction or elimination of the generation of hazardous waste as expeditiously as possible. The Hazardous and Solid Waste Amendments of 1984 significantly expanded the scope of RCRA by adding new corrective action requirements, land disposal restrictions, and technical requirements. RCRA, as amended, contains several provisions that are potential ARARs for CERCLA sites.

Substantive RCRA requirements are applicable to remedial actions on CERCLA sites if the waste is a RCRA hazardous waste, and either:

- The waste was initially treated, stored, or disposed of after the effective date of the RCRA requirement; or
- The activity at the CERCLA site constitutes treatment, storage, or disposal, as defined by RCRA (EPA 1988a).

The preamble to the NCP indicates that state regulations that are components of a federally authorized or delegated state program are generally considered federal requirements and potential federal ARARs for the purposes of ARARs analysis (55 FR §§ 8666, 8742 [1990]). California received approval for its base RCRA hazardous waste management program on July 23, 1992 (57 FR § 32726 [1992]). The California "Environmental Health Standards for the Management of Hazardous Waste," set forth in the *California Code of Regulations* (Cal. Code

Regs.) Title 22, Division 4.5, were approved by EPA as a component of the federally authorized California RCRA program. On September 26, 2001, California received final authorization of its revised State Hazardous Waste Management Program by the EPA (66 FR § 49118 [2001]). Therefore, Cal. Code Regs. Title 22, Division 4.5 is a source of potential federal ARARs for CERCLA response actions. The exception is when a state regulation is "broader in scope" than the corresponding federal RCRA regulations. In that case, such regulations are not considered part of the federally authorized program or potential federal ARARs. Instead, they are purely state law requirements and potential state ARARs.

The EPA July 23, 1992, notice approving the state of California RCRA program (57 FR § 32726 [1992]) specifically indicated that state regulations addressed certain non-RCRA, state-regulated hazardous wastes that fell outside the scope of federal RCRA requirements. Cal. Code Regs. Title 22, Division 4.5 requirements would be potential state ARARs for such non-RCRA, state-regulated wastes.

A key threshold question for the ARARs analysis is whether contaminants at the PW Transformer Storage Pit and HVSSA site constitute federal hazardous waste as defined under RCRA and the state's authorized program or qualify as non-RCRA, state-regulated hazardous waste. Waste characterization is discussed in Section C1.4.

## C1.4 WASTE CHARACTERIZATION

This section summarizes the characterization of wastes during selection of ARARs.

### C1.4.1 RCRA Hazardous Waste Determination

Federal RCRA hazardous waste determination is necessary to determine whether a waste is subject to RCRA requirements at Cal. Code Regs. Title 22, Division 4.5 and other state requirements at Cal. Code Regs. Title 22, Division 3, Chapter 15. The first step in the RCRA hazardous waste characterization process is to evaluate contaminated media at the sites and determine whether the contaminant constitutes a "listed" RCRA waste. The preamble to the NCP states that "… it is often necessary to know the origin of the waste to determine whether it is a listed waste and that, if such documentation is lacking, the lead agency may assume it is not a listed waste" (55 FR §§ 8666, 8758 [1990]).

This approach is confirmed in EPA guidance for CERCLA compliance with other laws (EPA 1988a), as follows:

> "To determine whether a waste is a listed waste under RCRA, it is often necessary to know the source. However, at many Superfund sites, no information exists on the source of wastes. The lead agency should use available site information, manifests, storage records, and vouchers in an effort to ascertain the nature of these contaminants. When this documentation is not available, the lead agency may assume that the wastes are not listed RCRA hazardous wastes, unless further analysis or information becomes

> available that allows the lead agency to determine that the wastes are listed RCRA hazardous wastes."

RCRA hazardous wastes that have been assigned EPA hazardous waste numbers (or codes) are listed in Cal. Code Regs. Title 22, §§ 66261.30 through 66261.33. The lists include hazardous waste codes beginning with the letters "F," "K," "P," and "U."

The second step in the RCRA hazardous waste characterization process is to evaluate potential hazardous characteristics of the waste. The evaluation of characteristic waste is described in EPA guidance (EPA 1988a), as follows:

> "Under certain circumstances, although no historical information exists about the waste, it may be possible to identify the waste as RCRA characteristic waste. This is important in the event that (1) remedial alternatives under consideration at the site involve on-site treatment, storage, or disposal, in which case RCRA may be triggered as discussed in this section; or (2) a remedial alternative involves offsite shipment. Since the generator (in this case, the agency or responsible party conducting the Superfund action) is responsible for determining whether the wastes exhibit any of these characteristics (defined in 40 CFR Sections 261.21 through 261.24), testing may be required. The lead agency must use best professional judgment to determine, on a site-specific basis, if testing for hazardous characteristics is necessary.
>
> In determining whether to test for the toxicity characteristic using the extraction procedures (EP) toxicity test, it may be possible to assume that certain low concentrations of waste are not toxic. For example, if the total waste concentration in soil is 20 times or less the EP toxicity concentration, the waste cannot be characteristic hazardous waste. In such a case, RCRA requirements would not be applicable. In other instances, where it appears that the substances may be characteristic hazardous waste (ignitable, corrosive, reactive, or EP toxic), testing should be performed."

Hazardous waste characteristics, as defined in 40 CFR §§ 261.21 through 261.24, are commonly referred to as ignitability, corrosivity, reactivity, and toxicity. California environmental health standards for the management of hazardous waste set forth in Cal. Code Regs. Title 22, Division 4.5 were approved by EPA as a component of the federally authorized California RCRA program. Therefore, the characterization of RCRA waste is based on the state requirements.

The characteristics of ignitability, corrosivity, reactivity, and toxicity are defined in Cal. Code Regs. Title 22, §§ 66261.21 through 66261.24. According to Cal. Code Regs. Title 22, § 66261.24(a)(1)(A), "A waste that exhibits the characteristic of toxicity pursuant to subsection (a)(1) of this section has the EPA Hazardous Waste Number specified in Table I of this section which corresponds to the toxic contaminant causing it to be hazardous." Table I assigns hazardous waste codes beginning with the letter "D" to wastes that exhibit the characteristic of toxicity; D waste codes are limited to "characteristic" hazardous wastes.

According to Cal. Code Regs. Title 22, § 66261.10, waste characteristics can be measured by an available standardized test method or be reasonably classified by generators of waste based on their knowledge of the waste provided that the waste has already been reliably tested or if there is documentation of chemicals used.

The requirements at Cal. Code Regs. Title 22, § 66261.24 list the toxic contaminant concentrations that determine the characteristic of toxicity. The concentration limits are in milligrams per liter. These units are directly comparable to total concentrations in waste groundwater and surface water. For waste soils, these concentrations apply to the extract or leachate produced by the toxicity characteristic leaching procedure (TCLP).

A waste is considered hazardous if contaminants in the wastewater or in the soil TCLP extract equal or exceed the TCLP limits. TCLP testing is required only if total contaminant concentrations in soil equal or exceed 20 times the TCLP limits because TCLP uses a 20 to 1 dilution for the extract (EPA 1988a).

The waste generated in the performance of Alternatives 1A, 1B, 1C, and 2 is not expected to be RCRA hazardous waste because the federal RCRA program does not regulate PCBs as hazardous waste. However, the Navy will characterize the waste it generates in accordance with potential RCRA ARARs.

### C1.4.2 California-Regulated, Non-RCRA Hazardous Waste

A waste determined not to be a RCRA hazardous waste might still be considered a state-regulated non-RCRA hazardous waste. The state is broader in scope in its RCRA program in determining hazardous waste. Cal. Code Regs. Title 22, § 66261.24(a)(2) lists the total threshold limit concentrations (TTLC) and the soluble threshold limit concentrations (STLC) for non-RCRA hazardous waste. The state applies its own leaching procedure, the waste extraction test, which uses a different acid reagent and has a different dilution factor (tenfold). Other state requirements may be broader in scope than federal ARARs for identifying non-RCRA wastes regulated by the state. These may be potential ARARs for wastes not covered under federal ARARs. See additional subsections of Cal. Code Regs. Title 22, § 66261.24. A waste is considered hazardous if its total concentrations exceed the TTLC or if the extract concentrations from the waste extraction test exceed the STLC. A waste extraction test is required when the total concentrations exceed the STLC but are less than the TTLC (Cal. Code Regs. Title 22, Division 4.5, Chapter 11, Appendix II [b]).

The State of California regulates PCBs as a non-RCRA state regulated hazardous waste at Cal. Code Regs. Title 22, § 66261.24(a)(2). The Navy will characterize waste it generates in the performance of Alternatives 1A, 1B, 1C, and 2 according to these potential non-RCRA state regulated hazardous waste ARARs.

### C1.4.3 Other California Waste Classifications

For waste discharged after July 18, 1997, solid waste classifications at Cal. Code Regs. Title 27, §§ 20210, 20220, and 20230 are used to determine applicability of waste management requirements. These classifications are summarized below.

A "designated waste" under Cal. Code Regs. Title 27, § 20210 is defined at California Water Code § 13173. Under California Water Code § 13173, designated waste is hazardous waste that has been granted a variance from hazardous waste management requirements or non-hazardous waste that consists of or contains pollutants that, under ambient environmental conditions at a waste management unit, could be released in concentrations exceeding applicable water quality objectives or that could reasonably be expected to affect beneficial uses of the waters of the state.

A non-hazardous solid waste under Cal. Code Regs. Title 27, § 20220 is all putrescible and nonputrescible solid, semisolid, and liquid wastes, including garbage, trash, refuse, paper, rubbish, ashes, industrial wastes, demolition and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, manure, vegetable or animal solid and semisolid wastes, and other discarded waste (whether of solid or semisolid consistency), provided that such wastes do not contain wastes that must be managed as hazardous wastes or wastes that contain soluble pollutants in concentrations that exceed applicable water quality objectives or could cause degradation of waters of the state.

## C2.0 POTENTIAL CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

This section discusses the evaluation of potential chemical-specific ARARs at the PW Transformer Storage Pit and HVSSA site. Summaries of the chemical-specific ARARs are presented in Table C-2.

### C2.1 POTENTIAL FEDERAL CHEMICAL-SPECIFIC ARARS

Chemical-specific ARARs are generally health- or risk-based numerical values or methodologies applied to site-specific conditions that result in the establishment of remediation goal.

### C2.1.1 Resource Conservation and Recovery Act

The key threshold question for potential soil ARARs is whether the wastes located at the PW Transformer Storage Pit and HVSSA site would be classified as hazardous waste. Soil may be classified as a federal hazardous waste as defined by RCRA and the state-authorized program, or as non-RCRA, state regulated hazardous waste. If soil is determined to be hazardous waste, the appropriate requirements will apply.

The federal RCRA requirements at 40 CFR § 261 do not apply in California because the state RCRA program is authorized. The authorized state RCRA requirements are, therefore, considered potential federal ARARs. The applicability of RCRA requirements depends on (1) whether the waste is a RCRA hazardous waste; (2) whether the waste was initially treated, stored, or disposed of after the effective date of the particular RCRA requirement; and (3) whether activity at the site constitutes treatment, storage, or disposal as defined by RCRA. RCRA requirements may, however, be relevant and appropriate even if they are not applicable. Examples include activities that are similar to the definition of RCRA treatment, storage, or disposal for waste that is similar to RCRA hazardous waste.

The determination of whether a waste is a RCRA hazardous waste can be made by comparing the site waste with the definition of RCRA hazardous waste. The RCRA requirements at Cal. Code Regs. Title 22, §§ 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100 are potential ARARs because they define RCRA hazardous waste. A waste can meet the definition of hazardous waste if it has the toxicity characteristic of hazardous waste. This determination is made by using the TCLP. The maximum concentrations allowable for the TCLP listed in Cal. Code Regs. Title 22, § 66261.24(a)(1)(B) are potential federal ARARs for determining whether the site has hazardous waste. If the site waste has concentrations exceeding these values, it is determined to be a characteristic RCRA hazardous waste.

RCRA land disposal restrictions at Cal. Code Regs. Title 22, § 66268.1(f) are potential federal ARARs for discharging waste to land. This section prohibits the disposal of hazardous waste to land unless (1) it is treated in accordance with the treatment standards of Cal. Code Regs. Title 22, § 66268.40 and the underlying hazardous constituents meet the Universal Treatment Standards at Cal. Code Regs. Title 22, § 66268.48; (2) it is treated to meet the alternative soil treatment standards of Cal. Code Regs. Title 22, § 66268.49; or (3) a treatability variance is obtained under Cal. Code Regs. Title 22, § 66268.44. These are potentially applicable federal ARARs because they are part of the state-approved RCRA program. RCRA Treatment Standards for non-RCRA, state-regulated waste are not potentially applicable federal ARARs but they may be potentially relevant and appropriate state ARARs.

As long as the excavated material remains inside the area of contamination, however, it is not newly generated and will not be subject to RCRA generator, treatment, or other waste management requirements. Should excavated material be moved outside the area of contamination, the substantive RCRA requirements managing hazardous waste, including land disposal restrictions, would be applicable. The waste generated in the performance of Alternatives 1A, 1B, 1C, and 2 is not expected to be RCRA hazardous waste because the federal RCRA program does not regulate PCBs as hazardous waste. However, the Navy will characterize the waste it generates in accordance with potential RCRA ARARs.

### C2.1.2 Toxic Substances Control Act

TSCA regulates storage and disposal of PCBs. These requirements have both action- and chemical-specific aspects. They address storage and disposal activities. Under TSCA, EPA has promulgated 40 CFR § 761.61 PCB remediation waste requirements that provide cleanup

and disposal options for PCB remediation waste. The options include (a) self-implementing on-site cleanup and disposal, (b) performance-based disposal, and (c) risk-based disposal. The self-implementing cleanup provisions are not binding on cleanups conducted under other authorities, including actions conducted under Sections 104 or 106 of CERCLA. Therefore, they are not applicable ARARs for actions at CERCLA sites. However, in the preamble of the final rule for 40 CFR part 761, U.S. EPA indicated that it anticipates that the final rule "will be a potential ARAR at CERCLA sites where PCBs are present. EPA expects that CERCLA cleanups would typically comply with the substantive requirements of one of the three options, provided by § 761.61, upon completion of the cleanups" (Title 63 *Code of Federal Regulations* 35,407, June 29, 1998). Therefore, 40 CFR § 761.61(a) is potentially relevant and appropriate at CERCLA sites where PCB contamination is present.

EPA designed self-implementing procedures for a general, moderate-size site where there should be a low residual environmental impact from remedial activities. The self-implementing on-site cleanup and disposal option requirements are based on the concentration of PCBs. The cleanup levels are based on four general waste categories and whether the wastes are in high- or low-occupancy areas. Under 40 CFR § 761.61(a)(4)(i), bulk PCB remediation waste cleanup levels are as follows: (1) for high-occupancy areas, less than or equal to 1 part per million (ppm) without further conditions; where the concentration exceeds 1 and is less than or equal to 10 ppm, a cap is required; and (2) for low-occupancy areas, less than or equal to 25 ppm unless an actual or proposed change in land use to high occupancy occurs. Up to 50 ppm may remain if the site is secured with a fence and signs are provided. Up to 100 ppm may remain if the site is capped. The Navy has identified 40 CFR § 761.61(a)(4)(i) as a potential federal ARAR.

Under CFR § 761.61(a)(4)(ii), nonporous surface cleanup levels are less than or equal to 10 micrograms per 100 square centimeters in high-occupancy areas, and less than 100 micrograms per 100 square centimeters in low-occupancy areas. Under CFR § 761.61(a)(4)(iii), porous surface cleanup levels are the same as for bulk PCB remediation waste at § 761.61(a)(4)(i). Under CFR § 761.61(a)(4)(iv), liquid cleanup levels are in § 761.79(b)(1) and (b)(2). Under CFR § 761.79(b)(1), the decontamination standard for water containing PCBs is (1) less than 200 micrograms per liter (µg/L) for noncontact use in a closed system where there are no releases; (2) less than 3 µg/L for water discharged to treatment works or navigable waters, or a PCB discharge limit specified in a permit issued under CFR § 307(b) or § 402 of the Clean Water Act; or (3) less than or equal to 0.5 µg/L for unrestricted use. Under CFR § 761.79(b)(2), the decontamination standard for organic liquids and non-aqueous inorganic liquids is less than 2 milligrams per kilogram.

A high-occupancy area is defined as any area where PCB remediation waste has been disposed of on site and where occupancy for any individual not wearing dermal and respiratory protection for a year is 335 hours or more for bulk PCB remediation waste and 840 hours or more for nonporous surfaces. Criteria for low-occupancy areas are less than 335 hours for bulk PCB remediation waste and less than 840 hours for nonporous surfaces.

PCB remediation waste means waste containing PCBs as a result of a spill, release, or other unauthorized disposal, at the following concentrations:

- Materials disposed of before April 18, 1978 that currently exceed or are equal to 50 ppm regardless of the concentration of the original spill
- Materials that are at any volume or concentration in which the original source exceeded or was equal to 500 ppm beginning on April 18, 1978, or exceeded or was equal to 50 ppm beginning on July 2, 1979
- Materials that are currently at any concentration if the PCBs are spilled or released from a source not authorized under this part.

PCB remediation waste means soil, rags, and other debris generated as a result of any PCB spill cleanup, including but not limited to environmental media, sewage sludge, and buildings and other man-made structures, porous surfaces, and nonporous surfaces.

Additionally, TSCA decontamination standards and procedures as defined in 40 CFR § 761.79 are considered to be potential action-specific ARARs.

## C2.2 POTENTIAL STATE CHEMICAL-SPECIFIC ARARS

### C2.2.1 State RCRA Requirements

State RCRA requirements included within the EPA-authorized RCRA program for California are considered to be potential federal ARARs and are discussed above. When state regulations are either broader in scope or more stringent than their federal counterparts, they are considered potential state ARARs. State requirements such as the non-RCRA, state-regulated hazardous waste requirements may be potential state ARARs because they are not within the scope of the federal ARARs (57 FR 60848). The Cal. Code Regs. Title 22, Division 4.5, requirements that are part of the state-approved RCRA program would be potential state ARARs for non-RCRA, state-regulated hazardous wastes.

The site waste characteristics need to be compared to the definition of non-RCRA, state-regulated hazardous waste. The non-RCRA, state-regulated waste definition requirements at Cal. Code Regs. Title 22, § 66261.24(a)(2) are potential state ARARs for determining whether other RCRA requirements are potential state ARARs. This section lists the TTLCs and STLCs. The site waste may be compared to these thresholds to determine whether it meets the characteristics for a non-RCRA, state-regulated hazardous waste.

The State of California regulates PCBs as a non-RCRA state regulated hazardous waste at Cal. Code Regs. Title 22, § 66261.24(a)(2). PCB wastes are regulated as hazardous waste by DTSC under the Ca-HSC and Title 22 of the Cal. Code Regs. Criteria for determining PCB wastes are:

- TTLC of 50 ppm of PCBs, and/or
- STLC of 5 ppm of PCBs as oily liquid.

The Navy will characterize waste it generates in the performance of Alternatives 1A, 1B, 1C, and 2 according to these potential non-RCRA state regulated hazardous waste ARARs.

### C2.2.2 California Code of Regulations Title 22, Division 4, Subdivision 5

Cal. Code Regs. Title 22, §§ 66261.113, states, "Any waste containing PCBs equal to or greater than 5,000 mg/kg, its TTLC – wet weight, is an extremely hazardous waste." This regulation is used to determine if the waste generated under all the alternatives meets the definition of extremely hazardous waste. However, it is unlikely that excavated soil would meet the definition of extremely hazardous waste because the maximum concentration of PCBs in the soil is below 5,000 mg/kg.

### C2.2.3 California Code of Regulations Title 27, Division 2, Subdivision 1

Cal. Code Regs. Title 27, §§ 20210, 20220 and 20230 are state definitions for designated, non-hazardous and inert waste. These may be potential ARARs for soil that meets the definitions. These soil classifications determine state classification and siting requirements for discharging waste to land.

## C3.0 POTENTIAL LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

### C3.1 POTENTIAL FEDERAL LOCATION-SPECIFIC ARARS

Location-specific ARARs are restrictions on the concentrations of hazardous substances or the conduct of activities as a result of the characteristics of the site or its immediate environment. The PW Transformer Storage Pit and HVSSA site does not encompass any historic properties included or eligible for inclusion on the National Register of Historic Places. Scientific, prehistoric, or archeological data have not been identified at the PW Transformer Storage Pit and HVSSA site. There are no floodplains or wetlands on located on the PW Transformer Storage Pit and HVSSA site. There are no federal biological resources, such as federally threatened or endangered species, that are present on or have habitat on this site. Therefore, no potential federal location-specific ARARs have been identified.

## C3.2 POTENTIAL STATE LOCATION-SPECIFIC ARARS

The DFG characterized the PW Transformer Storage Pit and HVSSA site as low-quality, disturbed desert scrub habitat, and has provided potential location-specific ARARs in accordance with the Navy's request.

Summaries of the Navy's responses to these potential location-specific ARARs are presented in Table C-1. The Navy will make a final determination in an Action Memorandum if these potential location-specific ARARs are applicable or relevant and appropriate.

### C3.2.1 California Department of Fish and Game Code Divisions 4 and 5

DFG Code §§ 3005, 3503, 3503.5, 3800, 4150, 4800, and 5000 are state regulations for the protection of birds and mammals, mountain lions, and desert tortoises. The Navy has received these regulations from the DFG and will make a determination in an Action Memorandum if these regulations are ARARs. If the special-status species listed above are identified, the Navy will perform the appropriate standard pre-construction surveys and protective measures prior to and during any removal action.

### C3.2.2 California Code of Regulations Title 14

Because of the presence or potential presence of fur-bearing mammals on the PW Transformer Storage Pit and HVSSA site, the Navy will make a determination in an Action Memorandum if Cal. Code Regs. Title 14 § 460 are applicable or relevant and appropriate as a potential location-specific state ARARs.

## C4.0 POTENTIAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Action-specific ARARs are technology- or activity-based requirements or limitations for remedial actions. These requirements are triggered by the particular remedial actions conducted at a site and suggest how a selected remedial alternative should be achieved. These action-specific requirements do not in themselves determine the remedial alternative; rather, they indicate how a selected alternative must be conducted.

This section discusses the evaluation of potential action-specific ARARs for each alternative proposed for the PW Transformer Storage Pit and HVSSA site. Summaries of the potential action-specific ARARs are presented in Table C-3.

## C4.1 ALTERNATIVE 1A: EXCAVATE SOILS WITH PCB CONCENTRATIONS GREATER THAN 1 MG/KG, BACKFILL AND COMPACT CLEAN IMPORTED SOIL IN EXCAVATION AREA, AND IMPLEMENT LUCS AT THE SITE FOLLOWING REMOVAL ACTION ACTIVITIES (MAINTAINS CURRENT LOW-OCCUPANCY INDUSTRIAL USE)

Alternative 1A consists of the following components:

- Excavation of all soils with PCB contamination greater than 1 mg/kg;
- Transportation and disposal of 100 cubic yards (yd3) of soils with PCB contamination greater than 50 mg/kg at a TSCA-permitted hazardous waste landfill;
- Transportation and disposal of 3,285 yd3 soils with PCB contamination less than 50 mg/kg at an appropriately permitted Class I municipal landfill; and
- Backfill and compaction of clean, imported soils in the excavation area.

### C4.1.1 Excavation and Temporary Storage of Soil

#### *C4.1.1.1 Federal Requirements*

The Navy has identified the following potential ARARs for the excavation and temporary storage of soil.

**Resource Conservation and Recovery Act**

As introduced under Section C2.0, Chemical-Specific ARARs, RCRA is a potential ARAR for excavation and off-site disposal of soil. Any excavated waste will be characterized to determine whether it is a hazardous waste in compliance with the potential ARARs at Cal. Code Regs. Title 22, §§ 66262.10(a) and 66262.11.

**Toxic Substances Control Act**

The excavated soil will be temporarily stored at the site prior to off-site disposal in compliance with the potential ARARs at 40 CFR § 761.65(c)(9). These requirements allow PCB remediation waste to be stored for up to 180 days subject to the following requirements:

- The waste is placed in a pile designed and operated to control dispersal of the waste by wind, where necessary, by means other than wetting.
- The waste must not generate leachate through decomposition or other reactions.

- The storage site has:

  - (A) A liner that is designed, constructed, and installed to prevent any migration of wastes off or through the liner into the adjacent subsurface soil, ground water or surface water at any time during the active life (including the closure period) of the storage site. The liner may be constructed of materials that may allow waste to migrate into the liner. The liner must be:

    (*1*) Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients, physical contact with the waste or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation.

    (*2*) Placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift.

    (*3*) Installed to cover all surrounding earth likely to be in contact with the waste.

  - (B) A cover installed to cover all of the stored waste likely to be contacted with precipitation, and is secured so as not to be functionally disabled by winds expected under normal seasonal meteorological conditions at the storage site.

  - (C) A run-on control system designed, constructed, operated, and maintained such that:

    (*1*) It prevents flow onto the stored waste during peak discharge from at least a 25-year storm.

    (*2*) It collects and controls at least the water volume resulting from a 24-hour, 25-year storm.

**Clean Air Act**

The excavation of PCB-contaminated soil will also be done in compliance with the potential ARAR at Kern County Air Pollution Control District Regulations 401.1 and 402. These regulations prohibit the emissions of visible fugitive dust beyond the property boundary and require reasonably available control measures for each fugitive dust source. The reasonably available control measures for earth-moving and storage piles include wind screens, enclosures around dust piles, and dust suppressants. Reasonably available control measures for disturbed surface areas include fences and barriers, vegetation, dust suppressants, gravel, and compaction.

#### *C4.1.1.2 State Requirements*

After evaluating the ARARs provided by the state agencies, the Navy accepts the potential action-specific state ARARs listed below for Alternative 1A.

**California Code of Regulations Title 23 and Title 27**

Cal. Code Regs. Title 27, §§ 20220, 20220 (c), and 20230 require, "Accurate characterization of waste. If the waste meets the definition of nonhazardous solid waste, it may be discharged only at a Class II waste management units" and also "Inert waste does not required to be discharged at classified units."

Cal. Code Regs. Title 23, § 2511 (d) and Cal. Code Regs. Title 27, § 20090 (d) require the following:

> "Action taken by public agencies to cleanup unauthorized releases are exempt from Title 27/ Title 23 accept that wastes removed from immediate place of release and discharged to land must be managed in accordance with classification (Title 27 Cal. Code Regs., Section 20200/ Title 23 Cal. Code Regs., Section 2520) and siting requirements of Title 27 or Title 23 and wastes contained or lift in place must comply with Title 27 or Title 23 to the extent feasible."

The Navy will characterize excavated soil to determine proper off-site disposal and will comply with any other requirements for wastes contained or left in place to the extent feasible.

## C4.2 ALTERNATIVE 1B: EXCAVATE SOILS WITH PCB CONCENTRATIONS GREATER THAN 13.3 MG/KG, BACKFILL AND COMPACT CLEAN IMPORTED SOIL AND CRUSHED GRAVEL IN EXCAVATION AREA TO COVER FULL EXTENT OF CONTAMINATED AREA, AND IMPLEMENT LUCS AT THE SITE FOLLOWING REMOVAL ACTION ACTIVITIES (ALLOWS RISK-BASED LOW-OCCUPANCY REUSE)

Alternative 1B consists of the following components:

- Excavation of all soils with PCB contamination greater than 25 mg/kg;
- Transportation and disposal of 100 $yd^3$ soils with PCB contamination greater than 50 mg/kg at a TSCA-permitted hazardous waste landfill;
- Transportation and disposal of 625 $yd^3$ soils with PCB contamination less than 50 mg/kg at an appropriately permitted Class I municipal landfill;
- Backfill and compaction of clean imported soils and crushed gravel in the excavation area; and
- Implementation of interim LUCs, including engineering controls (EC) and institutional controls (IC).

### C4.2.1 Excavation and Temporary Storage of Soil

The same potential action-specific federal and state ARARs identified or accepted by the Navy for excavation and temporary storage of soil in Alternative 1A apply to Alternative 1B.

### C4.2.2 Implementation of Interim LUCs

In addition, Cal. Code Regs. Title 22, §§ 67391.1 (e)(2) requires the following:

> "Whenever DTSC determines that it is not feasible to record a land use covenant, DTSC and the federal government shall use other mechanisms to ensure that future land use will be compatible with the levels of hazardous materials, hazardous wastes or constituents, or hazardous substances will remain at the property at levels which are not suitable for unrestricted use of the land."

The Navy accepts this regulation as a potential action-specific state ARAR, and LUCs will be included in Alternative 1B to maintain future land use to be consistent with current low-occupancy industrial use.

## C4.3 ALTERNATIVE 1C: EXCAVATE SOILS WITH PCB CONCENTRATIONS GREATER THAN 25 MG/KG, BACKFILL AND COMPACT CLEAN IMPORTED SOIL AND CRUSHED GRAVEL IN EXCAVATION AREA TO COVER FULL EXTENT OF CONTAMINATED AREA, AND IMPLEMENT LUCS AT THE SITE FOLLOWING REMOVAL ACTION ACTIVITIES (ALLOWS LOW-OCCUPANCY REUSE)

Alternative 1C consists of the following components:

- Excavation of all soils with PCB contamination greater than 25 mg/kg;
- Transportation and disposal of 100 $yd^3$ soils with PCB contamination greater than 50 mg/kg at a TSCA-permitted hazardous waste landfill;
- Transportation and disposal of 125 $yd^3$ soils with PCB contamination less than 50 mg/kg at an appropriately permitted Class I municipal landfill;
- Backfill and compaction of clean, imported soils and crushed gravel in the excavation area; and
- Implementation of interim LUCs, including ECs and ICs.

### C4.3.1 Excavation and Temporary Storage of Soil

The same potential action-specific federal and state ARARs identified or accepted by the Navy for excavation and temporary storage of soil in Alternative 1A apply to Alternative 1C.

### C4.3.2 Implementation of Interim LUCs

The same potential action-specific federal and state ARARs identified or accepted by the Navy for implementing interim LUCs under Alternative 1B apply to Alternative 1C.

## C4.4 ALTERNATIVE 2: EXCAVATE SOILS WITH PCB CONCENTRATIONS GREATER THAN 10 MG/KG, BACKFILL AND COMPACT CLEAN IMPORTED SOIL IN EXCAVATION AREA, CONSTRUCT 6-INCH ASPHALT CAP OVER SOILS WITH PCB CONCENTRATIONS GREATER THAN 1 MG/KG BUT LESS THAN OR EQUAL TO 10 MG/KG, AND IMPLEMENT LUCS AT THE SITE FOLLOWING REMOVAL ACTION ACTIVITIES (ALLOWS HIGH-OCCUPANCY REUSE)

Alternative 2 consists of the following components:

- Excavation of all soils with PCB contamination greater than 10 mg/kg;
- Transportation and disposal of 100 $yd^3$ soils with PCB contamination greater than 50 mg/kg at a TSCA-permitted hazardous waste landfill;
- Transportation and disposal of 750 $yd^3$ soils with PCB contamination less than 50 mg/kg at an appropriately permitted Class I municipal landfill;
- Backfill and compaction of clean, imported soils in the excavation area;
- Construction of a 6-inch asphalt cap in accordance with 40 CFR 264.310(a) over all soils containing greater than 1 mg/kg but less than or equal to 10 mg/kg PCBs on the site; and
- Implementation of interim LUCs, including ECs and ICs.

### C4.4.1 Excavation and Temporary Storage of Soil

The same potential action-specific federal and state ARARs identified or accepted by the Navy for excavation and temporary soil storage in Alternative 1A apply to Alternative 2.

### C4.4.2 Soil Cover

The Navy has identified the following potential ARARs for covering PCB contaminated soil.

#### *C4.4.2.1 Federal Requirements*

**Toxic Substances Control Act**

Under this alternative, the Navy would cover soil that contained concentrations of PCBs greater than 1 mg/kg in compliance with 40 CFR § 761.61(a)(7). This section requires a uniform placement of concrete, asphalt, or similar material of minimum thickness spread over the area where remediation waste was removed or left in place in order to prevent or minimize human and ecological exposure, infiltration of water, and erosion. A cover of compacted soil shall have a minimum thickness of 25 centimeters (10 inches). A concrete or asphalt cover shall have a minimum thickness of 15 centimeters (6 inches). The cover must comply with the permeability, sieve, liquid limit, and plasticity index requirements in § 761.75(b)(1)(ii) through (b)(1)(v). A cover must be of sufficient strength to maintain its effectiveness and integrity during the use of the cover surface which is exposed to the environment. A cover shall not be contaminated at a level greater than or equal to 1 mg/kg PCB per Aroclor™ (or equivalent) or per congener.

Requirements necessary to maintain the cover would constitute ICs and would be evaluated through the CERCLA Feasibility Study (FS), Proposed Plan (PP), and Record of Decision (ROD) process.

**Resource Conservation and Recovery Act**

TSCA at 40 CFR § 761.61(a)(7) also requires compliance with RCRA landfill requirements promulgated at 40 CFR 264.310(a). Since California received authorization to administer its own RCRA program, the potential ARARs would be at Cal. Code Regs. Title 22, § 66264.310(a)(1) through (a)(5).

The cover requirements at Cal. Code Regs. Title 22, § 66264.310(a)(1) through (5) require a final cover designed and constructed to:

1. Prevent the downward entry of water into the closed landfill throughout a period of at least 100 years;

2. Function with minimum maintenance;

3. Promote drainage and minimize erosion or abrasion of the cover;

4. Accommodate settling and subsidence so that the cover's integrity is maintained;

5. Accommodate lateral and vertical shear forces generated by the maximum credible earthquake so that the integrity of the cover is maintained;

**Clean Air Act**

Construction of the cover would also be done in compliance with the potential ARAR at Kern County Air Pollution Control District Regulation 401 and 402. This regulation requires the use of reasonable available control measure for construction activity. The reasonably available control measures include wind breaks and dust suppressants.

#### *C4.4.2.2 State Requirements*

Under Cal. Code Regs. Title 27, § 20080 (b), engineered alternatives are allowed that afford the equivalent water quality protection as the prescriptive standards. The Navy has identified the TSCA cover requirements as potential federal ARARs for designing the cover. This alternative cover would provide at least the equivalent protection as a cover designed under Cal. Code Regs. Title 27. The Navy accepts the substantive provisions of Cal. Code Regs. Title 27, §§ 20080 (b) and (c) as potential state ARARs for the cover evaluated in Alternative 2.

Cal. Code Regs. Title 27, § 21090, presents closure and post-closure cover requirements for solid waste landfills and allows alternative cover designs as long as the cover isolates waste at least as well as the prescriptive cover standards.

The Navy accepts the substantive provisions of this regulation as a potential state ARAR for Alternative 2. Under Alternative 2, the Navy is evaluating the excavation of PCB-contaminated soil with concentrations over 10 mg/kg and the construction of a cover over PCB-contaminated soil at concentrations between 1 and 10 mg/kg. Cal. Code Regs. Title 27, § 21090, allows an alternative cover that isolates waste at least as well as the prescriptive cover. The TSCA cover would be an alternative cover that would isolate the waste as well as the prescriptive cover required under Cal. Code Regs. Title 27, § 21090.

### C4.4.3 Implementation of Interim LUCs

The same potential action-specific federal and state ARARs identified or accepted by the Navy for implementing interim LUCs under Alternative 1B apply to Alternative 2.

## C5.0 REFERENCES

U.S. Environmental Protection Agency (EPA). 1988a. "CERCLA Compliance with Other Laws Manual, Draft Guidance." EPA/540/G-89/006. Office of Emergency and Remedial Response. Washington, D.C. August.

EPA. 1988b. "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA." Office of Solid Waste and Emergency Response Directive 9355.3-01, -02. EPA/540/G-89/004.

EPA. 1991. "ARARs Q's and A's: General Policy, RCRA, CWA, SDWA, Post-ROD Information and Contingent Waivers." Office of Solid Waste and Emergency Response Publication 9234.2-01/FSA. Washington, DC. July.

EPA. 1999. Letter Providing U.S. Environmental Protection Agency (EPA) Region 9 Preliminary Remediation Goals (PRG). From Stanford J. Smucker, Ph.D., to PRG Table Mailing List. EPA Region 9. October.

***TABLES***

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD**

Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Department of Fish and Game** | | | | |
| Birds and mammals | Action must be taken to prohibit the taking of birds and mammals, including the taking by poison. | Presence or potential presence of birds and mammals. | DFG Code § 3005 | The site is characterized as low-quality, disturbed desert scrub habitat, and the standard pre-construction surveys and protective measures for special-status species would be carried out at the site prior to and during any removal action.<br>The Navy will make a final determination in an Action Memorandum if the location-specific ARARs identified by the state agencies are applicable or relevant and appropriate. |
| Bird nests or eggs | Actions must be taken to avoid the taking or destruction of the nest or eggs of any bird. | Presence or potential presence of bird nests or eggs | DFG Code § 3503 | The site is characterized as low-quality, disturbed desert scrub habitat, and the standard pre-construction surveys and protective measures for special-status species would be carried out at the site prior to and during any removal action.<br>The Navy will make a final determination in an Action Memorandum if the location-specific ARARs identified by the state agencies are applicable or relevant and appropriate. |
| Birds of prey | Action must be taken to prevent the taking, possession, or destruction of any birds-of prey or their eggs. | Presence or potential presence of birds of prey | DFG Code § 3503.5 | The site is characterized as low-quality, disturbed desert scrub habitat, and the standard pre-construction surveys and protective measures for special-status species would be carried out at the site prior to and during any removal action.<br>The Navy will make a final determination in an Action Memorandum if the location-specific ARARs identified by the state agencies are applicable or relevant and appropriate. |
| Non-game birds | Action must be taken to prevent the taking of non-game birds. | Presence or potential presence of non-game birds | DFG Code § 3800 | The site is characterized as low-quality, disturbed desert scrub habitat, and the standard pre-construction surveys and protective measures for special-status species would be carried out at the site prior to and during any removal action.<br>The Navy will make a final determination in an Action Memorandum if the location-specific ARARs identified by the state agencies are applicable or relevant and appropriate. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Department of Fish and Game (Continued)** | | | | |
| Fur-bearing mammals | Action must be taken to avoid taking fur-bearing mammals. | Presence or potential presence of fur-bearing mammals | Cal. Code Regs. Title 14, § 460 | The site is characterized as low-quality, disturbed desert scrub habitat, and the standard pre-construction surveys and protective measures for special-status species would be carried out at the site prior to and during any removal action.<br>The Navy will make a final determination in an Action Memorandum if the location-specific ARARs identified by the state agencies are applicable or relevant and appropriate. |
| Non-game mammals | Action must be taken to avoid the taking or possession of non-game mammals. | Presence or potential presence of non-game mammals | DFG Code § 4150 | The site is characterized as low-quality, disturbed desert scrub habitat, and the standard pre-construction surveys and protective measures for special-status species would be carried out at the site prior to and during any removal action.<br>The Navy will make a final determination in an Action Memorandum if the location-specific ARARs identified by the state agencies are applicable or relevant and appropriate. |
| Mountain lions | Action must be taken to avoid injuring, taking or possessing or transporting any mountain lion. | Presence or potential presence of mountain lions | DFG Code § 4800 | The site is characterized as low-quality, disturbed desert scrub habitat, and the standard pre-construction surveys and protective measures for special-status species would be carried out at the site prior to and during any removal action.<br>The Navy will make a final determination in an Action Memorandum if the location-specific ARARs identified by the state agencies are applicable or relevant and appropriate. |
| Desert tortoises | Action must be taken to avoid the sale, purchase, harming of, or taking or possession of desert tortoises. | Presence or potential presence of desert tortoises | DFG Code § 5000 | The site is characterized as low-quality, disturbed desert scrub habitat, and the standard pre-construction surveys and protective measures for special-status species would be carried out at the site prior to and during any removal action.<br>The Navy will make a final determination in an Action Memorandum if the location-specific ARARs identified by the state agencies are applicable or relevant and appropriate. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Department of Toxic Substances Control** | | | | |
| Characterize waste | Defines RCRA hazardous waste. A solid waste is characterized as toxic based on if the waste exceeds the TCLP maximum concentrations. The regulation also defines state-regulated non-RCRA hazardous waste. | Waste | Cal. Code Regs. Title 22, § 66261.24 | The Navy has identified the substantive provisions of Cal. Code Regs. Title. 22, § 66261.24(a)(1), as a potential federal chemical-specific ARAR. The Navy accepts the substantive provisions of Cal. Code Regs. Title 22, § 66261.24(a)(2) – (a)(8), as potential state chemical-specific ARARs. These potential chemical-specific ARARs are used to determine if the waste generated under all the alternatives meets the definition of RCRA hazardous waste or state-regulated, non-RCRA hazardous waste. |
| Characterize waste | Any waste containing PCBs equal to or greater than 5,000 mg/kg for its TTLC – wet weight is an extremely hazardous waste. | Waste containing equal to or greater than 5,000 mg/kg PCBs wet weight | Cal. Code Regs. Title 22, § 66261.113 | The Navy accepts the substantive provisions of this definition as a potential state chemical-specific ARAR. This potential ARAR is used to determine if the waste generated under all the alternatives meets the definition of extremely hazardous waste. It is unlikely that excavated soil would meet the definition of extremely hazardous waste because the maximum concentration of PCBs in the soil is below 5,000 mg/kg. |
| Discharge or release of chemicals in the course of doing business | No person in the course of doing business shall knowingly discharge or release a chemical known to the state (California) to cause cancer or reproductive toxicity into water or onto or into land without first giving a clear and reasonable warning. | Person knowingly discharging chemical known to cause cancer or reproductive toxicity | Safe Drinking Water and Toxic Enforcement Act of 1986, CH&SC 25249.5 – 25249.13 | The Navy does not accept the substantive provisions of these state requirements as potential chemical-specific ARARs. First, the statute does not define "person" as including the federal government. Second, the statute allows alternative methodologies to establish acceptable exposure levels. The Navy completed a risk assessment in accordance with CERCLA requirements and guidance. This risk assessment is equivalent to the risk assessment required under the Safe Drinking Water and Toxic Enforcement Act of 1986. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Department of Toxic Substances Control (Continued)** | | | | |
| Land-use controls | Allows the state (as non-owners) to enter into restrictive land-use covenants with land owners and their successors after determining that protection of present or future human health or safety or the environment is necessary. | Transfer of property from the Navy to a non-federal entity | California Civil Code Section 1471 | The Navy does not accept the substantive provision of this state statute as a potential action-specific ARAR. NAWS China Lake is an active base with no plans for transfer. Therefore, the Navy is unable to enter into a land-use covenant. Instead, any land-use controls will be placed and implemented through the base master plan. |
| Land-use controls | Allows the state (as non-owners) to enter into restrictive land-use covenants with land owners and their successors after determining that protection of present or future human health or safety or the environment is necessary. | Transfer of property from the Navy to a non-federal entity | CH&SC 25202.5, 25221.1, 25355.5(a)(1)(C), 25233, 25234 | The Navy does not accept the substantive provisions of these state statutes as potential action-specific ARARs. NAWS China Lake is an active base with no plans for transfer. Therefore, the Navy is unable to enter into a land-use covenant. Instead, any land-use controls will be placed and implemented through the base master plan. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Department of Toxic Substances Control (Continued)** | | | | |
| Land-use controls | Whenever DTSC determines that it is not feasible to record a land-use covenant, DTSC and the federal government shall use other mechanisms to ensure that future land use will be compatible with the levels of hazardous materials, hazardous wastes or constituents, or hazardous substances that will remain at the property at levels not suitable for unrestricted land use. | Hazardous materials, hazardous wastes or constituents, or hazardous substances remaining on site at levels unsuitable for unrestricted reuse | Cal. Code Regs. Title 22, § 67391.1(e)(2) | The Navy accepts the substantive provision of this requirement as a potential state action-specific ARAR. |
| Closure of temporary waste pile | Closure and post-closure care of waste piles | RCRA hazardous waste pile | Cal. Code Regs. Title.22, §§ 66254.258(a) and (b) | The Navy will identify the substantive provision of this requirement as a potential federal action-specific ARAR for closing the temporary waste pile used to store excavated soil. |
| Off-site disposal of waste | Manifest requirements for transport of hazardous waste | Transporting hazardous waste off-site | CH&SC §§ 25160 et. seq. | The Navy does not accept the substantive provisions of these state requirements as potential state ARARs because ARARs apply to on-site actions. These requirements apply to RCRA hazardous waste that will be shipped off site. The Navy will comply with all legally applicable requirements for off-site disposal, including these requirements for RCRA hazardous waste. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Department of Toxic Substances Control (Continued)** | | | | |
| General provisions | Hazardous Waste Management System General | General standards and overview information applicable to the hazardous waste management system | Cal. Code Regs. Title 22, §§ 66260.1 – 66260.12 and §§ 66260.21-66260.210 | The Navy will not identify these requirements as potential ARARs. These requirements are procedural and administrative in nature and do not present an environmental criteria, standard, or limitation. |
| Definition of RCRA hazardous waste | This chapter identifies wastes subject to regulation as hazardous wastes under this division. | Waste | Cal. Code Regs. Title 22, §§ 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100, and Cal. Code Regs. Title 22, §§ 66261.3(a)(2)(C) or (F), 66261.22(a)(3) and (a)(4), 66261.24(a)(2) through (a)(8), and 66261.101 | The Navy has identified the substantive provisions of Cal. Code Regs. Title 22, §§ 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100 as potential federal chemical-specific ARARs. The Navy accepts the substantive provisions of Cal. Code Regs. Title 22, §§ 66261.3(a)(2)(C) or (F), 66261.22(a)(3) and (a)(4), 66261.24(a)(2) through (a)(8), and 66261.101 as potential state chemical-specific ARARs. These potential ARARs define RCRA hazardous and state-regulated, non-RCRA hazardous waste. The Navy will determine if the waste it generates meets these definitions. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Department of Toxic Substances Control (Continued)** | | | | |
| Characterization of waste | Establishes standards applicable to generators of hazardous waste in California, including characterizing the waste and properly manifesting, transporting, and disposing of the waste. | Generator of waste | Cal. Code Regs. Title 22, §§ 66262.10(a) and 66262.11 | The Navy has identified the substantive provisions of Cal. Code Regs. Title 22, §§ 66262.10(a) and 66262.11 as potential federal action-specific ARARs requiring the characterization of waste prior to off-site disposal. |
| Transporting hazardous waste | Establishes standards applicable to transporters of hazardous waste in California | Applies to transporters of waste from the site | Cal. Code Regs. Title 22, §§ 66263.10 – 66263.50 | The Navy will not identify the substantive provisions of these requirements as potential ARARs because the Navy will not transport the waste off site for disposal. |
| Closure standard | The owner or operator shall close the facility in a manner that: (a) minimizes the need for further maintenance and (b) controls to the extent necessary to protect human health and the environment post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated rainfall or run-off, or waste decomposition products. | RCRA hazardous waste facility | Cal. Code Regs. Title 22, § 66264.111 | The Navy will identify the substantive provisions of this regulation as potential federal action-specific ARARs for closing the temporary waste pile used to store excavated soil. |
| Environmental monitoring | Requirements for environmental monitoring and response programs for air, soil, and soil-pore gas for permitted facilities | RCRA permitted facility | Cal. Code Regs. Title 22, §§ 66264.700 through 66264.708 | The Navy will not identify the substantive provisions of these requirements as potential federal ARARs because the Navy has identified the TSCA regulations for temporary storage of bulk PCB remediation waste. These potential ARARs contain requirements for design and operating criteria and are more suited to the contaminants present in the soil that will be stored in the temporary piles. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Department of Toxic Substances Control (Continued)** | | | | |
| Definition of waste | Criteria for Identifying Hazardous Waste and Persistent and Bioaccumulative Toxic Substances; presents criteria for testing and identifying RCRA hazardous wastes and sets levels for TTLC and STLC | The criteria and TTLC and STLC levels are applicable for characterization of excavated soils or other wastes generated by remedial actions. | Cal. Code Regs. Title 22, § 66261.24 | See previous comment regarding Cal. Code Regs. Title 22, § 66261.24 |
| Characterization of waste | Establishes standards for generators of hazardous wastes in California, including those for hazardous waste determination, manifesting, transportation, recordkeeping, and reporting | Substantive requirements are applicable if excavated soils or treatment residuals exceed RCRA hazardous waste thresholds. | Cal. Code Regs. Title 22, § 66262.11 | See previous comment regarding Cal. Code Regs. Title 22, § 66262.11 |
| Removal of extremely hazardous waste | Requires the removal of improperly disposed, extremely hazardous wastes | Improperly disposed of extremely hazardous waste | Cal. Code Regs. Title 22, § 67430.3 | The Navy does not accept the substantive provision of this requirement as a potential state ARAR because it is procedural in nature and presents an enforcement standard. The Navy is evaluating the excavation and proper disposal of PCB-contaminated soil for this CERCLA removal action, which will result in compliance with this provision. Further, it is unlikely that the PCB-contaminated soil is extremely hazardous waste because the maximum concentration is below 5,000 mg/kg. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Department of Toxic Substances Control (Continued)** | | | | |
| Incineration of hazardous wastes | Allows a hazardous waste producer to request and DTSC to grant an emergency variance from certain incineration requirements, which have since been repealed. | Producer of hazardous waste planning to incinerate the hazardous waste | Cal. Code Regs. Title 22, § 66268.124 | The Navy will not identify the substantive requirement of this regulation as a potential ARAR. It is procedural in nature and does not present a substantive environmental standard, criteria, or limitation. Further, the Navy is not planning to incinerate PCB-contaminated soil on site. |
| Groundwater monitoring | Owner or operators shall conduct detection monitoring program under Cal. Code Regs. Title 22, § 66264.98, an evaluation monitoring program under Cal. Code Regs. Title 22, § 66264.99, when required, and a corrective action monitoring program under Cal. Code Regs. Title 22, § 66264.100, when required. The specific elements of these programs shall be specified in the facility permit. | Groundwater monitoring | Cal. Code Regs. Title 22, § 66264.91 | The Navy will not identify any of these requirements as potential federal ARARs. The Navy is performing an interim removal action for soil at this site. Groundwater is not part of this soil action, so the Navy does not need to evaluate groundwater ARARs at this time. |
| Corrective action monitoring program | Requirements for a corrective action plan for environmental monitoring and response programs for air, soil, and soil-pore gas | Permitted RCRA facility | Cal. Code Regs. Title 22, § 66264.708 | The Navy will not identify this requirement as a potential federal ARAR because it is procedural in nature and does not present a substantive environmental standard, criteria, or limitation. Further, the Navy's soil removal action under CERCLA would provide the same result as an action under this regulation.. |
| RCRA hazardous waste permits | Presents conditions applicable to all RCRA permits | RCRA permit | Cal. Code Regs. Title 22, § 66270.30 | The Navy will not identify this requirement as a potential federal ARAR because it is procedural in nature and does not present a substantive environmental standard, criteria, or limitation. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Department of Toxic Substances Control (Continued)** | | | | |
| Inspection of waste areas | Presents criteria under which DTSC may inspect sites where wastes are stored, handled, treated, processed, disposed of, or treated to recover resources | Place where wastes are stored, handled, treated, processed, disposed of, or treated to recover resources | Cal. Code Regs. Title 22, § 66272.1 | The Navy will not identify this requirement as a potential federal ARAR because it is procedural in nature and does not present a substantive environmental standard, criteria, or limitation. |
| Documentation and reporting for regulatory tiers, permits, WDRs, and plans | Contains certain requirements for applying for and reviewing a solid waste facility permit package | Application for a solid waste facility permit | Cal. Code Regs. Title 27, Division 2, Subdivision 1, Chapter 4, Subchapter 1 and Subchapter 3, Article 2 (to § 21600) | The Navy will not accept any of these regulations as potential state action-specific ARARs. The Navy is not operating a solid waste facility on site, and the interim removal action is not evaluating the operation of an on-site solid waste facility. Further, these requirements are procedural in nature and do not present a substantive environmental standard, criteria, or limitation. |
| Transportation of hazardous waste | Establishes standards that apply to persons transporting hazardous waste in California | Transporting hazardous waste off site | Cal. Code Regs. Title 22, §§ 66263.10-18 | The Navy will not identify these requirements as potential federal action-specific ARARs because the Navy will not transport any hazardous waste off site. |
| Air emissions<br>KCAPCD | Requirements on visible emissions, fugitive dust, and particulate matter | Emission into atmosphere | District Rules 401, 402, and 404.1 | The Navy has identified KCAPCD Rule 402 as a potential federal ARAR for all alternatives. The Navy will identify KCAPCD Rules 401 and 404.1 as potential federal ARARs for all alternatives. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Department of Toxic Substances Control (Continued)** | | | | |
| Criteria for landfills and disposal sites | Operating and closure and post-closure requirements for landfills and disposal sites | Solid waste management unit or solid waste landfill | Cal. Code Regs. Title 27, Division 2, Subdivision 1, Chapter 3, Subchapters 4 and 5 | The Navy does not accept any of the regulations in Cal. Code Regs. Title 27, Division 2, Subdivision 1, Chapter 3, Subchapters 4 and 5 as potential state action-specific ARARs. Cal. Code Regs. Title 27, Division 2, Subdivision 1, Chapter 3, Subchapter 4, contains operating requirements for landfills. The Navy is not currently operating a landfill on the site and is not evaluating the operation of a landfill as part of this interim removal action. Cal. Code Regs. Title 27, Division 2, Subdivision 1, Chapter 3, Subchapter 5 contains requirements for closure and post-closure maintenance of a solid waste management unit or solid waste landfill. Alternatives 1A, 1B, and 1C all evaluate maintaining low-occupancy use of the site, so a cover over the site to prevent human health exposure to concentrations of PCBs remaining in the soil is not necessary. Alternative 2 evaluates high-occupancy use of the site, so if PCB concentrations are left in place above 1 mg/kg, TSCA requires a cover. The Navy has identified the TSCA cover requirements at 40 CFR §761.61(a)(7) as potential federal ARARs for the Alternative 2 cover. The cover requirements contained in Cal. Code Regs. Title 27, Division 2, Subdivision 1, Chapter 3, Subchapter 5, are not more stringent than the TSCA cover requirements. Further, compliance with the TSCA cover requirements will result in compliance with these requirements. Many of the requirements in these subchapter are also procedural in nature and do not present a substantive environmental standard, criteria, or limitation. |
| EPA Region IX PRGs | Chemical concentrations in soil, air, and water that can be used as screening levels or triggers for further investigation | PRGs are not promulgated cleanup levels but levels above which further risk characterization is recommended. | EPA Region IX PRGs | The Navy does not accept these as potential ARARs because they are not promulgated standards. The Navy has used EPA Region IX in its evaluation of the interim removal action. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Department of Toxic Substances Control (Continued)** | | | | |
| California Designated Level Methodology for Waste Characterization and Cleanup Level Determination, Staff Report California RWQCB | Proposes a methodology for determining cleanup levels in soil based on impact to groundwater; designated waste is defined as non-hazardous waste that consists of pollutants, which under ambient environmental conditions, could cause degradation of waters of the state | Can be used to determine cleanup levels for soil that are protective of groundwater quality | | The Navy does not accept this as a potential state ARAR because it is not promulgated, and this action is for soil remediation only. |
| **California Regional Water Quality Control Board** | | | | |
| Water quality | Establishes water quality objectives, including narrative and numerical standards, that protect the beneficial uses of surface water and groundwater in the region; describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and provide comprehensive water quality planning; also includes implementation actions for setting soil cleanup levels for soils that threaten water quality | Waters of the state | Water Quality Control Plan (Basin Plan) for the Lahontan Region (statutory authority at Porter-Cologne Water Quality Control Act - California Water Code §§ 13240, 13241, 13242, and 13243) | The Navy does not expect to discharge or deposit any substance into waters of the state as part of the interim removal action, and surface water and groundwater remediation is not included as part of this interim action. Therefore, the Navy does not need to evaluate the Basin Plan as a potential ARAR at this time. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Regional Water Quality Control Board (Continued)** | | | | |
| Discharge to surface water or groundwater | Requires that high-quality surface and groundwater be maintained to the maximum extent possible; degradation of waters will be allowed (or allowed to remain) only if it is consistent with the maximum benefit to the people of the state, will not unreasonably affect present and anticipated beneficial uses, and will not result in water quality less than that prescribed in RWQCB and SWRCB policies; if degradation is allowed, the discharge must meet best practicable treatment or control, which must prevent pollution or nuisance and result in the highest water quality consistent with maximum benefit to the people of the state | Discharge to surface water or groundwater | State Water Resources Control Board Resolution No. 68-16 ("Antidegradation Policy") | The Navy will not discharge into waters of the state as part of the interim removal action, and surface water and groundwater remediation is not included as part of this interim action. Therefore, the Navy does not need to evaluate SWRCB Resolution 68-16 as a potential ARAR at this time. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Regional Water Quality Control Board (Continued)** | | | | |
| Cleanup and abatement of discharges | Establishes requirements for investigation and cleanup and abatement of discharges; among other requirements, dischargers must clean up and abate the effects of discharges in a manner that promotes the attainment of either background water quality or the best water quality reasonable if background water quality cannot be restored; requires the application of Cal. Code Regs. Title 23, § 2550.4 requirements to cleanups | Cleanup under Cal. Water Code § 13304 | SWRCB Resolution No. 92-49 (as amended April 21, 1994) | The Navy is evaluating an interim removal action for soil. Cleanup and abatement of surface water or groundwater quality is not part of the interim action. Therefore, the Navy does not need to evaluate SWRCB Resolution 92-49 at this time. |
| Construction of waste management unit | Establishes waste and siting classification systems and minimum waste management standards for discharges of waste to land for treatment, storage, and disposal; engineered alternatives consistent with Title 27 and Title 23 performance goals may be considered; establishes corrective action requirements for responding to leaks and other unauthorized discharges | Construction of a waste management unit | Cal. Code Regs. Title 27, Div. 2, Subdiv. 1 (§§ 20080 et seq.), Cal. Code Regs. Title 23, Div. 3, Chapter 15, (§§ 2510 et seq.) | The Navy accepts the substantive provisions of Cal. Code Regs. Title 27, §§ 20080(b) and (c) as potential state ARARs for the cover evaluated in Alternative 2. Under Cal. Code Regs. Title 27, § 20080(b), engineered alternatives are allowed that afford the equivalent water quality protection as the prescriptive standards. The Navy has identified the TSCA cover requirements as potential federal ARARs for designing the cover. This alternative cover would provide at least the equivalent protection as a cover designed under Cal. Code Regs. Title 27. The Navy does not accept the substantive provisions of Cal. Code Regs. Title 23, § 2510, as potential state ARARs because the PCB concentrations remaining in place will not likely meet the definition of hazardous waste. So the solid waste regulations promulgated under Title 27 are more suited to the waste remaining in place. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Regional Water Quality Control Board (Continued)** | | | | |
| Class I hazardous waste management units | Requires that hazardous waste be discharged to Class I waste management units that meet certain design and monitoring standards | Hazardous waste discharge to land | Cal. Code Regs. Title 23, §§ 2520 and 2521 | The Navy does not accept these regulations as potential state ARARs because there are no Class I hazardous waste units on site and the Navy is not evaluating the construction of a Class I hazardous waste unit as part of the interim removal action. The Navy will characterize the excavated soil for proper disposal at an off-site waste management unit. |
| Characterization of waste | Requires accurate characterization of waste; if the waste meets the definition of designated waste, it may be discharged only at a Class I hazardous waste management unit or certain Class II waste management units | Waste | Cal. Code Regs. Title 27, §§ 20200(c) and 20210 | The Navy accepts the substantive provisions of Cal. Code Regs. Title 27, § 20210, the definition of designated waste, as a potential state chemical-specific ARAR. The Navy accepts the substantive provisions of Cal. Code Regs. Title 27, §§ 20200(c) and 20210, as potential state action-specific ARARs for all alternatives requiring the accurate characterization of waste and proper off-site disposal to a classified unit. |
| Characterization of waste | Does not require inert waste be discharged at classified units | Waste | Cal. Code Regs. Title 27, § 20230 | The Navy accepts the substantive provision of this regulation as a potential state chemical-specific ARAR and action-specific ARAR for all alternatives. The Navy will characterize excavated soil to determine proper off-site disposal. |
| Characterization of waste | Requires accurate characterization of waste; if the waste meets the definition of nonhazardous solid waste, it may be discharged only at a Class II waste management units | Waste | Cal. Code Regs. Title 27, §§ 20200(c) and 20220 | The Navy accepts the substantive provisions of Cal. Code Regs. Title 27, § 20220, the definition of nonhazardous solid waste, as a potential state chemical-specific ARAR. The Navy accepts the substantive provisions of Cal. Code Regs. Title 27, §§ 20200(c) and 20210, as potential state action-specific ARARs for all alternatives requiring the accurate characterization of waste and proper off-site disposal to a classified unit. |
| Closed, abandoned, or inactive units | Persons responsible for discharges and closed, abandoned, or inactive units may be required to implement a detection monitoring program. | Closed, abandoned, or inactive unit | Cal. Code Regs. Title 27, § 20080(g), and Cal. Code Regs. Title 23, § 2510(g) | The Navy does not accept the substantive provisions of these regulations as potential ARARs because there is no closed, abandoned, or inactive unit on the site. Further, this interim removal action is for soil. Therefore, the Navy does not need to identify potential ARARs for groundwater at this time. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Regional Water Quality Control Board (Continued)** | | | | |
| Public agency cleanup | Action taken by public agencies to clean up unauthorized releases are exempt from Title 27 and Title 23 except that wastes removed from immediate place of release and discharged to land must be managed in accordance with classification (Title 27 Cal. Code Regs., Section 20200/ Title 23 Cal. Code Regs., Section 2520) and siting requirements of Title 27 or Title 23 and wastes contained or left in place must comply with Title 27 or Title 23 to the extent feasible | Action taken by a public agency to cleanup unauthorized release | Cal. Code Regs. Title 27, § 20090(d), and Cal. Code Regs. Title 23, § 2511(d) | The Navy accepts the substantive provision of Cal. Code Regs. Title 27, § 20090(d), and Cal. Code Regs. Title 23, § 2511, as potential state ARARs. The Navy will accurately characterize any soil excavated from the site for proper off-site disposal. The Navy will comply with any other requirements for wastes contained or left in place to the extent feasible. |
| Groundwater monitoring | Requirements to conduct detection, evaluation, and corrective action monitoring | Owner or operator of a facility that treats, stores, or disposes of waste at a waste management unit | Cal. Code Regs. Title 27, § 20385, and Cal. Code Regs. Title 23, § 2550.1 | The Navy does not accept the substantive provisions of these regulations as potential state ARARs. This interim removal action is for soil only; groundwater and surface water are not part of this action. Therefore, the Navy does not need to evaluate potential groundwater monitoring ARARs at this time. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Regional Water Quality Control Board (Continued)** | | | | |
| Groundwater monitoring | Requires establishment of a water quality protection standard consisting of a list of constituents of concern, concentration limits, compliance monitoring points and all monitoring points; this section further specifies the time period that the standard shall apply to | Waste management unit | Cal. Code Regs. Title 27, § 20390, and Cal. Code Regs. Title 23, § 2550.2 | The Navy does not accept the substantive provisions of these regulations as potential state ARARs. This interim removal action is for soil only; groundwater and surface water are not part of this action. Therefore, the Navy does not need to evaluate potential groundwater monitoring ARARs at this time. |
| Groundwater monitoring | Requires development of a list of constituents of concern that includes all waste constituents reasonably expected to be present in soil from discharges to land and that could adversely affect water quality | Waste management unit | Cal. Code Regs. Title 27, § 20395, and Cal. Code Regs. Title 23, § 2550.3 | The Navy does not accept the substantive provisions of these regulations as potential state ARARs. This interim removal action is for soil only; groundwater and surface water are not part of this action. Therefore, the Navy does not need to evaluate potential groundwater monitoring ARARs at this time. |
| Groundwater monitoring | Requires identification of the point of compliance hydraulically downgradient from the area where waste was discharged to land | Waste management unit | Cal. Code Regs. Title 27, § 20405, and Cal. Code Regs. Title 23, § 2550.5 | The Navy does not accept the substantive provisions of these regulations as potential state ARARs. This interim removal action is for soil only; groundwater and surface water are not part of this action. Therefore, the Navy does not need to evaluate potential groundwater monitoring ARARs at this time. |
| Groundwater monitoring | Requires monitoring for compliance with remedial action objectives for 3 years from the date of achieving cleanup goal | Waste management unit | Cal. Code Regs. Title 27, § 20410, and Cal. Code Regs. Title 23, § 2550.6 | The Navy does not accept the substantive provisions of these regulations as potential state ARARs. This interim removal action is for soil only; groundwater and surface water are not part of this action. Therefore, the Navy does not need to evaluate potential groundwater monitoring ARARs at this time. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Regional Water Quality Control Board (Continued)** | | | | |
| Groundwater monitoring | Concentration limits must be established for groundwater, surface water, and the unsaturated zone based on background, equal to background, or, for corrective actions, may be greater than background, not to exceed the lower of the applicable water quality objective or the concentration technologically or economically achievable. Specific factors must be considered in setting cleanup standards above background levels. | Waste management unit | Cal. Code Regs. Title 27, § 20400, and Cal. Code Regs. Title 23, § 2550.4 | The Navy does not accept the substantive provisions of these regulations as potential state ARARs. This interim removal action is for soil only; groundwater and surface water are not part of this action. Therefore, the Navy does not need to evaluate potential groundwater monitoring ARARs at this time. |
| Groundwater monitoring | General water quality monitoring and system requirements | Waste management unit | Cal. Code Regs. Title 27, § 20415, and Cal. Code Regs. Title 23, § 2550.7 | The Navy does not accept the substantive provisions of these regulations as potential state ARARs. This interim removal action is for soil only; groundwater and surface water are not part of this action. Therefore, the Navy does not need to evaluate potential groundwater monitoring ARARs at this time. |
| Groundwater monitoring | Requirements for a detection monitoring program | Waste management unit | Cal. Code Regs. Title 27, § 20420, and Cal. Code Regs. Title 23, § 2550.8 | The Navy does not accept the substantive provisions of these regulations as potential state ARARs. This interim removal action is for soil only; groundwater and surface water are not part of this action. Therefore, the Navy does not need to evaluate potential groundwater monitoring ARARs at this time. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Location | Requirement (as provided by the state) | Prerequisite | Citation | Navy Preliminary ARAR Determination |
|---|---|---|---|---|
| **California Regional Water Quality Control Board (Continued)** | | | | |
| Groundwater monitoring | Requirements for an evaluation monitoring program | Waste management unit | Cal. Code Regs. Title 27, § 20425, and Cal. Code Regs. Title 23, § 2550.9 | The Navy does not accept the substantive provisions of these regulations as potential state ARARs. This interim removal action is for soil only; groundwater and surface water are not part of this action. Therefore, the Navy does not need to evaluate potential groundwater monitoring ARARs at this time. |
| Groundwater monitoring | Requires implementation of corrective action measures that ensure that cleanup levels (i.e., water quality protection standard established under § 2550.2) are achieved throughout the zone affected by the release by removing the waste constituents or treating them in place; source control may be required; also requires monitoring to determine the effectiveness of the corrective actions | Waste management unit | Cal. Code Regs. Title 27, § 20430, and Cal. Code Regs. Title 23, § 2550.10 | The Navy does not accept the substantive provisions of these regulations as potential state ARARs. This interim removal action is for soil only; groundwater and surface water are not part of this action. Therefore, the Navy does not need to evaluate potential groundwater monitoring ARARs at this time. |
| Groundwater monitoring cover requirements | Presents closure and post-closure cover requirements for solid waste landfills; allows alternative cover designs as long as cover isolates waste at least as well as the prescriptive cover standards | Solid waste landfill | Cal. Code Regs. Title 27, § 21090 | The Navy accepts the substantive provisions of this regulation as potential state ARARs for Alternative 2. Under Alternative 2, the Navy is evaluating the excavation of PCB-contaminated soil with concentrations over 10 mg/kg and the construction of a cover over PCB-contaminated soil at concentrations between 1 and 10 mg/kg. Cal. Code Regs. Title 27, § 21090, allows an alternative cover that isolates waste at least as well as the prescriptive cover. The TSCA cover would be an alternative cover that would isolate the waste as well as the prescriptive cover required under Cal. Code Regs. Title 27, § 21090. |

**TABLE C-1: NAVY'S RESPONSES TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, DEPARTMENT OF TOXIC SUBSTANCES CONTROL, AND CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

Notes:
Only the substantive provisions of the requirements cited in this table are potential ARARs.

Statutes and policies, and their citations are provided as headings to identify general categories of potential ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as potential ARARs. Specific potential ARARs are addressed in the table below each general heading. Only pertinent substantive requirements of specific citations are considered potential ARARs.

| | |
|---|---|
| § | Section |
| ARAR | Applicable or relevant and appropriate requirement |
| Cal. Code Regs. | *California Code of Regulations* |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | *Code of Federal Regulations* |
| DFG | California Department of Fish and Game |
| DTSC | California Department of Toxic Substances Control |
| EPA | U.S. Environmental Protection Agency |
| HVSSA | High Voltage Shop Storage Area |
| KCAPCD | Kern County Air Pollution Control District |
| mg/kg | Milligram per kilogram |
| Navy | U.S. Department of the Navy |
| NAWS | Naval Air Weapons Station |
| PCB | Polychlorinated biphenyl |
| PRG | Preliminary remediation goal |
| PW | Public Works Compound |
| RCRA | Resource Conservation and Recovery Act |
| RWQCB | Regional Water Quality Control Board |
| STLC | Soluble threshold limit concentration |
| SWRCB | State Water Resources Control Board |
| TCLP | Toxicity characteristic leaching procedure |
| TSCA | Toxic Substances Control Act |
| TTLC | Total threshold limit concentration |
| WDR | Waste Discharge Requirement |

**TABLE C-2: POTENTIAL FEDERAL CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Requirement | Prerequisite | Citation[a] | Preliminary ARAR Determination | Comments |
|---|---|---|---|---|
| **Soil** | | | | |
| **Resource Conservation and Recovery Act (42 USC, Chapter 82, §§ 6901–6991[i])[b]** | | | | |
| Defines RCRA hazardous waste. A solid waste is characterized as toxic, based on the TCLP, if the waste exceeds the TCLP maximum concentrations. | Waste | Cal. Code Regs. Title 22, §§ 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100 | Applicable | These requirements are potentially applicable for determining whether waste is hazardous. |
| **Toxic Substances Control Act (15 USC, Chapter 53, §§ 2601–2692)[b]** | | | | |
| This act regulates the storage and disposal of PCB remediation waste. There are three options: (a) self-implementing on-site cleanup and disposal; (b) performance-based disposal using existing approved disposal technologies; and (c) risk-based disposal. This act is applicable to soils, debris, sludge, or dredged materials contaminated with PCBs at concentrations greater than 50 ppm. | Soils, debris, sludge, or dredged materials contaminated with PCBs at concentrations greater than 50 ppm. | 40 CFR § 761.61(a)(4)(i)<br>40 CFR § 761.61(c)(2) | Applicable and relevant and appropriate | This section is applicable for soil contaminated with PCBs at concentrations greater than 50 ppm. This section is relevant and appropriate for soil contaminated with PCBs at concentrations less than 50 ppm. |

Notes:

a Only the substantive provisions of the requirements cited in this table are potential ARARs.

b Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as potential ARARs; specific potential ARARs are addressed in the table below each general heading; only pertinent substantive requirements of specific citations are considered potential ARARs.

| | | | |
|---|---|---|---|
| § | Section | PCB | Polychlorinated biphenyl |
| ARAR | Applicable or relevant and appropriate requirement | ppm | Part per million |
| Cal. Code Regs. | *California Code of Regulations* | PW | Public Works Compound |
| CFR | *Code of Federal Regulations* | RCRA | Resource Conservation and Recovery Act |
| HVSSA | High Voltage Shop Storage Area | TCLP | Toxicity characteristic leaching procedure |
| Navy | U.S. Department of the Navy | USC | *United States Code* |
| NAWS | Naval Air Weapons Station | | |

**TABLE C-3: POTENTIAL FEDERAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Action | Requirement | Prerequisite | Citation[a] | Preliminary ARAR Determination | Comments |
|---|---|---|---|---|---|
| **Excavation and Temporary Storage of Soil** | | | | | |
| **Resource Conservation and Recovery Act (42 USC, Chapter 82, §§ 6901-6991[i])[b]** | | | | | |
| Generate waste | Definition of RCRA hazardous waste | Soil and water | Cal. Code Regs. Title 22, §§ 66262.10(a), 66262.11 | Applicable | These requirements are potentially applicable to all alternatives for determining whether waste generated in conjunction with the removal action meets the definition of RCRA hazardous waste. |
| Closure of temporary waste pile | Closure and post-closure care of waste piles | RCRA hazardous waste pile | Cal. Code Regs. Title 22, § 66254.258(a) and (b) | Applicable | The Navy will identify the substantive provision of this requirement as a potential federal action-specific ARAR for closing the temporary waste pile used to store excavated soil. |
| Closure standard | The owner or operator shall close the facility in a manner that: (a) minimizes the need for further maintenance and (b) controls to the extent necessary to protect human health and the environment post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated rainfall or run-off, or waste decomposition products. | RCRA hazardous waste facility | Cal. Code Regs. Title 22, § 66264.111 | Applicable | The Navy will identify the substantive provisions of this regulation as potential federal action-specific ARARs for closing the temporary waste pile used to store excavated soil. |

**TABLE C-3: POTENTIAL FEDERAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Action | Requirement | Prerequisite | Citation[a] | Preliminary ARAR Determination | Comments |
|---|---|---|---|---|---|
| **Excavation and Temporary Storage of Soil (Continued)** | | | | | |
| **Toxic Substances Control Act (15 USC, Chapter 53, §§ 2601–2692)[b]** | | | | | |
| Store excavated soil at the site prior to off-site disposal | Bulk PCB remediation waste may be stored at the cleanup site or site of generation for 180 days subject to the certain dispersion control, decompositions, liner, cover, and run-on requirements. | PCB remediation waste with as found PCB concentrations of 50 ppm or greater | 40 CFR § 761.65(c)(9) | Applicable and relevant and appropriate | These requirements are potentially applicable to all alternatives for storing the excavated soil and other waste generated in the performance of this removal action that contains PCBs at concentrations of 50 ppm or greater. These requirements are relevant and appropriate for storing excavated soil and other waste that contains PCB concentrations less than 50 ppm. |
| **Clean Air Act (42 USC § 7401 et seq.)[b]** | | | | | |
| Excavate soil | Prohibits fugitive dust emissions from any active operation to remain visible in the atmosphere beyond the property line of the emission source and requires one or more reasonably available control measures to minimize fugitive dust emissions from each fugitive dust source. Reasonably available control measures for earth-moving and open storage piles include wind screens, enclosures around storage piles, and dust suppressants. Reasonably available control measures for disturbed surface areas include fences and barriers, vegetation, dust suppressants, gravel, and compaction. | Fugitive dust emission from a fugitive dust source in an active operation. | KCAPCD Rule Number 402 | Applicable | This requirement is potentially applicable to all alternatives for excavating and stockpiling the soil. |

**TABLE C-3: POTENTIAL FEDERAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Action | Requirement | Prerequisite | Citation[a] | Preliminary ARAR Determination | Comments |
|---|---|---|---|---|---|
| **Cover Soil** | | | | | |
| **Toxic Substances Control Act (15 U.S.C §§ 2601-2692)[b]** | | | | | |
| Construct cover | A uniform placement of concrete, asphalt, or similar material of minimum thickness to prevent or minimize human and ecological exposure, infiltration of water, and erosion. A cover of compacted soil shall have a minimum thickness of 10 inches. A concrete or asphalt cover shall have a minimum thickness of 6 inches. The cover must comply with the permeability, sieve, liquid limit, and plasticity index requirements in § 761.75(b)(1)(ii) through (b)(1)(v). A cover must be of sufficient strength to maintain its effectiveness and integrity during the use of the cover surface which is exposed to the environment. A cover shall not be contaminated at a level ≥1 ppm PCB per AroclorTM (or equivalent) or per congener. | PCB remediation waste with as found concentrations of PCB concentrations of 50 ppm or greater | 40 CFR §761.61(a)(7) | Applicable and relevant and appropriate | These requirements are ARARs for Alternative 2. These requirements are applicable to soil containing as found concentrations of PCBs at concentrations of 50 ppm or greater and are relevant and appropriate to soil containing as found concentrations of PCBs less than 50 ppm. |

**TABLE C-3: POTENTIAL FEDERAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Action | Requirement | Prerequisite | Citation[a] | Preliminary ARAR Determination | Comments |
|---|---|---|---|---|---|
| **Cover Soil (Continued)** | | | | | |
| **Toxic Substances Control Act (15 U.S.C §§ 2601-2692)[b] (Continued)** | | | | | |
| Construct cover | Permeability, sieve, liquid limit, and plasticity index requirements. | PCB remediation waste with as found concentrations of PCB concentrations of 50 ppm or greater | 40 CFR § 761.75(b)(1)(ii) through (b)(1)(v) | Applicable and relevant and appropriate | These requirements are ARARs for Alternative 2. These requirements are applicable to soil containing as found concentrations of PCBs at concentrations of 50 ppm or greater and are relevant and appropriate to soil containing as found concentrations of PCBs less than 50 ppm. |
| **Resource Conservation and Recovery Act (42 U.S.C. §§ 6901-6991[i])[b]** | | | | | |
| Construct cover | Construct a cover that: a) prevents the downward entry of water throughout a period of at least 100 years; b) functions with minimum maintenance; c) promotes drainage and minimizes erosion or abrasion of the cover; d) accommodates settling and subsidence so that the cover's integrity is maintained; and e) Accommodates lateral and vertical shear forces generated by the maximum credible earthquake so that the integrity of the cover is maintained. | PCB remediation waste with as found concentrations of PCB concentrations of 50 ppm or greater | Cal. Code Regs. Title 22, § 66264.310(a)(1) through (a)(5) | Applicable and relevant and appropriate | These requirements are ARARs for Alternative 2. These requirements are applicable to soil containing as found concentrations of PCBs at concentrations of 50 ppm or greater and are relevant and appropriate to soil containing as found concentrations of PCBs less than 50 ppm. |

**TABLE C-3: POTENTIAL FEDERAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**
Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Action | Requirement | Prerequisite | Citation[a] | Preliminary ARAR Determination | Comments |
|---|---|---|---|---|---|
| | | | **Cover Soil (Continued)** | | |
| **Clean Air Act (42 U.S.C. §§ 7401-7671)[b]** | | | | | |
| Construct a cover | Prohibits fugitive dust emissions from any active operation to remain visible in the atmosphere beyond the property line of the emission source and requires one or more reasonably available control measures to minimize fugitive dust emissions from each fugitive dust source. Reasonably available control measures for construction include wind breaks and dust suppressants. | Fugitive dust emission from a fugitive dust source in an active operation. | KCAPCD Regulation 401, 402, 404.1 | Applicable | This requirement is applicable to the construction of the cover. |

Notes:
a Only the substantive provisions of the requirements cited in this table are potential ARARs.
b Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as potential ARARs; specific potential ARARs are addressed in the table below each general heading; only substantive requirements of specific citations are considered potential ARARs

| | | | |
|---|---|---|---|
| § | Section | NAWS | Naval Air Weapons Station |
| ARAR | Applicable or relevant and appropriate requirement | PCB | Polychlorinated biphenyl |
| Cal. Code Regs. | California Code of Regulations | ppm | Part per million |
| CFR | Code of Federal Regulations | PW | Public Works Compound |
| HVSSA | High Voltage Shop Storage Area | RCRA | Resource Conservation and Recovery Act |
| KCAPCD | Kern County Air Pollution Control District | USC | *United States Code* |
| Navy | U.S. Department of the Navy | | |

## APPENDIX D
## RISK-BASED CLEANUP GOALS CALCULATIONS

## TABLE D-1: RISK-BASED CLEANUP GOALS CALCULATIONS FOR PCBS

Engineering Evaluation/Cost Analysis, Non-Time Critical Removal Action, PW Transformer Storage Pit and HVSSA, NAWS China Lake, Ridgecrest, CA

| Scenario | Assumptions | Rational | | |
|---|---|---|---|---|
| 1 | Target Cancer Risk = 10-6, Exposure Frequency = 250 days per year | Used equation in Region 9 PRG guidance (EPA 2004a) | Cleanup Goal = (mg/kg) | TR x BW x AT/(EF x ED((IRS x CSF x MCF)+(SA x AF x ABS x SFx MCF)+(IR x SF/PEF))) |
| | | (Industrial PRG) | Cleanup Goal = (mg/kg) | 0.74 |
| 2 | Target Cancer Risk = 10-5, Exposure Frequency = 250 days per year | Used equation in Region 9 PRG guidance (EPA 2004a) | Cleanup Goal = (mg/kg) | TR x BW x AT/(EF x ED((IRS x CSF x MCF)+(SA x AF x ABS x SFx MCF)+(IR x SF/PEF))) |
| | | | Cleanup Goal = (mg/kg) | 7.4 |
| 3 | Target Cancer Risk = 10-6, Exposure Frequency = 335 hours per year | TSCA low-occupancy criterion | Cleanup Goal = (mg/kg) | TR x BW x AT/(EF x CF x ED((IRS x CSF x MCF)+(SA x AF x ABS x SFx MCF)+(IR x |
| | | | Cleanup Goal = (mg/kg) | 13.3 |
| 4 | Target Cancer Risk = 10-5, Exposure Frequency = 335 hours per year | TSCA low-occupancy criterion | Cleanup Goal = (mg/kg) | TR x BW x AT/(EF x CF x ED((IRS x CSF x MCF)+(SA x AF x ABS x SFx MCF)+(IR x |
| | | | Cleanup Goal = (mg/kg) | 133 |

| Parameter Codes | Parameter Definitions | Values | Units | Rational/References |
|---|---|---|---|---|
| TR | Target cancer risk | Scenario-specific | unitless | Site-specific |
| BW | Body Weight | 70 | kg | EPA 1991 |
| AT | Averaging Time - Cancer | 25,550 | days | EPA 1989 |
| EF | Exposure Frequency | Scenario-specific | days per year | Site-specific |
| CF | Conversion factor | 1/24 | day/hours | Not applicable |
| ED | Exposure Duration | 25 | years | EPA 1991, DTSC 2005 |
| IRS | Ingestion Rate - Soil | 100 | mg/day | EPA 2004a, DTSC 2005 |
| SF | Oral and inhalation Slope Factor | 2.0 | $(mg/kg\text{-}day)^{-1}$ | EPA 2007 |
| MCF | Mass Conversion Factor | 1E-06 | kg/mg | Not applicable |
| SA | Exposed Skin Surface Area | 3,300 | $cm^2$ | EPA 2004c |
| AF | Soil to Skin Adherence Factor | 0.2 | $mg/cm^2$ | DTSC 2000, DTSC 2005 |
| ABS | ABS | 0.14 | unitless | EPA 2004c |
| InhR | Inhalation Rate | 20 | $m^3/day$ | DTSC 2005 |
| PEF | Particulate emission factor | 1.316x10˝ | m˝/kg | DTSC 2005 |

**Definitions:**

| | | | | | |
|---|---|---|---|---|---|
| cm˂ | Square centimeter | kg | Kilogram | mg/kg | Milligram per kilogram |
| days/year | Day per year | kg/mg | Kilogram per milligram | m˃/day | Cubic meter of air per day |
| DTSC | Department of Toxic Substances Control | mg/cm˂ | Milligram per square centimeter | m˃/kg | Cubic meter of air per kg soil |
| EPA | U.S. Environmental Protection Agency | mg/day | Milligram per day | PEF | Particulate emission factor |

**References:**


DTSC. 2000. Draft Memorandum Regarding the Guidance for the Dermal Exposure Pathway

DTSC. 2005. Recommended DTSC Default Exposure Factors for Use in Risk Assesment at California Military Facilities

EPA. 1989. EPA RAGS Part A

EPA. 1991. Standard Default Exposure Factors

EPA. 2004a. Region 9 PRG Table

EPA. 2004b. EPA RAGS Part E

EPA. 2004c. Human Heatlh Evaluation Manual

EPA. 2007. IRIS