Final

FEASIBILITY STUDY REPORT INSTALLATION RESTORATION SITE 30 DAYCARE CENTER

Naval Station Treasure Island
San Francisco, California

November 16, 2006

Prepared for:
Base Realignment and Closure
Program Management Office West
San Diego, California

Prepared by:
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Contract Task Order 0118

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U.S. DEPARTMENT OF THE NAVY
BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST

REVIEW AND APPROVAL

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ACRONYMS AND ABBREVIATIONS

§	Section
§§	Sections
ARAR	Applicable or relevant and appropriate requirement
Bay	San Francisco Bay (the water body)
Bay Area	San Francisco Bay Area
BCT	BRAC Cleanup Team
BEC	BRAC Environmental Coordinator
bgs	Below ground surface
BRAC	Base Realignment and Closure
Cal. Code Regs.	*California Code of Regulations*
CCSF	City and County of San Francisco
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of concern
COPC	Contaminant of potential concern
CSM	Conceptual site model
DDT	Dichlorodiphenyltrichloroethane
Dioxin	Dibenzo-*p*-dioxins and polychlorinated furans
DoD	U.S. Department of Defense
DTSC	State of California Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
EPC	Exposure point concentration
FFSRA	Federal Facility Site Remediation Agreement
FOSL	Finding of Suitability to Lease
FS	Feasibility study
FRTR	Federal Remediation Technologies Roundtable
GRA	General response action
HHRA	Human health risk assessment
HI	Hazard index
IR	Installation restoration
IC	Institutional control
MCL	Maximum contaminant level
mg/kg	Milligram per kilogram
NAVSTA TI	Naval Station Treasure Island

ACRONYMS AND ABBREVIATIONS (CONTINUED)

Navy	U.S. Department of the Navy
ng/kg	Nanogram per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
O&M	Operation and maintenance
OSWER	Office of Solid Waste and Emergency Response
PA	Preliminary assessment
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyl
PRC	PRC Environmental Management, Inc.
PRG	Preliminary remediation goal
RAO	Remedial action objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI	Remedial investigation
RME	Reasonable maximum exposure
SARA	Superfund Amendments and Reauthorization Act
Shaw	Shaw Environmental, Inc.
SI	Site investigation
SLERA	Screening-level ecological risk assessment
SulTech	SulTech, a joint venture between Sullivan Consulting Group and Tetra Tech EM Inc.
SULLIVAN	Sullivan International Group, Inc.
TBC	To be considered
TEQ	Toxicity equivalent
Tetra Tech	Tetra Tech EM Inc.
TI	Treasure Island
TPH	Total petroleum hydrocarbons
USC	*United States Code*
VOC	Volatile organic compound
Water Board	California Regional Water Quality Control Board, San Francisco Bay Region
YBI	Yerba Buena Island

EXECUTIVE SUMMARY

Under Contract No. N68711-03-D-5104, Contract Task Order 118, the U.S. Department of the Navy (Navy) authorized SulTech, a joint venture of Sullivan International Group, Inc. (SULLIVAN) and Tetra Tech EM Inc. (Tetra Tech), to prepare this Feasibility Study (FS) Report for Installation Restoration (IR) Site 30, Daycare Center, at Naval Station Treasure Island (NAVSTA TI) in San Francisco, California. Hereinafter NAVSTA TI IR Site 30 will be referred to as Site 30.

The purpose of this FS is to develop and perform a comparative analysis of remedial actions to address potential concentrations of dibenzo-*p*-dioxins and polychlorinated furans (dioxins) beneath the daycare center building that pose a potential risk to human health under alternative land use scenarios. In its present and planned "Institutional Use" as a daycare center, Site 30 does not pose an unacceptable risk. The Final Remedial Investigation (RI) Report recommended an FS be conducted to evaluate remedial alternatives which would ensure protection of human health in the event Building 502, the daycare center, is demolished and the area is developed for commercial/industrial or residential use (SulTech 2006a).

SITE HISTORY

Site 30, which is part of Treasure Island (TI) Parcel T094, was undeveloped until 1985, when the daycare center was constructed. The daycare center was operated until NAVSTA TI was closed in 1997. After closure of the daycare center, the property was leased to the City and County of San Francisco. The daycare center was renovated and reopened by Kidango in 2003. According to the Draft 1996 Reuse Plan (City and County of San Francisco [CCSF] 1996), the reuse of the portion of NAVSTA TI which includes Site 30, is designated as "Residential/Open Space/Publicly Oriented Uses." However, Table 7 of the reuse plan specifically identifies Building 502 (the daycare center) for "Institutional Use" (CCSF 1996).

In April 2002, a 1989 as-built drawing was discovered indicating that the Navy Public Works Center installed an 8-inch water line down the middle of 11th Street. A note on the as-built drawing for the water project identified an old "trash dump" within the western portion of the water line along 11th Street between Avenues D and E (Shaw Environmental, Inc. [Shaw] 2003). Subsequent investigations were conducted to determine the nature and extent of the buried debris. Based on these findings, the Navy designated a portion of Parcel T094 as IR Site 30 on September 6, 2002.

SITE SETTING

TI is a relatively flat, manmade island, which consists primarily of sand dredged from San Francisco Bay and retained by perimeter rock and sand dikes. Asphalt and concrete provide surface cover at Site 30 and are underlain by dredged fill and shoal deposits predominantly consisting of fine- to medium-grained sands, with varying proportions of shell fragments, silt, and clay. The dredged fill was emplaced on top of the shoal sands. Younger Bay Mud consisting of interbedded sand, silt, and clay underlie the shoal sands.

Groundwater at Site 30 was encountered at approximately 5 to 7 feet below ground surface (bgs), during the 2004 sampling event. Based on general NAVSTA TI hydrogeology and basewide groundwater monitoring data, groundwater at Site 30 flows in an approximately northwest direction toward the shoreline. Currently groundwater at Site 30 is not used as a source for drinking water, agricultural, process, or industrial supply; however, it retains its designation for potential agricultural, process, and industrial supply (California Regional Water Quality Control Board, San Francisco Bay Region [Water Board] 2001).

Generally, the terrestrial habitat of TI is of poor quality for wildlife species, since the island is predominantly covered with urbanized areas.

Three CERCLA activities have been performed at Site 30. In 2002, a trench investigation sampling event was performed. Based on the results of the trench investigation sampling, a time-critical removal action was performed in 2002, and an asphalt and concrete pad was installed adjacent to Building 502 in 2003. These removal actions were completed prior to the reopening of the daycare center in 2003. In 2004, a groundwater investigation was performed for Site 30 and adjoining IR Site 31.

CONCEPTUAL SITE MODEL

According to the Draft 1996 Reuse Plan, the current and future use of Site 30 is "Institutional Use" as a daycare center. Recent comments by CCSF officials indicate the daycare center will be relocated; however, Site 30 is expected to continue as a daycare center for the reasonably foreseeable future (Navy 2006a). Under the exposure scenarios evaluated in the Final Remedial Investigation Report, a daycare center child up to the age of 5 years was evaluated (SulTech 2006a).

Based on current and anticipated future site conditions, children at the daycare center may be directly exposed to surface soil within the fenced areas at the site (0 to 2 feet bgs). Hypothetical commercial/industrial workers and hypothetical adult and child residents were evaluated for direct contact exposure to site-wide surface soil (0 to 2 feet bgs) including areas currently underneath pavement. Hypothetical commercial/industrial workers and hypothetical adult and child residents were also evaluated for exposure to site-wide subsurface soil (0 foot bgs to groundwater) assuming site redevelopment results in subsurface soil disturbance.

NATURE AND EXTENT OF CONTAMINATION

Soil and groundwater samples were collected as part of three investigations performed at Site 30. All of the sample depths and analytical suites for samples collected at Site 30 were concurred upon by the Base Realignment and Closure (BRAC) Cleanup Team (BCT) (Shaw 2003).

Soil samples were analyzed for volatile organic compounds (VOC), semivolatile organic compounds (SVOC), pesticides, polychlorinated biphenyls (PCB), metals, and dioxins. Three metals, one pesticide, and dioxins, measured as dioxin toxic equivalency (dioxin TEQ), were present at concentrations above the field screening levels (SulTech 2006a).

There were no detections of PCBs, SVOCs, or pesticides in groundwater samples from Site 30. Low concentrations of two VOCs and three metals were detected in groundwater below field screening levels.

BASELINE RISK ASSESSMENT

As part of the RI, a quantitative baseline human health risk assessment (HHRA) was completed. The HHRA evaluated both the existing and planned future use of the site as a daycare center, and alternative site uses including construction or utility worker, commercial/industrial and residential use. EPA guidance mandates the evaluation of a residential exposure scenario to support risk management decisions where land uses could include residential development, including formal changes in redevelopment plans (EPA 1989). Therefore, to ensure compliance with EPA guidance and to prepare risk estimates for unrestricted use, alternative land use scenarios consisting of commercial/industrial and residential redevelopment were evaluated as part of the risk assessment. Construction workers who would be involved with reconstruction of the site in the alternative land use scenarios were also evaluated. The evaluation of construction workers additionally applies to current utility workers that may infrequently visit the site.

Since the Water Board has concurred that groundwater at NAVSTA TI meets the exemption criteria for drinking water use and groundwater at NAVSTA TI is not presently used as a drinking water source, potential exposure to chemicals in groundwater is limited. Therefore, consumption of groundwater was not evaluated as a potential exposure pathway. The risk assessment did, however, evaluate the vapor intrusion from chemicals in groundwater as well as direct contact with groundwater under certain scenarios. Inhalation of vapors originating from groundwater was evaluated for daycare center children and staff under current site conditions as well as for commercial/industrial workers and adult and child residents under alternative land use scenarios at Site 30. Direct dermal contact with groundwater was evaluated as a complete exposure pathway for construction workers.

Contaminants of concern were identified only in soil and were evaluated as potential risk drivers under current and alternative land use scenarios. The alternative land use scenarios were evaluated assuming the removal of all paved surfaces at Site 30, thereby allowing the potential for direct contact exposure to site-wide soil via ingestion, dermal contact, and inhalation pathways.

To satisfy federal (Navy and U.S. Environmental Protection Agency [EPA]) and State of California EPA Department of Toxic Substances Control (DTSC) requirements, two methods of risk estimates were prepared in the HHRA, referred to as Method 1 (satisfying federal requirements) and Method 2 (satisfying state requirements). These two methods differed in the manner in which chemicals of potential concern and toxicity criteria were selected.

Because carcinogens and noncarcinogens manifest their effects through uniquely different mechanisms, adverse health effects are estimated separately for chemical carcinogens and noncarcinogens.

Estimated carcinogenic risks for the daycare center child and construction worker were below the target cancer risk management range (10^{-6} to 10^{-4}), which indicates that the site does not pose

an unacceptable risk to these receptors. Estimated carcinogenic risks for the hypothetical future commercial/industrial worker and child/adult resident were within the cancer risk management range. Noncancer hazards for all receptors were equal to or below the target noncancer hazard index (HI) threshold of 1. Detections of site contaminants in groundwater contribute no cancer risk and less than one percent of the non-cancer HIs. Therefore, it appears that only contaminants of concern in soil contribute to the risk at Site 30.

Dioxins were identified as risk drivers for alternative land use receptor scenarios of residential or commercial/industrial use to combined surface and subsurface soil (0 feet bgs to groundwater).

The potential for human health effects caused by lead is typically estimated based on blood-lead concentrations. LeadSpread modeling (DTSC 1999) was performed to evaluate blood-lead levels in a daycare center child and hypothetical adult and child residents. Blood-lead modeling resulted in 99th percentile concentrations below 10 micrograms per deciliter for all three receptors for modeled exposure point concentration (EPC). To evaluate potential harmful effects from exposure to lead in soil for construction workers and commercial/industrial workers, EPCs were compared to the EPA Region IX preliminary remediation goal for industrial soil, 800 milligrams per kilogram, and were found to be well below this benchmark.

The terrestrial habitat of TI is poor quality for wildlife species, because of the intense urbanization of the island (SulTech 2006a). A Tier 1 screening-level ecological risk assessment for terrestrial receptors exposed to soil was performed at IR Sites 6, 12, 21, 24, 30, 31, 32, and 33 (SulTech 2006b). The screening-level ecological risk assessment did not identify any ecological resources or processes at TI that needed to be protected or sustained. Based on the overall poor quality of the habitat on TI, the Navy does not recommend further evaluation of ecological risk in a Tier II assessment (SulTech 2006b).

REMEDIAL ACTION OBJECTIVES

Based on the potential for receptors to be exposed to soils containing unknown concentrations of dioxin beneath Building 502 the following remedial action objectives (RAO) were developed for Site 30:

- To protect potential future commercial/industrial and potential future residential receptors by preventing the ingestion and direct contact with soils containing dioxin TEQ above the previously established ambient dioxin TEQ of 12 nanograms per kilogram adjacent to Building 502 and soils containing unknown concentrations of dioxin beneath Building 502

- To protect the daycare center receptor by preventing the ingestion of and direct contact with soils containing unknown concentrations of dioxin beneath Building 502.

The only designated contaminants of concern (COC) at Site 30 are dioxins. Since dioxin is not volatile, preventing exposure of receptors to vapors in indoor air is not necessary as an RAO.

REMEDIAL ALTERNATIVES

Three remedial alternatives were developed for Site 30:

- Alternative 1: No Action. This alternative is required under CERCLA to provide a baseline for which the other alternatives can be compared. There are no costs associated with Alternative 1.

- Alternative 2: Engineering Controls Combined with Institutional Controls (IC). This alternative would use engineering controls (the existing daycare center building slab) and ICs to prevent human exposure to potentially dioxin-contaminated soils beneath the building. ICs would also be used to maintain the building slab as an effective exposure prevention barrier. Alternative 2 has a total present value cost of $782,000.

- Alternative 3: Building Demolition, Excavation, and Off-Site Disposal at a Permitted Landfill. This alternative involves the demolition of the existing building to allow access to the soil beneath the building. After a soil characterization study, dioxin-contaminated soils would be excavated and transported for off-site disposal at a permitted landfill. The excavated area would be backfilled with clean soil. Construction of a new daycare center is not part of this alternative. Alternative 3 has a total present value cost of $2,086,000.

DETAILED AND COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

To select the most appropriate remedial action alternative for Site 30, the remedial alternatives above are evaluated with respect to first seven of the nine National Oil and Hazardous Substances Pollution Contingency Plan (NCP) criteria; two threshold, five primary balancing, and two modifying criteria. The seven combined threshold and primary balancing criteria are considered the evaluation criteria, while the remaining two are considered modifying criteria.

- **Threshold criteria (2)** relate directly to the statutory requirements each remedial alternative must meet: (1) overall protection of human health and the environment; and (2) compliance with applicable or relevant and appropriate requirements (ARAR).

- **Primary balancing criteria (5)** are those upon which the preliminary selection of the remedy is based: (1) long-term effectiveness and permanence; (2) reduction of toxicity, mobility, and volume through treatment; (3) short-term effectiveness; (4) implementability; and (5) cost.

- **Modifying criteria (2)** include agency and public comments on the proposed alternatives in the FS and will be addressed during the development of the Proposed Plan: (1) state acceptance; and (2) community acceptance.

The comparative analysis of remedial alternatives evaluates the relative performance of each alternative with respect to seven of the nine specific NCP evaluation criteria.

Alternative 1, No Action, provides the least degree of protectiveness and does not meet the threshold criteria. Alternative 2 (Engineering Controls Combined with ICs) and Alternative 3 (Building Demolition, Excavation, and Off-Site Disposal at a Permitted Landfill) would each protect human health and the environment and would each comply with the applicable ARARs.

Alternative 2 would allow for the daycare center to continue to operate, and would use ICs to ensure that the existing exposure prevention barrier is maintained. Alternative 3 would require the demolition of the existing daycare center building to enable characterization and removal of potentially contaminated soil. The construction of a replacement daycare center, either on Site 30 or at another location, is not included as a component of Alternative 3.

Alternative 1 would not provide long-term effectiveness and permanence for preventing exposure to potentially contaminated soils at IR Site 30 beneath the daycare center building; however, Alternative 2 would because it requires monitoring and reporting on the integrity of the existing daycare center building slab and ICs to restrict industrial/commercial or residential development. Alternative 3 provides a higher level of long-term effectiveness and permanence by removing potential contamination from beneath Building 502.

Alternatives 1 and 2 do not treat potential contamination or reduce its toxicity, mobility, or volume. Alternative 3 would remove potential contamination from beneath Building 502 at IR Site 30, thus reducing the toxicity and volume of contaminated soil at the site.

Alternatives 1 and 2 would not introduce a risk to the community or the environment in the short term because no active treatment would be conducted. Alternative 3 could introduce some risk to the community during field activities due to truck traffic; however, these risks could be minimized through best management practices such as traffic control.

All of the alternatives are technically feasible and readily implementable. Alternative 1 does not require any efforts to implement. Alternatives 2 and 3 are proven technologies, and it is unlikely that technical or administrative issues would delay implementing either of these alternatives.

No costs are associated with Alternative 1. Alternative 3 has the highest overall costs (over $2,086,000). Alternative 3 is 2.7 times the cost of Alternative 2 ($782,000).

The Navy will use this FS to prepare a Proposed Plan for public comment, which will recommend one of these three remedial action alternatives as the preferred alternative to implement at the site. After considering regulatory and community comments, the Navy will issue a Record of Decision containing the selected final remedy.

1.0 INTRODUCTION

Under Contract No. N68711-03-D-5104, Contract Task Order 118, the U.S. Department of the Navy (Navy) authorized SulTech, a joint venture of Sullivan International Group, Inc. (SULLIVAN) and Tetra Tech EM Inc. (Tetra Tech), to prepare this Feasibility Study (FS) Report for Installation Restoration (IR) Site 30, Daycare Center, at Naval Station Treasure Island (NAVSTA TI) in San Francisco, California. Hereinafter, NAVSTA TI IR Site 30 is referred to as Site 30.

This FS was prepared in accordance with Title 40 of the Code of Federal Regulations (CFR), Part 300 (40 CFR 300), the National Oil and Hazardous Substances Pollution and Contingency Plan (NCP), and the U.S. Environmental Protection Agency's (EPA) Guidance for "Conducting Remedial Investigations and Feasibility Studies under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)" (EPA 1988). The CERCLA Remedial Investigation (RI)/FS process (1) characterizes threats to human health and the environment posed by hazardous substances released at a site; and, (2) evaluates potential remedial alternatives to mitigate those threats. The NCP indicates appropriate remediation is defined as a cost-effective remedial alternative which effectively mitigates and minimizes threats to, and provides adequate protection of human health, welfare, and the environment. Remedial alternatives evaluated in this FS vary in cost and in the level of protection afforded to human health.

The current and planned future use of Site 30 is "Institutional Use" as a daycare center (City and County of San Francisco [CCSF] 1996). The human health risk assessment (HHRA) within the Final RI Report determined the risk under the current and future use as a daycare center is below the risk management range and does not pose an unacceptable risk. The Final RI Report recommended an FS be conducted to evaluate remedial alternatives which would ensure protection of human health in the event Building 502, the daycare center, is demolished and the area is developed for commercial/industrial or residential use (SulTech 2006a).

In accordance with CERCLA requirements, one of the alternatives evaluated is the "No Action" Alternative, which is used to provide a baseline for comparing alternatives. In addition, in accordance with EPA requirements, residential use was evaluated (EPA 1989). Further, U. S. Department of Defense (DoD) policy requires any FS which evaluates an alternative which includes a land use control evaluate an "unrestricted use" alternative (DoD 2001).

1.1 PURPOSE AND SCOPE

In its present condition as a daycare center, the site does not pose an unacceptable risk (SulTech 2006a). The purpose of this FS document is to develop and evaluate remedial action alternatives necessary to address potential human health risks associated with contaminated soils adjacent to and beneath Building 502 at Site 30. The Site 30 HHRA determined polychlorinated dibenzo-*p*-dioxins and polychlorinated dibenzofurans (dioxins) were the primary risk drivers under the alternative land use scenarios (commercial/industrial or residential).

Development, screening, and detailed evaluation of remedial action alternatives are accomplished by performing the following steps:

- Development of remedial action objectives (RAO) which specify contaminants and media of concern, exposure pathways, and remediation goals. RAOs are developed on the basis of applicable or relevant and appropriate requirements (ARAR), HHRA results, and ecological risk assessment results.

- Development of general response actions (GRA) for each medium to address the RAOs. To develop GRAs, containment, treatment, removal, or other actions singly or in combination are considered.

- Quantification of the volume of each impacted medium of concern.

- Identification and screening of available technologies and process options for each GRA to eliminate technologies which cannot be implemented due to technical considerations or are not cost-effective.

- Compliance with DoD requirements by evaluation of an alternative which would permit "unrestricted use" of the site if land use controls (including engineering controls and institutional controls [IC]) are part of an alternative (DoD 2001).

- Assembly of retained process options into potential alternatives and screening of potential alternatives which do not meet basic threshold criteria or exhibit similar outcome characteristics of other potential alternatives.

- Detailed analyses of the retained alternatives based on the criteria identified in the NCP at 40 CFR, Part 300.430(e)(9).

The remedial alternatives developed and evaluated in this FS vary in terms of their effectiveness in protecting human health and the environment, implementability, and cost.

1.2 DOCUMENT FORMAT AND OUTLINE

This FS is organized into seven sections. An outline of the general topics discussed in each section is presented below.

- **Section 1.0, Introduction.** This section summarizes the FS purpose and scope, and report organization.

- **Section 2.0, Background Information.** This section provides information regarding the site history, regional and site geology and hydrogeology, and site investigation findings.

- **Section 3.0, RAOs, ARARs, and GRAs.** This section details the site-specific RAOs, presents the ARARs, and identifies GRAs.

- **Section 4.0, Preliminary Screening of Technologies and Process Options, and Development of Remedial Alternatives.** This section identifies and describes the technologies and associated process options screened for further evaluation, and outlines the remedial action alternatives which remain after screening.

- **Section 5.0, Detailed Analysis of Remedial Alternatives.** This section analyzes each of the alternatives based on NCP evaluation criteria.

- **Section 6.0, Comparative Analysis of Remedial Alternatives.** This section identifies and compares the advantages and disadvantages of each alternative.

- **Section 7.0, References.** This section lists the references used in this report.

Figures are provided at the end of the document following Section 7.0, tables are provided at the end of the section where they are first referenced. Appendices used to prepare this report are included after the figures. Appendix A is an evaluation of proposed ARARs. Appendix B includes the rationale, assumptions, and cost summary sheets for the remedial action alternatives evaluated. Appendix C contains the Navy's response to agency comments on the Draft FS Report.

2.0 BACKGROUND INFORMATION

This section includes a summary of the IR Program, Federal Facility Site Remediation Agreement (FFSRA), and background information provided in the Final RI Report (SulTech 2006a).

2.1 IR PROGRAM

In 1975, the DoD initiated a program to identify and investigate potential hazardous waste sites at military installations. The program was the result of increasing public and government concern over the potential impacts of past hazardous waste disposal methods. This program began on a pilot scale and expanded in 1980 as the DoD IR Program.

Concurrent with the formation of the IR Program, the U.S. Congress directed the EPA to develop a comprehensive national program to manage past disposal sites. The basis for this program is CERCLA (or "Superfund") as amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA). In 1988, DoD adopted EPA's terminology for the investigation and remediation of past hazardous waste disposal sites for use in its IR Program.

In response to the DoD IR Program, the Navy instituted its own program for implementation of the DoD IR Program at naval facilities. The Navy IR Program is conducted in the following three phases:

- Preliminary Assessment (PA) / Site Investigation (SI) - identification of potential disposal or contaminated sites, and evaluation of these sites with respect to potential threat to human health and the environment.

- RI/FS - verification and characterization of the extent of contamination, definition of potential migration pathways, determination of human health and ecological risk, and evaluation of the feasibility of potential remedial action measures.

- Remedial Design (RD) / Remedial Action (RA) - design and implementation of the required remedial action measures to mitigate or eliminate confirmed problems.

2.2 FEDERAL FACILITY SITE REMEDIATION AGREEMENT

The FFSRA is an agreement made between the State of California and the Navy, which stipulates the type, scope, and scheduling for each IR Program site at NAVSTA TI (Navy 1992). The FFRSA also provides for the coordination of activities conducted at the site and identifies the regulatory agencies responsible for oversight of IR Program activities at NAVSTA TI. These include the State of California Department of Toxic Substances Control (DTSC), and the California Regional Water Quality Control Board, San Francisco Bay Region (Water Board). All CERCLA remediation efforts on NAVSTA TI are governed by this FFSRA.

A NAVSTA TI project team has been established and is led by the Base Realignment and Closure (BRAC) Environmental Coordinator (BEC). Project team meetings are conducted to perform periodic program reviews and reach consensus on decisions with federal and state regulatory agencies. The core team, which is the BRAC Cleanup Team (BCT), includes the BEC and representatives of EPA and DTSC. Other key participants on the project team include Navy Remedial Project Managers, representatives from the Water Board and the City and County of San Francisco, and technical consultants.

2.3 SITE LOCATION, HISTORY, AND SETTING

This section describes the site's location, history, setting, current operations, and future land use.

2.3.1 Location

NAVSTA TI is located in the San Francisco Bay (Bay) in San Francisco County, midway between San Francisco and Oakland, California (Figure 1). The naval station consists of two contiguous islands connected by a causeway: the northern island, Treasure Island (TI), encompasses approximately 403 acres, and the southern island, Yerba Buena Island (YBI), encompasses approximately 147 acres (Figure 2). The U.S. Coast Guard owns 30 of the 147 acres which comprise YBI. All vehicular transportation to and from TI and YBI must use the San Francisco-Oakland Bay Bridge (Interstate 80), which passes through YBI by way of a tunnel. Site 30 is located in the central portion of NAVSTA TI (Figure 1 and Figure 2). TI was constructed for the site of the 1939 Golden Gate International Exposition and then San Francisco's proposed commercial airport.

Beyond the waters of the Bay, the facility is surrounded by the extensively developed, mixed-use, lands of the San Francisco Bay Area (Bay Area). The Bay Area, with a population exceeding 6.6 million, is a major metropolitan center of business, industry, government, and residential development.

2.3.2 Site History

Military activities at the former NAVSTA TI date back to 1866 when the U.S. government took possession of YBI for defensive fortifications before the construction of TI. YBI was occupied by the U.S. Department of the Army until 1896 when the Navy assumed operations. The Navy operated the first West Coast naval training station on YBI until 1923, when these activities were transferred to another location in San Diego. YBI continued to function as a naval receiving station until World War II. After World War II, naval operations were transferred to NAVSTA TI.

NAVSTA TI was built on Yerba Buena Shoals and a sand spit extending from the northwest point of YBI. Dredging and construction of the island began in 1936 and were completed in 1937. Further detail from the "Treasure Island Fill," Geologic and Engineering Aspects of SF Bay Fill, Special Report 97, is provided below;

> "During February 1936 through August 1937, the Army Corps of Engineers conducted construction activities on the 402-acre man-made Treasure Island, which was to be the site of the 1939-1940 Golden Gate International Exposition. The Yerba Buena Shoals, a 735-acre reef extending north from Yerba Buena Island was used as the foundation for Treasure Island. To build the island, the Army Corps of Engineers constructed a perimeter of rock and filled it with millions of tons of silt dredged from San Francisco Bay and Delta."
>
> "Approximately 29 million cubic yards of fill, primarily consisting of sand with lesser amounts of silt, clay, and gravel, were dredged from the Bay and the Delta and used for construction of the island." (Lee 1969)

In response to a Navy request, the City and County of San Francisco leased TI to the Navy in 1941 for the duration of World War II. During World War II, the island became a major naval station, processing approximately 12,000 military personnel per day for service overseas and upon their return to the United States. NAVSTA TI was used primarily for training, administration, housing, and other support services to the U.S. Pacific Fleet. After World War II, the City and County of San Francisco agreed to trade the deed for TI to the Navy in exchange for government-owned land south of San Francisco, where the San Francisco International Airport was eventually built (SulTech 2006a).

Many changes to NAVSTA TI have occurred over the last 45 years. The original exposition center and barracks no longer exist. The exposition center was replaced by numerous other buildings, and the barracks were replaced by parking areas and open space. Family housing replaced the ammunition storage area. Numerous piers were demolished, especially along the east side of NAVSTA TI. Only one major pier, at the southeast corner of NAVSTA TI, is still in use.

In 1993, the Defense Base Realignment and Closure Commission, pursuant to the Defense Base Closure and Realignment Act of 1990 (Public Law 101-510, Title XXIX, 10 United States Code (USC) Section (§) 2687 note), recommended the closure of NAVSTA TI. NAVSTA TI was

subsequently closed on September 30, 1997. NAVSTA TI is currently in the process of being transferred to the City and County of San Francisco.

During the environmental baseline survey, NAVSTA TI was divided up into a number of different parcels. Site 30, which is part of TI Parcel T094, was undeveloped until 1985, when a portion of the parcel was developed by the Navy for a child care facility (Figure 3). The child care facility was operated by the Navy until NAVSTA TI closed in 1997. After the closure of the naval station, the property was leased under the Finding of Suitability to Lease (FOSL) Zone 1D to the City and County of San Francisco on July 29, 1997 (PRC Environmental Management, Inc. [PRC] and Uribe & Associates 1997). Kidango renovated and reopened the facility as a daycare center on March 17, 2003 (Figure 3).

In April 2002, a 1989 as-built drawing was discovered indicating that the Navy Public Works Center installed an 8-inch water line down the middle of 11th Street. A note on the as-built drawing for the water line project identified an "old trash dump" within the western portion of the water line excavation along 11th Street between Avenues D and E (Shaw Environmental, Inc. [Shaw] 2003). Subsequently, a multi-phase investigation and removal action was conducted beginning in May 2002 to determine the nature and extent of the buried debris (Shaw 2003; 2004). Based on the findings of the early phases of this investigation, the Navy designated a portion of Parcel T094 as IR Site 30 on September 6, 2002 (Shaw 2003).

2.3.3 Site 30 Boundaries and Configuration

Site 30 is bounded to the north by a line drawn 2 feet north of the daycare center fence, to the east by Avenue E, to the south by 10th Street, and to the west by the sidewalk of Avenue D (Figure 4). Site 30 is a relatively small site with an area of approximately 1.5 acres. The shortest distance between Site 30 and San Francisco Bay is approximately 1,200 feet. The site boundary of adjacent IR Site 31 was modified in February 2005 to include the sidewalks on the south side of 11th Street. This FS incorporates these revised boundaries (Figure 4).

Site 30 includes Building 502, which is currently used as a daycare center. The daycare center property is fenced and consists of the daycare center building surrounded by paved or landscaped areas (Figure 4). Access to the property is provided only through the front entrance of the daycare center. A wooden fence prevents unauthorized access to the daycare center play yard. The paved areas, which comprise the majority of the property, include walking paths, playground, storage areas, a parking lot, and a concrete and asphalt pad. The concrete and asphalt pad adjacent to Building 502 was installed in January 2003 (Figure 4) as part of the time-critical removal action at Parcel T094 (Shaw 2003). Small grass lawns and landscaped areas cover a smaller fraction of the property.

2.3.4 Ecological Setting

Generally, the terrestrial habitat of TI is of poor quality for wildlife species, since the island is predominantly covered by anthropogenic features. To increase the understanding of the habitat and conditions found at IR sites on both TI and YBI, a group of Navy and federal, state, and regional agency representatives drove and walked through the IR sites on both TI and YBI. During the site tour conducted on June 3, 1994, the group characterized the habitat on TI as poor

quality, with large areas of pavement, gravel, or buildings restricting use of the sites by receptors of concern (EPA 1994; Navy 1994). Additionally, the vegetated parts of TI consist of lawns and landscaped areas. Lawns generally provide poor habitat and the landscaped areas are planted with predominantly non-native species. Disturbance from vehicular traffic and widespread human presence also reduce the quality of the habitat for wildlife species at TI. With higher quality habitat nearby at YBI, the group concluded receptor species' use of TI was infrequent and terrestrial receptor risk was minimal (Tetra Tech 1997).

A Tier 1 screening-level ecological risk assessment (SLERA) for terrestrial receptors exposed to soil was performed at IR Sites 6, 12, 21, 24, 30, 31, 32, and 33 (SulTech 2006b). The SLERA did not identify any ecological resources or processes at TI that needed to be protected or sustained. Based on the overall poor quality of the habitat on TI, the Navy does not recommend further evaluation of ecological risk in a Tier II assessment (SulTech 2006b).

2.3.5 Site Geology

This section briefly describes the regional and site-specific geological setting of TI and the local hydrogeology at Site 30. The Final RI Report provides a thorough description of the geology of TI and Site 30 (SulTech 2006a).

2.3.5.1 Regional Geology

The Bay Area, which is situated along the contact between the North American and Pacific crustal plates, is a tectonically active region. This seismic regime is characterized by southeast-to-northwest trending faults exhibiting primarily right lateral strike-slip movement. The major active faults in the vicinity of the site are all part of the San Andreas Fault system and include the Hayward fault, approximately 3 miles to the east; the San Andreas fault, approximately 9 miles to the west; the San Gregorio-Seal Cove fault, approximately 25 miles to the west; and the Calaveras fault, approximately 16 miles to the east (Dames and Moore 1988).

Basement rocks in the Bay Area consist primarily of the fractured and sheared rocks of the Late Jurassic to Early Cretaceous Franciscan Assemblage. The Bay is a drowned river valley developed within a southeast-to-northwest trending structural trough in the Franciscan Assemblage bedrock. Material eroded from the Berkeley/Oakland hills forms the broad, gently sloping coastal plain which borders the eastern shoreline of the Bay. Extensive areas of fill material are found at locations along the western shoreline of the Bay, primarily along the San Francisco waterfront and in San Mateo County. This fill material generally consists of variable amounts of soil, gravel, broken concrete and asphalt, rock, bay mud, alluvial and estuarine sediments, and other solid material. Soil characteristics are highly variable because of the different kinds and amounts of fill material in the profile (Dames and Moore 1988).

2.3.5.2 Treasure Island Geology

TI is a 403-acre relatively flat, manmade island, which consists primarily of sand dredged from the Bay and retained by a perimeter of rock and sand dikes. Dredging and construction of TI, directed by the U.S. Army Corps of Engineers, began in 1936 and was completed in 1937. TI was constructed on the Yerba Buena Shoals, a sand spit extending north and northwest of YBI.

TI ranges in elevation from 9 to 12 feet above mean sea level, based on the national geodetic vertical datum of 1929. Subsurface materials at TI can be divided into the following five units, listed from youngest to oldest: 1) Fill (Dredged Sand Fill), 2) Shoal Sands (Yerba Buena Shoal Sands), 3) Younger Bay Mud, 4) Older Bay Mud, and 5) Franciscan Assemblage.

Asphalt and concrete provide surface cover at Site 30 and are underlain by dredged fill and shoal deposits predominantly consisting of fine- to medium-grained sands, with varying proportions of shell fragments, silt, and clay. The dredged fill was emplaced on top of the shoal sands, during the construction of TI, which began in 1936. Younger Bay Mud consisting of interbedded sand, silt, and clay underlie the shoal sands.

2.3.5.3 Site Hydrogeology

Groundwater at Site 30 was encountered between 5 and 7 feet below ground surface (bgs), during the 2004 sampling event (SulTech 2006a). Based on general NAVSTA TI hydrogeology and basewide groundwater monitoring data, groundwater at Site 30 flows in an approximately northwest direction toward the shoreline.

Currently, groundwater at Site 30 is not used as a source of drinking water, agricultural, or industrial supply. In a letter from the Water Board to the Navy, the Water Board provided its concurrence that groundwater at NAVSTA TI meets the exemption criteria in State Water Resources Control Board Sources of Drinking Water Resolution 88-63, but retains its designation for potential agricultural, process, and industrial supply (Water Board 2001).

2.3.6 Current and Future Anticipated Land Use

According to the Draft 1996 Reuse Plan (CCSF 1996), the reuse of the portion of NAVSTA TI which includes Site 30, is designated as "Residential/Open Space/Publicly Oriented Uses." However, Table 7 of the reuse plan specifically identifies Building 502 for "Institutional Use," and the text of the plan indicates that the daycare center is part of the reuse plan (CCSF 1996). According to the plan, the following activities may be undertaken in the area:

- Theme parks
- Destination entertainment
- Hotel and resort
- Conference and meeting rooms
- Spectator sports and recreation areas (including golf)
- Community recreation
- Specialty restaurant and retail
- Performance, exposition, and display
- Festivals, markets, and fairs

- Film production and associated offices
- Museums and cultural institutions
- Neighborhood retail
- Employee housing for publicly-oriented uses

The Draft 1996 Reuse Plan describes the daycare center within the "Educational/Institutional Services" section and states "These users are generally very cost sensitive, and will be candidates for the reuse of existing facilities" (CCSF 1996). Recent comments by CCSF officials indicate the daycare center will be relocated; however Site 30 is expected to continue as a daycare center for the reasonably foreseeable future. (Navy 2006a).

2.4 SITE INVESTIGATIONS

This section describes the investigations which have been performed for NAVSTA TI which are relevant to Site 30 and investigations which have been performed specifically at Site 30. The Final RI Report for NAVSTA TI Site 30 provides a more thorough discussion of these investigations (SulTech 2006a).

2.4.1 Preliminary Assessment/Site Investigation

In April 1988, a PA/SI was performed. The PA/SI identified a total of 26 potentially contaminated sites at NAVSTA TI, which became the initial 26 IR sites. Each of the 26 sites was then evaluated with regard to contaminant characteristics, migration pathways, and potential receptors. The PA/SI report concluded additional investigations were not warranted at four of the sites, remedial measures were recommended for two sites, and the remaining 20 sites were recommended for an RI (Dames and Moore 1988). Site 30 was not identified in the PA/SI report.

2.4.2 Tidal Influence Studies

In 1995 and 2002, tidal influence studies were performed to determine the influence of the tides on groundwater levels at TI (PRC 1995; Tetra Tech 2002). These studies were performed in support of basewide remedial activities at NAVSTA TI. During the first study, fluctuations in the groundwater table between high and low tides ranged from 1.81 feet at 30 feet from the Bay to 0.12 foot at 250 feet from the Bay; the tidal fluctuation in the Bay was measured at 5.37 feet during the corresponding period (PRC 1995).

A follow-up study performed between December 2001 and March 2002 evaluated subsurface mixing of groundwater and seawater at TI (Tetra Tech 2002). This tidal mixing zone study estimated the physical mixing of surface water and groundwater took place over distances which ranged from 60 to 150 feet inland from the TI mean lowest low water shoreline, with spatial and temporal variations in the degree of mixing (Tetra Tech 2002). No monitoring wells at Site 30 were part of the study. The shortest distance between Site 30 and San Francisco Bay is approximately 1,200 feet.

2.4.3 Ambient Metals Determination

Ambient metal concentrations in soil and groundwater have been established for NAVSTA TI. The ambient metals concentrations for soils were established in 1996, as part of a basewide Phase I RI Report (PRC 1996). A separate study established the ambient metal concentrations in groundwater at NAVSTA TI (Tetra Tech 2001). These ambient metal concentrations were used as screening levels in the Final RI Report for NAVSTA TI Site 30 (SulTech 2006a). The purpose of establishing ambient concentrations is to assess whether the presence of a chemical constituent is the result of a site-specific release or whether the chemical constituents are from naturally occurring or regional anthropogenic sources.

2.4.4 Exploratory Trenching and Subsurface Investigations at Site 30

An exploratory trenching and subsurface investigation was performed at Parcel T094 in 2002. This investigation was performed following the discovery of a note on the as-built drawing for the 11th Street water main. The note indicated a "trash dump" was present along 11th Street in the vicinity of the former NAVSTA TI Child Care facility (Shaw 2003). The exploratory trenching and subsurface investigation was performed in five phases, and included Site 31 which is located immediately north of Site 30. Following the first phase, the additional phases were performed to fill data gaps identified in the earlier phases. Trenches were typically 5 feet long, a minimum of 4 feet deep, and 1 to 1.5 feet wide. All trenches were logged for debris, and soil samples were collected for analysis of polycyclic aromatic hydrocarbons (PAH), metals, organochlorine pesticides, polychlorinated biphenyls (PCBs) and dioxins. The depths and selected analyses varied depending on the phase of the investigation; however, all sample locations and analytical suites were concurred upon by the BCT (Shaw 2003). Many of the soil samples, particularly those collected for analysis for dioxins, were biased toward intervals where contamination was likely present, such as intervals with burnt debris. The field screening levels for this investigation were based on EPA residential PRGs for lead and PCBs, a technical memorandum prepared by Tetra Tech for total petroleum hydrocarbons (TPH), and DTSC's School Property Evaluation and Cleanup Division for dioxins (SulTech 2006a). The field screening levels were agreed upon in discussions between the Navy and DTSC at the BCT meeting in September 2002 (Shaw 2003). The results of this investigation led the Navy to perform a time-critical removal action on part of Site 30 and nearby portions of Site 31.

2.4.5 Time-Critical Removal Action at Site 30

In July 2002, a time-critical removal action was performed at Site 30. The objective was to remove debris-contaminated soil from areas which 1) were not already covered with a substantial pavement barrier, 2) contained concentrations of lead exceeding EPA's PRGs for residential soil of 400 milligrams per kilogram (mg/kg), or 3) contained dioxin toxicity equivalent (TEQ) concentrations exceeding the guideline of DTSC's School Property Evaluation and Cleanup Division of 19.5 nanograms per kilogram (ng/kg). A total of approximately 200 cubic yards of soil was removed from Site 30 during this removal action. In addition, a 1,400 square foot concrete and asphalt pad was installed adjacent to the daycare center building (Shaw 2003) (Figure 4).

A dioxin TEQ concentration exceeding the 19.5 ng/kg guideline was found adjacent to Building 502 at a depth between 4 and 5 feet bgs. Although the concrete pad may have been installed as an interim measure to prevent exposure when the time-critical removal action was conducted, the results of the subsequent HHRA determined the risk to daycare center receptors to be below the risk management range. Therefore, the concrete pad is not needed as an exposure prevention barrier for the daycare center receptors (SulTech 2006a).

2.4.6 NAVSTA TI and Site 30 Groundwater Monitoring Program

A basewide groundwater monitoring program was initiated in 1994, and site-specific groundwater water monitoring continues to the present (SulTech 2006a). The principal objective of the groundwater investigation is to evaluate whether contaminants are present in groundwater at concentrations which pose a risk to human health or aquatic receptors (SulTech 2006a). Groundwater samples were collected from Site 30 when the Site 30/31 groundwater investigation was performed in May 2004. Two monitoring wells (30/31MW06 and 30/31MW08) were used to evaluate groundwater at Site 30. One of these wells (30/31 MW08) is located in Avenue E and is upgradient of both Building 502 and the Site 30 Time-Critical Removal Area. The other well (30/31MW06) was located in 11th Street, downgradient of both Building 502 and the Site 30 time-critical removal area (SulTech 2004).

Groundwater sampling at Site 30 and adjacent IR Site 31 was conducted in May 2004 to assess the impacts to shallow groundwater from various known chemicals detected in the soil at Sites 30 and 31 (Shaw 2003, 2004). Prior to this sampling event, no groundwater data were available for Site 30 (SulTech 2004). Results of this sampling are discussed in Section 2.4.7.3 of this report.

2.4.7 Remedial Investigation Results

This section provides a summary of the remedial investigation results, including the conceptual site model; the nature and extent of contamination; contaminant fate and transport, and results from the baseline HHRA.

2.4.7.1 Conceptual Site Model

The purpose of the conceptual site model (CSM) is to aid in understanding and describing potential exposure pathways which may be present at the site. As discussed in the Final RI Report, a CSM was developed for Site 30 based on previously collected data and an understanding of the site (SulTech 2006a). The following paragraphs present the CSM.

Site 30 is currently used as the Treasure Island Daycare Center, and the City and County of San Francisco expect to continue this use for the reasonably foreseeable future (Navy 2006a). The daycare center admits children up to 5 years of age. Under the exposure scenarios evaluated, a daycare center child up to the age of 5 years was evaluated. The existing use of Site 30 as a daycare center is also the anticipated future use, and is therefore the primary configuration reviewed in the risk assessment. For cost estimating purposes, the life of the daycare center is estimated at 30 years. In order to ensure compliance with EPA guidance, and to prepare alternative risk estimates for unrestricted reuse per DoD policy, alternative land use scenarios

consisting of commercial/industrial and residential redevelopment were also considered. Additionally, workers involved in construction and digging activities as part of the implementation of such reuse are also evaluated in the risk assessment. Since groundwater is not a current or potential drinking water source at Site 30, the consumption of groundwater was not evaluated as a potential exposure pathway in the RI; however, potential pathways related to vapor intrusion from and direct contact with groundwater were evaluated (SulTech 2006a).

Based on current and anticipated future use of the site as a daycare center, children and staff may be directly exposed to surface soil at the site (0 to 2 feet below ground surface [bgs]). The routes of exposure evaluated for a daycare center child and staff from these exposure points include incidental ingestion of soil, dermal contact with soil, inhalation of windborne soil or dust particles, incidental ingestion of indoor dust via migration of chemicals from outdoor soil, dermal contact with indoor dust via migration of chemicals from outdoor soil, inhalation of particulate matter less than 10 microns in indoor air via suspension of dust particles, and inhalation of chemicals vaporized from outdoor soil. In addition, daycare center children and staff may also be exposed to vapors originating from groundwater or subsurface soil which migrate into indoor air. This indoor air inhalation pathway was also evaluated (SulTech 2006a).

The CSM was also developed for the alternative land use scenarios at Site 30. Hypothetical commercial/industrial adult workers and hypothetical adult and child residents, were evaluated for direct contact exposure to surface soil (0 to 2 feet bgs) available from the entire site, including areas currently underneath Building 502, existing pavement and the Site 30 concrete and asphalt pad, as well as site-wide surface and subsurface soil (0 foot bgs to groundwater) assuming site redevelopment results in subsurface soil disturbance. Inhalation of vapors originating from groundwater or subsurface soil mixed with indoor air was also evaluated for commercial/industrial workers and adult and child residents (SulTech 2006a). The ingestion of homegrown produce, although considered unlikely, was evaluated as part of the residential scenario. As discussed in the previous section of this report, groundwater is not a current or potential drinking water source at Site 30 and therefore the consumption of groundwater was not evaluated as a potential exposure pathway.

Construction workers were evaluated only for direct exposure to surface and subsurface soils (0 foot bgs to groundwater). The human health risk calculated for construction workers is also protective of current utility workers who may infrequently visit the site. The complete exposure pathways evaluated include dermal contact with soil, incidental ingestion of soil, and inhalation of particulates/vapors from soil in outdoor air. Inhalation of vapors originating from groundwater or subsurface soil mixed with indoor air was not evaluated for construction workers. These receptors were assumed to be restricted to the outdoors. However, as construction workers may spend time below ground surface during site redevelopment, inhalation risks to vapors in a semi-confined trench were evaluated (SulTech 2006a). Since groundwater is not a current or potential drinking water source at Site 30, the consumption of groundwater was not evaluated as a potential exposure pathway; however, dermal contact with groundwater was evaluated as a complete exposure pathway for the construction worker assuming contact with shallow groundwater during excavation activities which intercept the water table.

2.4.7.2 Establishment of Ambient Dioxin TEQ Value for NAVSTA TI

In September 2004, the Navy submitted a letter to DTSC proposing a NAVSTA TI ambient dioxin TEQ level of 12 ng/kg (Navy 2004). In a letter dated November 15, 2004, DTSC concurred with the ambient dioxin concentration with the understanding that it would be used only as a screening value for soil (DTSC 2004). DTSC also indicated the concurrence with the ambient dioxin TEQ value did not render unnecessary the need to perform risk assessments which calculate risk based on all constituents present at a specific site.

2.4.7.3 Nature and Extent of Contamination

The nature and extent of contamination in soil and groundwater was evaluated in the Final RI report and is summarized here. Volatile organic compounds (VOC), TPH, PAHs, pesticides, and metals were detected in soil samples from Site 30. VOCs were detected at concentrations below the residential PRGs. Concentrations of TPH were detected in some samples, but none were above the NAVSTA TI residential field screening level of 1,030 mg/kg for TPH as gasoline; 1,380 mg/kg as diesel, and 1,900 mg/kg as motor oil (SulTech 2006a). PAHs were not present above the benzo(a)pyrene equivalent field screening level of 0.62 mg/kg. Pesticides were also detected at low concentrations at Site 30; however one sample, out of 98 samples analyzed, contained dichlorodiphenyltrichloroethane (commonly known as DDT) at a concentration of 2.24 mg/kg, which exceeds the EPA residential PRG of 1.7 mg/kg. PCBs were detected at concentrations below the residential PRG. Only three metals were detected in soil at concentrations above their residential PRG. Lead was present above the NAVSTA TI ambient concentration in 82 of the 152 samples, but was above the residential PRG in only three samples. Arsenic was present above the NAVSTA TI ambient concentration in one of 98 samples, and was above the residential PRG in all 98 samples. Vanadium was present above ambient concentrations in 23 of 98 samples, but only one sample had a concentration above the residential PRG.

All of the soil samples collected for dioxin analysis were biased towards intervals and locations where dioxins would most likely be encountered, such as burnt debris areas. Figure 5 provides the locations and results of soil samples collected for dioxins at Site 30. Six of 19 soil samples exceeded the EPA residential PRG of 3.9 ng/kg for dioxin TEQ (EPA 2004, SulTech 2006a). Two of these samples exceeded both the NAVSTA TI dioxin ambient concentration of 12.0 ng/kg and the field screening concentration of 19.0 ng/kg (Shaw 2003). These two samples were collected at depths of 4.0 and 5.0 feet bgs from investigatory trenches excavated on the west side of Building 502. The purpose of the trenches was investigatory; however, the trenches were not extended further along Building 502 because of concerns regarding the undermining of the foundation. Other locations containing dioxin TEQ concentrations exceeding the residential PRG, but below the ambient level, are on the west side of Building 502 (Shaw 2003). Because burnt debris was visually identified in the two trenches adjacent to Building 502, the full lateral and vertical extent of dioxin contamination beneath Building 502 has not been determined (SulTech 2006a).

Groundwater samples were analyzed for VOCs, semivolatile organic compounds (SVOC), TPH, pesticides, PCBs, metals, and dioxins. Two VOCs and three metals were detected in groundwater at Site 30. The VOCs were detected at concentrations below the maximum

contaminant levels (MCL). The concentrations of metals were below the applicable MCL or NAVSTA TI ambient concentrations (SulTech 2006a). SVOCs, pesticides, PCBs, and dioxins were not detected in groundwater.

2.4.7.4 Contaminant Fate and Transport Evaluation

The chemicals exceeding screening levels in soil samples at Site 30 are benzo(a)pyrene, DDT, lead, arsenic, vanadium, and dioxins. An analysis of physical and chemical characteristics influencing fate transport processes was conducted. In general, chemicals exceeding screening levels are retained strongly by soil and are not expected to leach to groundwater or migrate off-site to the Bay. This finding is further supported by empirical evidence that among the chemicals exceeding the soil screening levels, only arsenic was detected in groundwater (SulTech 2006a).

2.4.7.5 Baseline Human Health Risk Assessment

The HHRA results for Site 30 are summarized below. The total reasonable maximum exposure (RME) cancer risks and noncancer hazard indices (HI) (including background) for Site 30 are discussed. Receptor scenarios evaluated in the risk assessment include current land use (current and altered site conditions), and alternative land use scenarios (commercial/industrial, resident, and construction worker).

The present use of Site 30 as a daycare center is considered the reasonably foreseeable use of Site 30. Risk was calculated under (1) current site conditions and (2) altered site condition assuming the asphalt and concrete pad was removed. Through quantitative analysis, conducted during the risk assessment, it was determined that an evaluation of the daycare center child would be protective of daycare center staff. Both scenarios assume the existing Building 502 remains and functions as an effective exposure prevention barrier to uncharacterized soils located below. Under both of these scenarios, the risk to daycare center receptors is below the risk management range and the site does not pose an unacceptable risk (SulTech 2006a).

EPA guidance mandates the evaluation of a residential exposure scenario to support risk management decisions where land uses could include residential development, including formal changes in redevelopment plans (EPA 1989). Therefore, to ensure compliance with EPA guidance and to prepare risk estimates for unrestricted use, alternative land use scenarios consisting of commercial/industrial and residential redevelopment were evaluated as part of the risk assessment. Construction workers which would be involved with reconstruction of the site into the alternative land use scenarios were also evaluated.

The risk to the construction worker was below the risk management range. The human health risk calculated for construction workers is also protective of current utility workers who may visit the site on an infrequent basis to repair subsurface utility lines. The construction worker evaluation, which assumes exposure of 1 year, is a conservative evaluation for the utility worker who is likely only on site for a few days. Therefore, no remedial actions are necessary for a current utility worker (SulTech 2006a).

The risk associated with the residential alternative land use was within the risk management range, with a maximum risk of $1x10^{-5}$ and an HI of 1 to subsurface soil (defined as 0 foot bgs to

groundwater). The risk to hypothetical commercial/industrial workers was calculated to be within the risk management range, with a maximum risk of 3 x 10^{-6} assuming exposure to subsurface soils. The primary risk driver for both was identified as dioxins.

Dioxins were identified as a risk driver for future commercial/industrial and residential exposures to combined surface and subsurface soil (0 ft bgs to groundwater). Risks from dioxins were estimated using a dioxin TEQ exposure point concentration (EPC) of 32.1 ng/kg and were largely driven by two concentrations, 27.7 and 34.1 ng/kg, in samples collected from locations currently beneath the Site 30 concrete and asphalt pad at depths of 4 and 5 feet bgs, respectively. Only 4 of the dioxin TEQ concentrations for the remaining 17 samples in the combined surface and subsurface soil data set exceeded the EPA Region IX PRG for residential soil of 3.9 ng/kg (EPA 2004), but these concentrations were below the ambient soil dioxin TEQ level for NAVSTA TI of 12 ng/kg (DTSC 2004). Therefore, the potential cancer risks associated with alternative land use receptor scenarios are largely driven by dioxin TEQ concentrations at these two locations, as well as concentrations within ambient levels.

The potential for human health effects caused by lead is typically estimated based on blood-lead concentrations. LeadSpread modeling (DTSC 1999) was performed to evaluate blood-lead levels in a daycare center child and adult and child residents. Blood-lead modeling resulted in 99th percentile concentrations below 10 micrograms per deciliter for all three receptors for modeled EPC. To evaluate potential deleterious effects from exposure to lead in soil for construction workers and commercial/industrial workers, EPCs were compared to the EPA Region IX PRG for industrial soil, 800 mg/kg, and were found to be well below this benchmark.

2.4.8 Contaminants of Concern for Site 30

Table 2-1 provides the contaminants of potential concern (COPC) exceeding thresholds at Site 30. The risk assessment identified no COPCs for the current and planned use of Site 30 as a daycare center. Additionally, no COPCs were identified for the construction worker scenario. However, under the alternative land use scenarios of commercial/industrial or residential, two COPCs, benzo(a)pyrene and dioxins, were identified. Although benzo(a)pyrene was identified as a COPC exceeding the cancer risk threshold (1 X 10^{-6}) under alternative commercial/industrial or residential land use scenarios; risk management of benzo(a)pyrene is not recommended as benzo(a)pyrene equivalent concentrations did not exceed the field screening criterion of 0.62 mg/kg (SulTech 2006a). Therefore, dioxin is the only designated contaminant of concern (COC) for Site 30.

The RI report recommended an FS be performed to evaluate remedial alternatives that would ensure protection of human health in the event that Building 502 were demolished and the area redeveloped for residential or commercial/industrial use. Based on the investigations performed at Site 30, the only locations where soils exhibit dioxin TEQ concentrations greater than the ambient dioxin TEQ level are adjacent to the existing building (Building 502) beneath the concrete and asphalt pad, and potentially beneath the existing building. Dioxins were not detected in groundwater samples collected at Site 30.

TABLE 2-1: CONTAMINANTS OF POTENTIAL CONCERN EXCEEDING THRESHOLDS

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

	COPCs Exceeding Cancer/Noncancer Thresholds[a]			
	Method 1		Method 2	
Receptor Scenario	**COPC**	**Est. RME Cancer Risk/HQ**	**COPC**	**Est. RME Cancer Risk/HQ**
Current Land Use				
Current Site Conditions				
Daycare Center Child – Exposure to Soil (0 to 2 feet bgs, Unpaved Areas within Fence) and Vapors in Indoor Air	b	c	b	c
Altered Site Conditions				
Daycare Center Child – Exposure to Soil (0 to 2 feet bgs, Unpaved and Concrete- and Asphalt Pad-Covered Areas within Fence) and Vapors in Indoor Air	b	c	b	c
Alternative Land Use				
Construction Worker – Exposure to Site-Wide Soil (0 foot bgs to groundwater), Groundwater, and Vapors in Trench Air	b	c	b	c
Resident – Exposure to Site-Wide Soil (0 to 2 feet bgs) and Vapors in Indoor Air	Benzo(a)pyrene Dioxins	3E-06 1E-06	Benzo(a)pyrene Dioxins	5E-06 1E-06
Resident – Exposure to Site-Wide Soil (0 foot bgs to groundwater) and Vapors in Indoor Air	Benzo(a)pyrene Dioxins	3E-06 8E-06	Benzo(a)pyrene Dioxins	4E-06 7E-06
Commercial/Industrial Worker – Exposure to Site-Wide Soil (0 to 2 feet bgs) and Vapors in Indoor Air	Benzo(a)pyrene	1E-06	Benzo(a)pyrene	2E-06
Commercial/Industrial Worker:– Exposure to Site-Wide Soil (0 foot bgs to groundwater) and Vapors in Indoor Air	Benzo(a)pyrene Dioxins	1E-06 2E-06	Benzo(a)pyrene Dioxins	2E-06 2E-06

Notes:

a Any COPC contributing a chemical-specific cancer risk greater than 1 x 10^{-6} or a chemical-specific HQ greater than 1. Chemical-specific cancer risks and HQs are shown after rounding to one significant figure.

b No COPCs exceed thresholds.

c RME Cancer risk or HQ not applicable because no COPCs exceed thresholds.

bgs Below ground surface

COPC Contaminant of potential concern

HQ Hazard quotient

RME Reasonable maximum exposure

Source: SulTech. 2006a. "Final Remedial Investigation Report, Installation Restoration Program Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, California." Department of the Navy, Southwest Division, Naval Facilities Engineering Command. February.

3.0 REMEDIAL ACTION OBJECTIVES, ARARS, AND GENERAL RESPONSE ACTIONS

This section identifies RAOs for Site 30, discusses ARARs, and presents a select number of GRAs which will protect human health and the environment under alternative land use scenarios. The RAOs are developed for the current daycare center child and staff, and several alternative land use scenarios, including construction worker, commercial/industrial worker, and residential receptors.

3.1 REMEDIAL ACTION OBJECTIVES

An RAO is a medium-specific (soil, groundwater, or air) goal for protecting human health or the environment. According to EPA guidance, an RAO should specify 1) the contaminant(s) of concern; 2) exposure routes and receptors, and 3) an acceptable contaminant level or range of levels for each exposure route (i.e., remediation goals) (EPA 1988). The remedial goals are usually chemical concentration limits, which provide a quantitative means of identifying areas for potential remedial action, screening the types of appropriate technologies, and assessing a remedial action's potential for achievement of the RAO. Remedial goals are also the performance requirements and the main basis for measuring the success of the response actions.

The risk at the site for daycare center adults and children under the current and future use configuration as a daycare center, including the location under the asphalt and concrete pad and unpaved areas, is below the risk management range of 1×10^{-4} to 1×10^{-6}. However, under alternative commercial/industrial and residential land use scenarios, the risk was within the risk management range. The only medium which presents a concern at Site 30 is soil adjacent to and beneath Building 502; therefore RAOs are developed only for soil.

Based on the potential for receptors to be exposed to soils containing unknown concentrations of dioxin beneath Building 502, the following RAOs were developed for Site 30:

- To protect potential future commercial/industrial and potential future residential receptors by preventing the ingestion and direct contact with soils containing dioxin TEQ above the previously established ambient dioxin TEQ of 12 ng/kg adjacent to Building 502 and soils containing unknown concentrations of dioxin beneath Building 502

- To protect the daycare center receptor by preventing the ingestion of and direct contact with soils containing unknown concentrations of dioxin beneath Building 502.

In developing the RAOs for dioxin, the preliminary remedial goal is set at a dioxin TEQ concentration of 12 ng/kg, which is the ambient level established for NAVSTA TI (DTSC 2004). Prevention of exposure of receptors to vapors in indoor air is not necessary as an RAO because the only COC identified at Site 30, dioxin, is not volatile.

3.2 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Section 121(d) of CERCLA, as amended by SARA, indicates on-site remedial actions must attain (or the decision document must justify a waiver of) any federal or more stringent state environmental standards, requirements, criteria, or limitations which are determined to be legally applicable or relevant and appropriate. As the lead federal agency, the Navy has primary responsibility for identifying federal ARARs for the Site 30 remedial action. State regulatory agencies are responsible for identifying state ARARs. Upon request by the Navy (Navy 2006b), DTSC provided potential state ARARs on January 24, 2006 (see Appendix A). The California Department of Health Services and the California Department of Fish and Game provided potential ARARs on March 3, 2006 and March 17, 2006, respectively. The ARAR identification process begins during the planning stages of the RI and continues as remedial action alternatives are developed and evaluated in the FS. ARARs are finalized in the Record of Decision.

This section summarizes the conclusions of the ARARs evaluation. A detailed evaluation of potential ARARs and other criteria or guidelines to be considered for the Site 30 remedial action is presented in Appendix A.

3.2.1 Overview of Applicable or Relevant and Appropriate Requirements

The identification of ARARs is a site-specific determination and involves a two-part analysis:

- First, a determination of whether a given requirement is applicable.
- Second, if the requirement is not applicable, a determination of whether it is relevant and appropriate.

A requirement is deemed applicable if the jurisdictional prerequisites of a standard show a direct correspondence when objectively compared to conditions at the site. If the jurisdictional prerequisites of the law or regulation are not met, the requirement may nonetheless be relevant and appropriate if the site's circumstances are sufficiently similar to circumstances in which the law otherwise applies and it is well-suited to the conditions of the site. An evaluation of the relevance and appropriateness of a requirement is site-specific, and must be based on best professional judgment. A requirement may be relevant, but not appropriate, for the specific site. In 40 CFR § 300.400(g)(2), the NCP lists factors to consider in evaluating relevance and appropriateness. Only requirements which are determined to be both relevant and appropriate must be followed. Portions of a requirement may be relevant and appropriate even if a requirement in its entirety is not. In addition, a requirement must be substantive in order to constitute an ARAR for activities conducted on site. Procedural or administrative requirements such as permits and reporting requirements are not ARARs.

In addition to ARARs, nonpromulgated agency advisories, criteria, or guidance issued by federal or state governments are not legally binding and do not have the status of ARARs. Such requirements may be useful and are to be considered (TBC). The preamble to the NCP states; however, that provisions in the TBC category "should not be required as cleanup standards

because they are, by definition, generally neither promulgated nor enforceable, so they do not have the same status under CERCLA as do ARARs."

The ARARs and TBC criteria are generally divided into three categories: chemical-specific, location-specific, and action-specific. Chemical-specific, location-specific, and potential action-specific ARARs which affect the development of RAOs are discussed in Section 3.2.2 through Section 3.2.4, respectively. Section 3.3 presents GRAs which are intended to meet the RAO for Site 30.

3.2.2 Chemical-Specific ARARs

Chemical-specific ARARs are health- or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical cleanup values. These values establish the acceptable amount or concentration of a chemical which may be found in or discharged to the ambient environment which is protective of human health and the environment. The only federal chemical-specific ARARs are for Alternative 3 and require characterization of any waste generated in performance of the alternative for proper disposal. These requirements center around the federal Resource Conservation and Recovery Act (RCRA) hazardous waste definitions, state non-RCRA hazardous waste definitions, and state designated waste and nonhazardous waste definitions.

The applicability of RCRA requirements depends on whether the excavated soil contains listed or characteristic RCRA waste, whether the waste was initially treated, stored, or disposed of after the effective date of the particular RCRA requirement, and whether the activity at the site constitutes generation, treatment, storage or disposal as defined by RCRA. Excavation of soil containing RCRA hazardous waste constitutes generation of waste to which RCRA requirements apply. To the extent the excavated soil contains RCRA hazardous wastes the Navy will comply with RCRA.

The following RCRA requirements are potential ARARs, since they define RCRA hazardous wastes:

- *California Code of Regulations* (Cal. Code Regs.), tit. 22, § 66261.21
- Cal. Code Regs., tit. 22 § 66261.22(a)(1)
- Cal. Code Regs, tit. 22 § 66261.23
- Cal Code Regs., tit. 22 § 66261.24(a)(1)
- Cal. Code Regs., tit. 22 § 66261.100

If the Navy determines a waste is a RCRA hazardous waste, the RCRA land disposal restrictions at Cal. Code Regs., tit.22, § 66268.1(f) are potential ARARs for discharging that waste to land.

State RCRA requirements included within the EPA-authorized RCRA program for California are considered potential federal ARARs. When state regulations are either broader in scope or more

stringent than their federal counterparts, they are considered potential state ARARs. The state of California regulates certain hazardous wastes under its RCRA program which fall outside the scope of the federal RCRA requirements. These requirements define non-RCRA, state-regulated hazardous waste and are potential state ARARs. The non-RCRA, state-regulated waste definition requirements at Cal. Code Regs. tit. 22, § 66261.24(a)(2) are potential state ARARs. Cal. Code Regs., tit., 22, §§ 66261.22(a)(3) and (4), § 66261.24(a)(2)–(a)(8), § 66261.101, § 66261.3(a)(2)(C) or § 66261.3(a)(2)(F) are also potential ARARs.

Cal. Code Regs. tit. 27, §§ 20210 and 20220 are also potential state ARARs for characterizing any waste generated in implementing Alternative 3 for proper off-site disposal.

Table A-1 in Appendix A summarizes the chemical-specific ARARs for Site 30.

3.2.3 Location-Specific ARARs

Location-specific ARARs are restrictions placed on the concentrations of hazardous substances or on the conduct of activities solely because of the specific qualities of some locations. Specific locations include flood plains, wetlands, historic places, and sensitive ecosystems or habitats. There are no location-specific ARARs for Site 30. The terrestrial habitat of NAVSTA TI is of poor quality for wildlife species because the island is predominantly covered with anthropogenic urbanized areas. Because of the low-quality habitat of Site 30, no receptors of concern use the area. Disturbance from vehicular traffic and general human presence also reduces the quality of the habitat to wildlife species at this site. In addition, there are no flood plains, wetlands, or historic places on Site 30.

3.2.4 Potential Action-Specific ARARs

The following are potential action-specific ARARs for Alternatives 2 and 3. There is no need to identify potential action-specific ARARs for the No Action Alternative.

Engineering Controls Combined with ICs are evaluated as Alternative 2. There are no potential federal or state ARARs for engineering controls and there are no federal ARARs for ICs. The substantive provisions of the following requirements are potential state action-specific ARARs for ICs which were identified by DTSC:

- California Civil Code §1471– which allows property owners to make a hazardous material covenant which runs with the land.
- California Health and Safety Code § 25202.5 – which allows DTSC to enter into agreements with property owners to restrict the use of the property.
- California Health and Safety Code § 25233(c) – which provides criteria for obtaining variances from land use restrictions.
- California Health and Safety Code § 25234 – which provides criteria for removing land use restrictions.

- California Health and Safety Code §§ 25222.1 and 25355.5(a)(1)(C) – which provides the authority for DTSC to enter into agreements with property owners to restrict the use of property.

- Cal. Code. Regs., tit. 22, § 67391.1(a) and (e)(1) – which requires DTSC and the federal government to execute an appropriate land use covenant, which is recorded in the county in which the land is located.

Alternative 3 consists of demolition of the building, excavation of contaminated soil, and off-site disposal of the waste at a permitted landfill.

There are no potential federal or state ARARs for demolition of the existing building. For excavation, Cal. Code Regs. tit. 22, §§66262.10(a) and 66262.11 are potential ARARs which require a generator of waste determine if the waste is RCRA hazardous waste:

- The Navy may store the building debris from demolition and excavated soil in a temporary staging pile prior to off-site disposal. The substantive provisions of the following RCRA requirements, set forth in 40 CFR § 264.554(d)(1)(i-ii) and (d)(2), (e), (f), (h), (i), (j), and (k) are potential ARARs for this staging pile. These sections provide that a generator may accumulate solid remediation waste in a staging pile up to 2 years without triggering land disposal restrictions.

The following substantive provision of Clean Air Act requirement is a potential ARAR for excavation:

- Substantive provisions of the Bay Area Air Quality Management District Regulation 6-302: the opacity limitation prohibits emissions for a period aggregating more than 3 minutes in any hour an emission equal to or greater than 20 percent opacity.

The following substantive provisions of sections of the Federal Hazardous Materials Transportation Law are potential ARARs for the transportation of any hazardous waste:

- Title 49 USC 5101 through 5127, Title 49 CFR 171.2(f), 171.2(g), 172.300, 172.301, 172.302, 172.303, 172.304, 172.312, 172.400, and 172.504 (requirements for transporting hazardous wastes, including representations that containers are safe, prohibitions on altering labels, marking requirements, labeling requirements, and placarding requirements).

The ARARs for characterization and proper disposal are discussed under the chemical-specific ARARs. Table A-2 in Appendix A summarizes the potential action-specific ARARs for Site 30.

3.3 GENERAL RESPONSE ACTIONS

GRAs are broad classes of responses or remedial actions intended to meet the RAOs. Similar to RAOs, GRAs are medium –specific; therefore, they are developed in relation to contamination of

soil, groundwater, or air. General response actions may include treatment, containment, excavation, extraction, disposal, institutional actions, or a combination of these (EPA 1988). Although in some cases, response actions may stand alone as complete remedial alternatives, in many cases, combinations of response actions are necessary to effectively address soil contamination and meet the RAOs.

Four GRAs were identified to achieve the RAOs developed for Site 30:

- No Action – Under the No Action Alternative, no remedial measures will be taken at the site.

- Institutional Controls – ICs are legal and administrative mechanisms used to implement land use and access restrictions that are used to limit the exposure of future landowner(s) and/or user(s) of the property to hazardous substances and to maintain the integrity of the remedial action until remediation is complete and remediation goals have been achieved. Monitoring and inspections are conducted to assure that the land use restrictions are being followed. Legal mechanisms include restrictive covenants, negative easements, and deed restrictions. Administrative mechanisms include deed notices, adopted local land use plans and ordinances, construction permitting, or other existing land use management systems which may be used to ensure compliance with use restrictions.

- Engineering Controls – Engineering controls are measures, such as the installation of engineered barriers or caps, which are used to reduce or eliminate the pathway for potential human exposure to contamination. Typically, engineering controls are used in conjunction with some form of ICs to ensure proper monitoring and maintenance of the engineering control.

- Active Remediation – Engineering instruments which minimize or eliminate the potential exposures of human and ecological receptors to contamination by reducing contaminant toxicity, volume, or mobility through treatment or containment. Because Site 30 presents a risk below the risk management range, the active remediation alternative is primarily intended to protect human health under alternative land use scenarios. Active remediation technologies can be categorized into three groups based on where the treatment occurs: in situ technologies, where the waste is treated on site where it is located (such as in the ground); ex situ, where the waste is treated on site, but at a location other than where the waste was originally located; and off site, at a permitted facility.

4.0 PRELIMINARY SCREENING OF REMEDIAL ACTION TECHNOLOGIES AND PROCESS OPTIONS AND DEVELOPMENT OF REMEDIAL ALTERNATIVES

Having developed the RAOs, identified and reviewed the potential ARARs, and developed the GRAs, the fourth step in the development of remedial alternatives is the preliminary screening of technology and process options. Remedial action technologies refer to general categories, such as active remediation, with process options referring to specific treatment trains. During the initial screening, the range of remedial action technology types and process options are reduced with respect to technical practicability, site conditions, waste characteristics, and contaminant properties, as well as their ability to meet NCP requirements and RAOs. During the secondary screening, retained remedial action technologies and process options are screened with respect to effectiveness, implementability, and cost.

The screening criteria utilized in evaluating remedial action technologies and process options; the identification and screening of remedial action technology and process options; and a summary of the remedial action technology and process options retained for alternative development are discussed in the following sections.

4.1 SCREENING CRITERIA

Various treatment technologies were evaluated during the initial screening to address soil contamination at Site 30. The screening evaluations focused on each remedial action technology's effectiveness, implementability, and cost. The screening matrix on remediation technologies compiled by the Federal Remediation Technologies Roundtable (FRTR 2005) was a primary source used for the initial screening evaluation.

4.1.1 Effectiveness

The evaluation of effectiveness focused on (1) the ability of the remedial action technology to address contaminants of concern, (2) the ability of the remedial action technology to achieve the RAO within a reasonable timeframe, and (3) the reliability of the remedial action technology. For the "active" remedial action technologies, the ability of a remedial action technology to address the contaminants of concern at Site 30 was evaluated based on its general applicability to treat dioxins in soil to concentrations which meet the RAO. Technologies were included in the initial screening evaluation, if they were rated as "better" in treating those chemicals within the Federal Remediation Technologies Screening Matrix (FRTR 2005).

The remediation timeframe is based on a remedial action technologies classification as short-term (achieving the cleanup goals after less than 3 years of implementation), medium-term (achieving the cleanup goals after 3 to 10 years of implementation), or long-term (requiring more than 10 years of implementation to achieve the cleanup goals) (FRTR 2005).

4.1.2 Implementability

The evaluation of implementability encompasses both the technical and the administrative feasibility of implementing a remedial action technology. Technical feasibility includes

compatibility with site-specific conditions; the availability of equipment; the ease of constructing the remediation system; the labor intensiveness required by the system; and the availability of vendors which have the capability to design, construct, and maintain the system. Administrative feasibility includes the ease of obtaining concurrence from regulatory agencies.

4.1.3 Cost

The evaluation of cost addresses direct and indirect capital costs and annual operation and maintenance (O&M) costs. When the information is available, the cost range is presented quantitatively. Otherwise, qualitative descriptions of low, moderate, and high are used. The terms low, moderate, and high cost describe a unit cost for treatment which is less than $100 per ton of soil, $100 to $300 per ton of soil, and more than $300 per ton of soil, respectively (FRTR 2005). The cost ranges are based on a review of the literature, vendor quotations, and data prepared for other studies.

4.2 Identification and Screening of Remedial Action Technology and Process Options

Technology types and process options were evaluated with respect to the three preliminary screening criteria described in Section 4.1. A summary of the preliminary screening process for soil treatment technologies is presented in Table 4-1.

Sources of remedial action technology descriptions in this section include (1) the remediation technology screening matrix of FRTR (FRTR 2005), (2) EPA Office of Solid Waste and Emergency Response (OSWER) Publication titled "Reference Guide to Non-combustion Technologies for Remediation of Persistent Organic Pollutants in Stockpiles and Soil", dated December 2005 (EPA 2005), (3) the OSWER publication on ICs (EPA 2003), and (4), the Department of Defense Policy on Land Use Controls Associated with Environmental Restoration Activities (DoD 2001).

The following sections describe the evaluations of the potential process options, which were identified within each of the GRAs for Site 30.

4.2.1 No Action

"No Action" implies that no remedial action will be conducted on site. No cost would be associated with the No Action Alternative and it would be highly implementable. However, effectiveness is considered to be low since under the No Action Alternative, soil would be left as is without implementing any ICs, containment, removal, treatment, or other mitigating actions. The NCP requires the no action response be evaluated in every FS because it provides a baseline for comparison to the other remedial alternatives (40 *CFR* Subsection 300.430[e][6]). Therefore, the No Action Alternative is retained for further evaluation.

4.2.2 Institutional Controls

ICs are legal and administrative mechanisms used to implement land use and access restrictions which are used to limit the exposure of future landowner(s) and/or user(s) of the property to hazardous substances and to maintain the integrity of the remedial action until remediation is complete and remediation goals have been achieved. Monitoring and inspections are conducted to assure the land use restrictions are being followed.

Often ICs are more effective if they are layered or implemented in series. Layering means using different categories of ICs concurrently to enhance the protectiveness of the remedy. Implementation of ICs in series may be applied to ensure both the short- and long-term effectiveness of the remedy. As a single remedy, ICs are typically implemented as a long-term approach. The following subsections describe and evaluate ICs which could be applied at Site 30.

4.2.2.1 Legal Mechanisms

Legal mechanisms involve legal instruments placed in the chain of title of the site property. Some legal mechanisms can be implemented without the intervention of any federal, state, or local regulatory agency. Legal mechanisms include restrictive covenants, negative easements, and deed restrictions.

When used as an IC, an easement typically provides access rights to a property so the facility owner or regulatory agency may inspect and monitor the effectiveness of a remediation system. Easements are typically easily implemented and low cost. Implemented independently, easements offer a low degree of effectiveness, but when combined with other legal mechanisms the effectiveness of easements can be increased. Because long-term monitoring is a critical component to assess the effectiveness of the IC approach, an easement is retained for further evaluation. Its implementation will be layered with other IC tools.

A covenant is an agreement between one landowner to another made in connection with a conveyance of property to use or refrain from using the property in a certain manner. A major benefit of a covenant is that it can be used to establish an IC where the unremediated property is being transferred from the current owner to another party. Covenants are typically easily implemented and low cost. Implemented independently, covenants offer a low degree of effectiveness, but when combined with other legal mechanisms the effectiveness of covenants can be increased. Because of the possibility of potential property transfer in the future, implementation of a covenant is retained for further evaluation.

A deed restriction is a clause or series of clauses in a deed which restricts the future use of the property. Deed restrictions may impose a vast array of limitations and conditions, such as restricting the types of buildings that can be built or restricting the types of uses for a piece of property. Deed restrictions are typically easily implemented and low cost. Implemented independently, deed restrictions offer a moderate degree of effectiveness, but when combined with other legal mechanisms the effectiveness of deed restrictions can be increased. Because of the possibility of potential property transfer in the future, implementation of deed restrictions are retained for further evaluation.

4.2.2.2 Administrative Mechanisms

Administrative mechanisms use the regulatory authority of a government entity to impose restrictions on citizens or property under its jurisdiction. Examples of government controls include zoning restrictions, groundwater use restrictions, adopted local land use plans, construction permitting, or other existing land use management systems which may be used to ensure compliance with use restrictions.

A zoning restriction is a common land use restriction specifying allowed land uses for certain areas. Zoning can be used to prevent certain exposures not otherwise prevented under a remedy. Examples of zoning restrictions include (1) prohibition of a site for residential development, or (2) restriction of excavation at sites to specific depths where contamination is present. The zoning restrictions are typically issued by a local government. However, they are not necessarily permanent; they can be repealed or local governments can grant exceptions after public hearings. Therefore, for a long-term remedy, the implementation of zoning restrictions are usually layered with other IC tools. At Site 30, zoning restrictions are highly implementable at low cost and are considered highly effective; therefore, they are retained for further evaluation.

Groundwater use restrictions are typically directed at limiting or prohibiting certain uses of groundwater, which may include limitations or prohibitions on well drilling in a certain area or groundwater extraction from a certain aquifer. The effectiveness of the groundwater use restrictions depends on the willingness and ability of local governments to monitor compliance and take enforcement action. Similar to zoning restrictions, groundwater use restrictions are typically layered with the implementation of other IC tools. In a letter from the Water Board to the Navy, the Water Board provided its concurrence that groundwater at NAVSTA TI meets the exemption criteria in State Water Resources Control Board Sources of Drinking Water Resolution 88-63 but retains its designation for potential agricultural, process and industrial supply (Water Board 2001). Groundwater use restrictions are not retained for further evaluation at Site 30 because there are no groundwater impacts from the site. For this reason, groundwater use restrictions are not presented in Table 4-1.

TI has a land use plan (the Draft NAVSTA TI Reuse Plan [CCSF 1996]); however, its effectiveness is considered to be low since the plan does not contain enforcement components. As a result, the Reuse Plan is not retained for further evaluation as a component of a remedial alternative, but is still considered useful as a planning tool.

Informational tools provide information or notification that residual contamination may remain on site. Common examples include state registries of contaminated properties, deed notices, and advisories. The most commonly used are deed notices, which refer to a non-enforceable, purely informational document filed in public land records which alert persons searching the records. Deed notices are typically easily implemented and low cost. Implemented independently, deed notices offer a low degree of effectiveness, but when combined with other legal mechanisms the effectiveness of deed notices can be increased. Because they are non-enforceable, informational devices are most likely to be used as a secondary layer to enhance the overall reliability of other ICs. Therefore, deed notices will be retained for further evaluation.

4.2.3 Engineering Controls

Engineering controls are measures, such as the installation of engineered barriers or caps, which are used to reduce or eliminate the pathway for potential human exposure to contamination. The NCP states "EPA expects to use engineering controls, such as containment, for waste that poses a relatively low risk or where treatment is impractical" (40 CFR 300.430).

4.2.3.1 Containment

Containment strategies have been used to prevent human exposure to contaminants when contaminants are to be buried or left in place at a site. When site conditions consist of extensive contamination, and removal of wastes poses potential health hazards, prohibitive costs, or lack of adequate treatment technologies, containment is often chosen. The purpose of final covers, also known as caps, under RCRA and CERCLA is to control moisture infiltration from the surface into closed facilities and to limit the formation of leachate and its migration to groundwater. Typically, a RCRA and CERCLA cover consists of three basic layers: a low hydraulic conductivity layer; a drainage layer, and a vegetation/soil layer. Single layer caps composed of concrete or bituminous asphalt form a barrier between the waste and the surface environment, but typically do not meet regulatory requirements for containment of wastes, such as at landfills. Typically, the caps are designed to both restrict contact with the underlying materials, as well as to minimize the infiltration of water to the underlying materials. Containment can also involve perimeter measures, such subsurface walls (sheet piles, cut-off walls, and interceptor trenches are examples) to minimize the lateral movement of contaminants. Containment is considered to be highly effective in eliminating exposure pathways by preventing contact with contaminated soils.

Benefits of containment include short installation times, no excavation of the contaminant-bearing materials, minimum worker exposure, and prevention of water infiltration and subsequent migration of contaminants. Limitations are the requirements for periodic inspections, deed restrictions, relatively high cost, and possible groundwater monitoring to verify no contaminant transport to aquifers. Generally, long-term operation and maintenance programs are recommended to demonstrate containment structures are maintained in good condition. Long-term monitoring is often used at sites where containment is a selected remedial strategy to determine if contaminants are migrating to groundwater sources.

If used at Site 30, containment would (1) require the demolition of Building 502, (2) require the excavation of soil so a landfill-type cap several feet thick could be installed and existing grades maintained; or (3) require raising the elevation of Site 30 to allow for proper installation of the cap, and (4) would be inconsistent with the current and planned future use of IR Site 30, and limit future uses of IR Site 30. As a result, overall implementability is considered to be low. Therefore, containment is not retained for further consideration.

4.2.3.2 Exposure Prevention Barriers

The purpose of an exposure prevention barrier is to prevent a complete exposure pathway to a human receptor. Exposure prevention barriers may also be used to contain contamination, but containment is not the primary purpose. Exposure prevention barriers are applicable at low-hazard sites where the nature and extent of the contamination is such that a fully engineered and

maintained containment system, such as required at landfills, is not warranted. The components of exposure prevention barriers may include existing or new building foundations and floors, parking lots, sidewalks, other paved areas, vapor barriers, subsurface vapor control systems, and landscaped areas. ICs would be required to maintain the exposure prevention control, and allow for appropriate precautions to be taken should the need to penetrate the exposure prevention barrier be required, as might be encountered with utility repair. Exposure prevention barriers are most effective where there are low concentrations of contaminants and the contaminants are not highly mobile, such as at Site 30.

Exposure prevention barriers have many benefits for low-risk sites. Exposure prevention barriers can use existing site features, such as building slabs, parking lots, or other paved surfaces. Exposure prevention barriers are typically fairly quick to construct, and use readily available construction skills and materials. Exposure prevention barriers are highly implementable and easy to integrate into site uses. Depending on the sophistication of the exposure prevention barrier, periodic maintenance may be required. Typically, exposure prevention barriers are periodically inspected to determine if they are functioning adequately. Exposure prevention barriers could be effective, are readily implementable, and would be relatively inexpensive to implement. Specific to Site 30, the use of the existing daycare center building slab as an effective exposure prevention barrier is consistent with the intended "Institutional Use" of the site as a daycare center. Exposure prevention measures are a low cost and viable technology for Site 30, and are therefore retained for further consideration.

4.2.4 Active Remediation

To meet EPA and DoD requirements, active remediation was evaluated as a remedial action technology type. Active remediation is the active removal of chemicals from a site, as opposed to either containing or preventing exposure to the chemicals. As a result, active remediation for Site 30 could include any of the following treatment technologies: (1) excavation and incineration of contaminated medium, (2) in situ bioremediation, (3) non-combustion processes treatment, (4) ex situ soil washing, and (5) excavation and off-site disposal of soil at a permitted landfill.

DoD policy requires an alternative permitting "unrestricted use" be evaluated in any FS where land use control (which include ICs and engineering controls) is being evaluated as an alternative (DoD 2001). The purpose of the active remediation evaluation is, in part, to fulfill this requirement. A variety of process options were screened, including options which treat the contamination in place (in situ), treat contamination on site but not in place (ex situ), and involve off-site treatment or disposal. Aside from effectiveness, implementability, and cost considerations, professional judgment and information from vendors were also used in the screening process in the following active remediation technologies.

4.2.4.1 Off-Site Disposal by Incineration

This option would involve the demolition of the existing building to access potentially contaminated soils, followed by excavation and transportation of any contaminated soil to an off-site, existing, permitted commercial incinerator. Incineration has been successfully used to treat dioxin-contaminated soils with concentrations from the parts per million range (mg/kg) to the

parts per billion range (micrograms per kilogram). Effectiveness is considered to be low since incineration has not been demonstrated to successfully reduce dioxins to the Site 30 preliminary remedial goal of 12 ng/kg. Additionally, incineration is controversial and the incineration of any chlorinated compounds, including dioxins, can produce airborne dioxins if appropriate conditions are not maintained. Incineration is also expensive, with commercial incineration costs for soil, including pre-treatment, exceeding $500 per ton. Because of the possibility of generating air emissions of dioxins during the incineration process, the effectiveness of actually reducing dioxins, as opposed to transferring dioxins to the air or air pollution control equipment media is questionable. If incineration were performed at an off-site facility, the transportation of the contaminated soil off site would permanently remove potentially contaminated soil from the site. This technology is moderately implementable, but would be cost prohibitive due to transportation, treatment, and disposal costs. This technology is not retained for further analysis.

4.2.4.2 In Situ Bioremediation

This option might require the demolition of the existing building to allow for access to potentially contaminated soil. Bioremediation techniques have been successfully used to remediate soil contaminants such as petroleum hydrocarbons, solvents, pesticides, wood preservatives, and other organic chemicals. However, there is little experience in using in situ bioremediation to treat dioxins, and despite some ongoing research, little experience exists in the performance of any type of in situ bioremediation at the low contaminant concentrations which exist at Site 30. Biodegradation rates are influenced by contaminant type, soil type, oxygen supply, moisture content, nutrient supply, pH and temperature. Based on available information, the effectiveness and implementability of in situ bioremediation to remedy dioxins is questionable, and the costs are unknown. Therefore, in situ bioremediation is not retained for further consideration.

4.2.4.3 Treatment by Non-combustion Processes

Several vendors offer proprietary processes for the non-combustion treatment of persistent organic compounds such as dioxin. Many of these processes are mobile and some are in situ. All of the ex situ processes would require demolition of the existing building to allow for access to potentially contaminated soils. The in situ processes might require demolition of the existing building or at the very least penetrating the existing daycare center building slab to characterize and treat potentially contaminated soil. These processes use innovative means of treating contamination. Most of them would require excavation of the soil, followed by some sort of pre-treatment. Few of these processes have been demonstrated at a field scale, and none have been shown to treat soils to reach the Site 30 preliminary remedial goal of 12 ng/kg. There are additional issues regarding the regulatory concurrence of processes which have not been successfully demonstrated in the field under similar conditions. The effectiveness of these processes in achieving the RAO is questionable and therefore considered low. Additionally, there are a number of uncertainties regarding implementability of non-combustion treatment, and the cost is considered to be moderate to high for these technologies. These technologies are briefly discussed below.

- In Situ Thermal Desorption has been used in California to reduce dioxin concentrations from 3,200 to 60 ng/kg at a field scale (EPA 2005). There are no

reports of thermal desorption being used to treat dioxin-contaminated soils to the Site 30 preliminary remedial goal of 12 ng/kg. Where applicable, this process has moderate to high costs. In situ thermal desorption was not retained because it has not been proven effective in treating dioxins at the concentrations present in soil at IR Site 30. The ex situ variant of this process has also not been demonstrated to treat dioxin contamination at the concentrations present at Site 30. Some dewatering of excavated soils may be required prior to treatment. Furthermore, costs would be high, since all costs associated with excavation would be included. Therefore, ex situ thermal desorption was not retained because it has not been proven effective in treating dioxins at the concentrations present in soil at IR Site 30 and the associated implementation costs are high.

- Gas-Phase Chemical Reaction involves heating the soil to very high temperatures and then treating the contaminants in the resulting gaseous phase. This process has been used at a field scale on dioxins, but is currently not marketed by the vendor, due to prohibitive costs (EPA 2005). Therefore, gas-phase chemical reaction is not retained for further evaluation.

- Geomelt™ is an in situ or ex situ process which heats the soil in a vitrification or solidification process. During treatment, contaminants are both destroyed by high heat and locked in a glass-like matrix as part of the vitrification process. Geomelt™ has been used in situ to immobilize dioxin-contaminated soils from an initial dioxin concentration of 11 µg /kg down to a final dioxin concentration of 0.12 µg/kg. This technology has not been demonstrated to be capable of reducing dioxin concentrations to the Site 30 preliminary remedial goal of 12 ng/kg from the already low concentrations of dioxin present at Site 30 (EPA 2005). This is a high cost option, with even higher costs resulting from the need to dispose of off site the vitrified soil to enable redevelopment of the site. The in situ variant would likely not work due to the shallow water table. Due to costs concerns, Geomelt™ is not retained for further evaluation.

- Base-Catalyzed Decomposition has been the subject only of pilot testing on dioxins in oil (EPA 2005). Base-catalyzed decomposition is a two-stage process, where contaminated soil is mixed with an alkali such as sodium hydroxide and then heated in a thermal desorption reactor. The desorbed compounds are then processed through another reactor, where the contaminants are treated further (EPA 2005). Because of the lack of any evidence that base-catalyzed decomposition can treat soils and unknown costs, this technology is not retained for further analysis.

- Cerox™ is an ex situ electrochemical proprietary technology which uses cerium in its highest valence state to treat contamination (EPA 2005). Cerox™ has not been tested on soils or sediments at a pilot or full scale, and its costs and potential efficacy at Site 30 are unknown (EPA 2005). This technology is not retained for further analysis.

- Plasma treatment would involve a preparatory step (thermal desorption) followed by treatment with the plasma (EPA 2005). Because of the necessity of thermal desorption, either in situ (not considered viable) or ex situ (following excavation), the costs would be high. Although several vendors have been experimenting with plasma as a contaminant destruction technique, plasma has not been demonstrated at a field scale. Therefore, this technology is not retained for further analysis.

- Supercritical water has been used to extract contaminants from liquid waste streams, but has not been used on solids (EPA 2005). Therefore, supercritical water is not retained for further analysis.

- Solvated Electron Technology is a proprietary process involving the treatment of contaminants with solvated electrons. This process is currently not marketed by the vendor, due to high treatment costs (EPA 2005). Therefore, this technology is not retained for further evaluation.

4.2.4.4 Ex Situ Soil Washing

Removal of contaminants by soil washing is a physical/chemical process for scrubbing soil ex situ. This process would require the demolition of the existing building to allow for access to potentially contaminated soil. The process either dissolves/suspends material in a wash solution, or concentrates contaminants into a smaller volume of soil through particle size separation, gravity separation, and attrition scrubbing. Costs for soil washing are considered to be moderate to high. It is applicable to heavy metals, radionuclides, and organic contaminants. Since contaminants tend to bind to clay, silt, and organic soil particles, washing separates these smaller particles from the coarser sand thus concentrating contaminants into a smaller volume. Complex mixtures of contaminants can make formulation of a washing solution more difficult, and soil washing has not been proven with dioxins. Because the effectiveness and implementability are considered to be low due to the inherent uncertainties for the treatment of dioxins, ex situ soil washing is not retained for further consideration.

4.2.4.5 Off-Site Disposal at a Permitted Landfill

This option would involve the demolition of the existing building to provide for access to the contaminated soil, the excavation of potentially contaminated soils from underneath the building, and the transportation and disposal of the contaminated soil at an off-site, permitted landfill. During a previous removal action at Site 30, lead and dioxin-contaminated soil was excavated and transported for disposal at a permitted landfill, successfully demonstrating the proven effectiveness of this approach. Implementability and costs are considered to be moderate, since excavation and off-site disposal is a relatively simple process with proven procedures. The limitation was the existing daycare center building slab, which overlays some of the contaminated soil. It is necessary to leave the soil in place at depth to protect the integrity of the existing daycare center building slab, which is consistent with the current and future use of the site and existing building as a daycare center. This process is retained for further evaluation.

4.3 SUMMARY OF RETAINED REMEDIAL TECHNOLOGY AND PROCESS OPTIONS

Based on the preliminary screening, the following technology and process options were retained: no action, required by the NCP; ICs, including legal measures and administrative measures; engineering controls in the form of exposure prevention barriers, and active remediation with excavation and disposal at a permitted landfill. The next step is to group the retained technology and process options into several viable remedial alternatives for further evaluation. In accordance with the NCP, the No Action Alternative will be retained as a basis for evaluating the other alternatives.

4.4 DEVELOPMENT OF REMEDIAL ACTION ALTERNATIVES

This section assembles the retained technology and process options into remedial alternatives for further analysis. Because soil is the only media requiring action, dioxins are the only contaminants of concern, and only a few of the technology and process options were retained during the screening process, only three remedial alternatives are developed. Therefore, the preliminary screening of remedial alternatives will be skipped, and the three remedial alternatives will be evaluated in detail in Section 5.0 of this document.

According to the NCP, these remedial alternatives should be analyzed in detail based on nine criteria, including: (1) overall protection of human health and the environment; (2) compliance with ARARs; (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, and volume through treatment; (5) short-term effectiveness; (6) implementability; (7) cost; (8) state acceptance; and (9) community acceptance (40 CFR, Part 300.430(e)(9)). Detailed descriptions of these alternatives are provided in the following subsections and the detailed analyses of these three alternatives against the NCP criteria are provided in Section 5.0. A comparative analysis of these alternatives is provided in Section 6.0. Appendix B provides details regarding the cost estimates developed for Alternatives 2 and 3.

4.4.1 Alternative 1: No Action

"No Action" implies no remedial action will be conducted on site. Under the No Action Alternative, soil would be left in place without implementing any ICs, containment, removal, treatment, or other mitigating actions. The NCP requires the no action response be evaluated in every FS because it provides a baseline for comparison to the other remedial alternatives (40 *CFR* Subsection 300.430[e][6]). There are no costs associated with this alternative.

4.4.2 Alternative 2: Engineering Controls Combined with ICs

Remedial Alternative 2, Engineering Controls Combined with ICs, uses a combination of engineering controls and ICs to prevent exposure to the contaminated soils beneath Building 502. The results of the risk assessment indicate that for the current and planned future use of Site 30 as a daycare center, the site-related risk is below the risk management range, even if the concrete pad adjacent to Building 502 at Site 30 is removed. However, because the nature and extent of dioxin contamination beneath Building 502 has not been characterized, there is a need to prevent exposure to potentially contaminated soils beneath Building 502. Under remedial Alternative 2, the existing daycare center building slab would be maintained as an effective exposure prevention barrier and ICs would be implemented to restrict industrial/commercial or residential

development and restrict site occupants from removing or penetrating the exposure barrier. Provisions for making any required repairs to subsurface utilities beneath Building 502 would be provided. Annual inspections, documentation, and IC oversight will be coordinated with DTSC.

The following sections present the elements of Alternative 2 and describe the engineering controls and ICs used for this alternative. The estimated cost of this alternative is $782,000.

4.4.2.1 Engineering Controls

Engineering controls considered for Site 30 include maintaining the existing daycare center building slab as an effective exposure prevention barrier. The plans for Building 502 indicate the existing daycare center building slab is 10.25 inches of concrete consisting of a 4-inch thick reinforced sub-slab, a 3.25-inch airfloor/concrete layer, and a 3-inch thick reinforced concrete layer over the airfloor/concrete layer. Airfloor is an interlocking metal form which provides both ventilation and radiant heat. Beneath this rigid system are a 2-inch sand layer, a vapor barrier, a capillary water barrier, and a minimum of 9 inches of engineered fill (Navy 1982). Figure 6 provides a cross section for the existing daycare center building slab system. The existing daycare center building slab is considered to be an effective engineering control because its thickness, construction, and the presence of several layers of clean fill material immediately beneath the existing daycare center building slab provides further separation between the slab and potentially contaminated soils. The existing daycare center building slab is assumed to not require maintenance to continue to function as an effective exposure prevention barrier; however, periodic inspections would be required to verify existing daycare center building slab performance as an effective exposure prevention barrier.

4.4.2.2 Institutional Controls

Alternative 2 would implement ICs to restrict industrial/commercial or residential development and to restrict site occupants from removing or penetrating the surface acting as the exposure prevention barrier, except when following specific guidelines to prevent the exposure to potentially contaminated soils. Since the daycare center is presently used, provisions would be made to allow for utility repair (such as water or sewer repairs) which may be required as part of the general maintenance of the building. These measures would require all subsurface work within the known or potentially contaminated areas be performed using measures designed to prevent the exposure of the occupants and workers to potentially contaminated soil. The alternative land use scenarios would require the maintenance of the existing effective exposure prevention barrier (existing daycare center building slab).

- Entry of the DTSC into a land use covenant with the new owner requiring the inspection of the building slab as an existing exposure prevention barrier with provision of making utility repairs, as necessary.
- Recording of a Deed Notice to notify the public regarding the existence of potential contamination.
- A Remedial Action Work Plan (RAWP) to specify the roles and responsibilities for implementing, monitoring, and enforcing the ICs (DoD 2004).
- Restriction of commercial/industrial or residential reuse of the site.

4.4.3 Alternative 3: Building Demolition, Excavation, and Off-Site Disposal at a Permitted Landfill

Remedial Alternative 3, Building Demolition, Excavation, and Off-Site Disposal at a Permitted Landfill, is the active remediation alternative intended to meet the DoD requirement of evaluating an alternative which would result in "unrestricted" use of the site where the FS is also evaluating alternatives which involve the use of land use controls (DoD 2001). The results of the risk assessment indicate that for the current and planned future use of Site 30 as a daycare center, the site-related risk is below the risk management range. However, Alternative 3 assumes removal of Building 502 and therefore addresses the concern from unknown possible dioxin TEQ concentrations beneath this building. Remedial Alternative 3 involves the demolition of the existing daycare center building (Building 502) and associated slab to allow for access to the potentially contaminated soil. The existing paved areas (e.g., sidewalks, parking lot) at the site, excluding Building 502 and concrete and asphalt pad installed in 2003, would not be removed as part of this alternative. The potentially contaminated soil beneath Building 502 and the concrete and asphalt pad would then be delineated, all contaminated soil identified within these areas excavated and transported to a landfill for disposal. The excavation would then be backfilled with clean soil. Alternative 3 does not include the construction of a new daycare center. The cost for this alternative is estimated to be $2,086,000.

A temporary fence would be installed around the site to prevent unauthorized persons from entering the site during remedial action activities. The existing 10,800 square foot building would be demolished, and a soil investigation would be performed to determine the extent of dioxin contamination within the building footprint. For the purposes of developing a cost estimate for this alternative, it is assumed all soil beneath the entire 10,800 square foot building and the 1,200 square foot concrete and asphalt pad will require excavation to a depth of 6 feet. The excavation depth was determined to be 6 feet bgs based on dioxin concentrations above the NAVSTA TI dioxin ambient level of 12.0 ng/kg detected at a maximum depth of 5 feet bgs. The soil beneath the concrete and asphalt pad is included in the cost estimate because the soil samples which have detected dioxin at concentrations above the ambient dioxin TEQ preliminary remedial goal are located beneath the concrete and asphalt pad. An estimated 3,120 cubic yards of building demolition debris would require disposal as nonhazardous waste at a permitted landfill. Based on excavation to 6 feet bgs, it is assumed an estimated 2,667 cubic yards (bank measure) of contaminated soil would be excavated and transported as a hazardous waste to an appropriately permitted landfill for disposal. The excavated area would be backfilled with clean soil and returned to approximately existing grades.

The intent of the remedial action described in Alternative 3 is to achieve unrestricted use of the site. It is assumed that following the completion of this alternative, the RAOs will have been achieved without the need for engineering controls and ICs. However, soils contain dioxin concentrations above the remediation goal may exist deeper than 6 feet bgs beneath Building 502. For the purpose of developing a cost estimate, the depth of 6 feet bgs was chosen based on the analytical results indicating elevated dioxin concentrations are present to a maximum depth of 5 feet bgs.

TABLE 4-1: INITIAL SCREENING OF SOIL TREATMENT TECHNOLOGIES

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

General Response Action	Technology Group	Treatment Technology	Description	Evaluation Criteria[a]			Evaluation Results
				Effectiveness	Implementability	Cost	
No Action	**No Action**	**No Action**	No remediation, institutional or engineering controls, or monitoring actions would be taken at the site. The site would remain in its current condition	Low effectiveness. Evaluation is required under the NCP and CERCLA as a baseline for comparison with other remedial alternatives.	Highly implementable. Evaluation is required under the NCP and CERCLA as a baseline for comparison with other remedial alternatives	No cost is associated with the No Action Alternative. Evaluation is required under the NCP and CERCLA as a baseline for comparison with other remedial alternatives.	Retained
Institutional Controls	**Administrative Mechanisms**	**Zoning Restrictions**	A common land use restriction specifying allowed land uses for certain areas. Zoning can be used to prohibit activities that could disturb a certain aspect of a remedy or to control certain exposures not otherwise protected under a remedy.	Highly effective in restricting future uses of land.	Zoning restrictions are highly implementable.	Low cost	Retained
		Land Use Plans	A land use plan outlines potential future land uses. A land use plan, when adopted may or may not contain an enforcement mechanism (such as zoning restrictions).	Low effectiveness. Do not necessarily contain an enforcement mechanism for prevention of exposure to COCs.	The NAVSTA TI Reuse Plan has not been formally adopted; therefore, it is difficult to implement.	Low cost	Eliminated
		Deed Notice	Commonly refers to a non-enforceable, purely informational document filed in public land records, which alerts persons searching the records to important information about the property.	Moderately effective. Informs potential human receptors about the property.	Highly implementable and complements other IC components.	Low cost	Retained
	Legal Mechanisms	**Easements**	Easements typically provide access rights to a property.	Low effectiveness as a stand-alone technology. Can be moderately effective in combination with other ICs and engineering controls. Allows for access to a property for inspections of engineering controls.	Highly implementable and complements other IC components.	Low cost	Retained
		Deed Restrictions	Deed restrictions are a clause or series of clauses in a deed which restricts the future use of the property.	Moderately effective. Future land use of the property would be restricted to designated use.	Highly implementable and complements other IC components.	Low cost	Retained
		Covenants	A covenant is an agreement between a landowner and another party made in connection with a conveyance of property to use or refrain from using a property in a certain manner. For example: a covenant not to dig on a certain portion of the property.	Will ensure the property would not be used in a manner which compromises the restrictions.	Highly implementable and complements other IC components.	Low cost	Retained
Engineering Controls	**Barriers**	**Barriers**	Barriers, such as building foundations, asphalt or concrete, or other hard surfaces are used to prevent direct contact with contaminated soil underneath.	Highly effective in eliminating exposure pathways. Prevents contact with contaminated soil.	Highly implementable.	Low cost	Retained
	Containment	**Capping**	Single layer caps composed of concrete or bituminous asphalt form a barrier between the contamination and the surface environment.	Highly effective in eliminating exposure pathways. Prevents contact with contaminated soil.	Low implementability. Would require modifications to the site that are inconsistent with planned reuse.	Moderate to high cost	Eliminated

TABLE 4-1: INITIAL SCREENING OF SOIL TREATMENT TECHNOLOGIES (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

General Response Action	Technology Group	Treatment Technology	Description	Evaluation Criteria[a]			Evaluation Results
				Effectiveness	Implementability	Cost	
Active Remediation	In Situ Treatment and On-Site Treatment	**On-Site Incineration**	The existing building is demolished to allow for access to the remaining contaminated soils. Soils are excavated and sent to a mobile incinerator, which has been set up on the site. Resulting residue is considered nonhazardous waste for disposal, and is either disposed of off site or used to backfill the excavation on site.	Low effectiveness. Effectiveness of incineration in meeting remedial goals has not been demonstrated.	Low implementability. Implementation would be difficult and would create some regulatory concerns.	High cost	Eliminated
		Treatment by Non-Combustion Processes	The existing building is demolished to allow for access to the remaining contaminated soils. Soils are excavated and treated using any of several proprietary processes to detoxify the contamination. Some soils may require an intermediate extraction/soil washing step. The treated soil is either disposed of off site or used as backfill at the excavation site.	Low effectiveness. These technologies have not been demonstrated to treat the already low levels of contamination to the required goals.	Low implementability. Too many uncertainties in the implementation process.	Moderate to high cost	Eliminated
		In Situ Bioremediation	The existing building may be demolished to allow for access to the remaining soils. Nutrients, chemicals, or microbes are added to the soil to remediate the dioxin. Soil is left in place.	Low effectiveness. These technologies have not been demonstrated to treat the already low levels of COCs to the remedial goals.	Low implementability. Too many uncertainties in the implementation process.	Low to moderate cost	Eliminated
		Ex Situ Soil Washing	The existing building is demolished to allow for access to the contaminated soil. A physical/chemical process for scrubbing soil ex situ by dissolving/suspending material in a wash solution, or concentrating contaminants through particle size separation, gravity separation, and attrition scrubbing.	Low effectiveness. These technologies have not been demonstrated to treat the already low levels of COCs to the remedial goals.	Low implementability. Too many uncertainties in the implementation process.	Moderate to high costs	Eliminated
	Off-Site Treatment	**Disposal by Off-Site Incineration**	The existing building is demolished to allow for access to the remaining contaminated soils. Soils are excavated and sent to a commercial incinerator for treatment.	Incineration has not been demonstrated to treat the already low levels of COCs to the remedial goals.	Moderately implementable. While excavation is considered a relatively simple process, permitted incineration facilities are relatively distant.	High cost	Eliminated
		Disposal at Permitted Off-Site Landfill	The existing building is demolished to allow for access to the remaining contaminated soils. Soils are excavated and sent to a permitted landfill for disposal.	Highly effective. This process has been successfully used in a removal action at the site.	Moderately implementable. Excavation and off-site disposal is a relatively simple process, with proven procedures.	Moderate cost	Retained

Notes:

a Cost:

Low	<$100/ton
Moderate	$100-$300/ton
High	More than $300/ton

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Contaminant of concern
IC	Institutional Controls
NAVSTA	Naval Station
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
TI	Treasure Island

5.0 DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

The remedial action technology and screening process described in Section 4.0 generated the following remedial action alternatives to be considered in the detailed analysis:

- **Alternative 1** – No Action
- **Alternative 2** – Engineering Controls Combined with ICs
- **Alternative 3** – Building Demolition, Excavation, and Off-Site Disposal at a Permitted Landfill

5.1 REMEDIAL ALTERNATIVE SCREENING CRITERIA

To select the most appropriate remedial action alternative for Site 30, the remedial alternatives are compared to the nine threshold, primary balancing, and modifying criteria listed below. Sections 5.2 through Sections 5.4 compare each of the individual alternatives to seven of the nine criteria listed below. The first two criteria relate directly to the statutory requirements each remedial alternative must meet and are categorized as threshold criteria. The next five criteria are the primary balancing criteria upon which the preliminary selection of the remedy is based. Together, these first seven criteria are considered the evaluation criteria. The remaining two criteria, state and community acceptance, are modifying criteria, and include agency and public comments on the proposed alternatives in the FS and will be addressed during the development of the Proposed Plan.

Threshold Criteria

- Overall protection of human health and the environment – Involves an assessment based on a composite of factors addressed under other evaluation criteria, including long-term effectiveness, short-term effectiveness, and compliance with ARARs.

  A determination and declaration that this criterion will be met by the proposed remedial alternative is required for the site; therefore, this is a threshold criterion which must be met by the selected remedial alternative. Ordinarily, this criterion is satisfied if the potential risks posed by the site are eliminated, reduced, or controlled through active remediation, treatment, engineering controls, or ICs.

- Compliance with ARARs – Assesses the compliance of an alternative with all chemical-specific, location-specific, and potential action-specific ARARs. This is also a threshold criterion which must be met by the selected remedial alternative.

Primary Balancing Criteria

- Long-term effectiveness and permanence – Examines the protection of human health and the environment after construction and implementation of the remedial alternative. This criterion addresses the long-term adequacy, reliability, and permanence of the remedial alternative.

  Following are components of this analysis:

  - The expected long-term reduction in risk posed by the site
  - The level of effort needed to maintain the remedy and monitor the area for changes in site conditions
  - The compatibility of the remedy with planned future use of the site

- Reduction of toxicity, mobility, and volume through treatment – Examines the effectiveness of the remedial alternative in reducing the toxicity, mobility, and volume of contaminants through treatment.

  The following factors are considered:

  - The amount of hazardous materials destroyed or treated
  - The degree of expected reduction in toxicity, mobility, or volume
  - The degree to which the benefits of the remedial alternative are irreversible
  - The types and quantities of treatment residuals which remain following treatment

- Short-term effectiveness – Examines the protection of community and worker health, as well as the protection of environment during construction and implementation of the remedial alternative.

  The following factors are considered:

  - Protection of the community during the implementation of the remedial alternative, including the effects of potential releases from the site, transportation of contaminated materials, and air-quality impacts from on-site treatment
  - Protection of workers during the implementation of the remedial alternative
  - Environmental impacts of the remedial alternative
  - Time required to achieve RAOs

- Implementability – Considers the technical and administrative feasibility of each alternative, as well as the availability of required resources. Factors considered in assessing this criterion include construction and O&M of the remedial alternative; ability to obtain concurrence from regulatory agencies; availability of required off-site treatment or disposal services; and availability of necessary equipment, materials, personnel, and time for implementation.

- Cost – Involves the development and evaluation of the capital cost of construction, equipment, land, buildings, engineering services, and project administration, as well as O&M costs for labor, spare parts, materials, and administration activities. The accuracy of costs developed for a FS typically ranges from -30 to + 50 percent, in accordance with EPA guidance (EPA 2000). In this FS, the present worth of each alternative is calculated using a discount rate of 3.0 percent, which is listed as the "real" interest rate, with an implementation time of up to 30 years (Office of Management and Budget 2006). Costs are then compared on a common, present-worth basis in terms of 2006 dollars. Costs presented in this FS Report are rounded to the nearest $1,000 dollars. The level of detail employed in developing these estimates is considered appropriate for making choices between alternatives, but the estimates are not intended for use in detailed budgetary planning.

Modifying Criteria

- State acceptance – Identifies the state's issues or concerns regarding each of the alternatives. This criterion will be evaluated during the Proposed Plan phase.

- Community acceptance – Identifies the community's issues or concerns regarding each of the alternatives. This criterion will be evaluated during the Proposed Plan phase.

5.2 NCP EVALUATION OF ALTERNATIVE 1: NO ACTION

Under this alternative, no remedial action would be performed at Site 30. No effort would be undertaken to contain, remove, monitor, or treat the contaminated soil at the site. An evaluation of the No Action Alternative is required under CERCLA to provide a baseline against which other alternatives can be measured.

5.2.1 Overall Protection of Human Health and the Environment

Results of the HHRA indicate that risk under the current and planned future use as a daycare center is below the risk management range. However, dioxin contamination has not been characterized beneath Building 502. Alternative 1 is not considered to be protective of human health, since it does not contain any measure to prevent exposure under alternative land use scenarios. The redevelopment of the site for commercial/industrial or residential reuse may result in exposure to the known characterized dioxin contamination adjacent to Building 502 or to potential contamination beneath Building 502. Therefore, Alternative 1 fails to meet the threshold criteria. An evaluation of Alternative 1 will be performed to provide a baseline for comparing Alternatives 2 and 3.

5.2.2 Compliance with ARARs

No ARARs apply to this alternative.

5.2.3 Long-Term Effectiveness and Permanence

Alternative 1 would be effective so long as site use remains the same as its current and future use as a daycare center. However, since Alternative 1 contains no mechanism to ensure either site use does not change, or any change in site use is managed appropriately, it can not be considered to be effective in the long term. Long-term human health risk is associated with the commercial/industrial and residential alternative land use scenarios. Therefore, Alternative 1 is considered to provide no long-term effectiveness and permanence.

5.2.4 Reduction of Toxicity, Mobility, or Volume through Treatment

This alternative would not reduce the toxicity, mobility, or volume of contaminants at Site 30 because known or potential contamination would not be treated, contained, or removed.

5.2.5 Short-Term Effectiveness

This criterion examines the effectiveness of the alternative during construction and implementation of the remedy until the RAO is met. No remedial action is involved under Alternative 1, so no new health risks are posed to the community, current occupants, workers, or the environment in the short term. The human health risk for current and future use of the site is below the risk management range; however, this alternative provides no protection for receptors under alternative land use scenarios. This alternative is considered to be moderately effective in the short term.

5.2.6 Implementability

This alternative is readily implementable. However, Alternative 1 is not likely to be accepted by the regulatory agencies, since it does not address potential risk in the event the integrity of the existing daycare center building slab is breeched or if commercial/industrial or residential alternative land use scenarios are implemented..

5.2.7 Cost

No capital or O&M costs are anticipated for Alternative 1.

5.3 NCP Evaluation of Alternative 2: Engineering Controls Combined with ICs

This section provides an evaluation of Alternative 2: Engineering Controls Combined with ICs. Alternative 2 uses the existing daycare center building slab as an effective exposure prevention barrier. ICs are used to ensure the existing daycare center building slab is maintained so that it functions as an effective exposure prevention barrier and to restrict the commercial/industrial or residential use of Site 30.

5.3.1 Overall Protection of Human Health and the Environment

Alternative 2 would protect human health under the alternative land use scenarios by preventing exposure to contaminated soil. No risk to ecological receptors was identified in the RI Report (SulTech 2006a). Risk to human health would be prevented by (1) Maintaining the existing daycare center building slab as an effective exposure prevention barrier at Site 30; (2) providing for building and utility maintenance under the existing daycare center building slab in a safe manner; and (3) restricting the use of the site for commercial/industrial or residential uses. As discussed in Section 4.4.2.1, the building slab is of sufficient thickness and construction that is assumed not to require maintenance to function as an effective exposure prevention barrier.

5.3.2 Compliance with ARARs

No chemical-specific ARARs would apply to Alternative 2 because soil would not be excavated. This alternative would comply with the potential action-specific state ARARs for ICs.

5.3.3 Long-Term Effectiveness and Permanence

Under Alternative 2, ICs would supplement the existing engineering controls to limit exposure of potentially dioxin-contaminated soil under Building 502 at Site 30 over the long term. Human health risks from site soils would remain below the risk management range over the long term because the existing exposure prevention barrier would be maintained. Provisions would be included to allow for subsurface repair work of utilities. In order for ICs to be effective, users of the site must comply with them. A RAWP would be prepared to guide IC implementation, inspection for compliance, reporting, and enforcement. In accordance with California law, the land use covenant would be recorded and future owners would be notified through a title search of the restrictions. In the event of commercial/industrial or residential alternative land use implementation, maintenance of the existing building slab as an effective exposure prevention barrier would be required. Alternative 2 would, therefore, be moderately effective over the long term.

5.3.4 Reduction of Mobility, Toxicity, or Volume through Treatment

Alternative 2 would not reduce the mobility, toxicity, or volume of hazardous substances over time through treatment at Site 30 because potentially contaminated soil would not be treated or removed.

5.3.5 Short-Term Effectiveness

Alternative 2 would not involve remedial construction activities, as all of the engineering control components are in place. Therefore, no construction would be required and no short-term risks to construction workers or the public would be created by this alternative. This alternative would be highly effective in the short term. Alternative 2 would meet the RAO.

5.3.6 Implementability

Implementability includes technical and administrative feasibility and the availability of required resources. From an administrative perspective, Alternative 2 would require agency concurrence with the legal mechanism used to implement the ICs. The specific mechanisms would be specified in the ROD and further detailed in the RAWP. This alternative would be easy to implement technically, since no active remediation is required. The implementation period for ICs would be in perpetuity. For the purposes of estimating costs for this FS, the project life is defined as 30 years for implementation of this alternative.

5.3.7 Cost

The detailed cost analysis for Alternative 2 includes an estimation of both capital and O&M costs. The costs were estimated for 30 year duration. The capital costs primarily involve preparation and implementation of the RAWP and include regulatory review. The O&M costs involve periodic inspections, annual reporting, and 5-year reviews pursuant to CERCLA. The cost estimate includes the cost for regulatory enforcement of the IC components. A 25 percent markup factor is included to account for Navy's contractor oversight costs.

The estimated total present value for Alternative 2 is $782,000. The basis for this cost estimate is presented in Table B-1 in Appendix B.

5.4 NCP Evaluation of Alternative 3: Building Demolition, Excavation, and Off-Site Disposal at a Permitted Landfill

This section provides an evaluation of Alternative 3: Building Demolition, Excavation, and Off-Site Disposal at a Permitted Landfill. Alternative 3 includes the demolition of the existing building, and conducting an investigation to determine the extent of potentially contaminated soil beneath the existing daycare center building slab. Following the investigation, the contaminated soils would be excavated and transported to an off-site, permitted landfill. For the purposes of the cost estimate, all of the soil beneath the existing daycare center building slab and the 1,200 square foot concrete and asphalt pad to a depth of 6 feet is assumed to require excavation and disposal as hazardous waste. The construction of a new daycare center is not included as part of this alternative.

5.4.1 Overall Protection of Human Health and the Environment

Alternative 3 will protect human health and the environment by removing potentially contaminated soil from beneath the existing daycare center building slab and disposing of it off-site in a secure, permitted landfill. The excavation of the contaminated soil would remove the potential primary risk driver, dioxins in soil, which is present under the commercial/industrial or residential alternative land use scenarios.

5.4.2 Compliance with ARARs

Alternative 3 would comply with all chemical-specific and action-specific ARARs identified for this alternative. The soil would have to be characterized in accordance with state and federal ARARs, prior to disposal in a landfill. If hazardous waste is generated as a result of the remedial action, the Navy will comply with all RCRA requirements relating to hazardous waste classification, accumulation, and pre-transport, as well as the relevant and appropriate sections of the Federal Hazardous Materials Transportation Law, which have been identified in Appendix A.

5.4.3 Long-Term Effectiveness and Permanence

Alternative 3 provides a permanent solution to known and potentially dioxin contaminated soil that may exist beneath Building 502 at Site 30. Following completion of the remedial action, the site would be available for unrestricted commercial/industrial or residential reuse because the RAOs will have been achieved without the need for engineering controls and ICs. Therefore, this alternative is effective in the long term and provides permanence.

5.4.4 Reduction of Mobility, Toxicity, or Volume through Treatment

Alternative 3 reduces the volume of potentially contaminated soils at Site 30; however, it does so by transporting the potentially contaminated soil to another location. Alternative 3 is therefore considered to not reduce the mobility, toxicity, or volume of soils through treatment.

5.4.5 Short-Term Effectiveness

Alternative 3 would take a relatively short time to implement. It is estimated the complete effort, including preparing the work plan, building demolition, excavation, backfilling, and confirmation activities can be completed within 1 year. Alternative 3 may present some inconvenience and increased expense to the current "Institutional" users of the existing daycare center, if travel distance and additional driving is necessary to go to an alternate daycare center. This alternative does create some potential short-term risks to remedial construction workers, due to the construction activities. These activities are related to the physical hazards of construction. Health and safety plans will be implemented to protect construction workers from contamination present under Building 502. There would be some risk to the public, due to the construction-related traffic. This could be mitigated through the implementation of a traffic plan to designate routes for traffic. This alternative would be moderately effective in the short term.

5.4.6 Implementability

Implementability includes technical and administrative feasibility and the availability of required resources. This alternative is technically feasible. Some coordination with regulatory agencies will be necessary to implement Alternative 3. Completion of the soil characterization and remediation field work is expected to require 6 weeks with all remedial action activities being completed within 1 year.

5.4.7 Cost

The estimated total present value for Alternative 3 is $2,086,000. The basis for this cost estimate is presented in Table B-1 in Appendix B. The cost does not include (1) the cost of the construction of a new daycare center, or (2) the costs that may be incurred by the current users of the daycare center to use another daycare center.

6.0 COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

This section presents a comparative analysis of the remedial action alternatives with respect to the NCP criteria. The purpose of this comparative analysis is to identify the relative advantages and disadvantages of each alternative and thereby provide a sound basis for remedy selection consistent with the NCP. The NCP states, "The national goal of the remedy selection process is to select remedies that are protective of human health and the environment, that maintain protection over time, and that minimize untreated waste."

The comparative analysis of the remedial alternatives evaluates the relative performance of each alternative with respect to seven of the nine specific NCP evaluation criteria (Table 6-1). A summary table highlighting the relative ranking of each alternative with respect to the seven evaluation criteria is provided in Table 6-2.

6.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Results of the HHRA indicate, under present conditions with the existing daycare center building slab serving as an effective exposure prevention barrier, the site does not pose an unacceptable risk. However, dioxin may be present in soil beneath Building 502 at concentrations high enough to represent an unacceptable risk and health hazard to daycare center receptors and hypothetical commercial/industrial or residential receptors, assuming the existing daycare center building slab is removed.

All alternatives would protect human health and the environment under the current and future use of the site as a daycare center; however, only Alternatives 2 and 3 are protective of human health under alternative land use scenarios. Alternative 1 does not protect the alternative land use scenario receptors against exposure to potential dioxin contamination beneath Building 502. Since there are no enforcement or monitoring components associated with Alternative 1, this alternative provides no mechanisms to ensure its effectiveness in protecting human health and the environment and does not meet the threshold criteria. Alternative 2 employs engineering controls and ICs to ensure human exposure pathways remain incomplete by (1) requiring the existing daycare center building slab remain in place and be periodically inspected, and (2) requiring any alternative future reuse of the property maintain the existing daycare center building slab as an effective exposure prevention barrier. Alternative 3 would remove any potentially contaminated soil, and the source for potential human health risk. Alternative 3 would allow for future unrestricted use of the site as commercial/industrial or residential without any further land use restrictions.

6.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Compliance with ARARs is also a threshold evaluation criterion. An alternative must either comply with ARARs or provide grounds for a waiver. There are no ARARs applicable to Alternative 1. Alternatives 2 and 3 are expected to meet the chemical-specific and potential action-specific ARARs identified in this FS Report (Appendix A).

6.3 LONG-TERM EFFECTIVENESS AND PERMANENCE

The residual contamination for Alternative 1 (No Action) and Alternative 2 (Engineering Controls Combined with ICs) is the same because the contamination is not being removed or treated; however, the residual risk due to direct exposure to the contaminated soil beneath Building 502 is reduced by the implementation of the engineering controls and ICs for Alternative 2. Although these residual risks do not pose an unacceptable risk to human health or the environment based on the current and future use of the site as a daycare center, potential risks may exist from the direct contact and ingestion of potentially contaminated soil beneath the existing daycare center building slab if the integrity is compromised or destroyed. Alternative 1 provides no protection from these potential risks, whereas Alternatives 2 and 3 do provide protection from these potential risks.

No remedial action or implementation of ICs would be conducted under Alternative 1; therefore, Alternative 1 would not provide long-term effectiveness and permanence for preventing exposure to potentially contaminated soils at Site 30 beneath the daycare center building.

Alternative 2 provides an adequate level of long-term effectiveness and permanence under current and future use as a daycare center and commercial/industrial and residential alternative land use scenarios by requiring the monitoring and reporting of the integrity of the existing daycare center building slab. Alternative 2 provides permanence through the use of ICs, which may include restrictive covenants, negative easements, and deed restrictions. These ICs would transfer with the land and would be binding upon future owners and occupants of the property. Procedures for implementing, monitoring, and enforcing the deed restrictions will be determined in the RAWP.

Alternative 3 provides a higher level of long-term effectiveness and permanence than Alternative 2 because potential contamination would be removed from under Building 502 and disposed of off-site at a permitted landfill.

6.4 REDUCTION OF MOBILITY, TOXICITY, OR VOLUME THROUGH TREATMENT

None of the alternatives would reduce the mobility, toxicity, or volume of potential contamination through treatment. Alternatives 1 and 2 do not treat the potential contamination, or reduce its toxicity, mobility, or volume. Alternative 3 would remove the potential contamination from beneath Building 502 at Site 30 and, therefore, reduce the toxicity and volume of contaminated soil

at the site. The potentially contaminated soil would be relocated to a permitted landfill, which does not qualify as treatment.

6.5 SHORT-TERM EFFECTIVENESS

Alternatives 1 and 2 will not introduce a risk to the community or the environment in the short term, since no active treatment will be conducted. Alternatives 1 and 2 are effective in the short term because Site 30 poses no unacceptable risk and the anticipated future use of the site is the present use, as a daycare center. Alternative 2 is more effective than Alternative 1, because the ICs would prevent exposure to unknown dioxin TEQ beneath the building slab. Alternative 3 could introduce some risk to the community during field activities due to truck traffic; however, these risks could be mitigated through best management practices such as traffic control. Although the risk assessment indicates the risk to the construction worker is below the risk management range from contaminants present at the site, any construction or demolition poses some risks for workers. These construction-related risks can be mitigated through the use of best management safety practices. Alternative 3 field work is estimated to take 6 weeks to complete.

6.6 IMPLEMENTABILITY

All of the alternatives are technically feasible and readily implementable. Alternative 1 does not require any efforts to implement. Alternatives 2 and 3 are proven technologies, and it is unlikely that technical or administrative issues would delay implementing either of these alternatives. The materials and services necessary to implement Alternative 3 are readily available locally. All of the alternatives are considered to be equally implementable.

6.7 COST

Estimated total capital costs for each alternative are summarized in Tables 6-1 and 6-2. These order-of-magnitude cost estimates were prepared based on commercially available cost estimating tools and previous estimates (published and unpublished) for similar projects. Actual costs will depend on actual labor rates, productivity, the final project schedule, and other variable factors. No costs are associated with Alternative 1. Alternative 3 has the highest overall costs (over $2,086,000). Alternative 3 is 2.7 times the cost of Alternative 2 ($782,000). The cost of Alternative 3 does not include the construction of a new daycare center.

6.8 COMPARATIVE ANALYSIS SUMMARY

Under the current site configuration and current and future use as a daycare center, the site does not pose an unacceptable risk. The human health risk associated with the commercial/industrial and residential alternative land use scenarios were within the risk management range. This risk was based on the conservative assumption that the daycare center building slab, as an effective exposure prevention barrier, would prevent exposure to potentially contaminated soil. Alternative 2 would allow for current and future use of the daycare center to continue, and would use ICs to ensure the existing exposure prevention barrier (daycare center building slab) is periodically inspected to evaluate its integrity.

Alternative 3 would require the demolition of the existing daycare center building and slab to enable the potentially contaminated soil to be removed. The construction of a replacement daycare center, either on Site 30 or at another location, is not included as a component of Alternative 3.

Alternative 1 (No Action) provides the least degree of protectiveness in the event potentially contaminated soil exists beneath Building 502 at concentrations which would pose a threat to human health and therefore does not meet the threshold criteria. Alternative 2 (Engineering Controls Combined with ICs) and Alternative 3 (Building Demolition, Excavation, and Off-Site Disposal at a Permitted Landfill) would each protect human health and the environment and would each comply with ARARs.

Based on the comparative analysis described above and presented in Table 6-2, Alternative 2 has advantages compared to the other alternatives. Alternative 2 would prevent exposure to potentially contaminated soil beneath Building 502 in both the short term and long term, and would allow Site 30 to be used in its current or future use as a daycare center, serving the community. While Alternative 3 would prevent exposure to potentially contaminated soil beneath Building 502 by using active remediation (excavation and off-site disposal) to reduce risks for unrestricted commercial/industrial or residential reuse, the cost for this alternative would be 2.7 times as high and it requires the demolition of the existing daycare center building.

TABLE 6-1: SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Effectiveness Criteria	Alternative 1: No Action	Alternative 2: Engineering Controls Combined with ICs	Alternative 3: Building Demolition, Excavation, and Off-Site Disposal at a Permitted Landfill
	Comment	Comment	Comment
Threshold Criteria[a]			
1. Overall Protection of Human Health and the Environment	Threshold not achieved: No protection to human health and the environment would be provided under unrestricted reuse.	Threshold achieved: Protection to human health and the environment would be provided.	Threshold achieved: Protection to human health and the environment would be provided.
2. Compliance with ARARs	Not applicable.	Threshold achieved: Meets ARARs.	Threshold achieved: Meets ARARs.
Primary Balancing Criteria[b]			
3. Long-Term Effectiveness and Permanence	Not effective and permanent because it does not address risks to alternative land use scenario receptors.	Effective in the long-term by preventing exposure to soil beneath Building 502.	Effective in the long-term by removing the contamination beneath Building 502 from Site 30 to a permitted landfill.
4. Reduction in Toxicity, Mobility, or Volume through Treatment	Would not reduce toxicity, mobility, or volume through treatment.	Would not reduce the toxicity, mobility, or volume through treatment, but would reduce or eliminate the risk exposure pathways.	Would not reduce the toxicity, mobility, or volume through treatment, but would reduce the volume of contamination on site by removing it to a permitted landfill.
5. Short-Term Effectiveness	No short-term risk because no active remediation activities are proposed.	No short-term risk because no active remediation activities are proposed.	Imposes moderate short-term risks during the building demolition and excavation.
6. Technical Implementability	Readily implementable.	Readily implementable.	Readily implementable.
7. Cost	$0	$782,000	$2,086,000
Modifying Criteria[c]			
8. State Acceptance	*	*	*
9. Community Acceptance	*	*	*

Notes:

a The first two criteria are threshold criteria. The selected remedial alternative(s) must meet the threshold criteria.

b These criteria are primary balancing criteria used to evaluate the alternative.

c State and community acceptance are modifying criteria and include agency and public comments on the proposed remedial alternatives in the Proposed Plan, which will be addressed during the development of the Record of Decision.

ARAR Applicable or relevant and appropriate requirement

EC Engineering control

IC Institutional control

RAO Remedial action objective

TABLE 6-2: REMEDIAL ALTERNATIVE RANKING

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Criteria	Alternative 1: No Action	Alternative 2: Engineering Controls Combined with ICs	Alternative 3: Building Demolition, Excavation, and Off-Site Disposal at a Permitted Landfill
1. Overall Protection of Human Health and the Environment	○	●	●
2. Compliance with ARARs	N/A	●	●
3. Long-Term Effectiveness and Permanence	○	◖	●
4. Reduction in Toxicity, Mobility, or Volume through Treatment	○	○	○
5. Short-Term Effectiveness	◖	●	◖
6. Technical Implementability	●	●	●
7. Cost	**$0**	**$782,000**	**$2,086,000**

Notes: ○ = Low, ◖ = Moderate; ● = High

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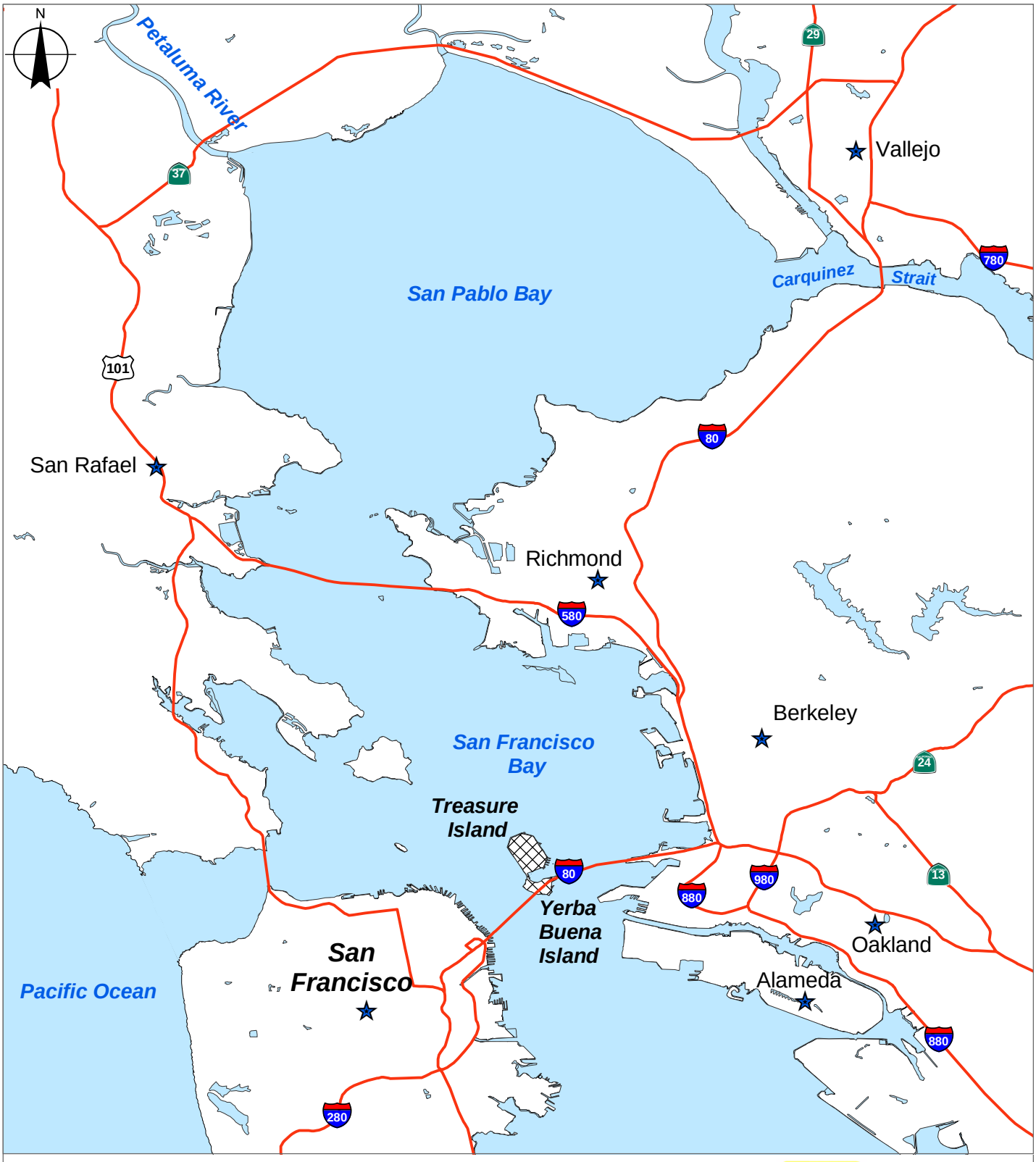
FIGURES



SulTech

NAVAL STATION TREASURE ISLAND

2 0 2 4
Miles

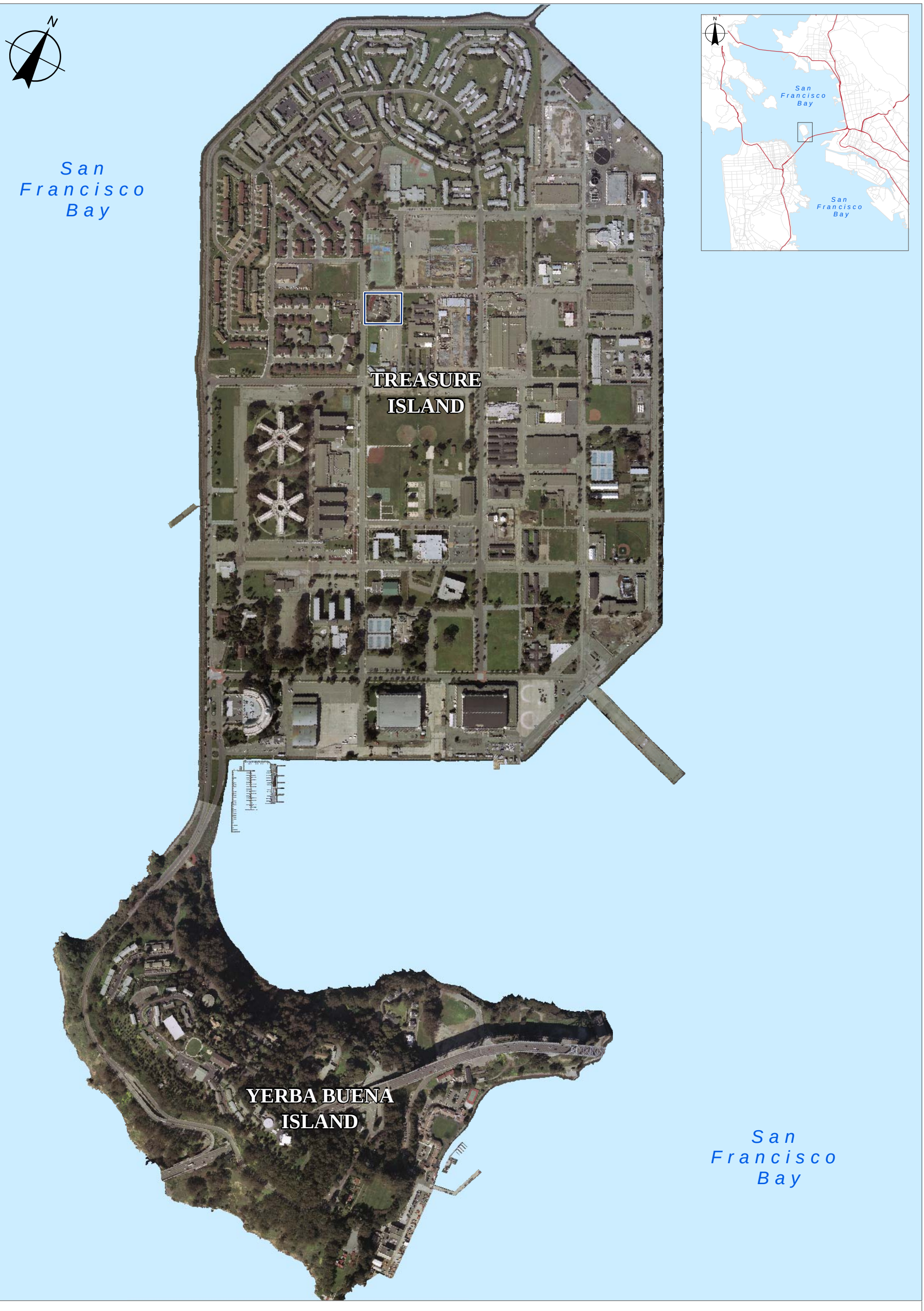
Naval Station Treasure Island, California
Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 1

INSTALLATION LOCATION MAP

Feasibility Study Report for Installation Restoration Site 30, Daycare Center

2006/03/15 V:\Projects\B171-TI\FS\Figure 1.mxd SULLIVAN - SD Shane C. DeGross



SITE 30 BOUNDARY

350 0 350 700
Feet

Note:
Aerial photograph taken by HJW Geospatial Inc. on February 18, 2003; photograph georeferenced by Tetra Tech.

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Naval Station Treasure Island, California
Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 2

AERIAL PHOTOGRAPH
NAVAL STATION TREASURE ISLAND

Feasibility Study Report for Installation Restoration Site 30, Daycare Center

2006-03-04 V:\Projects\B171-TI\FS\Figure 2.mxd SULLIVAN SD D. Wise

N

SITE 30 BOUNDARY

SITE 31 BOUNDARY

50 0 50 100

Feet

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Naval Station Treasure Island, California

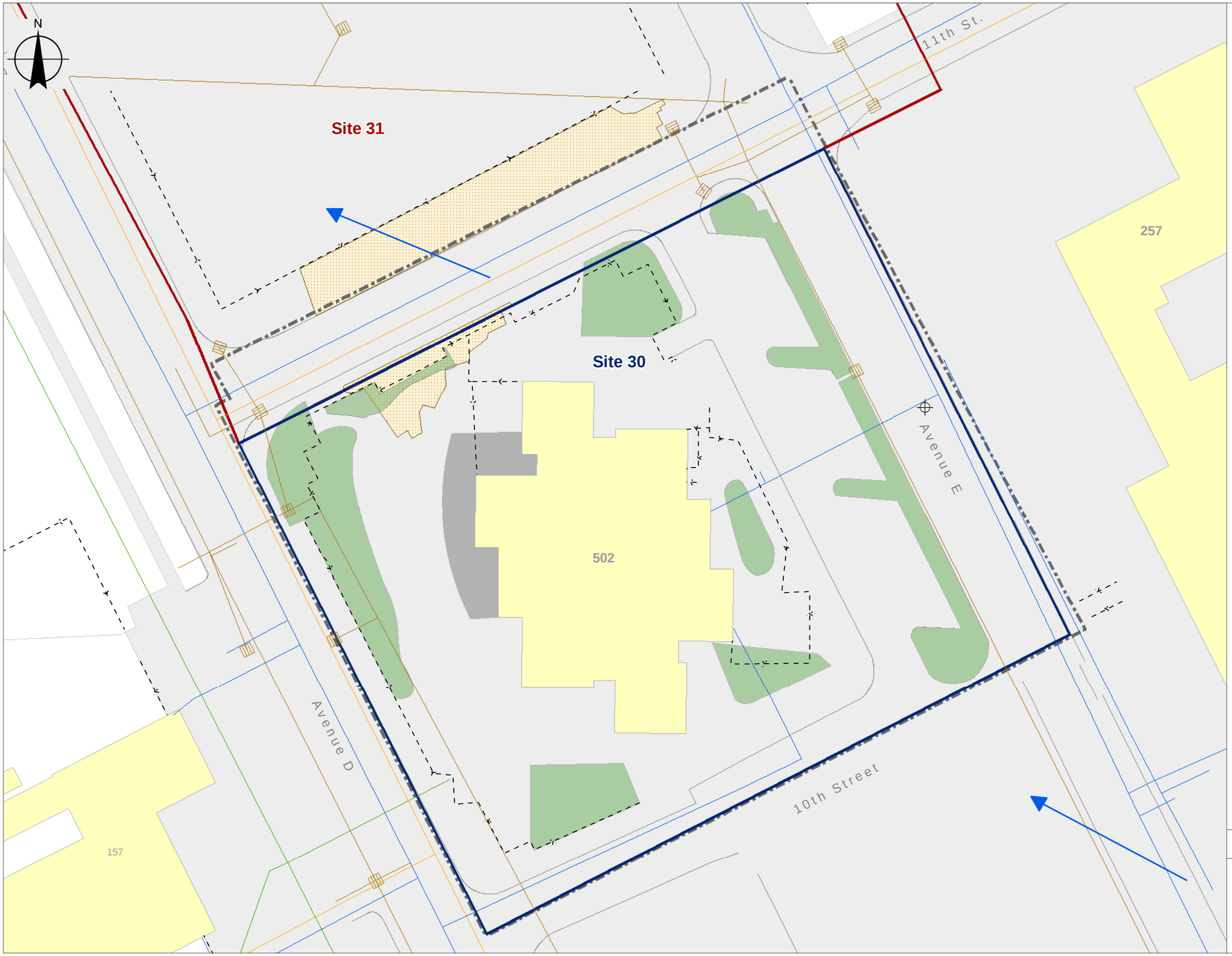
Department of the Navy, BRAC PMO West, San Diego, California

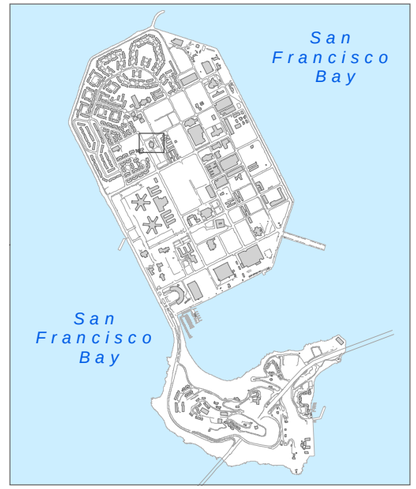
FIGURE 3

AERIAL PHOTOGRAPH SITE 30

Feasibility Study Report for Installation Restoration Site 30, Daycare Center

2006/03/14 V:\Projects\B171-TI\Figure 3.mxd SULLIVAN SD D. Wise





- WATER PIPELINE
- GAS PIPELINE
- SANITARY SEWER PIPELINE
- STORM DRAIN LINE
- STORM DRAIN
- FENCE
- ROAD CURB
- GROUNDWATER FLOW DIRECTION
- MONITORING WELL LOCATION
- ENVIRONMENTAL BASELINE SURVEY PARCEL T094 BOUNDARY
- IR SITE 30 BOUNDARY
- IR SITE 31 BOUNDARY
- AREA WHERE DEBRIS HAS BEEN REMOVED
- SITE 30 CONCRETE PAD
- VEGETATED AREAS, SITE 30
- BUILDING
- PAVED AREA
- UNPAVED AREA

SulTech

20 0 20 40
Feet

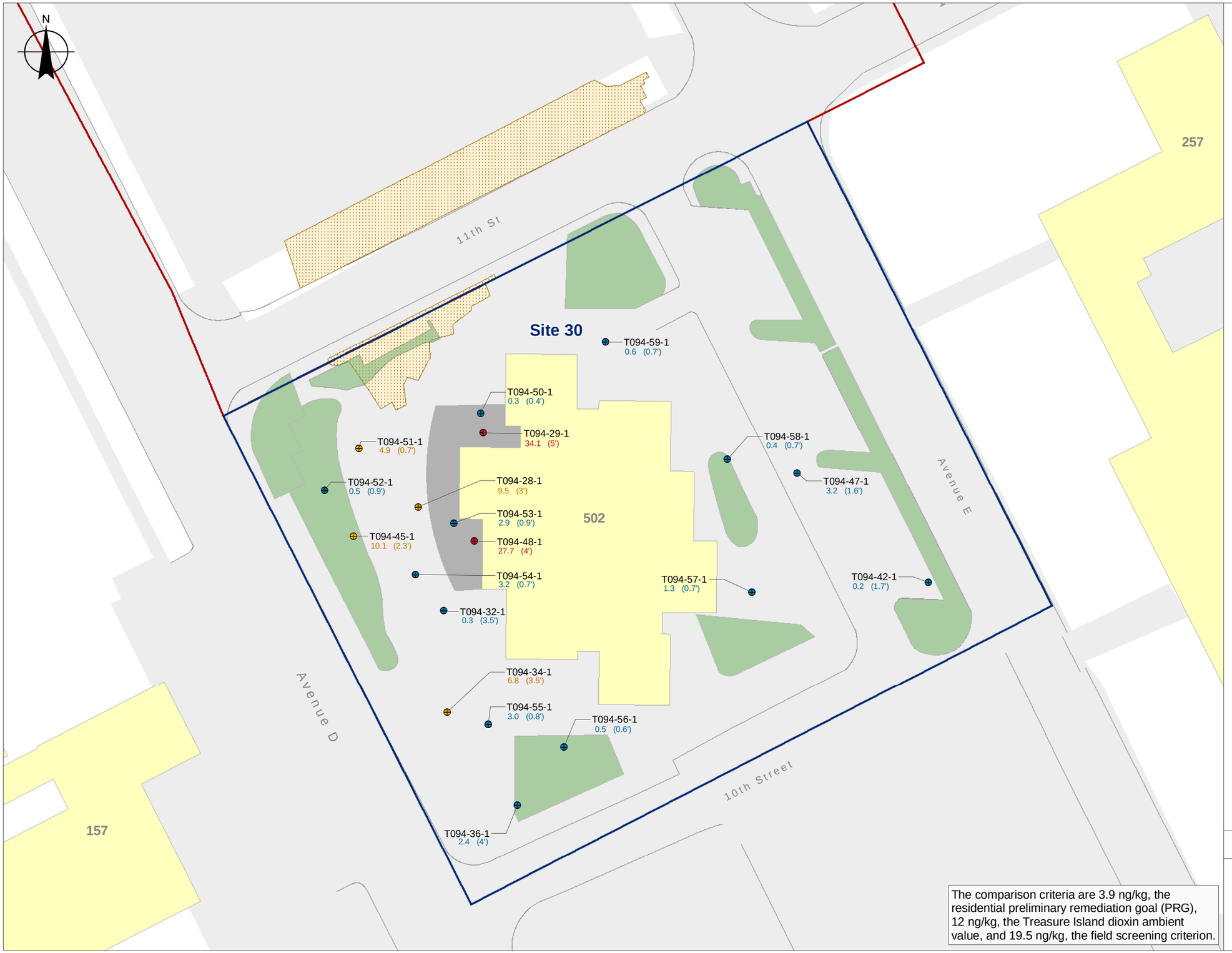
Naval Station Treasure Island, California
Department of the Navy, BRAC PMO West, San Diego, California

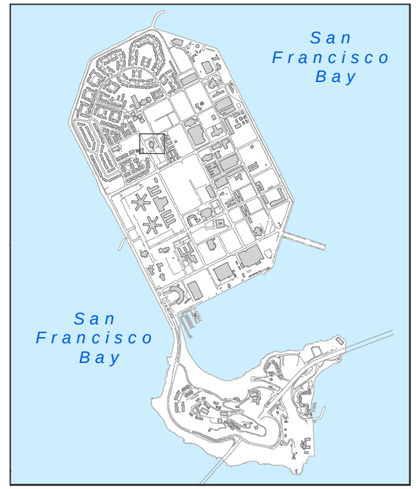
FIGURE 4

SITE 30 FEATURES MAP

Feasibility Study Report for Installation Restoration Site 30, Daycare Center

2006-03-04 V:\Projects\B171-TI\FS\Figure 4.mxd SULLIVAN - SD D. Wise





DIOXIN IN SOIL

- DIOXIN TEQ NOT DETECTED IN SAMPLE
- DIOXIN TEQ IS BELOW 3.9 NG/KG (RESIDENTIAL PRG)
- DIOXIN TEQ IS BETWEEN 3.9 NG/KG AND 12 NG/KG
- DIOXIN TEQ IS BETWEEN 12 NG/KG AND 19.5 NG/KG
- DIOXIN TEQ EXCEEDS 19.5 NG/KG

- ROAD CURB
- IR SITE 30 BOUNDARY
- IR SITE 31 BOUNDARY
- AREA WHERE DEBRIS HAS BEEN REMOVED
- SITE 30 CONCRETE PAD
- VEGETATED AREAS, SITE 30
- BUILDING
- PAVED AREA
- UNPAVED AREA

34.1 (5')
- Sample depth in feet
- Concentration in parts per trillion

Notes:
ng/kg - Nanogram per kilogram
TEQ - Toxicity Equivalent Quotient

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20 0 20 40
Feet

The comparison criteria are 3.9 ng/kg, the residential preliminary remediation goal (PRG), 12 ng/kg, the Treasure Island dioxin ambient value, and 19.5 ng/kg, the field screening criterion.

Naval Station Treasure Island, California

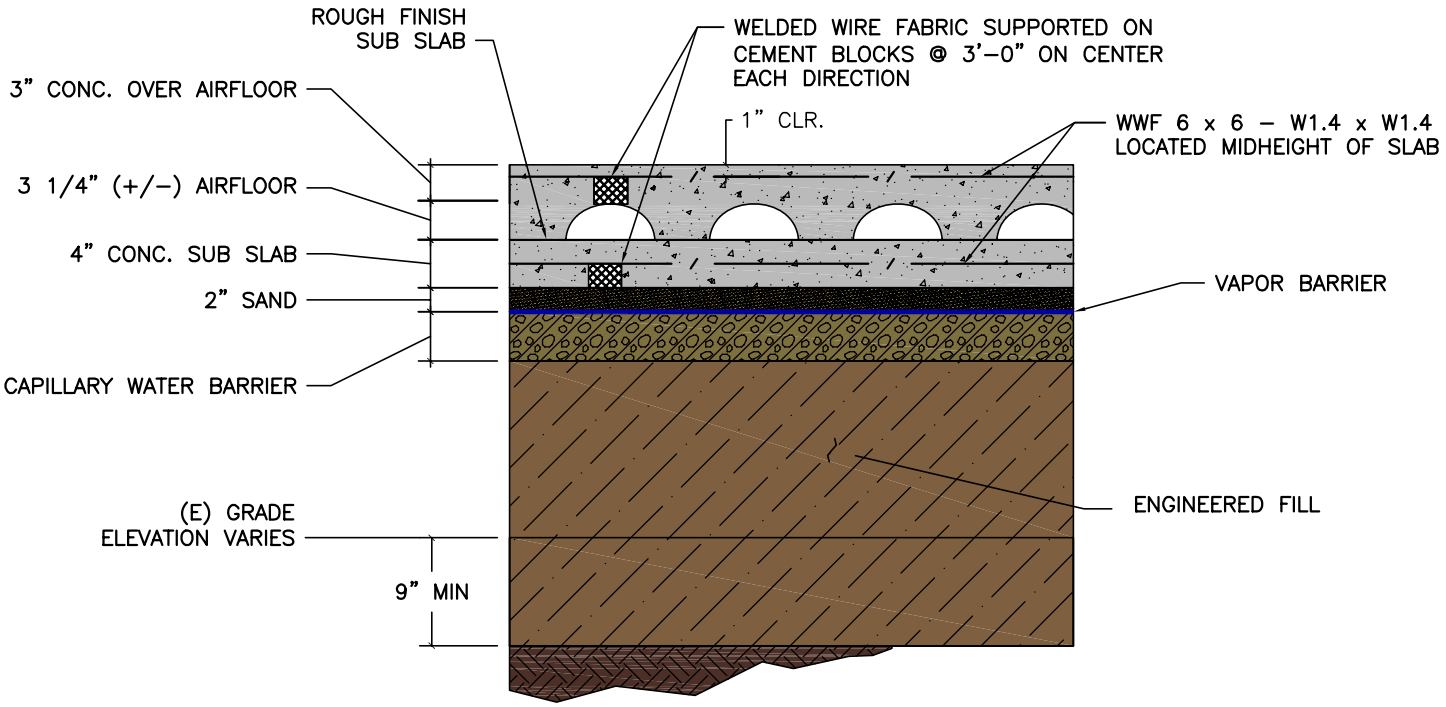
Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5

DIOXINS IN SOIL

Feasibility Study Report for Installation Restoration Site 30, Daycare Center

2006-05-01 V:\Projects\B171-TI\FS\Figure 5.mxd SULLIVAN - SD D. Wise



TYPICAL AIRFLOOR SLAB–ON–GRADE SECTION
SCALE 3/4"=1'–0"

NOTES:
CONTROL JOINTS AT 15'–0" ON CENTER (MAX).

SUBSLAB JOINTS AT 30'–0" ON CENTER (MAX).

AIRFLOOR NOT USED EVERYWHERE.

ENGINEERED FILL VARIES IN THICKNESS WITH A MINIMUM OF 9".

Source: Navy. 1982. Sheet S3, Concrete Sections, for NAVSTA TI P-218 Child Care Center. NAVFAC Drawing Number 6172602. October 1982.

Naval Station Treasure Island, California
Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 6

BUILDING SLAB DETAIL

Feasibility Study Report for Installation Restoration Site 30, Daycare Center

APPENDIX A
EVALUATION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

CONTENTS

ATTACHMENTS

TABLES

ACRONYMS AND ABBREVIATIONS

§	Section
§§	Sections
µg/L	Microgram per liter
ARAR	Applicable or relevant and appropriate requirement
BAAQMD	Bay Area Air Quality Management District
Cal. Code Regs.	*California Code of Regulations*
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DTSC	Department of Toxic Substances Control
EP	Extraction procedures
EPA	U.S. Environmental Protection Agency
FR	*Federal Register*
FS	Feasibility study
IC	Institutional control
mg/L	Milligram per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
RCRA	Resource Conservation and Recovery Act
SWRCB	State Water Resources Control Board
TBC	To be considered
TCLP	Toxicity characteristic leaching procedure
TI	Treasure Island
U.S.C.	United States Code

A1.0 EVALUATION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

This appendix identifies and evaluates potential federal and state of California applicable or relevant and appropriate requirements (ARAR) from the universe of regulations, requirements, and guidance and sets forth the U.S. Department of the Navy determinations regarding those potential ARARs for each remedial alternative retained for detailed analysis in the feasibility study (FS) for Site 30 at Treasure Island (TI), San Francisco, California.

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

A1.1 SUMMARY OF COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT AND NATIONAL OIL AND HAZARDOUS SUBSTANCES POLLUTION CONTINGENCY PLAN REQUIREMENTS

Section 121(d) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (42 *United States Code* [U.S.C.] Section [§] 9621[d]), as amended, states that remedial actions on CERCLA sites must attain (or the decision document must justify the waiver of) any federal or more stringent state environmental standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate.

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

If the requirement is not legally applicable, then it is evaluated to determine whether it is relevant and appropriate. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not applicable, address problems or situations similar to the circumstances of the proposed remedial action and are well suited to the conditions of the site (U.S. Environmental Protection Agency [EPA] 1988a). A requirement must be determined to be both relevant and appropriate in order to be considered a potential ARAR.

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

- The purpose of the requirement and the purpose of the CERCLA action
- The medium regulated or affected by the requirement and the medium contaminated or affected at the CERCLA site

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

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

Table A1 and Table A-2 present each potential ARAR with a determination of ARAR status (that is, applicable, relevant and appropriate, or to be considered [TBC]). For the determination of relevance and appropriateness, the pertinent criteria were examined to determine whether the requirements addressed problems or situations sufficiently similar to the circumstances of the release or remedial action contemplated, and whether the requirement was well suited to the site.

To qualify as a state potential ARAR under CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), a state requirement must be:

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

To constitute a potential ARAR, a requirement must be substantive. Only the substantive provisions of requirements identified as potential ARARs in the Site 30 FS are considered to be potential ARARs. Permits are considered to be procedural or administrative requirements. Provisions of generally relevant federal and state statutes and regulations that were determined to be procedural or nonenvironmental, including permit requirements, are not considered to be potential ARARs. CERCLA 121(e)(1), 42 U.S.C. § 9621(e)(1), states that "No Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely on-site, where such remedial action is selected and carried out in compliance with this section." The term *on-site* is defined for purposes of this ARARs discussion as "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action" (40 CFR § 300.5).

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

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

As the lead federal agency, the Navy has primary responsibility for identifying potential federal ARARs at TI. The Department of Toxic Substances Control (DTSC) is responsible for identifying and advising the Navy of potential state ARARs relating to Site 30.

A1.2 METHODOLOGY DESCRIPTION

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

A1.2.1 General

As the lead federal agency, the Navy has primary responsibility for identification of potential ARARs for Site 30. In preparing this ARARs analysis, the Navy undertook the following measures, consistent with CERCLA and the NCP:

- Identified federal ARARs for each remedial alternative addressed in the Site 30 FS, taking into account site-specific information for Site 30
- Reviewed potential state ARARs identified by the state to determine whether they satisfy CERCLA and NCP criteria that must be met in order to constitute state ARARs

- Evaluated and compared federal ARARs and their state counterparts to determine whether state ARARs are more stringent than federal ARARs or are in addition to the federally required actions

- Reached a conclusion about the federal and state ARARs that are the most stringent or "controlling" for each remedial alternative

As discussed in Section 3.0 of this FS, two remedial action objectives for Site 30 have been developed: 1) to protect commercial/industrial and residential receptors by preventing the ingestion and direct contact of soils containing dioxin toxicity equivalents above the Treasure Island ambient concentration of 12 nanograms/kilogram and soils containing unknown concentrations of dioxin beneath Building 502; and 2) for the daycare center receptor, to prevent the ingestion and direct contact of soils containing unknown concentrations of dioxin beneath Building 502.

The following remedial action alternatives will be considered in the detailed analysis:

- **Alternative 1** – No Action

- **Alternative 2** – Engineering Controls Combined with ICs

- **Alternative 3** – Building Demolition, Excavation, and Off-Site Disposal at a Permitted Landfill

A1.2.2 Identifying and Evaluating Federal ARARs

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

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

A1.2.3 Identifying and Evaluating State ARARs

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

A1.2.3.1 Solicitation of State ARARs under NCP

EPA guidance recommends that the lead federal agency consult with the state when identifying state ARARs for remedial actions (EPA 1988b). In essence, the CERCLA and NCP requirements at 40 CFR § 300.515 for remedial actions provide that the lead federal agency request that the state identify chemical-specific and location-specific state ARARs upon completion of site characterization. The requirements also provide that the lead federal agency request identification of all categories of state ARARs (chemical-specific, location-specific, and action-specific) upon identification of the remedial alternatives for detailed analysis in an FS. The state must respond within 30 days of receipt of the lead federal agency requests. The remainder of this subsection documents the Navy's efforts to date to identify and evaluate state ARARs.

The Navy followed the procedures set forth in 40 CFR § 300.515 for remedial actions in seeking state assistance in identifying state ARARs (Attachments A1 through A7).

A1.2.3.2 Chronology of Efforts to Identify State ARARs

This subsection summarizes the chronology of the Navy's efforts to obtain state assistance in identifying state ARARs for remedial actions at Site 30. Key correspondence between the Navy and the state agencies relating to this effort has been included in the administrative record for the FS.

At a Base Realignment and Closure Cleanup Team meeting in January 2006, the Navy informally requested state ARARs from DTSC because the DTSC Remedial Project Manager was taking annual leave for 30 days. DTSC provided a list of ARARs in a letter dated January 24, 2006 (Attachment A8). In letters dated February 7, 2006, the Navy formally requested chemical-specific, location-specific, and action-specific ARARs for Site 30 from all state agencies (Attachments A1 through A7).

On March 3, 2006, in response to the Navy's request for state ARARs, the California Department of Health Services sent a letter to the Navy identifying state ARARs for Site 30 (Attachment A9) and on March 17, 2006, the California Department of Fish and Game sent a letter identifying state ARARs (Attachment A10). The Navy reviewed all of the state requirements identified by the above agencies and has included the state requirements it determined to be ARARs. The Navy has prepared a response to the state ARAR requirements identified by each of the state agencies (see Attachment A11).

A1.3 OTHER GENERAL ISSUES

General issues identified during the evaluation of ARARs for Site 30 are discussed in the following sections.

A1.3.1 General Approach to Requirements of RCRA

RCRA is a federal statute enacted in 1976 to meet four goals: (1) the protection of human health and the environment, (2) the reduction of waste, (3) the conservation of energy and natural

resources, and (4) wherever feasible, the reduction or elimination of the generation of hazardous waste as expeditiously as possible. The Hazardous and Solid Waste Amendments of 1984 significantly expanded the scope of RCRA by adding new corrective action requirements, land disposal restrictions, and technical requirements. RCRA, as amended, contains several provisions that are potential ARARs for CERCLA sites.

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

- The waste was initially treated, stored, or disposed of after the effective date of the RCRA requirement; or

- The activity at the CERCLA site constitutes treatment, storage, or disposal, as defined by RCRA (EPA 1988a).

The preamble to the NCP indicates that state regulations that are components of a federally authorized or delegated state program are generally considered federal requirements and potential federal ARARs for the purposes of ARARs analysis (55 FR §§ 8666, 8742 [1990]). California received approval for its base RCRA hazardous waste management program on July 23, 1992 (57 FR § 32726 [1992]). The California "Environmental Health Standards for the Management of Hazardous Waste," set forth in Title 22 *California Code of Regulations* (Cal. Code Regs., tit. 22), Division 4.5, were approved by EPA as a component of the federally authorized California RCRA program. On September 26, 2001, California received final authorization of its revised State Hazardous Waste Management Program by the EPA (63 FR § 49118 [2001]). Therefore, Cal. Code Regs., tit. 22, Division 4.5 is a source of potential federal ARARs for CERCLA response actions. The exception is when a state regulation is "broader in scope" than the corresponding federal RCRA regulations. In that case, such regulations are not considered part of the federally authorized program or potential federal ARARs. Instead, they are purely state law requirements and potential state ARARs.

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

A key threshold question for the ARARs analysis is whether contaminants at Site 30 constitute federal hazardous waste as defined under RCRA and the state's authorized program or qualify as non-RCRA, state-regulated hazardous waste. Waste characterization is discussed in the following section.

A1.4 WASTE CHARACTERIZATION

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

A1.4.1 RCRA Hazardous Waste Determination

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

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

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

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

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

> "Under certain circumstances, although no historical information exists about the waste, it may be possible to identify the waste as RCRA characteristic waste. This is important in the event that (1) remedial alternatives under consideration at the site involve on-site treatment, storage, or disposal, in which case RCRA may be triggered as discussed in this section; or (2) a remedial alternative involves offsite shipment. Since the generator (in this case, the agency or responsible party conducting the Superfund action) is responsible for determining whether the wastes exhibit any of these characteristics (defined in 40 CFR Sections 261.21 through 261.24), testing may be required. The lead agency must use best professional judgment to determine, on a site-specific basis, if testing for hazardous characteristics is necessary.

> In determining whether to test for the toxicity characteristic using the extraction procedures (EP) toxicity test, it may be possible to assume that certain low concentrations of waste are not toxic. For example, if the total waste concentration in soil is 20 times or less the EP toxicity concentration, the waste cannot be characteristic hazardous waste. In such a case, RCRA requirements would not be applicable. In other instances, where it appears that the substances may be characteristic hazardous waste (ignitable, corrosive, reactive, or EP toxic), testing should be performed."

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

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

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

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

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

A1.4.2 California-Regulated, Non-RCRA Hazardous Waste

A waste determined not to be a RCRA hazardous waste might still be considered a state-regulated non-RCRA hazardous waste. The state is broader in scope in its RCRA program in determining hazardous waste. Cal. Code Regs., tit. 22, § 66261.24(a)(2) lists the total threshold limit concentrations and the soluble threshold limit concentrations for non-RCRA hazardous waste. The state applies its own leaching procedure, the waste extraction test, which uses a different acid reagent and has a different dilution factor (tenfold). Other state

requirements may be broader in scope than federal ARARs for identifying non-RCRA wastes regulated by the state. These may be potential ARARs for wastes not covered under federal ARARs. See additional subsections of Cal. Code Regs, tit. 22, § 66261.24. A waste is considered hazardous if its total concentrations exceed the total threshold limit concentrations or if the extract concentrations from the waste extraction test exceed the soluble threshold limit concentration. A waste extraction test is required when the total concentrations exceed the soluble threshold limit concentration but are less than the total threshold limit concentration (Cal. Code Regs., tit. 22, Division 4.5, Chapter 11, Appendix II [b]).

A1.4.3 Other California Waste Classifications

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

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

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

A2.0 POTENTIAL CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

A2.1 POTENTIAL FEDERAL CHEMICAL-SPECIFIC ARARS

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

A2.1.1 Resource Conservation and Recovery Act

The key threshold question for potential soil ARARs is whether the wastes located at Site 30 would be classified as hazardous waste. Soil may be classified as a federal hazardous waste as defined by RCRA and the state-authorized program, or as non-RCRA, state regulated hazardous waste. If soil is determined to be hazardous waste, the appropriate requirements will apply.

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

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

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

As long as the excavated material remains inside the area of contamination, however, it is not newly generated and will not be subject to RCRA generator, treatment, or other waste management requirements. Should excavated material be moved outside the area of contamination, the substantive RCRA requirements managing hazardous waste, including land disposal restrictions, would be applicable.

A2.2 POTENTIAL STATE CHEMICAL-SPECIFIC ARARS

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

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

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

A3.0 POTENTIAL LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

This section discusses potential location-specific ARARs for Site 30. Location-specific ARARs are restrictions on the concentrations of hazardous substances or the conduct of activities as a result of the characteristics of the site or its immediate environment. Site 30 does not encompass any historic properties included or eligible for inclusion on the National Register of Historic Places. No scientific, prehistoric, or archeological data have been identified at Site 30. There are no floodplains or wetlands on Site 30.

The terrestrial habitat of NAVSTA TI is of poor quality for wildlife species because the island is predominantly covered with urbanized areas. Because of the low-quality habitat of Site 30, no receptors of concern use the area. Disturbance from vehicular traffic and general human presence also reduces the quality of the habitat to wildlife species at this site.

Based on the above, there are no location-specific ARARs for Site 30.

A4.0 POTENTIAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

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

A4.1 ALTERNATIVE 1: NO ACTION

There is no need to identify ARARs for the No Action Alternative because ARARs apply to "any removal or remedial action conducted entirely on-site" and "no action" is not a removal or remedial action (CERCLA § 121(e), 42 U.S.C. § 9621[e]). CERCLA § 121 (42 U.S.C. § 9621) cleanup standards for selection of a Superfund remedy, including the requirement to meet

ARARs, are not triggered by the No Action Alternative (EPA 1991). Therefore, a discussion of compliance with action-specific ARARs is not appropriate for this alternative.

A4.2 ALTERNATIVE 2: ENGINEERING CONTROLS COMBINED WITH INSTITUTIONAL CONTROLS

Alternative 2 consists of Engineering Controls Combined with Institutional Controls (IC). The engineering controls evaluated include maintaining the existing Building 502 foundation slab as an exposure prevention barrier.

A4.2.1 Engineering Controls

A4.2.1.1 Federal

There are no potential ARARs for the engineering controls evaluated in Alternative 2.

A4.2.1.2 State

No potential state ARARs have been identified for the engineering controls evaluated in Alternative 2.

A4.2.2 Institutional Controls

A4.2.2.1 Federal

There are no potential federal ARARs for ICs.

A4.2.2.2 State

State statutes that have been accepted by the Navy as potential ARARs for implementing ICs and entering into an environmental restrictive covenant and agreement with DTSC include substantive provisions of California Civil Code § 1471, California Health and Safety Code § 25202.5, and Cal. Code Regs., tit. 22, § 67391.1(a) and (e)(1).

The substantive provisions of California Civil Code § 1471 are the following general narrative standard: "to do or refrain from doing some act on his or her own land … where…(c) Each such act relates to the use of land and each such act is reasonably necessary to protect present or future human health or safety or the environment as a result of the presence on the land of hazardous materials, as defined in Section 25260 of the Health and Safety Code." This narrative standard would be implemented through incorporation of restrictive environmental covenants in the deed at the time of transfer. These covenants would be recorded with the environmental restriction covenant and agreement and would run with the land.

The substantive provisions of California Health and Safety Code § 25202.5 are the general narrative standard to restrict "present and future uses of all or part of the land on which the facility is located." These substantive provisions will be implemented by incorporation of

restrictive environmental covenants in the Environmental Restriction Covenant and Agreement at the time of transfer for purposes of protecting present and future public health and safety.

California Health and Safety Code §§ 25222.1 and 25355.5(a)(1)(C) provide the authority for the state to enter into voluntary agreements to establish land use covenants with the owner of property. The substantive requirements of the following California Health and Safety Code § 25222.1 provisions are relevant and appropriate: (1) the general narrative standard: "restricting specified uses of the property,..." and (2) "…the agreement is irrevocable, and shall be recorded by the owner, …as a hazardous waste easement, covenant, restriction or servitude, or any combination thereof, as appropriate, upon the present and future uses of the land." The substantive requirements of the following California Health and Safety Code § 25355.5(a)(1)(C) provisions are relevant and appropriate: "…execution and recording of a written instrument that imposes an easement, covenant, restriction, or servitude, or combination thereof, as appropriate, upon the present and future uses of the land."

The Navy will comply with the substantive requirements of California Health and Safety Code §§ 25222.1 and 25355.5(a)(1)(C) by incorporating the CERCLA use restrictions into the Navy's deed of conveyance in the form of restrictive covenants under the authority of California Civil Code § 1471 and into the environmental restriction covenant and agreement. The substantive provisions of California Health and Safety Code §§ 25222.1 and 25355.5(a)(1)(C) may be interpreted in a manner that is consistent with the substantive provisions of California Civil Code § 1471. The covenants will be recorded with the deed and will run with the land.

California Health and Safety Code § 25233(c) sets forth "relevant and appropriate" substantive criteria for granting variances from prohibited uses based on specified environmental and health criteria. California Health and Safety Code § 25234 sets forth the following "relevant and appropriate" substantive criteria for the removal of a land use restriction on the grounds that "…the waste no longer creates a significant existing or potential hazard to present or future public health or safety."

In addition to being implemented through the Environmental Restriction Covenant and Agreement between the Navy and DTSC, the appropriate and relevant portions of California Health and Safety Code §§ 25202.5, 25222.1, 25233(c), 25234, and 25355.5(a)(1)(C) and California Civil Code § 1471 will also be implemented through the deed between the Navy and the transferee.

Cal. Code Regs., tit. 22, § 67391.1 provides that DTSC will not approve or concur in a response action decision document that includes ICs unless the controls are clearly set forth and defined in the decision document. This section also states, among other requirements, that DTSC shall not consider property owned by the federal government to be suitable for transfer to nonfederal entities where hazardous materials, hazardous wastes or constituents, or hazardous substances remain at the property at levels that are not suitable for unrestricted use without an IC. The Navy has identified the substantive provisions of §67391.1(e)(1) as potential ARARs.

A4.3 ALTERNATIVE 3: BUILDING DEMOLITION, EXCAVATION AND OFF-SITE DISPOSAL AT A PERMITTED LANDFILL

A4.3.1 Building Demolition

A4.3.1.1 Federal

There are no potential ARARs for the building demolition evaluated in Alternative 3.

A4.3.1.2 State

Other than Cal. Code Regs., tit. 27, Section 20220 (defines nonhazardous waste and sets forth requirements for disposal) which has been identified as a potential chemical-specific ARAR, there are no additional ARARs for building demolition.

A4.3.2 Excavation and Off-site Disposal

A4.3.2.1 Federal

Resource Conservation and Recovery Act

As introduced under Section A2, Chemical-Specific ARARs, RCRA is a potential ARAR for excavation and off-site disposal of soil. Any excavated waste will be characterized to determine whether it is a hazardous waste (Cal. Code Regs., tit. 22, §§ 66262.10(a) and 66262.11). Any hazardous waste accumulated on-site, including waste contained in soil, must comply with the RCRA requirements set forth in 40 CFR § 264.554(d)(1)(i-ii) and (d)(2), (e),(f),(h),(i),(j), and (k). This section provides that a generator may accumulate solid remediation waste in a staging pile for storage only up to 2 years, during remedial actions without triggering land disposal restrictions.

Clean Air Act

The Bay Area Air Quality Management District (BAAQMD) by delegation of authority from the EPA implements the federal Clean Air Act. Therefore, BAAQMD regulations are described as Clean Air Act requirements. The following BAAQMD regulation is a potential ARAR for excavation at Site 30:

- Regulation 6-302: Opacity Limitation (prohibiting emissions for a period aggregating more than 3 minutes in any hour an emission equal to or greater than 20 percent opacity).

Federal Hazardous Materials Transportation Law

The Federal Hazardous Materials Transportation Law (49 U.S.C. § 5101-5127), implemented at 49 CFR §§ 171.2(f), 171.2(g), 172.300, 172.301, 172.302, 172.303, 172.304, 172.312, 172.400, and 172.504, are potential relevant and appropriate requirements for transporting hazardous

waste. These sections consist of requirements for transporting hazardous wastes, including representations that containers are safe, prohibitions on altering labels, marking requirements, labeling requirements, and placarding requirements.

A4.3.2.2 State

No state action-specific ARARs have been identified for this excavation and off-site disposal alternative.

A5.0 REFERENCES

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

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

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

TABLES

TABLE A-1: POTENTIAL CHEMICAL-SPECIFIC[A] APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Requirement	Prerequisite	Citation[b]	Preliminary ARAR Determination	Comments
Soil				
Federal Requirements				
Resource Conservation and Recovery Act (42 U.S.C., Chapter 82, §§ 6901–6991[i])[c]				
Defines RCRA hazardous waste. A solid waste is characterized as toxic, based on the TCLP, if the waste exceeds the TCLP maximum concentrations.	Waste	Cal. Code Regs., tit. 22, §§ 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100	Applicable	These requirements are potentially applicable for determining whether waste is hazardous.
Land Disposal Restrictions prohibit disposal of hazardous waste unless treatment standards are met.	Hazardous waste land disposal	Cal. Code Regs., tit. 22 § 66268.1(f)	Applicable	This requirement is potentially applicable if RCRA hazardous waste is to be disposed of on land.
State Requirements				
Department of Toxic Substances Control[c]				
Definition of "non-RCRA hazardous waste."	Waste	Cal. Code Regs. tit. 22, § 66261.22(a)(3) and (4), § 66261.24(a)(2)–(a)(8), § 66261.101, § 66261.3(a)(2)(C), or § 66261.3(a)(2)(F)	Applicable	These requirements are potentially applicable for determining whether a waste is a non-RCRA hazardous waste.
State and Regional Water Quality Control Boards[c]				
Definitions of designated waste, nonhazardous waste, and inert waste	Waste	Cal. Code Regs. Tit 27, §§ 20210 and 20220	Applicable	These requirements are potential ARARs for classifying waste.

Notes:

a Many potential action-specific ARARs contain chemical-specific limitations and are addressed in the action-specific ARAR tables.

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

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

TABLE A-1: POTENTIAL CHEMICAL-SPECIFIC[A] APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

§	Section
§§	Sections
ARAR	Applicable or relevant and appropriate requirement
Cal. Code Regs.	*California Code of Regulations*
CFR	*Code of Federal Regulations*
RCRA	Resource Conservation and Recovery Act
TCLP	Toxicity characteristic leaching procedure
tit.	Title
U.S.C.	*United States Code*

TABLE A-2: POTENTIAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Institutional Controls					
State Requirements					
California Civil Code[a]					
Institutional controls	Provides conditions under which land use restrictions will apply to successive owners of land.	Transfer property from the Navy to a nonfederal agency.	*California Civil Code* §1471	Relevant and Appropriate	Substantive provisions are the following general narrative standard: "to do or refrain from doing some act on his or her own land…where (c) Each such act relates to the use of land and each such act is reasonably necessary to protect present or future human health or safety of the environment as a result of the presence of hazardous materials, as defined in Section 25260 of the California Health & Safety Code." This narrative standard would be implemented through incorporation of restrictive covenants in the deed at the time of transfer.

TABLE A-2: POTENTIAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Institutional Controls (Continued)					
State Requirements (Continued)					
California Health & Safety Code[a]					
Institutional controls	Allows Department of Toxic Substances Control to enter into an agreement with the owner of a hazardous waste facility to restrict present and future land uses.	Transfer property from the Navy to a nonfederal agency.	California Health & Safety Code § 25202.5	Relevant and Appropriate	The substantive provisions of this section are the general narrative standards to restrict "present and future uses of all or part of the land on which the facility …is located."
	Provides a streamlined process to be used to enter into an agreement to restrict specific use of property in order to implement the substantive use restrictions of California Health & Safety Code § 25232(b)(1)(A)–(E).	Transfer property from the Navy to a nonfederal agency.	California Health & Safety Code § 25222.1 and 25355.5(a)(1)(C)	Relevant and Appropriate	This section is a potential ARAR when the Navy is transferring property to a nonfederal entity. California Health & Safety Code § 25222.1 provides the authority for the state to enter into voluntary agreements to establish land-use covenants with the owner of the property. The substantive provision of California Health & Safety Code § 25222.1 is the general narrative standard: "restricting specified uses of the property."
	Provides a process for obtaining a written variance from a land use restriction.	Transfer property from the Navy to a nonfederal entity.	California Health & Safety Code §§ 25233(c) and 25234	Relevant and Appropriate	This section is a potential ARAR for institutional controls where the Navy is transferring property to a nonfederal entity. California Health & Safety Code § 25233(c) sets forth substantive criteria for granting variances from the uses prohibited in § 25232(b)(1)(A)-(E) based on specific environmental and health criteria.

TABLE A-2: POTENTIAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Institutional Controls (Continued)					
State Requirements (Continued)					
California Code Regulations Title 22					
Institutional controls	A land use covenant imposing appropriate limitations on land use shall be executed and recorded when Facility closure, corrective action, remedial or removal action, or other response actions are undertaken and hazardous materials, hazardous wastes or constituents, or hazardous substances will remain at the property at levels which are not suitable for unrestricted use of the land.	Property transfer by federal government to non-federal entity.	Cal. Code Regs., tit. 22, § 67391.1(a) and (e)(1)	Relevant and Appropriate	The substantive provisions of § 67391.1(a) and (e)(1) are potential ARARs.

TABLE A-2: POTENTIAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Excavation and Off-Site Disposal Of Waste					
Resource Conservation and Recovery Act (42 U.S.C., Chapter 82, §§ 6901-6991[i])[a]					
On-site waste generation	Definition of RCRA hazardous waste.	Soil and water.	Cal. Code Regs., tit. 22, §§ 66262.10(a), 66262.11	Applicable	The requirements of Cal. Code Regs., tit. 22, Division 4.5, Chapter 14 are potentially applicable for determining whether material generated contains hazardous waste. These requirements may be relevant and appropriate to material that is similar or identical to RCRA hazardous waste or non-RCRA hazardous waste.
Waste pile	A generator may accumulate solid remediation waste for storage only up to 2 years, during remedial operations without triggering LDRs.	Hazardous remediation waste temporarily stored in piles.	40 CFR § 264.554(d)(1)(i-ii)and (d)(2), (e),(f),(h),(i), (j), and (k)	Applicable	These requirements are potentially applicable for temporary waste storage during remediation.
Clean Air Act (42 U.S.C. § 7401 et seq.)[a]					
Excavation	Sets forth opacity limitations.	Excavation	BAAQMD Regulation 6-302	Relevant and Appropriate	This requirement is potentially applicable for excavation.

TABLE A-2: POTENTIAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Federal Hazardous Materials Transportation Law (49 U.S.C. §§ 5101-5127)[a]					
Transportation of hazardous material	Sets forth requirements for transporting hazardous waste including representations that containers are safe, prohibitions on altering labels, marking requirements, labeling requirements, and placarding requirements.	Interstate carriers transporting hazardous waste and substance by motor vehicle.	49 CFR §§171.2(f), 171.2(g), 172.300, 172.301,172. 302, 172.303, 172.304, 172.312, 172.400, 172.504	Relevant and Appropriate	These requirements are potentially relevant and appropriate for transporting hazardous materials on site.

Notes:

a	Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as potential ARAR. Specific potential ARARs are addressed in the table below each general heading; only substantive requirements of specific citations are considered potential ARARs
b	The Clean Air Act ARARs apply only to the alternatives involving excavation.
§	Section
§	Sections
ARAR	Applicable or relevant and appropriate requirement
BAAQMD	Bay Area Air Quality Management District
Cal. Code. Regs.	*California Code of Regulations*
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
DOT	U.S. Department of Transportation
RCRA	Resource Conservation and Recovery Act
tit.	Title
U.S.C.	*United States Code*

ATTACHMENT A1
NAVY LETTER TO CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY DEPARTMENT OF TOXIC SUBSTANCES CONTROL REQUESTING IDENTIFICATION OF STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR INSTALLATION RESTORATION SITE 30

2 Pages

DEPARTMENT OF THE NAVY
BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
1455 FRAZEE RD, SUITE 900
SAN DIEGO, CA 92108-4310

5090
Ser BPMOW.LNL/0115
February 7, 2006

CERTIFIED MAIL

Mr. David Rist
California Environmental Protection Agency
Department of Toxic Substances Control
Office of Military Facilities
700 Heinz Avenue, Suite 200
Berkeley, CA 94710

Dear Mr. Rist:

Subj: IDENTIFICATION OF STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR THE FEASIBILITY STUDY FOR INSTALLATION RESTORATION SITE 30, DAYCARE CENTER, AT FORMER NAVAL STATION TREASURE ISLAND

Pursuant to accomplishing the goals of the Naval Station Treasure Island (NAVSTA TI) Installation Restoration (IR) Program, the Department of the Navy (Navy) hereby request the California Environmental Protection Agency Department of Toxic Substances Control identify potential State chemical-specific, location-specific, and action-specific applicable or relevant and appropriate requirements (ARARs) for potential remedial actions for IR Site 30 at NAVSTA TI. State ARARs identified will be considered and evaluated during the preparation of the Feasibility Study (FS). In addition, the Navy is requesting the State of California identify any other criteria, advisories, guidance, and proposed standards the State requests to be considered (TBCs) for IR Site 30.

Enclosure (1), the Executive Summary presented in the Final Remedial Investigation Report for IR Site 30, of February 2006, should allow you to begin to identify, with some specificity, State chemical-specific and location-specific ARARs. For action-specific ARARs, no action, institutional controls to maintain the daycare center building foundation as a protective barrier, and demolition of the daycare center building with soil excavation are being evaluated as remedial alternatives. These three remedial alternatives will be discussed in detail in the FS report.

The Navy is requesting timely identification of potential State ARARs consistent with the requirements under Section 121(d)(2)(A) of Comprehensive Environmental Response, Compensation, and Liability Act and under the National Contingency Plan, 40 *Code of Federal Regulations* (CFR) 300.400(g) and 300.515(d) & (h). Experience to date around the country has shown that failure to identify ARARs with sufficient precision, early in the FS process, can cause severe disruptions in timely implementation of a remedial action. To ensure timely and complete ARARs identification for IR Site 30, please include the following information:

(1) A specific citation to the statutory or regulatory provisions for the potential State ARAR and the date of enactment or promulgation.

(2) A brief description of why the potential State ARAR is applicable or relevant and appropriate to IR Site 30.

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February 7, 2006

(3) A description of how the potential State ARAR would apply to potential remedial action, including specific numeric discharge, effluent, or emission limitations; hazardous substance/constituent action or cleanup levels, etc.; if the State intends to take the position that the potential State ARAR includes such limitations, levels, etc.

(4) If the State believes its proposed ARAR is more stringent than the corresponding Federal ARAR, please provide the rationale and technical justification for this position.

(5) If the State determines that there is not enough information to fully respond to our request, please identify any additional information that would be required to support identification of State ARARs and their application.

Consistent with 40 CFR 300.515(h)(2), we are requesting that you send a response via first class mail to the address above, attention NAVSTA Treasure Island BRAC Environmental Coordinator and postmarked within 30 days of receipt of this request. Please direct any technical questions you may have concerning this request to Ms. La Rae Landers at (619) 532-0970 and any legal questions to Mr. Jan Whitacre, Environmental Counsel at (619) 532-0910.

Sincerely,

Douglas G

By/JAMES B. SULLIVAN
BRAC Environmental Coordinator
By direction of the Director

Enclosure: (1) Executive Summary, Final Remedial Investigation Report for IR Site 30, Daycare Center, NAVSTA Treasure Island, February 2006

Copy to:
Ms. Patti Collins
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street, (SFD-8-1)
San Francisco, CA 94105-3901

ATTACHMENT A2
NAVY LETTER TO CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY REGIONAL WATER QUALITY CONTROL BOARD REQUESTING IDENTIFICATION OF STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR INSTALLATION RESTORATION SITE 30

2 Pages

DEPARTMENT OF THE NAVY
BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
1455 FRAZEE RD, SUITE 900
SAN DIEGO, CA 92108-4310

5090
Ser BPMOW.LNL/0117
February 7, 2006

CERTIFIED MAIL

Mr. Alan Friedman
California Environmental Protection Agency
Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, California 94612

Dear Mr. Friedman:

Subj: IDENTIFICATION OF STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR THE FEASIBILITY STUDY FOR INSTALLATION RESTORATION SITE 30, DAYCARE CENTER, AT FORMER NAVAL STATION TREASURE ISLAND

Pursuant to accomplishing the goals of the Naval Station Treasure Island (NAVSTA TI) Installation Restoration (IR) Program, the Department of the Navy (Navy) hereby request the California Environmental Protection Agency Regional Water Quality Control Board identify potential State chemical-specific, location-specific, and action-specific applicable or relevant and appropriate requirements (ARARs) for potential remedial actions for IR Site 30 at NAVSTA TI. State ARARs identified will be considered and evaluated during the preparation of the Feasibility Study (FS). In addition, the Navy is requesting the State of California identify any other criteria, advisories, guidance, and proposed standards the State requests to be considered (TBCs) for IR Site 30.

Enclosure (1), the Executive Summary presented in the Final Remedial Investigation Report for IR Site 30, to February 2006, should allow you to begin to identify, with some specificity, State chemical-specific and location-specific ARARs. For action-specific ARARs, no action, institutional controls to maintain the daycare center building foundation as a protective barrier, and demolition of the daycare center building with soil excavation are being evaluated as remedial alternatives. These three remedial alternatives will be discussed in detail in the FS report.

The Navy is requesting timely identification of potential State ARARs consistent with the requirements under Section 121(d)(2)(A) of Comprehensive Environmental Response, Compensation, and Liability Act and under the National Contingency Plan, 40 *Code of Federal Regulations* (CFR) 300.400(g) and 300.515(d) & (h). Experience to date around the country has shown that failure to identify ARARs with sufficient precision, early in the FS process, can cause severe disruptions in timely implementation of a remedial action. To ensure timely and complete ARARs identification for IR Site 30, please include the following information:

(1) A specific citation to the statutory or regulatory provisions for the potential State ARAR and the date of enactment or promulgation.

(2) A brief description of why the potential State ARAR is applicable or relevant and appropriate to IR Site 30.

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February 7, 2006

(3) A description of how the potential State ARAR would apply to potential remedial action, including specific numeric discharge, effluent, or emission limitations; hazardous substance/constituent action or cleanup levels, etc.; if the State intends to take the position that the potential State ARAR includes such limitations, levels, etc.

(4) If the State believes its proposed ARAR is more stringent than the corresponding Federal ARAR, please provide the rationale and technical justification for this position.

(5) If the State determines that there is not enough information to fully respond to our request, please identify any additional information that would be required to support identification of State ARARs and their application.

Consistent with 40 CFR 300.515(h)(2), we are requesting that you send a response via first class mail to the address above, attention NAVSTA Treasure Island BRAC Environmental Coordinator and postmarked within 30 days of receipt of this request. Please direct any technical questions you may have concerning this request to Ms. La Rae Landers at (619) 532-0970 and any legal questions to Mr. Jan Whitacre, Environmental Counsel at (619) 532-0910.

Sincerely,

/s/
JAMES B. SULLIVAN
BRAC Environmental Coordinator
By direction of the Director

Enclosure: (1) Executive Summary, Final Remedial Investigation Report for IR Site 30, Daycare Center, NAVSTA Treasure Island, February 2006

Copy to:
Mr. David Rist
California Environmental Protection Agency
Department of Toxic Substances Control
Office of Military Facilities
700 Heinz Avenue, Suite 200
Berkeley California 94710

ATTACHMENT A3
NAVY LETTER TO CALIFORNIA DEPARTMENT OF HEALTH SERVICES ENVIRONMENTAL MANAGEMENT BRANCH REQUESTING IDENTIFICATION OF STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR INSTALLATION RESTORATION SITE 30

2 Pages

DEPARTMENT OF THE NAVY
BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
1455 FRAZEE RD, SUITE 900
SAN DIEGO, CA 92108-4310

5090
Ser BPMOW.LNL/0114
February 7, 2006

CERTIFIED MAIL

Ms. Diedre Dement
California Department of Health Services
Environmental Management Branch
1616 Capitol Avenue, Mail Station 7405
P.O. Box 997413
Sacramento, CA 95899-7413

Dear Ms. Dement:

Subj: IDENTIFICATION OF STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR THE FEASIBILITY STUDY FOR INSTALLATION RESTORATION SITE 30, DAYCARE CENTER, AT FORMER NAVAL STATION TREASURE ISLAND

Pursuant to accomplishing the goals of the Naval Station Treasure Island (NAVSTA TI) Installation Restoration (IR) Program, the Department of the Navy (Navy) hereby request the California Department of Health Services identify potential State chemical-specific, location-specific, and action-specific applicable or relevant and appropriate requirements (ARARs) for potential remedial actions for IR Site 30 at NAVSTA TI. State ARARs identified will be considered and evaluated during the preparation of the Feasibility Study (FS). In addition, the Navy is requesting the State of California identify any other criteria, advisories, guidance, and proposed standards the State requests to be considered (TBCs) for IR Site 30.

Enclosure (1), the Executive Summary presented in the Final Remedial Investigation Report for IR Site 30, of February 2006, should allow you to begin to identify, with some specificity, State chemical-specific and location-specific ARARs. For action-specific ARARs, no action, institutional controls to maintain the daycare center building foundation as a protective barrier, and demolition of the daycare center building with soil excavation are being evaluated as remedial alternatives. These three remedial alternatives will be discussed in detail in the FS report.

The Navy is requesting timely identification of potential State ARARs consistent with the requirements under Section 121(d)(2)(A) of Comprehensive Environmental Response, Compensation, and Liability Act and under the National Contingency Plan, 40 *Code of Federal Regulations* (CFR) 300.400(g) and 300.515(d) & (h). Experience to date around the country has shown that failure to identify ARARs with sufficient precision, early in the FS process, can cause severe disruptions in timely implementation of a remedial action. To ensure timely and complete ARARs identification for IR Site 30, please include the following information:

(1) A specific citation to the statutory or regulatory provisions for the potential State ARAR and the date of enactment or promulgation.

(2) A brief description of why the potential State ARAR is applicable or relevant and appropriate to IR Site 30.

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Ser BPMOW.LNL/0114
February 7, 2006

(3) including specific numeric discharge, effluent, or emission limitations; hazardous substance/constituent action or cleanup levels, etc.; if the State intends to take the position that the potential State ARAR includes such limitations, levels, etc.

(4) If the State believes its proposed ARAR is more stringent than the corresponding Federal ARAR, please provide the rationale and technical justification for this position.

(5) If the State determines that there is not enough information to fully respond to our request, please identify any additional information that would be required to support identification of State ARARs and their application.

Consistent with 40 CFR 300.515(h)(2), we are requesting that you send a response via first class mail to the address above, attention NAVSTA Treasure Island BRAC Environmental Coordinator and postmarked within 30 days of receipt of this request. Please direct any technical questions you may have concerning this request to Ms. La Rae Landers at (619) 532-0970 and any legal questions to Mr. Jan Whitacre, Environmental Counsel at (619) 532-0910.

Sincerely,

By

JAMES B. SULLIVAN
BRAC Environmental Coordinator
By direction of the Director

Enclosure: (1) Executive Summary, Final Remedial Investigation Report for IR Site 30, Daycare Center, NAVSTA Treasure Island, February 2006

Copy to:
Mr. David Rist
California Environmental Protection Agency
Department of Toxic Substances Control
Office of Military Facilities
700 Heinz Avenue, Suite 200
Berkeley, California 94710

ATTACHMENT A4
NAVY LETTER TO CALIFORNIA DEPARTMENT OF FISH AND GAME REQUESTING IDENTIFICATION OF STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR INSTALLATION RESTORATION SITE 30

2 Pages

DEPARTMENT OF THE NAVY
BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
1455 FRAZEE RD, SUITE 900
SAN DIEGO, CA 92108-4310

5090
Ser BPMOW.LNL/0113
February 7, 2006

CERTIFIED MAIL

Mr. Charlie Huang
California Department of Fish and Game
1700 K Street, Room 250
P.O. Box 944204
Sacramento, CA 94244-2090

Dear Mr. Huang:

Subj: IDENTIFICATION OF STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR THE FEASIBILITY STUDY FOR INSTALLATION RESTORATION SITE 30, DAYCARE CENTER, AT FORMER NAVAL STATION TREASURE ISLAND

Pursuant to accomplishing the goals of the Naval Station Treasure Island (NAVSTA TI) Installation Restoration (IR) Program, the Department of the Navy (Navy) hereby request the California Department of Fish and Game identify potential State chemical-specific, location-specific, and action-specific applicable or relevant and appropriate requirements (ARARs) for potential remedial actions for IR Site 30 at NAVSTA TI. State ARARs identified will be considered and evaluated during the preparation of the Feasibility Study (FS). In addition, the Navy is requesting the State of California identify any other criteria, advisories, guidance, and proposed standards the State requests to be considered (TBCs) for IR Site 30.

Enclosure (1), the Executive Summary presented in the Final Remedial Investigation Report for IR Site 30, of February 2006, should allow you to begin to identify, with some specificity, State chemical-specific and location-specific ARARs. For action-specific ARARs, no action, institutional controls to maintain the daycare center building foundation as a protective barrier, and demolition of the daycare center building with soil excavation are being evaluated as remedial alternatives. These three remedial alternatives will be discussed in detail in the FS report.

The Navy is requesting timely identification of potential State ARARs consistent with the requirements under Section 121(d)(2)(A) of Comprehensive Environmental Response, Compensation, and Liability Act and under the National Contingency Plan, 40 *Code of Federal Regulations* (CFR) 300.400(g) and 300.515(d) & (h). Experience to date around the country has shown that failure to identify ARARs with sufficient precision, early in the FS process, can cause severe disruptions in timely implementation of a remedial action. To ensure timely and complete ARARs identification for IR Site 30, please include the following information:

(1) A specific citation to the statutory or regulatory provisions for the potential State ARAR and the date of enactment or promulgation.

(2) A brief description of why the potential State ARAR is applicable or relevant and appropriate to IR Site 30.

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Ser BPMOW.LNL/0113
February 7, 2006

(3) A description of how the potential State ARAR would apply to potential remedial action, including specific numeric discharge, effluent, or emission limitations; hazardous substance/constituent action or cleanup levels, etc.; if the State intends to take the position that the potential State ARAR includes such limitations, levels, etc.

(4) If the State believes its proposed ARAR is more stringent than the corresponding Federal ARAR, please provide the rationale and technical justification for this position.

(5) If the State determines that there is not enough information to fully respond to our request, please identify any additional information that would be required to support identification of State ARARs and their application.

Consistent with 40 CFR 300.515(h)(2), we are requesting that you send a response via first class mail to the address above, attention NAVSTA Treasure Island BRAC Environmental Coordinator and postmarked within 30 days of receipt of this request. Please direct any technical questions you may have concerning this request to Ms. La Rae Landers at (619) 532-0970 and any legal questions to Mr. Jan Whitacre, Environmental Counsel at (619) 532-0910.

Sincerely,

Douglas Gilg

for/JAMES B. SULLIVAN
BRAC Environmental Coordinator
By direction of the Director

Enclosure: (1) Executive Summary, Final Remedial Investigation Report for IR Site 30, Daycare Center, NAVSTA Treasure Island, February 2006

Copy to:
Mr. Davic Rist
California Environmental Protection Agency
Department of Toxic Substances Control
Office of Military Facilities
700 Heinz Avenue, Suite 200
Berkeley, California 94710

ATTACHMENT A5
NAVY LETTER TO BAY AREA AIR QUALITY MANAGEMENT DISTRICT REQUESTING IDENTIFICATION OF STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR INSTALLATION RESTORATION SITE 30

2 Pages

DEPARTMENT OF THE NAVY
BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
1455 FRAZEE RD, SUITE 900
SAN DIEGO, CA 92108-4310

5090
Ser BPMOW.LNL/0112
February 7, 2006

CERTIFIED MAIL

Mr. Jack Broadbent
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109-7799

Dear Mr. Broadbent:

Subj: IDENTIFICATION OF STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR THE FEASIBILITY STUDY FOR INSTALLATION RESTORATION SITE 30, DAYCARE CENTER, AT FORMER NAVAL STATION TREASURE ISLAND

Pursuant to accomplishing the goals of the Naval Station Treasure Island (NAVSTA TI) Installation Restoration (IR) Program, the Department of the Navy (Navy) hereby request the Bay Area Air Quality Management District identify potential State chemical-specific, location-specific, and action-specific applicable or relevant and appropriate requirements (ARARs) for potential remedial actions for IR Site 30 at NAVSTA TI. State ARARs identified will be considered and evaluated during the preparation of the Feasibility Study (FS). In addition, the Navy is requesting the State of California identify any other criteria, advisories, guidance, and proposed standards the State requests to be considered (TBCs) for IR Site 30.

Enclosure (1), the Executive Summary presented in the Final Remedial Investigation Report for IR Site 30, of February 2006, should allow you to begin to identify, with some specificity, State chemical-specific and location-specific ARARs. For action-specific ARARs, no action, institutional controls to maintain the daycare center building foundation as a protective barrier, and demolition of the daycare center building with soil excavation are being evaluated as remedial alternatives. These three remedial alternatives will be discussed in detail in the FS report.

The Navy is requesting timely identification of potential State ARARs consistent with the requirements under Section 121(d)(2)(A) of Comprehensive Environmental Response, Compensation, and Liability Act and under the National Contingency Plan, 40 *Code of Federal Regulations* (CFR) 300.400(g) and 300.515(d) & (h). Experience to date around the country has shown that failure to identify ARARs with sufficient precision, early in the FS process, can cause severe disruptions in timely implementation of a remedial action. To ensure timely and complete ARARs identification for IR Site 30, please include the following information:

(1) A specific citation to the statutory or regulatory provisions for the potential State ARAR and the date of enactment or promulgation.

(2) A brief description of why the potential State ARAR is applicable or relevant and appropriate to IR Site 30.

(3) including specific numeric discharge, effluent, or emission limitations; hazardous substance/constituent action or cleanup levels, etc.; if the State intends to take the position that the potential State ARAR includes such limitations, levels, etc.

(4) If the State believes its proposed ARAR is more stringent than the corresponding Federal ARAR, please provide the rationale and technical justification for this position.

(5) If the State determines that there is not enough information to fully respond to our request, please identify any additional information that would be required to support identification of State ARARs and their application.

Consistent with 40 CFR 300.515(h)(2), we are requesting that you send a response via first class mail to the address above, attention NAVSTA Treasure Island BRAC Environmental Coordinator and postmarked within 30 days of receipt of this request. Please direct any technical questions you may have concerning this request to Ms. La Rae Landers at (619) 532-0970 and any legal questions to Mr. Jan Whitacre, Environmental Counsel at (619) 532-0910.

Sincerely,

/s/ JAMES B. SULLIVAN
BRAC Environmental Coordinator
By direction of the Director

Enclosure: (1) Executive Summary, Final Remedial Investigation Report for IR Site 30, Daycare Center, NAVSTA Treasure Island, February 2006

Copy to:
Mr. David Rist
California Environmental Protection Agency
Department of Toxic Substances Control
Office of Military Facilities
700 Heinz Avenue, Suite 200
Berkeley, CA 94710

ATTACHMENT A6
NAVY LETTER TO SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION REQUESTING IDENTIFICATION OF STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR INSTALLATION RESTORATION SITE 30

2 Pages

DEPARTMENT OF THE NAVY
BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
1455 FRAZEE RD, SUITE 900
SAN DIEGO, CA 92108-4310

5090
Ser BPMOW.LNL/0111
February 7, 2006

CERTIFIED MAIL

Mr. Joseph La Clair
San Francisco Bay
Conservation and Development Commission
50 California Street, Suite 2600
San Francisco, California 94111

Dear Mr. La Clair:

Subj: IDENTIFICATION OF STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR THE FEASIBILITY STUDY FOR INSTALLATION RESTORATION SITE 30, DAYCARE CENTER, AT FORMER NAVAL STATION TREASURE ISLAND

Pursuant to accomplishing the goals of the Naval Station Treasure Island (NAVSTA TI) Installation Restoration (IR) Program, the Department of the Navy (Navy) hereby request the San Francisco Bay Conservation and Development Commission identify potential State chemical-specific, location-specific, and action-specific applicable or relevant and appropriate requirements (ARARs) for potential remedial actions for IR Site 30 at NAVSTA TI. State ARARs identified will be considered and evaluated during the preparation of the Feasibility Study (FS). In addition, the Navy is requesting the State of California identify any other criteria, advisories, guidance, and proposed standards the State requests to be considered (TBCs) for IR Site 30.

Enclosure (1), the Executive Summary presented in the Final Remedial Investigation Report for IR Site 30, of February 2006, should allow you to begin to identify, with some specificity, State chemical-specific and location-specific ARARs. For action-specific ARARs, no action, institutional controls to maintain the daycare center building foundation as a protective barrier, and demolition of the daycare center building with soil excavation are being evaluated as remedial alternatives. These three remedial alternatives will be discussed in detail in the FS report.

The Navy is requesting timely identification of potential State ARARs consistent with the requirements under Section 121(d)(2)(A) of Comprehensive Environmental Response, Compensation, and Liability Act and under the National Contingency Plan, 40 *Code of Federal Regulations* (CFR) 300.400(g) and 300.515(d) & (h). Experience to date around the country has shown that failure to identify ARARs with sufficient precision, early in the FS process, can cause severe disruptions in timely implementation of a remedial action. To ensure timely and complete ARARs identification for IR Site 30, please include the following information:

(1) A specific citation to the statutory or regulatory provisions for the potential State ARAR and the date of enactment or promulgation.

(2) A brief description of why the potential State ARAR is applicable or relevant and appropriate to IR Site 30.

5090
Ser BPMOW.LNL/0111
February 7, 2006

(3) A description of how the potential State ARAR would apply to potential remedial action, including specific numeric discharge, effluent, or emission limitations; hazardous substance/constituent action or cleanup levels, etc.; if the State intends to take the position that the potential State ARAR includes such limitations, levels, etc.

(4) If the State believes its proposed ARAR is more stringent than the corresponding Federal ARAR, please provide the rationale and technical justification for this position.

(5) If the State determines that there is not enough information to fully respond to our request, please identify any additional information that would be required to support identification of State ARARs and their application.

Consistent with 40 CFR 300.515(h)(2), we are requesting that you send a response via first class mail to the address above, attention NAVSTA Treasure Island BRAC Environmental Coordinator and postmarked within 30 days of receipt of this request. Please direct any technical questions you may have concerning this request to Ms. La Rae Landers at (619) 532-0970 and any legal questions to Mr. Jan Whitacre, Environmental Counsel at (619) 532-0910.

Sincerely,

for JAMES B. SULLIVAN
BRAC Environmental Coordinator
By direction of the Director

Enclosure: (1) Executive Summary, Final Remedial Investigation Report for IR Site 30, Daycare Center, NAVSTA Treasure Island, February 2006

Copy to:
Mr. David Rist
California Environmental Protection Agency
Department of Toxic Substances Control
Office of Military Facilities
700 Heinz Avenue, Suite 200
Berkeley, California 94710

ATTACHMENT A7
NAVY LETTER TO CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY INTEGRATED WASTE MANAGEMENT BOARD REQUESTING IDENTIFICATION OF STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR INSTALLATION RESTORATION SITE 30

2 Pages

DEPARTMENT OF THE NAVY
BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
1455 FRAZEE RD, SUITE 900
SAN DIEGO, CA 92108-4310

5090
Ser BPMOW.LNL/0116
February 7, 2006

CERTIFIED MAIL

Mr. Gino Yekta
California Environmental Protection Agency
Integratec Waste Management Board
1001 I Street
P.O. Box 4025
Sacramento, CA 95812-4025

Dear Mr. Yekta:

Subj: IDENTIFICATION OF STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR THE FEASIBILITY STUDY FOR INSTALLATION RESTORATION SITE 30, DAYCARE CENTER, AT FORMER NAVAL STATION TREASURE ISLAND

Pursuant to accomplishing the goals of the Naval Station Treasure Island (NAVSTA TI) Installation Restoration (IR) Program, the Department of the Navy (Navy) hereby request the California Environmental Protection Agency Integrated Waste Management Board identify potential State chemical-specific, location-specific, and action-specific applicable or relevant and appropriate requirements (ARARs) for potential remedial actions for IR Site 30 at NAVSTA TI. State ARARs identified will be considered and evaluated during the preparation of the Feasibility Study (FS). In addition, the Navy is requesting the State of California identify any other criteria, advisories, guidance, and proposed standards the State requests to be considered (TBCs) for IR Site 30.

Enclosure (1), the Executive Summary presented in the Final Remedial Investigation Report for IR Site 30, of February 2006, should allow you to begin to identify, with some specificity, State chemical-specific and location-specific ARARs. For action-specific ARARs, no action, institutional controls to maintain the daycare center building foundation as a protective barrier, and demolition of the daycare center building with soil excavation are being evaluated as remedial alternatives. These three remedial alternatives will be discussed in detail in the FS report.

The Navy is requesting timely identification of potential State ARARs consistent with the requirements under Section 121(d)(2)(A) of Comprehensive Environmental Response, Compensation, and Liability Act and under the National Contingency Plan, 40 *Code of Federal Regulations* (CFR) 300.400(g) and 300.515(d) & (h). Experience to date around the country has shown that failure to identify ARARs with sufficient precision, early in the FS process, can cause severe disruptions in timely implementation of a remedial action. To ensure timely and complete ARARs identification for IR Site 30, please include the following information:

(1) A specific citation to the statutory or regulatory provisions for the potential State ARAR and the date of enactment or promulgation.

(2) A brief description of why the potential State ARAR is applicable or relevant and appropriate to IR Site 30.

5090
Ser BPMOW.LNL/0116
February 7, 2006

(3) A description of how the potential State ARAR would apply to potential remedial action, including specific numeric discharge, effluent, or emission limitations; hazardous substance/constituent action or cleanup levels, etc.; if the State intends to take the position that the potential State ARAR includes such limitations, levels, etc.

(4) If the State believes its proposed ARAR is more stringent than the corresponding Federal ARAR, please provide the rationale and technical justification for this position.

(5) If the State determines that there is not enough information to fully respond to our request, please identify any additional information that would be required to support identification of State ARARs and their application.

Consistent with 40 CFR 300.515(h)(2), we are requesting that you send a response via first class mail to the address above, attention NAVSTA Treasure Island BRAC Environmental Coordinator and postmarked within 30 days of receipt of this request. Please direct any technical questions you may have concerning this request to Ms. La Rae Landers at (619) 532-0970 and any legal questions to Mr. Jan Whitacre, Environmental Counsel at (619) 532-0910.

Sincerely,

JAMES B. SULLIVAN
BRAC Environmental Coordinator
By direction of the Director

Enclosure: (1) Executive Summary, Final Remedial Investigation Report for IR Site 30, Daycare Center, NAVSTA Treasure Island, February 2006

Copy to:
Mr. David Rist
California Environmental Protection Agency
Department of Toxic Substances Control
Office of Military Facilities
700 Heinz Avenue, Suite 200
Berkeley, California 94710

ATTACHMENT A8
DTSC LETTER IDENTIFYING STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR INSTALLATION RESTORATION SITE 30 FROM DEPARTMENT OF TOXIC SUBSTANCES CONTROL TO NAVY

4 Pages

Department of Toxic Substances Control

Alan C. Lloyd, Ph.D.
Agency Secretary
Cal/EPA

700 Heinz Avenue, Suite 200
Berkeley, California 94710-2721

Arnold Schwarzenegger
Governor

January 24, 2006

Ms. La Rae Landers
Lead Remedial Project Manager
Department of the Navy
Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

IDENTIFICATION OF STATE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) FOR THE SITE 30 (PARCEL T094) DRAFT FEASIBILITY STUDY, NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

Dear Ms. Landers:

Thank you for the opportunity to provide State of California laws and regulations for developing ARARs for the draft Feasibility Study for Site 30 at Naval Station Treasure Island. Below are the requirements of the Department of Toxic Substances Control (DTSC). DTSC also understands that the Navy will be soliciting ARARs from other State agencies and request that in areas where there are overlapping State requirements, that the most stringent of these requirements apply.

The following California laws and regulations are applicable to the remedial technology alternatives that include excavation and off-site disposal as determined by the Department of Toxic Substances Control.

Determination of a Hazardous Waste

California Code of Regulations, Title 22 (22 CCR), Division 4.5, Chapter 11

Hazardous Waste Determination requirements are applicable for alternatives that

will generate waste. The above identified sections include requirements for determining whether excavated material or extracted groundwater or other generated waste are either RCRA or non-RCRA hazardous waste (i.e. California only waste).

Land Disposal Restrictions (LDR)

California Code of Regulations, Title 22, Chapter 18.

Land disposal restrictions prohibit disposal of hazardous waste unless treatment standards are met and are applicable for alternatives that will generate waste subject to land disposal restrictions.

Hazardous Waste Generator Requirements

California Code of Regulations, Title 22, Chapter 12 and Chapters 15 and 18 as referenced in Chapter 12.

On-site hazardous waste accumulation requirements are applicable if hazardous waste is generated and accumulated on site before transport.

Drinking Water Primary Standards

California Code of Regulations, Title 22, Div. 4, Ch. 15, Article 4, Section 64431 et seq., and Article 5.5, Section 64444 et seq.

These requirements are considered relevant and appropriate where the aquifer is a potential drinking water source and the State MCLs are more stringent than Federal MCLs (Even though Treasure Island groundwater has been de-designated as a potential drinking water source, concentrations of contaminants at Site 30 should be compared to the State MCLs as a basis for the establishment of institutional controls to prohibit the use of groundwater).

Remediation Waste Staging and On-Site Storage

California Health and Safety Code, Chapter 6.5, Article 2, section 25123.3

This section provides definitions and requirements for on-site storage of non-RCRA hazardous waste soil prior to on-site treatment or off-site transportation and is applicable if non-RCRA hazardous waste soil is accumulated and stored on-site.

Transportation of Hazardous Waste

California Code of Regulations, Title 22, Chapter 13, Sections 66263.10 -.18

This regulation is applicable as these requirements must be fully complied with when transporting hazardous waste off-site.

The following regulation is relevant and appropriate for remedial technology alternatives that involve the consolidation of waste and the installation of a protected cap. These regulations are relevant and appropriate because Site 30 is known to contain hazardous waste.

Construction of Landfill Cover Systems

California Code of Regulations, Title 22, Chapter 14, Article 14. Landfills, section 66264.303. Monitoring and Inspection.

This section describes the requirements for inspections during construction or installation cover systems. These systems shall be inspected for uniformity, damage, and imperfections.

Landfill Closure and Post Closure Care

California Code of Regulations, Title 22, Chapter 14, Article 14. Landfills, section 66264.310.

This section describes the design and construction requirements for landfill cover as well as post closure requirements. Also, describes requirements for gas recovery.

The following regulation is applicable for the remedial technology alternatives using land use controls.

Covenants to Restrict Use of Property - Environmental Restriction

California Civil Code, section 1471

This section allows an owner of land to make a covenant to restrict use of land for the benefit of a covenantee. The covenant runs with the land to bind successive owners, and the restrictions must be reasonably necessary to protect present or future human health or safety or the environment as a result of the presence on the land of hazardous materials, as defined in section 25260 of the California Health and Safety Code. Requires recording of the covenant in the county where the land is located.

California Health and Safety Code section 25202.5

This section allows DTSC to enter into an agreement with the owners of a hazardous waste facility to restrict present and future land uses.

California Health and Safety Code sections 25221.1 and 25355.5(a)(1)(C)

This section allows DTSC to enter into voluntary agreements with land owners to restrict the use of property. The agreements run with the land restricting present and future uses of the land.

California Health and Safety Code sections 25233(c) and 25234

This section provides the process and criteria for obtaining written variances from land use restrictions, and for termination of land use restrictions.

California Code of Regulation, Title 22, Division 4.5, Chapter 39, section 67391.1

This section defines requirements for establishing land use covenants for imposing limitations on land use when hazardous materials, hazardous waste or constituents, or hazardous substances will remain at the property at levels which are not suitable for unrestricted use of the land.

The above State of California ARARs reflects DTSC's understanding of the remedial alternatives that are to be presented in the upcoming draft Feasibility Study for Site 30. The State of California may submit additional ARARs as more specific information on the remedial alternatives is provided by the Navy. If you have any questions regarding State ARARs please call me at 510-540-3763.

Sincerely,

David Rist

David Rist
Hazardous Substance Scientist
Office of Military Facilities

cc: See next page.

ATTACHMENT A9
LETTER IDENTIFYING STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR INSTALLATION RESTORATION SITE 30 FROM CALIFORNIA DEPARTMENT OF HEALTH SERVICES TO NAVY

2 Pages

State of California Department of Health Services

Memorandum

Date: March 3, 2006

To: Mr. David Rist
Remedial Project Manager
Office of Military Facilities
Department of Toxic Substances Control (DTSC)
700 Heinz Avenue, Suite 200
Berkeley, California 94710-7320

From: Department of Health Services
Environmental Management Branch
P.O. Box 997413, MS 7405
1616 Capitol Avenue
Sacramento, California 95899-7413

Subject: Request for Applicable or Relevant and Appropriate Requirements (ARARs) for Draft Feasibility Study for Installation Restoration, Naval Station Treasure Island, California

This is in response to your request, dated Febuary 7, 2006, for Applicable or Relevant and Appropriate Requirements (ARARs) for Naval Station Treasure Island.

As an Agreement State with the Nuclear Regulatory Commission (NRC), California licenses and monitors compliance of byproduct materials use as defined by the Atomic Energy Act of 1954. In addition, the Department of Health Services (DHS) controls the uses of naturally occurring radioactive materials (e.g. radium-226). DHS regulatory authority does not include the licensing and compliance monitoring of facilities under exclusive federal jurisdiction. This is the NRC's responsibility. DHS becomes involved when a federal facility (e.g. a military base) is going to close and revert to State control. We are currently providing radiological consultation for closing military bases in California in preparation for the bases being transferred into State, local or private ownership.

Listed below are the regulations, statutes and guidance that pertain to radioactive materials found on military bases in California.

1. Title 10, Code of Federal Regulations (CFR), Sections 20.1001-2402 and Appendices A through F, as incorporated by reference to Title 17, California Code of Regulations (CCR), Section 30253. A significant change in the regulations, as adopted by California, is that the federal term "licensee" is replaced by "user" as defined in Title 17, CCR, Section 30100.

2. Title 10, Code of Federal Regulations (CFR), Sections 20.1402 through 20.1404, Radiological Criteria for License Termination, Final Rule.

3. Relevant guidance documents published by the Nuclear Regulatory Commission

(NRC) (e.g. NUREG/CR - 5849).

If you have questions about DHS' ARARs or their applications to this base, please contact me at (916) 449-5921.

Penny Leinwander
Senior Health Physicist

cc: Mr. James B. Sullivan
BRAC Environmental Coordinator
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, CA 92106-4310

ATTACHMENT A10
LETTER IDENTIFYING STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR INSTALLATION RESTORATION SITE 30 FROM CALIFORNIA DEPARTMENT OF FISH AND GAME TO NAVY

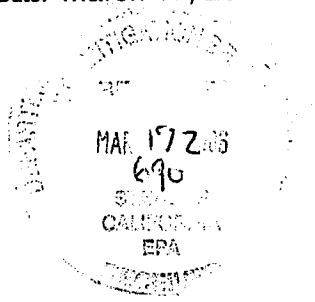
9 Pages

State of California

Memorandum

To: Mr. David Rist
Department of Toxic Substances Control
700 Heinz Avenue, Suite 200
Berkeley, CA 94710

Date: March 17, 2006



From: Charlie Huang, Ph.D.
Staff Toxicologist
Scientific Division
Office of Spill Prevention and Response
Department of Fish and Game
1700 K Street, Suite 250
Sacramento, CA 95814

Subject: **Applicable or Relevant and Appropriate Requirements (ARARs) for Installation Restoration (IR) Site 30 at the Naval Station Treasure Island, San Francisco, California**

This memo is in response to a recent letter from Mr. James Sullivan of the Navy, requesting potential State ARARs for the feasibility study for Installation Restoration (IR) Site 30 at the Naval Station Treasure Island (NAVSTA TI). The Department of Fish and Game, Office of Spill Prevention and Response (DFG-OSPR) appreciates this opportunity to provide State laws and regulations to guide the planned cleanup of NAVSTA TI.

It is our understanding that the Navy is making the request for ARARs for the purpose of ensuring a coordinated cleanup effort. The request for DFG-OSPR to define appropriate State cleanup requirements is made pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as a portion of the removal action process. This memo will serve to advise you of the DFG's continuing interest in coordinating any natural resource issues, as the designated natural resource trustee for the State of California. This may be necessary should release(s) of any hazardous materials at the subject site affect State natural resources.

NAVSTA TI, located in San Francisco Bay between San Francisco and Oakland, California, consists of two contiguous islands: 403-acre Treasure Island (TI) and 147-acre Yerba Buena Island (YBI). NAVSTA TI is part of the greater ecosystem of the San Francisco Bay, which is the largest coastal embayment on the Pacific Coast and home to a diverse ecological community. Four wildlife species, classified as endangered by state and/or federal governments, inhabit the vicinity of NAVSTA TI: the California Least Tern, the Peregrine Falcon, the California Brown Pelican, and the Double-crested Cormorant. U.S. Fish and Wildlife Service has removed the Peregrine Falcon from the federal endangered species list, however it retains its endangered status under State law.

IR Site 30 is a relatively small site of approximately 1.5 acres. It includes Building 502, which is currently used as the Treasure Island Daycare Center.

The Remedial Investigation report stated that the chemicals exceeding screening criteria in soil samples at IR Site 30 are benzo(a)pyrene, DDT, lead, arsenic, vanadium, and dioxins. The site does not contain significant habitat for wildlife species because IR Site 30 is predominantly covered with urbanized areas. However, there is potential risk to aquatic receptors because contaminated groundwater migrated to the offshore surface water of the Bay.

Listed on the enclosed table is a site-specific list of Fish and Game Code Sections which may apply as State ARARs or TBCs (to be considered) with the date of enactment or promulgation. The specific citation and explanation for each listed ARAR and TBC are also enclosed, in addition to applicable statutes and regulations.

The DFG-OSPR appreciates the opportunity to provide our ARARs. If you have any questions or need further information, please contact me at (916) 324-9805 or by e-mail at chuang@ospr.dfg.ca.gov.

Reviewer: Julie Yamamoto, Ph.D., Senior Toxicologist
Wendy Johnson, Staff Counsel

Enclosure

cc: Department of Fish and Game
Office of Spill Prevention and Response
Julie Yamamoto, CDFG/OSPR-Scientific
Wendy Johnson, CDFG/OSPR-Legal

CALIFORNIA DEPARTMENT OF FISH AND GAME
LOCATION AND ACTION SPECIFIC ARARs AND TBCs
IR Site 30, Naval Station Treasure Island

LOCATION	STANDARD	SPECIFIC CITATION	ARAR/TBC EXPLANATION
Aquatic habitat/species	Action must be taken if toxic materials are placed where they can enter waters of the State. There can be no release that would have a deleterious effect on species or habitat.	Fish and Game Code section 5650 (a), (b) & (f)	This code section prohibits depositing or placing where it can pass into waters of the state any petroleum products (Section 5650(a)(1)), factory refuse (section 5650(a)(4)), sawdust, shavings, slabs or edgings (section 5650(a)(3)), and any substance deleterious to fish, plant life or bird life (section 5650(a)(6)). These are substantive, promulgated environmental protection requirements. These requirements impose strict criminal liability on violators. (*People v. Chevron Chemical Company (1983) 143 Cal. App. 3d 50).* This imposition of strict criminal liability imposes a standard that is more stringent than federal law. The extent to which each subdivision of section 5650 is relevant and appropriate depends on the site characterization and the potential for contaminants to be deposited near or within waters of the state.
Wildlife Species	Action must be taken to prohibit the taking of birds and mammals, including the taking by poison	Fish and Game Code section 3005 (Stats. 1957, c. 456, p. 1353 section 3005)	This code section prohibits the taking of birds and mammals, including taking by poison. "Take" is defined by Fish and Game Code section 86 to include killing. "Poison" is not defined in the code. Although there is no state authority on this point, federal law recognizes that poison, such as Strychnine, may affect incidental taking. (*Defenders of Wildlife v. Administrator, Environmental Protection Agency (1989) 882. F. 2d. 1295).* This code section imposes a substantive, promulgated environmental protection requirement.
Endangered Species	Action must be taken to conserve endangered species. there can be no releases and/or actions	Fish and Game Code section 2080 (Added by	This section prohibits the take, possession, purchase or sell within the state, any species (including rare native plant species), or any product thereof, that the commission determines to be an endangered or threatened species, or the attempt of any of these acts. This section is applicable and relevant to the extent

CALIFORNIA DEPARTMENT OF FISH AND GAME
LOCATION AND ACTION SPECIFIC ARARs AND TBCs
IR Site 30, Naval Station Treasure Island

LOCATION	STANDARD	SPECIFIC CITATION	ARAR/TBC EXPLANATION
	that would have a deleterious effect on species or habitat.	Stats. 1984, c. 1240, section 2).	that there are endangered or threatened species in the area which have the potential of being affected if actions are not taken to conserve the species. This section prohibits releases and/or actions that would have a deleterious effect on species or their habitat. This section and applicable Title 14 regulations should be considered as ARARs. *California Code of Regulations Title 14 sections 670.2* provides a listing the plants of California declared to be Endangered, Threatened or Rare. *California Code of Regulations Title 14 section 670.5* provides a listing of Animals of California declared to be endangered or threatened. *California Code of Regulations Title 14 section 783 et. seq.,* provides the implementation regulations for the California Endangered Species Act.
Fully protected bird species/habitat	Action must be taken to prevent the taking of fully protected birds	Fish and Game Code section 3511 (Added by Stats.1970, c. 1036, p. 1848 section 4)	This section provides that it is unlawful to take or possess any of the following fully protected birds: (a). American peregrine falcon (b). Brown Pelican (c). California black rail (d). California clapper rail (e). California condor (f). California least tern (g). Golden eagle (h). Greater sandhill crane

CALIFORNIA DEPARTMENT OF FISH AND GAME
LOCATION AND ACTION SPECIFIC ARARs AND TBCs
IR Site 30, Naval Station Treasure Island

LOCATION	STANDARD	SPECIFIC CITATION	ARAR/TBC EXPLANATION
			(i). Light-footed clapper rail (j). Southern bald eagle (k). Trumpeter swan (l). White-tailed kite (m). Yuma clapper rail This should be considered Applicable and Relevant to the extent that such fully protected birds or their habitat are detected on or near the site. The Brown Pelican and California least tern are known to occur on or near this site.
Fully Protected Mammals	Actions must be taken to assure that no fully protected mammals are taken or possessed at any time.	Fish and Game Code section 4700 (Added by Stats. 1970, c. 1036, p. 1848 section 6)	This section prohibits the take or possession of any of the fully protected mammals or their parts. The following are fully protected mammals: (a) Morro Bay kangaroo rat (b) Bighorn sheep except Nelson bighorn sheep (c) Northern elephant seal (d) Guadalupe fur seal (e) Ring-tailed cat (f) Pacific right whale (g) Salt-marsh harvest mouse (h) Southern sea otter (i) Wolverine This section is applicable, relevant, and appropriate to the extent that such mammals and/or their habitat are located on or near the site.

CALIFORNIA DEPARTMENT OF FISH AND GAME
LOCATION AND ACTION SPECIFIC ARARs AND TBCs
IR Site 30, Naval Station Treasure Island

LOCATION	STANDARD	SPECIFIC CITATION	ARAR/TBC EXPLANATION
Fully Protected Reptiles and Amphibians	Actions must be taken to prevent the take or possession of any fully protected reptile or amphibian.	Fish and Game Code section 5050 (Added by Stats. 1970, c. 1036, p. 1849, section 7)	This section prohibits the take or possession of fully protected reptiles and amphibians or parts thereof. The following are fully protected reptiles and amphibians: (1) Blunt-nosed leopard lizard (2) San Francisco garter snake (3) Santa Cruz long-toed salamander (4) Limestone salamander (5) Black toad This section is applicable, relevant and appropriate to the extent that these amphibians or reptiles and/or their habitat are located on or near the site.
Birds	Action must be taken to avoid the take or destruction of the nest or eggs of any bird	Fish and Game Code section 3503	This section prohibits the take, possession, or needless destruction of the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.
Birds of Prey	Action must be taken to prevent the take, possession, or destruction of any birds-of prey or their eggs	Fish and Game Code section 3503.5 (Added by Stats. 1985, c. 1334, section	This section prohibits the take, possession, or destruction of any birds in the orders of Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto. This section will be applicable and relevant to the extent that such species or their eggs are located on or near the site.

CALIFORNIA DEPARTMENT OF FISH AND GAME
LOCATION AND ACTION SPECIFIC ARARs AND TBCs
IR Site 30, Naval Station Treasure Island

LOCATION	STANDARD	SPECIFIC CITATION	ARAR/TBC EXPLANATION
		6)	
Nongame birds	Actions must be taken to prevent the take of nongame birds.	Fish and Game Code section 3800 (Added by Stats. 1971, c. 1470, p. 2906, section 13)	This section prohibits the take of nongame birds, except in accordance with regulations of the commission, or when related to mining operations with a mitigation plan approved by the department. This section further provides requirements concerning mitigation plans related to mining. This section is applicable and relevant to the extent that nongame birds or their eggs are located on or near the site and such species have not been included in the fish and wildlife conservation plan filed pursuant to the Federal Fish and Wildlife Conservation Act. Species included in the plan will be protected at the federal standard making this section an ARAR to the extent that it is more stringent than the federal standard of protection.
Fur-bearing mammals	Provides manners under which fur-bearing mammals may be taken	Fish and Game Code section 4000, et. Seq. (Stats. 1957, c. 456, p. 1380, section 4000)	This section provides that a fur-bearing mammal may be taken only with a trap, a firearm, bow and arrow, poison under a proper permit, or with the use of dogs.
Nongame mammals	Action must be taken to avoid the take or possession of nongame mammals	Fish and Game Code section 4150 (Added by Stats. 1971, c.	Nongame mammals are those occurring naturally in California which are not game mammals, fully protected mammals, or fur-bearing mammals. These mammals, or their parts, may not be taken or possessed except as provided in this code or in accordance with regulations adopted by the commission.

CALIFORNIA DEPARTMENT OF FISH AND GAME
LOCATION AND ACTION SPECIFIC ARARs AND TBCs
IR Site 30, Naval Station Treasure Island

LOCATION	STANDARD	SPECIFIC CITATION	ARAR/TBC EXPLANATION
		1470, p. 2907, section 21)	
White Shark	Action must be taken to avoid the take of any white shark	Fish and Game Code section5517 (Added by Stats. 1993, c. 1174 (A.B. 522), section 2)	It is unlawful to take any white shark (Carcharodon carcharias), except under permit issued pursuant to section 1002 for scientific or educational purposes.
Tidal Invertebrates	Action must be taken to avoid the take or possession of mollusks, crustaceans, or other invertebrates	Fish and Game Code section 8500(Added by Stats. 1972, c. 1248, p. 2436. Section 2, eff. Dec. 13, 1972)	It is unlawful to possess or take, unless otherwise expressly permitted in this chapter, mollusks, crustaceans, or other invertebrates, unless a valid tidal invertebrate permit has been issued. The taking, possessing, or landing of such invertebrates pursuant to this section shall be subject to regulations adopted by the commission.
White Shark	Action must be taken to prevent the take of any white shark.	Title 14 C.C.R. section 28.06	Regulation provides that white shark may not be taken, except under permit issued by the Department pursuant to section 1002 of the Fish and Game Code for scientific or educational purposes.

CALIFORNIA DEPARTMENT OF FISH AND GAME
LOCATION AND ACTION SPECIFIC ARARs AND TBCs
IR Site 30, Naval Station Treasure Island

LOCATION	STANDARD	SPECIFIC CITATION	ARAR/TBC EXPLANATION
		(effective 03/07/94)	
Protected Amphibians	Action must be taken to avoid the take or possession of protected amphibians.	Title 14 C.C.R. sections 40 (Section 40 designated effective 03/01/74)	This regulation makes it unlawful to capture, collect, intentionally kill or injure, possess, purchase, propagate, sell, transport, import, or export any native reptile or amphibian, or parts thereof unless under special permit from the department issued pursuant to Title 14 C.C.R. sections 650, 670.7, or 783 of these regulations, or as otherwise provided in the Fish and Game Code or these regulations.

ATTACHMENT A11
NAVY'S RESPONSE TO STATE "APPLICABLE" OR "RELEVANT AND APPROPRIATE" REQUIREMENTS FOR INSTALLATION RESTORATION SITE 30

15 pages

NAVY'S RESPONSE TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, CALIFORNIA DEPARTMENT OF HEALTH SERVICES, AND THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Location	Standard	Specific Citation	ARAR/TBC Explanation Provided by State	Navy ARAR Determination
California Department of Fish and Game				
Aquatic habitat/ Species	Action must be taken if toxic materials are placed where they can enter waters of the State. There can be no release that would have a deleterious effect on species or habitat.	Fish and Game Code § 5650 (a), (b) & (f)	This code section prohibits depositing or placing where it can pass into waters of the state any petroleum products (Section [§] 5650(a)(l)), factory refuse (§ 5650(a)(4)), sawdust, shaving, slabs or edgings (§ 5650(a)(3)), and any substance deleterious to fish, plant life or bird life (§ 5650(a)(6). These are substantive, promulgated environmental protection requirements. These requirements impose strict criminal liability on violators. (*People v. Chevron Chemical Company (1983) 143 Cal. App. 3d 50*). This imposition of strict criminal liability imposes a standard that is more stringent than federal law. The extent to which each subdivision of § 5650 is relevant and appropriate depends on the site characterization and the potential for contamination to be deposited near or within waters of the state.	The Navy does not expect to deposit any substance into the waters of the state as part of the remedial action for Site 30. The Navy has determined that this section is not a potential ARAR.
Wildlife Species	Action must be taken to prohibit the taking of birds and mammals, including the taking by poison.	Fish and Game Code § 3005 (Stats. 1957, c. 456, p. 1353 § 3005)	This code section prohibits the taking of birds and mammals, including, taking by poison. "Take" is defined by Fish and Game Code § 86 to include killing. "Poison" is not defined in the code. Although there is no state authority on this point, federal law recognizes that poison, such as Strychnine, may affect incidental taking. (Defenders of Wildlife v. Administrator, Environmental Protection Agency (1989) 882.F. 2d. 1295). This code section imposes a substantive, promulgated environmental protection requirement.	The terrestrial habitat of NAVSTA TI is of poor quality for wildlife species because the island is predominantly covered with urbanized areas. Because of the low-quality habitat of Site 30, no receptors of concern use the area. The Navy has determined that this section is not a potential ARAR.

NAVY'S RESPONSE TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, CALIFORNIA DEPARTMENT OF HEALTH SERVICES, AND THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Location	Standard	Specific Citation	ARAR/TBC Explanation Provided by State	Navy ARAR Determination
California Department of Fish and Game (Continued)				
Endangered Species	Action must be taken to conserve endangered species. There can be no releases and/or actions that would have a deleterious effect on species or habitat.	Fish and Game Code § 2080 (Added by Stats. 1984, c. 1240, § 2).	This section prohibits the taking, possession, purchase, or sell within the state, any species (including rare native plant species), or any product thereof that the commission determines to be an endangered or threatened species, or the attempt of any of these acts. This section is applicable to the extent that there are endangered or threatened species in the area which have the potential of being affected if actions are not taken to conserve the species. This section prohibits releases and/or actions that would have a deleterious effect on species or their habitat. This section and applicable Title 14 regulations should be considered as ARARs. Cal. Code Regs., tit. 14, § 670.2 provides a listing the plants of California declared to be endangered, threatened, or rare. Cal. Code Regs., tit. 14, § 670.5 provides a listing of Animals of California declared to be endangered or threatened. California Code of Regulations Title 14 section 783 et. seq., provides the implementation regulations for the California Endangered Species Act.	The terrestrial habitat of NAVSTA TI is of poor quality for wildlife species because the island is predominantly covered with urbanized areas. Because of the low-quality habitat of Site 30, no receptors of concern use the area. The Navy has determined that this section is not a potential ARAR.

NAVY'S RESPONSE TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, CALIFORNIA DEPARTMENT OF HEALTH SERVICES, AND THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Location	Standard	Specific Citation	ARAR/TBC Explanation Provided by State	Navy ARAR Determination
California Department of Fish and Game (Continued)				
Fully protected bird species/ habitat	Action must be taken to prevent the taking of fully protected birds.	Fish and Game Code § 3511 (Added by Stats. 1970, c. 1036, p. 1848 § 4)	This section provides that it is unlawful to take or possess any of the following fully protected birds: (a) American peregrine falcon (b) Brown Pelican (c) California black rail (d) California clapper rail (e) California condor (f) California least tern (g) Golden eagle (h) Greater sandhill crane (i) Light-footed clapper rail (j) Southern bald eagle (k) Trumpeter swan (l) White-tailed kite (m) Yuma clapper rail This should be considered Applicable and Relevant to the extent that such fully protected birds or their habitat are detected on or near the site. The Brown Pelican and California least tern are known to occur on or near this site.	The terrestrial habitat of NAVSTA TI is of poor quality for wildlife species because the island is predominantly covered with urbanized areas. Because of the low-quality habitat of Site 30, no receptors of concern use the area. The Navy has not observed the Brown Pelican or California least tern at Site 30. The Navy has determined that this section is not a potential ARAR.

NAVY'S RESPONSE TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, CALIFORNIA DEPARTMENT OF HEALTH SERVICES, AND THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Location	Standard	Specific Citation	ARAR/TBC Explanation Provided by State	Navy ARAR Determination
California Department of Fish and Game (Continued)				
Fully Protected Mammals	Actions must be taken to assure that no fully protected mammals are taken or possessed at any time.	Fish and Game Code § 4700 (Added by Stats. 1970, c. 1036, p. 1848 § 6)	This section prohibits the taking or possession of any of the fully protected mammals or their parts. The following are fully protected mammals: (a) Mono Bay kangaroo rat (b) Bighorn sheep, except Nelson bighorn sheep (c) Northern elephant seal (d) Guadalupe fur seal (e) Ring-tailed cat (f) Pacific right whale (6) Salt-marsh harvest mouse (h) Southern sea otter (i) Wolverine This section is applicable, relevant, and appropriate to the extent that such mammals and/or their habitat are located on or near the site.	The terrestrial habitat of NAVSTA TI is of poor quality for wildlife species because the island is predominantly covered with urbanized areas. Because of the low-quality habitat of Site 30, no receptors of concern use the area. The Navy has not observed any fully protected mammals at Site 30. The Navy has determined that this section is not a potential ARAR

NAVY'S RESPONSE TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, CALIFORNIA DEPARTMENT OF HEALTH SERVICES, AND THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Location	Standard	Specific Citation	ARAR/TBC Explanation Provided by State	Navy ARAR Determination
California Department of Fish and Game (Continued)				
Fully Protected Reptiles and Amphibians	Actions must be taken to prevent the taking or possession of any fully protected reptile or amphibian.	Fish Game Code § 5050 (Added by Stats. 1970, c. 1036, p. 1849 §7)	This section prohibits the taking or possession of fully protected reptiles and amphibians or parts thereof. The following are fully protected reptiles and amphibians: (1) Blunt-nosed leopard lizard (2) San Francisco garter snake (3) Santa Cruz long-toed salamander (4) Limestone salamander (5) Black toad This section is applicable, relevant, and appropriate to the extent that such amphibians or reptiles and/or their habitat are located on or near the site.	The terrestrial habitat of NAVSTA TI is of poor quality for wildlife species because the island is predominantly covered with urbanized areas. Because of the low-quality habitat of Site 30, no receptors of concern use the area. The Navy has not observed any fully protected reptiles or amphibians at Site 30. The Navy has determined that this section is not a potential ARAR
Birds	Actions must be taken to avoid the taking or destruction of the nest or eggs of any bird.	Fish Game Code § 3503	This section prohibits the taking, possession, or needless destruction of the nest or eggs of any bird, except otherwise provided by this code or any regulation made pursuant thereto.	The Navy has not observed any nests or eggs at Site 30. The Navy has determined that this section is not a potential ARAR.

NAVY'S RESPONSE TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, CALIFORNIA DEPARTMENT OF HEALTH SERVICES, AND THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Location	Standard	Specific Citation	ARAR/TBC Explanation Provided by State	Navy ARAR Determination
California Department of Fish and Game (Continued)				
Birds of Prey	Action must be taken to prevent the taking, possession, or destruction of any birds-of prey or their eggs.	Fish Game Code § 3503.5 (Added by Stats. 1985. c 1334. § 6)	This section prohibits the taking, possession, or destruction of any birds in the orders of Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird, except as otherwise provided by this code or any regulation adopted pursuant thereto. This section will be applicable and relevant to the extent that such species or their eggs are located on or near the site.	The terrestrial habitat of NAVSTA TI is of poor quality for wildlife species because the island is predominantly covered with urbanized areas. Because of the low-quality habitat of Site 30, no receptors of concern use the area. The Navy has not observed any birds in the orders of Falconiformes or Strigiformes at Site 30. The Navy has determined that this section is not a potential ARAR.

NAVY'S RESPONSE TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, CALIFORNIA DEPARTMENT OF HEALTH SERVICES, AND THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Location	Standard	Specific Citation	ARAR/TBC Explanation Provided by State	Navy ARAR Determination
California Department of Fish and Game (Continued)				
Non-game Birds	Action must be taken to prevent the taking of non-game birds.	Fish Game Code § 3800 (Added by Stats. 1971. c 1470, p 2906, § 13)	This section prohibits the taking of non-game birds, except in accordance with regulations of the commission, or when related to mining operations with a mitigation plan approved by the department. This section further provides requirements concerning mitigation plans related to mining. This section is applicable and relevant to the extent that non-game birds or their eggs are located on or near the site and such species have not been included in the fish and wildlife conservation plan filed pursuant to the Federal Fish and Wildlife Conservation Act. Species included in the plan will be protected at the federal standard making this section an ARAR to the extent that it is more stringent than the federal standard of protection.	The terrestrial habitat of NAVSTA TI is of poor quality for wildlife species because the island is predominantly covered with urbanized areas. Because of the low-quality habitat of Site 30, no receptors of concern use the area. Navy does not expect to take or impact any non-game birds as part of the remedial action. The Navy has determined that this section is not a potential ARAR.

NAVY'S RESPONSE TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, CALIFORNIA DEPARTMENT OF HEALTH SERVICES, AND THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Location	Standard	Specific Citation	ARAR/TBC Explanation Provided by State	Navy ARAR Determination
California Department of Fish and Game (Continued)				
Fur-Bearing Mammals	Provides manners under which fur-bearing mammals may be taken.	Fish Game Code § 4000 (Added by Stats. 1957. c. 456, p 1380, § 4000)	This section provides that a fur-bearing mammal may be taken only with a trap, a firearm, bow and arrow, poison under a proper permit, or with the use of dogs.	The terrestrial habitat of NAVSTA TI is of poor quality for wildlife species because the island is predominantly covered with urbanized areas. Because of the low-quality habitat of Site 30, no receptors of concern use the area. Navy does not expect to take or impact any fur-bearing mammals as part of the remedial action. The Navy has determined that this section is not a potential ARAR

NAVY'S RESPONSE TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, CALIFORNIA DEPARTMENT OF HEALTH SERVICES, AND THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Location	Standard	Specific Citation	ARAR/TBC Explanation Provided by State	Navy ARAR Determination
California Department of Fish and Game (Continued)				
Non-Game Mammals	Action must be taken to avoid the taking or possession of non-game mammals.	Fish Game Code § 4150 (Added by Stats. 1971 c. 1470, p 2907, § 21)	Non-game mammals are those occurring naturally in California which are not game mammals, fully protected mammals, or fur-bearing mammals. These mammals, or their parts, may not be taken or possessed, except as provided in this code or in accordance with regulations adopted by the commission.	The terrestrial habitat of NAVSTA TI is of poor quality for wildlife species because the island is predominantly covered with urbanized areas. Because of the low-quality habitat of Site 30, no receptors of concern use the area. Navy does not expect to take or impact any non-game mammals as part of the remedial action. The Navy has determined that this section is not a potential ARAR
White Shark	Action must be taken to avoid the taking of any white shark.	Fish Game Code § 5517 (Added by Stats. 1993. c 1174 (A.B. 522), § 2)	It is unlawful to take any white shark (Carcharodon carcharias), except under permit issued pursuant to § 1002 for scientific or educational purposes.	Site 30 is inland; there are no white sharks in the vicinity of Site 30. The Navy has determined that this section is not a potential ARAR.

NAVY'S RESPONSE TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, CALIFORNIA DEPARTMENT OF HEALTH SERVICES, AND THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Location	Standard	Specific Citation	ARAR/TBC Explanation Provided by State	Navy ARAR Determination
California Department of Fish and Game (Continued)				
Tidal Invertebrates	Action must be taken to avoid the taking or possession of mollusk, crustaceans, or other invertebrates.	Fish Game Code § 8500 (Added by Stats. 1972. c 1248, p. 2436, § 2, effective 12/13/72)	It is unlawful to possess or take, unless otherwise expressly permitted in this chapter, mollusks, crustaceans, or other invertebrates, unless a valid tidal invertebrate permit has been issued. The taking, possessing, or landing of such invertebrates pursuant to this section shall be subject to regulations adopted by the commission.	Site 30 is inland there are no mollusks, crustaceans, or other invertebrates in the vicinity of Site 30. The Navy has determined that this section is not a potential ARAR.
White Shark	Action must be taken to prevent the taking of any white shark.	Cal. Code Regs., tit. 14, § 28.06 (effective 03/07/94)	Regulation provides that white shark may not be taken, except under permit issued by the Department pursuant to § 1002 of the Fish and Game Code for scientific or educational purposes.	Site 30 is inland; there are no white sharks in the vicinity of Site 30. The Navy has determined that this section is not a potential ARAR.
Protected Amphibians	Action must be taken to avoid the taking or possession of protected amphibians.	Cal. Code Regs., tit. 14, § 40 (§ 40 designated effective 03/01/74)	This regulation makes it unlawful to capture, collect, intentionally kill or injure, possess, purchase, propagate, sell, transport, import, or export any native reptile or amphibian, or parts thereof unless special permit from the department issued pursuant to Cal. Code Regs., tit. 14, § 650, 670.7, or 783 of these regulations, or as otherwise provided in the Fish and Game Code or these regulations.	The terrestrial habitat of NAVSTA TI is of poor quality for wildlife species because the island is predominantly covered with urbanized areas. Because of the low-quality habitat of Site 30, no receptors of concern use the area. The Navy has determined that this section is not a potential ARAR.

NAVY'S RESPONSE TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, CALIFORNIA DEPARTMENT OF HEALTH SERVICES, AND THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (CONTINUED)

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Standard	Specific Citation	ARAR/TBC Explanation
California Department of Health Services		
Radioactive materials	Title 10, Code of Federal Regulations, § 20.1001-2402 and Appendices A through F, as incorporated by reference to Cal. Code Regs., tit. 17, § 30253. A significant change in the regulations, as adopted by California, is that the federal term "licensee" is replaced by "user" as defined Cal. Code Regs., tit. 17, § 30100.	No radiological contamination exists on Site 30. The Navy has determined that this section is not a potential ARAR.
Radioactive materials	Title 10, Code of Federal Regulations, § 20.1402 through 20.1404, Radiological Criteria for License Termination, Final Rule.	No radiological contamination exists on Site 30. The Navy has determined that this section is not a potential ARAR.
Radioactive materials	Relevant guidance documents published by the Nuclear Regulatory Commission (NRC) (e.g., NUREG/CR - 5849).	No radiological contamination exists on Site 30. The Navy has determined that these guidance documents are not potential ARARs.

NAVY'S RESPONSE TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, CALIFORNIA DEPARTMENT OF HEALTH SERVICES, AND THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Standard	Specific Citation	ARAR/TBC Explanation	Navy ARAR Determination
Department of Toxic Substances Control			
Determination of a Hazardous Waste	Cal. Code Regs., tit. 22, Division 4.5, Chapter 11.	Hazardous Waste Determination requirements are applicable for alternatives that will generate waste. The above identified sections include requirements for determining whether excavated material or extracted groundwater or other generated waste are either RCRA or non-RCRA hazardous waste (i.e., California only waste).	The Navy has evaluated the requirements identified and has included the substantive provisions of the following requirements as potential federal ARARs: Cal. Code Regs., tit. 22, §§ 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100. The Navy has identified the substantive provisions of the following requirements as potential state ARARs: Cal. Code Regs., tit. 22, §§ 66261.22(a)(3) and (4), § 66261.24(a)(2)–(a)(8), § 66261.101, § 66261.3(a)(2)(C) or § 66261.3(a)(2)(F)
Land Disposal Restrictions	Cal. Code Regs., tit. 22, Chapter 18.	Land disposal restrictions prohibit disposal of hazardous waste unless treatment standards are met and are applicable for alternatives that will generate waste subject to land disposal restrictions.	The Navy has evaluated the requirements identified and has included the substantive provisions of the following requirement as potential ARARs: Cal. Code Regs., tit. 22 § 66268.1(f)
Hazardous Waste Generator Requirements	Cal. Code Regs., tit. 22, Chapter 12 and Chapters 15 and 18 as referenced in Chapter 12.	On-site hazardous waste accumulation requirements are applicable if hazardous waste is generated and accumulated on site before transport.	The Navy has evaluated the requirements identified and has included the substantive provisions of the following requirement as potential ARARs: Cal. Code Regs., tit. 22, §§ 66262.10(a), 66262.11

NAVY'S RESPONSE TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, CALIFORNIA DEPARTMENT OF HEALTH SERVICES, AND THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Standard	Specific Citation	ARAR/TBC Explanation	Navy ARAR Determination
Department of Toxic Substances Control (Continued)			
Drinking Water Primary Standards	Cal. Code Regs., tit. 22, Div. 4, Ch. 15, Article 4, § 64431 et seq., and Article 5.5, § 64444 et seq.	These requirements are considered relevant and appropriate where the aquifer is a potential drinking water source and the State MCLs are more stringent than Federal MCLs (Even though Treasure Island groundwater has been de-designated as a potential drinking water source, concentrations of contaminant at Site 30 should be compared to the State MCLs as a basis for the establishment of institutional controls to prohibit the use of groundwater).	Because groundwater is not a medium of concern at Site 30, MCLs are not potential ARARs.
Remediation Waste Staging and On-Site Storage	California Health and Safety Code, Chapter 6.5, Article 2, § 25123.3	This section provides definitions and requirements for on-site storage of non-RCRA hazardous waste soil prior to on-site treatment or off-site transportation and is applicable if non-RCRA hazardous waste soil is accumulated and stored on-site.	It is the Navy's position that this section is not an ARAR if 40 CFR § 264.554 is identified as an ARAR because it is more stringent. The Navy identified the substantive provisions of 40 CFR § 264.554(d)(1)(i-ii) and (d)(2), (e),(f),(h),(i),(j), and (k) as potential ARARs.
Transportation of Hazardous Waste	Cal. Code Regs., tit. 22, Chapter 13, §§ 66263.10 -.18	This regulation is applicable as these requirements must be fully complied with when transporting hazardous waste off-site. The following regulation is relevant and appropriate for remedial technology alternatives that involve the consolidation of waste and the installation of a protected cap. These regulations are relevant and appropriate because Site 30 is known to contain hazardous waste.	The Navy reviewed these sections and has determined that they are not potential ARARs, as they apply to off-site activities. These regulations do not apply to on-site transportation of hazardous waste. Cal. Code Regs., tit. 22, § 66263.10(b).

NAVY'S RESPONSE TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, CALIFORNIA DEPARTMENT OF HEALTH SERVICES, AND THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Standard	Specific Citation	ARAR/TBC Explanation	Navy ARAR Determination
Department of Toxic Substances Control (Continued)			
Construction of Landfill Cover Systems	Cal. Code Regs., tit. 22, Chapter 14, Article 14, Landfills, § 66264.303, Monitoring and Inspection	This section describes the requirements for inspections during construction or installation of cover systems. These systems shall be inspected for uniformity, damage, and imperfections.	The Navy reviewed this section and determined that it is not a potential ARAR because no cover is considered as part of any remedial alternative in the FS.
Landfill Closure and Post-Closure Care	Cal. Code Regs., 22. Chapter 14, Article 14, Landfills, § 66264.310.	This section describes the design and construction requirements for landfill cover as well as post-closure requirements. Also, describes requirements for gas recovery.	The Navy reviewed this section and determined that it is not a potential ARAR because no cover or gas recovery is considered as part of any remedial alternative in the FS.
Covenants to Restrict Use of Property - Environmental Restriction	California Civil Code § 1471	This section allows an owner of land to make a covenant to restrict use of land for the benefit of a covenantee. The covenant runs with the land to bind successive owners, and the restrictions must be reasonably necessary to protect present or future human health or safety or the environment as a result of the presence on the land of hazardous materials, as defined in section 25260 of the California Health and Safety Code. Requires recording of the covenant in the county where the land is located.	The Navy identified the substantive provisions of Civil Code § 1471 as a potential ARAR.
Land use control	California Health & Safety Code § 25202.5	This section allows DTSC to enter into an agreement with the owners of a hazardous waste facility to restrict present and future land uses.	The Navy identified the substantive provisions of California Health and Safety Code § 25202.5 as a potential ARAR.

NAVY'S RESPONSE TO ARARS IDENTIFIED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, CALIFORNIA DEPARTMENT OF HEALTH SERVICES, AND THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (CONTINUED)

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

Standard	Specific Citation	ARAR/TBC Explanation	Navy ARAR Determination
Department of Toxic Substances Control (Continued)			
Land use control	California Health & Safety Code §§ 25221.1 and 25355.5(a)(1)(C)	This section allows DTSC to enter into voluntary agreements with land owners to restrict the use of property. The agreements run with the land restricting present and future uses of the land.	The Navy identified the substantive provisions of California Health & Safety Code §§ 25221.1 and 25355.5(a)(1)(C) as a potential ARARs.
Land use control	California Health & Safety Code §§ 25233(c) and 25234	This section provides the process and criteria for obtaining written variances from land use restrictions, and for termination of land use restrictions.	The Navy identified the substantive provisions of California Health & Safety Code §§ 25233(c) and 25234 as a potential ARARs.
Land use control	Cal. Code Regs., tit. 22, Division 4.5. Chapter 39, § 67391.1	This section defines requirements for establishing land use covenants for imposing limitations on land use when hazardous materials, hazardous waste or constituents, or hazardous substances will remain at the property at levels which are not suitable for unrestricted use of the land.	The Navy identified the substantive provisions of Cal. Code Regs., tit. 22, § 67391.1(a) and (e)(1) as potential ARARs.

Notes:

§	Section	IR	Installation restoration
A.B.	Assembly Bill	MCL	Maximum contaminant level
ARAR	Applicable or relevant and appropriate requirement	NAVSTA	Naval Station
c.	Chapter	Navy	U.S. Department of the Navy
Cal. App.	California Appellate Court	NRC	Nuclear Regulatory Commission
Cal. Code Regs.	California Code of Regulations	NUREG/CR	Nuclear Regulatory Commission publication
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
Ch.	Chapter	Stats.	Statutes
Div.	Division	TBC	To be considered
DTSC	California Department of Toxic Substances Control	TI	Treasure Island
et seq.	And the following	tit.	Title
FS	Feasibility study		

APPENDIX B
REMEDIAL ALTERNATIVE COST SUMMARY AND ASSUMPTIONS

CONTENTS

TABLES

ACRONYMS AND ABBREVIATIONS

cy	Cubic yard
Earth Tech	Earth Tech, Inc.
EPA	U.S. Environmental Protection Agency
FS	Feasibility study
IC	Institutional control
LUC	Land use control
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
O&M	Operation and maintenance
OMB	Office of Management and Budget
RACER™	Remedial Action Cost Engineering and Requirements™
RAWP	Remedial Action Work Plan
Site 30	Installation Restoration Site 30
sf	Square feet

B1.0 INTRODUCTION

This appendix describes each remedial alternative and the associated assumptions used to develop the cost estimate for Installation Restoration Site 30 (Site 30) at Treasure Island in San Francisco, California.

This remaining sections of this appendix are organized as follows:

- Section B2.0 describes the purpose of the estimates.
- Section B3.0 presents the types of cost-estimating methods used.
- Section B4.0 summarizes the cost estimate methodology.
- Section B5.0 describes the components of each alternative's cost estimate.
- Section B6.0 provides assumptions used for each individual cost estimate.
- Section B7.0 lists the references used in preparing the cost estimates.

Cost estimate tables are included at the end of this appendix following Section B7.0.

B2.0 PURPOSE OF ESTIMATES

Cost estimates are developed as part of the Feasibility Study (FS), primarily to compare remedial alternatives during the remedy selection process, and not to establish project budgets or to negotiate Superfund enforcement settlements. The cost estimate typically is carried over from the FS to the Proposed Plan for public comment during remedy selection. The cost estimate in the Record of Decision reflects any changes to the remedial alternative that occur during the remedy selection process as a result of new information or public comment (U.S. Environmental Protection Agency [EPA] 2000).

Cost estimates developed during the detailed analysis phase are used to compare alternatives and to support remedy selection. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) includes the following language in its description of the cost criteria for the detailed analysis and remedy selection.

> "The types of costs that shall be assessed include the following: (1) Capital costs, including both direct and indirect costs; (2) Annual operations and maintenance costs; and (3) Net present value of capital and O&M [operations and maintenance] costs (Title 40 *Code of Federal Regulations* 300.430 [e][9][iii][G])." (EPA 2000)

B3.0 TYPES OF COST ESTIMATING METHODS

The cost estimates presented in this appendix were developed using both detailed and parametric approaches; both are accepted by EPA, as described as follows.

The detailed approach estimates cost on an item-by-item basis. Detailed methods typically rely on compiled sources of unit cost data for each item, taken from either a built-in database (if part of a software package, for example) or from other sources (for example, cost estimating references). This method, also known as "bottom up" estimating, is used when design information is available.

The parametric approach relies on relationships between cost and design parameters. These relationships are usually statistically or model-based. Statistically based approaches rely on scaled-up or scaled-down versions of projects where historical cost data are available. Model-based approaches use a generic design linked to a cost database and adjusted for site-specific information. This method, also known as "top down" estimating, is used when design information is not available (EPA 2000).

B4.0 METHODOLOGY

Cost estimates for this FS report were prepared in accordance with "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study" (EPA 2000). The Remedial Action Cost Engineering and Requirements™ (RACER™) System 2006 was the primary source of cost data (Earth Tech, Inc. [Earth Tech] 2006). Costs for unique line items that are not included in RACER™ were based on vendor quotes. Excel spreadsheets were used to tabulate costs and calculate net present values in 2006 dollars; RACER™ outputs are presented in 2006 dollars.

B4.1 DESCRIPTION OF REMEDIAL ACTION COST ENGINEERING AND REQUIREMENTS™

RACER™ is a computer modeling tool that estimates costs for all phases of remediation (Earth Tech 2006). RACER™ can be used to evaluate costs for interim studies and measures, remedial design and corrective measures design, remedial action and corrective action, O&M, long-term monitoring, and site closeout. The system was originally developed in 1991 under U.S. Department of the Air Force funding. Numerous revisions and updates have been incorporated through several releases since RACER™ was introduced.

RACER™ is a parametric cost modeling system that uses a patented methodology for estimating costs. The RACER™ cost database is a duplicate of the Environmental Cost Handling Options and Solutions, which was published by the R.S. Means Company (R.S. Means Company, Inc. 2005). RACER™ cost estimates are based on generic engineering solutions for environmental projects, technologies, and processes. Historical project information, industry data, government laboratories, construction management agencies, vendors, contractors, and engineering analysis were used to develop generic solutions to engineering problems. Cost estimates in RACER™ are tailored specifically to each project by adding site-specific parameters to reflect project-

specific conditions and requirements. The tailored design is then translated into specific quantities of work, and the quantities of work are priced using current data.

B4.2 USER-DEFINED COSTS

It was not always possible to develop cost estimates using RACER™ because of the unique characteristics for some elements of the remedial alternatives. In these cases, the costs of the elements were estimated using vendor quotes, evaluated, and then adjusted as necessary to account for inflation.

B5.0 COMPONENTS OF COST ESTIMATE

Cost estimates for the remedial alternatives include capital costs, annual O&M, or periodic costs, present value costs, contingency allowances, and escalation costs. Each of these factors is discussed in further detail in the following sections.

B5.1 CAPITAL COSTS

Capital costs include direct and indirect costs. Costs incurred for equipment, material, labor, construction, development, and implementation of remedial technologies are included as direct costs. Indirect costs include health and safety, site supervision, engineering, overhead and profit, and startup. Indirect costs are included in the estimate as either a separate line item or as a percentage of the direct capital cost.

B5.2 ANNUAL O&M OR PERIODIC COSTS

Annual O&M costs are incurred after construction. These costs are necessary to assure the effectiveness of a remedial alternative. For active components of remediation systems, annual O&M costs typically include power, operating labor, consumable materials, purchased services (for example, laboratory analysis), equipment replacement, maintenance, sampling, permit fees, annual reports, and site reviews. For remedial approaches involving land use controls (LUC), O&M costs include inspections and the preparation of reports documenting inspections to verify that the LUC components, including engineering controls and institutional controls (IC), are functioning as intended.

Periodic costs occur once every few years or once during the entire period of O&M. Examples include 5-year reviews, equipment replacement, site closeout, and remedy failure and replacement.

The capital costs primarily involve preparation and implementation of the Remedial Action Work Plan (RAWP). The O&M costs involve periodic inspections, annual reporting, and 5-year reviews pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The cost estimate includes the cost for regulatory enforcement of the IC components. A 25 percent markup factor is included to account for the Navy's contractor oversight costs.

B5.3 PRESENT VALUE ANALYSIS

Remedial action projects typically involve construction costs that are expended at the beginning of a project (capital costs) and costs in subsequent years (O&M or periodic costs). Present value analysis is a method to evaluate expenditures that occur over various periods. This standard methodology allows for cost comparisons of different remedial alternatives on the basis of a single cost figure for each alternative. This single value, referred to as the present value, is the amount that must be set aside at the initial point in time (base year) to assure that funds would be available in the future as they are needed. Present value analysis uses a discount rate and period of analysis to calculate the present value of each expenditure. Both factors are discussed in the subsections as follows.

B5.3.1 Discount Rate

A discount rate is similar to an interest rate and is used to account for the time value of money. A dollar is worth more today than in the future because the dollar would earn interest, if invested in an alternate use today. If the capital were not employed in a specific use, it would have a productivity value in alternate uses. The choice of a discount rate is important because the selected rate directly alters the present value of a cost estimate, which is then used in selecting a remedy.

EPA policy on the use of discount rates for remedial investigation and FS cost analysis is set forth in the preamble to the NCP (55 Federal Register 8722). As recommended in EPA's "A Guide to Developing and Documenting Cost Estimates During Feasibility Studies" (EPA 2000), real discount rates published in economic analysis by the federal government on August 11, 2005 in the Office of Management and Budget (OMB) Circular A-94 (OMB 2006), have been used in the cost estimates. The current discount rate for a 30-year stream of payments is 3.0 percent.

B5.3.2 Present Value

The present value of a series of equal annual future payments, such as for annual O&M, is calculated using the equation presented as follows:

$$PV = \sum_{t=1}^{N} \frac{x_t}{(1+i)t}$$

where

PV	=	Present value
x_t	=	Payment in year t (t = 0 for present or base year)
i	=	Discount factor
t	=	Number of years after construction that expenditures start
N	=	Number of years that the stream of equal annual future payments will run

The present value of a single periodic future payment is calculated using the following equation:

$$PV = \frac{x_t}{(1+i)^t}$$

where

PV	=	Present value
x_t	=	Payment in year t (t = 0 for present or base year)
i	=	Discount factor
t	=	Number of years after construction that expenditures occur

The present value of a remedial alternative represents the sum of the present values of all future payments associated with the project. The present value for this cost estimate was calculated using 2006 dollars. (See Section B5.5, Escalation Costs, for adjustment of capital costs.)

B5.4 CONTINGENCY ALLOWANCES

Contingency is factored into a cost estimate to cover unknowns, unforeseen circumstances, or unanticipated conditions that are not possible to evaluate based on the data at hand when the estimate is prepared. The two main types of contingencies are scope and bid. Scope contingency covers unknown costs that would result from changes in scope that may occur during the design. Bid contingency covers unknown costs associated with constructing or implementing a project scope. Exhibit 5-6 of EPA's "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study" lists some expected ranges in contingency fees for certain remedial technologies (EPA 2000). Contingency is calculated as a percentage (15%) of total capital costs and O & M for Alternatives 2. Alternative 3 includes contingency as a percentage (15%) on total capital costs.

B5.5 ESCALATION COSTS

Some RACER™ output costs are expressed in 2006 dollars (Earth Tech 2006), and some vendor costs are expressed in 2006 dollars. Escalation costs reflect the increase in project costs over time as a result of inflation. Escalation costs were not required for this cost estimate because all capital costs are assumed to occur in 2006.

B6.0 INDIVIDUAL COST ESTIMATE ASSUMPTIONS

This section identifies the assumptions and parameters used in developing cost estimates for remediation of soil at Site 30. Table B-1 presents the cost summary for all remedial alternatives for soil at Site 30. Table B-1A presents a cost summary of remedial costs associated with Alternative 2, Engineering Controls Combined with ICs. Table B-1B presents a summary of costs associated with Alternative 3, Building Demolition, Excavation, and Off-Site Disposal at a Permitted Landfill.

B6.1 ALTERNATIVE 2, ENGINEERING CONTROLS COMBINED WITH INSTITUTIONAL CONTROLS

The major components of remediation under Alternative 2 are (1) continued use of the existing building on the site as a daycare center, (2) continued use of the building foundation pad as an effective exposure prevention barrier, and (3) ICs.

The following assumptions were incorporated into Alternative 2:

General

- There is soil containing unknown concentrations of dioxin toxicity equivalents (TEQ) beneath Building 502.
- The cost estimate covers costs over a 30-year period.

Engineering Controls

- The building foundation slab will not require additional maintenance to continue to function as an exposure prevention barrier.

Institutional Controls and Comprehensive Environmental Response, Compensation, and Liability Act Reviews

- ICs would include a RAWP, environmental restrictions in deed, annual inspections, 5-year reviews. Regulatory review of the RAWP and Site Closeout Report capital costs include 20 hours of regulatory involvement. ICs would be in place indefinitely.
- Five-year reviews will be required. Five-year reviews will consist of document review, a site visit separate from the annual site visit, interviews, and a report per EPA guidelines (EPA 2001). Costs also include 50 hours of regulatory review of the 5–year review reports.
- Annual site visits will be performed to ensure the site use has not changed and the integrity of the building foundation slab has not been compromised. Annual inspections will include a site visit (4 hours) and a letter report. O & M costs associated with implementation of ICs include 10 hours annually for site regulatory enforcement.

B6.2 ALTERNATIVE 3: BUILDING DEMOLITION, EXCAVATION, AND OFF-SITE DISPOSAL

The major components of Alternative 3 are (1) demolition of the existing building to allow for characterization and the excavation of soils beneath Building 502, (2) excavation of soils to a depth of 6 feet, and (3) transportation and disposal of contaminated soil in a permitted off-site

landfill. The costs for providing an alternate daycare center or for reconstructing the daycare center are not included in the cost estimate.

The assumptions listed as follows were made for Alternative 3 at Site 30.

General

- Safety level D personal protective equipment will be required for all activities. This level of protection is adequate for the low levels of dioxin encountered historically at the site.

Building Demolition

- Additional perimeter construction fence will be installed to serve as a boundary for the excavation area (approximately 500 feet in length) at Site 30.
- The building area is 10,800 square feet (sf), constructed of concrete, and is a single story in height.
- Story height is 12 feet.
- The building does not contain lead-based paint or asbestos requiring abatement.
- Load and haul of demolition materials is assumed to be by highway truck and disposed of as nonhazardous waste at $19.31 per cubic yard (cy).
- Distance to nonhazardous Class III landfill is 50 miles or less (one-way) (Altamont Landfill & Resource Recovery Facility).
- Total demolition debris volume is 3,120 cy and assumes a 35 percent reduction in building volume to account for living space and debris fluffing.

Underground Pipe and Pavement Demolition

- Pipe material is concrete.
- A total of 400 feet of underground piping exists.
- Pipe demolition debris is 472 cy, which includes overburden soil and a 25 percent bulking factor.
- The existing daycare center building slab is 10.25 inches thick (per drawings), has an area of 10,800 sf, and constructed of reinforced concrete. The demolition of the slab will require the removal of some pavement adjacent to the slab.
- The existing cover in the excavation area, excluding the building and concrete pad, is asphalt.

- Approximately 427 cy of demolition debris will be produced from demolition of the existing daycare center building slab, which includes a 25 percent bulking factor.

- Approximately 100 cy asphalt and concrete will be generated by demolition of exterior concrete cap and asphalt cover immediately adjacent to the building.

- The cost will be $19.31 per cy disposal/recycling fee for the demolished existing daycare center building slab, pipe, concrete and asphalt waste (nonhazardous).

- The length of travel will be 50 miles or less (one-way) to a nonhazardous recycling facility (Altamont Landfill & Resource Recovery Facility).

Characterization Sampling and Analysis

- Characterization sampling will take 3 days to perform.

- Differential global positioning system unit will be required.

- Characterization samples will be analyzed for dioxins and metals.

- Characterization samples to be analyzed on a 5 to 7 day turnaround time.

- Characterization sampling will be performed to adequately characterize and profile excavated material sent off site for disposal.

- Fifty-one samples will be collected for characterization analysis and analyzed for dioxins and metals including blanks and duplicates.

Excavation and Disposal of Contaminated Soils

- Excavation will take 3 weeks to complete.

- The excavation area is approximately 12,000 sf, which includes the area of the building (10,800 sf) and the area of the exterior concrete pad (1,200 sf).

- The excavation depth is 6 feet below ground surface.

- Soil type is sand-silt/sand-clay mixture.

- The off-site disposal volume will be approximately 3,333 cy, which includes a bulking factor of 25 percent.

- No drum removal is required.

- Ground penetrating radar is not necessary.

- All excavated waste will be considered Resource Conservation and Recovery Act-hazardous waste and will be disposed of at $115.86 per cy.

- One-way haul distance for excavated hazardous waste is 200 miles or less (Kettleman Hills, California).

Confirmation Sampling and Analysis

- Confirmation sampling will be conducted to demonstrate the removal of contamination.

- Confirmation samples will be collected as the excavation progresses.

- Turnaround time for confirmation samples is 5 to 7 days.

- Confirmation sampling area will be 12,000 sf and be sampled at the rate of one sample per 325 sf.

- Duplicate and rinsate samples will be required at the rate of 10 percent of the total confirmation samples collected.

Site Restoration

- An estimated 2,572 cy of imported, unclassified fill to be compacted in 6-inch lifts.

- An estimated 485 cy of imported gravel will be required for areas of backfill with groundwater infiltration.

- An estimated 278 cy of topsoil will be imported and spread across excavation area of 12,000 sf.

- Vegetative cover will be necessary.

Professional Labor Management

- Professional labor percentages were calculated by RACER based on the total cost of the project.

- Project management is approximately 2.5 percent of the total direct remedial action construction cost (total cost).

- Construction oversight is approximately 2.75 percent of the total cost.

- Reporting is approximately 0.35 percent of the total cost.

- As-built drawings are approximately 0.35 percent of the total cost.

- Public notice is approximately 0.08 percent of the total cost.
- Field work duration is assumed to be 8 weeks.
- Project duration is assumed to be 1 year, and will include a work plan, field work, data validation, and closure report.

B7.0 REFERENCES

Earth Tech, Inc. 2006. Remedial Action Cost Engineering and Requirements, Parametric Cost Estimating Software for Environmental Cleanup Projects." RACER™ Version 8.1.

Office of Management and Budget (OMB). 2006. OMB Circular No A-94, Appendix C, Discount Rates for Cost-Effectiveness, Lease Purchase, and Related Analyses." Revised January 2006. Available online at: http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html. Accessed February 2006.

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U.S. Environmental Protection Agency (EPA). 2000. "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study." EPA/540/R-00/002.

EPA. 2001. "Comprehensive Five-Year Review Guidance." EPA 540-R-01-007. June.

TABLES

TABLE B-1: TOTAL REMEDIAL COST SUMMARY FOR ALTERNATIVES 1, 2, AND 3 AT SITE 30

Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

TOTAL REMEDIAL COST SUMMARY FOR SOIL AT SITE 30

Site:	30	**Base Year:**	2006
Location:	NAVSTA TI	**Date:**	November 7, 2006
Phase:	Feasibility Study		

	Alternative 1	Alternative 2	Alternative 3
Description	**No Action**	**Engineering Controls Combined with Institutional Controls**	**Building Demolition, Excavation, and Off-Site Waste Disposal**
Total Project Duration (Years)	0	30	1
Capital Cost	$0	$322,000	$2,086,000
Annual O&M (Institutional Controls)	$0	$174,000	$0
Periodic Cost - 5-year Reviews	$0	$286,000	$0
Total Cost in 2006 Dollars	**$0**	**$782,000**	**$2,086,000**

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

Note:

NAVSTA	Naval Station
O&M	Operation and maintenance
TI	Treasure Island

TABLE B-1A: SITE 30 ALTERNATIVE 2: ENGINEERING CONTROLS COMBINED WITH INSTITUTIONAL CONTROLS
Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

COST ESTIMATE SUMMARY

Site: 30
Location: Treasure Island, California
Phase: Feasibility Study
Base Year: 2006
Date: November 7, 2006

Description: To be protective of the site occupants under current use, this alternative includes engineering controls to maintain building foundation slab. Thirty years of ICs will begin when LUC RD is completed. Capital costs occur in year 0.

CAPITAL COSTS: ENGINEERING CONTROLS COMBINED WITH INSTITUTIONAL CONTROLS

DESCRIPTION	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
Work Plans and Reports						
Senior Project Manager	30	HR	0	175		$5,250
Program Manager	120	HR	0	191		$22,861
Senior Staff Engineer	400	HR	0	105		$42,000
Staff Scientist	160	HR	0	75		$12,000
Word Processing/Clerical	100	HR	0	55		$5,500
Draftsman/CADD	40	HR	0	108		$4,301
Regulatory Review	20	HR	0	185		$3,695
SUBTOTAL						**$95,607**
Administrative Land Use Controls - Implementation						
Overnight Delivery, 8-ounce letter	22	EA	19	0	0	$418
Program Manager	92	HR	0	191	0	$17,527
Project Engineer	180	HR	0	185	0	$33,253
Staff Engineer	225	HR	0	162	0	$36,376
QA Officer	52	HR	0	156	0	$8,103
Word Processing/Clerical	154	HR	0	82	0	$12,668
Draftsman/CADD	368	HR	0	108	0	$39,571
Computer Data Entry	150	HR	0	74	0	$11,085
Attorney, Partner, Real Estate	30	HR	0	200	0	$6,000
Attorney, Associate, Real Estate	5	HR	0	150	0	$750
Paralegal, Real Estate	36	HR	0	100	0	$3,600
Other Direct Costs	1	LS	1719	0	0	$1,719
Surveying - 2-man crew	6	DAY	0	1643	345	$11,929
Portable GPS Set with Mapping, 5 centimeters Accuracy	1	MO	994	0	0	$994 $0
Local Fees	2	LS	250	0	0	$500
SUBTOTAL						$184,492
SUBTOTAL CAPITAL COSTS IN 2006 DOLLARS						$280,100
Contingency		15%				$42,015
TOTAL CAPITAL COST IN 2006 DOLLARS						$322,115

OPERATIONS AND MAINTENANCE COSTS:

Institutional Controls						
Annual Inspections Years 1-30						
Overnight Delivery, 8-ounce letter	2	EA	19			$37
Program Manager	2	HR		191		$381
Project Engineer	4	HR		185		$739
Staff Engineer	16	HR		162		$2,587
Other Direct Costs	1	LS	1267			$1,267
SUBTOTAL						$5,011
Contingency	15%					$752
Navy Oversight	25%					$1,253
Regulatory Involvement	10	HR		185		$1,847
SUBTOTAL	*Subtotal per event.*					$8,862

TABLE B-1A: SITE 30 ALTERNATIVE 2: ENGINEERING CONTROLS COMBINED WITH INSTITUTIONAL CONTROLS (CONTINUED)
Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

PERIODIC COSTS

DESCRIPTION			Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
5-Year Reviews								
Five-Year Reviews	Year	5, 10, 15, 20, 25, and 30	6					
Program Manager			40	HR	-	191	-	$7,620
Project Engineer			120	HR	-	185	-	$22,169
Staff Engineer			60	HR	-	162	-	$9,700
Draftsman/CADD			40	HR	-	108	-	$4,301
Word Processing/Clerical			60	HR	-	81	-	$4,889
SUBTOTAL								$48,680
Contingency			15%	0		0		$7,302
Navy Oversight			25%	0		0		$12,170
Regulatory Involvement			50		-	185	-	$9,236
SUBTOTAL								$77,388

PRESENT VALUE ANALYSES:

Cost Type		Year	Total Cost	Total Cost per Year	Discount Factor[b,c]	Present Value
Capital Cost		0	$322,115	$322,115	1.0000	$322,115
Annual O&M		1-30	$265,872	$8,862	19.6004	$173,707
Periodic Cost	(5-Year Reviews)	5, 10, 15, 20, 25, 30	$464,325	$77,388	3.6918	$285,702
			$1,052,312			$781,523

TOTAL PRESENT VALUE OF ALTERNATIVE **$781,523**

Notes:

a Cost obtained from RACER™ 2006 (Remedial Action Cost Engineering and Requirements™).

b Discount factor = $\frac{1}{(1+i)^t}$ where i = 0.030 for a 30+ year technology and t = year (i.e., the present value of the dollar paid in year t at 3.0%)

c Multiyear discount factor = $\frac{(1+i)n - 1}{i(1+i)n}$ where i = 0.030 for a 30+ year technology and n = total number of years

CADD Computer-Aided Design and Drafting
EA Each
GPS Global positioning system
HR Hour
IC Institutional control
LS Lump sum
LUC Land use control
MO Month
O&M Operation and maintenance
QA/QC Quality assurance/quality control
RD Remedial design

TABLE B-1B: SITE 30 ALTERNATIVE 3: BUILDING DEMOLITION, EXCAVATION, AND OFF-SITE WASTE DISPOSAL AT A PERMITTED LANDFILL
Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

COST ESTIMATE SUMMARY

Site: 30
Location: Treasure Island, California
Phase: Feasibility Study
Base Year: 2006
Date: November 7, 2006

Description: Excavation to be protective of all reuse scenarios, and off-site disposal of dioxin-contaminated soil at Site 30 including backfill and restoration. Capital costs occur in year 0.

CAPITAL COSTS: BUILDING DEMOLITION, EXCAVATION, AND OFF-SITE DISPOSAL

DESCRIPTION	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
Remedial Action Work Plan						
Senior Project Manager	30	HR	0	175	0	$5,250
Program Manager	120	HR	0	191	0	$22,861
Senior Staff Engineer	400	HR	0	105	0	$42,000
Staff Scientist	160	HR	0	75	0	$12,000
Word Processing/Clerical	100	HR	0	55	0	$5,500
Draftsman/CADD	40	HR	0	108	0	$4,301
Regulatory Review	20	HR	0	185	0	$3,695
SUBTOTAL						**$95,607**
Building Demolition						
Building demolition, single-level building, concrete, includes 50-mile haul, excludes foundation demolition, dump fees	129,600	CF	0	0	0	$50,544
Stripping and sorting of demolition debris (20% of demolition cost)	20	%				$10,109
Dump charges	3,120	CY	19	0	0	$60,247
966, 4.0 cy, wheel loader	20	HR	0	100	98	$3,968
26 cy, semi-dump	523	HR	0	83	93	$92,242
SUBTOTAL						**$217,109**
Building Slab Demolition						
Demolition of rod reinforced concrete to 6 inches thick with power equipment	427	CY	0	130	28	$67,261
Dump charges	333	CY	19	0	0	$6,437
910, 1.25 cy, wheel loader	7	HR	0	100	43	$1,002
8 cy, dump truck	142	HR	0	83	64	$20,901
SUBTOTAL						**$95,601**
Underground Pipe Demolition						
Minor site demolition, pipe, sewer/water removal, excludes excavation, hauling	400	LF	0	21	1	$8,908
Excavation, trench, medium soil, 6 to 10 feet deep, 1-1/2 cy bucket, gradall, excludes sheeting or dewatering	378	BCY	0	3	2	$1,726
SUBTOTAL						**$10,634**
Loading and Hauling of Pipe Debris						
Dumping Charges	472	CY	26	0	0	$12,154
926, 2.0 cy, Wheel Loader	20	HR	0	100	98	$3,968
20 cy, Semi-Dump	523	HR	0	83	93	$92,242
SUBTOTAL						**$108,363**
Pre-Excavation Characterization Sampling and Analysis						
Sample collection, vehicles, van or pickup rental	3	DAY	55	0	0	$164
Direct Push Rig, Truck-Mounted, Non-Hydraulic	3	DAY	100	400	1200	$5,100
Per diem (per person)	10	DAY	194	0	0	$1,940
Disposable boot covers (Tyvek)	20	PR	2	0	0	$33
Disposable gloves (Latex)	40	PR	0	0	0	$12
Disposable coveralls (Tyvek)	40	EA	7	0	0	$270
Disposable ear plugs	40	PR	0	0	0	$7
Differential GPS unit rental	1	MO	883	0	0	$883
Testing, TAL metals (6010/7000s)	51	EA	430	0	1	$21,960
Testing, dioxins	51	EA	2000	0	0	$102,000
Coolers and ice chests, 48-quart ice chest	3	EA	51	0	0	$152
Safety signs, barriers, yellow nylon tape allowance	1	EA	0	716	0	$716
Underground utility review prior to intrusive sampling	1	EA	0	895	0	$895
Inspection log for intrusive sampling, per day	3	Day	0	269	0	$806
Plastic sheeting/bags (herculite)	3185	SF	0	0	0	$446
Decontamination kit in 3-gallon metal drum, 27 items	1	EA	480	0	0	$480
Shipping container liners, 90 mil high density Poly liner, 55-gallon drum	6	EA	151	0	0	$906
Wastewater disposal fee	1	KGA	3	0	0	$3
DOT steel drums, 55-gallon, open, 17C	6	EA	122	0	0	$730
Health and safety officer	24	HR	0	181	0	$4,354
Process water, supplied by water line	1	KGA	5	0	0	$5
SUBTOTAL						**$141,860**

TABLE B-1B: SITE 30 ALTERNATIVE 3: BUILDING DEMOLITION, EXCAVATION, AND OFF-SITE WASTE DISPOSAL AT A PERMITTED LANDFILL (CONTINUED)
Feasibility Study Report, Installation Restoration Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, CA

CAPITAL COSTS: BUILDING DEMOLITION, EXCAVATION, AND OFF-SITE DISPOSAL (CONTINUED)

DESCRIPTION	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost
Excavation of Contaminated Soils						
Temporary Fence	500	LF	8	4	0	$5,960
Demolition of bituminous road with power equipment	17	CY	0	38	8	$776
Excavation and loading, bank measure, medium material, 2 cy bucket, hydraulic excavator	2667	BCY	0	3	2	$12,187
Disposable materials per sample	40	EA	12	0	0	$494
Confirmation sampling, TAL metals (6010/7000s))	40	EA	430	0	0	$17,184
Confirmation sampling, dioxins (8280)	40	EA	2000	0	0	$80,000
Synthetic covers over waste piles, plastic waste pile covers, plastic laminate waste pile cover, 130 lb. tear strength	28164	SF	0	0	0	$7,041
Spray washing, decontamination of heavy equipment	1	EA	0	894	0	$894
Health and safety officer	120	HR	0	181	0	$21,770
SUBTOTAL						**$146,306**
Loading and Hauling of Contaminated Soil						
Dump Charges	3333	CY	116	0	0	$386,161
20 cy, Semi-Dump	2161	HR	0	83	92	$378,996
SUBTOTAL						**$765,158**
Site Restoration						
Gravel, delivered and dumped	485	CY	31	6	2	$18,572
Unclassified fill, 6-inch lifts, off-site, includes delivery, spreading, and compaction	2571	CY	9	4	3	$38,874
Loam or topsoil, imported topsoil, 6 inches deep, furnish and place	278	LCY	30	10	2	$11,750
Seeding, vegetative cover	0	ACR	2441	208	71	$762
SUBTOTAL						**$69,957**
Site Close-Out Documentation						
Project Manager	80	HR	0	175	0	$14,000
Staff Engineer	240	HR	0	162	0	$38,880
Word Processing/Clerical	60	HR	0	55	0	$3,300
Draftsman/CADD	40	HR	0	108	0	$4,320
Regulatory Review	20	HR	0	185	0	$3,695
SUBTOTAL						**$60,500**
TOTAL WITHOUT PROFESSIONAL LABOR MANAGEMENT						**$1,711,096**
Professional Labor Management[a]						
Project Management Labor Cost		2.50%				$42,777
Construction Oversight Labor Cost		2.75%				$47,055
Reporting Labor Cost		0.35%				$5,989
As-Built Drawings Labor Cost		0.35%				$5,989
Public Notice Labor Cost		0.08%				$1,369
Site Closure Activities Labor Cost		0.00%				$0
SUBTOTAL						**$103,179**
SUBTOTAL CAPITAL COSTS IN 2006 DOLLARS						**$1,814,275**
Contingency		15%				**$272,141**
TOTAL CAPITAL COST IN 2006 DOLLARS						**$2,086,416**

Notes:
Costs obtained from RACER™ 2006 (Remedial Action Cost Engineering and Requirements™). Some costs adjusted based on professional judgement.

ACR	Acre
BCY	Bulk cubic yard
CADD	Computer-Aided Design and Drafting
CF	Cubic feet
cy	Cubic yard
DOT	Department of Transportation
EA	Each
GPS	Global positioning system
HR	Hour
KGA	1,000-gallons
lb	Pound
LCY	Loose cubic yards
LF	Linear foot
MO	Month
PR	Pair
TAL	Target analyte list
SF	Square feet

APPENDIX C
RESPONSE TO AGENCY COMMENTS

19 pages.

FINAL RESPONSES TO BCT/RAB COMMENTS ON THE DRAFT FEASIBILITY STUDY REPORT FOR INSTALLATION RESTORATION SITE 30, DAYCARE CENTER, NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

RESPONSES TO REGULATORY AGENCY COMMENTS ON THE DRAFT FEASIBILITY STUDY REPORT FOR INSTALLATION RESTORATION SITE 30, DAYCARE CENTER, NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

This document presents the U.S. Department of the Navy's (Navy) responses to regulatory agency comments on the "Draft Feasibility Study [FS] Report for Installation Restoration [IR] Site 30, Daycare Center, Naval Station Treasure Island [NAVSTA TI], San Francisco, California," dated July 2006. The Navy received comments from (1) the Department of Toxic Substances Control (DTSC) on July 27, 2006 and (2) the San Francisco Bay Regional Water Quality Control Board (Water Board) on August 2, 2006. The U.S. Environmental Protection Agency (EPA) did not have any comments.

The Navy's responses to the comments received are organized into two sections according to each entity that submitted comments and are presented below.

Responses to Comments from David Rist, Hazardous Substances Scientist, Office of Military Facilities, DTSC

General Comments

1. Comment: When discussing groundwater at Site 30, the Navy has concluded that contaminants detected in groundwater do not need to be evaluated as potential risk drivers because the State Water Board has concurred that Naval Station Treasure Island (NSTI) meets the exemption criteria for drinking water use. DTSC disagrees with this position and believes that when contaminants in groundwater are detected at concentrations exceeding State of California Maximum Contaminants Levels (MCLs), then a remedy must be applied to ensure that groundwater is not developed for future use. When groundwater at a site has been exempted as a beneficial source, other uses (i.e., fire suppression, process and irrigation water) are still permitted and need to be addressed in the final remedy. Therefore, when a site does have contaminants in groundwater exceeding MCLs, an institutional control restricting the future development of ground water for any type of use needs to be included as part of the overall remedy for the site. However, since all of the VOCs detected in groundwater at Site 30 were reported below MCLs, an IC for these contaminants will not be necessary.

Response: Comment noted.

2. Comment: **The document alternatively refers to the asphalt and cement pad, that was installed adjacent to Building 502 as part of the time-critical removal action in 2003, as either a slab or pad. As a result it is often difficult to determine if the building pad or the adjacent slab is being referred to. DTSC suggests that the Navy use consistent language when referring to the slab adjacent to the building and that the cement pad beneath the building always be referred to as the building pad.**

Response: The Navy would like to clarify the current use of the two terms in the FS Report. The FS Report is consistent with the IR Site 30 Remedial Investigation (RI) Report in referring to the asphalt and concrete pad, adjacent to Building 502 that was installed as part of the time-critical removal action in 2003, as a "pad." The "slab" is in reference to the foundation of the building. Accordingly, the FS Report is consistent with referring to the asphalt and concrete pad as a "pad". As a result, no text will be revised in response to this comment.

Specific Comments

1. Comment: **Page 10, Section 2.4.5, Time-Critical Removal Action at Site 30**

The last sentence of this section uses the word "pad" when referring to the 1400 square foot asphalt and cement slab that was installed adjacent to the daycare center building. Please correct. Also, please clearly state that the slab was installed to prevent exposure to the known dioxin contamination that exist in surface soils adjacent to Building 502.

Response: As stated in the response DTSC General Comment No. 2, "pad" refers to the asphalt and concrete pad adjacent to Building 502. Additionally, the known dioxin contamination does not exist in surface soil, but was detected at a depth between 4 and 5 feet below ground surface (bgs) adjacent to Building 502. This information will be added to the section. The text will be revised to state, "Although the pad may have been installed as an interim measure to prevent exposure at the time, the results of the human health risk assessment (HHRA) determined the risk to daycare center receptors to be below the risk management range. Therefore, the pad is not needed as an exposure prevention barrier for the daycare center receptors" (SulTech 2006).

2. Comment: **Page 12, Section 2.4.7.3, Nature and Extent of Contamination**

The TPH screening values presented in this section appear to be for non-residential reuse and not residential (5,900 mg/kg for gasoline,

6,700 mg/kg for diesel, and 9,400 mg/kg for motor oil). The Navy and regulatory agencies previously established residential screening criteria for TPH in shallow soils which are: gasoline at 1,030 mg/kg; diesel at 1,380 mg/kg; and motor oil at 1,900 mg/kg. Please amend this section to reflect the previously agreed upon screening values.

Response: Section 2.4.7.3 of the FS Report will be revised to reflect the agreed upon screening values.

3. Comment: Page 32, Section 4.4.2, Alternative 2: Engineering Controls Combined with ICs and Section 4.4.2.2, Institutional Controls

This section concludes that the site-related risk, as a daycare center or under a future residential scenario, is within the risk management range and that ICs are only necessary to address the uncharacterized waste remaining beneath Building 502. DTSC disagrees with this position as dioxins resulting in a risk greater than E10-6 are known to exist adjacent to Building 502 and are also likely to exist in the waste debris continuing beneath the building. To protect the current and potential future users of the site, as a daycare center or a residential development, DTSC believes that an IC that addresses all of the dioxins, beneath both the building and adjacent slab, is necessary.

Response: The results of the HHRA determined the risk to daycare center receptors to be below the risk management range, even for altered site conditions with the pad removed (SulTech 2006). The risk to industrial/commercial workers and residential receptors is within the risk management range and institutional controls (IC) to restrict industrial/commercial or residential development is part of Alternative 2. In either case, the pad is not needed as an exposure prevention barrier. This information will be clarified in Sections 4.4.2 and 4.4.2.2.

4. Comment: Page 33, Section 4.4.3, Alternative 3: Building Demolition, Excavation, and Off-Site Disposal at a Permitted Landfill

In Alternative 3, which provides for the removal of all dioxin contaminated soil to a depth of six feet below ground surface, the Navy makes the assumption that after the removal, all of the removal action objectives will have been achieved and that ICs will not be necessary. While the removal of six feet of contamination beneath the existing slab and building may remove a significant portion of the dioxins, it cannot be stated that all of the dioxins will be removed thereby obviating the need for ICs following the removal action.

Response: Section 4.4.3 will be revised to state how the excavation depth was determined, as follows: "The excavation depth was determined to be 6 feet bgs based on dioxin concentrations above the NAVSTA TI dioxin ambient level of 12.0 ng/kg detected at a maximum depth of 5 feet bgs." Additionally, the following paragraph will be added to the section: "The intent of the remedial action described in Alternative 3 is to achieve unrestricted use of the site. It is assumed that, following the completion of this alternative, the RAOs will have been achieved without the need for engineering controls and ICs. However, soils containing dioxin concentrations above the remediation goal may exist deeper than 6 feet bgs beneath Building 502. For the purpose of developing a cost estimate, the depth of 6 feet bgs was chosen based on the analytical results indicating elevated dioxin concentrations are present to a maximum depth of 5 feet bgs."

5. Comment: Page 43, Section 5.3.7, Cost

The last sentence of this section states that the total cost for ICs does not include the cost of enforcing the IC components. Please discuss what the anticipated "enforcement cost" are and why they were not included as part of the overall cost.

Response: The regulatory enforcement costs will be added to the text and cost estimate.

6. Comment: Page 44, Section 5.4.3, Long-Term Effectiveness and Permanence

Alternative 3 may provide for unrestricted commercial/industrial or residential reuse, if all of the contamination is successfully removed. Please clarify.

Response: Please see response to DTSC Specific Comment No. 4. The text will be clarified as follows: "Following completion of the remedial action, the site would be available for unrestricted commercial/industrial or residential reuse because the RAOs will have been achieved without the need for engineering controls and ICs. Therefore, this alternative is effective in the long term and provides permanence."

7. Comment: Figures 4 and 5, Site 30 Features Map and Dioxins in Soil

The legend refers to the slab adjacent to Building 502 as a "pad". Please correct.

Response: The legend of each figure is consistent with the use of the terms "pad" and "slab" in the FS Report. Please also see the response to DTSC General

Comment No. 2. The figures will not be revised in response to this comment.

8. Comment: Appendix B, Page B-3, Section B5.2, Annual O&M or Periodic Costs

The costs for enforcing the IC components are mentioned in Section 5.3.7, Cost, but are not included in Section B5.2. Again, please briefly discuss what costs are associated with enforcing the IC components and why they were not included as part of the overall costs.

Response: The regulatory enforcement costs will be added to the text and cost estimate. Section B5.2 will be revised to be consistent with Section 5.3.7, as follows: "The capital costs primarily involve preparation and implementation of the RAWP. The O&M costs involve periodic inspections, annual reporting, and 5-year reviews pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The cost estimate includes the cost for regulatory enforcement of the IC components. A 25 percent markup factor is included to account for the Navy's contractor oversight costs."

9. Comment: Appendix B, Page B-6, Section B6.1, Alternative 2, Engineering Controls Combined With Institutional Controls

It should be noted that if ICs are implemented and subsequently violated in the future, DTSC's oversight requirements could easily exceed 10 hours in a given year.

Response: Comment noted.

Responses to Comments from Agnes Farres, Water Board Project Manager

Specific Comments

1. **Comment:** **<u>ES-4 and Section 3.1:</u> The remedial action objectives specify protecting commercial/industrial, residential and daycare center receptors by preventing ingestion and direct contact with contaminated soils. However, according to Table 2-1, the only COPCs exceeding thresholds are under the hypothetical alternate land use whereby receptors are exposed to site-wide soil and vapors in indoor air. Explain why preventing the exposure of receptors to vapors in indoor air is not included in the remedial action objectives.**

   Response: Preventing exposure of receptors to vapors in indoor air is not necessary as a remedial action objective (RAO) because the only chemicals of concern (COC) are dioxins, which are not volatile. The text will be revised to clarify this rationale.

2. **Comment:** **<u>Section 2.4.7.1:</u> The following statement is repeated several times; "Since groundwater is not a current or potential drinking water source at Site 30, it was not evaluated as a potential exposure pathway". This statement implies that exposure pathways to contaminated groundwater were not evaluated because it is not a drinking water source. However, the potential for inhalation of vapors originating from groundwater was evaluated for commercial/industrial workers and adult and child residents and the potential for dermal contact with groundwater was evaluated for commercial/industrial workers and adult and child residents and the potential for dermal contact with groundwater was evaluated for the construction worker. The statement should be clarified to state that the *consumption* of groundwater was not evaluated as a potential exposure pathway since groundwater is not a current or potential drinking water source.**

   Response: Section 2.4.7.1 will be revised to state that "the *consumption* of groundwater was not evaluated as a potential exposure pathway."

3. **Comment:** **<u>Section 2.4.7.3:</u> The description of the three metals detected in soil is confusing and should be reworded. For example, the description for lead should state "lead was present above ambient concentrations in 82 of the 152 samples, but was above the residential PRG in only three samples". Similarly, the description for vanadium should state "Vanadium was present above ambient concentrations in 23 of 98 samples, but only one sample had a concentration above the residential PRG".**

Response: The text will be reworded to include the information requested above. For example: "Lead was detected above ambient concentrations but exceeded the residential preliminary remediation goal (PRG) in only three samples."

4. Comment: **<u>Section 4.2.4.5:</u> Explain why leaving soil in place to protect the integrity of the existing daycare center building slab is inconsistent with the current and future use of the site and building as a daycare center.**

Response: The sentence is in error. The sentence will be revised to indicate that leaving soil in place to protect the integrity of the slab is "consistent" with the current and future use of the site.

5. Comment: **<u>Section 4.4.3:</u> The description of the site hydrogeology states that groundwater was encountered at approximately five feet below ground surface. Provide a rationale for requiring excavation to a depth of six feet under Alternative 3 (Building Demolition, Excavation, and Off-Site Disposal at a Permitted Landfill).**

Response: Groundwater was encountered between 5 and 7 feet bgs, and the text will be revised to indicate this depth interval. Additionally, please see response to DTSC's Specific Comment No. 4.

6. Comment: **<u>Section 6.3:</u> Explain why the magnitude of residual risk remaining after implementation of Alternative 2 (Engineering Controls Combined with ICs) would not be less than residual risk remaining after implementation of Alternative 1 (No Action).**

Response: The text will be revised to clarify that the residual contamination for Alternative 1 (No Action) and Alternative 2 (Engineering Controls Combined with ICs) is the same because the contaminated soil is not being remediated. However, the purpose of the Alternative 2 ICs is to prevent a complete exposure pathway to direct contact with the potentially contaminated soil beneath the Building 502; therefore, Section 6.3 will be revised to state the following:

"The residual contamination for Alternative 1 (No Action) and Alternative 2 (Engineering Controls Combined with ICs) is the same because the contamination is not being removed or treated; however, the residual risk due to direct exposure to the contaminated soil beneath Building 502 is reduced by the implementation of the engineering controls and ICs for Alternative 2."

RESPONSES TO TREASURE ISLAND DEVELOPMENT AUTHORITY AND RESTORATION ADVISORY BOARD COMMENTS ON THE DRAFT FEASIBILITY STUDY REPORT FOR INSTALLATION RESTORATION SITE 30, DAYCARE CENTER, NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

This document presents the Navy responses to comments from the Treasure Island Development Authority (TIDA) and the NAVSTA TI Restoration Advisory Board (RAB) on the Draft FS Report for Installation Restoration Site 30, Daycare Center, Naval Station TI, San Francisco, California, dated July 2006. The comments addressed below were received from (1) Geomatrix Consultants, Inc. on behalf of TIDA on August 14, 2006; and (2) the NAVSTA TI RAB on August 14 and 15, 2006.

The Navy's responses to the comments received are organized into two sections according to each entity that submitted comments and are presented below.

Responses to Comments from Gary R. Foote, P.G., Geomatrix Consultants, Inc.

General Comments

1. Comment: The human health risk assessment included in Appendix I of the Final Remedial Investigation (RI) Report for Site 30 included a discussion about risk posed to current utility workers (Section I.8.1.2 of Appendix I of RI Report). This information needs to be included in the risk assessment summary presented in Section 2.4.7.5 and the Executive Summary of the Site 30 FS. This assessment should provide the Navy's justification for why no remedial actions are necessary to protect current subsurface workers (e.g., landscape workers and utility workers) who may be exposed to soil outside the footprint of Building 502.

Response: The evaluation of the construction worker is protective of current utility workers. As stated in the Final RI Report for IR Site 30: "Incidentally, evaluation of the hypothetical construction worker would also be considered protective of "current" utility workers that may visit the daycare center site on an infrequent basis to repair subsurface utility lines." (SulTech 2006) The construction worker receptor, which assumes exposure of 1 year, is a conservative evaluation for the utility worker making a subsurface repair, who is likely on site for only a few days.

Section 2.4.7.5 and the Executive Summary will be revised to clarify evaluation of construction workers is protective of current utility workers and that no remedial actions are necessary for a current utility worker because the risk to construction workers was below the risk management range.

2. Comment: The text states that based on recent comments from officials at the City and County of San Francisco, Site 30 is expected to continue as a

daycare center (Executive Summary, p. ES-2 and Section 2.3.6). We wish to clarify that the current development plans do anticipate interim use of the existing building as a daycare center for several years; however, the ultimate development plans do not include the existing building or a daycare center at the existing location. Please provide this additional information in the two sections noted.

Response: The Navy and the TIDA have agreed to evaluate sites based on the 1996 Reuse Plan, which specifically identifies Building 502 for "Institutional Use," and states that a daycare center is planned at this building (City and County of San Francisco [CCSF] 1996). Based on a more recent transfer meeting held in September 2006, the Navy acknowledges the statement in the ES and Section 2.3.6 is now incorrect and will be deleted from the document. However, per CERCLA, reasonably foreseeable future use of the site will be a daycare center.

Specific Comments

1. Comment: ***Reference to City of San Francisco.*** **Throughout the document, the text refers to the "City of San Francisco." The text should refer to the "City and County of San Francisco."**

Response: Text will be revised throughout the document to reference the "City and County of San Francisco."

2. Comment: ***Executive Summary, page ES-1, first paragraph under Site History.*** **The daycare center was renovated and reopened in 2003 by Kidango, rather than the Treasure Island Homeless Development Initiative.**

Response: Text will be revised to indicate that the daycare center was renovated and reopened in 2003 by Kidango.

3. Comment: ***Executive Summary, page ES-2, last paragraph under Site Setting.*** **Please clarify that the removal actions were completed before the center was opened by Kidango in 2003.**

Response: Text will be revised to clarify that the removal actions occurred and were completed before the daycare center was opened in 2003.

4. Comment: ***Executive Summary, page ES-3, second paragraph under Baseline Risk Assessment.*** **This paragraph indicates that contaminants in groundwater were not evaluated in the risk assessment. This is not**

correct. The risk assessment evaluated vapor intrusion from chemicals in groundwater (current and hypothetical future buildings) and direct contact with groundwater for hypothetical future construction workers and current utility workers.

Response: The text will be revised to clarify that vapor intrusion modeling was conducted as part of the risk assessment. The text will be further revised to discuss how risk to current and hypothetical receptors, as well as construction workers, was evaluated for vapor intrusion and direct contact with groundwater. Please also refer to the response to Water Board Specific Comment 2.

5. Comment: ***Executive Summary, page ES-4, Remedial Action Objectives (RAOs).*** **For the first RAO, please clarify that it pertains to potential future commercial/industrial and residential receptors. This comment also applies to Section 3.1.**

Response: The Executive Summary and Section 3.1 will be revised to clarify that the first RAO pertains to potential future commercial/industrial workers and residential receptors.

6. Comment: ***Executive Summary, page ES-5, Detailed Comparative Analysis of Remedial Alternatives.*** **This section explicitly discusses how the alternatives compare for each of the threshold criteria, but does not provide the same level of discussion for the primary balancing criteria. We suggest that this section discuss how the alternatives compare for each of the balancing criteria.**

Response: The Executive Summary will be revised to present a comparison of each alternative to the primary balancing criteria as follows:

"Alternative 1 would not provide long-term effectiveness and permanence for preventing exposure to potentially contaminated soils at IR Site 30 beneath the daycare center building; however, Alternative 2 would provide long-term effectiveness and permanence by requiring (1) monitoring and reporting on the integrity of the existing daycare center building slab and (2) ICs to restrict industrial/commercial or residential development. Alternative 3 provides a higher level of long-term effectiveness and permanence by removing potential contamination from beneath Building 502.

Alternatives 1 and 2 do not treat potential contamination or reduce its toxicity, mobility, or volume. Alternative 3 would remove potential contamination from beneath Building 502 at IR Site 30, thus reducing the toxicity and volume of contaminated soil at the site.

Alternatives 1 and 2 would not introduce a risk to the community or the environment in the short term because no active treatment would be conducted. Alternative 3 could introduce some risk to the community during field activities due to truck traffic; however, these risks could be minimized through best management practices such as traffic control.

All of the alternatives are technically feasible and readily implementable. Alternative 1 does not require any effort to implement. Alternatives 2 and 3 are proven technologies, and it is unlikely that technical or administrative issues would delay implementing either of these alternatives.

Estimated total capital costs for each alternative are summarized in Tables 6-1 and 6-2. No costs are associated with Alternative 1. Alternative 3 has the highest overall costs (over $2,086,000). Alternative 3 is 2.7 times the cost of Alternative 2 ($782,000)."

7. Comment: ***Section 2.3.2, last paragraph, top of page 6.*** **The text states that documentation about the "old trash dump" in the middle of 11th Street was discovered during the environmental baseline survey completed to support the Finding of Suitability to Lease (FOSL). The FOSL was completed in 1997 and we understand that the documentation about the "old Trash dump" was discovered later than 1997. This comment also applies to the Site History section of the Executive Summary.**

Response: Section 2.3.2, Site History, and the Executive Summary will be revised to state the following:

"In April 2002, a 1989 as-built drawing was discovered indicating that the Navy Public Works Center installed an 8-inch water line down the middle of 11th Street. A note on the as-built drawing for the water line project identified an "old trash dump" within the western portion of the water line excavation along 11th Street between Avenues D and E (Shaw 2003)."

The text stating that the "old trash dump" was discovered during the Environmental Baseline Survey to support the Finding of Suitability to Lease will be deleted.

8. Comment: ***Section 2.4.7.1.*** **There are several places in this section where the text states that groundwater was not evaluated as a potential exposure pathway in the RI. While direct ingestion of groundwater was not evaluated for the reasons cited in the text, other exposure pathways for groundwater were evaluated. See comment 3.**

Response: Section 2.4.7.1 will be revised to clarify that direct ingestion of groundwater was not evaluated as a potential exposure pathway but that vapor intrusion and direct contact exposure pathways were evaluated. Please also refer to the response to Water Board Specific Comment 2 and Geomatrix Consultants, Inc. Comment 4.

9. Comment: ***Section 2.4.7.3, first paragraph.*** **Please identify which pesticide exceeded its residential PRG.**

Response: The sentence in Section 2.4.7.3 will be revised as follows: "Pesticides were also detected at low concentrations at Site 30; however, one sample, out of 98 samples analyzed, contained dichlorodiphenyltrichloroethane (DDT) at a concentration of 2.24 mg/kg, which exceeds the EPA residential PRG of 1.7 mg/kg."

10. Comment: ***Section 4.2, Identification and Screening of Remedial Action Technology and Process Options.*** **This section does not consistently discuss each technology with respect to the three screening criteria (effectiveness, implementability, and cost). Most notably, the screening criteria are not discussed in the description of the various institutional controls that are presented. We suggest that Table 4-1 be revised to include headings for each of the three screening criteria. This information would better justify the evaluation result.**

Response: The text of Section 4.2 will be revised to consistently discuss the technologies presented with respect to the three screening criteria. Table 4-1 will be revised to include headings for each of the three screening criteria to clearly justify the evaluation results.

11. Comment: ***Section 4.2.2.*** **The discussion of potential institutional controls includes a description of deed restrictions (fourth paragraph of Section 4.2.2.1) and groundwater use restrictions (Section 4.2.2.2,**

third paragraph). However, this information is missing from Table 4-1.

Response: Table 4-1 will be revised to include deed restrictions; however, because groundwater is not affected, groundwater restrictions are unnecessary at IR Site 30. A sentence will be added to Section 4.2.2.2, at the end of paragraph three, stating: "For this reason, groundwater use restrictions are not presented in Table 4-1."

12. Comment: ***Section 4.2.3.1, last paragraph.*** **The three reasons cited for eliminating containment for further consideration are also true for excavation, which was retained for further consideration. The document needs to provide better justification for eliminating containment.**

Response: The rationale for eliminating containment will be revised as follows:

"If used at IR Site 30, containment would (1) require the demolition of Building 502; (2) require the excavation of soil so a landfill-type cap several feet thick could be installed and existing grades maintained; or (3) require raising the elevation of Site 30 to allow for proper installation of the cap; and (4) be inconsistent with the current and planned future use of IR Site 30, and limit future uses of IR Site 30."

13. Comment: ***Section 4.2.4.*** **This section defines active remediation to be removal of contaminants from the site. Active remediation can include other treatment technologies (as discussed in later subsections). We suggest broadening the definition of active remediation.**

Response: The definition of active remediation will be revised in the text to state: "Active remediation is the active removal of chemicals from a site, as opposed to either containing or preventing exposure to the chemicals. As a result, active remediation for Site 30 could include any of the following treatment technologies: (1) excavation and incineration of contaminated medium, (2) in situ bioremediation, (3) noncombustion processes treatment, (4) ex situ soil washing, and (5) excavation and off-site disposal of soil at a permitted landfill."

14. Comment: ***Section 4.2.4.3.*** **It is incorrect to say that thermal desorption is limited by the depth of the groundwater table. Resistive heating actually requires water to function efficiently.**

Response: Comment noted. The text will be revised to state that "In situ thermal desorption was not retained because it has not been proven effective to treat dioxins at the concentrations present in soil at IR Site 30."

15. Comment: ***Section 4.2.4.5, second to last sentence.*** **It appears that the word "inconsistent" should be consistent.**

Response: Please see response to Water Board Specific Comment No. 4.

16. Comment: ***Section 4.4.2.*** **Under the day care center use, the text states that the "site-related risk is either below or within the risk management range." Elsewhere in the document, the text states that the risk is below (not within) the risk management range. Please correct.**

Response: Section 4.4.2 will be revised to state that "site-related risk is below the risk management range for daycare center use."

17. Comment: ***Section 4.4.3.*** **It is unclear why Alternative 3 does not include replacement of the daycare center building (i.e., site restoration) and temporary re-location of the daycare facilities during remediation. These costs need to be considered for maintaining current site use.**

Response: The Base Realignment and Closure legislation does not permit the Department of Defense, and therefore the Navy, to enhance a property prior to transfer. The construction of a new building on IR Site 30 would constitute an enhancement; therefore, Alternative 3 does not include the cost of a new building. As a result, no text will be revised in response to this comment.

18. Comment: ***Section 6.3.*** **The text states that Alternative 3 provides a higher level of long-term effectiveness and permanence than Alternative 2. We concur with this conclusion.**

However, Table 6-2 shows the two alternatives as having equal long-term effectiveness and permanence. The table should be revised to be consistent with the text.

Response: Table 6-2 will be revised to indicate Alternative 3 has a higher long-term effectiveness and permanence than Alternative 2.

19. Comment: ***Table 6-2.*** **Under the criteria "Reduction in Toxicity, Mobility, or Volume through Treatment," it would appear that Alternative 3 should be ranked higher than Alternatives 1 and 2 because the on-site**

volume would be reduced. Given the qualitative nature of the ranking of each alternative according to the six criteria, it appears that the "Overall Rank by Alternative" is very subjective. We suggest eliminating the overall rank from the table.

Response: Alternative 3 is not ranked to be more effective than Alternatives 1 and 2 at reducing the toxicity, mobility, or volume of contamination because it does not involve treatment. While the on-site volume is reduced, the contamination is not treated, but rather relocated. No text will be revised in response to this comment. The "Overall Rank by Alternative" will be eliminated from the table.

20. Comment: ***Appendix B.*** **In general not enough explanation is provided to justify the costs. Although very detailed costs are implied, the scope of the activities described is very vague. Notes should be provided giving the source and basis for each quantity and unit cost.**

Response: The text of Appendix B provides a discussion of the assumptions used in developing the costs. Costs are based on output from RACER^{TM} and professional judgment. As a result, no text will be revised in response to this comment.

21. Comment: ***Appendix B, Tables B-1A and B-1B.*** **Capital costs do not include the contingencies required by EPA's "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study." There are inconsistencies between labor rates for Work Plans and Reports and those for Administrative Land Use Controls. For Alternative 3 (Table B-1B), it is unclear whether the costs for "Pre-Excavation Characterization Sampling and Analysis" include labor for field oversight, data QA/QC and reporting.**

Response: The capital costs will be revised to include contingencies. The labor rates in Tables B-1A and B-1B will be revised for consistency. Additionally, the cost for labor oversight for the "Pre-Excavation Characterization Sampling and Analysis" is included in the "Labor Management" section of the table. The reporting costs are included in the "Site Closeout Documentation" section of the table. Additionally, quality assurance and quality control sampling is limited because the purpose of the "Pre-Excavation Characterization Sampling and Analysis" is construction-related. As a result, Appendix B text will be revised to include the assumptions made for contingencies.

Responses to Comments from Dale Smith and Nathan Brennan, RAB Members

Comments provided by Dale Smith in a letter dated August 14, 2006

1. Comment: Page 10. It would be helpful to see where the groundwater monitoring wells mentioned in the text are located and the general groundwater flow direction. Could these be added to Figure 4?

Response: The locations of the groundwater monitoring wells and groundwater flow direction will be added to Figure 4.

2. Comment: Page 11. What is the anticipated life of the daycare center? Ten years have been mentioned at times but the housing is anticipated to last 30 years. It is likely the daycare center would be needed for the entire life of the housing.

Response: For cost estimating purposes, the life of the project is estimated at 30 years, which includes the daycare center. Text will be added to clarify the estimate.

3. Comment: Page 26. Please explain paragraph two. It does not make sense. Does it refer to the daycare center or other sites, or is it generic?

Response: The text will be revised as follows: "TI has a land use plan (the Draft NAVSTA TI Reuse Plan [CCSF 1996]); however, the plan does not contain enforcement components. As a result, the Reuse Plan is not retained for further evaluation as a component of a remedial alternative, but is still considered useful as a planning tool."

4. Comment: Page 28. I am opposed to any remediation that includes incineration. Dioxins and furans are very toxic and stack conditions are hard to control. Although this activity would not take place in the Bay Area, it should not take place anywhere else, either.

Response: Comment noted.

5. Comment: Page 32. Could fans be installed in the airfloor to improve circulation and prevent vapor build up? Figure 6 seems to show the building is elevated and the airfloor is above ground. This would seem to indicate the buildings will be lifted up to install the barrier and airfloor. If this is true, could the buildings be moved to another unoccupied site and thus get away from the contamination once and for all?

Response: Figure 6 shows the 1982 construction drawing of the airfloor system and vapor barrier that has already been permanently built into the floor slab of Building 502. The airfloor system is a radiant heating and cooling system that distributes air through the floor to the rest of the building. There are not any plans to move the building. As a result, no text will be revised in response to this comment. Please also refer to the response to Water Board Specific Comment 1.

Comment provided by Dale Smith in an email dated August 14th, 2006.

1. **Comment: The document states that the dredge material for the island came from the delta. I thought most of it had come from the bay and the Oakland harbor area. If the soil did come from the delta, has it ever been tested for mercury?**

Response: Any reference to 'delta' being used as a source for fill is assumed to refer to the San Francisco Bay Area Delta. According to "Treasure Island Fill," Geologic and Engineering Aspects of SF Bay Fill, Special Report 97 (Lee 1969), Treasure Island fill consisted of fill from the San Francisco Bay and Delta. The following paragraphs from "Treasure Island Fill" will be added to the text: "During February 1936 through August 1937, the Army Corps of Engineers conducted construction activities on the 402-acre man-made Treasure Island, which was to be the site of the 1939-1940 Golden Gate International Exposition. The Yerba Buena Shoals, a 735-acre reef extending north from Yerba Buena Island was used as the foundation for Treasure Island. To build the island, the Army Corps of Engineers constructed a perimeter of rock and filled it with millions of tons of silt dredged from San Francisco Bay and Delta."

"Approximately 29 million cubic yards of fill, primarily consisting of sand with lesser amounts of silt, clay, and gravel, were dredged from the Bay and the Delta and used for construction of the island."

As stated in the Final 2006 RI Report (SulTech 2006), 198 soil samples were analyzed for mercury; only 1 sample (0.71 milligram per kilogram [mg/kg]) was above the ambient level of 0.51 mg/kg. None of the soil samples exceeded the EPA's residential PRG of 23 mg/kg.

Responses to Comments from Dale Smith and Nathan Brennan (Continued)

Comments provided by Nathan Brennan in an email dated August 15th, 2006.

General Comment

1. **Comment:** **The FS looks good, although the City's plan is changing and this Childcare facility is now planned for demolition with new facilities provided in the new development.**

   Response: Please see response to Geomatrix General Comment No. 2.

Specific Comments

1. **Comment:** ***Page ES-2.*** **Conceptual Site Model – The plan by San Francisco's TIDA has changed since the Draft 1996 Reuse Plan and the update of 2004. With further development of a plan with concentration of housing and facilities towards Clipper Cove, the Childcare Center is now planned to be included into those buildings (although the school is likely to remain in its location).**

   Response: Please see the response to Geomatrix General Comment No. 2.

2. **Comment:** ***Page 1.*** **As in item #1 the City's TIDA Plan is changing.**

   Response: Please see the response to Geomatrix General Comment No. 2.

3. **Comment:** ***Page 33, Section 4.4.3.*** **In consideration of Item #1, this Alternative (3) is the best plan.**

   Response: Comment noted.

REFERENCES

City and County of San Francisco (CCSF). 1996. "Naval Station Treasure Island Reuse Plan - Public Review Draft." Prepared for the Office of Military Base Conversion, Planning Department, CCSF, and the San Francisco Redevelopment Agency. June 3.

Lee, Charles. 1969. "Treasure Island Fill." Geologic and Engineering Aspects of San Francisco Bay Fill, Special Report 97. California Division of Mines and Geology, San Francisco. PP69-72.

SulTech 2006. "Final Remedial Investigation Report, Installation Restoration Site 30, Daycare