Record of Decision,
Five Transformer Sites
(Bldg 3, Bldg 106, S-17, Bldg 81 & S-26)

NAVAL COMPUTER AND TELECOMMUNICATIONS AREA MASTER STATION PACIFIC
OAHU, HAWAII

December 2010

Department of the Navy
Naval Facilities Engineering Command, Hawaii
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NAVFAC
Naval Facilities Engineering Command
NAVFAC HAWAII

CONTENTS

ACRONYMS AND ABBREVIATIONS

40 CFR	Title 40 Code of Federal Regulations
µg/100 cm^2	microgram per 100 square centimeters
AM	action memorandum
AR	Administrative Record
ARAR	applicable or relevant and appropriate requirement
ASTM	American Society for Testing and Materials
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSM	conceptual site model
cy	cubic yard
DoD	Department of Defense
DOH	Department of Health, State of Hawaii
DON	Department of the Navy
Earth Tech	Earth Tech, Inc.
EE/CA	engineering evaluation/cost analysis
EPA	U.S. Environmental Protection Agency
LUC	land use control
mg/kg	milligram per kilogram
msl	mean sea level
NAS	Naval Air Station
NAVFAC PAC	Naval Facilities Pacific
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NCTAMSPAC	Naval Computer and Telecommunications Area Master Station Pacific
NPL	National Priorities List
NRTF	Naval Radio Transmitting Facility
NTCRA	non-time critical removal action
PCB	polychlorinated biphenyl
PHNC	Pearl Harbor Naval Complex
ppm	parts per million
PRC	PRC Environmental Management, Inc.
PWC	Public Works Center
RAB	Restoration Advisory Board
RAWP	Remedial Action Work Plan
ROD	record of decision
RSE	removal site evaluation
RVR	remediation verification report
SAL	soil action level
SARA	Superfund Amendments and Reauthorization Act
TBC	to-be-considered
TSCA	Toxic Substances Control Act
U.S.C.	United States Code

1. Declaration

1.1 SITE NAME AND LOCATION

This record of decision (ROD) has been prepared for five transformer sites at Naval Computer and Telecommunications Area Master Station Pacific (NCTAMSPAC) located on Oahu, Hawaii. NCTAMSPAC operates at several locations around the island of Oahu, including NCTAMSPAC Wahiawa Branch and Naval Radio Transmitting Facility (NRTF) Lualualei (see Figure 1), which are the subjects of this ROD.

Three transformer sites are located at NCTAMSPAC Wahiawa Branch, Oahu, Hawaii:

- Building 3
- Building 106
- S-17

Two transformer sites are located at NRTF Lualualei, Oahu, Hawaii:

- Building 81
- S-26

The U.S. Navy completed Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) non-time-critical removal actions (NTCRA) at these five transformer sites. NCTAMSPAC is currently on the National Priorities List (NPL) maintained by the U.S. Environmental Protection Agency (EPA) (Comprehensive Environmental Response, Compensation and Liability Information System Identification Number HI0170090054) and was listed on the NPL on May 31, 1994.

1.2 STATEMENT OF BASIS AND PURPOSE

This ROD presents the selected final remedy for the five transformer sites at NCTAMSPAC, which was chosen in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA), and to the extent practicable the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Information supporting the decisions leading to the selected final remedy is contained in the Administrative Record (AR) files for these sites. The Navy and EPA, with concurrence by the State of Hawaii Department of Health (DOH), select land use controls (LUC) as the final remedy for these five transformer sites. Concurrence with this selected final remedy is indicated by the signatures in Section 1.7.

This ROD incorporates elements of a streamlined remedial action completion report, as described in the *Department of Defense (DoD)/EPA Joint Guidance on Streamlined Closeout and NPL Deletion Process* (DoD 2006) and Department of the Navy (DON) *Guidance to Documenting Milestones throughout the Site Closeout Process* (DON 2006a) (see Attachment A).

1.3 ASSESSMENT OF SITE

The selected final remedy in this ROD is necessary to protect human health and the environment from actual or potential releases of hazardous substances present in surface and subsurface soils and concrete at the five transformer sites at NCTAMSPAC.

1.4 DESCRIPTION OF THE SELECTED REMEDY

The Navy and EPA, with concurrence from DOH, have selected LUCs as the final remedy for the five transformer sites located at NCTAMSPAC. The final response action described in this document was developed in accordance with CERCLA and includes LUCs that will protect human health and the environment at these five sites. The elements of the selected final remedy include the following:

- Administering LUCs to restrict land use to low-occupancy use only, and to ensure long-term viability of the final remedy. The elements of the selected remedy will be detailed in the Remedial Action Work Plan (RAWP) to be submitted to the regulatory agencies within 90 days of the ROD signature date.

This decision is based on the following:

- CERCLA NTCRAs were previously conducted at Building 106, S-17, Building 81, and S-26, consisting of excavation and on-island thermal desorption treatment of polychlorinated biphenyls (PCB)-contaminated soil and concrete. A separate CERCLA NTRA was also previously conducted at Building 3, consisting of excavation and disposal of PCB-contaminated soil at an off-island landfill. The NTCRAs implemented are consistent with the objectives of the final remedy presented in the proposed plan (DON 2006b) and are thus incorporated in the final remedy selected for the five transformer sites documented in this ROD.
- The action memorandum (AM) (DON 1999) documented the Navy's decision to undertake NTCRAs if PCB concentrations in soil or concrete exceeded the Toxic Substances Control Act (TSCA) high-occupancy cleanup level (≤ 1 milligram per kilogram [mg/kg] for soil and ≤ 10 micrograms per 100 square centimeters [10 µg/100 cm^2] for concrete) found at Title 40 Code of Federal Regulations (40 CFR) 761.61(a)(4) and the DOH Tier 1 soil action level (SAL) (1 mg/kg) for unrestricted use (DOH 2005) after confirmation sampling. The TSCA high-occupancy cleanup level (≤ 1 mg/kg) is an "applicable or relevant and appropriate requirement" (ARAR), and the DOH Tier 1 SAL (1 mg/kg) is a "to-be-considered" (TBC) criterion for the response actions completed at these sites.
- Post-excavation confirmation sampling results after the NTCRAs show that PCBs at five transformer sites remain in the soil and concrete at concentrations above TSCA high-occupancy cleanup levels and the DOH Tier 1 SAL that allow for unrestricted use.

Table 1 lists the land use access requirements under TSCA as related to the remaining concentrations of PCBs in contaminated media.

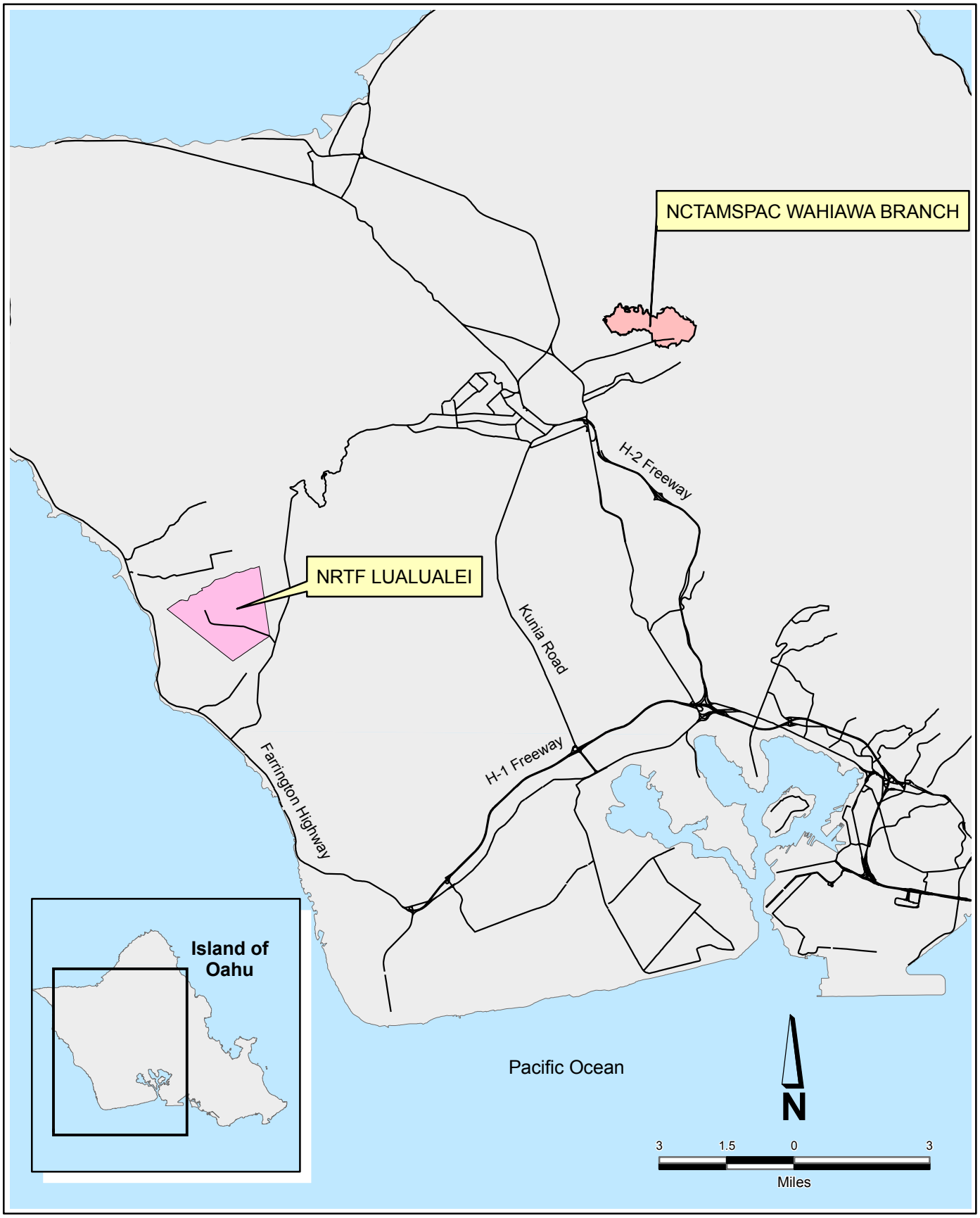


Figure 1
Facility Location Map
NCTAMSPAC Wahiawa Branch
and NRTF Lualualei
NCTAMSPAC, Oahu, Hawaii

Table 1: TSCA Land Use Access Requirements for PCBs

PCB Concentration	Medium	Cap Required?	LUCs Required?	Occupancy Status
≤ 1 ppm	Bulk Waste	No	No	High
> 1ppm and ≤ 10 ppm	Bulk Waste	Yes	Yes, to maintain cap	High
> 1 ppm and ≤ 25 ppm	Bulk Waste	No	Yes, to restrict occupancy	Low
> 25 ppm and ≤ 50 ppm	Bulk Waste	No	Yes, to restrict occupancy	None (Fenced and Signed)
> 25 ppm and ≤ 100 ppm	Bulk Waste	Yes	Yes, to maintain cap and restrict occupancy	Low
≤ 10 µg/100 cm^2	Non-porous Surface	NA	No	High
< 100 µg/100 cm^2	Non-porous Surface	NA	Yes, to restrict occupancy	Low
> 10 µg/100 cm^2	Porous Surface	NA	Yes, to maintain surface coating	See requirements at 40 CFR § 761.30(p)
≤ 10 µg/100 cm^2	Porous Surface	NA	Yes	High

Notes:
CFR = Code of Federal Regulations
cm^2 = centimeters squared
ppm = parts per million
µg = micrograms
NA = not applicable
§ = section

LUCs being implemented as the final remedy at these five transformer sites are to restrict current and future land use to activities compatible with low-occupancy use and to ensure long-term viability of the final remedy. Under TSCA, remediation sites fall into two categories: low-occupancy areas and high-occupancy areas. In terms of frequency of occupation, a low-occupancy area limits occupancy for any individual who is not wearing dermal and respiratory protection to less than 335 hours per calendar year for porous surfaces. Both soil and concrete are considered porous surfaces; thus, access would be restricted to approximately 6.7 hours per week or less under the low-occupancy scenario. Examples of a low-occupancy area could include an electrical substation 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). High occupancy means areas where occupancy for any individual who is not wearing dermal and respiratory protection exceeds the time limits specified for low occupancy. Examples of a high-occupancy area could include: a residence, school, day care center, sleeping quarters, a single or multiple occupancy 40 hours per week work station, a school classroom, a cafeteria in an industrial facility, a control room, or a work station at an assembly line.

LUCs for these sites will remain in effect until a ROD amendment or other documentation is prepared based on an intent to change land use. The Department of Defense and the State of Hawaii have agreed that a LUC under the Uniform Environmental Covenants Act is not required until property transfer; however the Navy will prepare an overall Land Use Control Implementation Plan identifying all LUC remedies at these sites. Therefore, specific information on implementation of these LUCs will be provided in a RAWP, submitted as a separate document. The final selected remedy is described in Section 2.12.

This decision is supported by documents in the AR file for NCTAMSPAC. The Restoration Advisory Board (RAB), composed of representatives of the DOH, EPA, Navy, and the community, provided review and comment leading to the selection of this decision.

1.5 STATUTORY DETERMINATIONS

The Navy is the lead agency for environmental cleanup at NCTAMSPAC pursuant to Executive Order 12580, which authorizes the Navy to conduct CERCLA response actions such as the removal of PCB-contaminated soil and concrete or concrete cleaning and encapsulation at NCTAMSPAC in accordance with CERCLA Section 120, 42 U.S.C. Section 9620. Pursuant to Title 10 of U.S.C. Section 2705, the EPA and DOH are afforded an opportunity for timely review and comment before the Navy undertakes a removal action, and CERCLA Section 120, 42 U.S.C. Section 9620 provides for the joint selection of remedial actions by the Navy and EPA. The DOH has also provided oversight during the environmental investigations and cleanup activities on NCTAMSPAC.

The Navy and EPA jointly have concluded that LUCs are the final remedy necessary to ensure protection of human health at Building 3, Building 106, and S-17, located at NCTAMSPAC Wahiawa Branch, and at Building 81 and S-26, located at NRTF Lualualei. The selected final remedy is protective of human health and the environment, complies with federal requirements that are applicable or relevant and appropriate, is cost effective, and uses to the maximum extent practicable permanent and alternative technologies.

This decision was reached because residual PCB concentrations in soil and concrete at these sites exceed the TSCA high-occupancy action level ($\leq$ 1 mg/kg for soil and $\leq$ 10 µg/100 cm^2 for concrete) and the DOH Tier 1 SAL (1 mg/kg) for unrestricted use (DOH 2005). In an effort to achieve the TSCA cleanup levels for concrete, concrete cleaning (power-washing or solvent extraction) was conducted at S-17 and S-26. Per TSCA, cleanup of concrete was verified by comparing results for bulk concrete samples with the TSCA action level of $\leq$ 1 mg/kg. The TSCA high-occupancy action level ($\leq$ 1 mg/kg) is an ARAR, and the DOH Tier 1 SAL (1 mg/kg) is a TBC criterion for the response action completed at these sites. The removal and treatment of contaminated soil and concrete has already been completed at these sites. Through the NTCRAs at the five transformer sites, the toxicity, volume, and mobility of PCBs were reduced by excavating the contaminated media, and then treating the excavated media by thermal desorption; however, some residual PCB contamination remains in place. For those sites where the residual levels exceed the TSCA requirements for low-occupancy use ($\leq$ 25 ppm), a clean, backfilled soil cap and vegetation or concrete encapsulation (concrete encapsulation at S-17 only) was placed over the remaining PCB contamination. Table 1 provides detailed information on the specific TSCA requirements. The NTCRAs are consistent with cleanup objectives to provide a permanent cost-effective remedy for contaminated soils and concrete, and permanently and significantly reduce the mobility of hazardous wastes, thereby reducing the risk to human health and the environment. The NTCRAs and treatment satisfy the statutory preference for treatment as a principal element of the remedy.

This final remedy allows hazardous substances, pollutants, or contaminants to remain on site at concentrations above levels that allow for unlimited use and unrestricted exposure. As a result, a statutory review will be conducted every five years after initiation of the selected final remedy, as required under CERCLA Section 121(c), 42 U.S.C. Section 9621(c), and the NCP [40 CFR Section 300.430(f)(4)(ii)]. The Five-Year Reviews will be performed to ensure that the LUCs remain protective of human health and the environment.

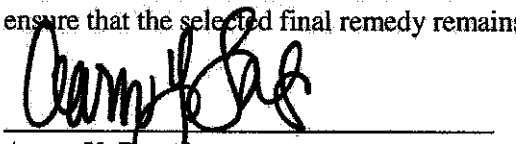
1.6 DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD (Section 2). Additional information can be found in the AR file for these five transformer sites.

- Summary of soil and concrete sampling results where cleanup levels were not achieved (Section 2.5.4)
- Current and reasonably anticipated future land use assumptions used in the ROD (Section 2.6)
- Potential land use that will be available at the site as a result of the selected final remedy (Section 2.6.2)
- Summary of site risks (Section 2.7)
- How source materials constituting principal threat are addressed (Section 2.11)
- Key factors that led to selecting the final remedy (Section 2.12.1)
- Estimated cost for annual inspections and maintenance (if necessary) and 5-year reviews, and the total number of years over which the remedy cost estimates are projected (Section 2.12.4)

1.7 AUTHORIZING SIGNATURES

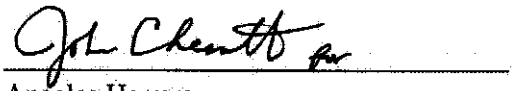
The Navy and EPA, with concurrence from DOH, have concluded that LUCs are protective of human health and the environment. These LUCS will be implemented at Building 3, Building 106 and S-17 located at NCTAMSPAC Wahiawa Branch and Building 81 and S-26 located at NRTF Lualualei. In accordance with CERCLA requirements, Five-Year Reviews will be necessary to ensure that the selected final remedy remains protective of human health and the environment.



12/02/10

Aaron Y. Poentis
Regional Environmental Program Manager
By direction of
Commander, Navy Region Hawaii

Date

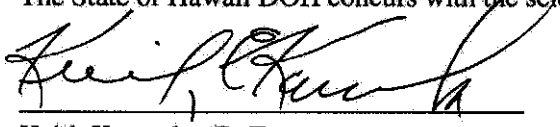


12/22/10

Angeles Herrera
Acting Assistant Director, Federal Facilities and Site Cleanup Branch
U.S. Environmental Protection Agency, Region 9

Date

The State of Hawaii DOH concurs with the selected remedy as documented in the ROD.



3-30-11

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State of Hawaii, Department of Health

Date

2. Decision Summary

2.1 SITE NAME, LOCATION, AND DESCRIPTION

NCTAMSPAC operates at several locations around the island of Oahu. Only NCTAMSPAC Wahiawa Branch and NRTF Lualualei are the subjects of this ROD.

NCTAMSPAC Wahiawa Branch occupies 700 acres on the central plateau of Oahu, west of the Koolau Mountains. It is located near the Town of Wahiawa. Land use around the facility is primarily agricultural for pineapple cultivation. Three transformer sites are located at this installation (see Figure 2):

- **Building 3:** An active transformer site located in the south-central section of the facility near the intersection of Center Street and Tarawa Drive. This site includes the area outside of Building 3, consisting of concrete and grass.
- **Building 106:** An active transformer site located southeast of and adjacent to Building 106 along Saipan Drive on the western side of NCTAMS Wahiawa. The site includes Building 106 and the surrounding asphalt.
- **S-17:** An inactive site formerly located in a mostly level, grassy field along the south side of Polaris Drive, near the center of NCTAMS Wahiawa. The site included an underground vault where access was provided by a subsurface tunnel located near Polaris Drive. The vault has been filled with concrete.

NRTF Lualualei occupies 1,700 acres within Lualualei Valley, near the southwest shore of Oahu. Two transformer sites are located at this installation (see Figure 3).

- **Building 81:** An active transformer site located near the center of the installation, north of Edison Road. This site includes Building 81 and the surrounding grass, concrete, and asphalt.
- **S-26:** An active transformer site located near a former residential area in the west-central portion of NRTF Lualualei and adjacent to Building 404. The site includes a fenced area and surrounding concrete.

Previous investigations identified a potential for the five transformer sites to impact the environment, resulting in unacceptable risk to human health and the environment. PCB-contaminated soil and concrete were found at elevated levels and needed to be removed. The threat of exposure to PCBs warranted action. The Navy served as the lead agency for all of the aforementioned investigations conducted at the NCTAMSPAC. Throughout these investigations additional support and oversight was provided by the EPA and DOH. Navy funds provided the monies used to conduct the cleanup and removal actions at the five NCTAMSPAC transformer sites.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

Available historical records at NCTAMSPAC indicate PCBs were present in the dielectric fluid used in many of the former and existing transformers at NCTAMSPAC Wahiawa Branch and at NRTF Lualualei. The PCB-containing fluids may have been released to concrete surfaces or surface soil by leaking directly from the transformers or during regular transformer testing and maintenance. Periodic sampling was required to test the dielectric properties of the transformer fluid during their operation. Once testing was completed, the fluid was reportedly poured onto the adjacent area, such as grass, concrete pads, or along building walls. All of the active transformers at NCTAMSPAC have been replaced or retrofilled with non-PCB-containing dielectric fluid.

2.2.1 Site History

Table 2 provides a summary of all of the previous investigations completed at NCTAMSPAC and indicates which of the five transformer sites was included in each investigation or activity. Additional information on the final actions completed for the five transformer sites at NCTAMSPAC is provided below:

Remediation Verification Report (RVR). NTCRAs were performed from 1999 to 2004. RVRs were prepared to document the NTCRAs and verification sampling results for transformer sites. Sixty-three transformer sites achieved the cleanup levels (Earth Tech 2008a, ECC 2007), as established in the AM (DON 2002) and in accordance with the TSCA high-occupancy action level (≤ 1 mg/kg for soil and ≤ 10 µg/100 cm^2 for concrete) and the DOH Tier 1 SAL (1 mg/kg) and are safe for future unrestricted land use.

However, LUCs are necessary for protection of human health and the environment for five transformer sites at NCTAMSPAC where cleanup levels were not met after contaminated soil was excavated and concrete was encapsulated.

Proposed Plan. In June 2006, a proposed plan was prepared to present the recommended final remedy for 70 individual transformer sites from two installations on Oahu, NCTAMS PAC and Pearl Harbor Naval Complex (PHNC). The proposed plan recommended no further action for 54 of the 70 sites (DON 2006b). The Navy and EPA selected no further action for 52 of the 54 of the transformer sites initially proposed for no further action in the proposed plan. Two of the PHNC transformer sites previously identified in the proposed plan as no further action sites now require further evaluation.

The proposed plan identified a response action consisting of removal and treatment of soil and concrete along with the implementation of LUCs to address human health risks as the proposed final remedy for seven transformer sites at NCTAMSPAC (Building 3, Building 106, Building 121, Building 242, and S-17 at NCTAMSPAC Wahiawa Branch, and Building 81 and S-26 at NRTF Lualualei).. Building 121 and Building 242 located at NCTAMS PAC now require further evaluation based on the results of a 2010 risk assessment technical memorandum (ATS 2010), and are not included in this ROD.

2.2.2 Enforcement Activities

No enforcement activities have been conducted at the five transformer sites at NCTAMSPAC, Oahu, Hawaii.

2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION

Public participation in the response action selection process and during the environmental activities at the five transformer sites has been continuously encouraged. In an effort to involve the public in the decision-making process for environmental activities at the five transformer sites, RABs for Central Oahu and Waianae Coast/Lualualei were established in 1996. The RABs are composed of representatives of DOH, EPA, the Navy, and the community. The Navy has held periodic public RAB meetings, issued fact sheets, and established official contacts for the public at Naval Facilities Engineering Command, Hawaii.

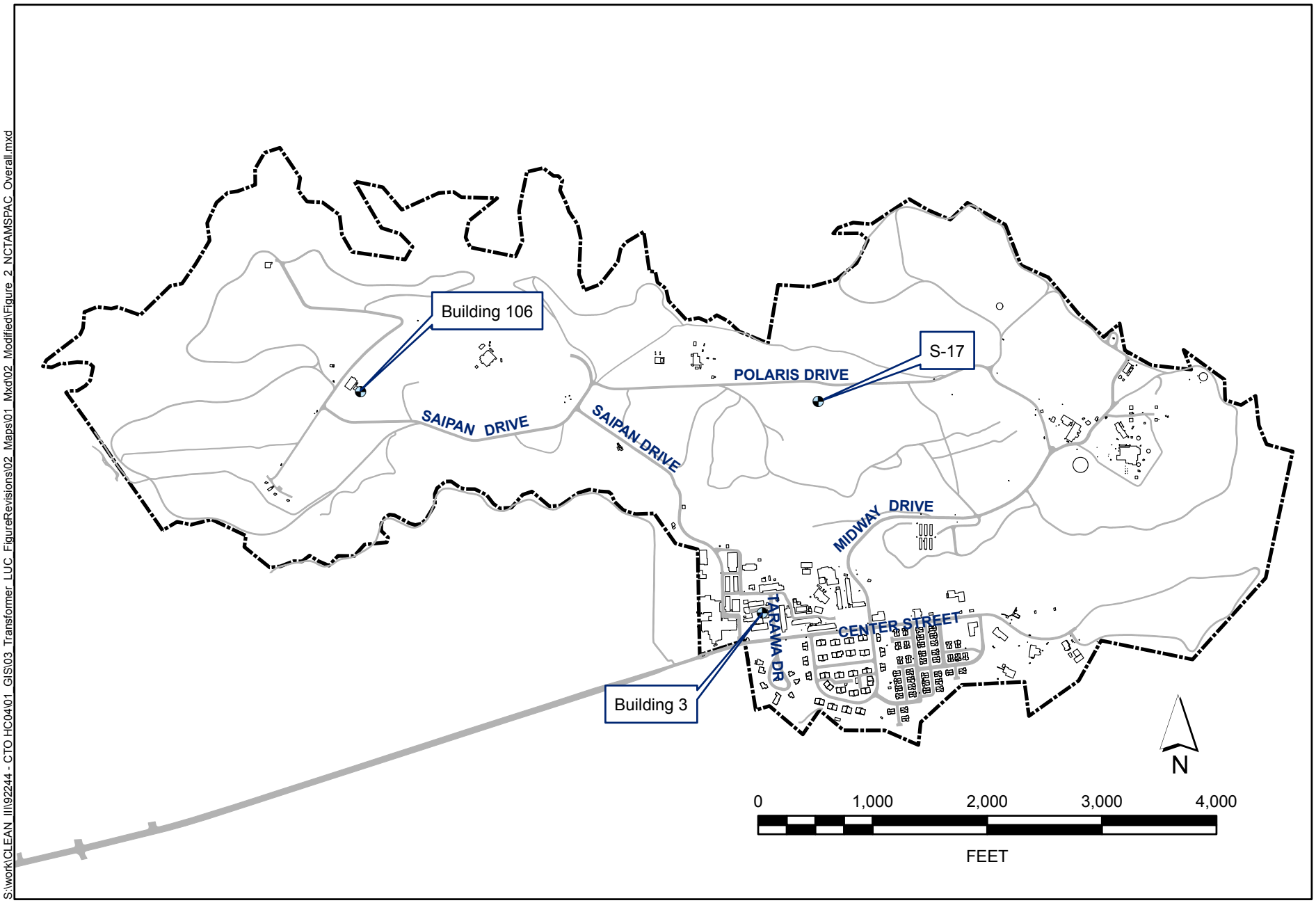


Figure 2
Transformer Site Location Map
NCTAMSPAC Wahiawa Branch
NCTAMSPAC, Oahu, Hawaii

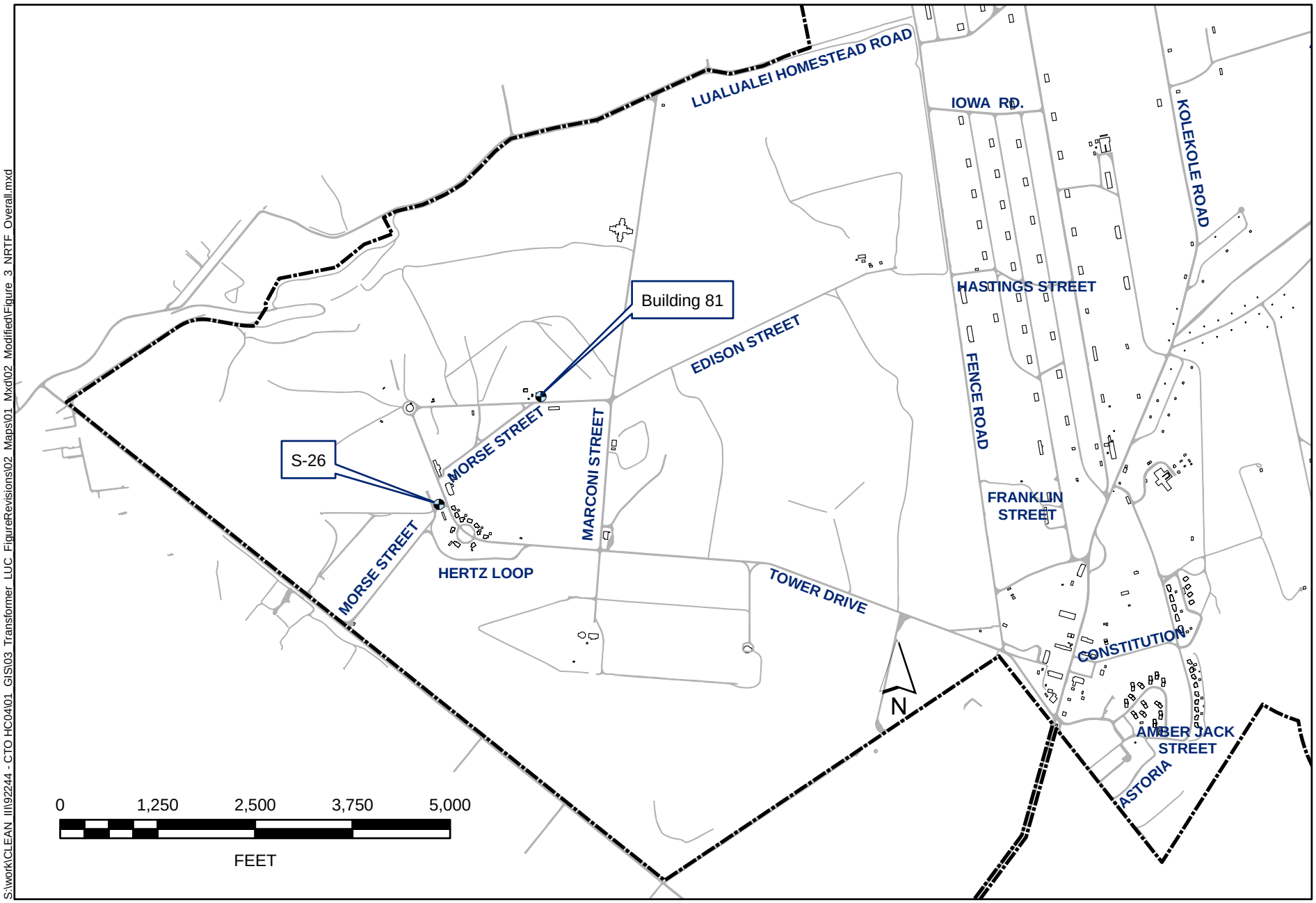


Figure 3
Transformer Site Location Map
NRTF Lualualei
NCTAMSPAC, Oahu, Hawaii

Table 2: Previous Investigations at the NCTAMSPAC

Activity Initiated (Report Issue Date)	Action/Report Title	Primary Focus	NCTAMSPAC LUC ROD Transformer Sites					Summary of Previous Investigations
			Bldg. 3	Bldg. 106	S-17	Bldg. 81	S-26	
1986 (NEESA 1986)	Initial Assessment Study (IAS) of Naval Communication Area Master Station, Eastern Pacific Area, Oahu, Hawaii.	Inspections of sites with past maintenance practices	X	X		X	X	An IAS was conducted by NEESA at NCTAMSPAC. This IAS identified 25 transformer locations requiring further investigation based on past maintenance practices; however, the IAS did not include sampling. Building 3 and Building 106 at NCTAMSPAC Wahiawa Branch and Building 81 and S-26 at NRTF Lualualei were included in the IAS (NEESA 1986).
1989 (HLA 1989)	Site Inspection (SI) Report Naval Communication Area Master Station Eastern Pacific Area, Wahiawa, Oahu.	Site inspection of transformer locations and identification of sites needing further evaluation	X	X		X	X	An SI was conducted for transformer sites at NCTAMSPAC Wahiawa Branch and NRTF Lualualei identified in the IAS report. Soil samples were collected from the transformer locations to assess the extent of PCB contamination. Elevated PCB concentrations were detected in soil samples from all transformer locations. Building 3, Building 106, S-26, and Building 81 were identified for further evaluation (HLA 1989).
1992 (PRC 1992)	NCTAMS EASTPAC Wahiawa, NRTF Lualualei, Removal Action Field Report, Final.	Removal of contaminated soil at 11 transformer locations identified as needing further evaluation	X					A removal action was conducted at 11 transformer locations at NCTAMSPAC Wahiawa Branch identified in the IAS report, including Building 3 (PRC 1992). PCB-contaminated soil was removed from Building 3 and disposed of in an EPA-approved landfill to receive CERCLA wastes on the mainland. Following excavation, confirmation samples were collected to confirm the excavation results. Post-remedial data collected showed that PCB contamination was present above the TSCA high occupancy cleanup level (exceeding 1 mg/kg, but less than 10 mg/kg). Confirmation resampling was conducted in 2004 due to legal action that was taken against one of the analyzing laboratories (Eureka Laboratories, Inc.), which raised concerns over the validity of post-remedial data collected for the 1991 removal action. In association with the removal action field effort for the 11 transformer locations at NCTAMSPAC Wahiawa Branch, further site characterization data was also obtained at Building 106 and S-26.

Table 2: Previous Investigations at the NCTAMSPAC (Continued)

Activity Initiated (Report Issue Date)	Action/Report Title	Primary Focus	NCTAMSPAC LUC ROD Transformer Sites					Summary of Previous Investigations
			Bldg. 3	Bldg. 106	S-17	Bldg. 81	S-26	
1998 (Earth Tech 1998)	Engineering Evaluation/Cost Analysis (EE/CA) for Removal Action PCB Contamination at Various Transformer Locations, NCTAMSPAC, Oahu, Hawaii.	Evaluation of the available alternatives to address the PCB-contaminated soils located at multiple transformer locations		X	X		X	An EE/CA was prepared to evaluate removal action alternatives to address PCB contamination at transformers at NCTAMSPAC (Earth Tech 1998). Of the seven transformer sites presented in the EE/CA, only three transformer sites (Building 106 and S-17 at NCTAMSPAC Wahiawa Branch and S-26 at NRTF Lualualei) are discussed in this ROD. The EE/CA recommended a removal action consisting of excavation of PCB-contaminated soil and concrete and disposal in an off-island landfill.
1999 (DON 1999)	Action Memorandum (AM), Polychlorinated Biphenyl Removal at Various Transformer Locations, Within the Naval Computer and Telecommunications Area Master Station, Pacific, Hawaii.	Documentation from the Navy to approve the removal action at multiple transformer sites		X	X		X	An AM documented the Navy's decision to conduct NTCRAs at the transformer sites (DON 1999).
1998-2000 (Earth Tech 2006a)	Non-time Critical Removal Action (NTCRA)	Excavate and stockpile contaminated soil for future treatment		X	X		X	An NTCRA was conducted for Building 106, S-17, and S-26 from September 1998 to July 2000. The TSCA cleanup level (10 mg/kg) was used at Building 106 and S-17 at NCTAMSPAC Wahiawa Branch since these sites were classified as low-occupancy use areas. S-26 at NRTF Lualualei is located in a high-occupancy use area at NCTAMSPAC Wahiawa Branch; therefore, the TSCA high-occupancy cleanup level (1 mg/kg) was used. A total of 1,628 cubic yards (cy) of PCB-containing soil was excavated from these sites. In an effort to achieve the TSCA concrete cleanup levels, concrete cleaning (power-washing or solvent extraction) was conducted at S-17 and S-26. Per TSCA, cleanup of concrete was verified by comparing results for bulk concrete samples with the TSCA action level of 1 mg/kg. The soil from the transformer sites was stockpiled at NRTF Lualualei until it could be transported to the thermal desorption unit for treatment in 2003 and 2004. The stockpiling of soil and concrete from NCTAMSPAC and NRTF Lualualei was considered "on-site" as it was kept on the same NCTAMSPAC NPL site. In addition, the stockpiling was performed while the effort to consolidate soils for purposes of treatment was being clarified and established. The excavated areas were later backfilled with treated soil from the treatment system that met the unrestricted use cleanup level (1 mg/kg), compacted, and restored (such as landscaping, concrete and asphalt paving) (Earth Tech 2006a).

Table 2: Previous Investigations at the NCTAMSPAC (Continued)

Activity Initiated (Report Issue Date)	Action/Report Title	Primary Focus	NCTAMSPAC LUC ROD Transformer Sites					Summary of Previous Investigations
			Bldg. 3	Bldg. 106	S-17	Bldg. 81	S-26	
2000 (Earth Tech 2000)	EE/CA, Treatment/Disposal Alternatives for Contaminated Soil, NCTAMSPAC, Former NAS Barbers Point, and Pearl Harbor Naval Complex, Oahu, Hawaii.	Evaluation of treatment alternatives for the proposed consolidated contaminated soil from multiple transformer sites located at multiple naval facilities		X		X	X	In 2000, the Navy, in consultation with the EPA and the DOH, determined that soil from multiple transformer sites from multiple naval facilities across Oahu could be consolidated for treatment and this action could be considered an on-site action. Based on this decision, an evaluation of treatment alternatives was conducted within a treatment EE/CA prepared in September 2000 (Earth Tech 2000) for the combined sites. The EE/CA recommended consolidating soils from three facilities (former NAS Barbers Point, PHNC, and NCTAMSPAC) and treating the soil with thermal desorption. Prior to implementation of the treatment process, soil that was already excavated was stockpiled either at former NAS Barbers Point or NRTF Lualualei. Once the treatment process began, these stockpiles were to be transported to the treatment unit located at former NAS Barbers Point.
2000 (DON 2000)	AM, Treatment of Contaminated Soil, NCTAMSPAC, Former NAS Barbers Point and Pearl Harbor Naval Complex, Oahu, Hawaii.	Documentation from the Navy to approve the removal action at multiple transformer sites		X		X	X	An AM (DON 2000) documented the Navy's decision to undertake removal actions at Building 106, Building 81 and S-26. In addition, the AM documented the Navy's proposal to excavate PCB-contaminated soil from various locations, consolidate soils from three facilities (former NAS Barbers Point, PHNC, and NCTAMSPAC) and treat the soil with thermal desorption.
2001 (Earth Tech 2001a)	Building 81 Removal Site Evaluation (RSE), Naval Radio Transmitting Facility, Lualualei, Oahu, Hawaii.	Investigation conducted in order to delineate the nature and extent of soil contamination at Building 81 and identify a response action for the contamination				X		An RSE was conducted at Building 81 at NRTF Lualualei from January through October 2000. The purpose of the RSE was to delineate the nature and extent of soil contamination based on previously established screening criteria presented a risk evaluation based on site contaminants, and proposed a response action based on appropriate cleanup criteria (Earth Tech 2001a). An NTCRA was recommended for Building 81.

Table 2: Previous Investigations at the NCTAMSPAC (Continued)

Activity Initiated (Report Issue Date)	Action/Report Title	Primary Focus	NCTAMSPAC LUC ROD Transformer Sites					Summary of Previous Investigations
			Bldg. 3	Bldg. 106	S-17	Bldg. 81	S-26	
2002 (DON 2002)	AM Addendum for Excavation and Treatment of Contaminated Media from Multiple Naval Facilities, Oahu, Hawaii.	Documentation from the Navy on the approved procedures for excavation, treatment, and final placement of contaminated media at sites not covered in the 2000 action memorandum				X		In 2002, an AM addendum (DON 2002) documented procedures for the excavation, treatment, and final placement of PCB-contaminated soil and concrete from transformer sites that were not originally considered in the 2000 AM (DON 2000) or any of the previous EE/CAs or AMs prepared for former NAS Barbers Point, PHNC, and NCTAMSPAC. Building 81 was identified in this document to undergo an NTCRA (DON 2002). The AM addendum also proposed site selection criteria for new sites that would be remediated using excavation, treatment of contaminated soil, solvent extraction or removal of concrete, and final placement of treated materials in an on-island coral pit because the conditions are consistent with the previous site conditions in the referenced action memoranda (*Department of the Navy. 1999. Action Memorandum, Polychlorinated Biphenyl Removal Action at Various Transformer Sites within the Naval Computer and Telecommunications Area Master Station, Pacific, Hawaii. August; and Department of the Navy. 2000. Action Memorandum, Treatment of Contaminated Soil, NCTAMS PAC, Former NAS Barbers Point, and Pearl Harbor Naval Complex, Oahu, Hawaii. October*.) While the AM addendum presented the general criteria for the inclusion of a site in the removal action, site-specific information of those sites would be included as an attachment to the AM addendum, and thereby "plugged in" to the document. This "plug-in" AM addendum would allow the selection of a protective, presumptive cleanup action (excavation, treatment, and placement) at future PCB transformer sites, provided that the sites meet the selection criteria.
2002 (Earth Tech 2002)	SI Report, Various Transformer Sites, Naval Communication Area Master Station Eastern Pacific Area, Oahu, Hawaii.	Site inspection for PCB contamination at transformer sites at NCTAMSPAC				X		In November and December 2001, an SI was conducted at various transformer locations at NCTAMSPAC, including Building 81 at NRTF Lualualei (Earth Tech 2001b). Based on sampling results that exceeded cleanup levels, Building 81 was recommended for further action (Earth Tech 2002).

Table 2: Previous Investigations at the NCTAMSPAC (Continued)

Activity Initiated (Report Issue Date)	Action/Report Title	Primary Focus	NCTAMSPAC LUC ROD Transformer Sites					Summary of Previous Investigations
			Bldg. 3	Bldg. 106	S-17	Bldg. 81	S-26	
2003 (DON 2003)	AM Attachment II for Excavation and Treatment of Contaminated Media from Multiple Naval Facilities, Oahu, Hawaii.	Documentation from the Navy recommending that new transformer sites undergo removal action				X		In February 2002 and March 2003, a "plug-in" attachment to the AM addendum (DON 2003) was prepared recommending that additional sites, including Building 81 at NRTF Lualualei, undergo an NTCRA consisting of excavation followed by on-island thermal desorption treatment, and transport and placement of treated media back at the excavation sites (DON 2003).
2001 and 2003 (Earth Tech 2001c, 2003a)	Removal Action Design Support and Confirmation Sampling.	Preliminary sampling investigation to support the removal action design efforts at various transformer sites				X		From 2002 to 2004, preliminary sampling was conducted to support design efforts for the removal action at various transformer locations, including Buildings 81 at NRTF Lualualei. Pre-excavation sampling was conducted to define the lateral and vertical extent of PCB contamination in soils at concentrations that exceed the cleanup level (1 mg/kg) before soil excavation and treatment at former NAS Barbers Point (Earth Tech 2001c, 2003a).
2004 (ECC 2007)	NTCRA	Excavate and stockpile contaminated soil for future treatment				X		An additional NTCRA was conducted for Building 81 from April through August 2004. A total of 7,147 cy of PCB-containing soil was excavated from these sites. The soil from the transformer sites was transported directly to the thermal desorption unit for treatment. The excavated area was later backfilled with treated soil from the treatment system that met the unrestricted use cleanup level (1 mg/kg), compacted, and restored (such as landscaping, concrete and asphalt paving) (ECC 2007).

Table 2: Previous Investigations at the NCTAMSPAC (Continued)

Activity Initiated (Report Issue Date)	Action/Report Title	Primary Focus	NCTAMSPAC LUC ROD Transformer Sites					Summary of Previous Investigations
			Bldg. 3	Bldg. 106	S-17	Bldg. 81	S-26	
2005 (Earth Tech 2005)	Laboratory Data Report, Verification and Confirmation Sampling of Nine Transformer Sites, Naval Computer and Telecommunications Area Master Station Wahiawa, Oahu, Hawaii.	Confirmation re-sampling conducted at the transformer sites to use as a comparison for the controversial sampling data obtained from the 1992 removal action	X					A laboratory data report documented the confirmation resampling results (Earth Tech 2005). Based on statistical comparison, the analytical data from the 1991 removal action were valid, and the findings of the removal action were confirmed (Earth Tech 2005). The 2004 confirmation re-sampling results confirmed the findings of the 1991 removal action, which indicated PCB contamination remains at concentrations above the TSCA high occupancy cleanup level (1 mg/kg but less than 10 mg/kg) in an area along the northwestern side of Building 3 adjacent to the concrete stairs and slab and beneath a clean, backfilled soil cap and vegetation.

Notes:
cy = cubic yard
ECC = Environmental Chemical Corporation
EPA = U.S. Environmental Protection Agency
DOH = Department of Health, State of Hawaii
DON = Department of the Navy
Earth Tech = Earth Tech, Inc.
HLA = Harding Lawson Associates
LUC = land use control
mg/kg = milligram per kilogram
NAS = Naval Air Station
NCTAMS = Naval Computer and Telecommunications Area Master Station
NCTAMSPAC = Naval Computer and Telecommunications Area Master Station Pacific
NEESA = Naval Energy and Environmental Support Activity
NRTF = Naval Radio Transmitting Facility
PCB = polychlorinated biphenyl
PHNC = Pearl Harbor Naval Complex
PRC = PRC Environmental Management, Inc.
ROD = record of decision
TSCA = Toxic Substances Control Act

EE/CAs were prepared in 1998 and 2000 (Earth Tech 1998, 2000) and recommended the removal of PCB-contaminated soil and concrete from various transformer sites at Navy installations on Oahu, and consolidation of the material for on-island treatment using indirect thermal desorption treatment to reduce contaminant concentrations. Before they became final, draft EE/CAs were made available to the community for comment during a 30-day public review period. A notice of the availability of the EE/CAs was published in the Honolulu Advertiser and Star Bulletin on September 26, 1997 and July 2, 2000, respectively.

A proposed plan (DON 2006b), identifying a response action consisting of removal and treatment of soil and concrete and implementation of LUCs as the Navy's recommended alternative for the five transformer sites at NCTAMSPAC, was released to the public on June 25, 2006. Public meetings to present and discuss the proposed plan were held on July 20, July 24, and July 25, 2006. A 30-day comment period for the proposed plan was held from June 27, 2006, to July 26, 2006. No written or verbal comments were received during the comment period or public meetings.

Project documents — including work plans, technical reports, fact sheets, and other materials relating to NCTAMSPAC investigations — can be found in the information repositories for NCTAMSPAC at the following locations:

Wahiawa Public Library
820 California Avenue
Wahiawa, Hawaii 96786
Telephone: (808) 622-6345

Waianae Public Library
85-625 Farrington Hwy
Waianae, Hawaii 96792
Telephone: (808) 697-7868

Hamilton Library at the University of Hawaii at Manoa
Gifts and Exchange Section
2550 McCarthy Mall
Honolulu, Hawaii 96822
Telephone: (808) 956-8264

Additional project information is included in the AR file located at Naval Facilities Engineering Command, Pacific (NAVFAC PAC) in Pearl Harbor:

Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Attn: NAVFAC PAC EV4
Pearl Harbor, Hawaii 96860-3134

2.4 SCOPE AND ROLE OF THE RESPONSE-ACTION DECISION

The five transformer sites discussed in this ROD are located at NCTAMSPAC. Removal actions were necessary at Building 3, Building 106 and S-17 at NCTAMSPAC Wahiawa Branch and at Building 81 and S-26 at NRTF Lualualei to protect human health and the environment from PCBs present in soil and concrete. NTCRAs and treatment of PCB-contaminated soil and concrete have already been completed at these sites; however, some residual PCB contamination remains in place beneath some of the buildings, under concrete structures, or under clean backfilled material

(Building 81 and Building S-26 only) or encapsulated concrete (S-17 only). LUCs were the selected final remedy for these sites and are necessary to restrict the sites to low-occupancy use only.

NCTAMSPAC is listed on the NPL, which identifies priorities among known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories.

The selected response action of LUCs for the transformer sites at Building 3, Building 106, and S-17 at NCTAMS PAC Wahiawa Branch and Building 81 and S-26 at NRTF Lualualei do not affect response actions at other sites at NCTAMS PAC.

2.4.1 Past Response Action

NTCRAs were implemented at the five transformer sites from 1991 through 2004 to remove PCB-contaminated soils and concrete at concentrations that exceeded cleanup levels. The results of the NTCRAs indicate that conditions at the five transformer sites pose no unacceptable risk to human health or the environment under the current land use configurations (low-occupancy areas), as the contamination exists beneath a clean, backfilled soil cap and vegetation or concrete encapsulation.

2.5 SITE CHARACTERISTICS

NCTAMSPAC consists of two study areas on the island of Oahu: NCTAMSPAC Wahiawa Branch, and NRTF Lualualei. NCTAMSPAC operates and maintains communication facilities and equipment for Navy shore installations, fleet units in the Pacific, and the Defense Communications System. NCTAMSPAC Wahiawa Branch serves as the main receiving station, and NRTF Lualualei serves as the main transmitting facility.

NCTAMSPAC Wahiawa Branch occupies 700 acres on the Schofield Plateau at 1,300 feet above mean sea level (msl). The plateau, which forms central Oahu between the Koolau and Waianae Ranges, was created when Koolau lava flows overlapped the flanks of the older Waianae Range. The plateau slopes gently westward near the facility, corresponding to the dip of the underlying lava beds. A thick layer of surface soil covering most of the facility is dissected by a system of narrow, steep-sided gullies formed by local erosion.

NRTF Lualualei occupies 1,700 acres in Lualualei Valley, a large valley between the leeward coast of Oahu and the crest of the Waianae Mountain Range, near the southwest shore of Oahu.

2.5.1 Geology and Hydrology

2.5.1.1 NCTAMSPAC WAHIAWA BRANCH

Three stratigraphic units occur at NCTAMSPAC Wahiawa Branch:

- The upper layer is silty clay or clayey silt laterite, a reddish soil formed by weathering of the underlying basalt. In the gullies, the surface soil is silty clay or clayey silt alluvium deposited in the beds of intermittent streams.
- Below the silty clay and laterite is saprolite, 10 to 100 feet thick, formed by weathering of the underlying Koolau volcanic rocks. Saprolite is distinguished from soil by its residual basaltic structure and texture, including fractures and vesicles.
- Below are unweathered to moderately weathered Koolau volcanic rocks (basalt) deposited as lava and tuff flows. These flows crop out near the crest of the Koolau Range. Unweathered Koolau volcanic rocks are highly permeable, jointed, and dense to very dense vesicular basalt. They may be locally weathered along joints.

Surface soil at NCTAMSPAC Wahiawa Branch is predominantly part of the Helemano-Wahiawa association of laterite soils (highly weathered reddish soil rich in secondary oxides of iron). Derived from weathered basalt, these upland soils are generally level to moderately sloping, well drained, and moderately fine textured. Helemano silty clay soil occurs throughout the facility but is predominant in the southern region. On the gentler slopes (2 to 12 percent), this clay is moderately to highly permeable, has slow surface runoff, and is slightly susceptible to erosion. On the steeper slopes (30 to 90 percent), permeability is moderate, runoff medium to very rapid, and the erosion hazard is very severe. The surface soil in the flatter, northern portion of the facility is predominantly Paaloa silty clay, a moderately permeable upland soil with slow to medium surface runoff and 3 to 12 percent slopes. Manana silty clay loam, moderately permeable upland soil containing more than 10 percent sand with medium surface runoff, also occurs in this area (Earth Tech 2003a).

No permanent surface water exists within the boundaries of NCTAMSPAC Wahiawa Branch, apart from two eroded potholes on the floor of an intermittent stream (Earth Tech 2006b). Storm drainage follows the topography of the land. Two large streams and a system of gullies direct drainage to the intermittent stream, which flows west and eventually drains into Poamoho Stream. The flow of the intermittent streams changes seasonally because of variations in rainfall and the height of the water table. The normally dry streams may fill with surface water within hours of rainfall in the mountains. The small pools of water that remain after the rain stops eventually drain or evaporate.

Poamoho Stream, the nearest perennial stream, is located from 300 to 600 feet north of the NCTAMSPAC Wahiawa Branch facility. Poamoho Stream merges with Kaukonahua Stream 7 miles northwest of the facility. About 1 mile beyond the confluence, the stream empties into Kaiaka Bay on the north shore of Oahu (Earth Tech 2006b).

Groundwater of the Schofield High-Level Aquifer lies within the fractured basalt of the Koolau Volcanic Series and, possibly at greater depths, within the Waianae Volcanics. Basalt dikes form relatively impermeable barriers in the permeable volcanic rock. The dikes divert groundwater to successively lower compartments, creating step-like breaks in the water table. Perched water occurs locally where less-permeable strata impede the downward flow of surface water. Groundwater flows westward. The aquifer is recharged by infiltration of rainfall in the Koolau Range and by rainwater and streamflow infiltration on the Schofield Plateau (Earth Tech 2003a). The potentiometric surface of the Schofield Aquifer downgradient of NCTAMSPAC Wahiawa Branch is 800 to 900 feet below ground surface (bgs), based on initial water level measurements in a municipal well located 500 feet east of Transformer 234. The 960-foot-deep well has supplied municipal water to NCTAMSPAC Wahiawa Branch since April 1997; it is sampled quarterly by DOH (Earth Tech 2003a).

2.5.1.2 NRTF LUALUALEI

The stratigraphy of Lualualei Valley consists of a thick sequence of calcareous and noncalcareous sedimentary rocks overlying basalts of the Waianae Volcanic series. The sedimentary sequence is thickest near the center of the valley; the youngest strata are unconsolidated, noncalcareous alluvial deposits derived from weathered volcanics or Pleistocene alluvium. The underlying calcareous sedimentary strata include coralline limestones and detrital limestones composed of broken shell fragments and beach sands. The basal Waianae Volcanic series, which include lower, middle, and upper basalt members with a total thickness of more than 6,000 feet, are exposed northwest and southeast of the facility. NRTF Lualualei is generally level; elevations range between 10 and 100 feet above msl. Soils in the Lualualei area are included in the Lualualei-Fill Land-Ewa Soil Association, an assemblage of well-drained, fine-textured soils that occur in drainages and on alluvial fans in nearly level to moderately sloping layers. Surficial soils consist of 20 to 50 inches of silty clay loam. These surface soils overlie coralline limestone (Earth Tech 2003a).

Surface runoff at NRTF Lualualei is generally in a northeast direction, toward the Pacific Ocean. The runoff is limited by the semiarid conditions, the flat to gently rolling topography, and the moderate permeability of the surface soils. The facility is drained by the intermittent Mailiii Stream, which flows west through the northern section of the facility and along the northern boundary. Niulii Reservoir is located in the eastern area of the facility and consists of two wastewater stabilization ponds and one overflow pond. The reservoir was constructed in the early 1930s and functions as a system of three in-line sewage treatment oxidation ponds. The pond-treatment system received a National Pollutant Discharge Elimination System permit in the early 1970s. Niulii Reservoir is a tributary of Mailiii Stream but is believed to have overflowed only once from heavy rains. Reservoir water probably recharges shallow groundwater to a limited extent (Earth Tech 2006b).

The occurrence of groundwater resources beneath the Waianae Coastal area is the result of precipitation infiltrating the ground surface and percolating downward into permeable rock materials. Groundwater occurs in the upland Waianae Range basalt lava flows, the Lualualei Valley alluvium, the coralline (reef) deposits, and the basaltic lava flows beneath Lualualei Valley. Groundwater at NRTF Lualualei exists within a shallow unconfined aquifer. Depth to groundwater is projected to be 60 to 80 feet bgs, with a gradient of approximately 1 foot per mile southwest (Earth Tech 2003a).

2.5.2 Archaeological Importance

No known cultural resources (archaeological sites) are located within or in close proximity to the five transformer sites located at NCTAMSPAC.

2.5.3 Sensitive Populations, Habitats, and Natural Resources

No sensitive populations, habitats, or natural resources have been seen in the vicinity of the transformer sites.

2.5.4 Results of Surface and Subsurface Soil and Concrete Sampling

Surface and subsurface soil samples and concrete wipe samples were collected as part of design support for the site inspection and removal actions. PCBs were detected at concentrations above cleanup levels. Confirmation samples were collected after the removal actions were complete to verify that PCB-contaminated media had been removed.

Table 3 summarizes the site characteristics for each of the five transformer sites following removal action activities. The table incorporates the conclusions documented in the RVR (Earth Tech 2006a) discussed in Section 2.2.1 of this ROD. Detailed information including site-specific activities, verification sample laboratory reports, and validated data, is presented in the respective RVRs (Earth Tech 2006a; ECC 2007).

2.5.5 Conceptual Site Model

Sources of PCB Contamination. Sources of PCB contamination at these transformer sites are a result of: (1) testing and previously disposing of PCB dielectric fluid from the transformers onto the surrounding soils; (2) leaking PCB dielectric fluid from the transformers onto the surrounding soil or concrete pad. These sources are considered the principal mechanisms that released PCBs at these transformer sites. PCBs are generally insoluble and tend to sorb to soil particles, making PCB transport by leaching unlikely. The primary mechanism for the transport of PCBs was erosion by surface runoff. Transport of PCBs sorbed to soil particles was possible in areas eroded by surface runoff; however, surface erosion was minimal in the areas surrounding these transformers sites because of the gentle slopes and vegetative cover.

Table 3: Summary of Removal Actions at Five Transformer Sites at NCTAMSPAC

Facility	Site	Excavation Dates	Removal Action Summary	Removal Action Final Volume[1]	Soil Cleanup Levels and Concrete Action Levels for PCBs[3]	Cleanup Level Results
NCTAMSPAC Wahiawa Branch	Building 3	January 1991	An RA conducted in 1991 including site Building 3. Later, as a result of allegations that the laboratory that analyzed the original confirmation samples had falsified data, re-sampling was done in 2004. Based on statistical comparison, the 1991 RA analytical data were valid and the findings of the RA report were confirmed	Unknown	1991 Sampling: 10 mg/kg (soil) 2004 Sampling: 1 mg/kg (soil)	All soil confirmation resampling results from 2004 were below the cleanup level (10 mg/kg); however, four original samples from the 1991 RA were above the 1 mg/kg cleanup level. The results were as follows: 3-4 = 6.07 mg/kg at 1.5 ft bgs 3-5 = 5.67 mg/kg at 1.5 ft bgs 3-7 = 1.05 mg/kg at 1.5 ft bgs 3-17 = 1.46 mg/kg at 1.75 ft bgs
NCTAMSPAC Wahiawa Branch	Building 106 (Subsite A)	10Aug99 – 24Aug99	One excavation event was conducted at this site. Field crew encountered a concrete footing running 4 feet below the retaining wall. The footing extended about 4 feet from the base of the retaining walls. The concentration of PCBs in a soil sample collected immediately above the concrete footing was above the cleanup level; however, the footing was not removed because of its close structural integrity with the retaining wall. Soil above the concrete footing was removed.	Approximately, 8 cy of soil was excavated.	10 mg/kg (soil)	All soil verification sample results do not exceed the cleanup level (10 mg/kg); however, one verification sample was above the 1 mg/kg cleanup level. The result was as follows: TB088 = 2.6 mg/kg
NCTAMSPAC Wahiawa Branch	Building 106 (Subsite B)	11Aug99 – 27Aug99	One excavation event was conducted at this site. One pipe found at a depth of 2.5 feet next to Building 106 in front of the eye wash station. An electrical concrete jacket was encountered near the southern entrance of Building 106.	Approximately, 12 cy of soil was excavated	10 mg/kg (soil)	All soil verification sample results do not exceed the cleanup level (10 mg/kg); however, one verification sample was above the 1 mg/kg cleanup level. The result was as follows: TB085 = 7.73 mg/kg

Table 3: Summary of Removal Actions at Five Transformer Sites at NCTAMSPAC (Continued)

Facility	Site	Excavation Dates	Removal Action Summary	Removal Action Final Volume[1]	Soil Cleanup Levels and Concrete Action Levels for PCBs	Cleanup Level Results
NCTAMSPAC Wahiawa Branch	S-17	17Jun99	Interior of concrete vault was cleaned and soil samples were collected around the exterior and underneath (via directional boring) the vault to characterize any potential soil contamination. Vault was sealed with 56 cy of concrete because there is a potential for water and sediment to accumulate within the vault from infiltrating water. Water and sediment could become contaminated with PCBs that are leached out of the concrete and may pose a threat to human receptors.	No soil was excavated from this site. 20 gallons of sediment and water from within the vault was removed.	10 µg/100 cm^2 (concrete)	All concrete verification sample results and soil characterization samples do not exceed the cleanup level (1 mg/kg and 10 µg/100 cm^2). Risk evaluation results showed that PCB contamination in soil or within the surface concrete at Site S-17 do not pose a threat to either human or ecological receptors. PCB concentrations in concrete within the underground vault (results are from samples collected before the vault was cleaned) exceeded the cleanup goals and could pose a threat to human receptors.

Table 3: Summary of Removal Actions at Five Transformer Sites at NCTAMSPAC (Continued)

Facility	Site	Excavation Dates	Removal Action Summary	Removal Action Final Volume[1]	Soil Cleanup Levels and Concrete Action Levels for PCBs	Cleanup Level Results
NRTF Lualualei	Building 81	05Apr04 – 03Jun04; 08Jun04; 22Jun04; 12Jul04; 02Aug04	Excavation and overexcavation were conducted at this site. [2]	In total, 7,147.1 bcy of soil was excavated and 9,291.2 lcy treated (includes overexcavated volume).	1 mg/kg (soil)	Four soil confirmation sample results were above the cleanup level for PCBs. The results were as follows: TU1040 = 43.0 D mg/kg TU1185 = 33.0 D mg/kg TU1333 = 35.0 D mg/kg TU1352 = 9.0 D mg/kg
NRTF Lualualei	S-26 (Subsite A)	31Mar99 – 5Apr99; 27May99 – 28May99; 23Jun99; 3Feb00	Four excavation events were conducted at this site. An electrical conduit casing was encountered at 2 feet bgs adjacent to the electrical manhole and south of S-26. The PCB concentration in a soil sample collected immediately above the casing exceeded the cleanup level and was removed. Excavation did not progress beyond the obstruction.	Approximately, 113 cy of soil was excavated.	1 mg/kg (soil)	All soil verification sample results do not exceed the cleanup level (1 mg/kg).
NRTF Lualualei	S-26 (Subsite B)	12Apr99 – 16Sep99; 8Oct99 – 22Oct99; 7Dec99 – 27Dec99	Three excavation events were conducted at this site. Soil removal at most of the excavation area stopped at 11 feet when it reached hard consolidated coral rock. Site was recommended for closure because: S-26 was no longer a residential area and verification sampling results indicated that PCB concentrations do not exceed the cleanup goal of 10 mg/kg; the depth of 11 feet was beyond the realm of typical subsurface activities, so exposure pathways to potential site workers were eliminated.	Approximately, 1,320 cy of soil was excavated.	10 mg/kg (soil)	All soil verification sample results do not exceed the cleanup levels (10 mg/kg); however, 12 soil verification sample results were above the current 1 mg/kg cleanup level. The results were as follows: TB091 = 8.390 mg/kg TB092 = 1.500 mg/kg TB093 = 6.790 mg/kg TB094 = 7.680 mg/kg TB095 = 3.200 mg/kg TB096 = 2.600 mg/kg TB097 = 2.000 mg/kg TB098 = 1.200 mg/kg TB099 = 2.200 mg/kg TB100 = 15.00 mg/kg TB101 = 1.600 mg/kg TB102 = 57.50 mg/kg
		10Dec99 – 17Dec99	One power-washing event was conducted to clean the contaminated concrete pads within the excavation area.	Approximately, 250 ft^2 of concrete was power washed.	10 µg/100 cm^2 (concrete)	All concrete verification sample results do not exceed the cleanup level (10 µg/100 cm^2).

Table 3: Summary of Removal Actions at Five Transformer Sites at NCTAMSPAC (Continued)

Facility	Site	Excavation Dates	Removal Action Summary	Removal Action Final Volume[1]	Soil Cleanup Levels and Concrete Action Levels for PCBs[3]	Cleanup Level Results
NRTF Lualualei	S-26 (Subsite B) (continued)	25Jul00	One solvent extraction event was conducted at this site.	Approximately, 225 ft^2 of concrete was cleaned by solvent extraction.	10 µg/100 cm^2 (concrete)	All concrete verification sample results do not exceed the cleanup level (10 µg/100 cm^2).
NRTF Lualualei	S-26 (Subsite C)	3May99 – 27May99; 27Mar00 – 18Jul00	Two excavation events were conducted at this site.	Approximately, 175 cy of soil was excavated.	10 mg/kg (soil)	All soil verification sample results do not exceed the cleanup level (10 mg/kg); in addition, no verification samples were above the current 1 mg/kg cleanup level.

Notes:
[1] The volume difference between excavation (measures in bcy) and treated (measures in lcy) is caused by the thermal desorption process that increases the pore spaces and voids within the soil.
[2] Overexcavation was conducted when post-excavation confirmation sampling results were above the cleanup levels. Overexcavation consisted of collecting soil samples laterally and vertically at the site and then excavating the site to the newly established excavation limits.
[3] The original cleanup level from some transformer sites was 10 ppm; however, the revised cleanup level was 1 ppm.
µg/100 cm^2 = microgram per 100 square centimeters
bcy = bank cubic yard
cy = cubic yard
D = the reported value is derived from analysis of a diluted sample of the sample extract
ft = foot
ft^2 = square feet
lcy = loose cubic yard
mg/kg = milligram per kilogram
N/A = not applicable
PCB = polychlorinated biphenyl
RA = removal action

Affected Media. The potentially affected media were surface and subsurface soil and concrete in the immediate vicinity of the transformer sites. All previous investigations were on surface soils or concrete only; therefore, the depth of PCB contamination was not known for any of the transformer sites identified in the 1998 EE/CA. A previous removal action conducted in 1991 at transformer sites at NCTAMSPAC indicated that higher PCB concentrations in the surface soils tend to correlate with an increased depth of contamination (PRC 1992). A correlation could not be made; however, that equates surface soil contamination levels to depth of contamination. The 1998 EE/CA therefore assumed that surface soil contamination below 50 mg/kg would require a 1-foot excavation and greater than 50 mg/kg would require a 2-foot excavation to evaluate removal action options consistently. Actual excavation depths were established during verification sampling. Contamination of surface water and groundwater was considered unlikely because of the low solubility of PCBs and the depth of groundwater. As a result, groundwater samples were not collected because there was no indication that PCBs had migrated to groundwater, based on the depth of PCB contamination in soil and the depth to groundwater.

Following removal actions at these five transformer sites, PCB concentrations remain in soil or concrete above cleanup levels established for these sites; therefore, LUCs are necessary to restrict the sites to low-occupancy use only.

Known and Potential Routes of Exposure. The primary route of exposure was direct contact with contaminated soil or concrete, either through the skin or by incidental ingestion. Contact with contaminated airborne dust or eroded soil particles in surface runoff was unlikely because of the vegetative or asphalt cover; however, dust generated by construction or removal activities were of concern. If vegetation or asphalt was disturbed through construction or removal activities, controls were implemented to minimize airborne transport of PCBs. Given the low volatility of PCBs, transport in the gaseous phase was not considered a significant mechanism. PCBs are nearly insoluble and have a strong tendency to sorb to soil particles, making it unlikely that PCBs have contaminated the groundwater. Exposure to PCB-contaminated groundwater was therefore considered unlikely.

Following removal actions at these five transformer sites, PCB concentrations remain in soil and/or concrete above the cleanup levels established for these sites; therefore, LUCs are necessary to restrict the sites to low-occupancy use only, which will limit the routes of exposure to PCBs.

Known or Potential Human and Environmental Receptors. Access to NCTAMSPAC Wahiawa Branch and NRTF Lualualei is restricted to employees of the Navy, their dependents, and contractors. Employees and contractors who routinely enter the vicinity of the transformer sites were potentially exposed to contaminated soil through incidental ingestion, direct dermal contact, or dust inhalation. Human exposure to contaminated air was possible if work generates fugitive dust. Surrounding areas at NCTAMSPAC Wahiawa Branch and NRTF Lualualei support a limited ecological environment. The five transformer sites are small areas near administrative buildings, concrete or asphalt pavement, and/or ornamental vegetation, and are considered a disturbed habitat of low ecological quality. Therefore, ecological receptors were not evaluated.

Following removal actions at these five transformer sites, PCB concentrations remain in soil or concrete above the cleanup levels established for these sites; therefore, LUCs are necessary to restrict the sites to low-occupancy use only, which will limit the exposure of PCBs to any known or potential human receptors

Nature and Extent of Contamination at the Five Transformer Sites. The nature and extent of contamination was assessed by incorporating the physical setting and CSM for the transformer sites with results of available previous sampling results to estimate the areas of potential contamination at

each of the five transformer sites. In cases where the sampling data were insufficient or nonexistent, assumptions were made on the extent of contamination. Since the 1998 EE/CA was finalized, the Navy concluded, after discussions with EPA and DOH, that soil from multiple transformer sites could be consolidated for treatment based on similar characteristics to the sites evaluated in the 1998 EE/CA. Therefore, the evaluations in the 1998 EE/CA would apply to the additional transformer sites identified for treatment.

Removal actions were conducted at these five transformer sites. Based on post-excavation confirmation sampling results, PCB concentrations remain in soil or concrete above the cleanup levels established for these sites; therefore, LUCs are necessary to restrict the sites to low-occupancy use only.

2.6 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

The current and potential future land use for each of the transformer sites is summarized in Table 4 below.

Table 4: Description of Current and Future Land Use

Site	Facility	Current Land Use	Future Land Use
Building 3	NCTAMSPAC Wahiawa Branch	The site is a 98 ft^2 area of concrete and grass immediately adjacent to the north end of Building 3. Building 3 is currently a dining facility. Activities in the surrounding area include administrative buildings (Bldgs 2 and 24) a storage facility (Bldg 25), and a transformer (Bldg 127).	No plans to change current land use.
Building 106	NCTAMSPAC Wahiawa Branch	The site includes two areas; a 50 ft^2 grassy area southeast of Building 106 and a 447 ft^2 asphalt paved area immediately adjacent to Building 106. Building 106 currently houses generators. The surrounding areas include open space, and Building 105 located to the northwest of Building 106, which is currently used for administrative activities.	No plans to change current land use.
S-17	NCTAMSPAC Wahiawa Branch	This site is an underground vault that formerly housed a transformer. The vault has been filled in with concrete. The area surrounding the vault is an open grassy field.	No plans to change current land use.
Building 81	NRTF Lualualei	The site is a 1,409 ft^2 area northwest of Building 81. Building 81 is an emergency power plant facility. The site is surrounded by grass, concrete, and asphalt. The surrounding area includes a warehouse (Bldg 64).	No plans to change current land use.
S-26	NRTF Lualualei	The site is a 4,288 ft^2 area north of Building S-26, and southeast of Building 404. Buildings S-26 and 404 are part of an active transformer substation. Vacant residential housing is located to the south of the site. The housing residents were relocated and there are no future plans to use this area for residential use.	No plans to change current land use.

2.7 SUMMARY OF SITE RISKS

The primary risks to human health and the environment at these five transformer sites are posed by the presence of PCBs in soil and concrete. The PCB-containing fluids may have been released to surface soil or concrete by leaking directly from the transformers or during regular transformer testing and maintenance. Transformer maintenance included periodic sampling to test the dielectric properties of the transformer fluid. Once testing was completed, the fluid was reportedly poured onto the adjacent areas, such as the grass, concrete pad, or building wall. Data from samples previously collected by the Navy confirmed the presence of PCB contamination at these sites.

PCBs are listed and regulated as hazardous substances under CERCLA. Human and animal exposure to PCBs can result in adverse health effects, including chloracne (a dermal reaction), liver damage, suppression of development and reproduction, and possible cancer. PCBs accumulate in plant tissue, but are not known to adversely affect plants. Potential risks may result from the following exposure pathways:

- Dermal absorption (via direct contact) to human or ecological receptors;
- Inhalation of particulates by human or ecological receptors;
- Incidental ingestion of soil by human or ecological receptors; and
- Leaching of contaminants from the soil into groundwater.

The health risk posed by exposure to PCBs takes into account contaminant concentrations, potential exposure pathways, and current land use. The risk evaluation conducted in the 1998 EE/CA (Earth Tech 1998) concluded that a removal action was justified to eliminate any actual or potential risk of human exposure to PCBs. Since the 1998 EE/CA was finalized and after discussions with EPA and DOH, the Navy concluded that soil from multiple transformer sites, including those at NCTAMSPAC, could be consolidated for treatment based on similar site characteristics.

The five transformer sites at NCTAMSPAC that are represented in this ROD were consolidated since they fulfilled the requirements for NTCRAs that were laid out in the AM and its subsequent addendums (DON 2000, 2002, 2003).

The NTCRAs included removal of soil and concrete with PCBs at concentrations above the cleanup levels followed by thermal desorption treatment of the excavated soil and concrete. Afterward, post-excavation confirmation samples were collected to evaluate whether the cleanup levels had been achieved. Post-excavation confirmation sampling results showed PCBs at concentrations in soil and concrete above the TSCA high-occupancy action level ($\leq$ 1 mg/kg for soil and $\leq$ 10 µg/100 cm^2 for concrete) and the DOH Tier 1 SAL (1 mg/kg) for unrestricted use (DOH 2005).

As a result of previous removal actions at the five transformer sites at NCTAMSPAC, LUCs are required to ensure protection of human health and the environment. The LUCs will be applied only to the affected area within each site.

A summary of site risks for each transformer site is discussed in the following subsections.

2.7.1 Building 3

Building 3 includes one area of concern that is located on the north side of the building, adjacent to the concrete stairs and slab (see Figure 4). The original cleanup level for this site at the time of the NTCRA was $\leq$ 10 mg/kg for low-occupancy use. The future land use of this site is not anticipated to change from low-occupancy use.

A removal action was conducted in 1991 that included Building 3. Post-remedial data collected showed that PCB contamination was present above the high-occupancy cleanup level (exceeding 1 mg/kg, but less than 10 mg/kg) (PRC 1992). Confirmation resampling was conducted in 2004 as a result of legal action that was taken against one of the analyzing laboratories (Eureka Laboratories, Inc.), which raised concerns over the validity of post-remedial data collected for the 1991 removal action. Based on statistical comparison, the 1991 removal action analytical data were valid, and the findings of the removal action report were confirmed (Earth Tech 2005). The 2004 confirmation resampling results confirmed findings of the 1991 removal action. Locations of three soil confirmation samples with results ranging from 1.05 mg/kg to 6.07 mg/kg and one soil

characterization sample with a result of 1.46 mg/kg from the 1991 removal action remain in place above the TSCA high-occupancy cleanup level (≤ 1 mg/kg but less than 10 mg/kg for soil) and the DOH Tier 1 SAL (1 mg/kg) in an area along the northwestern side of Building 3 adjacent to the concrete stairs and slab beneath a clean, backfilled soil cap and vegetation. LUCs are required to restrict land use to low-occupancy use only.

2.7.2 Building 106

Building 106 includes two areas of concern (see Figures 5 and 6) that are discussed further in the paragraphs below. The original cleanup level for this site at the time of the NTCRA was ≤ 10 mg/kg for TSCA low-occupancy use. The future land use of this site is not anticipated to change from low-occupancy use.

The first area of concern was located southeast of Building 106, in a grassy area outside the 4-foot-high retaining wall. One soil verification sample result of 2.6 mg/kg is above the TSCA high-occupancy cleanup level (≤ 1 mg/kg for soil) and the DOH Tier 1 SAL (1 mg/kg). LUCs are required to restrict land use to low-occupancy use.

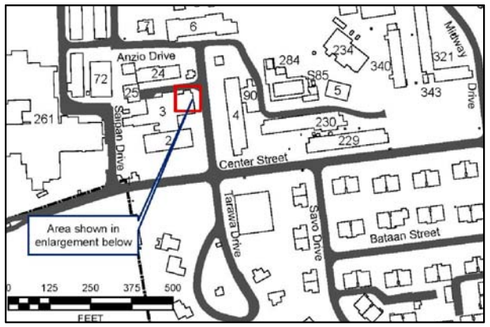
The second area of concern was located along the southwestern side of Building 106, on asphalt inside the 4-foot-high retaining wall that surrounds Building 106. One soil verification sample result of 7.73 mg/kg is above TSCA high-occupancy cleanup level (≤ 1 mg/kg for soil) and the DOH Tier 1 SAL (1 mg/kg). LUCs are required to restrict land use to low-occupancy use.

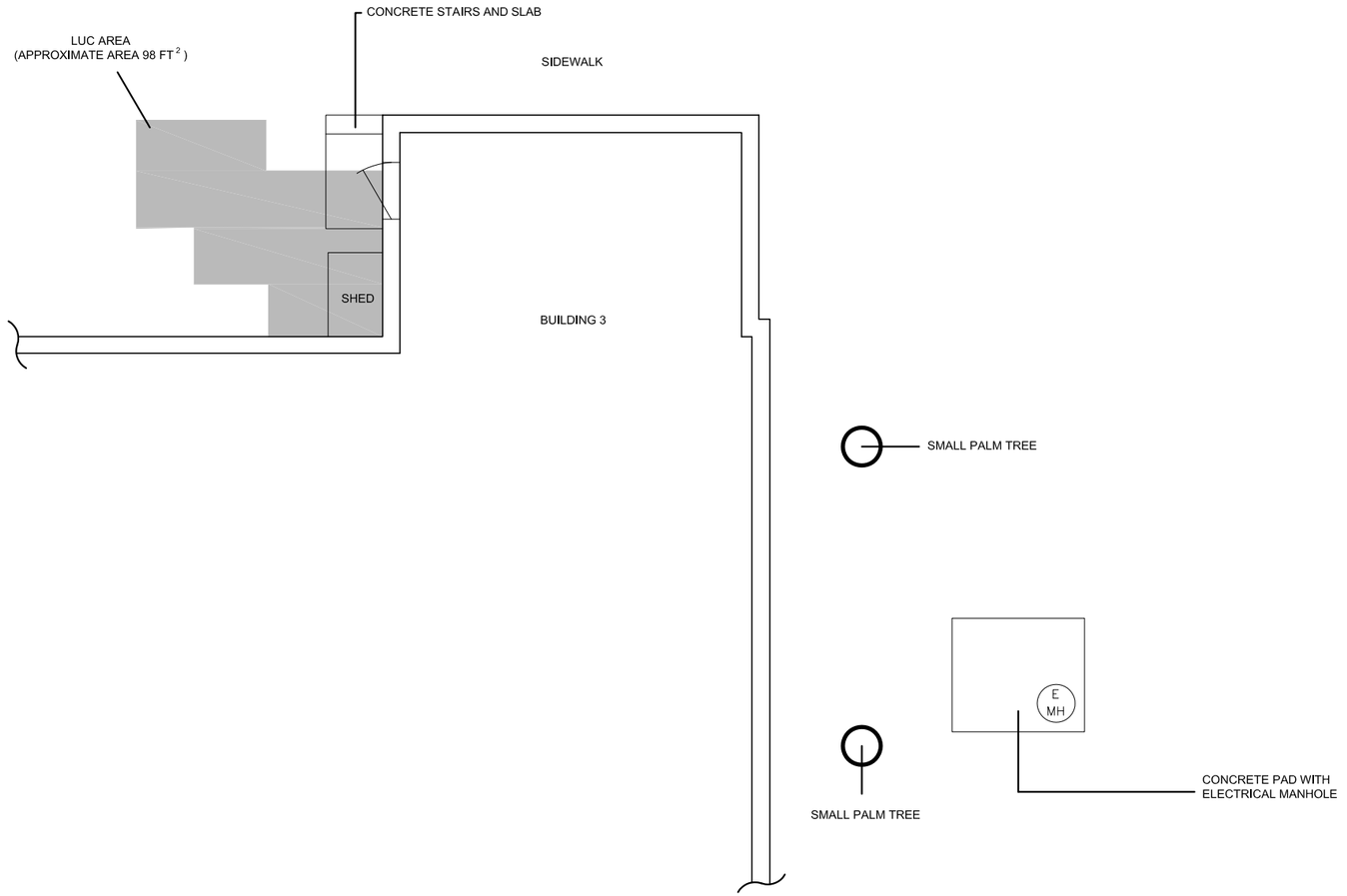
2.7.3 S-17

The site consists of the underground vault south of Polaris Drive (see Figure 7). The interior of the vault was cleaned, and one concrete verification sample was collected. The concrete verification sample result of 0.75 µg/100 cm^2 was well below the TSCA high-occupancy cleanup level for concrete (≤ 10 µg/100 cm^2). In addition, the results of field sampling indicated that PCB concentrations in soils do not exceed the cleanup goals established for the site. The risk evaluation showed that PCB contamination in the surface or subsurface soils or within the surface concrete at Site S-17 does not pose a threat to either human or ecological receptors. However, PCB concentrations in concrete within the underground vault (results are from samples collected before the vault was cleaned) exceeded the cleanup goals and could pose a threat to human receptors. In addition, there is a potential for water and sediment to accumulate within the vault from infiltrating water. Water and sediment could become contaminated with PCBs that are leached out of the concrete and may pose a threat to human receptors. The vault was sealed with 56 cubic yards (cy) of concrete to prevent further access or contamination and to limit direct exposure to PCB concentrations to eliminate the potential for water to continue to infiltrate the underground vault and to remove the potential exposure pathway. LUCs that restrict alterations to the concrete vault and the concrete fill and the upkeep of the material are required.

2.7.4 Building 81

This site is located west of Building 81 at NRTF Lualualei (see Figure 8). The future land use of this site is not anticipated to change from low-occupancy use. Four soil verification samples with results of 9.0 mg/kg, 33.0 mg/kg, 35.0 mg/kg, and 43.0 mg/kg are above the TSCA high-occupancy cleanup level (≤ 1 mg/kg for soil) and the DOH Tier 1 SAL (1 mg/kg). Due to the proximity of underground fuel lines, the impacted soil could not be removed. LUCs are required to restrict the site to low-occupancy use because PCB-contaminated soil exists beneath a clean, backfilled soil cap that will limit direct exposure to PCB concentrations in subsurface soil (as described in Section 2.12.1).





LEGEND

Land Use Control (LUC) Area

SOURCE

PRC Environmental Management, Inc. 1992

Earth Tech, Inc. 2003

N

4 0 4 8

Approximate Scale 1" = 8'

Figure 4
Building 3 and Land Use Control Area
NCTAMSPAC Wahiawa Branch
Oahu, Hawaii

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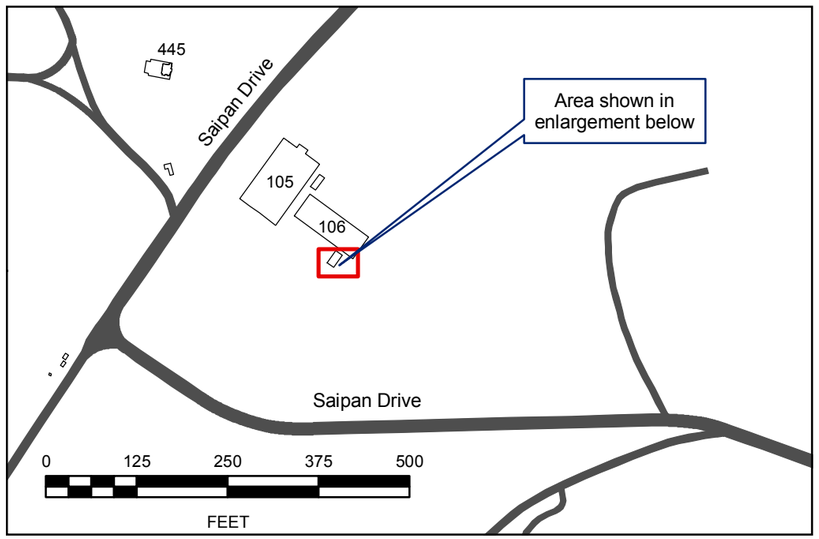

BUILDING 106

CONCRETE SLAB

CONCRETE SLAB

RETAINING WALL (APPROX. 4' HIGH)

LUC AREA (APPROXIMATELY 50 FT^2)

SUBSITE A

LEGEND

- Fence
- Road
- Land Use Control (LUC) Area
- 106 — Facility Location and ID

Approximate Scale
1" = 5'

5 0 5 10

FEET

N

Figure 5
Building 106 and Land Use Control Area South of the Retaining Wall, NCTAMSPAC Wahiawa Branch, Oahu, Hawaii

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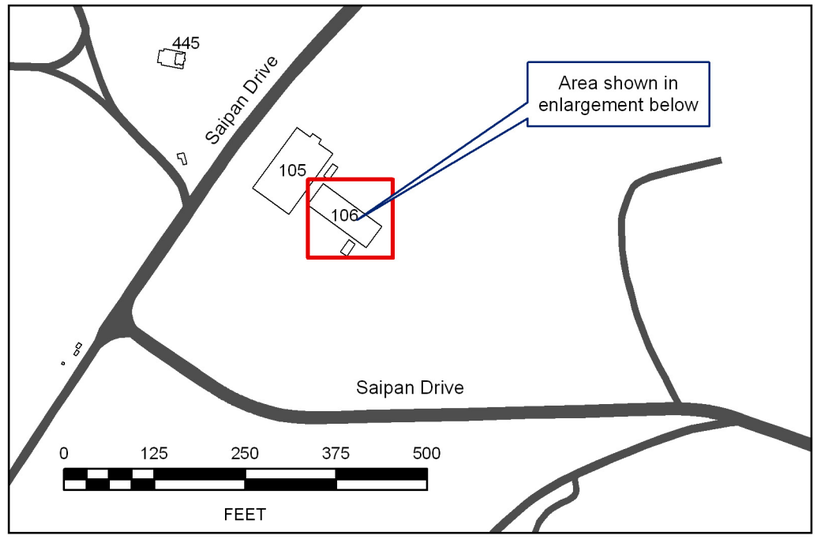

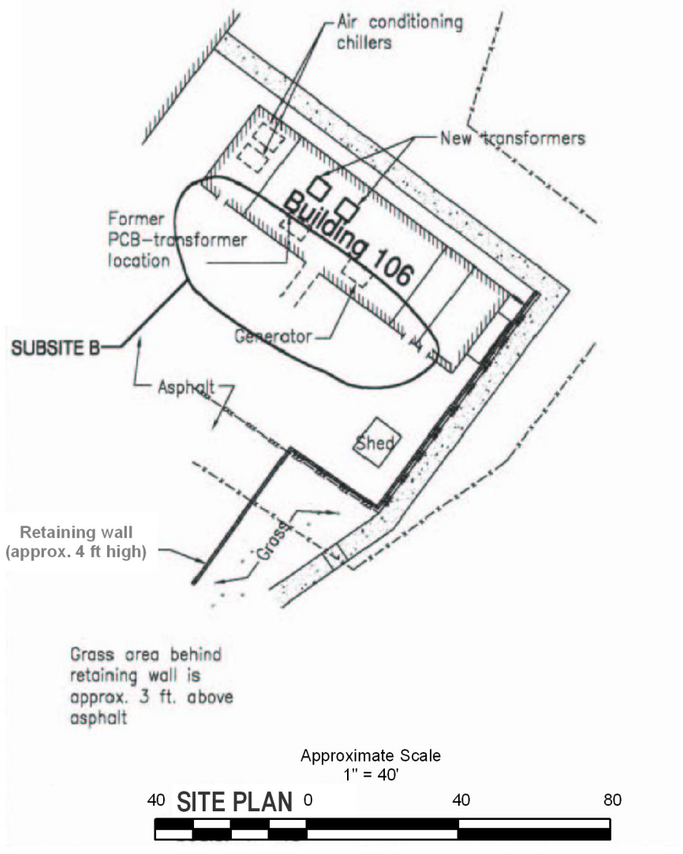

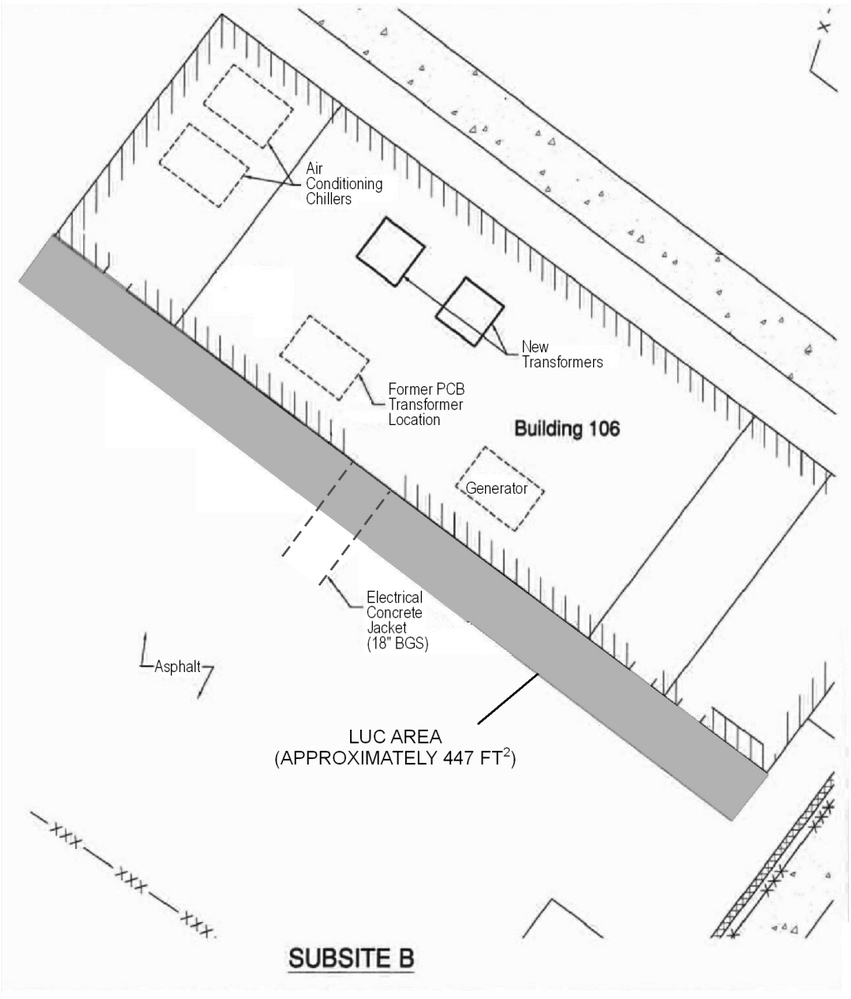

LEGEND

- Road
- Fence
- Previous fence location
- Land Use Control (LUC) Area
- 106 — Facility Location and ID

N

Figure 6
Building 106 and Land Use Control Area South of Building,
NCTAMSPAC Wahiawa Branch,
Oahu, Hawaii

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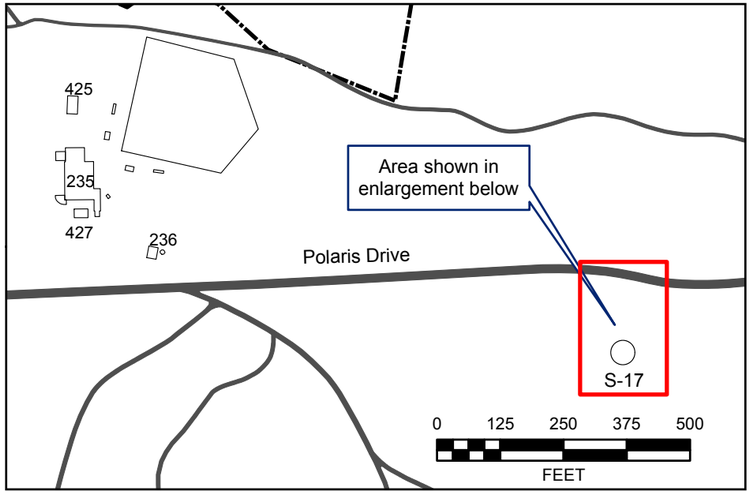

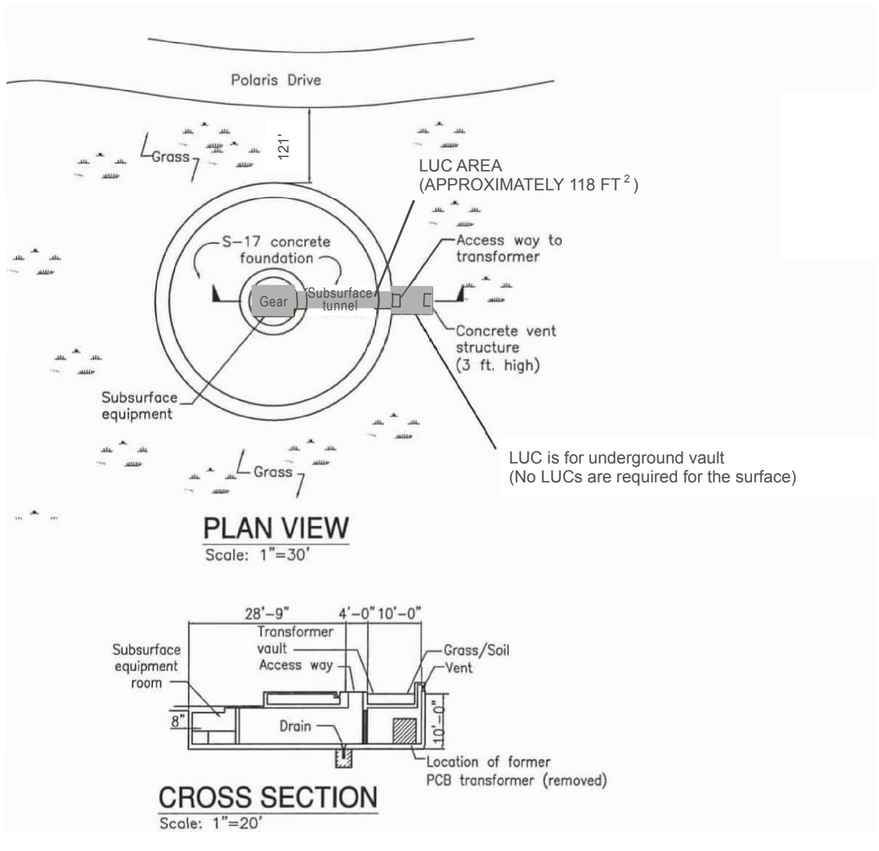

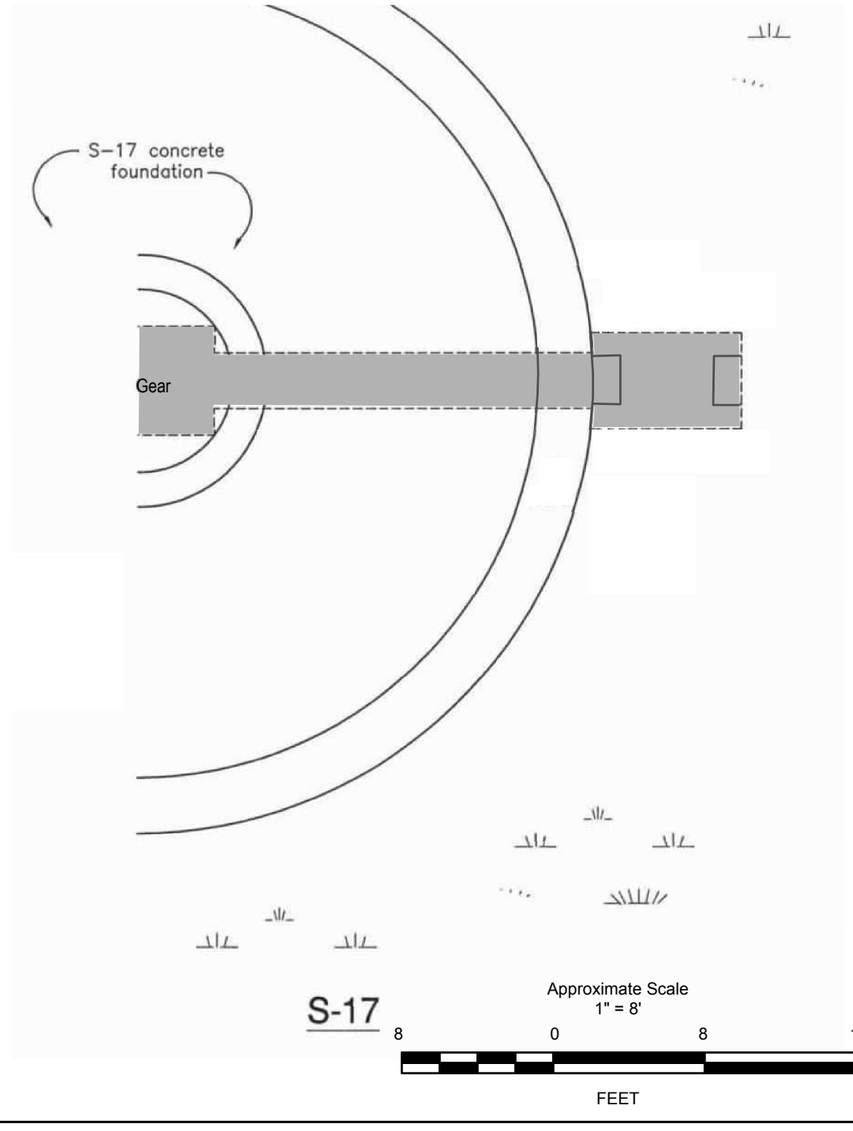

LEGEND

- Road
- Land Use Control (LUC) Area
- 235 — Facility Location and ID

N

Figure 7
S-17 and Land Use Control Area
NCTAMSPAC Wahiawa Branch,
Oahu, Hawaii

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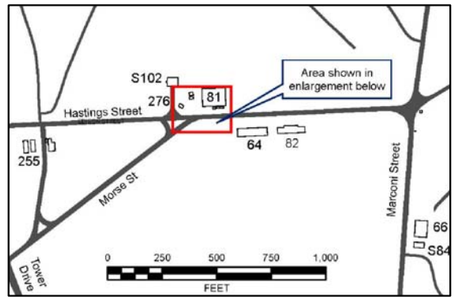
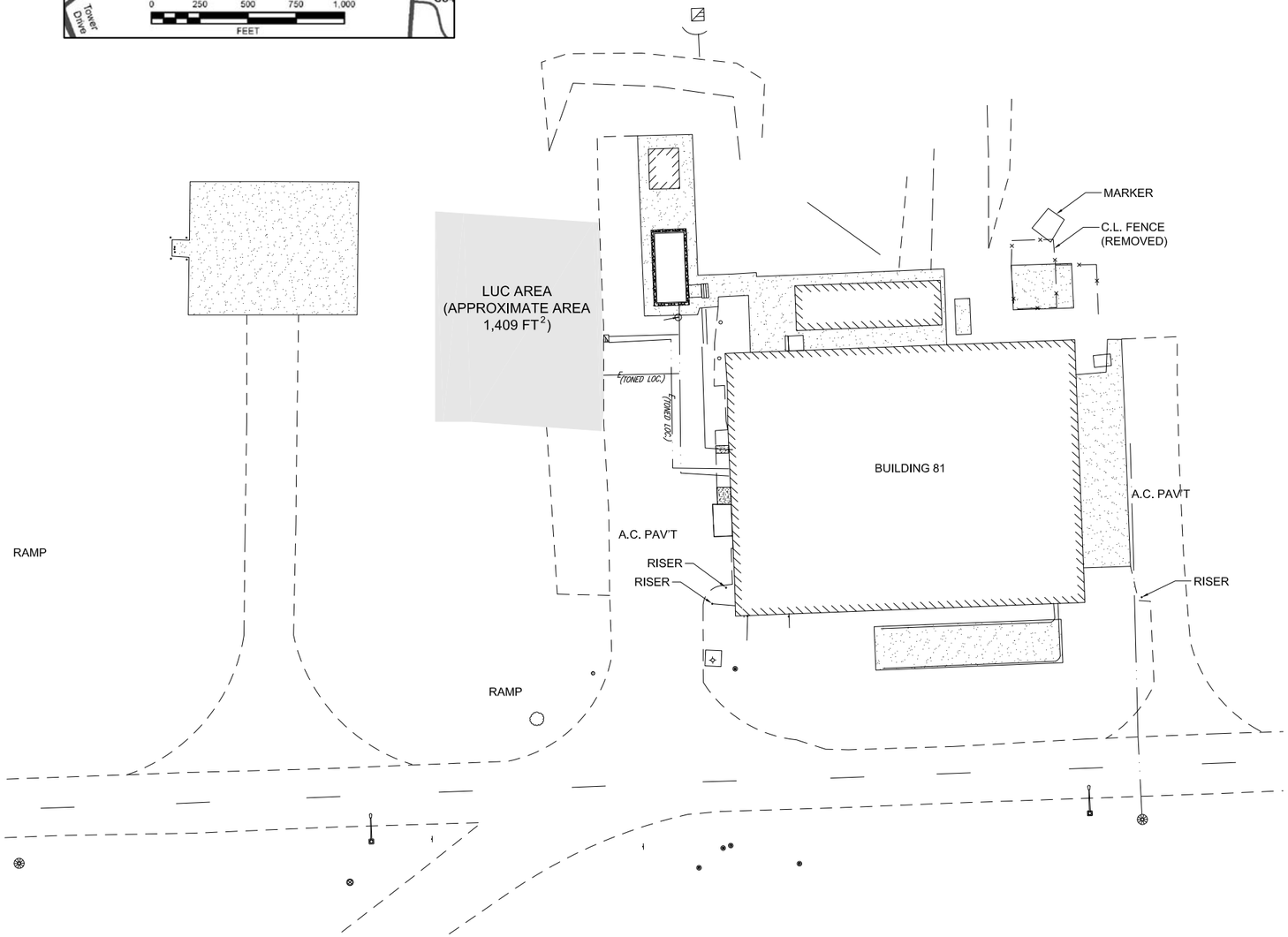




LEGEND

Land Use Control (LUC) Area

N

15 0 15 30

Approximate Scale 1" = 30'

Figure 8
Building 81 and Land Use Control Area,
NRTF Lualualei, Oahu, Hawaii

2.7.5 S-26

Transformer site S-26 at NRTF Lualualei is located at the southeast end of Building 404 (see Figure 9). The original cleanup level for this site was ≤ 1 mg/kg for high occupancy use, because base housing was located adjacent to the site. However, the housing residents were relocated and the future use of the area is low-occupancy use. During the removal action, ten soil verification sample results ranging from 1.2 mg/kg to 8.4 mg/kg were above the TSCA high-occupancy cleanup level of ≤ 1 mg/kg. LUCs are required for soil in the area north and east of the concrete transformer pad.

2.8 RESPONSE ACTION OBJECTIVES

AMs prepared for the transformer sites at NCTAMSPAC recommended the removal of PCB-contaminated soil and concrete from the sites and consolidation of the material for on-island treatment using indirect thermal desorption treatment to reduce contaminant concentrations. The AMs concluded that should LUCs be required, they would be evaluated at a later date.

Upon completion of the 1999-2004 removal actions for PCB-contaminated soil and concrete, it was determined that LUCs would be required for these five transformer sites at NCTAMSPAC for continued protection of human health and the environment. This action fulfills the ARARs as required by 40 CFR 300.430(f) of the NCP and 40 CFR 761.61(a) of the TSCA regulations. Therefore, the response action objectives for the five transformer sites are as follows:

- Comply with local, state, and federal regulations.
- Implement LUCs to restrict the sites to low-occupancy use and provide long-term protection of human health and the environment.
- Prevent contact of future residents with PCB-contaminated soil and concrete at concentrations in excess of TSCA cleanup standards in 40 CFR 761.61(a)(4).

2.9 DESCRIPTION OF ALTERNATIVES

In accordance with the AM addendum (DON 2002), LUCs for the NTCRA sites would be considered if confirmation sampling indicated that PCB concentrations exceeding the cleanup levels remained at a site and further excavation was not practical. This option is appropriate if there is a structure that remains in place over the area where sampling indicates that contamination exists. The five transformer sites located at NCTAMSPAC fall under this scenario. The three remedy alternatives stated below were evaluated in the proposed plan (DON 2006b) because excavation and treatment of PCB-contaminated media were part of a previously recommended remedy for these sites and has been completed; however, the selected final remedy for these sites is LUCs.

Three remedy alternatives, as presented in the proposed plan (DON 2006b), were evaluated using the nine NCP evaluation criteria (40 CFR 300.430[e][9][iii]). The three remedy alternatives evaluated include:

- No Action
- Excavation to Low-Occupancy Reuse, Thermal Desorption Treatment, and Implementation of LUCs
- Excavation to High-Occupancy Reuse, Thermal Desorption Treatment

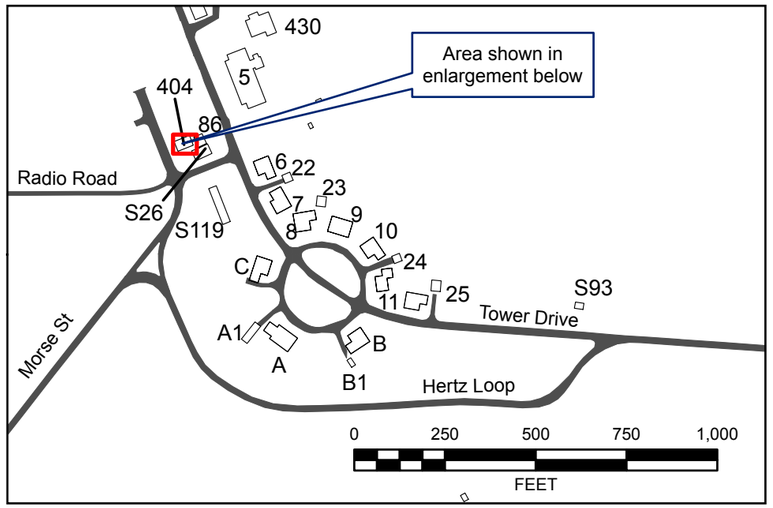
An evaluation of the implementation of LUCs alternative is available for public review in the proposed plan (DON 2006b). Section 2.10 below presents the evaluation results for these three remedy alternatives.

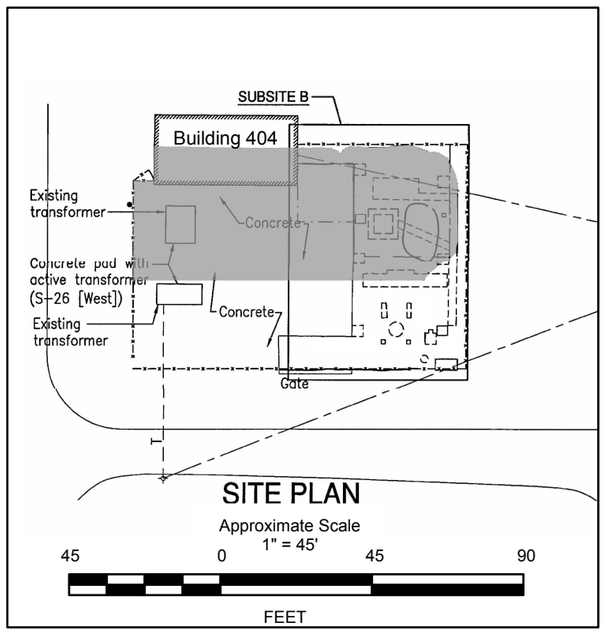
2.9.1 Description of Final Remedy Components

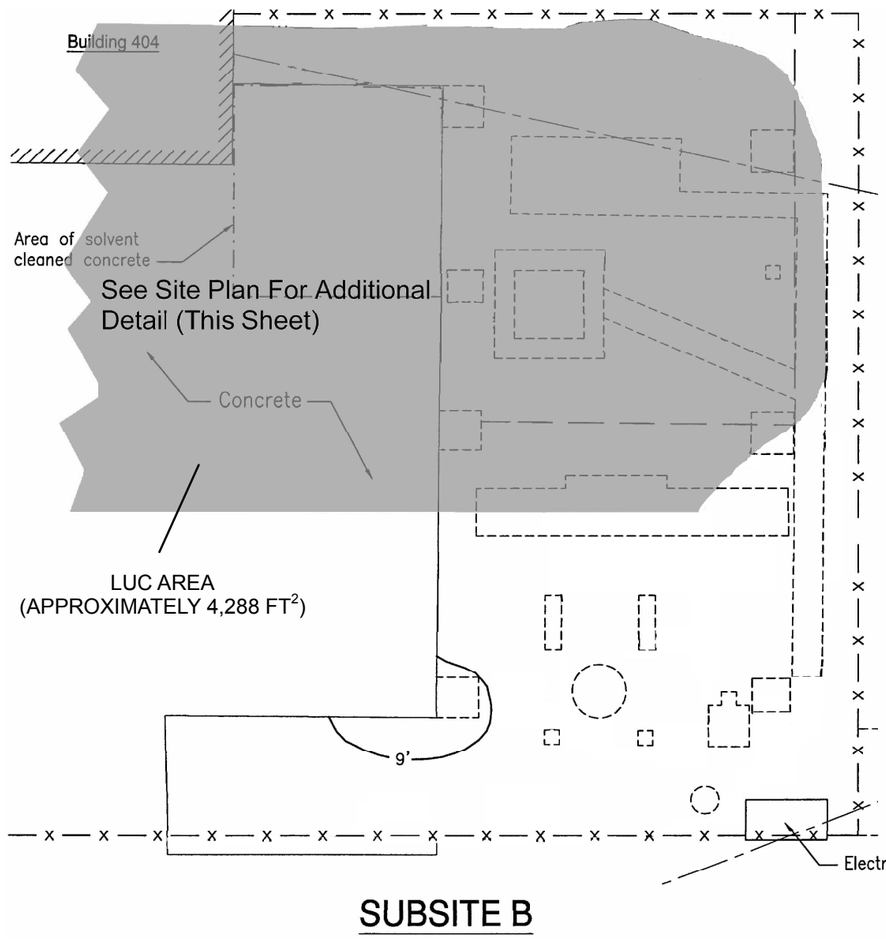
The major components of each alternative are summarized in Table 5 below.

Table 5: Description of Final Remedy Components

Alternative Component	No Action	Excavation to Low-Occupancy Reuse, Thermal Desorption Treatment and Implementation of Land Use Controls (LUC)	Excavation to High-Occupancy Reuse, Thermal Desorption Treatment
Treatment	None	All accessible contaminated soil exceeding cleanup levels is excavated and processed through thermal desorption treatment until final confirmation results are below cleanup levels. Inaccessible soil is left in place.	All contaminated soil exceeding cleanup levels is excavated and processed through thermal desorption treatment until final confirmation results are below cleanup levels for high-occupancy use.
Containment	None	Pathways to any residual material that is left in place at concentrations exceeding cleanup levels are removed through soil caps, concrete or asphalt barriers, epoxy encapsulants, or other engineering controls.	None
Institutional controls	None	The property owner will restrict the sites to low-occupancy use. Notifications will be added to the deed describing contamination left in place. Various other LUCs may also be required, such as maintenance of the epoxy encapsulant or fencing.	None
Operation and Maintenance	None	5-year inspections of engineering controls and site conditions will be required and observations will be reported in 5-year reports. Any maintenance required will be conducted at that time.	None
Monitoring Requirements	None	5-year reviews are required to ensure that the LUCs are maintained.	None







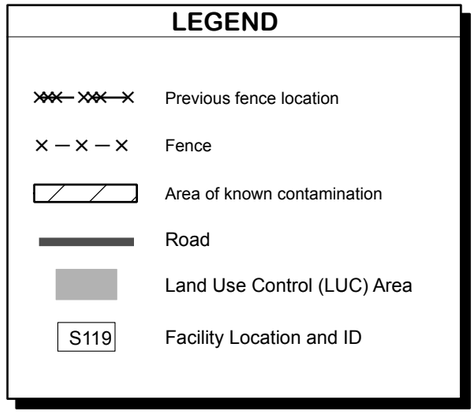


Figure 9
S-26 and Land Use Control Area,
NRTF Lualualei, Oahu, Hawaii

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2.9.2 Common Elements and Distinguishing Features of Each Alternative

The common elements and distinguishing features of each alternative are summarized in Table 6 below.

Table 6: Summary of Common Elements and Distinguishing Features of Each Alternative

Element and Feature	No Action	Excavation to Low-Occupancy Reuse, Thermal Desorption Treatment, and Implementation of LUCs	Excavation to High-Occupancy Reuse, Thermal Desorption Treatment
Key ARARs and TBCs	• ARARs not identified for a No Action remedy.	The following ARAR is pertinent to this alternative: • 40 CFR 761.61(a)(4), PCB remediation waste The following TBC affects this alternative: • State of Hawaii DOH Tier 1 SAL	The following ARAR is pertinent to this alternative: • 40 CFR 761.61(a)(4), PCB remediation waste The following TBC affects this alternative: • State of Hawaii DOH Tier 1 SAL
Long-term reliability	This alternative would provide no protection for human and ecological receptors.	Excavation and thermal desorption treatment of soil provides long-term effectiveness and with LUCs is a final remedy for these sites.	Excavation and thermal desorption of soil provides long-term effectiveness and no restrictions is a final remedy for the sites.
Quantity of waste to be managed	No soil would be handled. All waste remains at the site.	Approximately 40,000 cy of material has been excavated and treated by thermal desorption.	Additional volume of soil would be needed to be excavated to meet high-occupancy cleanup levels; this was deemed to be impractical at these sites due to operation and cost constraints.

Notes:
ARAR = applicable or relevant and appropriate requirement
CFR = Code of Federal Regulations
cy = cubic yard
DOH = State of Hawaii Department of Health
LUC = land use control
PCB = polychlorinated biphenyl
SAL = soil action level
TBC = "to be considered"

2.9.3 Expected Outcomes of Each Alternative

No Action. The no-action alternative was not expected to be protective of both human health and the environment. Neither human receptors nor ecological receptors are protected from contaminants in soil or concrete at these five transformer sites.

Excavation to Low-Occupancy Reuse, Thermal Desorption Treatment, and Implementation of LUCs. The excavation and treatment alternatives were expected to be protective of both human health and the environment with the implementation of LUCs when excavation of the sites does not result in high-occupancy use. LUCs are necessary to restrict access for low-occupancy use.

Excavation to High-Occupancy Reuse, Thermal Desorption Treatment. The excavation and treatment alternatives were expected to be protective of both human health and the environment. Site obstructions prevent the excavation of all contaminated media to levels acceptable for high-occupancy use.

2.10 COMPARATIVE ANALYSIS OF ALTERNATIVES

The NCP (40 CFR 300.430(e)(9)) requires evaluation of remedial action alternatives by nine criteria that measure effectiveness, implementability, and cost (EPA 1993). The criteria are summarized in Table 7.

Table 7: Criteria for Detailed Evaluation of Remedial Action Alternatives

Criterion	How the Criterion is Applied
Effectiveness	
Overall protection of human health and the environment	Assesses the ability of an alternative to eliminate, reduce, or control the risks associated with exposure pathways including direct contact, potential migration, and risks to ecosystems.
Compliance with applicable or relevant and appropriate requirements (ARAR)	Evaluates the potential of an alternative to achieve chemical-, location-, and action-specific ARARs.
Short-term effectiveness	Assesses the capability of an alternative to protect human health and the environment during implementation of the alternative (such as the construction, removal, and disposal).
Long-term effectiveness and permanence	Measures the ability of an alternative to permanently protect human health and the environment.
Reduction in toxicity, mobility, or volume of contaminants	Evaluates the ability of an alternative to permanently or significantly reduce the toxicity, mobility, or volume of the chemicals particularly through treatment.
Implementability	
Implementability	Evaluates the technical feasibility or difficulty of applying the alternative at the site, the reliability of the technology, the unknowns associated with the alternative, and the need for treatability studies. Assesses regulatory agency concurrence and the need for permits and waivers. Assesses mobilization needs, the accessibility of equipment, and number of trained personnel required to complete the alternative.
State acceptance	Assesses the anticipated level of acceptance by the State of Hawaii.
Community acceptance	Assesses the anticipated level of acceptance by the community.
Cost	Assesses the capital and operation and maintenance (O&M) costs of each alternative.

Table 8 presents a summary of the comparative analysis of the no-action alternative and the two response action alternatives presented in the proposed plan (DON 2006b). Each alternative is evaluated against the nine NCP criteria and rated (poor, fair, good, very good, or excellent) according to the ability of the alternative to achieve the remedial action objectives.

2.11 PRINCIPAL THREAT WASTE

The NCP establishes an expectation that treatment will be used to address the principal threats (source material that is highly toxic or highly mobile) posed by a site wherever practicable. Materials constituting a principal threat waste are source materials with toxicity and mobility characteristics that combine to pose a potential risk several orders of magnitude greater than the risk level that is acceptable for the current or anticipated future land use, given realistic exposure scenarios (EPA 1997). No highly toxic or highly mobile source material was identified at the five transformer sites located at NCTAMSPAC. Therefore, no principal threat wastes exist at these five transformer sites.

2.12 SELECTED FINAL REMEDY

2.12.1 Summary of the Rationale for the Selected Final Remedy

Excavation to low occupancy remedial goals, thermal desorption, and LUCs were selected as the final remedy for the five transformer sites at NCTAMSPAC. Because excavation to low-occupancy use and thermal desorption were previously completed during the NTCRA, only LUCs remain to be implemented as the final remedy. This decision is supported by documents in the AR for NCTAMSPAC. In addition to ARARs previously established in the EE/CAs and AMs, the following requirements were also met through the NTCRA performed from 1999 to 2004:

Table 8: Detailed Analysis of Removal Action Alternatives for the Implementation of LUCs

Criterion	1. No Action	2. Excavation to Low Occupancy Reuse, Thermal Desorption Treatment, and Implementation of LUCs	3. Excavation to High Occupancy Reuse and Thermal Desorption Treatment
Overall Protection of Human Health and the Environment	**Poor** Alternative is not protective of human health and the environment.	**Fair** Alternative protects human health by limiting exposure pathways, and reduces contamination levels and risk of future exposures.	**Good** Alternative is protective of human health and the environment and reduces contaminant levels and risk of future exposure.
Compliance with ARARs	**Poor** Alternative does not comply with ARARs.	**Very Good** Alternative complies with ARARs.	**Very Good** Alternative complies with ARARs.
Long-Term Effectiveness and Permanence	**Poor** Alternative does not reduce contamination levels or restrict exposure pathways.	**Fair** Requires long-term maintenance and enforcement of LUCs.	**Good** Effectively reduces contaminant levels and risk of future exposure.
Reduction in Toxicity, Mobility, and Volume Through Treatment	**Poor** Alternative does not reduce toxicity, mobility, or volume of contamination.	**Good** Alternative reduces mobility and volume of contamination through treatment.	**Good** Alternative reduces mobility and volume of contamination through treatment.
Short-Term Effectiveness	**Good** No physical disturbance resulting in increased exposure.	**Good** Appropriate precautions will be taken to minimize exposure to significant quantities of contaminated soil during excavation, transportation, and treatment.	**Good** Appropriate precautions will be taken to minimize exposure to significant quantities of contaminated soil during excavation, transportation, and treatment.
Technical and Administrative Feasibility and Availability of Services and Materials	**Good** Little maintenance is required.	**Good** LUCs will be successfully applied to restrict access for industrial use.	**Poor** Site obstructions prevent the excavation of all contaminated soils to levels acceptable for residential use.
Projected State Acceptance	**Poor** State acceptance is unlikely because contamination would not be removed.	**Good** State acceptance is likely because mobility and volume of contamination would be reduced. Site would be available for restricted future use.	**Good** State acceptance is likely because mobility and volume of contamination would be reduced. Contamination would be removed, and the site would be available for unrestricted future use.
Projected Community Acceptance	**Poor** Public acceptance is not likely because risk will not be reduced.	**Good** Public acceptance is likely. Site would be available for restricted future use.	**Good** Public acceptance is likely. Contamination would be removed from the site, and the site would be available for unrestricted future use.
Costs	**Very Good** $0	**Good** $131,795 (present value) $194,945 (future value)	**Poor** $1,363,497
Overall Rating	**Poor**	**Good**	**Fair**

Notes:
Scores based on scales of excellent, very good, good, fair, and poor.
ARAR = applicable or relevant and appropriate requirement
LUC = land use control
PCB = polychlorinated biphenyl

- 40 CFR Section 761.61(a)(4)(i)(B)(3) of the TSCA regulations state: "Bulk PCB remediation wastes may remain at a cleanup site at concentrations >25 parts per million (ppm) and ≤100 ppm if the site is covered with a cap meeting the requirements of paragraphs (a)(7) and (a)(8) of this section."
- Section 761.61(a)(7) of the TSCA regulations contains cap requirements for PCB-remediation waste. The term "cap" means, when referring to on-site cleanup and disposal of PCB remediation waste, "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 exposure, infiltration of water, and erosion. A cap of compacted soil shall have a minimum thickness of 25 cm (10 inches). A concrete or asphalt cap shall have a minimum thickness of 15 cm (6 inches). A cap must be of sufficient strength to maintain its effectiveness and integrity during the use of the cap surface which is exposed to the environment. A cap shall not be contaminated at a level ≥1 ppm PCB per Aroclor (or equivalent) or per congener."

The primary objective of the final remedy of LUCs at the five transformer sites is to prevent exposure to PCBs present in subsurface soil and prevent migration or relocation of contaminated soil to areas where human or ecological exposure could occur. The implementation of LUCs will ensure the long-term integrity of the existing soil caps and restrict land use to low-occupancy use only.

A summary of the restoration activities at each of the five transformer sites is provided below:

Building 3. The excavated area was backfilled to within 2 feet of the original surface with 3B-Fine aggregates, and the top 2 feet was restored with clean topsoil. The topsoil was graded to match the original slope of the ground and was seeded with Bermuda grass (PRC 1992).

Building 106. The excavated area at Subsite A was backfilled with a minimum of 18 inches of compacted clean coral fill and the surface was restored with 4 to 6 inches of topsoil. The excavated area at Subsite B was backfilled with a minimum of 6 to 8 inches of compacted clean coral fill, and the surface was repaved.

S-17. Approximately 1,005 square feet (ft^2) of concrete within the vault was cleaned by solvent extraction. The entire vault (extending to approximately 10 feet below ground surface) was then sealed with 56 cy of concrete.

Building 81. The excavated area was backfilled with a minimum of 18 inches of compacted treated soil, completed with topsoil, replanted with trees, and hydroseeded.

S-26. The excavated area at Subsite A was backfilled with a minimum of 6 to 8 inches of clean coral fill, followed by 4 ot 6 inches of top soil. The 2.5 foot excavation under the roadway was backfilled and visibly compacted to 95 percent. The roadway was repaved and the surface was restored with clean topsoil. The excavated area at Subsite B was backfilled with a minimum of 8.5 feet of clean coral fill and the surface was restored with 4 to 6 inches of clean topsoil. Also at Subsite B, the former concrete blocks were backfilled into the excavation site. The excavated area at Subsite C was backfilled with a minimum of 18 inches of clean coral fill, followed by 4 to 6 inches of clean topsoil (Earth Tech 2008a).

Backfill and compaction at all sites were performed in accordance with design specifications that were submitted and approved by the Navy, unless otherwise noted.

No compaction testing was completed at Building 3. The original design specification called for compaction testing, but the Navy concluded that completing the compaction testing was unnecessary. The adequacy of compaction at Building 3 was instead assessed visually (PRC 1992).

Clean coral fill was used as backfill for the excavation sites at Building 106, S-17, and S-26. Before the fill was placed, the Public Works Center (PWC) scarified the underlying subgrade of the excavation to a depth of 6 inches. The backfill was placed in horizontal lifts from 6 to 12 inches in loose depth. The backfill was compacted using compactor attachments, tandem rollers, or portable jumping-jack compactors. PWC compacted each lift before the overlying lift was placed. Soil was compacted to 90 percent of maximum dry density for landscaped areas and to 95 percent of maximum dry density for paved areas (American Society for Testing and Materials [ASTM] D 1557). Once sites were backfilled and compacted to the specified density, the surface was restored to match its pre-excavation appearance (Earth Tech 2008a).

Treated soil from the treatment system at Naval Air Station (NAS) Barber's Point was used as backfill for the excavation sites at Building 81. The soil was loaded into tandem dump trucks at the treatment site, transported to the excavation sites, and either dumped directly into, or temporarily stockpiled next to, the excavations. Soil was spread onto the excavation floor in 8-inch lifts using heavy equipment and compacted using compactor attachments, tandem rollers, or portable jumping-jack type compactors. Soil was compacted to 90 percent of maximum dry density for landscaped areas and to 95 percent of maximum dry density for paved areas (ASTM D 1557). Density testing was performed in accordance with ASTM D 2922 and D 1556. In addition, moisture content tests were also carried out in accordance with ASTM D 3017. Once sites were backfilled and compacted to the specified density, the surface was restored to match its pre-excavation appearance (ECC 2007).

Before topsoil was placed at Building 81, the backfill surface was cleared of all materials that might hinder subsequent maintenance operations. Topsoil previously removed from the treatment site at former NAS Barbers Point was stockpiled and reused or was imported from a commercial source and was free from subsoil, litter, and other objectionable material. Suitable topsoil was placed in the top 4 inches of all areas to be reseeded. Before the topsoil was put in place, the subgrade was scarified to a depth of 3 inches. Topsoil was spread in such a manner that planting could proceed with little additional soil preparation. Topsoil was spread uniformly but not compacted (Earth Tech 2003b).

The underground concrete vault at S-17 was encapsulated with concrete and was permanently closed to prevent any further infiltration of water and to remove the potential exposure pathway. Since the entire underground vault was filled with concrete, it was not necessary to paint the specified areas with epoxy encapsulant in two layers of contrasting color, in accordance with Section 761.30(p) of TSCA. Instead, the area was marked with a sign indicating the presence of PCBs (Earth Tech 2008a).

In summary, the site restoration completed at each of the five transformer sites complies with TSCA requirements for capping contamination as described in 40 CFR Section 761.61(a)(7).

LUCs were selected as the final remedy because it represents the best balance of the NCP evaluation criteria. It is protective of human health and the environment, complies with ARARs, reduces contaminant mobility, is cost effective, and meets response action objectives. Although no principal threat wastes exist at these five transformer sites, the selected remedy satisfies the statutory preference for removal and treatment as a principal element of the final remedy because treatment of PCB-contaminated soil and concrete was performed to the extent practicable through the NTCRA (40 CFR Section 300.430(a)(1)(iii)(A)).

2.12.2 Description of the Selected Final Remedy

The Navy and EPA, with concurrence by DOH, have selected LUCs as the final remedy for the five transformer sites at NCTAMSPAC. The Navy will modify its internal procedures to ensure that land use at the five transformer sites remains that of low occupancy only. If the Navy transfers the property, the Navy will ensure that the deeds and deed notices comply with TSCA requirements for land use restrictions. LUCs will be maintained until the concentrations of hazardous substances in soil and concrete are at levels to allow for unrestricted land use and exposure. The LUCs for the five transformer sites are presented in Section 2.12.3 and will be applied only to the affected area within the sites. Figures 4 through 9 show each of the five transformer sites and the boundaries of the LUCs. The elements of the selected final remedy include the following:

- Administering LUCs to restrict land use to low-occupancy use only, and to ensure long-term viability of the final remedy.

Details on the LUCs will be provided in an RAWP, submitted as a separate document.

2.12.3 Land Use Controls

The land use at Building 3, Building 106 and S-17, located at NCTAMSPAC Wahiawa Branch, and at Building 81 and S-26, located at NRTF Lualualei, is subject to specific restrictions. These restrictions, called LUCs, are an integral part of the final remedy selected for these sites. The risks necessitating LUCs are discussed in Section 2.7. Figures 4 through 9 show the five transformer sites with the areas designated where LUCs are to be implemented.

Land Use Control Performance Objectives. Performance objectives for the LUCs being implemented as an integral part of the final remedy at these five transformer sites are to restrict current and future land use to activities compatible with low-occupancy use and to ensure long-term viability of the final remedy. The LUCs for future land use imposed at the five transformer sites are presented below and will be applied only to the affected area within the sites (see Figures 4 through 9).

The following LUC performance objectives apply to the affected areas at all five transformer sites at NCTAMSPAC:

- Limit transformer sites to low-occupancy use only.
- Protect human health by reducing rates of exposure to contaminated soils or concrete left in place at the transformer sites.
- Ensure that site soil and concrete are not disturbed, excavated, or removed unless done in accordance with special handling procedures and with the prior consent of the Navy and EPA, with concurrence from DOH.
- Ensure no unauthorized access, use, and development occurs at the site including excavation or uncontrolled soil removal, and building of schools, day care, or recreational facilities.
- Ensure that all future site users and environmental regulators are aware that contamination is present at the sites at concentrations that may pose a risk under certain exposure scenarios.
- Ensure that all future site users and environmental regulators are aware that land use restrictions are imposed on the sites to protect human health and the environment.
- Ensure that legal notice of site contamination and LUCs is provided at multiple locations or in multiple documents (or both) where a person would typically look for the notice.

- Ensure that legal and physical notices of LUCs are maintained in perpetuity, until they are no longer needed, or until a ROD amendment or other such documentation is prepared based on the intent to change land use.

A RAWP will be prepared to document how the LUC component of the final remedy will be implemented. The RAWP will contain implementation and maintenance actions, including periodic inspections and reporting requirements for the LUC elements of the final remedy for the five transformer sites. The Navy is responsible for implementing, maintaining, reporting, and enforcing the LUCs until the LUCs are terminated. LUCs will be maintained until the concentrations of hazardous substances in soil and concrete are at levels to allow for unrestricted land use and exposure.

Should the property ever be transferred, the LUCs will be maintained through appropriate deed restrictions. In the event that the Navy transfers LUC responsibilities to another party by contract, property transfer agreement, or through other means, the Navy shall retain ultimate responsibility for remedy integrity.

The Navy shall implement internal procedures for upholding LUCs by maintaining a database of the LUCs (i.e. Naval Installation Restoration Information Solution). The Navy shall commit to notify EPA in advance of any changes to the internal procedures that would affect the LUCs.

2.12.4 Summary of the Estimated Final Remedy Costs

Detailed costs for adding LUCs to the previously completed removal actions were not evaluated for the alternatives compared in this ROD. A detailed comparison of costs for the removal action was previously provided in the removal AM. LUCs are now being evaluated as part of the final remedy because removing PCB-contaminated soil and concrete to the TSCA high-occupancy cleanup levels was unfeasible based on operational and anticipated cost constraints.

The estimated cost for the LUCs (including inspections and maintenance) and 5-year reviews is $5,000/year for 30 years.

2.12.5 Expected Outcomes of the Selected Final Remedy

The selected final remedy at the five transformer sites will eliminate future human health risks by limiting PCB-contaminated soils and concrete to levels protective of low-occupancy use and by implementing LUCs to limit exposure pathways of human receptors to contaminants at these sites. By maintaining LUCs, the selected remedy reduces risks to human health to acceptable levels. The final remedy does not change the current land use at Buildings 3, 106, S-17 and 81, or the planned future land use at transformer S-26.

2.12.6 Selected Final Remedy Ongoing Activities

Five-Year Reviews are required to evaluate the effectiveness of the final remedy for the five transformer sites at NCTAMSPAC.

2.13 STATUTORY DETERMINATIONS

The implementation of LUCs at the five transformer sites is protective of human health and the environment, complies with ARARs, and is cost-effective. The following sections summarize how the selected remedy meets these statutory requirements.

2.13.1 Protection of Human Health and the Environment

Implementing LUCs limits exposure pathway of human receptors to contaminants at the five transformer sites. By maintaining LUCs, the selected remedy reduces risks to human health to acceptable levels. The five transformer sites are small areas and are considered a disturbed habitat of low ecological quality. Therefore, there are no unacceptable risks to the environment.

2.13.2 Compliance with Applicable or Relevant and Appropriate Requirements

As required by CERCLA, SARA, and EPA policy, response actions are required to attain ARARs.

- "Applicable requirements" are defined as those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site.
- "Relevant and appropriate requirements" are defined as those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not directly applicable to a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site.

Because ARARs do not exist for every chemical or circumstance, nonpromulgated federal or state advisories, criteria, or guidance materials (TBC materials) may help determine the levels or goals that are protective for a site and the necessary approach to carry out certain actions or requirements. TBCs are nonpromulgated federal, state, or local advisories or guidance that are not legally binding and do not have the status of ARARs. The NCP does not require agencies to follow TBCs; however, it does suggest that TBCs be used when ARARs do not exist and when ARARs alone would not adequately protect human health and the environment.

ARARs and TBCs fall into three broad categories:

- Chemical-specific, which establish numerical standards limiting the concentration of substances in the medium of concern or medium affected by the cleanup action.
- Location-specific, which restrict the concentration of a substance or the performance of the cleanup action on the basis of site location.
- Action-specific, which restrict the performance and design standards of a particular cleanup action on the basis of a technology or activity.

ARARs and TBCs are used as screening criteria to assess the extent of significant contamination, to formulate response alternatives, and to govern the implementation and operation of a selected action. According to SARA, EPA may waive ARARs under specific conditions, but only if protection of human health and the environment is still assured.

Federal and state chemical-specific, location-specific, and action-specific ARARs and TBCs pertinent to the evaluation of response actions for five transformer sites are summarized below. A detailed description of the ARARs and TBC criteria is provided in the EE/CA (Earth Tech 2000).

Chemical-Specific ARAR and TBCs

The following ARARs and TBC were identified for the five transformer sites at NCTAMSPAC.

ARARs:

- **40 CFR 761.61(a)(4) of the TSCA regulations for PCB remediation waste.** Section 761.61(a)(4) contains cleanup levels for PCB remediation wastes. These cleanup levels are applicable to the action at the five transformer sites. Section 761.61(a)(4) sets cleanup levels for PCB bulk remediation waste at less than or equal to 1 mg/kg for high-occupancy areas and less than or equal to 25 ppm for low-occupancy areas. These restrictions are applicable to the LUCs at the five transformer sites.
- **40 CFR 761.79(b)(4) and 40 CFR 761.30(p) of the TSCA regulations for cleanup and disposal of PCB remediation waste for porous surfaces.** These regulations outlines cleanup and disposal procedures for porous surfaces. These regulations are applicable to the LUCs at the five transformer sites.

TBC:

- **State of Hawaii DOH Tier 1 Soil Action Level.** Under a conservative residential exposure scenario of ingestion, inhalation, and dermal contact, the State of Hawaii DOH considers 1 mg/kg of PCBs in soil as the acceptable human health risk level. This TBC criterion provides guidance but is not a promulgated regulation. The PCB cleanup level for the removal action at the five transformer sites had been established under TSCA and was consistent with the Hawaii DOH Tier 1 Soil Action Level of 1 mg/kg.

Action-Specific ARARs and TBCs

The following ARARs were identified for the response action at the five transformer sites at NCTAMSPAC:

- **40 CFR 761.61(a)(7) of the TSCAregulations for cap requirements, for areas where remediation waste was removed or left in place.** Section 761.61(a)(7) outlines the requirements for capped surfaces in order to prevent or minimize human exposure, infiltration of water, and erosion of the remediated waste. These restrictions are applicable to the LUCs at the five transformer sites.

- **40 CFR 761.61(a)(8)of the TSCA regulations for deed restrictions for caps, fences, and low-occupancy areas.** Section 761.61(a)(8) outlines deed restrictions and maintenance requirements for areas that have undergone PCB remediation and include the use of a cap or fence. These restrictions are applicable to the LUCs at the five transformer sites.

The selected remedy of implementation of LUCs complies with the ARARs and TBCs listed above because implementation of LUCs limits exposure of human receptors to the contaminants left in place, reducing risks to acceptable levels. The LUCs selected for the five transformer sites are relevant and appropriate. In summary, the selected remedy of implementation of LUCs at the five transformer sites complies with 40 CFR Section 300.430(e)(9)(iii)(B).

2.13.3 Cost-Effectiveness

LUCs provide a cost-effective remedy by establishing restrictions on land use for the five transformer sites at NCTAMSPAC. The selected final remedy is effective in meeting remedial action objectives and protecting human health and the environment, is implementable, and is cost effective.

2.13.4 Utilization of Permanent Solutions and Alternative Treatment Technologies

The selected alternative represents the maximum extent to which permanent solutions and treatment technologies can be used in a cost-effective manner. Specifically, this alternative provides the best short- and long-term effectiveness, is protective of human health and the environment, complies with ARARs, achieves removal action objectives, is feasible, and reduces contaminant mobility.

2.13.5 Preference for Treatment as a Principal Element

The NCP (40 CFR Section 300.430(a)(1)(iii)(A)) establishes the expectation that treatment will be used to address the principal threats at a site where practicable. A principal threat waste is a source material considered to be highly toxic or mobile and cannot be contained in a reliable manner or would present a significant risk to human health and the environment should exposure occur. Although no principal threat wastes were identified at the five transformer sites as discussed in Section 2.11, this final remedy satisfies the statutory preference for removal and treatment as a principal element of the final remedy.

Through the removal action at the five transformer sites, the toxicity, volume, and mobility of PCBs were reduced by excavating the soil and then treating the excavated soil by thermal desorption. The final remedial action described in this document was developed in accordance with CERCLA and concludes that LUCs will provide protection of human health at these five sites.

LUCs at these five sites will limit the future use of the property and limit pathways for human exposure to contamination to acceptable levels. LUCs for these sites will remain in effect until a ROD addendum or other such documentation is prepared due to intent to change land use.

2.13.6 Five-Year Review Requirement

Because the selected alternative results in contaminants remaining at the five transformer sites above levels that allow for high-occupancy use, a Five-Year Review is required every five years after the initiation of the final remedy to ensure that the LUC elements of the final remedy remain protective of human health and the environment.

2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

No comments were received on the preferred remedy during the review of the proposed plan (DON 2006b). However, two transformer sites (Building 121 and Building 242 located at NCTAMS PAC Wahiawa) that were previously identified in the proposed plan now require further evaluation. A revised proposed plan will be prepared for these two sites.

3. Responsiveness Summary

A public notice, announcing the availability for review of the proposed plan (DON 2006b) and other project related documents, was published in the *Honolulu Advertiser* and *Star Bulletin* on June 25, 2006. A 30-day public comment period for the proposed plan was held from June 27, 2006, to July 26, 2006. In addition, public meetings to discuss the proposed plan were held on July 20, 2006, at the Leeward Community College, Pearl City, Hawaii, on July 24, 2006, at the Waianae Public Library, Waianae, Hawaii, and on July 25, 2006, at the Wahiawa Recreation Center, Wahiawa, Hawaii. Complete transcripts of the public meetings are available in the AR file. No verbal or written comments were received on the proposed plan at these meetings.

3.1 STAKEHOLDER ISSUES AND LEAD AGENCY RESPONSES

No stakeholder issues were received on the selected final remedy presented in the proposed plan.

3.2 TECHNICAL AND LEGAL ISSUES

No technical or legal issues were received on the selected final remedy presented in the proposed plan.

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Attachment A
RACR-Record of Decision
Cross-Reference Checklist

The record of decision for the five transformer sites at Naval Computer and Telecommunications Area Master Station Pacific incorporates elements of a streamlined Remedial Action Completion Report (RACR), as described in the *Department of Defense (DoD)/EPA Joint Guidance on Streamlined Closeout and NPL Deletion Process* (DoD 2006). The purpose of a streamlined RACR is to document the achievement of the removal action objectives at a site. Table A-1 below summarizes the streamlined RACR sections that correspond to the decision document sections.

Table A-1: RACR-Record of Decision Cross-Reference Checklist

RACR Section Contents	Corresponding Decision Document Section(s)
A. Overview - A brief discussion of • Site characteristics, • Chemicals of potential concern, and • Major findings and results of site investigation activities.	2.1: Site Name, Location, and Description 2.2.1: Site History 2.5: Site Characteristics
B. Remedial Action Objectives - Identifies the remedial action objectives and cleanup standards specified in the Decision Document, and subsequent modifications, if any.	2.5: Site Characteristics 2.8: Response Action Objectives
C. Remedial Actions - Briefly discusses the remedial actions taken to meet the remedial objectives.	2.2.1: Site History
D. Demonstration of Completion - Presents information needed to demonstrate attainment of remedial objectives, e.g., final sampling report, visual inspection report.	2.2.1 Site History
E. Ongoing Activities - Describes the activities, if any, still being performed or to be performed, e.g., operations and maintenance, Five-Year Reviews.	2.12.2: Description of Selected Final Remedy 2.12.6: Selected Final Remedy Ongoing Activities
F. Community Relations - Briefly summarizes the public outreach activities conducted at the site, e.g., community relations plan; the date the RAB was formed and terminated; the dates of public meetings; environmental justice initiatives.	2.3: Highlights of Community Participation 3: Responsiveness Summary
G. Certification Statement - A statement by a U.S. Navy representative authorized to sign decision documents, certifying that the RACR memorializes the completion of the remedial action objectives.	1.7: Authorizing Signatures

Attachment B
EPA Region 9 Federal Facility LUC ROD Checklist

EPA Region 9

FEDERAL FACILITY LAND USE CONTROL ROD CHECKLIST

(Navy/Army, DLA RODs, #s 1-9 below and RD/RAWP, #s 10-19 below /Air Force RODs, #s 1-19 below)

Cross-Checked Against Navy Record of Decision and Land Use Control Remedial Action Work Plan

No.	Checklist Item	Section Where Addressed
To Be Addressed in the Record of Decision		
1	Map/Figure showing boundaries of the land use controls	Figures 5 to 12
2	Document risk exposure assumptions and reasonably anticipated land uses, as well as any known prohibited uses which might not be obvious based on the reasonably anticipated land uses. (For example, where "unrestricted industrial" use is anticipated, list prohibited uses such as on-site company day-care centers, recreation areas, etc.)	Section 1.4: Description of selected remedy Section 2.6.2: Post-removal action and future land use
3	Describe the risks necessitating the LUCs.	Sections 2.7 and 2.7.1 to 2.7.5 : Summary of site risks
4	State the LUC performance objectives. We have had comments on these because several of the objectives have not been clear. The following are some examples of what we have been looking for: • Prohibiting digging or disturbing of site soil. • Prohibiting excavation and removal of site soil to an offsite location. • Prohibiting the development and use of the property for residential housing, elementary or secondary schools, and child care facilities. • Ensuring protective covers are maintained. • Ensuring metals have not impacted the underlying shallow groundwater at the Bldg. 284 Site at concentrations that could adversely impact adjacent Pearl Harbor.	Section 2.12.3: Land Use Controls
5	Generally describe the LUC (restriction), the logic for its selection and any related deed restrictions/notifications.	Section 1.4: Description of selected remedy Section 2.12.1: Summary of the rationale for the selected final remedy Section 2.12.2: Description of selected final remedy
6	Duration language: *"Land Use Controls will be maintained until the concentration of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and exposure."*	Section 2.12.3: Land Use Controls
7	Include language that the Navy is responsible for implementing, maintaining, reporting on, and enforcing the land use controls. This may be modified to include another party should the site-specific circumstances warrant it.	Section 2.12.3: Land Use Controls
8	Where someone else will or the Navy plans that someone else will ultimately be implementing, maintaining, reporting on, and enforcing land use controls, the following language should be included: *"Although the Navy may later transfer [has transferred] these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Navy shall retain*	Section 2.12.3: Land Use Controls

No.	Checklist Item	Section Where Addressed
	ultimate responsibility for remedy integrity."	
9	Refer to the remedial design (RD) or remedial action work plan (RAWP) for the implementation actions. Because this is a new idea (i.e., including the LUC implementation actions in either or both of these two primary documents), to ensure that the requirement is clear and enforceable, we developed the following language where it makes sense: *"A LUC Work Plan will be prepared as the land use component of the Remedial Design. Within 90 days of ROD signature, the Navy shall prepare and submit to EPA for review and approval a LUC Work Plan that shall contain implementation and maintenance actions, including periodic inspections."*	Section 1.4: Description of selected remedy Section 2.12.3: Land Use Controls
To Be Addressed in the Land Use Control Remedial Action Work Plan (RAWP)		
10	Commitment by military service to address any situation that may interfere with the effectiveness of LUC: *"Any activity that is inconsistent with the IC objectives or use restrictions, or any other action that may interfere with the effectiveness of the ICs will be addressed by the Navy as soon as practicable, but in no case will the process be initiated later than 10 days after the Navy becomes aware of the breach."*	
11	Commitment by military service to notify EPA of and address any situation that may interfere with the effectiveness of LUC: *"The Navy will notify EPA and DOH as soon a practicable but no longer than ten days after discovery of any activity that is inconsistent with the IC objectives or use restrictions, or any other action that may interfere with the effectiveness of the ICs The Navy will notify EPA and DOH regarding how the Navy has addressed or will address the breach within 10 days of sending EPA and DOH notification of the breach."*	
12	Notification to EPA and the state regarding land use changes: <u>For a closing base:</u> *"Prior to seeking approval from the EPA and DOH the recipient of the property must notify and obtain approval from the Navy of any proposals for a land use change at a site inconsistent with the use restrictions and assumptions described in this ROD Amendment."* <u>For an active base:</u> *"The Navy shall notify EPA and state 45 days in advance of any proposed land use changes that are inconsistent with land use control objectives or the selected remedy."*	
13	Notification regarding transfers and federal-to-federal transfers: *"The Navy will provide notice to EPA and DOH at least six (6) months prior to any transfer or sale of [OUs at issue] so that EPA and DOH can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective ICs. If it is not possible for the facility to notify EPA and DOH at least six months prior to any transfer or sale, then the facility will notify EPA and DOH as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to ICs. In addition to the land transfer notice and discussion provisions above, the Navy further agrees to provide EPA and DOH with similar notice, within the same time frames, as to federal-to-federal transfer of property. The Navy shall provide a copy of executed deed or transfer assembly to EPA and DOH."*	
14	Concurrence language: *"The Navy shall not modify or terminate Land Use Controls, implementation actions, or modify land use without approval by EPA and DOH. The Navy shall seek prior concurrence before any anticipated action that may disrupt the effectiveness of the LUCs or any action that may alter or negate the need for LUCs."*	
15	Monitoring and reporting language: *"Monitoring of the environmental use restrictions and controls will be conducted annually [or more or less frequently as may be determined to be necessary based upon site activities or conditions] by the Navy. The monitoring results will be included in a separate report or as a*	

No.	Checklist Item	Section Where Addressed
	section of another environmental report, if appropriate, and provided to the EPA and DOH. The annual monitoring reports will be used in preparation of the Five Year Review to evaluate the effectiveness of the remedy. *The annual monitoring report, submitted to the regulatory agencies by the Navy, will evaluate the status of the ICs and how any IC deficiencies or inconsistent uses have been addressed. The annual evaluation will address whether the use restrictions and controls referenced above were communicated in the deed(s), whether the owners and state and local agencies were notified of the use restrictions and controls affecting the property, and whether use of the property has conformed with such restrictions and controls."*	
16	A comprehensive list of LUCs. If the description of the LUCs in #5 above is comprehensive, it could substitute for #16's listing of LUCs.	
17	For active facilities, a description of the internal procedures for implementing the LUCs (e.g., orders, instructions, Base Master Plan) and a commitment by the Navy to notify EPA and DOH in advance of any changes to the internal procedures that would affect the LUCs.	
18	Other property transfer language: a. "Deed Restrictions: "Each transfer of fee title from the United States will include a CERCLA 120(h)(3) covenant which will have a description of the residual contamination on the property and the environmental use restrictions, expressly prohibiting activities inconsistent with the performance measure goals and objectives. The environmental restrictions are included in a section of the CERCLA 120(h)(3) covenant that the United States is required to include in the deed for any property that has had hazardous substances stored for one year or more, known to have been released or disposed of on the property. Each deed will also contain a reservation of access to the property for the Navy, USEPA, and DOH, and their respective officials, agents, employees, contractors, and subcontractors for purposes consistent with the Navy's Installation Restoration Program ("IRP") or the Federal Facility Agreement ("FFA"). The deed will contain appropriate provisions to ensure that the restrictions continue to run with the land and are enforceable by the Navy." b. "Lease Restrictions: " During the time between the adoption of this ROD and deeding of the property, equivalent restrictions are being implemented by lease terms, which are no less restrictive than the use restrictions and controls described above, in this ROD. These lease terms shall remain in place until the property is transferred by deed, at which time they will be superseded by the institutional controls described in this ROD." c. "Notice: "Concurrent with the transfer of fee title from the Navy to transferee, information regarding the environmental use restrictions and controls will be communicated in writing to the property owners and to appropriate state and local agencies to ensure such agencies can factor such conditions into their oversight and decision-making activities regarding the property."	
19	Ensure that the document adequately describes pre-transfer LUCs, not just post-transfer LUCs.	

Attachment C
RACER Cost Estimate Details

Attachment C.1
Alternative 2 Cost Estimate

NCTAMS Transformers Site HC04 Alternative 2
Land Use Controls
(Escalated)

Site Name: NCTAMS Transformers
Site ID: HC04
Alternative 2: LUCs
Location: NCTAMS, Oahu, Hawaii
Report Option: Fiscal

Estimator: Keith Robertson

Name: **Reviewer:** Mike West
Title: Senior Cost Engineer
Agency/Org./Office: AECOM
5575 DTC Parkway Suite 325
Business Address: Greenwood Village, CO 80111
Phone: 303-224-6777
Email: Mike.West2@aecom.com

Prepared Date: 3/24/2010

Phase Type	Phase Name	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018
Long Term Monitoring	Site HC04 Alt2, Land Use Controls FY2010-2040	$3,614	$3,614	$3,614	$3,614	$3,614	$3,614	$3,614	$3,614
Long Term Monitoring	Site HC04 Alt2, 5-Year Reviews	$0	$0	$0	$0	$5,275	$0	$0	$0
Sub-total with mark-ups		$3,614	$3,614	$3,614	$3,614	$8,889	$3,614	$3,614	$3,614
Escalation Factor		1.0404	1.0612	1.0824	1.1041	1.1262	1.1487	1.1717	1.1951
Total		$3,760	$3,835	$3,912	$3,990	$10,011	$4,151	$4,235	$4,319
Year		0	1	2	3	4	5	6	7
Present Value Discount Rate (2.7%)		1.0000	0.9737	0.9481	0.9232	0.8989	0.8753	0.8523	0.8299
Present Worth Value		**$3,760**	**$3,734**	**$3,709**	**$3,684**	**$8,999**	**$3,634**	**$3,609**	**$3,584**

Note: A 2.7 percent discount rate was used to calculate present value costs based upon the rates published in Appendix C of the *Circular A-94 Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs* (United States Office of Management and Budget, 2009)

NCTAMS Transformers Site HC04 Alternative 2
Land Use Controls
(Escalated)

Site Name: NCTAMS Transformers
Site ID: HC04
Alternative 2: LUCs
Location: NCTAMS, Oahu, Hawaii
Report Option: Fiscal

Name:
Title:
Agency/Org./Office:

Business Address:
Phone:
Email:
Prepared Date:

Phase Type	**FY2019**	**FY2020**	**FY2021**	**FY2022**	**FY2023**	**FY2024**	**FY2025**	**FY2026**	**FY2027**	**FY2028**	**FY2029**	**FY2030**	**FY2031**	**FY2032**
Long Term Monitoring	$3,614	$3,614	$3,614	$3,614	$3,614	$3,614	$3,614	$3,614	$3,614	$3,614	$3,614	$3,614	$3,614	$3,614
Long Term Monitoring	$0	$5,275	$0	$0	$0	$0	$5,275	$0	$0	$0	$0	$5,275	$0	$0
Sub-total with mark-ups	$3,614	$8,889	$3,614	$3,614	$3,614	$3,614	$8,889	$3,614	$3,614	$3,614	$3,614	$8,889	$3,614	$3,614
Escalation Factor	1.2190	1.2434	1.2682	1.2936	1.3195	1.3459	1.3728	1.4002	1.4282	1.4568	1.4859	1.5157	1.5460	1.5769
Total	$4,405	$11,053	$4,583	$4,675	$4,769	$4,864	$12,203	$5,060	$5,162	$5,265	$5,370	$13,473	$5,587	$5,699
Year	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Present Value Discount Rate (2.7%)	0.8080	0.7868	0.7661	0.7460	0.7264	0.7073	0.6887	0.6706	0.6529	0.6358	0.6191	0.6028	0.5869	0.5715
Present Worth Value	**$3,560**	**$8,696**	**$3,511**	**$3,487**	**$3,464**	**$3,440**	**$8,404**	**$3,393**	**$3,370**	**$3,347**	**$3,324**	**$8,121**	**$3,279**	**$3,257**

Note: A 2.7 percent discount rate was used to calculate present value costs based upon the rates published in Appendix C of the *Circular A-94 Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs* (United States Office of Management and Budget, 2009)

NCTAMS Transformers Site HC04 Alternative 2
Land Use Controls
(Escalated)

Site Name: NCTAMS Transformers
Site ID: HC04
Alternative 2: LUCs
Location: NCTAMS, Oahu, Hawaii
Report Option: Fiscal

Name:
Title:
Agency/Org./Office:

Business Address:
Phone:
Email:
Prepared Date:

Phase Type	FY2033	FY2034	FY2035	FY2036	FY2037	FY2038	FY2039	FY2040	Row Total
Long Term Monitoring	$3,614	$3,614	$3,614	$3,614	$3,614	$3,614	$3,614	$3,614	$108,420
Long Term Monitoring	$0	$0	$5,275	$0	$0	$0	$0	$5,275	$31,650
Sub-total with mark-ups	$3,614	$3,614	$8,889	$3,614	$3,614	$3,614	$3,614	$8,889	$140,070
Escalation Factor	1.6084	1.6406	1.6734	1.7069	1.7410	1.7758	1.8114	1.8476	
Total	$5,813	$5,929	$14,875	$6,169	$6,292	$6,418	$6,546	$16,423	$198,846
Year	22	23	24	25	26	27	28	29	
Present Value Discount Rate (2.7%)	0.5565	0.5419	0.5276	0.5137	0.5002	0.4871	0.4743	0.4618	
Present Worth Value	**$3,235**	**$3,213**	**$7,848**	**$3,169**	**$3,147**	**$3,126**	**$3,105**	**$7,584**	**$131,795**

Note: A 2.7 percent discount rate was used to calculate present value costs based upon the rates published in Appendix C of the *Circular A-94 Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs* (United States Office of Management and Budget, 2009)

Alternative Cost Over Time Report
(with Markups)

System:

RACER Version: 10.2.0
Database Location: C:\Documents and Settings\testguest\Desktop\Hawaii\AECOM Honolulu Office Transformer Estimates.mdb

Folder:

Folder Name: NCTAMS and PHNC Estimates

Site:

Site ID: 92244.00.64.02_1
Site Name: NCTAMS Transformer Remediation Project
Site Category: None

Location

State / Country: HAWAII
City: HONOLULU

Location Modifier	Default	User
	1.690	1.690

Options

Database: Modified System
Cost Database Date: 2009
Report Option: Fiscal

Alternative Cost Over Time Report
(with Markups)

Description	Naval Computer & Telecommunications Area Master Station (NCTAMS) Transformer Remediation Project Location: Honolulu, HI Sites included in the estimate: Building 3, Building 106A, Building 106B, S-17, Building 81 and S-26. Three (3) alternatives will be evaluated: 1) No Action 2) Land Use Controls 3) Excavation to High Occupancy Reuse and Thermal Desorption Treatment

Alternative Cost Over Time Report
(with Markups)

Alternative:

Alternative ID: NCTAMS 0002
Alternative Name: Alt #2: Land Use Controls
Alternative Type: None

Media/Waste Type
Primary: Soil
Secondary: N/A

Contaminant
Primary: PCBs
Secondary: None

Phase Names
Pre-Study: ☐
Study: ☐
Design: ☐
Removal/Interim Action: ☐
Remedial Action: ☐
Operations & Maintenance: ☐
Long Term Monitoring: ☑
Site Closeout: ☐

Documentation
Description: Alternative #2 - Land Use Controls
This alternative assumes that the soil remediation has already taken place. The activities captured in this alternative include 5 Year Reporting and a one 1 page annual letter report with a site visit, annually. The estimated long-term monitoring duration is 30 years.

Support Team: Jeff Johnson
AECOM
841 Bishop Street, Suite 500
Honolulu, HI 96813
Phone Number: (808) 523-8874

Alternative Cost Over Time Report
(with Markups)

References: Reference Documents:
ConfSamples_5Trans_NCTAMS.pdf
Email Communications: CE for PCB Removal Actions at Hickam AFB; Transformer Volumes; Transformer soil/concrete volumes; and Cost Estimate.

Estimator Information

Estimator Name: Andrew Schleppi, CCC
Estimator Title: Cost Engineer
Agency/Org./Office: AECOM
Business Address: 5575 DTC Parkway
Suite 200
Greenwood Village, CO 80111
Telephone Number: 303-771-3103
Email Address: andrew.schleppi@aecom.com

Estimate Prepared Date: 10/27/2009

Estimator Signature: _____ Date: _____

Reviewer Information

Reviewer Name:
Reviewer Title:
Agency/Org./Office:
Business Address:
Telephone Number:
Email Address:
Date Reviewed:

Reviewer Signature: _____ Date: _____

Alternative Cost Over Time Report
(with Markups)

Phase Type	Phase Name	2010	2011	2012	2013	2014	2015
Long Term Monitoring	Land Use Controls Phase	$3,614	$3,614	$3,614	$3,614	$8,889	$3,614
Total Alternative Cost		$3,614	$3,614	$3,614	$3,614	$8,889	$3,614
Escalation Factor		1.0200	1.0404	1.0612	1.0824	1.1041	1.1262
Escalated Cost		$3,686	$3,760	$3,835	$3,912	$9,814	$4,070

Alternative Cost Over Time Report
(with Markups)

Phase Type	Phase Name	2016	2017	2018	2019	2020	2021
Long Term Monitoring	Land Use Controls Phase	$3,614	$3,614	$3,614	$8,889	$3,614	$3,614
Total Alternative Cost		$3,614	$3,614	$3,614	$8,889	$3,614	$3,614
Escalation Factor		1.1487	1.1717	1.1951	1.2190	1.2434	1.2682
Escalated Cost		$4,151	$4,234	$4,319	$10,836	$4,494	$4,583

Alternative Cost Over Time Report
(with Markups)

Phase Type	Phase Name	2022	2023	2024	2025	2026	2027
Long Term Monitoring	Land Use Controls Phase	$3,614	$3,614	$8,889	$3,614	$3,614	$3,614
Total Alternative Cost		$3,614	$3,614	$8,889	$3,614	$3,614	$3,614
Escalation Factor		1.2936	1.3195	1.3459	1.3728	1.4002	1.4282
Escalated Cost		$4,675	$4,769	$11,964	$4,961	$5,060	$5,161

Alternative Cost Over Time Report
(with Markups)

Phase Type	Phase Name	2028	2029	2030	2031	2032	2033
Long Term Monitoring	Land Use Controls Phase	$3,614	$8,889	$3,614	$3,614	$3,614	$3,614
Total Alternative Cost		$3,614	$8,889	$3,614	$3,614	$3,614	$3,614
Escalation Factor		1.4568	1.4859	1.5157	1.5460	1.5769	1.6084
Escalated Cost		$5,265	$13,208	$5,478	$5,587	$5,699	$5,813

Alternative Cost Over Time Report
(with Markups)

Phase Type	Phase Name	2034	2035	2036	2037	2038	2039
Long Term Monitoring	Land Use Controls Phase	$8,889	$3,614	$3,614	$3,614	$3,614	$8,889
Total Alternative Cost		$8,889	$3,614	$3,614	$3,614	$3,614	$8,889
Escalation Factor		1.6406	1.6734	1.7069	1.7410	1.7758	1.8114
Escalated Cost		$14,583	$6,048	$6,169	$6,292	$6,418	$16,101

Alternative Cost Over Time Report
(with Markups)

Phase Type	Phase Name	Total
Long Term Monitoring	Land Use Controls Phase	$140,069
Total Alternative Cost		$140,069
Escalation Factor		
Escalated Cost		$194,945

Estimate Documentation Report

System:

RACER Version: 10.2.0
Database Location: C:\Documents and Settings\testguest\Desktop\Hawaii\AECOM Honolulu Office Transformer Estimates.mdb

Folder:

Folder Name: NCTAMS and PHNC Estimates

Site:

Site ID: 92244.00.64.02_1
Site Name: NCTAMS Transformer Remediation Project
Site Category: None

Location

State / Country: HAWAII
City: HONOLULU

Location Modifier	Default	User
	1.690	1.690

Options

Database: Modified System
Cost Database Date: 2009
Report Option: Fiscal

Description

Naval Computer & Telecommunications Area Master Station (NCTAMS)
Transformer Remediation Project
Location: Honolulu, HI
Sites included in the estimate: Building 3, Building 106A, Building 106B, S-17, Building 81 and S-26.

Three (3) alternatives will be evaluated:
1) No Action
2) Land Use Controls
3) Excavation to High Occupancy Reuse and Thermal Desorption Treatment

Estimate Documentation Report

Alternative Documentation:

Alternative ID:	NCTAMS 0002
Alternative Name:	Alt #2: Land Use Controls
Alternative Type:	None

Media/Waste Type

Primary:	Soil
Secondary:	N/A

Contaminant

Primary:	PCBs
Secondary:	None

Phase Names

Pre-Study:	☐
Study:	☐
Design:	☐
Removal/Interim Action:	☐
Remedial Action:	☐
Operations & Maintenance:	☐
Long Term Monitoring:	☑
Site Closeout:	☐

Documentation

Description:	Alternative #2 - Land Use Controls This alternative assumes that the soil remediation has already taken place. The activities captured in this alternative include 5 Year Reporting and a one 1 page annual letter report with a site visit, annually. The estimated long-term monitoring duration is 30 years.
Support Team:	Jeff Johnson AECOM 841 Bishop Street, Suite 500 Honolulu, HI 96813 Phone Number: (808) 523-8874
References:	Reference Documents: ConfSamples_5Trans_NCTAMS.pdf Email Communications: CE for PCB Removal Actions at Hickam AFB; Transformer Volumes; Transformer soil/concrete volumes; and Cost Estimate.

Estimator Information

Estimator Name:	Andrew Schleppi, CCC
Estimator Title:	Cost Engineer
Agency/Org./Office:	AECOM
Business Address:	5575 DTC Parkway Suite 200 Greenwood Village, CO 80111
Telephone Number:	303-771-3103

Estimate Documentation Report

Email Address: andrew.schleppi@aecom.com
Estimate Prepared Date: 10/27/2009

Estimator Signature: _____ Date: _____

Reviewer Information
Reviewer Name:
Reviewer Title:
Agency/Org./Office:
Business Address:
Telephone Number:
Email Address:
Date Reviewed:

Reviewer Signature: _____ Date: _____

Estimated Costs:

Phase Names		Direct Cost	Marked-up Cost
Land Use Controls Phase		$135,571	$140,069
	Total Cost:	$135,571	$140,069
	Escalation:	$53,170	$54,876
	Total Alternative Cost:	$188,741	$194,945

Estimate Documentation Report

Phase Documentation:

Phase Type:	Long Term Monitoring
Phase Name:	Land Use Controls Phase
Description:	Alternative #2: Land Use Controls Phase Start Date: January 2010 This phase of work will esitmate the annual site inspection and letter report, and 5-year review reports for a duration of 30 years.

Start Date:	January, 2010
Labor Rate Group:	Hawaii Generic Labor Rates - 2009
Analysis Rate Group:	System Analysis Rate
Phase Markups:	System Defaults

Technology Markups	Markup	% Prime	% Sub.
Five-Year Review	Yes	100	0
LETTER REPORT AND SITE VISIT	Yes	100	0

Total Marked-up Cost: $140,069

Technologies:

Estimate Documentation Report

Technology Name: Five-Year Review (# 1)

Description	Default	Value	UOM
System Definition			
Required Parameters			
Site Complexity		Low	n/a
Document Review		Yes	n/a
Interviews		No	n/a
Site Inspection		No	n/a
Report		Yes	n/a
Travel		No	n/a
Rebound Study		No	n/a
Start Date		January-2014	n/a
No. Reviews		6	EA
Document Review			
Required Parameters			
5-Year Review Check List		Yes	n/a
Record of Decision		Yes	n/a
Remedial Action Design & Construction		Yes	n/a
Close-Out Report		Yes	n/a
Operations & Maintenance Manuals & Reports		No	n/a
Consent Decree or Settlement Records		No	n/a
Groundwater Monitoring & Reports		No	n/a
Remedial Action Required		No	n/a
Previous 5-Year Review Reports		Yes	n/a
Report			
Required Parameters			
Introduction		Yes	n/a
Remedial Objectives		Yes	n/a
ARARs Review		Yes	n/a
Summary of Site Visit		No	n/a
Areas of Non Compliance		Yes	n/a
Technology Recommendations		No	n/a
Statement of Protectiveness		Yes	n/a
Next Review		Yes	n/a
Implementation Requirements		Yes	n/a

Estimate Documentation Report

Comments: Assumptions:
Deselected tasks not applicable to the NCTAMS project.

Technology Name: Administrative Land Use Controls (# 1)
User Name: LETTER REPORT AND SITE VISIT

Description	Default	Value	UOM
System Definition			
Required Parameters			
Rename Model		LETTER REPORT AND SITE VISIT	n/a
Planning Documents		No	n/a
Implementation		No	n/a
Monitoring & Enforcement		Yes	n/a
Monitoring & Enforcement: Start Date		2010	n/a
Modification/Termination		No	n/a
Type of Site		Active Government Installation	n/a
Monitoring & Enforcement			
Required Parameters			
Duration of Monitoring/Enforcement		30	Years
Notice Letters		No	n/a
Guard Service/Security		No	n/a
Reports & Certifications		Yes	n/a
Reports & Certifications: Frequency		Annually	n/a
Site Visits/Inspections		Yes	n/a
Site Visits/Inspections: Number		1	EA
Site Visits/Inspections: Safety Level		D	n/a
Site Visits/Inspections: Duration		1	Days
Site Visits/Inspections: Number of People		2	EA
Site Visits/Inspections: Frequency		Annually	n/a
Site Visits/Inspections: Airfare		0	$ Per Ticket
Site Visits/Inspections: Mileage		15	MI

Comments: This technology assumes that 2 Staff Engineers will visit the site once annually. One (1) letter report will be written annually. Minor project management time was included along with ODCs. Removed the Health & Safety Officer assembly.

Attachment C.2
Alternative 3 Cost Estimate

Alternative Cost Over Time Report
(with Markups)

System:

RACER Version: 10.2.0
Database Location: C:\Documents and Settings\testguest\Desktop\Hawaii\AECOM Honolulu Office Transformer Estimates.mdb

Folder:

Folder Name: NCTAMS and PHNC Estimates

Site:

Site ID: 92244.00.64.02_1
Site Name: NCTAMS Transformer Remediation Project
Site Category: None

Location

State / Country: HAWAII
City: HONOLULU

Location Modifier	Default	User
	1.690	1.690

Options

Database: Modified System
Cost Database Date: 2009
Report Option: Fiscal

Alternative Cost Over Time Report
(with Markups)

Description	Naval Computer & Telecommunications Area Master Station (NCTAMS) Transformer Remediation Project Location: Honolulu, HI Sites included in the estimate: Building 3, Building 106A, Building 106B, S-17, Building 81 and S-26. Three (3) alternatives will be evaluated: 1) No Action 2) Land Use Controls 3) Excavation to High Occupancy Reuse and Thermal Desorption Treatment

Alternative Cost Over Time Report
(with Markups)

Alternative:

Alternative ID:	NCTAMS 0003
Alternative Name:	Alt #3: Excavation, Treatment, Backfill
Alternative Type:	None

Media/Waste Type

Primary:	Soil
Secondary:	N/A

Contaminant

Primary:	PCBs
Secondary:	None

Phase Names

Pre-Study:	☐
Study:	☐
Design:	☐
Removal/Interim Action:	☐
Remedial Action:	☑
Operations & Maintenance:	☐
Long Term Monitoring:	☑
Site Closeout:	☐

Documentation

Description: Alternative #3: Excavation to high occupancy reuse and thermal desorption treatment

Excavation of soil/concrete, confirmation sampling, transport to treatment facility, treatment, transport back to transformer site, backfill basin.

Alternative Cost Over Time Report
(with Markups)

Support Team:	Jeff Johnson AECOM 841 Bishop Street, Suite 500 Honolulu, HI 96813 Phone Number: (808) 523-8874
References:	Reference Documents: ConfSamples_5Trans_NCTAMS.pdf Email Communications: CE for PCB Removal Actions at Hickam AFB; Transformer Volumes; Transformer soil/concrete volumes; and Cost Estimate.

Estimator Information

Estimator Name:	Andrew Schleppi, CCC
Estimator Title:	Cost Engineer
Agency/Org./Office:	AECOM
Business Address:	5575 DTC Parkway Suite 200 Greenwood Village, CO 80111
Telephone Number:	303-771-3103
Email Address:	andrew.schleppi@aecom.com
Estimate Prepared Date:	10/27/2009

Estimator Signature: _____ Date: _____

Reviewer Information

Reviewer Name:	
Reviewer Title:	
Agency/Org./Office:	
Business Address:	
Telephone Number:	
Email Address:	
Date Reviewed:	

Reviewer Signature: _____ Date: _____

Alternative Cost Over Time Report
(with Markups)

Phase Type	Phase Name	2010	Total
Remedial Action	Excavation and Treatment Activities	$1,336,761	$1,336,761
Total Alternative Cost		$1,336,761	$1,336,761
Escalation Factor		1.0200	
Escalated Cost		$1,363,497	$1,363,497

Estimate Documentation Report

System:

RACER Version: 10.2.0
Database Location: C:\Documents and Settings\testguest\Desktop\Hawaii\AECOM Honolulu Office Transformer Estimates.mdb

Folder:

Folder Name: NCTAMS and PHNC Estimates

Site:

Site ID: 92244.00.64.02_1
Site Name: NCTAMS Transformer Remediation Project
Site Category: None

Location

State / Country: HAWAII
City: HONOLULU

Location Modifier	Default	User
	1.690	1.690

Options

Database: Modified System
Cost Database Date: 2009
Report Option: Fiscal

Description: Naval Computer & Telecommunications Area Master Station (NCTAMS) Transformer Remediation Project
Location: Honolulu, HI
Sites included in the estimate: Building 3, Building 106A, Building 106B, S-17, Building 81 and S-26.

Three (3) alternatives will be evaluated:
1) No Action
2) Land Use Controls
3) Excavation to High Occupancy Reuse and Thermal Desorption Treatment

Estimate Documentation Report

Alternative Documentation:

Alternative ID:	NCTAMS 0003
Alternative Name:	Alt #3: Excavation, Treatment, Backfill
Alternative Type:	None

Media/Waste Type

Primary:	Soil
Secondary:	N/A

Contaminant

Primary:	PCBs
Secondary:	None

Phase Names

Pre-Study:	☐
Study:	☐
Design:	☐
Removal/Interim Action:	☐
Remedial Action:	☑
Operations & Maintenance:	☐
Long Term Monitoring:	☑
Site Closeout:	☐

Documentation

Description: Alternative #3: Excavation to high occupancy reuse and thermal desorption treatment

Excavation of soil/concrete, confirmation sampling, transport to treatment facility, treatment, transport back to transformer site, backfill basin.

Support Team: Jeff Johnson
AECOM
841 Bishop Street, Suite 500
Honolulu, HI 96813
Phone Number: (808) 523-8874

References: Reference Documents:
ConfSamples_5Trans_NCTAMS.pdf
Email Communications: CE for PCB Removal Actions at Hickam AFB; Transformer Volumes; Transformer soil/concrete volumes; and Cost Estimate.

Estimator Information

Estimator Name:	Andrew Schleppi, CCC
Estimator Title:	Cost Engineer
Agency/Org./Office:	AECOM
Business Address:	5575 DTC Parkway Suite 200 Greenwood Village, CO 80111

Estimate Documentation Report

Telephone Number: 303-771-3103
Email Address: andrew.schleppi@aecom.com

Estimate Prepared Date: 10/27/2009

Estimator Signature: _____ Date: _____

Reviewer Information
Reviewer Name:
Reviewer Title:
Agency/Org./Office:
Business Address:
Telephone Number:
Email Address:
Date Reviewed:

Reviewer Signature: _____ Date: _____

Estimated Costs:

Phase Names		Direct Cost	Marked-up Cost
Excavation and Treatment Activities		$1,296,839	$1,336,761
	Total Cost:	$1,296,839	$1,336,761
	Escalation:	$25,937	$26,735
	Total Alternative Cost:	$1,322,776	$1,363,497

Estimate Documentation Report

Phase Documentation:

Phase Type:	Remedial Action
Phase Name:	Excavation and Treatment Activities
Description:	Alternative #3: Excavation to high occupancy reuse and thermal desorption treatment This phase of work captures the cost of excavation of soil/concrete, confirmation sampling, transport to treatment facility, treatment, transport back to transformer site, backfill basin, and restore site. Sites included in the estimate: Bldg 3, Bldg 106A, Bldg 106B, S-17, Bldg 81 and S-26.
Approach:	Ex Situ
Start Date:	January, 2010
Labor Rate Group:	Hawaii Generic Labor Rates - 2009
Analysis Rate Group:	System Analysis Rate
Phase Markups:	System Defaults

Technology Markups	Markup	% Prime	% Sub.
THERMAL DESORPTION UNIT START UP COST	Yes	100	0
Excavation	Yes	100	0
Transportation	Yes	100	0
Excavation	Yes	100	0
Transportation	Yes	100	0
Excavation	Yes	100	0
Transportation	Yes	100	0
Excavation	Yes	100	0
Transportation	Yes	100	0
Excavation	Yes	100	0
Transportation	Yes	100	0
Excavation	Yes	100	0
Transportation	Yes	100	0
INDIRECT THERMAL TREATMENT OF IMPACTED MEDIA	Yes	100	0
Professional Labor Management	Yes	100	0
SITE PREP AND RESTORATION COSTS	Yes	100	0
SPENT FILTER CAKE/CARBON T&D	Yes	100	0

Total Marked-up Cost: $1,336,761

Technologies:

Estimate Documentation Report

Technology Name: User Defined Estimate (# 1)
User Name: THERMAL DESORPTION UNIT START UP COST

Description	Default	Value	UOM
System Definition			
Required Parameters			
Model Name		THERMAL DESORPTION UNIT START UP COST	n/a
WBS Type		HTRW	n/a
Selected WBS		331.01.90	n/a
Safety Level		D	n/a

Comments: This technology captures that cost to establish a thermal desorption unit. The technology includes a line item cost for mob/demob and a line item cost for proof of performance and shake down. The total startup cost of $600,000 was divided evenly between the NCTAMS and PHNC sites.

Estimate Documentation Report

Technology Name: Excavation (# 1)

Description	Default	Value	UOM
System Definition			
Required Parameters			
Estimating Method		Volume / Depth	n/a
Volume		12.7	CY
Depth		3.5	FT
Soil Type		Sand-Silt/Sand-Clay Mixture	n/a
Safety Level		D	n/a
Excavation			
Secondary Parameters			
Existing Cover	Soil/Gravel	< 6 IN Concrete, Rod Reinforced	n/a
Replacement Cover	Soil/Seeding	< 6 IN Concrete, Rod Reinforced	n/a
Sidewall Protection	None	None	n/a
% of Excavated Material To Be Used as Backfill	0	100	%
Source of Additional Fill	Off Site	None	n/a
Backfill Hauling Distance (one way)	0	0	MI
Dewatering Required	No	No	n/a
Analytical			
Secondary Parameters			
Primary Analytical Template	System Soil - PCBs	System Soil - PCBs	n/a
Secondary Analytical Template	None	None	n/a
Number of Sampling Points/Locations	5	14	EA
Number of Composites Submitted to Lab	5	14	EA
Turnaround Time	Standard (21 Days)	Standard (21 Days)	n/a
Submit Data Electronically	Yes	Yes	n/a
Data Package / QC	Stage 1	Stage 1	n/a
Lab Data Review	Stage 1	Stage 1	n/a
Sampling Reports	Abbreviated	Abbreviated	n/a

Comments: Excavation #1:
This technology captures the cost of excavation, confirmation sampling and reporting, and site restoration. Add an equipment operator for a full 8 hour day.
Site: Bldg 3, NCTAMSPAC Wahiawa
98 ft2 x 3.5’ depth = 12.7 yd3 soil
uilding 3 (NCTAMS Excavation #1): 14 samples

Estimate Documentation Report

Technology Name: Transportation (# 1)

Description	Default	Value	UOM
System Definition			
Required Parameters			
Waste Type		Non-Hazardous	n/a
Waste Form		Solid	n/a
Condition of Waste		Bulk to remain as bulk	n/a
Volume of Bulk Solid		16	CY
Distance to Off-site Facility (One-way)		22	MI
Safety Level		D	n/a

Comments: Transportation #1
This technology captures the cost to transport the spoil material from the site to the thermal desorption treatment facility and then back to the site. Added a truck bed liner assembly. The assembly quantities were doubled. BCY volume was increased by 25% fluff factor.
Site: Building 3

Estimate Documentation Report

Technology Name: Excavation (# 2)

Description	Default	Value	UOM
System Definition			
Required Parameters			
Estimating Method		Volume / Depth	n/a
Volume		11.1	CY
Depth		6	FT
Soil Type		Sand-Silt/Sand-Clay Mixture	n/a
Safety Level		D	n/a
Excavation			
Secondary Parameters			
Existing Cover	Soil/Gravel	Soil/Gravel	n/a
Replacement Cover	Soil/Seeding	Soil/Seeding	n/a
Sidewall Protection	Side Sloping	Trench Box	n/a
% of Excavated Material To Be Used as Backfill	0	100	%
Source of Additional Fill	Off Site	None	n/a
Backfill Hauling Distance (one way)	0	0	MI
Dewatering Required	No	No	n/a
Analytical			
Secondary Parameters			
Primary Analytical Template	System Soil - PCBs	System Soil - PCBs	n/a
Secondary Analytical Template	None	None	n/a
Number of Sampling Points/Locations	5	6	EA
Number of Composites Submitted to Lab	5	6	EA
Turnaround Time	Standard (21 Days)	Standard (21 Days)	n/a
Submit Data Electronically	Yes	Yes	n/a
Data Package / QC	Stage 1	Stage 1	n/a
Lab Data Review	Stage 1	Stage 1	n/a
Sampling Reports	Abbreviated	Abbreviated	n/a

Comments: Excavation #2:
This technology captures the cost of excavation, confirmation sampling and reporting, and site restoration. Add an equipment operator for a full 8 hour day.
Site: Bldg 106A, South of Retaining Wall, NCTAMSPAC Wahaiwa
50 ft2 x 6' depth= 11.1 yd3 soil
Building 106A, south of retaining wall (NCTAMS Excavation #2): 6 samples

Estimate Documentation Report

Technology Name: Transportation (# 2)

Description	Default	Value	UOM
System Definition			
Required Parameters			
Waste Type		Non-Hazardous	n/a
Waste Form		Solid	n/a
Condition of Waste		Bulk to remain as bulk	n/a
Volume of Bulk Solid		14	CY
Distance to Off-site Facility (One-way)		22	MI
Safety Level		D	n/a

Comments: Transportation #2
This technology captures the cost to transport the spoil material from the site to the thermal desorption treatment facility and then back to the site. Added a truck bed liner assembly. The assembly quantities were doubled. BCY volume was increased by 25% fluff factor.
Site: Building 106A

Estimate Documentation Report

Technology Name: Excavation (# 3)

Description	Default	Value	UOM
System Definition			
Required Parameters			
Estimating Method		Volume / Depth	n/a
Volume		82.8	CY
Depth		5.1	FT
Soil Type		Sand-Silt/Sand-Clay Mixture	n/a
Safety Level		D	n/a
Excavation			
Secondary Parameters			
Existing Cover	Soil/Gravel	Asphalt	n/a
Replacement Cover	Soil/Seeding	Asphalt	n/a
Sidewall Protection	Side Sloping	Trench Box	n/a
% of Excavated Material To Be Used as Backfill	0	100	%
Source of Additional Fill	Off Site	None	n/a
Backfill Hauling Distance (one way)	0	0	MI
Dewatering Required	No	No	n/a
Analytical			
Secondary Parameters			
Primary Analytical Template	System Soil - PCBs	System Soil - PCBs	n/a
Secondary Analytical Template	None	None	n/a
Number of Sampling Points/Locations	5	38	EA
Number of Composites Submitted to Lab	5	38	EA
Turnaround Time	Standard (21 Days)	Standard (21 Days)	n/a
Submit Data Electronically	Yes	Yes	n/a
Data Package / QC	Stage 1	Stage 1	n/a
Lab Data Review	Stage 1	Stage 1	n/a
Sampling Reports	Abbreviated	Abbreviated	n/a

Comments: Excavation #3:
This technology captures the cost of excavation, confirmation sampling and reporting, and site restoration. Add an equipment operator for a full 8 hour day.
Site: Bldg 106B, South of Building, NCTAMSPAC Wahaiwa
447 ft2 x 5' depth= 82.8 yd3 soil
Building 106B, south of building (NCTAMS Excavation #3): 38 samples

Estimate Documentation Report

Technology Name: Transportation (# 3)

Description	Default	Value	UOM
System Definition			
Required Parameters			
Waste Type		Non-Hazardous	n/a
Waste Form		Solid	n/a
Condition of Waste		Bulk to remain as bulk	n/a
Volume of Bulk Solid		104	CY
Distance to Off-site Facility (One-way)		22	MI
Safety Level		D	n/a

Comments: Transportation #3
This technology captures the cost to transport the spoil material from the site to the thermal desorption treatment facility and then back to the site. Added a truck bed liner assembly. The assembly quantities were doubled. BCY volume was increased by 25% fluff factor.
Site: Building 106B

Estimate Documentation Report

Technology Name: Excavation (# 4)

Description	Default	Value	UOM
System Definition			
Required Parameters			
Estimating Method		Volume / Depth	n/a
Volume		43.7	CY
Depth		10	FT
Soil Type		Sand-Silt/Sand-Clay Mixture	n/a
Safety Level		D	n/a
Excavation			
Secondary Parameters			
Existing Cover	Soil/Gravel	< 6 IN Concrete, Rod Reinforced	n/a
Replacement Cover	Soil/Seeding	< 6 IN Concrete, Rod Reinforced	n/a
Sidewall Protection	Side Sloping	Trench Box	n/a
% of Excavated Material To Be Used as Backfill	0	0	%
Source of Additional Fill	Off Site	None	n/a
Backfill Hauling Distance (one way)	0	0	MI
Dewatering Required	No	No	n/a
Analytical			
Secondary Parameters			
Primary Analytical Template	System Soil - PCBs	System Soil - PCBs	n/a
Secondary Analytical Template	None	None	n/a
Number of Sampling Points/Locations	5	14	EA
Number of Composites Submitted to Lab	5	14	EA
Turnaround Time	Standard (21 Days)	Standard (21 Days)	n/a
Submit Data Electronically	Yes	Yes	n/a
Data Package / QC	Stage 1	Stage 1	n/a
Lab Data Review	Stage 1	Stage 1	n/a
Sampling Reports	Abbreviated	Abbreviated	n/a

Comments: Excavation #4:
This technology captures the cost of excavation, confirmation sampling and reporting, and site restoration. Add an equipment operator for a full 8 hour day.
Site: S-17, NCTAMSPAC Wahaiwa
118 ft2 x 10’ depth (filled w/concrete) = 43.7 yd3 concrete
S-17 (NCTAMS Excavation #4): 14 samples

Estimate Documentation Report

Technology Name: Transportation (# 4)

Description	Default	Value	UOM
System Definition			
Required Parameters			
Waste Type		Non-Hazardous	n/a
Waste Form		Solid	n/a
Condition of Waste		Bulk to remain as bulk	n/a
Volume of Bulk Solid		59	CY
Distance to Off-site Facility (One-way)		22	MI
Safety Level		D	n/a

Comments: Transportation #4
This technology captures the cost to transport the spoil material from the site to the thermal desorption treatment facility. Subsequent to treatment, transport and dispose at a clean landfill. The assembly quantities were doubled.Added a truck bed liner assembly and $60/CY disposal cost at a clean landfill. BCY volume was increased by 35% fluff factor for concrete.
Site: S-17

Estimate Documentation Report

Technology Name: Excavation (# 5)

Description	Default	Value	UOM
System Definition			
Required Parameters			
Estimating Method		Volume / Depth	n/a
Volume		313	CY
Depth		6	FT
Soil Type		Sand-Silt/Sand-Clay Mixture	n/a
Safety Level		D	n/a
Excavation			
Secondary Parameters			
Existing Cover	Soil/Gravel	Soil/Gravel	n/a
Replacement Cover	Soil/Seeding	Soil/Seeding	n/a
Sidewall Protection	Side Sloping	Trench Box	n/a
% of Excavated Material To Be Used as Backfill	0	100	%
Source of Additional Fill	Off Site	None	n/a
Backfill Hauling Distance (one way)	0	0	MI
Dewatering Required	No	No	n/a
Analytical			
Secondary Parameters			
Primary Analytical Template	System Soil - PCBs	System Soil - PCBs	n/a
Secondary Analytical Template	None	None	n/a
Number of Sampling Points/Locations	5	99	EA
Number of Composites Submitted to Lab	5	99	EA
Turnaround Time	Standard (21 Days)	Standard (21 Days)	n/a
Submit Data Electronically	Yes	Yes	n/a
Data Package / QC	Stage 1	Stage 1	n/a
Lab Data Review	Stage 1	Stage 1	n/a
Sampling Reports	Abbreviated	Abbreviated	n/a

Comments: Excavation #5:
This technology captures the cost of excavation, confirmation sampling and reporting, and site restoration. Add an equipment operator for 2 full 8 hour days.
Site: Bldg 81, NRTF Lualualei
1,409 ft2 x 6’ depth= 313 yd3 soil
Building 81 (NCTAMS Excavation #5): 99 samples

Estimate Documentation Report

Technology Name: Transportation (# 5)

Description	Default	Value	UOM
System Definition			
Required Parameters			
Waste Type		Non-Hazardous	n/a
Waste Form		Solid	n/a
Condition of Waste		Bulk to remain as bulk	n/a
Volume of Bulk Solid		391	CY
Distance to Off-site Facility (One-way)		22	MI
Safety Level		D	n/a

Comments: Transportation #5
This technology captures the cost to transport the spoil material from the site to the thermal desorption treatment facility and then back to the site. Added a truck bed liner assembly. The assembly quantities were doubled. BCY volume was increased by 25% fluff factor.
Site: Building 81

Estimate Documentation Report

Technology Name: Excavation (# 6)

Description	Default	Value	UOM
System Definition			
Required Parameters			
Estimating Method		Volume / Depth	n/a
Volume		606.7	CY
Depth		13	FT
Soil Type		Sand-Silt/Sand-Clay Mixture	n/a
Safety Level		D	n/a
Excavation			
Secondary Parameters			
Existing Cover	Soil/Gravel	< 6 IN Concrete, Rod Reinforced	n/a
Replacement Cover	Soil/Seeding	< 6 IN Concrete, Rod Reinforced	n/a
Sidewall Protection	Side Sloping	Trench Box	n/a
% of Excavated Material To Be Used as Backfill	0	75	%
Source of Additional Fill	Off Site	Off Site	n/a
Backfill Hauling Distance (one way)	10	10	MI
Dewatering Required	No	No	n/a
Analytical			
Secondary Parameters			
Primary Analytical Template	System Soil - PCBs	System Soil - PCBs	n/a
Secondary Analytical Template	None	None	n/a
Number of Sampling Points/Locations	6	200	EA
Number of Composites Submitted to Lab	5	200	EA
Turnaround Time	Standard (21 Days)	Standard (21 Days)	n/a
Submit Data Electronically	Yes	Yes	n/a
Data Package / QC	Stage 1	Stage 1	n/a
Lab Data Review	Stage 1	Stage 1	n/a
Sampling Reports	Abbreviated	Abbreviated	n/a

Comments: Excavation #6:
This technology captures the cost of excavation, confirmation sampling and reporting, and site restoration. Add an equipment operator for 3 full 8 hour days.
Site: S-26, NRTF Lualualei
1,902 ft2 x 6" concrete slab= 35.2 yd3 concrete
1,187 ft2 x 13' depth= 571.5 yd3 soil

S-26 (NCTAMS Excavation #6): 286 samples (Valid Range was only 200, so changed the QTY at the assembly level to 286)

Technology Name: Transportation (# 6)

Description	Default	Value	UOM
System Definition			
Required Parameters			
Waste Type		Non-Hazardous	n/a
Waste Form		Solid	n/a
Condition of Waste		Bulk to remain as bulk	n/a
Volume of Bulk Solid		762	CY
Distance to Off-site Facility (One-way)		22	MI
Safety Level		D	n/a

Comments: Transportation #6
This technology captures the cost to transport the spoil material from the site to the thermal desorption treatment facility and then back to the site. Added a truck bed liner assembly and $60/CY disposal charge for the concrete at a clean landfill. The assembly quantities were doubled. BCY volume was increased by 35% fluff factor for concrete and 25% for soil.
Site: S-26

Technology Name: User Defined Estimate (# 2)
User Name: INDIRECT THERMAL TREATMENT OF IMPACTED MEDIA

Description	Default	Value	UOM
System Definition			
Required Parameters			
Model Name		INDIRECT THERMAL TREATMENT OF IMPACTED MEDIA	n/a
WBS Type		HTRW	n/a
Selected WBS		331.14.02	n/a
Safety Level		D	n/a

Comments: Indirect Thermal Treatment of PCB Impacted Soil/Concrete estimated at $756.76 per BCY. Historical price quote received from like project. NCTAMS estimated at 1070 BCY of media.

Estimate Documentation Report

Technology Name: Professional Labor Management (# 1)

Description	Default	Value	UOM
System Definition			
Required Parameters			
Markedup Construction Cost ($)		135,597	$
Percentage	19.9	19.9	%
Dollar Amount		26,984	$

Comments: Assumptions:
Accepted the default professional labor percentage for oversight and field reporting of the excavation and transportation activities.

Technology Name: User Defined Estimate (# 3)
User Name: SITE PREP AND RESTORATION COSTS

Description	Default	Value	UOM
System Definition			
Required Parameters			
Model Name		SITE PREP AND RESTORATION COSTS	n/a
WBS Type		HTRW	n/a
Selected WBS		331.20.01	n/a
Safety Level		D	n/a

Comments: Assumptions:
This technology captures the costs of various site preparation and restoration activites. Activities include rebuilding concrete stairs, retaining wall support, lanscaping, tree removal and retaining wall support.

Estimate Documentation Report

Technology Name: User Defined Estimate (# 4)
User Name: SPENT FILTER CAKE/CARBON T&D

Description	Default	Value	UOM
System Definition			
Required Parameters			
Model Name		SPENT FILTER CAKE/CARBON T&D	n/a
WBS Type		HTRW	n/a
Selected WBS		331.07.90	n/a
Safety Level		D	n/a

Comments: This technology captures the cost to pack, load, transport and dispose of spent filter cake/carbon from the thermal desorption system.
NCTAMS Quantity = 1070 BCY = 1337.5 CY x 1.3 = 1738.75 tons x 0.00086 = 1.49 tons of carbon / 1.3 = 1.15 CY of spent carbon.
Estimated a minimum of 1.15 CY to be transported. Added a $500 startup cost to cover misc. costs.