



FINAL

**RECORD OF DECISION
Installation Restoration Site 28
West Side On-Off Ramps**

**Naval Station Treasure Island
San Francisco, California**

December 2010

Prepared for:



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

Prepared under:

**Contract Number N62473-06-D-2206
Task Order Number 0028**

Prepared by:



**The Alliance Compliance Group Joint Venture
2750 Womble Road, Suite 100
San Diego, California 92106
(619) 260-1432**

ALNC-2206-0028-0012

TABLE OF CONTENTS

1.0	DECLARATION	1
1.1	LOCATION	1
1.2	STATEMENT OF BASIS AND PURPOSE	1
1.3	SELECTED REMEDY	6
1.4	STATUTORY DETERMINATIONS	6
1.5	AUTHORIZING SIGNATURES	7
2.0	DECISION SUMMARY	8
2.1	SITE DESCRIPTION AND HISTORY	8
2.2	SITE CHARACTERISTICS	8
2.3	PREVIOUS INVESTIGATIONS	9
2.4	CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USE	10
2.5	SUMMARY OF SITE RISKS	11
	2.5.1 Summary of Human Health Risks Assessment	13
	2.5.2 Summary of Ecological Risks Assessment	16
2.6	COMMUNITY PARTICIPATION	17
3.0	RESPONSIVENESS SUMMARY	19

FIGURES

- 1 Naval Station Treasure Island Location Map
- 2 Aerial Photograph of Treasure Island
- 3 Site 28 – Site Location Map
- 4 Boundaries of the Tidelands Trust

TABLES

- 1 Previous Investigations
- 2 Lead Threshold/LeadSpread Results (Surface Soil 0 to 6 inches bgs)
- 3 Lead Threshold/LeadSpread Results (Surface Soil 0 to 2 feet bgs)
- 4 Method 2 Site-Related Risk and Total Risk Estimates

APPENDICES

- A Administrative Record Index
- B Table of References
- C Public Meeting Transcript
- D Responses to Agencies Comments for Draft ROD



FINAL RECORD OF DECISION

Installation Restoration Site 28, West Side On-Off Ramps
Naval Station Treasure Island, San Francisco, California

December 2010

1.0 DECLARATION

This Record of Decision (ROD) presents the basis for the no further action (NFA) decision for Installation Restoration (IR) Site 28 (Site 28), West Side On-Off Ramps at Naval Station Treasure Island (NAVSTA TI) in San Francisco, California (Figure 1 and Figure 2).

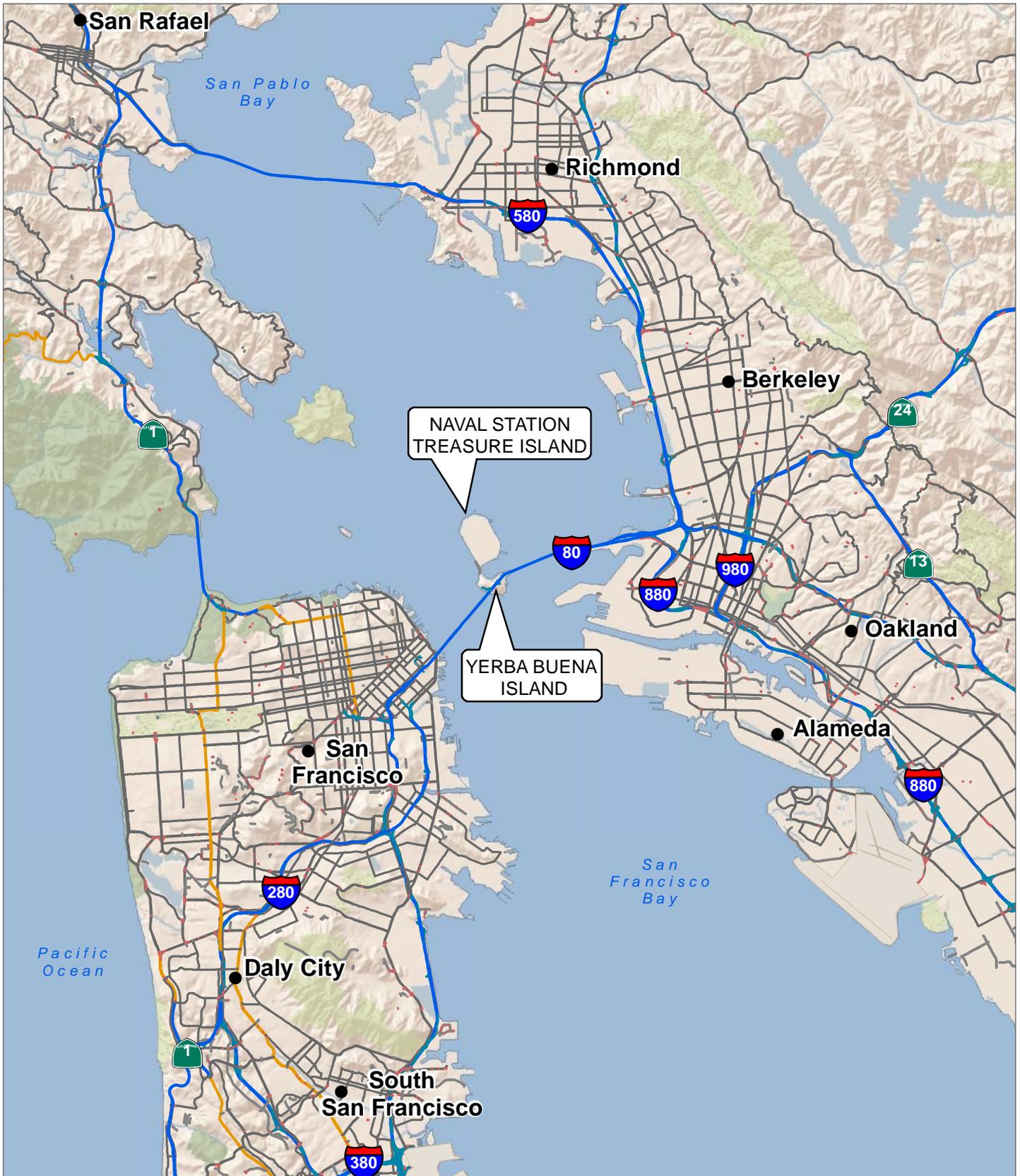
1.1 LOCATION

NAVSTA TI is located in San Francisco Bay, midway between San Francisco and Oakland, California (Figure 1). The facility consists of two contiguous islands: Treasure Island (TI), which is approximately 403 acres (Figure 2), and Yerba Buena Island (YBI), which is approximately 147 acres. The U.S. Coast Guard owns 30 of the 147 acres on YBI. Treasure Island is manmade and is constructed of materials dredged from the bay; YBI is a natural island.

Site 28, West Side On-Off Ramps, is located in the western portion of YBI and is bounded to the west by the San Francisco Bay; to the east by Treasure Island Road, which is within the boundaries of Site 28; and to the south by Site 29 (Figure 3). Other than the roads running through Site 28, most of the site is steeply sloped to the southwest toward the Bay and densely vegetated with trees and brush.

1.2 STATEMENT OF BASIS AND PURPOSE

This decision document presents the basis for the NFA decision for Site 28 at NAVSTA TI. The NFA decision was made in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document satisfies all the requirements of a ROD under CERCLA and is based on the Administrative Record for this site. In addition, the NFA decision was made in accordance with the State of California Hazardous Substances Account Act (HSAA), as codified in Chapter 6.8 of the California Health and Safety Code (HSC). It is the intent of the U.S. Department of the Navy (DON) that this document fulfill the substantive state requirements for remedial action plans at remedial sites as specified in HSC Section (§) 25356.1.

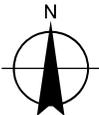


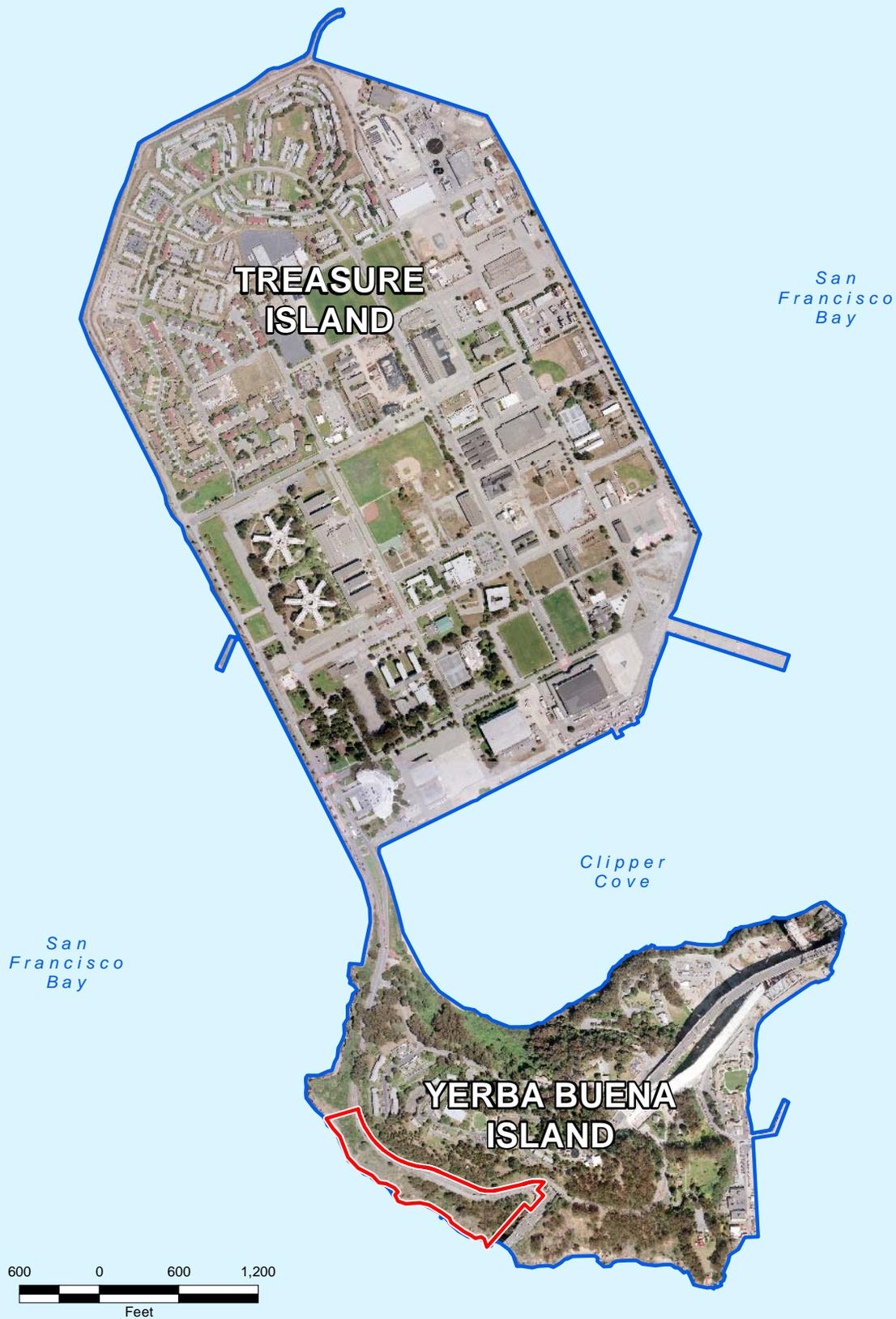
Naval Station Treasure Island, California
 Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 1

INSTALLATION LOCATION MAP

ROD, Site 28 West Side On-Off Ramps,
 NAVSTA TI, San Francisco CA





 SITE 28 BOUNDARY

Aerial photograph taken by Air Flight Service for Tetra Tech Inc. on May 15, 2009

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

FIGURE 2
AERIAL PHOTOGRAPH
NAVAL STATION TREASURE ISLAND

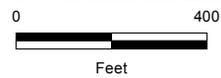
ROD, Site 28 West Side On-Off Ramps,
NAVSTA TI, San Francisco CA



 SITE 28 BOUNDARY

 SITE 29 BOUNDARY

Aerial photograph taken by Air Flight Service for Tetra Tech Inc. on May 15, 2009.



Site 29

Site 28

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

FIGURE 3

**SITE 28 - WEST SIDE ON-OFF RAMP
DETAILED SITE MAP**

ROD, Site 28 West Side On-Off Ramps,
NAVSTA TI, San Francisco CA



The remedy for Site 28 is based on information contained in the Administrative Record ([Appendix A](#)) for the site. Information not specifically summarized in this ROD or its references but which is contained in the Administrative Record has been considered and is relevant to selection of the NFA decision. Thus, the ROD is based on and relies on the entire Administrative Record file.

The DON, as the lead federal agency, provides funding under the Base Realignment and Closure (BRAC) program for site cleanups at NAVSTA TI and is vested with the authority to select CERCLA cleanup remedies at NAVSTA TI. The Federal Facility Site Remediation Agreement ([FFSRA](#))⁽¹⁾^a for NAVSTA TI documents how the Navy meets and implements CERCLA in partnership with the California Environmental Protection Agency's (Cal/EPA) Department of Toxic Substances Control (DTSC), Region II, and the Cal/EPA San Francisco Bay Regional Water Quality Control Board (Water Board). The DON selected the NFA for Site 28, West Side On-Off Ramps. DTSC, the Water Board, and the U.S. Environmental Protection Agency (EPA) are in agreement with the NFA remedy for Site 28.

The Final Revised Remedial Investigation (RI) report was completed in February 2009, and a [Proposed Plan](#)⁽²⁾ was completed in April 2010.

Investigation findings supporting the DON's declaration of a NFA decision include:

- The site's steep, rocky slopes, future restrictions associated with the Tidelands Trust discussed in [Section 2.4](#), and location make future development or recreational access unlikely, thus eliminating potential exposure via the industrial or residential development scenarios.
- No cancer risks exist for site-related chemicals, and HI's are below 1.0 for the most conservative exposure scenario.
- Blood-lead levels as modeled for adult residents are below the benchmark established by the DTSC. Although exceedances are found for child residents, residential and non-maritime uses will be prohibited under the Tidelands Trust.
- Blood-lead levels as modeled for hypothetical recreational receptors are well below the benchmark established by the DTSC.

^a **Blue text** identifies detailed site information available in the Administrative Record and listed in the Reference Table ([Appendix B](#)). The subscript number refers to the reference item number in [Appendix B](#). This ROD is also available on CD, whereby **blue text** serves as a hyperlink to reference information. The hyperlink will open a text box at the top of the screen. A blue box surrounds applicable information in the hyperlink. To the extent that there may be any inconsistencies between the referenced information attached to the ROD via hyperlinks and the information in the hard copy ROD itself, the language in the hard copy ROD controls. [Acronyms and Abbreviations](#) are provided at the end of the ROD.

- Impending inclusion of this site in the Tidelands Trust will further limit any future development of this site.

1.3 SELECTED REMEDY

DON, in partnership with DTSC, the Water Board, and EPA, considered all pertinent factors in accordance with CERCLA and concluded that no further CERCLA action is necessary to ensure protection of human health or the environment at Site 28. Results of investigations concluded that no unacceptable risk to human health or the environment is present from potential exposure to soil or groundwater for current or future planned uses at Site 28. No institutional controls will be required and no groundwater cleanup is needed for Site 28. Although this is a NFA ROD and no land use controls will be included as part of the CERCLA remedy, property use of Site 28 will be restricted due to placement in the Tidelands Trust. This ROD does not include or affect any other sites at NAVSTA TI.

1.4 STATUTORY DETERMINATIONS

The statutory determinations normally included in ROD documents pursuant to CERCLA § 121 are not required for Site 28 since it has been determined that no remedial action is necessary to ensure protection of human health and the environment ([EPA_{\[3\]}](#)), “A Guide to Preparing Superfund Proposed Plans, Record of Decision, and Other Remedy Selection Decision Documents”). In addition, a 5-year review will not be required for Site 28 per CERCLA § 121(c) or NCP § 300.430(f)(5)(iii)(C) because there are no hazardous substances, pollutants, or contaminants present in quantities that would prevent current or expected future uses of the site.

1.5 AUTHORIZING SIGNATURES

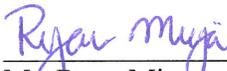
This signature sheet documents DON's selection of the NFA decision in this ROD. This signature sheet also documents the State of California's (DTSC and Water Board) concurrence with this ROD.



Mr. James B. Sullivan
Base Realignment and Closure
Environmental Coordinator
Naval Station Treasure Island
U.S. Department of the Navy

11/22/2010

Date



Mr. Ryan Miya
Team Leader, Cal/EPA Department of Toxic Substances Control
Brownfields Restoration and Environmental Cleanup Program
Berkeley Office

11/18/2010

Date



Mr. Bruce H. Wolfe
Executive Officer
California Regional Water Quality Control Board
San Francisco Bay Region

Nov. 17, 2010

Date

2.0 DECISION SUMMARY

This decision summary provides an overview of Site 28 at NAVSTA TI, its history, environmental conditions, potential risks from hazardous substances, and the bases for the NFA decision.

2.1 SITE DESCRIPTION AND HISTORY

NAVSTA TI lies in San Francisco Bay, midway between San Francisco and Oakland, California, and consists of two contiguous islands: TI and YBI. Site 28, West Side On-Off Ramps, is located in the western portion of YBI and is bounded to the west by the San Francisco Bay; to the east by Treasure Island Road, which is within the boundaries of Site 28; and to the southeast by Site 29 (Figure 3). Other than the roads running through Site 28, most of the site is steeply sloped to the southwest toward the Bay and densely vegetated with trees and brush. The On-Off Ramps were likely constructed at the same time as the San Francisco–Oakland Bay Bridge (SFOBB), in 1936. There is no documentation of Navy-specific activities at Site 28, other than routine repairs, maintenance, and reinforcements of the roadway and ramp structures.

The Navy owned the property comprising the ramps and the area beneath the bridge until 2001, when the Federal Highway Administration (FHWA) transferred the bridge right-of-way and ramps from the Navy to the California Department of Transportation (Caltrans). A boundary adjustment was made in 2005 so that all lands deeded to Caltrans from Site 28 or 29 were included within Site 29. The West Side On-Off Ramps were not part of the boundary adjustment and remained part of Site 28 (Figure 3).

TI₍₄₎ was built on the Yerba Buena Shoals, a sand spit that extended from the northwest point of YBI. Dredging and construction of the island began in 1936 and were completed in 1937. Approximately 29 million cubic yards of fill, primarily consisting of sand with lesser amounts of silt, clay, and gravel, were transported to or dredged from the Bay and the Sacramento River Delta and used for construction of the island. The island was originally used for the Golden Gate International Exposition in 1939. In 1941, in response to a Navy request, the City of San Francisco leased TI, YBI, and the surrounding offshore area to the Navy for the duration of World War II. After the war, the City of San Francisco agreed to trade the deed of NAVSTA TI to the Navy in exchange for government-owned land south of San Francisco. The Navy operated TI for various Naval activities including a medical clinic, fuel farm, service station, fire training school, waterfront facilities, ammunition storage, troop and family housing, personnel support, a brig, and a Navy and Marine Corps museum.

2.2 SITE CHARACTERISTICS

Other than the roads running through Site 28, most of the site is steeply sloped to the southwest toward the San Francisco Bay and densely vegetated with trees and brush; no other features exist at Site 28, and the site remains as open space along the shoreline.

DON⁽⁵⁾ owned the property comprising the ramps and the area beneath the bridge until 2001, when the FHWA transferred the bridge right-of-way and ramps from DON to Caltrans. Caltrans was identified as a potentially responsible party (PRP) in the transfer deed. A boundary adjustment was made in 2005 so that all lands deeded to Caltrans, except current Site 28, were included within Site 29. The West Side On-Off Ramps were not part of the boundary adjustment and remained part of Site 28. Currently, Site 28 is not being used by DON. Construction activities for the new SFOBB are currently underway on Sites 8 and 29 on the eastern side of YBI, and the deed for these two sites has been granted to Caltrans by the FHWA. Construction activities will likely not impact Site 28, even as bridge construction progresses to the west.

Environmental settings⁽⁶⁾ are summarized in the Final RI report. Much of the habitat at Site 28 is disturbed due to road maintenance and erosion control activities, and is expected to continue to be disturbed in this manner in the future. Birds classified as endangered by either the state or federal government are known to inhabit the region and have been reported historically to forage at or near NAVSTA TI. Two pairs of the peregrine falcon, a state endangered species, are known to nest on the SFOBB. However, no sightings of these birds have been reported at TI or YBI in the California Natural Diversity Database.

A special-status plant survey of YBI conducted in 1996 indicated the presence of the dune gilia (*Gilia capitata ssp. chamissonis*) on the west-facing slope below Treasure Island Road (where Site 28 is located), which is listed as a special-status plant by the California Native Plant Society.

2.3 PREVIOUS INVESTIGATIONS

Site 28 was identified as an IR Site in 1993 after metal impacts to soils at the site were identified during the Health and Safety Soil Sampling in 1993, and **data collected**⁽⁷⁾ during the Phase IIB investigation at Site 28 were incorporated into a Final RI report. In addition, the results of all investigations were compiled in the Final RI and used as a basis to evaluate potential human health and ecological risks. The human health risk assessment (HHRA) was completed following Navy, EPA, and DTSC's regulatory guidelines. The HHRA and ecological risk assessment (ERA) were included in the Final RI report.

There is no enforcement activity related to Site 28. Environmental investigations associated with Site 28 were implemented under the base-wide IR Program, as discussed above.

Investigation activities previously performed at Site 28 include the Health and Safety Soil Sampling Investigation, the Phase IIB RI, and the validation study. More detailed description of past investigations is presented in the Final RI report. **Table 1** summarizes the previous CERCLA studies, investigations, and the **Proposed Plan**⁽²⁾, as well as other studies, investigations, and removal actions conducted under the DON cleanup programs and other authorities.

TABLE 1 PREVIOUS INVESTIGATIONS

Previous Investigation	Date	Investigation Activities
CERCLA Investigations and Studies		
Remedial Investigation	1995	The primary objective of the RI conducted in 1995 was to assess the extent of the metals contamination in the soil, and to determine whether the soil had been contaminated as a result of activities associated with maintenance of the West Side On-Off Ramps. Fourteen sampling locations were selected for shallow soil sampling, and 23 soil samples were collected from a depth of 0 to 2 feet bgs.
Final Validation Study	2001	In 2001, the Navy conducted a study to validate the results of the SLERA performed in 1997 as part of the 1995 RI. Specifically, the validation study was conducted to confirm SLERA results for the American peregrine falcon.
Proposed Plan	2010	The Proposed Plan ⁽²⁾ invited the public to review and comment on the finding of NFA for Site 28 before the final remedy was selected. Regulatory agencies concurred with the NFA.
Various Compliance Program Investigations, Studies, and Removal Actions		
Health and Safety Soil Sampling Investigation	1993	The investigation was conducted in 1993 in connection with health and safety concerns for workers performing seismic improvements to the on- and off-ramps in areas possibly containing elevated concentrations of metals in airborne dust; the investigation was not designed to provide data of sufficient quality to support a HHRA.

Notes:

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	HHRA	Human health risk analysis
		RI	Remedial Investigation
NFA	No further action	SLERA	Screening level ecological risk assessment

2.4 CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USE

In 1993, the BRAC Commission, pursuant to the Defense Base Closure and Realignment Act of 1990 (Pub. L. 101-510, Title XXIX, 10 USC § 2687 note), recommended the closure of NAVSTA TI. NAVSTA TI was subsequently closed on September 30, 1997, and is currently in the process of being transferred. Potential future land and resource use are discussed below.

Land Use

According to the Draft Naval Station Treasure Island Reuse Plan dated 1996, **Site 28**⁽⁸⁾ is designated with a future use as shoreline open space. The future use of Site 28 will be further restricted by its inclusion in the Tidelands Trust.

Tidelands Trust

Treasure Island was built by depositing dredge material on the tidelands and shoals located to the north of YBI; TI is therefore subject to the provisions of the common law public trust doctrine, sometimes referred to collectively as the “Public Trust” or the **“Tidelands Trust”**⁽⁹⁾. The Tidelands

Trust is overseen by the California State Lands Commission, and administered by the State Legislature. **The Public Trust Doctrine**⁽¹⁰⁾ includes the principle that certain resources are preserved for public use, and that the government is required to maintain such resources for the public's reasonable use in the State of California. The Tidelands Trust imposes the following restrictions on the development of Treasure Island:

- Land uses are limited to Trust purposes. Residential, industrial, and non-maritime uses are prohibited.
- Sale of Trust lands to private entities is prohibited.
- Once Site 28 is brought into Tidelands Trust jurisdiction, it cannot be removed from the Trust, and land-use restrictions will remain in perpetuity.
- Revenues generated from Trust uses must be expended for Trust purposes.

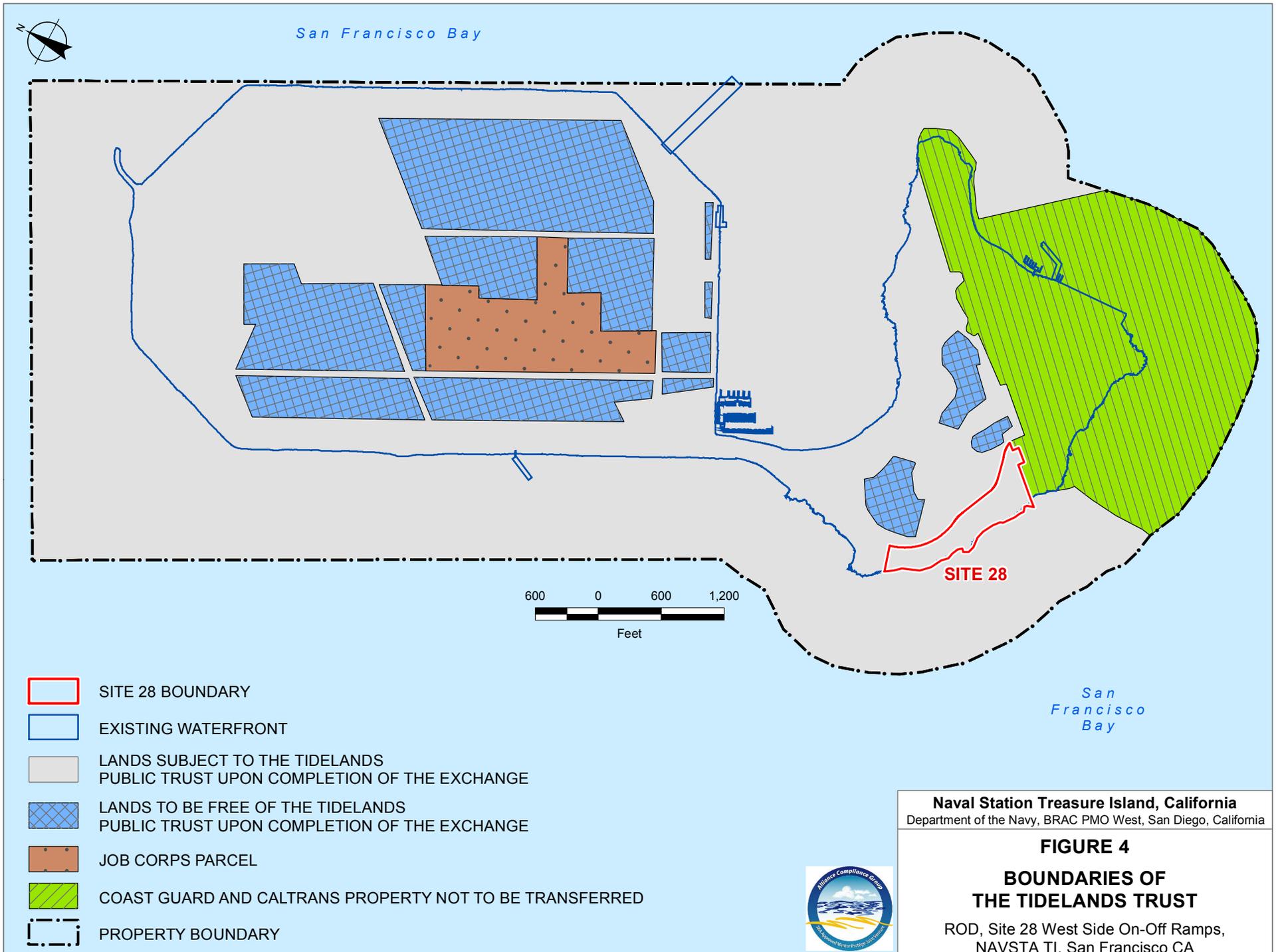
The Treasure Island Tidelands Trust Exchange Act of 2004 proposed an exchange of lands under which non-Trust lands on YBI would be brought into the Trust, and Trust lands on TI would be released from the Trust. This type of exchange is allowed under the Tidelands Trust. Upon inclusion in the Tidelands Trust, Site 28 lands would be limited to uses that attract people to the waterfront, promote public recreation, protect habitat, and/or preserve open space. The lands on YBI proposed for inclusion in the Tidelands Trust include the entirety of Site 28, as shown in **Figure 4**. The **inclusion of Site 28**⁽¹¹⁾ in the Tidelands Trust is expected to occur soon after transfer of the property from the DON to the Treasure Island Development Authority.

Resource Use

Under the San Francisco Bay Basin Water Quality Control Plan, all **groundwater**⁽¹²⁾ within the Bay Basin which meets the criteria in State Water Resources Control Board (SWRCB) Resolution No. 88-63 has a potential beneficial use for municipal or domestic supply. However, Site 28 does not contain any artificial fill, nor is it adjacent to any locations containing artificial fill. Any groundwater available in the colluvium or bedrock at Site 28 is not expected to meet the minimum yield criteria and would not be a feasible source of water from an economic point of view or from a groundwater industry standard.

2.5 SUMMARY OF SITE RISKS

DON conducted baseline human health and ecological risk assessments as part of the RI at Site 28. A baseline risk assessment estimates risks posed by a site if no action were taken. The baseline risk assessment provides the basis for taking action and identifies the contaminant(s) and exposure pathway(s) which need to be addressed by any proposed remedial action. This section of the ROD introduces basic risk assessment nomenclature and summarizes the results of baseline risk assessments for Site 28 at NAVSTA TI.



“Risk values” are probabilities usually expressed in scientific notation (for example, 1×10^{-6} , which is the same as 1-in-1,000,000). An excess lifetime cancer risk of 1×10^{-6} indicates that a hypothetical individual experiencing the estimated reasonable maximum exposure (RME) would have a theoretical 1-in-1,000,000 chance of developing cancer as a result of site-related exposure, referred to as a “theoretical excess lifetime cancer risk” because it would be in addition to the risks of cancer individuals would face from other causes (such as smoking or exposure to too much sun). EPA’s generally acceptable risk range for site-related exposure is 1×10^{-4} to 1×10^{-6} and is referred to as the “risk management range.”

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified period (for example, an entire lifetime) with a reference dose (RfD) derived for a similar exposure period. An RfD represents a level that an individual may be exposed to which is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ less than 1.0 indicates that the receptor’s dose of a single contaminant is less than the RfD and that toxic noncancer effects from the chemical are unlikely. The hazard index (HI) is the sum of more than one HQ for multiple chemicals and/or multiple exposure pathways. An HI less than 1.0 indicates that toxic noncancer effects from all contaminants are unlikely. An HI greater than 1.0 indicates that site-related exposures may present a risk to human health.

The following sections provide a more complete summary of both the human health and ecological risks for Site 28.

2.5.1 Summary of Human Health Risks Assessment

A quantitative baseline HHRA was completed based on RI data collected for Site 28 in 1995 and the **conceptual site model (CSM) for human health**⁽¹³⁾. This risk assessment evaluated all potential human receptors for Site 28. Specifically, potential exposures under both current and alternative land uses were considered, including potential risks to construction workers (i.e., exposure under current land use) and these hypothetical receptors: commercial/industrial workers, future residents, and recreational site visitors. Many of these human receptors and exposure pathways are not valid because of steep, rocky slopes unsuitable for construction, impending inclusion in Tidelands Trust lands, and proximity to the SFOBB. Groundwater is not a current or potential drinking-water source at Site 28, and is present at a depth greater than 10 feet bgs at this steeply sloped site; hence, the groundwater exposure pathway is not evaluated.

Both **site-related risks and total risks**⁽¹⁴⁾ were evaluated for each receptor. The baseline total risk estimates for construction workers, residents, and commercial/industrial workers were evaluated based on potential exposure to all chemicals; these included naturally occurring chemicals, but excluded naturally occurring minerals. Site-related risks were estimated based on potential exposure to all chemicals resulting from site-related activities, but excluded those that are naturally occurring. The results of this complete evaluation provided additional information for making risk management decisions relative to the necessity for or selection of remedial alternatives at Site 28.

Chemicals of potential concern (COPC)⁽¹⁵⁾ were identified using two methods: Method 1 satisfies the Navy and Federal Requirements, and Method 2 satisfies state requirements. Using Method 1, only one site-related COPC was identified: lead in soil. Using Method 2, site-related COPCs included lead, antimony, and thallium in soil.

Calculation of potential risks⁽¹⁶⁾ are based on RME assumptions recommended by EPA and DTSC rather than an average or medium-range exposure assumption. RME assumptions provide a conservative and health-protective approach that estimates the highest health risks that are reasonably expected to occur at a site. Actual risks from exposures to **COPCs**⁽¹⁵⁾ in soil at Site 28 are likely to be lower.

Among the three identified COPCs, antimony and thallium are considered noncarcinogenic by EPA, while **lead**⁽¹⁷⁾ was evaluated using DTSC’s LeadSpread model; hence, cancer risks were not estimated for potential exposures to the three COPCs at Site 28. Based on the **HHRA results**⁽¹⁸⁾ and as discussed in more detail below, the noncancer HIs for commercial/industrial worker, construction worker, and resident exposure were below the noncancer hazard threshold of 1.0.

Table 2 and **Table 3** summarize lead threshold screening and LeadSpread results for lead for soil from 0 to 6 inches bgs and from 0 to 2 feet bgs. Lead was identified as COPC under both Method 1 and Method 2. LeadSpread modeling results of blood-lead levels are identical for these two methods.

TABLE 2 LEAD THRESHOLD/LEADSPREAD RESULTS (SURFACE SOIL 0 TO 6 INCHES BGS)

Receptor Scenario	Lead EPC and Threshold Comparison/Calculated Blood-Lead Concentration for Hypothetical Future Resident
Commercial/Industrial Worker	Lead EPC = 302 mg/kg, less than EPA Region IX RSL for industrial soils (800 mg/kg)
Construction Worker	Lead EPC = 302 mg/kg, less than site-specific RSL for construction worker (966 mg/kg)
Resident	Lead EPC = 302 mg/kg, less than EPA Region IX RSL for residential soils (400 mg/kg). Blood Lead Level – Adult Resident = 2.7 µg/dL; Child Resident = 9.4 µg/dL

Notes:

µg/dL	Micrograms per deciliter	EPC	Exposure-point concentration
bgs	Below ground surface	mg/kg	Milligrams per kilogram
EPA	U.S. Environmental Protection Agency	RSL	Regional Screening Level

TABLE 3 LEAD THRESHOLD/LEADSPREAD RESULTS (SURFACE SOIL 0 TO 2 FEET BGS)

Receptor Scenario	Lead EPC and Threshold Comparison/Calculated Blood-Lead Concentration for Hypothetical Future Resident
Commercial/Industrial Worker	Lead EPC = 830 mg/kg, greater than EPA Region IX RSL for industrial soils (800 mg/kg)
Construction Worker	Lead EPC = 830 mg/kg, less than site-specific RSL for construction worker (966 mg/kg)
Resident	Lead EPC = 830 mg/kg, greater than EPA Region IX RSL for residential soils (400 mg/kg). Blood Lead Level – Adult Resident = 4.2 µg/dL; Child Resident = 20.6 µg/dL

Notes:

µg/dL	Micrograms per deciliter	EPC	Exposure-point concentration
bgs	Below ground surface	mg/kg	Milligrams per kilogram
EPA	U.S. Environmental Protection Agency	RSL	Regional Screening Level

Using LeadSpread, blood-lead modeling of the lead exposure-point concentration (EPC) (302 mg/kg) in site-wide surface soil from 0 to 6 inches bgs resulted in a 99th percentile blood-lead concentration below 10 microgram per deciliter (µg/dL) for both the adult resident (2.7 µg/dL) and the child resident (9.4 µg/dL). This lead EPC is also below the **EPA Region IX residential soil RSL₍₁₉₎** of 400 mg/kg. Blood-lead modeling of the lead EPC (830 mg/kg) in site-wide surface soil from 0 to 2 feet bgs resulted in a 99th percentile blood-lead concentration below 10 µg/dL for the adult resident (4.2 µg/dL), but a 99th percentile blood-lead concentration above 10 µg/dL for the child resident (20.6 µg/dL). In addition, this lead EPC exceeded the RSL for industrial soil (800 mg/kg) but was below a construction worker RSL of 966 mg/kg, which was developed using EPA methodology and was presented in the Final RI report.

It should be noted that the lead EPC in soil from 0 to 2 feet bgs (830 mg/kg) was largely influenced by four of the forty overall soil samples. The detected concentrations of lead exceeding the EPA Region IX RSL for residential soil (400 mg/kg) were limited to these four samples. Sample results from these locations were excluded and the 0 to 2 feet bgs EPC was recalculated. The “adjusted” lead EPC for 0 to 2 feet bgs is 398 mg/kg, which is below both the RSL for residential soil and the RSL for industrial soil. In addition, blood-lead modeling of a recreational receptor was conducted using the highest lead EPC of 956 mg/kg, which was calculated to represent localized lead “hot spots” found in surface soil at locations 28-SB05, 28-SB06, and 28-SB07; this modeling resulted in a 99th percentile blood-lead concentration, which is below 10 µg/dL for both the adult (2.3 µg/dL) and the child (5.9 µg/dL) recreational receptors.

In addition to the LeadSpread analysis for lead in soil summarized above, site-related and total risks were calculated for antimony and thallium, the two COPCs identified by Method 2 only, in soil. Both of these metals are considered noncarcinogenic by the EPA; hence, potential health risks associated with antimony and thallium were estimated based on the calculation of the noncancer HIs.

Table 4 summarizes Method 2 site-related risk and total risk estimates under the more health-protective assumptions of RME. Total cancer risk resulting from the site background (i.e, total risk) ranges from 2×10^{-6} to 5×10^{-5} for all three categories of receptors. Since lead was evaluated using LeadSpread and in the absence of other site-related carcinogenic compounds, there are no site-related cancer risks at Site 28. Both total and site-related HIs are below 1.0, which indicates that toxic noncancer effects from all chemicals are insignificant.

The HHRA specifies the **uncertainties**⁽²⁰⁾ inherent in the risk assessment process based on the number of samples collected, their location, the literature-based exposure and toxicity values used to calculate risks, and risk characterization or underestimation of the actual cancer risk or HI. In general, the risk assessment process is based on the use of health-protective assumptions that, when combined, are intended to overestimate the actual risks.

Based on the HHRA results and the Tidelands Trust restrictions on future use of Site 28, potential health impacts to current and potential future site occupants are considered minimal. Therefore, no action is warranted to protect human health.

TABLE 4 METHOD 2 SITE-RELATED RISK AND TOTAL RISK ESTIMATES

Receptor	RME Cancer Risk		RME Noncancer HI	
	Site-Related	Total	Site-Related	Total
Commercial/Industrial Worker – Exposure to Soil (0-2 feet bgs) ¹	NA	1E-05	0.01	0.1
Construction Worker – Exposure to Soil (0-2 feet bgs) ¹	NA	2E-06	0.04	0.4
Resident – Exposure to Soil (0-2 feet bgs) ¹	NA	5E-05	0.2	1.0

Notes:

- | | | | |
|-----|--|-----|-----------------------------|
| 1 | Exposure to soil via incidental ingestion, dermal contact, and inhalation of particulates or vapors in outdoor air | HI | Hazard Index |
| bgs | Below ground surface | RME | Reasonable maximum exposure |
| NA | Not applicable | | |

2.5.2 Summary of Ecological Risks Assessment

The ERA for Site 28 was finalized in 2001 with the completion of the validation study for YBI Sites 8, 11, 28, and 29. The ERA was completed in three phases. In Phase I, the problem formulation was developed based on existing data, biotic surveys, and fate-and-transport analysis. This information helped form the basis of the ecological portion of the conceptual site model and helped focus the additional work needed to complete the screening-level ecological risk assessment (SLERA) under Phase II. On YBI, all IR sites were recommended for further evaluation in a SLERA.

In Phase II of the **ERA**⁽²¹⁾, a SLERA was conducted for Sites 8, 11, 28, and 29 as part of the Draft Final RI Report. A **CSM for terrestrial receptors**⁽²²⁾ was developed for Site 28. The SLERA focused on three representative species, the deer mouse (*Peromyscus maniculatus*),

American kestrel (*Falco sparverius*), and American peregrine falcon (*Falco peregrinus anatum*). The deer mouse and American kestrel were selected to represent small mammals and raptors, respectively; the peregrine falcon was selected because it is a state endangered species and two pairs are known to nest on the SFOBB. Potential risks posed by ingestion of chemicals of potential ecological concern (COPEC) in prey and soil were assessed using an exposure-dose and -effect model (food-chain model [FCM]).

The results of the FCM conducted in the SLERA indicated potential risk to peregrine falcons under conservative exposure and effect conditions at Sites 8, 11, 28, and 29. To further evaluate potential risk to the peregrine falcon, a validation study using site-collected bird-tissue data was recommended. The FCM conducted in the SLERA also indicated possible risk to small mammals from the concentrations of chemicals at the site; however, based on the small total area of the sites, the disturbed nature of the sites, and continuing disturbance of the sites from planned construction on the SFOBB, the DON and regulatory agencies agreed that further evaluation of small mammals was not necessary (as stated in the comments received by the DTSC on January 23, 1998).

The final phase of the ERA, the validation study, was completed in December 2001. The conclusion of the validation study was that Sites 8, 11, 28, and 29 posed minimal risks to **peregrine falcons**⁽²³⁾. At the request of the regulatory agencies, EPCs were recalculated in the RI report to include data collected after the completion of the ERA. These recalculated EPCs were evaluated to ensure that the overall conclusions of the ERA did not change. A comparison of the EPCs used in the SLERA and validation study with those calculated in 2005 as part of the RI was completed as part of the Final RI report. The results of this comparison showed that, overall, EPCs have decreased.

Based on the information and data presented in the Draft Final RI Report, the validation study, and the re-evaluation of EPCs in the RI, the Navy considers chemical concentrations in soils at Sites 8, 11, 28, and 29 to pose minimal risk to ecological receptors. No further investigation or action for ecological concerns was recommended in the Final RI report for Site 28.

The ERA found that chemical levels in soil at Site 28 pose minimal risk to ecological receptors. Based on the findings of the risk assessments and the planned future land use and restrictions as a result of the Tidelands Trust, the Navy, DTSC, EPA, and Water Board agree that no action is necessary at Site 28.

2.6 COMMUNITY PARTICIPATION

The **Final Community Relations Plan**⁽²⁴⁾ for NAVSTA TI was updated in May 2008. The Navy maintains an active community participation program through the NAVSTA TI Restoration Advisory Board (RAB). The RAB is made up of federal, state, and local government representatives and citizens. Through regular meetings, the Navy informs the RAB of the progress of investigations and solicits input on planned environmental investigations and

actions. In addition, the Navy issues fact sheets and newsletters to keep the public informed of IR Program activities at NAVSTA TI and follows CERCLA community relations requirements.

The Final RI report for Site 28 at NAVSTA TI was completed in February 2009. The **Proposed Plan**(2) for Site 28 was released to the public on April 29, 2010. The Final RI report and the **Proposed Plan**(2) were both made available for a 30-day public review period through both the following two locations, and they were also posted on the **IR Program website**(25) (http://www.bracpmo.navy.mil/basepage.aspx?baseid=44&state=California&name=treasure_island):

San Francisco Public Library
100 Larkin Street (at Grove)
San Francisco, CA 94102-4733

Library Hours:
Sunday: 12:00 p.m. – 5:00 p.m.
Monday and Saturday: 10:00 a.m. – 6:00 p.m.
Tuesday through Thursday: 9:00 a.m. – 8:00 p.m.
Friday: 12:00 p.m. – 6:00 p.m.

Treasure Island Information Repository
410 Palm Avenue, Building 1, Room 161
Treasure Island, CA 94130-1806

Library Hours:
Monday through Friday: 8:00 a.m. – 5:00 p.m.

For access to the Administrative Record, contact:

Ms. Diane Silva
Naval Certified Command Records Manager
NAVFAC Southwest 1220 Pacific Highway, Code EV33
NBSD Bldg. 3159
San Diego, CA 92132
Phone: (619) 556-1280

For additional information on the IR Program, contact:

Mr. James Sullivan
BRAC Environmental Coordinator
Navy BRAC PMO West
1455 Frazee Road, Suite 900
San Diego, CA 92108-4310
Phone: (619) 532-0966

In accordance with CERCLA §§ 113 and 117 and NCP § 300.430(f)(3), DON provided a public comment period for the proposed NFA remedy for Site 28 described in the **Proposed Plan**(2) from April 29 to May 29, 2010. The Proposed Plan was mailed to the TI community mailing list on April 29. Public notice of the meeting and availability of documents was placed in the *San Francisco Examiner* on May 2, 2010, on the **IR Program website**(25), and noted in the

Proposed Plan⁽²⁾. A public meeting to present the Proposed Plan was held on May 12, 2010. A transcript of the public meeting is included as [Appendix C](#) to this ROD.

3.0 RESPONSIVENESS SUMMARY

The responsiveness summary is the third component of a ROD; its purpose is to summarize information about the views of the public and support agencies on both the NFA and general concerns about the site submitted during the public comment period. It documents how public comments were integrated into the decision-making process. The participants in the public meeting held on May 12, 2010, included community members and representatives of the Navy and Water Board.

There were no oral or written comments received during the public meeting held on May 12, 2010, or via mail during the public comment period from April 29 through May 29, 2010.

ACRONYMS AND ABBREVIATIONS

µg/dL	Micrograms per deciliter
§	Section
ARAR	Applicable or relevant and appropriate requirement
BCT	Base Realignment and Closure Cleanup Team
bgs	Below ground surface
BRAC	Base Realignment and Closure
Cal/EPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	Chemical of potential concern
COPEC	Chemical of potential ecological concern
CSM	Conceptual Site Model
DON	Department of Navy
DTSC	State of California Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
EPC	Exposure-point concentration
ERA	Ecological risk assessment
FCM	Food chain model
FFSRA	Federal Facility IR Site Remediation Agreement
FHWA	Federal Highway Administration
HHRA	Human health risk assessment
HI	Hazard index
HQ	Hazard quotient
HSAA	State of California Hazardous Substances Account Act
HSC	California Health and Safety Code
IR	Installation Restoration
mg/kg	Milligrams per kilogram
NAVSTA TI	Naval Station Treasure Island
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	No further action
PA/SI	Preliminary assessment/site inspection
PRP	Potentially responsible party

ACRONYMS AND ABBREVIATIONS (CONTINUED)

RAB	Restoration Advisory Board
RfD	Reference dose
RI	Remedial Investigation
RI/FS	Remedial investigation/feasibility study
RME	Reasonable maximum exposure
RPM	Remedial project manager
ROD	Record of decision
RSL	Regional Screening Level
SARA	Superfund Amendments and Reauthorization Act
SFOBB	San Francisco–Oakland Bay Bridge
Site 28	Installation Restoration Site 28
SLERA	Screening-level ecological risk assessment
SWRCB	State Water Resources Control Board
TI	Treasure Island
Water Board	San Francisco Bay Regional Water Quality Control Board
YBI	Yerba Buena Island

APPENDIX A
ADMINISTRATIVE RECORD INDEX

TREASURE ISLAND NAVSTA

DRAFT ENVIRONMENTAL RESTORATION RECORD INDEX - UPDATE (SORTED BY RECORD DATE/RECORD NUMBER)

DOCUMENTS RELATED TO SITE 28

UIC No. / Rec. No.	Record Date	Author				Location	FRC Accession No.
Doc. Control No.	Prc. Date	Author Affil.				SWDIV Box No(s)	FRC Warehouse
Record Type	SSIC No.	Recipient	Subject	Distribution	Sites	CD No.	— FRC Box No(s) —
Contract No.	CTO No.	Recipient Affil.					
Approx. # Pages							
N60028 / 000793 NONE CORRESPONDENCE N62474-94-D-7609 6	11-04-1997 11-29-1999 5090.3.A. 00183	GALANG, E. NAVY RIST, D. DTSC - BERKELEY, CA	CONFERENCE CALL MEETING MINUTES, RESPONSE TO COMMENTS REVIEW MEETING	INFO REPOSITORY	SITE 00011 SITE 00028 SITE 00029	FRC - PERRIS	181-03-0181 BX 0020 41106473
N60028 / 000792 NONE CORRESPONDENCE N62474-94-D-7609 2	12-03-1997 11-29-1999 5090.3.A. 00183	GALANG, E. NAVY RIST, D. DTSC - BERKELEY, CA	SUBMISSION OF THE CONFERENCE CALL MEETING MINUTES, RESPONSE TO COMMENTS REVIEW MEETING ON 04 NOVEMBER 1997, AND VALIDATION STUDY FOR SITES 11, 28, AND 29, DRAFT W	INFO REPOSITORY	SITE 00011 SITE 00028 SITE 00029	FRC - PERRIS	181-03-0181 BX 0020 41106473
N60028 / 000794 REPORT N62474-94-D-7609 66	12-03-1997 11-29-1999 5090.3.A. 00183	GADE, KRISTIN J. TETRA TECH GALANG, ERNESTO NAVY	VALIDATION STUDY FOR SITES 11, 28, AND 29, DRAFT WORK PLAN/FIELD SAMPLING PLAN (WP/FSP)	INFO REPOSITORY	SITE 00011 SITE 00028 SITE 00029	FRC - PERRIS	181-03-0181 BX 0020 41106473
N60028 / 000820 NONE CORRESPONDENCE NONE 7	01-23-1998 11-29-1999 5090.3.A. NONE	RIST, D. DTSC - BERKELEY, CA GALANG, E. NAVY	COMMENTS ON THE VALIDATION STUDY FOR SITES 11, 28, AND 29 DRAFT WORK PLAN/FIELD SAMPLING PLAN (WP/FSP)	ADMIN RECORD	SITE 00011 SITE 00028 SITE 00029	FRC - PERRIS	181-03-0181 BX 0021 41106473
N60028 / 000829 NONE CORRESPONDENCE N62474-94-D-7609 2	02-23-1998 11-29-1999 5090.3.A. 00183	GALANG, E. NAVY RIST, D. DTSC - BERKELEY, CA	SUBMISSION OF THE VALIDATION STUDY FOR SITES 11, 28, AND 29; FINAL WORK PLAN/FIELD SAMPLING PLAN (WP/FSP) - 23 FEBRUARY 1998	INFO REPOSITORY	SITE 00011 SITE 00028 SITE 00029	FRC - PERRIS	181-03-0181 BX 0021 41106473

UIC No. / Rec. No.	Record Date	Author					Location	FRC Accession No.	
Doc. Control No.	Prc. Date	Author Affil.					SWDIV Box No(s)	FRC Warehouse	
Record Type	SSIC No.	Recipient	Subject	Distribution	Sites	CD No.		FRC Box No(s)	
Contract No.	CTO No.	Recipient Affil.							
Approx. # Pages									
N60028 / 000830	02-23-1998 11-29-1999	GADE, KRISTIN, J TETRA TECH	VALIDATION STUDY FOR SITES 11, 28, AND 29; FINAL WORK PLAN/FIELD SAMPLING PLAN (WP/FSP)	ADMIN RECORD	SITE 00011 SITE 00028 SITE 00029	FRC - PERRIS	181-03-0181 41106473	BX 0021	
REPORT N62474-94-D-7609 72	5090.3.A. 00183	GALANG, ERNESTO NAVY							
N60028 / 000912	10-09-1998 11-29-1999	GALANG, E. NAVY	SUBMISSION OF THE TECHNICAL MEMORANDUM (TM), BIRD SURVEY RESULTS FOR THE VALIDATION STUDY FOR SITES 11, 28, AND 29 - 09 OCTOBER 1998	ADMIN RECORD	SITE 00011 SITE 00028 SITE 00029	FRC - PERRIS	181-03-0181 41106473	BX 0022	
NONE CORRESPONDENCE N62474-94-D-7609 2	5090.3.A. 00183	RIST, D. DTSC - BERKELEY, CA							
N60028 / 000913	10-09-1998 11-29-1999	GADE, KRISTIN J. TETRA TECH	TECHNICAL MEMORANDUM (TM), BIRD SURVEY RESULTS FOR THE VALIDATION STUDY FOR SITES 11, 28, AND 29	ADMIN RECORD	SITE 00011 SITE 00028 SITE 00029	FRC - PERRIS	181-03-0181 41106473	BX 0023	
REPORT N62474-94-D-7609 32	5090.3.A. 00183	GALANG, ERNESTO NAVY							

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Location	FRC Accession No.			
Doc. Control No.	Prc. Date	Author	Author Affil.	SWDIV Box No(s)	FRC Warehouse			
Record Type	SSIC No.	Recipient	Recipient Affil.	CD No.	FRC Box No(s)			
Contract No.	CTO No.	Subject	Distribution	Sites				
Approx. # Pages								
N60028 / 001107	02-03-2000	GALANG, E.	REMEDIAL PROJECT MANAGER AND BRAC	ADMIN RECORD	BLDG 0001133	FRC - PERRIS	181-03-0181	BX 0027
SWDIV SER	03-31-2000	NAVFAC -	CLEANUP TEAM (RPM/BCT) MEETING		BLDG 0001205		41106473	
6225EG/L0034-3	5090.3.A.	SOUTHWEST	MINUTES - 14 DECEMBER 1999: FINAL -		BLDG 0001207			
MINUTES	NONE		STRATEGIC PLANNING SESSION 1		BLDG 0001209			
NONE		MULTIPLE	(INCLUDES 4 ATTACHMENTS: AGENDA,		BLDG 0001231			
30		AGENCIES	SIGN-IN SHEET, VARIOUS HANDOUTS)		BLDG 0001232			
					BLDG 0001233			
					BLDG 0001244			
					BLDG 0001251			
					BLDG 0001253			
					SITE 00001			
					SITE 00003			
					SITE 00004			
					SITE 00005			
					SITE 00006			
					SITE 00007			
					SITE 00008			
					SITE 00009			
					SITE 00009B			
					SITE 00010			
					SITE 00011			
					SITE 00011B			
					SITE 00012			
					SITE 00012B			
					SITE 00013			
					SITE 00014			
					SITE 00014B			
					SITE 00015			
					SITE 00015B			
					SITE 00016			
					SITE 00017			
					SITE 00017A			
					SITE 00019			
					SITE 00020			
					SITE 00020B			

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Subject	Distribution	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
						SITE 00021 SITE 00021B SITE 00021C SITE 00022 SITE 00022B SITE 00024 SITE 00024B SITE 00025 SITE 00025B SITE 00027 SITE 00028 SITE 00029 SITE 0006B		
N60028 / 001110 SWDIV SER 6225EG/L0034-1 MINUTES NONE 25	02-03-2000 03-31-2000 5090.3.A. NONE	GALANG, E. NAVFAC - SOUTHWEST MULTIPLE AGENCIES		REMEDIAL PROJECT MANAGER AND BRAC CLEANUP TEAM (RPM/BCT) MEETING MINUTES - 06 DECEMBER 1999: REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (INCLUDES 3 ATTACHMENTS: AGENDA, SIGN-IN SHEET AND VARIOUS HANDOUTS)	ADMIN RECORD	BLDG 0001133 BLDG 0001205 BLDG 0001207 BLDG 0001209 BLDG 0001231 BLDG 0001232 BLDG 0001233 BLDG 0001244 BLDG 0001251 BLDG 0001253 SITE 00001 SITE 00003 SITE 00006 SITE 00011 SITE 00012 SITE 00028 SITE 00029	FRC - PERRIS	181-03-0181 BX 0027 41106473

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Location	FRC Accession No.		
Doc. Control No.	Prc. Date	Author	Author Affil.	SWDIV Box No(s)	FRC Warehouse		
Record Type	SSIC No.	Recipient	Recipient Affil.	CD No.	FRC Box No(s)		
Contract No.	CTO No.	Subject	Distribution	Sites			
Approx. # Pages							
N60028 / 001119	03-28-2000	GALANG, E.	TRANSMITTAL OF REMEDIAL PROJECT	ADMIN RECORD	BLDG 0001127	FRC - PERRIS	181-03-0186 BX 0003
SWDIV SER	05-03-2000	NAVFAC -	MANAGER (RPM)/BRAC CLOSURE TEAM		BLDG 0001207		41031802
6225EG/L0088-1	5090.3.A.	SOUTHWEST	(BCT) MEETING MINUTES OF 1 FEBRUARY		BLDG 0001313		
MINUTES	NONE		AND 8 FEBRUARY 2000 RE: REMEDIAL		BLDG 0001315		
NONE		MULTIPLE	INVESTIGATION/FEASIBILITY STUDY (RI/FS)		BLDG 0001317		
40		AGENCIES	(W/ENCLOSURES) (*SEE COMMENT FIELD		BLDG 0001321		
			BELOW)		BLDG 0001323		
					BLDG 0001325		
					SITE 00001		
					SITE 00003		
					SITE 00004		
					SITE 00005		
					SITE 00006		
					SITE 00007		
					SITE 00008		
					SITE 00009		
					SITE 00010		
					SITE 00011		
					SITE 00012		
					SITE 00013		
					SITE 00014		
					SITE 00015		
					SITE 00016		
					SITE 00017		
					SITE 00019		
					SITE 00020		
					SITE 00021		
					SITE 00022		
					SITE 00024		
					SITE 00025		
					SITE 00027		
					SITE 00028		
					SITE 00029		
					UST 227		
					UST 270		

UIC No. / Rec. No.	Record Date	Author					Location	FRC Accession No.
Doc. Control No.	Prc. Date	Author Affil.		Subject	Distribution	Sites	SWDIV Box No(s)	FRC Warehouse
Record Type	SSIC No.	Recipient					CD No.	FRC Box No(s)
Contract No.	CTO No.	Recipient Affil.						
Approx. # Pages								
						WELL 025-MW02 WELL 025-MW04 WELL 143-MW1 WELL 143-MW2		
N60028 / 000115 TC.0308.10711 MM N62474-94-D-7609 40	08-08-2000 12-19-2000 5090.3.A. 00308	TETRA TECH EM, INC. NAVFAC - SOUTHWEST DIVISION		DRAFT - REMEDIAL PROJECT MANAGER AND BRAC CLEANUP TEAM (RPM/BCT) MEETING MINUTES - 08 AUGUST 2000 - INCLUDES SIGN-IN SHEET, AGENDA, FIGURES, SAMPLES, AOC'S FROM BRAC HISTORICAL STUDY, SUMMARY OF UPCOMING DOCUMENTS	ADMIN RECORD INFO REPOSITORY	BLDG 0001105 BLDG 0001107 PARCEL 0001 PARCEL 0003 PARCEL 0004 SITE 00008 SITE 00010 SITE 00012 SITE 00028	FRC - PERRIS	181-03-0181 BX 0003 41106473
N60028 / 000117 TC.0308.10712 MM N62474-94-D-7609 50	10-03-2000 12-19-2000 5090.3.A. 00308	TETRA TECH EM, INC. NAVFAC - SOUTHWEST DIVISION		DRAFT - REMEDIAL PROJECT MANAGER	ADMIN RECORD INFO REPOSITORY	SITE 00003 SITE 00004 SITE 00005 SITE 00006 SITE 00007 SITE 00008 SITE 00009 SITE 00010 SITE 00011 SITE 00012 SITE 00015 SITE 00017 SITE 00019 SITE 00021 SITE 00024 SITE 00025 SITE 00027 SITE 00028 SITE 00029	FRC - PERRIS	181-03-0181 BX 0003 41106473

UIC No. / Rec. No.	Record Date	Author					Location	FRC Accession No.	
Doc. Control No.	Prc. Date	Author Affil.					SWDIV Box No(s)	FRC Warehouse	
Record Type	SSIC No.	Recipient	Subject	Distribution	Sites	CD No.	FRC Box No(s)		
Contract No.	CTO No.	Recipient Affil.							
Approx. # Pages									
N60028 / 000113	10-09-2000	SULLIVAN, J.	FINAL - REMEDIAL PROJECT MANAGER AND BRAC CLEANUP TEAM (RPM/BCT)	ADMIN RECORD	SITE 00001	FRC - PERRIS	181-03-0181	BX 0003	
TC.0308.10622 & SWDIV SER 06CA.JS	12-18-2000	NAVFAC - SOUTHWEST	MEETING MINUTES - 13 AND 14 JUNE 2000 - INCLUDES AGENDA, SIGN-IN SHEET, SUMMARY OF SITES 13 & 27 AND COMPILATION OF ACTION ITEMS (WITH ATTACHMENTS)	INFO REPOSITORY	SITE 00003		41106473		
MINUTES	5090.3.A.00308	MULTIPLE AGENCIES			SITE 00004				
N62474-94-D-7609					SITE 00005				
30					SITE 00006				
					SITE 00007				
					SITE 00008				
					SITE 00009				
					SITE 00010				
					SITE 00011				
					SITE 00012				
					SITE 00013				
					SITE 00014				
					SITE 00015				
					SITE 00016				
					SITE 00017				
					SITE 00019				
					SITE 00020				
					SITE 00021				
					SITE 00022				
					SITE 00024				
					SITE 00025				
					SITE 00027				
					SITE 00028				
					SITE 00029				

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Subject	Distribution	Sites	Location	FRC Accession No.
Doc. Control No.	Prc. Date	Author	Author Affil.				SWDIV Box No(s)	FRC Warehouse
Record Type	SSIC No.	Author	Author Affil.				CD No.	FRC Box No(s)
Contract No.	CTO No.	Recipient	Recipient Affil.					
Approx. # Pages		Recipient	Recipient Affil.					
N60028 / 000121 TC.0308.10778 & SWDIV SER 06CA.JS/0026 MM N62474-94-D-7609 80	01-09-2001 01-11-2001 5090.3.A. 00308	TETRA TECH EM, INC. VARIOUS AGENCIES	TETRA TECH EM, INC. VARIOUS AGENCIES	DRAFT - REMEDIAL PROJECT MANAGER AND BRAC CLEANUP TEAM (RPM/BCT) MEETING MINUTES - 12 DECEMBER 2000 (WITH ATTACHMENTS)	ADMIN RECORD INFO REPOSITORY	BLDG 0001213 BLDG 0001235 BLDG 0001237 BLDG 0001252 BLDG 0001254 SITE 00003 SITE 00005 SITE 00007 SITE 00008 SITE 00010 SITE 00012 SITE 00017 SITE 00021 SITE 00028 SITE 00029	FRC - PERRIS	181-03-0181 BX 0003 41106473
N60028 / 000136 DS.0183.13580 & SWDIV SER 6CA.PR/0326 REPORT N62474-94-D-7609 80	03-29-2001 04-09-2001 5090.3.A. 00183	J. CANEPA TETRA TECH EM, INC. P. ROSENFELD NAVFAC - SOUTHWEST DIVISION	J. CANEPA TETRA TECH EM, INC. P. ROSENFELD NAVFAC - SOUTHWEST DIVISION	DRAFT VALIDATION STUDY FOR SITES 8, 11, 28 AND 29 - INCLUDES SWDIV TRANSMITTAL LETTER BY J. SULLIVAN {SEE AR #256 - NAVY'S RESPONSE TO COMMENTS}	ADMIN RECORD INFO REPOSITORY	SITE 00008 SITE 00011 SITE 00028 SITE 00029	FRC - PERRIS	181-03-0181 BX 0004 41106473
N60028 / 000256 TC.0183.11105 & SWDIV SER CT.SA/0776 CORRESPONDENCE N62474-94-D-7609 13	07-27-2001 08-13-2001 5090.3.A. 00183	TETRA TECH EM, INC. NAVFAC - SOUTHWEST DIVISION	TETRA TECH EM, INC. NAVFAC - SOUTHWEST DIVISION	NAVY'S RESPONSE TO DTSC & DFG OSPR COMMENTS ON THE DRAFT VALIDATION STUDY FOR SITES 8, 11, 28, AND 29 - INCLUDES SWDIV TRANSMITTAL LETTER BY S. ANDERSON {SEE AR #136 - DRAFT VALIDATION STUDY}	ADMIN RECORD INFO REPOSITORY	SITE 00008 SITE 00011 SITE 00028 SITE 00029	FRC - PERRIS	181-03-0181 BX 0006 41106473
N60028 / 000653 DS.0183.17538 & SWDIV SER 06CA.SA/1309 REPORT N62474-94-D-7609 60	12-17-2001 03-01-2002 5090.3.A. 00183	J. CANEPA TETRA TECH EM, INC. S. ANDERSON NAVFAC - SOUTHWEST DIVISION	J. CANEPA TETRA TECH EM, INC. S. ANDERSON NAVFAC - SOUTHWEST DIVISION	FINAL VALIDATION STUDY - INCLUDES SWDIV TRANSMITTAL LETTER BY S. ANDERSON	ADMIN RECORD INFO REPOSITORY	SITE 00008 SITE 00011 SITE 00028 SITE 00029	FRC - PERRIS	181-03-0181 BX 0016 41106473

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Location	FRC Accession No.		
Doc. Control No.	Prc. Date	Author	Author Affil.	SWDIV Box No(s)	FRC Warehouse		
Record Type	SSIC No.	Author Affil.	Author Affil.	CD No.	FRC Box No(s)		
Contract No.	CTO No.	Recipient	Subject	Distribution	Sites		
Approx. # Pages	CTO No.	Recipient Affil.	Subject	Distribution	Sites		
N60028 / 001131	08-01-2002		ENVIRONMENTAL CLOSEOUT	ADMIN RECORD	BLDG 0000003	FRC - PERRIS	181-03-0186 BX 0003
DS.A016.10057 & SWDIV SER 06CA.JS/0878	09-23-2002	TETRA TECH EM, INC.	STRATEGY/SCHEDULES - INCLUDES SWDIV TRANSMITTAL LETTER BY J. SULLIVAN	INFO REPOSITORY	BLDG 0000041 BLDG 0000062 BLDG 0000099 BLDG 0000257 BLDG 0000289 BLDG 0000290 BLDG 0000325 BLDG 0000335		41031802
MISC N68711-00-D-0005 150		NAVFAC - SOUTHWEST DIVISION			SITE 00001 SITE 00003 SITE 00004 SITE 00005 SITE 00006 SITE 00007 SITE 00008 SITE 00009 SITE 00010 SITE 00011 SITE 00012 SITE 00013 SITE 00014 SITE 00015 SITE 00016 SITE 00017 SITE 00019 SITE 00020 SITE 00021 SITE 00022 SITE 00024 SITE 00025 SITE 00027 SITE 00028 SITE 00029		

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Subject	Distribution	Sites	Location	FRC Accession No.
Doc. Control No.	Prc. Date						SWDIV Box No(s)	FRC Warehouse
Record Type	SSIC No.		Recipient				CD No.	FRC Box No(s)
Contract No.	CTO No.		Recipient Affil.					
Approx. # Pages								
N60028 / 001150 DS.0302.17804 & SWDIV SER 06CA.SA/0542 MISC N62474-94-D-7609 120	03-01-2003 03-19-2003 5090.3.A. 00302	V. EARLY TETRA TECH EM, INC. NAVFAC - SOUTHWEST DIVISION		DRAFT TECHNICAL MEMORANDUM FOR ADDITIONAL INVESTIGATION OF INTERTIDAL SEDIMENTS - INCLUDES SWDIV TRANSMITTAL LETTER BY S. ANDERSON	ADMIN RECORD INFO REPOSITORY	SITE 00005 SITE 00008 SITE 00009 SITE 00010 SITE 00011 SITE 00028 SITE 00029	FRC - PERRIS	181-03-0186 BX 0004 41031802
N60028 / 001230 DS.B006.19535 & SWDIV SER BPMOW.SDA/0066 MISC N68711-03-D-5104 20	11-02-2004 11-22-2004 5090.3.A. 00006	SULTECH NAVFAC - SOUTHWEST DIVISION		FINAL POINT PAPER, BOUNDARY ADJUSTMENT [INCLUDES SWDIV TRANSMITTAL LETTER BY R. PLASEIED]	ADMIN RECORD INFO REPOSITORY	SITE 00008 SITE 00011 SITE 00028 SITE 00029	NAVFAC - SOUTHWEST	
N60028 / 001347 DS.B104.20006 REPORT N68711-03-D-5104 200	03-03-2006 04-24-2006 5090.3.A. 00104	SULTECH BRAC PMO WEST		DRAFT REMEDIAL INVESTIGATION REPORT, VOLUMES I & II OF II [CD COPY ENCLOSED] {***SEE COMMENTS***}	ADMIN RECORD INFO REPOSITORY	SITE 00008 SITE 00028 SITE 00029	CHOICE IMAGING SOLUTIONS SW-20101025-3/6	
N60028 / 001348 BRAC SER BPMOW.JW0194 CORRESPONDENCE NONE 2	03-03-2006 04-24-2006 5090.3.A. NONE	SULLIVAN, J. BRAC PMO WEST RIST, D. DTSC - BERKELEY, CA		TRANSMITTAL OF THE DRAFT REMEDIAL INVESTIGATION (RI) REPORT, VOLUMES I & II OF II (SEE AR #1347 - DRAFT REMEDIAL INVESTIGATION REPORT)	ADMIN RECORD INFO REPOSITORY	SITE 00008 SITE 00028 SITE 00029	CHOICE IMAGING SOLUTIONS SW-20101025-4/6	

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Subject	Distribution	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
N60028 / 001595	12-19-2006				ADMIN RECORD	BLDG 0000001	NAVFAC -	
TTEM-0055-FZN6-0211	03-18-2009	TETRA TECH EM, INC.		ADVISORY BOARD (RAB) MEETING	INFO REPOSITORY	BLDG 0000061	SOUTHWEST	
MINUTES	5090.3.A.			MINUTES, MEETING # 127 (INCLUDES		BLDG 0000083		
N62467-04-D-0055	CTO FZN6	RAB MEMBERS		VARIOUS HANDOUTS AND CD COPY)		BLDG 0000233		
34						BLDG 0000240		
						BLDG 0001311		
						BLDG 0001313		
						BLDG 0001325		
						SITE 00006		
						SITE 00008		
						SITE 00009		
						SITE 00010		
						SITE 00012		
						SITE 00021		
						SITE 00024		
						SITE 00025		
						SITE 00027		
						SITE 00028		
						SITE 00029		
						SITE 00030		
						SITE 00031		
						SITE 00032		
						SITE 00033		

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Location	FRC Accession No.
Doc. Control No.	Prc. Date	Author	Author Affil.	SWDIV Box No(s)	FRC Warehouse
Record Type	SSIC No.	Author Affil.	Author Affil.	CD No.	FRC Box No(s)
Contract No.	CTO No.	Recipient	Recipient		
Approx. # Pages		Recipient Affil.	Subject	Distribution	Sites
N60028 / 001502	01-09-2007				
TTEM.0055.FZN6.01	05-20-2008	TETRA TECH EM, INC.	09 JANUARY 2007 FINAL MEETING MINUTES, REMEDIAL PROJECT MANAGERS (RPM) AND BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) {INCLUDES AGENDA, SIGN-IN SHEET, VARIOUS HANDOUTS, AND CD COPY}	ADMIN RECORD INFO REPOSITORY	BLDG 0000233 SITE 00006 SITE 00008 SITE 00009 SITE 00010 SITE 00011 SITE 00012 SITE 00021 SITE 00024 SITE 00025 SITE 00027 SITE 00028 SITE 00029 SITE 00030 SITE 00031 SITE 00032
07	5090.3.A.				
MINUTES	FZN6	BRAC PMO WEST			
N62467-04-D-0055					
60					
N60028 / 001503	02-06-2007				
TTEM.0055.FZN6.00	05-20-2008	TETRA TECH EM, INC.	06 FEBRUARY 2007 FINAL MEETING MINUTES, REMEDIAL PROJECT MANAGERS (RPM) AND BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) {INCLUDES AGENDA, SIGN-IN SHEET, AND VARIOUS HANDOUTS} (CD COPY ENCLOSED) [SEE AR # 1501 - BRAC PMO WEST TRANSMITTAL LETTER]	ADMIN RECORD INFO REPOSITORY	BLDG 0000233 SITE 00006 SITE 00009 SITE 00010 SITE 00012 SITE 00021 SITE 00024 SITE 00025 SITE 00027 SITE 00028 SITE 00030 SITE 00032 SITE 00033
16	5090.3.A.				
MINUTES	FZN6	BRAC PMO WEST			
N62467-04-D-0055					
45					

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Location	FRC Accession No.
Doc. Control No.	Prc. Date	Author	Author Affil.	SWDIV Box No(s)	FRC Warehouse
Record Type	SSIC No.	Author	Author Affil.	CD No.	FRC Box No(s)
Contract No.	CTO No.	Recipient	Recipient Affil.	Subject	Distribution
Approx. # Pages		Recipient	Recipient Affil.	Subject	Sites
N60028 / 001596	02-20-2007				
TTEM-0055-FZN6-0003	03-18-2009	TETRA TECH EM, INC.		20 FEBRUARY 2007 FINAL RESTORATION ADVISORY BOARD (RAB) MEETING MINUTES, MEETING # 128 (INCLUDES VARIOUS HANDOUTS AND CD COPY)	ADMIN RECORD INFO REPOSITORY
MINUTES	5090.3.A.				SITE 00008 SITE 00009 SITE 00010 SITE 00012 SITE 00021 SITE 00024 SITE 00027 SITE 00028 SITE 00029 SITE 00030 SITE 00031
N62467-04-D-0055	CTO FZN6	RAB MEMBERS			
40					
N60028 / 001504	03-06-2007				
TTEM.0055.FZN6.009	05-20-2008	TETRA TECH EM, INC.		06 MARCH 2007 FINAL MEETING MINUTES, REMEDIAL PROJECT MANAGERS (RPM) AND BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) (INCLUDES AGENDA, SIGN-IN SHEET, AND VARIOUS HANDOUTS) (CD COPY ENCLOSED) [SEE AR # 1501 - BRAC PMO WEST TRANSMITTAL LETTER]	ADMIN RECORD INFO REPOSITORY
MINUTES	5090.3.A.				BLDG 0000233 SITE 00006 SITE 00009 SITE 00010 SITE 00012 SITE 00021 SITE 00024 SITE 00025 SITE 00027 SITE 00028 SITE 00030 SITE 00030 SITE 00031 SITE 00032 SITE 00033
N62467-04-D-0055	FZN6	BRAC PMO WEST			
50					

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Subject	Distribution	Sites	Location	FRC Accession No.
Doc. Control No.	Prc. Date	Author	Author Affil.					
Record Type	SSIC No.	Author Affil.	Author Affil.				SWDIV Box No(s)	FRC Warehouse
Contract No.	CTO No.	Recipient	Recipient				CD No.	FRC Box No(s)
Approx. # Pages		Recipient Affil.	Recipient Affil.					
N60028 / 001500	04-03-2007							
TTEM.0055.FZN6.00	05-15-2008	TETRA TECH EM,	TETRA TECH EM,	03 APRIL 2007 DRAFT MEETING MINUTES,	ADMIN RECORD	BLDG 0000233	NAVFAC -	
11	5090.3.A.	INC.	INC.	REMEDIAL PROJECT MANAGERS (RPM)	INFO REPOSITORY	SITE 00006	SOUTHWEST	
MINUTES	FZN6			AND BASE REALIGNMENT AND CLOSURE		SITE 00009		
N62467-04-D-0055		BRAC PMO WEST	BRAC PMO WEST	(BRAC) CLEANUP TEAM (BCT) [INCLUDES		SITE 00010		
30				AGENDA, SIGN-IN SHEET, VARIOUS		SITE 00012		
				HANDOUTS, AND CD COPY]		SITE 00021		
						SITE 00024		
						SITE 00025		
						SITE 00027		
						SITE 00028		
						SITE 00030		
						SITE 00031		
						SITE 00032		
						SITE 00033		
N60028 / 001505	04-03-2007							
TTEM.0055.FZN6.00	05-20-2008	TETRA TECH EM,	TETRA TECH EM,	03 APRIL 2007 FINAL MEETING MINUTES,	ADMIN RECORD	BLDG 0000233	NAVFAC -	
12	5090.3.A.	INC.	INC.	REMEDIAL PROJECT MANAGERS (RPM)	INFO REPOSITORY	SITE 00006	SOUTHWEST	
MINUTES	FZN6			AND BASE REALIGNMENT AND CLOSURE		SITE 00009		
N62467-04-D-0055		BRAC PMO WEST	BRAC PMO WEST	(BRAC) CLEANUP TEAM (BCT) [INCLUDES		SITE 00010		
40				AGENDA, SIGN-IN SHEET, AND VARIOUS		SITE 00012		
				HANDOUTS, AND CD COPY]		SITE 00021		
						SITE 00024		
						SITE 00025		
						SITE 00027		
						SITE 00028		
						SITE 00030		
						SITE 00031		
						SITE 00032		
						SITE 00033		

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Subject	Distribution	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
Doc. Control No.	Prc. Date	Author	Author Affil.					
Record Type	SSIC No.	Author Affil.	Author Affil.					
Contract No.	CTO No.	Recipient	Recipient					
Approx. # Pages		Recipient Affil.	Recipient Affil.					
N60028 / 001506	05-01-2007							
TTEM.0055.FZN6.00	05-20-2008	TETRA TECH EM,	TETRA TECH EM,	01 MAY 2007 FINAL MEETING MINUTES,	ADMIN RECORD	BLDG 0000233	NAVFAC -	
15	5090.3.A.	INC.	INC.	REMEDIAL PROJECT MANAGERS (RPM)	INFO REPOSITORY	SITE 00006	SOUTHWEST	
MINUTES	FZN6			AND BASE REALIGNMENT AND CLOSURE		SITE 00009		
N62467-04-D-0055		BRAC PMO WEST	BRAC PMO WEST	(BRAC) CLEANUP TEAM (BCT) [INCLUDES		SITE 00010		
35				AGENDA, SIGN-IN SHEET, AND VARIOUS		SITE 00012		
				HANDOUTS, AND CD COPY]		SITE 00021		
						SITE 00024		
						SITE 00025		
						SITE 00027		
						SITE 00028		
						SITE 00030		
						SITE 00031		
						SITE 00032		
						SITE 00033		
N60028 / 001507	06-05-2007							
TTEM.0055.FZN6.00	05-20-2008	TETRA TECH EM,	TETRA TECH EM,	05 JUNE 2007 FINAL MEETING MINUTES,	ADMIN RECORD	BLDG 0000233	NAVFAC -	
18	5090.3.A.	INC.	INC.	REMEDIAL PROJECT MANAGERS (RPM)	INFO REPOSITORY	SITE 00006	SOUTHWEST	
MINUTES	FZN6			AND BASE REALIGNMENT AND CLOSURE		SITE 00009		
N62467-04-D-0055		BRAC PMO WEST	BRAC PMO WEST	(BRAC) CLEANUP TEAM (BCT) [INCLUDES		SITE 00010		
40				AGENDA, SIGN-IN SHEET, AND VARIOUS		SITE 00012		
				HANDOUTS, AND CD COPY]		SITE 00021		
						SITE 00024		
						SITE 00025		
						SITE 00027		
						SITE 00028		
						SITE 00030		
						SITE 00031		
						SITE 00032		
						SITE 00033		

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Location	FRC Accession No.
Doc. Control No.	Prc. Date	Author	Author Affil.	SWDIV Box No(s)	FRC Warehouse
Record Type	SSIC No.	Author Affil.	Author Affil.	CD No.	FRC Box No(s)
Contract No.	CTO No.	Recipient	Recipient		
Approx. # Pages	CTO No.	Recipient Affil.	Subject	Distribution	Sites
N60028 / 001598	06-19-2007				
TTEM-0055-FZN6-0098	03-18-2009	TETRA TECH EM, INC.	19 JUNE 2007 FINAL RESTORATION ADVISORY BOARD (RAB) MEETING MINUTES, MEETING # 130 (INCLUDES AGENDA, VARIOUS HANDOUTS, AND CD COPY)	ADMIN RECORD INFO REPOSITORY	SITE 00006 SITE 00006A SITE 00008 SITE 00009 SITE 00010 SITE 00012 SITE 00021 SITE 00024 SITE 00025 SITE 00027 SITE 00028 SITE 00029
MINUTES	5090.3.A.				
N62467-04-D-0055	CTO FZN6	RAB MEMBERS			
30					
N60028 / 001497	07-10-2007				
TTEM.0055.FZN6.0020	05-15-2008	TETRA TECH EM, INC.	10 JULY 2007 DRAFT MEETING MINUTES, REMEDIAL PROJECT MANAGERS (RPM) AND BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) (INCLUDES AGENDA, SIGN-IN SHEET, AND VARIOUS HANDOUTS) (CD COPY ENCLOSED)	ADMIN RECORD INFO REPOSITORY	SITE 00006 SITE 00008 SITE 00011 SITE 00012 SITE 00021 SITE 00024 SITE 00025 SITE 00028 SITE 00029 SITE 00032 SITE 00033
MINUTES	5090.3.A.				
N62467-04-D-0055	FZN6	BRAC PMO WEST			
30					

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Subject	Distribution	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
Doc. Control No.	Prc. Date	Author	Author Affil.					
Record Type	SSIC No.	Author Affil.	Author Affil.					
Contract No.	CTO No.	Recipient	Recipient					
Approx. # Pages		Recipient Affil.	Recipient Affil.					
N60028 / 001508	07-10-2007							
TTEM.0055.FZN6.00 21 MINUTES N62467-04-D-0055 45	05-20-2008 5090.3.A. FZN6	TETRA TECH EM, INC.	BRAC PMO WEST	10 JULY 2007 FINAL MEETING MINUTES, REMEDIAL PROJECT MANAGERS (RPM) AND BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) [INCLUDES AGENDA, SIGN-IN SHEET, AND VARIOUS HANDOUTS, AND CD COPY]	ADMIN RECORD INFO REPOSITORY	BLDG 0000233 SITE 00006 SITE 00009 SITE 00010 SITE 00012 SITE 00021 SITE 00024 SITE 00025 SITE 00027 SITE 00028 SITE 00030 SITE 00031 SITE 00032 SITE 00033	NAVFAC - SOUTHWEST	
N60028 / 001496	08-08-2007							
TTEM.0055.FZN6.00 23 MINUTES N62467-04-D-0055 70	05-15-2008 5090.3.A. FZN6	TETRA TECH EM, INC.	BRAC PMO WEST	08 AND 09 AUGUST 2007 DRAFT MEETING MINUTES, REMEDIAL PROJECT MANAGERS (RPM) AND BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) {INCLUDES AGENDA, SIGN-IN SHEET, AND VARIOUS HANDOUTS} (CD COPY ENCLOSED)	ADMIN RECORD INFO REPOSITORY	BLDG 0000233 SITE 00006 SITE 00009 SITE 00010 SITE 00012 SITE 00021 SITE 00024 SITE 00025 SITE 00027 SITE 00028 SITE 00030 SITE 00032 SITE 00033	NAVFAC - SOUTHWEST	

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Subject	Distribution	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
Doc. Control No.	Prc. Date	Author	Author Affil.					
Record Type	SSIC No.	Author Affil.	Author Affil.					
Contract No.	CTO No.	Recipient	Recipient					
Approx. # Pages		Recipient Affil.	Recipient Affil.					
N60028 / 001509	08-08-2007							
TTEM.0055.FZN6.00 24 MINUTES N62467-04-D-0055 200	05-20-2008 5090.3.A. FZN6	TETRA TECH EM, INC.	TETRA TECH EM, INC.	08 AND 09 AUGUST 2007 FINAL MEETING MINUTES, REMEDIAL PROJECT MANAGERS (RPM) AND BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) MEETING MINUTES [INCLUDES AGENDA, SIGN-IN SHEET, AND VARIOUS HANDOUTS, AND CD COPY]	ADMIN RECORD INFO REPOSITORY	BLDG 0000233 SITE 00006 SITE 00009 SITE 00010 SITE 00012 SITE 00021 SITE 00024 SITE 00025 SITE 00027 SITE 00028 SITE 00030 SITE 00031 SITE 00032 SITE 00033	NAVFAC - SOUTHWEST	
N60028 / 001599	08-21-2007							
TTEM-0055-FZN6- 0101 MINUTES N62467-04-D-0055 32	03-18-2009 5090.3.A. CTO FZN6	TETRA TECH EM, INC.	TETRA TECH EM, INC.	21 AUGUST 2007 FINAL RESTORATION ADVISORY BOARD (RAB) MEETING MINUTES, MEETING # 131 (INCLUDES AGENDA, VARIOUS HANDOUTS, AND CD COPY)	ADMIN RECORD INFO REPOSITORY	SITE 00006 SITE 00008 SITE 00009 SITE 00010 SITE 00012 SITE 00021 SITE 00024 SITE 00027 SITE 00028 SITE 00029 SITE 00030 SITE 00031 SITE 00033	NAVFAC - SOUTHWEST	

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Location	FRC Accession No.		
Doc. Control No.	Prc. Date	Author	Author Affil.	SWDIV Box No(s)	FRC Warehouse		
Record Type	SSIC No.	Author Affil.	Author Affil.	CD No.	FRC Box No(s)		
Contract No.	CTO No.	Recipient	Recipient Affil.	Subject	Distribution		
Approx. # Pages		Recipient Affil.	Recipient Affil.	Subject	Distribution		
N60028 / 001495	09-11-2007						
TTEM.0055.FZN6.00 26 MINUTES N62467-04-D-0055 30	05-15-2008 5090.3.A. FZN6	TETRA TECH EM, INC.	BRAC PMO WEST	11 SEPTEMBER 2007 DRAFT MEETING MINUTES, REMEDIAL PROJECT MANAGERS (RPM) AND BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) [INCLUDES AGENDA, SIGN-IN SHEET, AND VARIOUS HANDOUTS, AND CD COPY]	ADMIN RECORD INFO REPOSITORY	BLDG 0000233 SITE 00006 SITE 00008 SITE 00009 SITE 00010 SITE 00012 SITE 00021 SITE 00024 SITE 00025 SITE 00027 SITE 00028 SITE 00029 SITE 00030 SITE 00031 SITE 00032 SITE 00033	NAVFAC - SOUTHWEST
N60028 / 001510	09-11-2007						
TTEM.0055.FZN6.00 27 MINUTES N62467-04-D-0055 40	05-20-2008 5090.3.A. FZN6	TETRA TECH EM, INC.	BRAC PMO WEST	11 SEPTEMBER 2007 FINAL MEETING MINUTES, REMEDIAL PROJECT MANAGERS (RPM) AND BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) [INCLUDES AGENDA, SIGN-IN SHEET, AND VARIOUS HANDOUTS, AND CD COPY]	ADMIN RECORD INFO REPOSITORY	BLDG 0000233 SITE 00006 SITE 00009 SITE 00010 SITE 00012 SITE 00021 SITE 00024 SITE 00025 SITE 00027 SITE 00028 SITE 00030 SITE 00031 SITE 00032 SITE 00033	NAVFAC - SOUTHWEST

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Location	FRC Accession No.
Doc. Control No.	Prc. Date	Author	Author Affil.	SWDIV Box No(s)	FRC Warehouse
Record Type	SSIC No.	Author Affil.	Author Affil.	CD No.	FRC Box No(s)
Contract No.	CTO No.	Recipient	Recipient Affil.	Subject	Distribution
Approx. # Pages		Recipient Affil.	Recipient Affil.	Subject	Distribution
N60028 / 001494	10-02-2007				
TTEM.0055.FZN6.00	05-15-2008	TETRA TECH EM, INC.	TETRA TECH EM, INC.	02 OCTOBER 2007 DRAFT MEETING MINUTES, REMEDIAL PROJECT MANAGERS (RPM) AND BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) [INCLUDES AGENDA, SIGN-IN SHEET, AND VARIOUS HANDOUTS, AND CD COPY]	ADMIN RECORD INFO REPOSITORY
29	5090.3.A.				
MINUTES	FZN6	BRAC PMO WEST	BRAC PMO WEST		
N62467-04-D-0055					
30					
					BLDG 0000233
					SITE 00006
					SITE 00008
					SITE 00009
					SITE 00010
					SITE 00012
					SITE 00021
					SITE 00024
					SITE 00025
					SITE 00027
					SITE 00028
					SITE 00029
					SITE 00030
					SITE 00031
					SITE 00032
					SITE 00033
N60028 / 001511	10-02-2007				
TTEM.0055.FZN6.00	05-20-2008	TETRA TECH EM, INC.	TETRA TECH EM, INC.	02 OCTOBER 2007 FINAL MEETING MINUTES, REMEDIAL PROJECT MANAGERS (RPM) AND BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) [INCLUDES AGENDA, SIGN-IN SHEET, AND VARIOUS HANDOUTS, AND CD COPY]	ADMIN RECORD INFO REPOSITORY
30	5090.3.A.				
MINUTES	FZN6	BRAC PMO WEST	BRAC PMO WEST		
N62467-04-D-0055					
40					
					BLDG 0000233
					SITE 00006
					SITE 00009
					SITE 00010
					SITE 00012
					SITE 00021
					SITE 00024
					SITE 00025
					SITE 00027
					SITE 00028
					SITE 00030
					SITE 00031
					SITE 00032
					SITE 00033

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Subject	Distribution	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
Doc. Control No.	Prc. Date	Author	Author Affil.					
Record Type	SSIC No.	Author Affil.	Author Affil.					
Contract No.	CTO No.	Recipient	Recipient Affil.					
Approx. # Pages		Recipient Affil.	Recipient Affil.					
N60028 / 001600	10-16-2007							
TTEM-0055-FZN6-0104	03-18-2009	TETRA TECH EM, INC.	TETRA TECH EM, INC.	16 OCTOBER 2007 FINAL RESTORATION ADVISORY BOARD (RAB) MEETING MINUTES, MEETING # 132 (INCLUDES AGENDA, VARIOUS HANDOUTS, AND CD COPY)	ADMIN RECORD INFO REPOSITORY	SITE 00008 SITE 00012 SITE 00027 SITE 00028 SITE 00029	NAVFAC - SOUTHWEST	
MINUTES	5090.3.A.							
N62467-04-D-0055	CTO FZN6	RAB MEMBERS	RAB MEMBERS					
19								
N60028 / 001493	11-06-2007							
TTEM.0055.FZN6.00	05-15-2008	TETRA TECH EM, INC.	TETRA TECH EM, INC.	06 NOVEMBER 2007 DRAFT MEETING MINUTES, REMEDIAL PROJECT MANAGERS (RPM) AND BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) [INCLUDES AGENDA, SIGN-IN SHEET, AND VARIOUS HANDOUTS, AND CD COPY]	ADMIN RECORD INFO REPOSITORY	BLDG 0000233 SITE 00006 SITE 00008 SITE 00009 SITE 00010 SITE 00012 SITE 00021 SITE 00024 SITE 00025 SITE 00027 SITE 00028 SITE 00029 SITE 00030 SITE 00031 SITE 00032 SITE 00033	NAVFAC - SOUTHWEST	
32	5090.3.A.							
MINUTES	FZN6	BRAC PMO WEST	BRAC PMO WEST					
N62467-04-D-0055								
30								

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Location	FRC Accession No.			
Doc. Control No.	Prc. Date	Author	Author Affil.	SWDIV Box No(s)	FRC Warehouse			
Record Type	SSIC No.	Author	Author Affil.	CD No.	FRC Box No(s)			
Contract No.	CTO No.	Recipient	Recipient Affil.	Subject	Distribution			
Approx. # Pages		Recipient	Recipient Affil.	Subject	Distribution			
N60028 / 001512	11-06-2007							
TTEM.0055.FZN6.00 33 MINUTES N62467-04-D-0055 40	05-20-2008 5090.3.A. FZN6	TETRA TECH EM, INC. BRAC PMO WEST		06 NOVEMBER 2007 FINAL MEETING MINUTES, REMEDIAL PROJECT MANAGERS (RPM) AND BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) [INCLUDES AGENDA, SIGN-IN SHEET, AND VARIOUS HANDOUTS, AND CD COPY]	ADMIN RECORD INFO REPOSITORY	BLDG 0000233 SITE 00006 SITE 00009 SITE 00010 SITE 00012 SITE 00021 SITE 00024 SITE 00025 SITE 00027 SITE 00028 SITE 00030 SITE 00031 SITE 00032 SITE 00033	NAVFAC - SOUTHWEST	
N60028 / 001471	11-19-2007	SULLIVAN, J.						
BRAC SER BPMOW.JW/0088 CORRESPONDENCE NONE 2	12-28-2007 5090.3.A. NONE	BRAC PMO WEST WONG, H. DTSC - BERKELEY		TRANSMITTAL OF 1) DRAFT REVISED REMEDIAL INVESTIGATION REPORT FOR ARMY SLUDGE DISPOSAL AREA, WEST SIDE ON-OFF RAMPS, AND EAST SIDE ON- OFF RAMPS AND 2) BRIEFING PAPER ON THE REVISED RI REPORT] {***SEE COMMENTS***}	ADMIN RECORD INFO REPOSITORY	SITE 00008 SITE 00028 SITE 00029	CHOICE IMAGING SOLUTIONS SW-20101025-5/6	
N60028 / 001472	11-19-2007	WARMERDAM, J.						
SULT.5104.0104.000 8 REPORT N68711-03-D-5104 1700	12-28-2007 5090.3.A. 00104	SULTECH BRAC PMO WEST		DRAFT REVISED REMEDIAL INVESTIGATION REPORT FOR ARMY SLUDGE DISPOSAL AREA, WEST SIDE ON- OFF RAMPS, AND EAST SIDE ON-OFF RAMPS, VOLUMES I & II OF II (INCLUDES BRIEFING PAPER ON THE REVISED RI REPORT) [CD COPY ENCLOSED]	ADMIN RECORD INFO REPOSITORY	SITE 00008 SITE 00028 SITE 00029	CHOICE IMAGING SOLUTIONS SW-20101025-5/6	

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Subject	Distribution	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
Doc. Control No.	Prc. Date	Author	Author Affil.					
Record Type	SSIC No.	Author	Author Affil.					
Contract No.	CTO No.	Recipient	Recipient Affil.					
Approx. # Pages								
N60028 / 001492	12-04-2007							
TTEM.0055.FZN6.00	05-15-2008	TETRA TECH EM,	TETRA TECH EM,	04 DECEMBER 2007 DRAFT MEETING	ADMIN RECORD	BLDG 0000233	NAVFAC -	
35	5090.3.A.	INC.	INC.	MINUTES, REMEDIAL PROJECT MANAGERS	INFO REPOSITORY	SITE 00008	SOUTHWEST	
MINUTES	FZN6			(RPM) AND BASE REALIGNMENT AND		SITE 00009		
N62467-04-D-0055		BRAC PMO WEST	BRAC PMO WEST	CLOSURE (BRAC) CLEANUP TEAM (BCT)		SITE 00010		
30				[INCLUDES AGENDA, SIGN-IN SHEET, AND		SITE 00012		
				VARIOUS HANDOUTS, AND CD COPY]		SITE 00024		
						SITE 00027		
						SITE 00028		
						SITE 00029		
						SITE 00030		
						SITE 00031		
						SITE 00032		
						SITE 00033		
N60028 / 001513	12-04-2007							
TTEM.0055.FZN6.00	05-20-2008	TETRA TECH EM,	TETRA TECH EM,	04 DECEMBER 2007 FINAL MEETING	ADMIN RECORD	BLDG 0000233	NAVFAC -	
36	5090.3.A.	INC.	INC.	MINUTES, REMEDIAL PROJECT MANAGERS	INFO REPOSITORY	SITE 00006	SOUTHWEST	
MINUTES	FZN6			(RPM) AND BASE REALIGNMENT AND		SITE 00009		
N62467-04-D-0055		BRAC PMO WEST	BRAC PMO WEST	CLOSURE (BRAC) CLEANUP TEAM (BCT)		SITE 00010		
40				[INCLUDES AGENDA, SIGN-IN SHEET, AND		SITE 00012		
				VARIOUS HANDOUTS, AND CD COPY]		SITE 00021		
						SITE 00024		
						SITE 00025		
						SITE 00027		
						SITE 00028		
						SITE 00030		
						SITE 00031		
						SITE 00032		
						SITE 00033		
N60028 / 001601	12-18-2007							
TTEM-0055-FZN6-	03-18-2009	TETRA TECH EM,	TETRA TECH EM,	18 DECEMBER 2007 FINAL RESTORATION	ADMIN RECORD	SITE 00008	NAVFAC -	
0110	5090.3.A.	INC.	INC.	ADVISORY BOARD (RAB) MEETING	INFO REPOSITORY	SITE 00012	SOUTHWEST	
MINUTES	CTO FZN6			MINUTES, MEETING # 133 (INCLUDES		SITE 00021		
N62467-04-D-0055		RAB MEMBERS	RAB MEMBERS	AGENDA, VARIOUS HANDOUTS, AND CD		SITE 00024		
33				COPY)		SITE 00028		
						SITE 00029		

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Subject	Distribution	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
Doc. Control No.	Prc. Date	Author	Author Affil.					
Record Type	SSIC No.	Author Affil.	Author Affil.					
Contract No.	CTO No.	Recipient	Recipient Affil.					
Approx. # Pages								
N60028 / 001616 TTEM-0055-FZN6-0039 MINUTES N62467-04-D-0055 35	01-08-2008 06-01-2009 5090.3.A. CTO FZN6	TETRA TECH EM, INC. BRAC PMO WEST	TETRA TECH EM, INC. BRAC PMO WEST	08 JANUARY 2008 FINAL REMEDIAL PROJECT MANAGERS (RPM) AND BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) MEETING MINUTES [INCLUDES AGENDA, SIGN-IN SHEET, AND VARIOUS HANDOUTS] {CD COPY ENCLOSED}	ADMIN RECORD INFO REPOSITORY	SITE 00008 SITE 00012 SITE 00028 SITE 00029	NAVFAC - SOUTHWEST	
N60028 / 001602 TTEM-0055-FZN6-0124 MINUTES N62467-04-D-0055 59	02-05-2008 03-18-2009 5090.3.A. CTO FZN6	TETRA TECH EM, INC. RAB MEMBERS	TETRA TECH EM, INC. RAB MEMBERS	05 FEBRUARY 2008 FINAL RESTORATION ADVISORY BOARD (RAB) MEETING MINUTES, MEETING # 134 (INCLUDES AGENDA, VARIOUS HANDOUTS, AND CD COPY)	ADMIN RECORD INFO REPOSITORY	BLDG 0000233 BLDG 0000343 BLDG 0000344 SITE 00006A SITE 00008 SITE 00011 SITE 00012 SITE 00021 SITE 00024 SITE 00025 SITE 00027 SITE 00028 SITE 00029	NAVFAC - SOUTHWEST	
N60028 / 001491 TTEM.0055.FZN6.00 38 MINUTES N62467-04-D-0055 35	02-08-2008 05-12-2008 5090.3.A. FZN6	TETRA TECH EM, INC. BRAC PMO WEST	TETRA TECH EM, INC. BRAC PMO WEST	08 JANUARY 2008 DRAFT MEETING MINUTES REMEDIAL PROJECT MANAGERS (RPM) AND BASE REALIGNMENT AND CLOSURE (BRAC) CLEAN UP TEAM (BCT) {INCLUDES AGENDA, SIGN IN SHEET, AND VARIOUS HANDOUTS} (CD COPY ENCLOSED)	ADMIN RECORD INFO REPOSITORY	SITE 00008 SITE 00012 SITE 00028 SITE 00029	NAVFAC - SOUTHWEST	

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Subject	Distribution	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
Doc. Control No.	Prc. Date	Author	Author Affil.	Subject	Distribution	Sites	Location	FRC Accession No.
Record Type	SSIC No.	Author	Author Affil.	Subject	Distribution	Sites	Location	FRC Accession No.
Contract No.	CTO No.	Recipient	Recipient Affil.	Subject	Distribution	Sites	Location	FRC Accession No.
Approx. # Pages	CTO No.	Recipient	Recipient Affil.	Subject	Distribution	Sites	Location	FRC Accession No.
N60028 / 001678	08-06-2008							
TTEM-0055-FZN6-0147	05-20-2010	TETRA TECH EM, INC.		06 AUGUST 2008 DRAFT REMEDIAL PROJECT MANAGERS AND BASE REALIGNMENT AND CLOSURE CLEANUP TEAM MEETING MINUTES (INCLUDES AGENDA, SIGN-IN SHEET, VARIOUS HANDOUTS, AND CD COPY)	ADMIN RECORD	BLDG 0000001 BLDG 0000233 BLDG 0000461 BLDG 0001123 BLDG 0001237 SITE 00008 SITE 00011 SITE 00012 SITE 00021 SITE 00024 SITE 00025 SITE 00028 SITE 00029 SITE 00032	NAVFAC - SOUTHWEST	
MINUTES	5090.3.A.							
N62467-04-D-0055	CTO FZN6	BRAC PMO WEST						
120								
N60028 / 001626	09-10-2008							
TTEM-0055-FZN6-0151	07-01-2009	TETRA TECH EM, INC.		10 SEPTEMBER 2008 FINAL REMEDIAL PROJECT MANAGERS (RPM) AND BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) MEETING MINUTES [INCLUDES AGENDA, SIGN-IN SHEET, VARIOUS HANDOUTS, AND CD COPY]	ADMIN RECORD INFO REPOSITORY	BLDG 0000233 BLDG 0000343 BLDG 0000344 BLDG 0001211 BLDG 0001213 BLDG 0001235 BLDG 0001237 BLDG 0001319 BLDG 0001325 SITE 00006 SITE 00008 SITE 00012 SITE 00021 SITE 00024 SITE 00028 SITE 00029 SITE 00030 SITE 00031 SITE 00033	NAVFAC - SOUTHWEST	
MINUTES	5090.3.A.							
N62467-04-D-0055	CTO FZN6	BRAC PMO WEST						
48								

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Subject	Distribution	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
Doc. Control No.	Prc. Date	Author	Author Affil.					
Record Type	SSIC No.	Author	Author Affil.					
Contract No.	CTO No.	Recipient	Recipient Affil.					
Approx. # Pages								
N60028 / 001679	09-10-2008							
TTEM-0055-FZN6-0150	05-20-2010	TETRA TECH EM, INC.		10 SEPTEMBER 2007 DRAFT REMEDIAL PROJECT MANAGERS AND BASE REALIGNMENT AND CLOSURE CLEANUP TEAM MEETING MINUTES (INCLUDES AGENDA, SIGN-IN SHEET, VARIOUS HANDOUTS, AND CD COPY)	ADMIN RECORD	BLDG 0000007 BLDG 0000233 BLDG 0000343 BLDG 0000344 BLDG 0001211 BLDG 0001213 BLDG 0001235 BLDG 0001319 BLDG 0001321 BLDG 0001325 SITE 00006 SITE 00008 SITE 00012 SITE 00021 SITE 00024 SITE 00028 SITE 00029 SITE 00030 SITE 00031 SITE 00033	NAVFAC - SOUTHWEST	
MINUTES	5090.3.A.							
N62467-04-D-0055	CTO FZN6	BRAC PMO WEST						
120								
N60028 / 001680	10-08-2008							
TTEM-0055-FZN6-0153	05-20-2010	TETRA TECH EM, INC.		08 OCTOBER 2008 DRAFT REMEDIAL PROJECT MANAGERS AND BASE REALIGNMENT AND CLOSURE CLEANUP TEAM MEETING MINUTES (INCLUDES AGENDA, SIGN-IN SHEET, VARIOUS HANDOUTS, AND CD COPY)	ADMIN RECORD SENSITIVE	BLDG 0000233 BLDG 0000343 BLDG 0000344 BLDG 0000570 BLDG 0001319 BLDG 0001321 BLDG 0001325 SITE 00006 SITE 00008 SITE 00012 SITE 00024 SITE 00028 SITE 00029 SITE 00030 SITE 00031	NAVFAC - SOUTHWEST	
MINUTES	5090.3.A.							
N62467-04-D-0055	CTO FZN6	BRAC PMO WEST						
120								

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Location	FRC Accession No.		
Doc. Control No.	Prc. Date	Author	Author Affil.	SWDIV Box No(s)	FRC Warehouse		
Record Type	SSIC No.	Author	Author Affil.	CD No.	FRC Box No(s)		
Contract No.	CTO No.	Recipient	Recipient Affil.	Subject	Distribution	Sites	
Approx. # Pages		Recipient	Recipient Affil.				
N60028 / 001689 TTEM-0055-FZN6-0200 MINUTES N62467-04-D-0055 31	02-17-2009 07-22-2010 5090.3.A. CTO FZN6	CANEPA, J. TETRA TECH EM, INC. RESTORATION ADVISORY BOARD	RESTORATION ADVISORY BOARD	17 FEBRUARY 2009 FINAL RESTORATION ADVISORY BOARD MEETING MINUTES (MEETING NO. 140) [INCLUDES AGENDA, VARIOUS HANDOUTS, AND CD COPY]	ADMIN RECORD INFO REPOSITORY SENSITIVE	BLDG 0000233 BLDG 0000343 BLDG 0000344 BLDG 0000461 BLDG 0000463 BLDG 0001319 BLDG 0001325 SITE 00006 SITE 00008 SITE 00012 SITE 00021 SITE 00024 SITE 00027 SITE 00028 SITE 00029 SITE 00032 SITE 00033	NAVFAC - SOUTHWEST
N60028 / 001608 SULT-5104-0104-0012 REPORT N68711-03-D-5104 791	02-28-2009 05-01-2009 5090.3.A. CTO 0104	WARMERDAM, J. SULTECH BRAC PMO WEST	BRAC PMO WEST	FINAL REVISED REMEDIAL INVESTIGATION REPORT (CD COPY ENCLOSED) [CONTAINS SENSITIVE MAPS]	ADMIN RECORD INFO REPOSITORY SENSITIVE	SITE 00008 SITE 00011 SITE 00028 SITE 00029	CHOICE IMAGING SOLUTIONS SW-20101025-1/6
N60028 / 001607 BRAC SER BPMOW.JHW/0127 CORRESPONDENCE NONE 2	04-01-2009 05-01-2009 5090.3.A. NONE	SULLIVAN, J. BRAC PMO WEST MIYA, R. BROWNSDIELDS AND ENVIRONMENTAL RESTORATION PROGRAM - BERKELEY, CA	BRAC PMO WEST	TRANSMITTAL OF THE FINAL REVISED REMEDIAL INVESTIGATION REPORT (WEST SIDE ON-OFF CAMPUS)	ADMIN RECORD INFO REPOSITORY	SITE 00028	CHOICE IMAGING SOLUTIONS SW-20101025-6/6

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Subject	Distribution	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
Doc. Control No.	Prc. Date	Author	Author Affil.					
Record Type	SSIC No.	Author Affil.	Author Affil.					
Contract No.	CTO No.	Recipient	Recipient Affil.					
Approx. # Pages		Recipient Affil.	Recipient Affil.					
N60028 / 001630	04-16-2009	RASH, M.		DRAFT SITE MANAGEMENT PLAN (CD	ADMIN RECORD	SITE 00001	NAVFAC -	
TTEM-0055-FZN6-0194	07-06-2009	TETRA TECH EM, INC.		COPY ENCLOSED)	INFO REPOSITORY	SITE 00003	SOUTHWEST	
REPORT	5090.3.A.					SITE 00004		
N62467-04-D-0055	CTO FZN6	BRAC PMO WEST				SITE 00006		
150						SITE 00007		
						SITE 00008		
						SITE 00009		
						SITE 00010		
						SITE 00011		
						SITE 00012		
						SITE 00013		
						SITE 00014		
						SITE 00015		
						SITE 00016		
						SITE 00019		
						SITE 00020		
						SITE 00021		
						SITE 00022		
						SITE 00024		
						SITE 00025		
						SITE 00026		
						SITE 00027		
						SITE 00028		
						SITE 00029		
						SITE 00030		
						SITE 00031		
						SITE 00032		
						SITE 00033		

UIC No. / Rec. No.	Record Date	Author					Location	FRC Accession No.
Doc. Control No.	Prc. Date	Author Affil.					SWDIV Box No(s)	FRC Warehouse
Record Type	SSIC No.	Recipient	Subject	Distribution	Sites	CD No.		FRC Box No(s)
Contract No.	CTO No.	Recipient Affil.						
Approx. # Pages								
N60028 / 001684	09-28-2009	RASH, M.	FINAL SITE MANAGEMENT PLAN (CD COPY	ADMIN RECORD	SITE 00001		NAVFAC -	
TTEM-0055-FZN6-0197	05-26-2010	TETRA TECH EM, INC.	ENCLOSED)	INFO REPOSITORY	SITE 00003		SOUTHWEST	
REPORT	5090.3.A.			SENSITIVE	SITE 00004			
N62476-04-D-0055	CTO FZN6	BRAC PMO WEST			SITE 00006			
148					SITE 00007			
					SITE 00008			
					SITE 00009			
					SITE 00010			
					SITE 00011			
					SITE 00012			
					SITE 00013			
					SITE 00014			
					SITE 00015			
					SITE 00016			
					SITE 00019			
					SITE 00020			
					SITE 00021			
					SITE 00022			
					SITE 00024			
					SITE 00025			
					SITE 00026			
					SITE 00027			
					SITE 00028			
					SITE 00029			
					SITE 00030			
					SITE 00031			
					SITE 00032			
					SITE 00033			

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Location	FRC Accession No.	
Doc. Control No.	Prc. Date	Author	Author Affil.	SWDIV Box No(s)	FRC Warehouse	
Record Type	SSIC No.	Author Affil.	Author Affil.	CD No.	FRC Box No(s)	
Contract No.	CTO No.	Recipient	Recipient Affil.	Distribution	Sites	
Approx. # Pages		Subject				
N60028 / 001699	10-07-2009	CANEPA, J.		ADMIN RECORD	BLDG 0001121	NAVFAC -
TTEM-0055-FZN6-0216	09-24-2010	TETRA TECH EM, INC.		INFO REPOSITORY	BLDG 0001123	SOUTHWEST
MINUTES	5090.3.A.				BLDG 0001124	
N62467-04-D-0055	CTO FZN6	BRAC PMO WEST			BLDG 0001232	
10					BLDG 0001237	
					BLDG 0001238	
					BLDG 0001244	
					BLDG 0001246	
					BLDG 0001311	
					BLDG 0001313	
					BLDG 0001319	
					BLDG 0001321	
					BLDG 0001325	
					SITE 00012	
					SITE 00021	
					SITE 00024	
					SITE 00027	
					SITE 00028	
					SITE 00031	
					SITE 00032	
N60028 / 001693	10-20-2009	CANEPA, J.		ADMIN RECORD	BLDG 0000099	NAVFAC -
TTEM-0055-FZN6-0214	07-22-2010	TETRA TECH EM, INC.		INFO REPOSITORY	BLDG 0000260	SOUTHWEST
MINUTES	5090.3.A.			SENSITIVE	BLDG 0001311	
N62467-04-D-0055	CTO FZN6	RESTORATION ADVISORY BOARD			BLDG 0001313	
38					BLDG 0001325	
					SITE 00006	
					SITE 00012	
					SITE 00021	
					SITE 00024	
					SITE 00028	
					SITE 00032	

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Subject	Distribution	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
Doc. Control No.	Prc. Date	Author	Author Affil.					
Record Type	SSIC No.	Author	Author Affil.					
Contract No.	CTO No.	Recipient	Recipient Affil.					
Approx. # Pages								
N60028 / 001700 TTEM-0055-FZN6-0221 MINUTES N62467-04-D-0055 9	11-04-2009 09-24-2010 5090.3.A. CTO FZN6	CANEPA, J. TETRA TECH EM, INC. BRAC PMO WEST		04 NOVEMBER 2009 DRAFT REMEDIAL PROJECT MANAGERS AND BASE REALIGNMENT AND CLOSURE CLEANUP TEAM MEETING MINUTES (CD COPY ENCLOSED)	ADMIN RECORD INFO REPOSITORY	BLDG 0000233 BLDG 0000445 BLDG 0001123 BLDG 0001319 BLDG 0001321 SITE 00006 SITE 00011 SITE 00012 SITE 00021 SITE 00024 SITE 00027 SITE 00028 SITE 00032	NAVFAC - SOUTHWEST	
N60028 / 001701 TTEM-0055-FZN6-0238 MINUTES N62467-04-D-0055 11	02-03-2010 09-24-2010 5090.3.A. CTO FZN6	CANEPA, J. TETRA TECH EM, INC. BRAC PMO WEST		03 FEBRUARY 2010 DRAFT REMEDIAL PROJECT MANAGERS AND BASE REALIGNMENT AND CLOSURE CLEANUP TEAM MEETING MINUTES (CD COPY ENCLOSED)	ADMIN RECORD INFO REPOSITORY	BLDG 0000092 BLDG 0000233 BLDG 0001321 SITE 00006 SITE 00012 SITE 00021 SITE 00024 SITE 00027 SITE 00028 SITE 00029 SITE 00030 SITE 00031 SITE 00032 SITE 00033 WELL MW38	NAVFAC - SOUTHWEST	

UIC No. / Rec. No.	Record Date	Author	Subject	Distribution	Sites	Location	FRC Accession No.
Doc. Control No.	Prc. Date	Author Affil.					
Record Type	SSIC No.	Recipient				SWDIV Box No(s)	FRC Warehouse
Contract No.	CTO No.	Recipient Affil.				CD No.	FRC Box No(s)
Approx. # Pages							
N60028 / 001702	03-03-2010	CANEPA, J.	03 MARCH 2010 DRAFT REMEDIAL	ADMIN RECORD	BLDG 0001121	NAVFAC -	
TTEM-0055-FZN6-0247	09-24-2010	TETRA TECH EM, INC.	PROJECT MANAGERS AND BASE	INFO REPOSITORY	BLDG 0001123	SOUTHWEST	
MINUTES	5090.3.A.		REALIGNMENT AND CLOSURE CLEANUP		SITE 00011		
N62467-04-D-0055	CTO FZN6	BRAC PMO WEST	TEAM MEETING MINUTES (CD COPY		SITE 00012		
13			ENCLOSED)		SITE 00021		
					SITE 00024		
					SITE 00025		
					SITE 00027		
					SITE 00028		
					SITE 00031		
					SITE 00032		
					SITE 00033		
					WELL 21-MW09A		
N60028 / 001703	04-07-2010	CANEPA, J.	07 APRIL 2010 DRAFT REMEDIAL PROJECT	ADMIN RECORD	BLDG 0000233	NAVFAC -	
TTEM-0055-FZN6-0250	09-24-2010	TETRA TECH EM, INC.	MANAGERS AND BASE REALIGNMENT AND	INFO REPOSITORY	BLDG 0000343	SOUTHWEST	
MINUTES	5090.3.A.		CLOSURE CLEANUP TEAM MEETING		BLDG 0000344		
N62467-04-D-0055	CTO FZN6	BRAC PMO WEST	MINUTES (CD COPY ENCLOSED)		BLDG 0001121		
18					BLDG 0001123		
					BLDG 0001319		
					BLDG 0001321		
					SITE 00006		
					SITE 00012		
					SITE 00021		
					SITE 00024		
					SITE 00027		
					SITE 00028		
					SITE 00030		
					SITE 00031		
					SITE 00032		
					SITE 00033		
					UST 000240		

UIC No. / Rec. No.	Record Date	Author	Author Affil.	Subject	Distribution	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
Doc. Control No.	Prc. Date	Author	Author Affil.					
Record Type	SSIC No.	Author Affil.	Author Affil.					
Contract No.	CTO No.	Recipient	Recipient Affil.					
Approx. # Pages		Recipient Affil.	Recipient Affil.					
N60028 / 001686	04-19-2010	RASH, M.		DRAFT 2010 SITE MANAGEMENT PLAN (CD	ADMIN RECORD	BLDG 0000066	NAVFAC -	
TTEM-0055-FZN6-0241	06-15-2010	TETRA TECH EM, INC.		COPY ENCLOSED)	INFO REPOSITORY	BLDG 0000180	SOUTHWEST	
REPORT	5090.3.A.				SENSITIVE	BLDG 0000227		
N62467-04-D-0055	CTO FZN6	BRAC PMO WEST				BLDG 0000530		
151						PARCEL T086		
						SITE 00004		
						SITE 00006		
						SITE 00008		
						SITE 00011		
						SITE 00012		
						SITE 00014		
						SITE 00015		
						SITE 00016		
						SITE 00019		
						SITE 00020		
						SITE 00021		
						SITE 00022		
						SITE 00024		
						SITE 00025		
						SITE 00027		
						SITE 00028		
						SITE 00029		
						SITE 00030		
						SITE 00032		
						SITE 00033		
						UST 000001		
						UST 000001A		
						UST 000001B		
						UST 000001C		
						UST 000001D		
						UST 000001E		
						UST 000001F		
						UST 000002		
						UST 000002A		
						UST 000002C		

UIC No. / Rec. No.	Record Date	Author						Location	FRC Accession No.
Doc. Control No.	Prc. Date	Author Affil.						SWDIV Box No(s)	FRC Warehouse
Record Type	SSIC No.	Recipient		Subject		Distribution	Sites	CD No.	FRC Box No(s)
Contract No.	CTO No.	Recipient Affil.							
Approx. # Pages									
							UST 00002D		
							UST 000003		
							UST 000004		
							UST 000005		
							UST 000006		
							UST 000007		
							UST 000009		
							UST 000010		
							UST 000057		
							UST 000062		
							UST 000111		
							UST 000140		
							UST 000169		
							UST 000180A		
							UST 000180B		
							UST 000180C		
							UST 000180D		
							UST 000180E		
							UST 000201		
							UST 000204		
							UST 000221		
							UST 000225A-D		
							UST 000230		
							UST 000234		
							UST 000237		
							UST 000238		
							UST 000240		
							UST 000257		
							UST 000300D		
							UST 000330C		
							UST 000368A		
							UST 000368B		
							UST 000469		
							UST QR08		

UIC No. / Rec. No.	Record Date	Author	Subject	Distribution	Sites	Location	FRC Accession No.
Doc. Control No.	Prc. Date	Author Affil.				SWDIV Box No(s)	FRC Warehouse
Record Type	SSIC No.	Recipient				CD No.	FRC Box No(s)
Contract No.	CTO No.	Recipient Affil.					
Approx. # Pages							
N60028 / 001697 ALNC-2206-0028-0005 REPORT N62473-06-D-2206 206	07-01-2010 09-13-2010 5090.3.A. CTO 0028	BORNHOFT, S. THE ALLIANCE COMPLIANCE GROUP JOINT VENTURE NAVFAC - SOUTHWEST	DRAFT RECORD OF DECISION, WEST SIDE ON-OFF RAMPS (CD COPY ENCLOSED)	ADMIN RECORD INFO REPOSITORY SENSITIVE	SITE 00028	NAVFAC - SOUTHWEST	
N60028 / 001696 TTEM-0055-FZN6-0276 REPORT N62467-04-D-0055 89	07-12-2010 08-18-2010 5090.3.A. CTO FZN6	CANEPA, J. TETRA TECH EM, INC. BRAC PMO WEST	DRAFT POINT PAPER FOR REDEFINING BOUNDARY OF EAST SIDE ON- AND OFF- RAMPS UNDER THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CD COPY ENCLOSED)	ADMIN RECORD INFO REPOSITORY SENSITIVE	SITE 00008 SITE 00011 SITE 00028 SITE 00029	NAVFAC - SOUTHWEST	

Total Estimated Record Page Count: 6,148

Total - Administrative Records: 71

[UIC NUMBER]='N60028'

No Keywords

Sites=SITE 00028

No Classification

APPENDIX B
TABLE OF REFERENCES

(Reference Documents Provided on CD Only)

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
1	FFSRA	Section 1.2	Federal Facility Site Remediation Agreement (FFSRA) with the State of California for Naval Station Treasure Island. Sections 1 and 2. Department of Navy. September 29.
2	Proposed Plan	Section 1.2	Proposed Plan for Installation Restoration Site 28, West Side On-Off Ramps, Naval Station Treasure Island. The Alliance Compliance Group Joint Venture. April 29, 2010.
3	EPA	Section 1.4	http://www.epa.gov/superfund/policy/remedy/rods/index.htm
4	TI	Section 2.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 1.5. SulTech. February 2009.
5	DON	Section 2.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 1.5.2. SulTech. February 2009.
6	Environmental settings	Section 2.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.2.2.1 and Section 7.2.2.5. SulTech. February 2009.
7	Data collected	Section 2.3	Phase IIB Remedial Investigation Summary of Validated Data, Volume I of II. Naval Station Treasure Island, San Francisco California. Executive Summary. PRC Environmental Management, Inc. May 30, 1996.
8	Site 28	Section 2.4	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 1.5.3. SulTech. February 2009.
9	"Tidelands Trust"	Section 2.4	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 1.9. SulTech. February 2009.
10	Public Trust Doctrine	Section 2.4	The Public Trust Doctrine. California State Lands Commission. Also available online at: http://www.slc.ca.gov/policy_statements/public_trust/public_trustDoctrine.pdf
11	inclusion of Site 28	Section 2.4	Email from Office of Economic and Workforce Development, City of San Francisco, staff, Mr. Michael Tymoff, to the Navy RPM, Mr. Perry Charles. March 05, 2009.
12	groundwater	Section 2.4	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 3.3.2. SulTech. February 2009.
13	CSM for human health	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Figure G-2. SulTech. February 2009.
14	Site-related risks and total risks	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 6.0. SulTech. February 2009.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
15	Chemicals of potential concern (COPC)	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Table G3.1.1 through Table G3.1.3. SulTech. February 2009.
16	Calculation of potential risks	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Section G10.1 and Section G10.2. SulTech. February 2009.
17	Lead	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Figure 4-2. SulTech. February 2009.
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.
19	EPA Region IX residential soil RSL	Section 2.5.1	http://www.epa.gov/region9/superfund/prg/index.html
20	Uncertainties	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 6.3. SulTech. February 2009.
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.
22	CSM for terrestrial receptors	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Figure 7-4. SulTech. February 2009.
23	Peregrine falcons	Section 2.5.2	Final Validation Study for IR Sites 11, 28, and 29, Naval Station Treasure Island, San Francisco, California. Prepared for Department of the Navy, Engineering Field Activity West, Naval Facilities Engineering Command, San Bruno, California. Section 6.3.3. December 17, 2001.
24	Final Community Relations Plan	Section 2.6	Final Community Relations Plan 2008 Update Naval Station Treasure Island San Francisco, California. Executive Summary. Tetra Tech EM Inc. May 30, 2008.
25	IR Program website	Section 2.6	http://www.bracpmo.navy.mil/basepage.aspx?baseid=44&state=California&name=treasure_island

Note:

^a **Blue** text indicates hyperlinks available on reference CD to detailed site information contained in the publicly available Administrative Record.

For access to information contained in the Administrative Record for Treasure Island, please contact:

Ms. Diane Silva
NARA Certified Command Records Manager
NAVFAC Southwest 1220 Pacific Highway, Code EV33
NBSD Bldg. 3519
San Diego, CA 92132
Phone: (619) 556-1820
Fax: (619) 556-1278
E-mail: diane.silva@navy.mil

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ³
1	FFSRA	Section 1.2	Federal Facility Site Remediation Agreement (FFSRA) with the State of California for Naval Station Treasure Island. Sections 1 and 2. Department of Navy. September 29.

Federal Facility Site
Remediation Agreement for
Treasure Island Naval Station

actions at the Site in accordance with applicable state law and other applicable promulgated requirements, and consistent, to the maximum extent possible, with the priorities, guidelines, criteria, and regulations contained in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

(d) Facilitate cooperation, exchange of information and participation of the Parties in such action; and,

(e) Ensure the adequate assessment of potential injury to natural resources, and the prompt notification of and cooperation with the Federal and State Natural Resources Trustees necessary to guarantee the implementation of response actions achieving appropriate cleanup levels.

(f) Recognize and reach compromise on perceived conflicts between State and Department of Defense response authorities under applicable state and federal law, and to preserve any rights or entitlements each party may have under applicable state and federal law.

1.3 Specifically, the purposes of this Agreement are to:

(a) Establish requirements for the performance of pre-remedial work and Remedial Investigation (RI) to determine fully the nature and extent of the threat to the public health or welfare or the environment caused by the release and threatened release of hazardous substances, wastes (only to the extent that the definition of waste in Water Code Section 13050 covers hazardous substances, pollutants, and contaminants), pollutants, or contaminants at the Site and to establish requirements for the performance of a Feasibility Study (FS) for the Site to identify, evaluate, and select alternatives for the appropriate remedial action(s) to prevent, mitigate, or abate the release or threatened release of hazardous substances, wastes (only to the extent that the definition of waste in Water Code Section 13050 covers hazardous substances, pollutants, and contaminants), pollutants, or contaminants at the Site in accordance with applicable state and federal law;

(b) Identify the nature, objective, and schedule of response actions to be taken at the Site. Response actions at the Site shall attain that degree of cleanup of hazardous substances, wastes (only to the extent that the definition of waste in Water Code Section 13050 covers hazardous substances,

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ³
1	FFSRA	Section 1.2	Federal Facility Site Remediation Agreement (FFSRA) with the State of California for Naval Station Treasure Island. Sections 1 and 2. Department of Navy. September 29.

**Federal Facility Site
Remediation Agreement for
Treasure Island Naval Station**

pollutants, and contaminants) , pollutants or contaminants mandated by applicable state and federal law;

(c) Implement the selected remedial actions(s) in accordance with applicable state and federal law;

(d) Assure compliance, through this Agreement, with applicable state and federal hazardous waste and water quality laws and regulations for matters covered herein;

(e) Coordinate response actions at the Site with the mission, national security, and support activities at Treasure Island Naval Station;

(f) Expedite the cleanup process to the extent consistent with protection of human health and the environment;

(g) Provide for initiation, development, selection and implementation by the Navy of response actions, including operable units and the final remedial action(s), to be undertaken at Treasure Island Naval Station.

(h) Provide for State oversight of and participation in the initiation, development, selection and implementation of response actions, including operable units and the final remedial action(s), to be undertaken at Treasure Island Naval Station, including the review of all applicable data as it becomes available and the development of studies, reports, and action plans; and, preserve the state's right to enforcement pursuant to applicable state and federal law; and

(i) Provide for operation and maintenance of any remedial action selected and implemented pursuant to this Agreement.

(j) Identify operable unit (OU) alternatives which are appropriate at the Site prior to the implementation of final remedial action(s) for the Site. OU alternatives shall be identified to the parties as early as possible prior to proposal of OUs to the State. This process is designed to promote cooperation among the Parties in identifying OU alternatives prior to the final selection of OUs.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ³
1	FFSRA	Section 1.2	Federal Facility Site Remediation Agreement (FFSRA) with the State of California for Naval Station Treasure Island. Sections 1 and 2. Department of Navy. September 29.

**Federal Facility Site
Remediation Agreement for
Treasure Island Naval Station**

1 2. PARTIES

2
3 2.1 The Parties to this Agreement are the Navy, and the State
4 of California. The terms of the Agreement shall apply to and be
5 binding upon the State of California and the Navy.

6
7 2.2 This Agreement shall be enforceable against all of the
8 Parties to this Agreement. This Section shall not be construed as
9 an agreement to indemnify any person. The Navy shall notify its
10 agents, members, employees, response action contractors for the
11 Site, and all subsequent owners, operators, and lessees of the Site
12 of the existence of this Agreement.

13
14 2.3 Each Party shall be responsible for ensuring that its
15 contractors comply with the terms and conditions of this Agreement.
16 Failure of a Party to provide proper direction to its contractors
17 and any resultant noncompliance with this Agreement by a contractor
18 shall not be considered a Force Majeure event or other good cause
19 for extensions under Section 9 (Extensions), unless the Parties so
20 agree, or unless established by the Dispute Resolution process
21 contained in Section 12. The Navy will notify the State of the
22 identity and assigned tasks of each of its contractors performing
23 work under this Agreement upon their selection.

24
25 2.4 The State of California is represented by the California
26 Department of Toxic Substances Control (DTSC) as lead agency and
27 the California Regional Water Quality Control Board (RWQCB) as
28 support agency. The responsibilities of the lead and support
29 agencies are set forth in this Agreement, the Memorandum of
30 Understanding between DTSC and the State Water Resources Control
31 Board and the Regional Water Quality Control Boards for the Cleanup
32 of Hazardous Waste Sites (Aug. 1, 1990), and the Regional
33 Memorandum of Understanding between DTSC, Region 2, and RWQCB, San
34 Francisco Bay Region, when and if it becomes effective. In the
35 event of conflict, between any of the above documents and this
36 Agreement, this Agreement shall govern. Copies of said
37 memorandum(s) shall be made an attachment(s) to this Agreement, and
38 are incorporated herein by this reference. The State may change
39 the State lead agency during the performance of this Agreement.
40 Such change of State lead agency is not subject to dispute
41 resolution, but may constitute good cause for a request for an
42 extension under Section 9 of this Agreement. The State shall
43 notify the Navy of such change of State lead agency within 14 days
44 after the decision is made. If the State lead agency changes, the
45 new lead agency will accept all work previously accepted by the
46 prior lead agency for the State.

Naval Station Treasure Island

INTRODUCTION

The U.S. Department of the Navy (Navy) is responsible for planning and implementing cleanup actions to remediate contamination which may have resulted from historical operations at Naval Station Treasure Island (NAVSTA TI) (Figure 1). Under the **Installation Restoration (IR) Program**, the Navy conducted environmental investigations at Site 28, which includes a portion of the West Side On-Off Ramps, at NAVSTA TI (see Figure 2 on page 2). The investigations were conducted in cooperation with the California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC), the Cal/EPA Regional Water Quality Control Board (Regional Water Board), the U.S. Environmental Protection Agency (USEPA), and the Treasure Island Development Authority (TIDA).

In this Proposed Plan, the Navy proposes that no environmental cleanup action be taken at Site 28. This no-action plan is proposed because the **human health and ecological risk assessment** report evaluated during the **remedial investigation (RI)** concluded that the low chemical concentrations detected do not pose **unacceptable risks** to human health or the environment based on **exposure pathways** to potential **receptors** under current and future hypothetical land use scenarios. This Proposed Plan explains further why the Navy is proposing no action. This Proposed Plan meets the requirements of the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**, and the California Health and Safety Code (HSC) Chapter 6.8.

“Glossary of Terms” is located at the end of this document to assist the reader in understanding terms used in this Proposed Plan. Specialized or technical terms are highlighted in bold the first time they appear and are defined in the Glossary.

INVITATION TO COMMENT

Public participation is a critical part of the CERCLA process. As such, the Navy encourages you to express your opinion of the presented no action alternative for Site 28 by providing written or oral comments on this Proposed Plan. You are invited to attend a public meeting scheduled on **May 12, 2010, at 6:30 p.m. at the Casa de la Vista, Building 271** on Treasure Island (TI) to discuss this Proposed Plan. You are encouraged to review the Final RI Report for more background and detailed technical information. The Final RI Report is available for public review at the San Francisco Public Library information repository and at the Treasure Island Building 1 information repository at the following addresses:

San Francisco Public Library
100 Larkin Street (at Grove)
San Francisco, CA 94102-4733

Treasure Island Information Repository
410 Palm Avenue, Building 1, Room 161
Treasure Island, San Francisco, CA 94130-1806

The Navy has established a 30-day public comment period, during which time interested and concerned neighbors, community members, and other interested parties may express their views and opinions on the conclusions and recommendations in this Proposed Plan. The 30-day public comment period will begin April 29, 2010 and end May 29, 2010.

CONTENTS	
Introduction.....	Page 1
Invitation to Comment	Page 1
Site Background.....	Page 2
Site Characterization.....	Page 2
Summary of Site Risk Assessments.....	Page 3
Description of The No-Action Proposed Plan.....	Page 5
Multi-Agency Environmental Team	
Supportive Statement.....	Page 5
The Next Step for Site 28.....	Page 6
Opportunities for Community Involvement.....	Page 7
Glossary of Terms.....	Page 8
For More Information	Page 9



Figure 1: Site Location Map

THE CERCLA PROCESS



Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ¹
2	Proposed Plan	Section 1.2	Proposed Plan for Installation Restoration Site 28, West Side On-Off Ramps, Naval Station Treasure Island. The Alliance Compliance Group Joint Venture. April 29, 2010.

SITE BACKGROUND

TI is located in the central San Francisco Bay region, just north of the San Francisco-Oakland Bay Bridge (SFOBB), and within the City and County of San Francisco (the City). TI was built in 1936 and 1937 on the Yerba Buena Shoals, a sand spit extending from the northwest point of Yerba Buena Island (YBI) (Figure 1). It was used initially for the Golden Gate International Exposition in 1939. In 1941, TI was leased to the Navy, which operated the facility for various activities including the Naval Technical Training Center; waterfront facilities; troop and family housing; personnel support; a Navy brig; and a Navy and Marine Corps Museum until the closure of NAVSTA TI in 1997. The Navy gained title to TI in 1943. In 1993, the Defense Base Realignment and Closure (BRAC) commission recommended closure of NAVSTA TI; the facility was subsequently closed on September 30, 1997.

Site 28 (which includes a portion of the West Side On-Off Ramps to and from SFOBB), is located in the western portion of YBI and is bounded to the west and southwest by the Bay; to the east and southeast by Site 29, and to the north by vacant land (Figure 2). Other than the roads running through Site 28, most of the site is steeply sloped to the southwest, toward the Bay, and densely vegetated with trees and brush.



Figure 2: Site 28 – West Side On-Off Ramps

The Navy owned the property beneath the SFOBB until 2001, when the Federal Highway Administration transferred the bridge right-of-way from the Navy to the California Department of Transportation (Caltrans). The transfer did not include the West Side On-Off Ramps at Site 28, which remain Navy property. At Site 28, the soil beneath and surrounding the on- and off-ramps and the area beneath the main SFOBB structure is subject to contamination by lead and other metals as a result of vehicle emissions and bridge

painting and maintenance. As described below, RI activities were conducted by the Navy to evaluate this possibility. A boundary adjustment was made in 2005 so that all lands deeded to Caltrans in Sites 28 and 29 were included within Site 29. The West Side On-Off Ramps were not part of the boundary adjustment and remain part of Site 28 (Figure 2).

According to the Draft NAVSTA TI Reuse Plan dated 1996, Site 28 is designated for a future use as shoreline open space. Site 28 falls within lands that will be subject to the **Tidelands Trust**, which limits the potential uses of the land.

SITE CHARACTERIZATION

This section summarizes the three investigational activities previously performed at Site 28: the Health and Safety Sampling Investigation, the RI, and the validation study.

The geologic setting of YBI, a natural island of approximately 147 acres, consists of four geologic units: (1) landslide debris, (2) artificial fill, (3) colluvium and eolian sands, and (4) Franciscan Assemblage. Based on site observations, sandy soil at Site 28 generally appears to be a mix of Franciscan-derived colluvium and small amounts of marine sand. Some mixing of the soil may have occurred as a result of natural landsliding or road and highway construction. Site 28 is partially underlain by shales and sandstones of the Franciscan Assemblage.

Soil samples were collected at Site 28 to a depth of 1.75 feet below ground surface (bgs). Based on information acquired from the adjacent Site 29, groundwater at this steeply sloped site is expected to occur at a depth greater than 10 feet bgs. The steep ground surface at this site limits the amount of infiltration and recharge to groundwater following precipitation events. Moreover, the selected chemicals exceeding comparison criteria in soil (see discussion below) at the site have low solubilities and are relatively immobile under ambient conditions; therefore, they are not expected to pose an unacceptable risk to groundwater quality. Additionally, groundwater is not a current or potential future drinking-water source at Site 28; therefore, groundwater exposure pathways were not further evaluated at the site.

Health and Safety Soil Sampling Investigation

In 1992, the Navy conducted a soil investigation of what is now Site 28. The 1992 investigation was conducted in connection with a desire to understand potential health and safety concerns for workers performing seismic improvements to the on- and off-ramps in areas possibly containing elevated concentrations of metals in airborne dust. Thirty-seven shallow soil samples were collected and submitted for laboratory analysis for lead and zinc. Lead and zinc were detected in all 37 of the soil samples collected from the area near the West Side On-Off Ramps, at levels indicating the presence of these metals above ambient concentrations; therefore, it was determined that an additional investigation was warranted.

It should be noted that the 1992 investigation was not designed to provide data of sufficient quality to support a **Hu-**

Item	Reference or Phrase in ROD	Location in ROD	Identification of Document Available in the Administration Record ¹
2	Proposed Plan	Section 1.2	Proposed Plan for Installation Restoration Site 28, West Side On-Off Ramps, Naval Station Treasure Island. The Alliance Compliance Group Joint Venture. April 29, 2010.

man Health Risk Assessment (HHRA). The data were presumably collected to support the worker health and safety program of the contractor working on the SFOBB at this time; paint debris and paint chip-impacted surface soil were likely sampled as part of that program. Moreover, the Navy has been unable to locate a copy of the original report to verify sample locations, collection methods, and analytical methods. These data were not appropriate for use in the HHRA for the following reasons:

- Laboratory and data validation reports, and specifics regarding data quality procedures for these samples are not known nor available
- Most likely, paint chip debris from under the bridge was selectively sampled for health and safety purposes rather than soil data normally used in risk assessments
- The location of the 1992 samples have since been paved for erosion control, thereby eliminating the potential exposure pathway
- The 1995 RI data were collected outside of the immediate footprint of the roadway in an area that is currently vegetated and is largely characterized by a very steep ground surface. These data were considered to more accurately represent site soil conditions across the property.

Remedial Investigation

The primary objective of the RI conducted in 1995 was to assess the extent of metals contamination in the soil, and to determine whether soil was contaminated as a result of Navy activities associated with maintenance of the West Side On-Off Ramps. Twenty-three samples were collected from the seventeen sampling locations selected for shallow soil sampling, and the samples were submitted to an off-site laboratory for analysis of metals. PRC concluded that lead was the only metal consistently detected in the RI samples. Zinc was also detected consistently in samples collected during the Health and Safety Soil Sampling Investigation; however, as stated previously, the Navy has been unable to locate a copy of the original report to verify sample locations, collection methods, and analysis methods.

Final Validation Study for Installation Restoration Sites 8, 11, 28, and 29

In 2001, the Navy conducted a study to validate the results of the **Screening Level Ecological Risk Assessment (SLERA)** performed in 1997 as part of the RI. Specifically, the validation study was conducted to confirm SLERA results for the American peregrine falcon. The results of the validation study indicated that **chemicals of potential ecological concern (COPEC)** at Sites 8, 11, 28, and 29 did not pose an unacceptable risk to the peregrine falcon.

Tidelands Trust

TI was built by depositing dredge material on the tidelands and shoals to the north of YBI. The Tidelands Trust is overseen by the California State Lands Commission and administered by the State Legislature. The trust applies to TI, and it

imposes the following restrictions on the development of TI:

- Land uses are limited to Trust purposes. Residential and non-maritime uses are prohibited;
- Sale of Trust lands to private entities is prohibited; and
- Revenues generated from Trust uses must be expended for Trust purposes.

The TI Public Trust Act of 2004 proposed an exchange of lands under which, post-transfer, non-Trust lands on YBI would be brought into the Trust, and Trust lands on TI would be released from the Trust. This type of exchange is allowed under the Tidelands Trust. Upon inclusion in the Tidelands Trust, Site 28 in its entirety (Figure 3) will be limited to uses which may intermittently attract people to the waterfront, promote public recreation, protect habitat, or preserve open space; however, as previously stated, residential and non-maritime uses are prohibited by the Tidelands Trust. Moreover, access and use of Site 28 is expect to be limited, considering the hillside topography and proximity to the SFOBB. The ground surface across Site 28 is too steep to allow (residential/commercial) redevelopment activities. The steeply sloped ground surface also largely prohibits safe and practical access for a recreational user. Therefore, residential and commercial development and recreational use of Site 28 are considered highly unlikely and impractical.

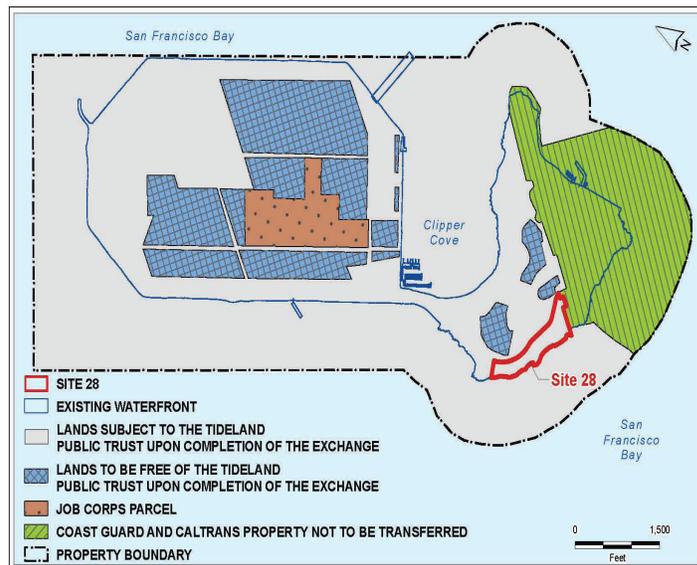


Figure 3: Boundaries of the Tidelands Trust

SUMMARY OF SITE RISK ASSESSMENTS

The Navy conducted baseline **human health and ecological risk assessments** as part of the RI at Site 28. The risk assessments were completed using surface soil data collected for metals analysis in the 1995 RI. The HHRA calculated risks for lead, antimony, and thallium. The HHRA evaluated potential health risks to a hypothetical future commercial/industrial worker, construction worker, resident, and recreational visitor. The human-health risk calculations indicate that potential health risks associated with antimony and thallium are within the acceptable range. The results of the HHRA in-

Item	Reference or Phrase in ROD	Location in ROD	Identification of Document Available in the Administration Record ¹
2	Proposed Plan	Section 1.2	Proposed Plan for Installation Restoration Site 28, West Side On-Off Ramps, Naval Station Treasure Island. The Alliance Compliance Group Joint Venture. April 29, 2010.

dicade that lead levels in soil may present unacceptable risks to hypothetical future residents, but potential risks from lead in soil to hypothetical future commercial/industrial receptors, future construction/maintenance workers, and potential future adult and child recreational visitors are below the threshold. Since current site usage is limited to intermittent construction/maintenance workers, and since the site does not lead itself to future redevelopment (either residential or commercial/industrial) and/or daily recreational activities, the observed levels of lead in soils at the site do not pose an unacceptable risk to human health. Similarly, the ecological risk assessment conducted as part of the RI concluded that Site 28 risks to ecological receptors, including the peregrine falcon, are below the threshold.

Based on the findings of the risk assessments and the planned future land use and restrictions as a result of the Tidelands Trust, the Navy, DTSC, USEPS, and Regional Water Board agree that no action is necessary at Site 28. More detailed summaries of the human health and ecological risk assessments follows.

Human Health Risk Assessment

In performing the HHRA as part of the Site 28 RI, the Navy calculated both cancer risks and noncancer **hazard indices (HI)** for an array of current and hypothetical future exposure scenarios. The exposure scenarios included potential risks to construction workers (i.e., exposure under current land use), and these hypothetical receptors: commercial/industrial workers, future residents, and recreational site visitors. Although future development of the site for residential or industrial use is impractical and not planned, evaluation of these scenarios provides alternative risk estimates for unrestricted reuse of the site and supports risk management decisions for the site.

Risks were estimated for chemicals related to former Site 28 operations, referred to as “site-related risks.” For comparison purposes and to satisfy regulator requirements, “total risks” were also calculated for all chemicals present at the site, including chemicals below background levels.

Chemicals of potential concern (COPC) were identified using two methods: Method 1 satisfies the Navy and Federal Requirements, and Method 2 satisfies state requirements. Using Method 1, only one site-related COPC was identified: lead in soil. Using Method 2, site-related COPCs are lead, antimony, and thallium in soil.

Health impacts associated with lead were evaluated using DTSC’s LeadSpread model, wherein potential blood-lead levels in human receptors are estimated based in part on potential exposure to lead in site soils. The estimated blood-lead level is then compared to the blood-lead level of concern in order to determine the potential significance for health impacts associated with lead.

Since antimony and thallium are considered noncarcinogenic by the USEPA, potential health risks associated with these metals were estimated in the RI based on the calculation of the noncancer HI. The HI is a determination of a constituents

overall noncarcinogenic toxicity. The HHRA also included estimation of cancer risks for carcinogenic chemicals; however, these chemicals were not related to known activities at the site and hence cancer risks were only estimated as part of the “total risk” calculations.

The HHRA calculated cancer and/or noncancer health effects associated with each chemical and potential complete exposure pathway within the “site-related risks” and “total Risks” calculations. Cancer and noncancer effects were then summed across exposure pathways for each potential receptor. Lead was not included in this cumulative risk characterization because potential health effects from lead were evaluated using DTSC methodology that calculated blood-lead levels in potentially exposed populations.

The Navy characterized cancer risks associated with exposure to contaminants classified as carcinogens as an estimate of the probability (excess risk) that an individual will develop cancer over a 70-year lifetime as a direct result of exposure to those potential carcinogens. For example, a cancer risk of 1×10^{-6} indicates that an individual has a “one in one million” probability of developing cancer during a 70-year lifetime as a result of the assumed exposure conditions.

For known or suspected carcinogens (“total risk” calculation only), where cumulative carcinogenic risk to an individual is less than 1×10^{-6} , action generally is not warranted unless there are adverse environmental impacts. Conversely, carcinogenic risks in excess of 1×10^{-4} may warrant corrective action. Correspondingly, the risk range between 1×10^{-4} and 1×10^{-6} is often referred to as “**risk management range.**” A risk estimated within this risk management range may be considered minimal if justified based on site-specific conditions (OSWER Directive 9355.0-30). Based on the HHRA presented in the Site 28 RI, the “total risk” at Site 28 for all exposure scenarios was found to be within the risk management range, peaking at 5×10^{-6} (hypothetical residential exposure scenario). As previously indicated, the “site-related risks” did not yield a cancer risk due to the noncarcinogenic nature of antimony and thallium.

For noncarcinogenic chemicals, an HI value of 1.0 or less indicates that adverse noncancer human health effects are not expected to occur. However, a total HI exceeding 1.0 does not necessarily mean that adverse effects are “expected to occur” or are “significant.” If the total HI is greater than 1.0, a segregated analysis of the HI’s for each specific biological organ (or **target organ**) is then performed to determine whether the noncancer health risks of chemicals to different target organs are possible. Based on the HHRA presented in the Site 28 RI, the noncancer HI’s for the site-related chemicals were well below 1.0 for all exposure scenarios evaluated. Noncancer HI’s for the “total risk” calculations were below 1.0 for both hypothetical commercial/industrial and construction worker exposure scenarios, and equaled 1.0 for the hypothetical resident exposure scenario.

While lead is considered a class B-2 carcinogen (with suffi-

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ¹
2	Proposed Plan	Section 1.2	Proposed Plan for Installation Restoration Site 28, West Side On-Off Ramps, Naval Station Treasure Island. The Alliance Compliance Group Joint Venture. April 29, 2010.

cient evidence in animals and inadequate evidence in humans), its health effects are typically evaluated through estimation of blood-lead levels based on DTSC's LeadSpread computer-based model. These estimates are then compared to the blood-lead level of concern, which has been defined as 10 micrograms per deciliter of blood ($\mu\text{g}/\text{dL}$). The HHRA presented in the Site 28 RI estimated potential blood-lead levels for human exposure at four exposure areas at Site 28. Estimated blood-lead levels were well below the blood-lead level of concern of $10 \mu\text{g}/\text{dL}$ for hypothetical adult residents, hypothetical commercial/industrial workers, construction workers, and potential recreational visitors to the site. Estimated blood-lead levels exceeded $10 \mu\text{g}/\text{dL}$ for hypothetical child residents, but were below $\mu\text{g}/\text{dL}$ for child recreational visitors to the site. Commercial and residential development is not planned for Site 28.

As previously indicated, exposure to groundwater was not evaluated as part of the HHRA. Generally, groundwater at YBI is estimated to occur at 10 feet bgs and does not meet the minimum yield requirements for the beneficial use of groundwater as specified by the Regional Water Board, and is therefore not a potential drinking-water resource. Combined with the nonvolatile nature of the COPCs at Site 28, this precludes both indirect and direct contact with groundwater for receptors via drinking water or other municipal use.

Based on the HHRA results and the Tidelands Trust restrictions on future use of Site 28, potential health impacts to current and potential future site occupants are considered minimal.

Ecological Risk Assessment

The **ecological risk assessment (ERA)** for Site 28 was finalized in 2001 with the completion of the validation study for Sites 8, 11, 28, and 29 at YBI. The ERA was completed in three phases. In the first phase of the ERA, the problem formulation was developed based on existing data, biotic surveys, and **fate and transport** analysis. This information helped form the basis for the ecological portion of the **conceptual site model** and helped focus additional work necessary to complete the SLERA under Phase II. Based on the information presented in the Phase I report, all IR sites at YBI were recommended for further evaluation in a SLERA.

In the second phase of the ERA, a SLERA was conducted for Sites 8, 11, 28, and 29 that focused on three representative species: the deer mouse (*Peromyscus maniculatus*), American kestrel (*Falco sparverius*), and American peregrine falcon (*Falco peregrinus anatum*). The deer mouse and American kestrel were selected to represent small mammals and raptors, respectively; the peregrine falcon was selected because it is a state-listed endangered species, and two pairs are known to nest on the SFOBB. Potential risks posed by ingestion of COPECs in prey and soil were assessed using a food-chain model (FCM) and an exposure-dose and -effect model.

The results of the FCM conducted in the Phase II ERA indicated potential risk to peregrine falcons under conservative

exposure and effects conditions at Sites 8, 11, 28, and 29. To further evaluate potential risk to the peregrine falcon, a validation study using site-collected bird tissue data was recommended. The FCM conducted in the Phase II ERA also indicated possible risk to small mammals from the concentrations of chemicals at the sites; however, based on the small total area of the sites, the disturbed nature of the sites, and continuing disturbance of the sites, the Navy and regulatory agencies agreed that further evaluation of small mammals was not necessary.

The final phase of the ERA and the validation study, was finalized in December 2001. The conclusion of the validation study was that Sites 8, 11, 28, and 29 posed minimal risk to peregrine falcons. Because the ERA for Site 28 was finalized prior to completion of the RI, the RI report did not re-evaluate the ecological risk, but provided a summary of the ERA conducted at Site 28. Per DTSC's request, this summary included recalculation of **exposure point concentrations (EPC)**, to include data collected since completion of the ERA. Recalculated EPCs were evaluated to ensure that the overall conclusions of the ERA had not changed. A comparison of the EPCs used in the Phase II ERA and validation study *versus* the EPCs calculated in 2005 as part of the RI was performed as part of the RI report. The results of the comparison show that, overall, EPCs have decreased. Therefore, the Site 28 RI Report recommended no further investigation or action for **ecological receptors** at Site 28.

DESCRIPTION OF THE NO-ACTION PROPOSED PLAN

Under CERCLA, the no-action option is appropriate for sites when there is no current or potential threat to human health or the environment. The 2009 Final RI Report made the following conclusions and recommendations:

1. The site's steep, rocky slopes, and location make future development or recreational access unlikely, thus eliminating potential exposure using the industrial or residential development scenarios.
2. No cancer risks exist for site-related chemicals, and HI's are below 1.0 for the most conservative exposure scenario.
3. Blood-lead levels as modeled for adult residents are below the benchmark established by the DTSC; however, exceedances are found for child residents.
4. Blood-lead levels as modeled for hypothetical recreational receptors are well below the benchmark established by the DTSC.
5. Impending inclusion of this site in the Tidelands Trust would further limit any future development of this site.

Based on these conclusions, no action is recommended for Site 28.

MULTI-AGENCY ENVIRONMENTAL TEAM SUPPORTIVE STATEMENT

The Base Realignment and Closure Cleanup Team (BCT) is

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ¹
2	Proposed Plan	Section 1.2	Proposed Plan for Installation Restoration Site 28, West Side On-Off Ramps, Naval Station Treasure Island. The Alliance Compliance Group Joint Venture. April 29, 2010.

composed of the Navy, USEPA, Cal/EPA DTSC, and the Regional Water Board. The primary goals of the BCT are to protect human health and the environment, coordinate environmental investigations, and expedite the environmental cleanup at NAVSTA TI. The BCT reviewed all major documents and activities associated with Site 28, including the RI Report. Based on these reviews and discussions on key documents, the BCT supports the Navy's recommendation for no action at Site 28.

THE NEXT STEP FOR SITE 28

The 30-day public comment period will begin April 29, 2010 and end May 29, 2010. After the comment period has ended, the Navy will consider the comments received on this Proposed Plan before making a final decision for Site 28. the Navy's decision will be recorded as a **Record of Decision (ROD)**, which will include all of the public comments received on this Proposed Plan, as well as the Navy's responses to those comments. A public notice will be placed in the *San Francisco Examiner* announcing when the ROD is available to the public in the San Francisco Public Library information repository.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ¹
2	Proposed Plan	Section 1.2	Proposed Plan for Installation Restoration Site 28, West Side On-Off Ramps, Naval Station Treasure Island. The Alliance Compliance Group Joint Venture. April 29, 2010.

INFORMATION REPOSITORIES

The Proposed Plan and other Site 28 related documents are available at:

San Francisco Public Library
 100 Larkin Street (at Grove)
 San Francisco, CA 94102-4733
 (415) 557-4400

Treasure Island Information Repository
 410 Palm Avenue, Building 1, Room 161
 Treasure Island, San Francisco, CA 94130-1806
 (415) 743-4729

OPPORTUNITIES FOR COMMUNITY INVOLVEMENT

Public Meeting: May 12, 2010, 6:30-7:30 p.m.

Location: Casa de la Vista, Building 271, Treasure Island

You are invited to this community meeting to discuss the information presented in this Proposed Plan for Site 28. Navy representatives will provide visual displays and information on the environmental investigations conducted for Site 28. You will have an opportunity to ask questions and formally comment on the Navy's no action proposal for Site 28, as presented in this Proposed Plan.

Public Comment Period Occurs from April 29, 2010 through May 29, 2010

We encourage you to comment on this Proposed Plan during the 30-day public comment period. Comments may be submitted orally or in writing at the public meeting, or you may mail written comments postmarked no later than **May 29, 2010**, to:

Mr. James Sullivan
 BRAC Environmental Coordinator
 Navy BRAC Program Management Office West
 1455 Frazee Road, Suite 900
 San Diego, California 92108-4310

or via e-mail to (james.b.sullivan2@navy.mil) no later than **May 29, 2010**. Public comments received during this period, or in person at the public meeting on **May 12, 2010**, will be considered in the final decision-making process for Site 28.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ¹
2	Proposed Plan	Section 1.2	Proposed Plan for Installation Restoration Site 28, West Side On-Off Ramps, Naval Station Treasure Island. The Alliance Compliance Group Joint Venture. April 29, 2010.

GLOSSARY OF TERMS

Specialized terms used in this Proposed Plan are defined below:

Chemicals of Potential Ecological Concern (COPEC): chemicals selected to help calculate site risks to the environment based on their toxicity, mobility, and concentration.

Chemicals of Potential Concern (COPC): chemicals selected to help calculate site risks to human health based on their toxicity, mobility, and concentration.

Colluvium: loose sediment.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): the law which established 1) a program to identify hazardous waste sites and 2) procedures to clean up sites to be protective of human health and the environment.

Conceptual Site Model: to portray a site's characteristics such as geology and hydrogeology in order to understand how a site functions so it may be used to assist in decision making.

Ecological Receptor: any ecological organism which may be exposed to site contaminants.

Ecological Risk Assessment (ERA): an evaluation of the likelihood that plants or animals exposed to contaminants from a site would suffer harm.

Exposure Pathway: the way in which a chemical comes into contact with a living organism, such as touching, breathing, or ingesting.

Exposure Point Concentration (EPC): concentration of a chemical at the point at which the receptor is exposed to the chemical.

Fate and Transport: A description of how chemicals can migrate and change in concentration over time and distance along the path of travel.

Hazard Index (HI): a summation of the hazard quotients for all chemicals to which an individual is exposed. (The hazard quotient is the ratio of estimated site-specific exposure to a single chemical from a site over a specified period to the estimated daily exposure level, at which no adverse health effects are likely to occur. The value is used to evaluate the potential for noncancer health effects, such as organ damage, from chemical exposure.)

Human Health Risk Assessment (HHRA): an analysis of the potential negative human health effects caused by hazardous substances released from or present at a site.

Installation Restoration (IR) Program: a U.S. Department of Defense (DoD) program developed to identify, assess, characterize, and clean up or control contamination from past hazardous waste-disposal operations and hazardous materials spills at DoD facilities.

Receptor: any organism (human or ecological) which may be exposed to site contaminants.

Record of Decision (ROD): a document containing the final decision and agreement among the installation, State of California, and USEPA concerning selection of the remedial action(s) at a site. The ROD is based on information from the RI and public comments and concerns.

Remedial Investigation (RI): an investigation in which the types, amounts, and locations of contamination at a site are identified.

Risk Management Range: an established range used by risk managers to determine whether further action is needed to reduce risk to human health or the environment.

Screening Level Ecological Risk Assessment (SLERA): a preliminary ecological risk assessment tool used to evaluate the likelihood that some, more prevalent receptors exposed to a site's contaminants would suffer harm.

Target Organ: the biological organ(s) most adversely affected by exposure to a chemical substance.

Tidelands Trust: the public trust overseen by the California State Lands Commission and administered by the State Legislature, which imposes land use controls or restrictions upon the development of Treasure Island. Residential, industrial, and non-maritime uses are generally prohibited.

Unacceptable Risk: a quantification of potential harm to humans, animals, or plants from exposure to contaminants at elevated levels. An unacceptable risk means there is a potential for deleterious effects, and action may be warranted.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ¹
2	Proposed Plan	Section 1.2	Proposed Plan for Installation Restoration Site 28, West Side On-Off Ramps, Naval Station Treasure Island. The Alliance Compliance Group Joint Venture. April 29, 2010.

FOR MORE INFORMATION

For more information on the environmental program at TI and the Proposed Plan, please contact the following:

Navy Contact

Mr. James Sullivan
 BRAC Environmental Coordinator
 Navy BRAC Program Management Office West
 1455 Frazee Road, Suite 900
 San Diego, CA 92108-4310
 (619) 532-0966
james.b.sullivan2@navy.mil

DTSC Contact

Ms. Remedios Sunga
 Project Manager, DTSC
 700 Heinz Avenue
 Berkeley, CA 94710
 (510) 540-3840
RSunga@dtsc.ca.gov

Water Board Contact

Mr. Ross Steenson
 Project Manager
 Water Board
 1515 Clay Street, Suite 1400
 Oakland, CA 94612
 (510) 622-2445
rsteenson@waterboards.ca.gov

WHERE TO SUBMIT COMMENTS

In addition to the public meeting, you may submit your comments on the Proposed Plan via email or mail to the Navy contact person identified above.

DATES TO REMEMBER

**May 12, 2010
 6:30-7:30 p.m.**

Public meeting for comments on the Proposed Plan.

All comments must be postmarked by May 29, 2010 for consideration.

USE THIS SPACE TO WRITE YOUR COMMENTS

COMMENTS: _____

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ¹
2	Proposed Plan	Section 1.2	Proposed Plan for Installation Restoration Site 28, West Side On-Off Ramps, Naval Station Treasure Island. The Alliance Compliance Group Joint Venture. April 29, 2010.

MAILING COUPON

If you would like to be added to the Naval Station Treasure Island mailing list and receive copies of future newsletters and fact sheets, please fill out the coupon below and mail it to:

Mr. James Sullivan
 BRAC Environmental Coordinator
 Navy BRAC Program Management Office West
 1455 Frazee Road, Suite 900
 San Diego, CA 92108-4310

Name: _____

Address: _____

City: _____

State: _____ **Zip:** _____

ADD MY NAME TO THE MAILING LIST **DELETE MY NAME FROM THE MAILING LIST**

Fold Here



Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
4	TI	Section 2.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 1.5. SulTech. February 2009.

Assessment/Site Inspection of Naval Station Treasure Island” (Dames and Moore 1988), (2) ”Master Plan for the Naval Station Treasure Island, San Francisco California” (DON 1988), and (3) “Historical Study of Yerba Buena Island, Treasure Island, and their Buildings” (Mare Island Naval Shipyard BRAC Environmental Division 1996).

NAVSTA TI is located in San Francisco Bay (Bay), midway between San Francisco and Oakland, California (Figure 1-1). NAVSTA TI consists of two contiguous islands: TI, which is approximately 403 acres, and Yerba Buena Island (YBI), which is approximately 147 acres (Figure 1-2). IR Site 28 is located on YBI (Figure 1-3). TI is a manmade island constructed of materials dredged from the Bay; YBI is a natural island. All vehicular traffic to and from TI and YBI must use Interstate 80 and the SFOBB, which passes through YBI by way of a tunnel.

Beyond the waters of the Bay, NAVSTA TI is surrounded by the extensively developed, mixed-use lands of the Bay Area. The Bay Area, with a population that exceeds 6.6 million, is a major metropolitan center of business, industry, and government.

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

TI was built on Yerba Buena Shoals, a sand spit extending from the northwest point of YBI. Dredging and construction of the island began in 1936 and were completed in 1937. Approximately 29 million cubic yards of fill, primarily consisting of sand with lesser amounts of silt, clay, and gravel, was transported to or dredged from the Bay and the Sacramento River delta and used for construction of the island. The island was developed to be the site for the 1939 Golden Gate International Exposition and then San Francisco’s proposed commercial airport.

In response to a DON request, the CCSF leased TI to the DON in 1941 for the duration of World War II. The island became a major naval facility, processing approximately 12,000 military personnel per day for service overseas and upon their return to the United States. After the war, the City of San Francisco agreed to trade the deed for TI to the DON in exchange for government-owned land south of San Francisco where the San Francisco International Airport was eventually built.

Many changes to 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 TI. Only one major pier, at the southeast corner of TI, is still in use.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
5	DON	Section 2.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 1.5.2. SuITech. February 2009.

1.5.1 Current Operations

In 1993, NAVSTA TI was designated for closure under the Base Closure and Realignment Act of 1990. NAVSTA TI was closed on September 30, 1997, and IR Site 28 presently is not being used by the DON. Construction activities for the new SFOBB are currently under way on IR Sites 8 and 29 on the eastern side of YBI, and the deed for these two sites has been granted to Caltrans by the Federal Highway Administration (FHWA). Construction activities will likely not impact IR Site 28 as bridge construction progresses to the west.

1.5.2 Installation Restoration Site 28

IR Site 28, West Side On-Off Ramps, is located in the western portion of YBI and is bounded to the west by the Bay; to the east by Treasure Island Road, which is within the boundaries of IR Site 28; and to the south by IR Site 29 (Figure 1-3). Besides the roads running through IR Site 28, most of the site is steeply sloped to the southwest toward the Bay and densely vegetated with trees and brush.

The DON owned the property comprising the ramps and the area beneath the bridge until 2001, when the FHWA transferred the bridge right-of-way and ramps from the DON to Caltrans. Caltrans was identified as a potentially responsible party in the transfer deed. A boundary adjustment was made in 2005 so that all lands deeded to Caltrans in IR Sites 28 and 29 were included within IR Site 29. The West Side On-Off Ramps were not part of the boundary adjustment and remain part of IR Site 28.

1.5.3 Future Land Use

The future land use for sites on TI and YBI are defined according to the Draft Naval Station Treasure Island Reuse Plan (CCSF 1996, hereafter referred to as the “Reuse Plan”). IR Site 28 is presently designated with a future use as shoreline open space (CCSF 1996). The future use of IR Site 28 is planned to be further limited when it is included in the Tidelands Trust.

1.6 SUMMARY OF PREVIOUS INVESTIGATIONS AT INSTALLATION RESTORATION SITE 28

A number of investigations have been conducted at IR Site 28. This section summarizes investigation activities previously performed at IR Site 28. Table 1-1 provides a summary of the investigation reports that provide background information or historical information related to NAVSTA TI. Table 1-2 summarizes the field activities previously completed at IR Site 28. Table 1-3 provides the type of analysis performed on each sample collected at IR Site 28. A detailed site map and sample locations for IR Site 28 are shown in Figure 1-4. Analytical results for investigations conducted at IR Site 28 are discussed in Section 4.0.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
6	Environmental settings	Section 2.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.2.2.1 and Section 7.2.2.5. SulTech. February 2009.

7.2.2.1 **Plants**

To characterize the flora of YBI and evaluate the site for potential threatened, endangered, or special status plant species, the DON conducted a literature review and field survey at YBI. The plant survey included field observations on April 22 and 30, May 13 and 28, and June 17, 1996. The results were used to create the list of plants expected and observed on NAVSTA TI (Table 7-1). Plant communities at IR Site 28 are discussed below. Figure 7-1 shows the vegetation communities on YBI. The location of the native plant communities delineated during the special-status plant survey are shown on Figure 7-2.

IR Site 28 is comprised of non-native plant communities, northern coastal scrub, and small areas of coast live oak woodland. It is characterized by eucalyptus woodlands in the less sloped areas just west of Treasure Island Road (near the on- and off-ramps), which grade into northern coastal scrub on the steep slopes closer to the Bay. Small stands of coast live oak woodland are interspersed with the coastal scrub. The southern edge of IR Site 28 consists of very steep slopes covered with dense vegetation, deep leaf litter under eucalyptus trees, or altered habitat (such as slopes covered with jute netting for erosion control purposes) (PRC 1996b). Much of the habitat at IR Site 28 is disturbed due to road maintenance and erosion control activities, and is expected to continue to be disturbed in this manner in the future.

7.2.2.2 **Reptiles and Amphibians**

Table 7-2 lists the reptiles and amphibians observed or expected to occur at NAVSTA TI. Terrestrial reptiles and amphibians that may breed on YBI include the northern alligator lizard (*Gerrhonotus coeruleus*) and the California slender salamander (*Batrachoseps attenuatus*) (Anderson 1960). Although no reptile and amphibian surveys were performed at NAVSTA TI, suitable habitat exists on YBI for both of these species.

7.2.2.3 **Birds**

DON wildlife biologists Nola Chow and Jeff Lewis conducted two, 1-day bird surveys on June 15 and 22, 1994. The surveys included observations at three areas of NAVSTA TI: (1) YBI general area, (2) USCG area (on YBI), and (3) TI. These observations were included in the list of birds expected and observed on NAVSTA TI (see Table 7-3). Typical species that occur on YBI include the American robin (*Turdus migratorius*), white-crowned sparrow (*Zonotrichia leucophrys*), American goldfinch (*Carduelis tristis*), towhee (*Pipilo* spp.), song sparrow (*Melospiza melodia*), red-winged blackbird (*Agelaius phoeniceus*), and American kestrel (*Falco sparverius*). The American peregrine falcon (*Falco peregrinus anatum*) is known to nest on the SFOBB and is expected to feed on some avian species that forage at NAVSTA TI.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
6	Environmental settings	Section 2.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.2.2.1 and Section 7.2.2.5. SulTech. February 2009.

7.2.2.4 Mammals

Table 7-4 lists the mammals expected to inhabit or to be observed at NAVSTA TI. Small mammals native to California that may inhabit IR Site 28 include the California ground squirrel (*Spermophilus beecheyi*), the deer mouse, the California pocket mouse (*Perognathus californicus*), and several bats (Order Chiroptera). Deer mice are found in almost any terrestrial habitat in North America where other mammals are found; they often nest in rotting logs, among rocks, or in a burrow (Ingles 1965). Habitat for the California pocket mouse has been described as slopes covered with chaparral or live oaks. Habitat for the California ground squirrel, an herbivorous species, has been described as pastures and grain fields, slopes with scattered trees, and rocky ridges (Burt 1990).

7.2.2.5 Special Status Species

The California Department of Fish and Game’s (CDFG) “California Natural Diversity Database” (CDFG 2005b) was accessed for information on potential special status species in the area. Special status species are defined as (1) plants and animals officially listed or proposed for listing under state or federal Endangered Species Acts, (2) state or federal candidate species for possible listing, (3) species included in the California Native Plant Society’s rare and endangered plant list, and (4) CDFG “Species of Special Concern” (CDFG 2005a). This last category also includes species listed by CDFG that are not state or federally designated threatened or endangered but that fall into one or more of the following categories:

- Species that are biologically rare, restricted in distribution, declining throughout their range, or that reside in California during a critical stage in their life cycle.
- Populations in California that may be peripheral to the major population of a species range but that are threatened with extirpation in California.
- Species closely associated with habitats that are declining in California such as wetland, riparian, and primary forest habitats.

Wildlife classified as endangered by either the state or federal government that are known to inhabit the region and have been reported historically to forage at or near NAVSTA TI. These are the American peregrine falcon (*Falco peregrinus anatum*), California least tern (*Sterna antillarum*), and California brown pelican (*Pelecanus occidentalis californicus*). However, no sightings of any of these birds have been reported at TI or YBI in the California Natural Diversity Database (CNDDDB). The peregrine falcon, delisted from federally endangered status in 1999, remains a state endangered species. Two pairs are known to nest on the SFOBB. The California least tern is a state and federally endangered bird that is known to occur at Alameda Naval Air Station; it has not been observed at TI or YBI (CNDDDB). The brown pelican is also listed as state and federally endangered, but it is bird that feeds offshore and was addressed in the offshore Operable Unit RI Report (Tetra Tech 2001b). A special-status plant survey of YBI conducted in 1996, indicated the presence of the dune gilia (*Gilia capitata ssp. chamissonis*), which had been proposed by the California Native Plant Society (CNPS) as a rare species in

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
6	Environmental settings	Section 2.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.2.2.1 and Section 7.2.2.5. SulTech. February 2009.

1996 (PRC 1996b). It is now listed as a special plant by CNPS, and thought to be endangered both in California and elsewhere. According to CNDDDB, the plant was observed on the south side of the island.

7.2.2.6 Trophic Linkages

The terrestrial community at NAVSTA TI forms a relatively simple ecosystem, dominated by a variety of weedy and ornamental plant species. Plants provide leafy vegetation, seeds, and fruits for the primary consumers. Typical primary consumers are herbivorous mammals, such as the deer mouse and California ground squirrel, and a variety of terrestrial insects (for example, grasshoppers). Granivores, such as mourning doves and rock doves, feed on plant seeds. Terrestrial invertebrates, such as insects and earthworms, are consumed by a variety of birds including brewer's and red-winged blackbirds, European starlings, and the American robin. Top predators include the American kestrel and peregrine falcon. A terrestrial food web is presented on Figure 7-3.

7.2.3 Conceptual Site Model

The CSM illustrates exposure pathways to be evaluated in the ERA and provides other key information such as chemical sources, release and transport mechanisms, and the relative importance of exposure pathways to specific receptor groups. The CSM includes the following components:

- Stressors/selection of COPECs
- Fate and transport
- Exposure pathways
- Assessment and measurement endpoints

The following sections briefly describe the components of the CSMs for IR Site 28 as illustrated on Figure 7-4.

7.2.3.1 Stressors/Selection of Chemicals of Potential Ecological Concern

Stressors can be defined as any factor that causes adverse ecological impacts at the site. Bulk chemistry data from results of soil samples (0 to 2 feet bgs) collected for the RI were used to select the list of ecological COPECs for terrestrial receptors in the Phase II SLERA. Essential nutrients present at requirement levels and chemical concentrations less than background concentrations were excluded from further assessment on a site-by-site basis. Inorganic chemicals at concentrations that exceed background or ambient concentrations in more than 10 percent of samples on site were included, as were all organic chemicals such as pesticides or

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ²
7	Data collected	Section 2.3	Phase IIB Remedial Investigation Summary of Validated Data, Volume I of II. Naval Station Treasure Island, San Francisco California. Executive Summary. PRC Environmental Management, Inc. May 30, 1996.

APPENDIX C: ANALYTICAL RESULTS FOR SITE 28 SOIL SAMPLES

Site 28 Remedial Investigation, NAVSTA Treasure Island

Sample Location ID	28-SB001	28-SB002	28-SB003	28-SB004	28-SB004	28-SB005	28-SB005
Sample ID	199EE003	199EE002	199EE001	199EE019	199EE020	199EE017	199EE018
Sample Date	07/03/1995	07/03/1995	07/03/1995	10/16/1995	10/16/1995	10/16/1995	10/16/1995
Sample Depth	0.00 - 0.50	0.00 - 0.50	0.00 - 0.50	0.00 - 0.50	1.00 - 1.50	0.50 - 1.00	1.25 - 1.75
Metals (mg/kg)							
ALUMINIUM	5,770	6,540	7,060	6,900 J j	6,310 J j	5,900 J j	5,820 J j
ANTIMONY	0.47 UJ e	0.43 UJ e	0.51 UJ be	0.65 J e	0.78 J e	0.63 UJ e	0.82 J e
ARSENIC	2.7 UJ b	2.4 UJ b	2.5 UJ b	3.5	3.2	3	3.2
BARIUM	63.5	44.1	58.1	72.7 J j	63.1 J j	57.2 J j	58.7 J j
BERYLLIUM	0.04 UJ b	0.02 U	0.04 UJ b	0.07 UJ b	0.05 UJ b	0.05 UJ b	0.04 UJ b
CADMIUM	0.1 UJ b	0.04 U					
CALCIUM	5,810 UJ b	2,030 UJ b	3,190 UJ b	4,300 J j	3,260 J j	6,920 J j	2,510 J j
CHROMIUM	31.3	41.4	38.1	38.5 J j	39 J j	32.9 J j	59.5 J j
COBALT	6.6 J g	7.8 J g	7.5 J g	8.7 J j	8.9 J j	7.5 J j	8.5 J j
COPPER	23.6	9.9 UJ b	11.4 UJ b	9.4	7.7	10.7	8.4
IRON	10,500	11,900	11,700	14,000 J j	12,400 J j	11,200 J j	11,800 J j
LEAD	398	22.1 UJ b	121	55.9	21.9	1,120	438
MAGNESIUM	3,020	3,220	3,460	3,520 J j	3,320 J j	3,510 J j	3,200 J j
MANGANESE	210 J e	192 J e	202 J e	253 J j	243 J j	218 J j	224 J j
MERCURY	0.14	0.05 U	0.07 J g	0.14 J h	0.09 J h	0.27 J h	0.12 J h
MOLYBDENUM	0.2 U	0.18 U	0.18 U	0.25 U	0.25 U	0.25 U	0.25 U
NICKEL	32.9	43.1	35.8	44.1	47.4	41	40.8
POTASSIUM	1,350 J j	689 J gj	899 J gj	1,060	761 J g	1,120	843 J g
SELENIUM	0.76 U	0.69 U	0.69 U	0.81 U	0.81 U	0.83 U	0.81 U
SILVER	0.13 U	0.12 U	0.12 U	0.15 U	0.15 U	0.15 U	0.14 U
SODIUM	142 UJ b	116 UJ b	235 UJ b	25.7 U	43.2 UJ b	150 UJ b	29.9 UJ b
THALLIUM	0.45 U	0.41 U	0.41 U	0.4 U	0.4 U	1.9	0.39 U
VANADIUM	23.4	28.1	26.6	28 J j	25.5 J j	22.9 J j	23.5 J j
ZINC	217 J de	34.7 J de	148 J de	65.2	47.7	1,380	46.7

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ²
7	Data collected	Section 2.3	Phase IIB Remedial Investigation Summary of Validated Data, Volume I of II. Naval Station Treasure Island, San Francisco California. Executive Summary. PRC Environmental Management, Inc. May 30, 1996.

APPENDIX C: ANALYTICAL RESULTS FOR SITE 28 SOIL SAMPLES (Continued)

Site 28 Remedial Investigation, NAVSTA Treasure Island

Sample Location ID	28-SB006	28-SB006	28-SB007	28-SB007	28-SB008	28-SB008	28-SB009
Sample ID	199EE015	199EE016	199EE013	199EE014	199EE011	199EE012	199EE021
Sample Date	10/16/1995	10/16/1995	10/16/1995	10/16/1995	10/16/1995	10/16/1995	10/16/1995
Sample Depth	0.50 - 1.00	1.00 - 1.50	0.50 - 1.00	1.25 - 1.75	0.50 - 1.00	1.25 - 1.75	0.00 - 0.50
Metals (mg/kg)							
ALUMINIUM	6,580 J j	6,000 J j	5,920 J j	6,130 J j	5,650 J j	7,290 J j	6,550 J j
ANTIMONY	0.65 J e	0.72 J e	0.86 J e	1.1 J e	1 J e	0.82 J e	0.9 J e
ARSENIC	3.2	3.1	2.9	3.3	3.3	3.4	3
BARIUM	65.6 J j	67.5 J j	48.8 J j	67.9 J j	53.4 J j	64.4 J j	53.7 J j
BERYLLIUM	0.02 UJ b	0.06 UJ b	0.03 UJ b	0.05 UJ b	0.02 UJ b	0.1 UJ b	0.02 U
CADMIUM	0.04 U						
CALCIUM	4,830 J j	2,340 J j	3,680 J j	2,960 J j	2,710 J j	2,320 J j	2,660 J j
CHROMIUM	41 J j	34.9 J j	35.2 J j	35.1 J j	34 J j	41 J j	42 J j
COBALT	8.5 J j	7.5 J j	6.4 J j	12.3 J j	7.4 J j	14.3 J j	8.9 J j
COPPER	11.2	8.2	8.1	11.1	8.1	7.4	6.9
IRON	13,300 J j	11,600 J j	10,600 J j	12,000 J j	10,800 J j	12,800 J j	13,300 J j
LEAD	758	19.3	1,010	26.4	13	5.1	9.7
MAGNESIUM	3,780 J j	3,800 J j	2,940 J j	3,210 J j	2,750 J j	3,860 J j	4,050 J j
MANGANESE	225 J j	200 J j	177 J j	280 J j	207 J j	275 J j	223 J j
MERCURY	0.11 J h	0.12 J h	0.05 UJ h	0.08 J h	0.05 UJ h	0.05 UJ h	0.09 J h
MOLYBDENUM	0.25 U						
NICKEL	42.4	42	30.1	41.1	27.5	43	50.8
POTASSIUM	1,270	761 J g	902 J g	772 J g	1,180	876 J g	915 J g
SELENIUM	0.8 U	0.81 U	0.81 U	0.81 U	0.8 U	0.81 U	0.8 U
SILVER	0.14 U	0.14 U	0.15 U	0.14 U	0.14 U	0.15 U	0.14 U
SODIUM	114 UJ b	83.5 UJ b	60.4 UJ b	111 UJ b	25.4 U	103 UJ b	25.4 U
THALLIUM	0.39 U	0.39 U	0.58 J g	0.39 U	0.39 U	0.4 U	0.39 U
VANADIUM	29.4 J j	23.4 J j	24 J j	25.5 J j	25.3 J j	27.2 J j	29.1 J j
ZINC	1,060	46.4	43.7	45.6	28.7	28.8	37.5

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ²
7	Data collected	Section 2.3	Phase IIB Remedial Investigation Summary of Validated Data, Volume I of II. Naval Station Treasure Island, San Francisco California. Executive Summary. PRC Environmental Management, Inc. May 30, 1996.

APPENDIX C: ANALYTICAL RESULTS FOR SITE 28 SOIL SAMPLES (Continued)

Site 28 Remedial Investigation, NAVSTA Treasure Island

Sample Location ID	28-SB009	28-SB010	28-SB010	28-SB011	28-SB011	28-SB012	28-SB013
Sample ID	199EE022	199EE023	199EE024	199EE025	199EE026	199EE004	199EE005
Sample Date	10/16/1995	10/16/1995	10/16/1995	10/16/1995	10/16/1995	07/03/1995	07/03/1995
Sample Depth	1.25 - 1.75	0.00 - 0.50	1.25 - 1.75	0.00 - 0.50	1.25 - 1.75	0.00 - 0.50	0.00 - 0.50
Metals (mg/kg)							
ALUMINIUM	4,840 J j	6,120 J j	6,590 J j	4,990 J j	5,610 J j	5,780	7,790
ANTIMONY	0.73 J e	0.65 J e	0.69 J e	0.61 UJ e	0.63 UJ e	0.49 UJ be	0.53 UJ be
ARSENIC	3.3	2.9	3.5	2.5	2.7	2.1 UJ b	3.5 UJ b
BARIIUM	62.7 J j	61.1 J j	70.3 J j	44.2 J j	47.8 J j	64	76.4
BERYLLIUM	0.07 UJ b	0.05 UJ b	0.04 UJ b	0.02 U	0.03 UJ b	0.03 UJ b	0.13 UJ b
CADMIUM	0.04 U						
CALCIUM	1,680 J j	2,850 J j	2,820 J j	1,830 J j	1,630 J j	2,470 UJ b	2,740 UJ b
CHROMIUM	29.2 J j	37.8 J j	39.5 J j	35.7 J j	33.5 J j	32.4	33.7
COBALT	7 J j	8 J j	8.6 J j	7 J j	6.5 J j	6.5 J g	8 J g
COPPER	8	8.3	8.3	3.9 J g	4.8 J g	11.6 UJ b	28.3
IRON	9,750 J j	11,600 J j	12,300 J j	9,330 J j	10,400 J j	9,980	14,300
LEAD	19.3	172	22.8	3.4	4.8	9.4 UJ b	124
MAGNESIUM	2,920 J j	3,470 J j	3,540 J j	2,450 J j	2,700 J j	3,090	4,250
MANGANESE	218 J j	216 J j	212 J j	130 J j	110 J j	188 J e	244 J e
MERCURY	0.11 J h	0.09 J h	0.06 J h	0.07 J h	0.05 J h	0.05 U	0.06 J g
MOLYBDENUM	0.25 U	0.25 U	0.25 U	0.24 U	0.25 U	0.18 U	0.18 U
NICKEL	29.4	44	41.4	34.6	43.1	32.9	32.8
POTASSIUM	720 J g	832 J g	807 J g	434 J g	451 J g	1,230 J j	1,260 J j
SELENIUM	0.8 U	0.81 U	0.81 U	0.79 U	0.81 U	0.69 U	0.69 U
SILVER	0.14 U	0.14 U	0.15 U	0.14 U	0.15 U	0.12 U	0.12 U
SODIUM	53.8 UJ b	55.5 UJ b	25.7 U	25 U	44 UJ b	233 UJ b	26.1 U
THALLIUM	0.39 U	0.39 U	0.39 U	1.9	0.4 U	0.41 U	0.62
VANADIUM	20 J j	23.8 J j	25.1 J j	21.3 J j	22.3 J j	21	26
ZINC	33.6	44	50.4	29.5	22.9	46 J de	119 J de

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ²
7	Data collected	Section 2.3	Phase IIB Remedial Investigation Summary of Validated Data, Volume I of II. Naval Station Treasure Island, San Francisco California. Executive Summary. PRC Environmental Management, Inc. May 30, 1996.

APPENDIX C: ANALYTICAL RESULTS FOR SITE 28 SOIL SAMPLES (Continued)

Site 28 Remedial Investigation, NAVSTA Treasure Island

Sample Location ID	28-SB014	28-SB014
Sample ID	199EE006	199EE007
Sample Date	07/03/1995	07/03/1995
Sample Depth	0.00 - 0.50	1.00 - 1.50
Metals (mg/kg)		
ALUMINIUM	6,520	6,570
ANTIMONY	0.43 UJ e	0.43 UJ e
ARSENIC	3.2 UJ b	3.2 UJ b
BARIIUM	83.2	98.5
BERYLLIUM	0.09 UJ b	0.08 UJ b
CADMIUM	0.12 UJ b	0.11 UJ b
CALCIUM	2,760 UJ b	2,970 UJ b
CHROMIUM	34.6	31.9
COBALT	8.4 J g	7.1 J g
COPPER	24.6	18.8
IRON	12,700	11,600
LEAD	336	245
MAGNESIUM	3,720	3,580
MANGANESE	229 J e	201 J e
MERCURY	0.05 J g	0.05 J g
MOLYBDENUM	0.18 U	0.18 U
NICKEL	33.9	33.8
POTASSIUM	1,150 J j	1,080 J j
SELENIUM	0.7 U	0.69 U
SILVER	0.12 U	0.12 U
SODIUM	26.3 U	26.1 U
THALLIUM	0.41 U	0.74
VANADIUM	22.4	22.7
ZINC	139 J de	374 J de

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ²
7	Data collected	Section 2.3	Phase IIB Remedial Investigation Summary of Validated Data, Volume I of II. Naval Station Treasure Island, San Francisco California. Executive Summary. PRC Environmental Management, Inc. May 30, 1996.

APPENDIX C: ANALYTICAL RESULTS FOR SITE 28 SOIL SAMPLES (Continued)

Site 28 Remedial Investigation, NAVSTA Treasure Island

Notes:

b	Laboratory blank and common contamination problem
d	Duplicate precision problem
e	Matrix spike/LCS recovery problem
g	Quantification below reporting limit
h	Holding time exceedance
ID	Identification.
J	Estimated value
j	Other qualification reasons
LCS	Laboratory control sample
mg/kg	Milligram per kilogram
NAVSTA	Naval Station.
U	Nondetected

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
8	Site 28	Section 2.4	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 1.5.3. SulTech. February 2009.

1.5.1 Current Operations

In 1993, NAVSTA TI was designated for closure under the Base Closure and Realignment Act of 1990. NAVSTA TI was closed on September 30, 1997, and IR Site 28 presently is not being used by the DON. Construction activities for the new SFOBB are currently under way on IR Sites 8 and 29 on the eastern side of YBI, and the deed for these two sites has been granted to Caltrans by the Federal Highway Administration (FHWA). Construction activities will likely not impact IR Site 28 as bridge construction progresses to the west.

1.5.2 Installation Restoration Site 28

IR Site 28, West Side On-Off Ramps, is located in the western portion of YBI and is bounded to the west by the Bay; to the east by Treasure Island Road, which is within the boundaries of IR Site 28; and to the south by IR Site 29 (Figure 1-3). Besides the roads running through IR Site 28, most of the site is steeply sloped to the southwest toward the Bay and densely vegetated with trees and brush.

The DON owned the property comprising the ramps and the area beneath the bridge until 2001, when the FHWA transferred the bridge right-of-way and ramps from the DON to Caltrans. Caltrans was identified as a potentially responsible party in the transfer deed. A boundary adjustment was made in 2005 so that all lands deeded to Caltrans in IR Sites 28 and 29 were included within IR Site 29. The West Side On-Off Ramps were not part of the boundary adjustment and remain part of IR Site 28.

1.5.3 Future Land Use

The future land use for sites on TI and YBI are defined according to the Draft Naval Station Treasure Island Reuse Plan (CCSF 1996, hereafter referred to as the “Reuse Plan”). IR Site 28 is presently designated with a future use as shoreline open space (CCSF 1996). The future use of IR Site 28 is planned to be further limited when it is included in the Tidelands Trust.

1.6 SUMMARY OF PREVIOUS INVESTIGATIONS AT INSTALLATION RESTORATION SITE 28

A number of investigations have been conducted at IR Site 28. This section summarizes investigation activities previously performed at IR Site 28. Table 1-1 provides a summary of the investigation reports that provide background information or historical information related to NAVSTA TI. Table 1-2 summarizes the field activities previously completed at IR Site 28. Table 1-3 provides the type of analysis performed on each sample collected at IR Site 28. A detailed site map and sample locations for IR Site 28 are shown in Figure 1-4. Analytical results for investigations conducted at IR Site 28 are discussed in Section 4.0.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
9	"Tidelands Trust"	Section 2.4	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 1.9. SulTech. February 2009.

Although a potential human health risk associated with lead at IR Site 28 was identified in the 1997 RI Report based on a residential use scenario, the text states that *"it is highly unlikely that residential housing will be constructed near the on- and off-ramps of Site 28"* (PRC 1997). Consequently, it was more appropriate to consider the risk associated with an industrial use scenario for this site. The results of the HHRA for the industrial use scenario indicate that lead in soil at IR Site 28 would not cause adverse health effects in humans (PRC 1997). However, based on the SLERA, IR Site 28 was recommended for evaluation in an FS based on risk to terrestrial ecological receptors (PRC 1997).

1.6.3 Final Validation Study for Installation Restoration Sites 8, 11, 28, and 29

In 2001, the DON conducted a study to validate the results of the SLERA performed in 1997 as part of the Phase II RI (Tetra Tech 2001a). Specifically, the validation study was conducted to confirm SLERA results for the American peregrine falcon. The results of the validation study indicated that chemicals of ecological concern at IR Sites 8, 11, 28, and 29 posed an acceptable risk to the peregrine falcon (Tetra Tech 2001a).

1.7 CURRENT CALTRANS ACTIVITIES AT YERBA BUENA ISLAND

Construction activities for the new SFOBB are currently disturbing soils at YBI in the vicinity of IR Site 28. No construction-related removals have occurred to date at IR Site 28. If removals do occur at IR Site 28 in the future, revisions will be made to the NAVSTA TI database to account for all removed soil.

1.8 BOUNDARY ADJUSTMENTS

IR Site 28 is located in the western portion of YBI and is bounded to the west by the Bay, to the east by Treasure Island Road, and, prior to 2005, the U.S. Coast Guard (USCG) Station to the south. The SFOBB and access ramps occupy the southern portion of IR Site 28. During a scoping meeting subsequent to the June 7, 2005, BCT meeting, the DON proposed moving the IR Site 28 southern boundary approximately 225 feet to the north and transferring the area containing the SFOBB, not including access ramps, to IR Site 29. The rationale for this request was that the primary chemical of potential concern (COPC) in that portion of IR Site 28 (lead) and its present and historical land use are more consistent with IR Site 29. This new boundary adjustment enables the proposed early transfer of the remainder of IR Site 28. Concurrence on the revised site boundary was received from the BCT members during the scoping meeting. A formal letter was sent from the DON to the BCT members, documenting concurrence and officially making the change to the site boundaries (DON 2005b).

1.9 TIDELANDS TRUST

Treasure Island was built by depositing dredge material on the tidelands and shoals located to the north of YBI and is, therefore, subject to the provisions of the Tidelands Trust. This Trust is

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
9	"Tidelands Trust"	Section 2.4	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 1.9. SulTech. February 2009.

overseen by the California State Lands Commission and administered by the State Legislature, and imposes the following restrictions, which complicate the development of Treasure Island:

- Land uses are limited to Trust purposes.
- Sale of Trust lands to private entities is generally prohibited.
- Revenues generated from Trust uses must be expended for Trust purposes (State Lands Commission 2007).

The Treasure Island Public Trust Act of 2004 proposes an exchange of lands under which non-Trust lands on YBI would be brought into the Trust, and Trust lands on TI would be released from the Trust (State Senate 2004). This type of exchange is allowed under the Tidelands Trust. The lands on YBI proposed for inclusion in the Tidelands Trust include the entirety of IR Site 28. Upon inclusion in the Tidelands Trust, IR Site 28 lands would be limited to uses that attract people to the waterfront, promote public recreation, protect habitat, or preserve open space (State Senate 2007). Residential, industrial, and non-maritime uses of Tidelands Trust lands are generally prohibited. The impending inclusion of IR Site 28 in the Tidelands Trust is an issue that will be considered as risks and future uses of the site are addressed in the RI/FS process.

1.10 CONCEPTUAL SITE MODEL

Previously collected data and an understanding of the exposure setting and land use were used to develop a conceptual site model (CSM) for IR Site 28 (see Figure G-2 of Appendix G). A CSM is an effective tool for defining site dynamics, streamlining any future risk evaluations, and for developing any further actions at the site. The purpose of the CSM is to aid in understanding and describing potential exposure pathways that may be present at the site. The following were considered in developing the CSM:

- The suspected sources and types of contaminants present
- Contaminant release and transport mechanisms
- Rate of contaminant release and transport (if possible)
- Affected media
- Known and possible routes of migration
- Known and potential human and ecological receptors

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
10	Public Trust Doctrine	Section 2.4	The Public Trust Doctrine. California State Lands Commission. Also available online at: http://www.slc.ca.gov/policy_statements/public_trust/public_trustDoctrine.pdf

The Public Trust Doctrine

California State Lands Commission

I. Origins of the Public Trust

The origins of the public trust doctrine are traceable to Roman law concepts of common property. Under Roman law, the air, the rivers, the sea and the seashore were incapable of private ownership; they were dedicated to the use of the public.¹ This concept that tide and submerged lands are unique and that the state holds them in trust for the people has endured throughout the ages. In 13th century Spain, for example, public rights in navigable waterways were recognized in *Las Siete Partidas*, the laws of Spain set forth by Alfonso the Wise.² Under English common law, this principle evolved into the public trust doctrine pursuant to which the sovereign held the navigable waterways and submerged lands, not in a proprietary capacity, but rather “as trustee of a public trust for the benefit of the people” for uses such as commerce, navigation and fishing.³

¹Institutes of Justinian 2.1.1.

²Las Siete Partidas 3.28.6 (S. Scott trans. & ed. 1932).

³*Colberg, Inc. v. State of California ex rel. Dept. Pub. Works* (1967) 67 Cal.2d 408, 416.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
10	Public Trust Doctrine	Section 2.4	The Public Trust Doctrine. California State Lands Commission. Also available online at: http://www.slc.ca.gov/policy_statements/public_trust/public_trustDoctrine.pdf

After the American Revolution, each of the original states succeeded to this sovereign right and duty. Each became trustee of the tide and submerged lands within its boundaries for the common use of the people.⁴ Subsequently admitted states, like California, possess the same sovereign rights over their tide and submerged lands as the original thirteen states under the equal-footing doctrine.⁵ That is, title to lands under navigable waters up to the high water mark is held by the state in trust for the people. These lands are not alienable in that all of the public's interest in them cannot be extinguished.⁶

II. Purpose of the Public Trust

The United States Supreme Court issued its landmark opinion on the nature of a state's title to its tide and submerged lands nearly 110 years ago, and although courts have reviewed tidelands trust issues many times since then, the basic premise of the trust remains fundamentally unchanged. The Court said then that a state's title to its tide and submerged lands is different from that to the lands it holds for sale. "It is a title held in trust for the people of the State that they may enjoy the navigation of the waters, carry on commerce over them, and have liberty of fishing" free from obstruction or interference

⁴*Martin v. Waddell* (1842) 41 U.S. (16 Pet.) 367, 410.

⁵*Pollard=s Lessee v. Hagen* (1845) 44 U.S. (3 How.) 212, 228-29.

⁶*People v. California Fish Co.* (1913) 166 Cal. 576, 597-99; *City of Berkeley v. Superior Court* (1980) 26 Cal.3d 515, 524-25.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
10	Public Trust Doctrine	Section 2.4	The Public Trust Doctrine. California State Lands Commission. Also available online at: http://www.slc.ca.gov/policy_statements/public_trust/public_trustDoctrine.pdf

from private parties.⁷ In other words, the public trust is an affirmation of the duty of the state to protect the people’s common heritage of tide and submerged lands for their common use.⁸

But to what common uses may tide and submerged lands be put? Traditionally, public trust uses were limited to water-related commerce, navigation, and fishing. In more recent years, however, the California Supreme Court has said that the public trust embraces the right of the public to use the navigable waters of the state for bathing, swimming, boating, and general recreational purposes. It is sufficiently flexible to encompass changing public needs, such as the preservation of the lands in their natural state for scientific study, as open space and as wildlife habitat. The administrator of the public trust “is not burdened with an outmoded classification favoring one mode of utilization over another.”⁹

The Legislature, acting within the confines of the common law public trust doctrine, is the ultimate administrator of the tidelands trust and often may be the ultimate arbiter of permissible uses of trust lands. All uses, including those specifically authorized by the Legislature, must take into account the overarching principle of the public trust doctrine that trust lands belong to the public and are to be used to promote public rather than exclusively private purposes. The Legislature cannot commit trust lands

⁷*Illinois Central R.R. Co. v Illinois* (1892) 146 U.S. 387, 452.

⁸*National Audubon Society v. Superior Court* (1983) 33 Cal.3d 419, 441.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ⁹
10	Public Trust Doctrine	Section 2.4	The Public Trust Doctrine. California State Lands Commission. Also available online at: http://www.slc.ca.gov/policy_statements/public_trust/public_trustDoctrine.pdf

irretrievably to private development because it would be abdicating the public trust.¹⁰

Within these confines, however, the Legislature has considerable discretion.

The Legislature already may have spoken to the issue of the uses to which particular tide and submerged lands may be put when making grants of these lands in trust to local government entities. Statutory trust grants are not all the same--some authorize the construction of ports and airports, others allow only recreational uses and still others allow a broad range of uses.

A further and often complicating factor is that granted and ungranted lands already may have been developed for particular trust uses that are incompatible with other trust uses or may have become antiquated. Some tidelands have been dedicated exclusively to industrial port uses, for example, and in these areas, recreational uses, even if also authorized by the trust grant, may be incompatible. Similarly, tidelands set aside for public beaches may not be suitable for construction of a cannery, even though a cannery may be an acceptable trust use. Piers, wharves and warehouses that once served commercial navigation but no longer can serve modern container shipping may have to be removed or converted to a more productive trust use. Historic public trust uses may have been replaced by new technologies. Antiquated structures on the waterfront may be an

⁹*Marks v. Whitney* (1971) 6 Cal.3d 251, 259-260.

¹⁰*Illinois Central Railroad v. Illinois, supra*, at 452-53.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
10	Public Trust Doctrine	Section 2.4	The Public Trust Doctrine. California State Lands Commission. Also available online at: http://www.slc.ca.gov/policy_statements/public_trust/public_trustDoctrine.pdf

impediment rather than a magnet for public access and use of the waters. Public trust uses may and often do conflict with one another. The state and local tidelands grantees, as administrators of their respective public trust lands, are charged with choosing among these conflicting uses, with the Legislature as the ultimate arbiter of their choices.

For all these reasons, a list of uses or a list of cases without more may not be as useful as an analysis of public trust law applied to a specific factual situation.

III. The Leasing of Tidelands

A few principles established by the courts are instructive in analyzing under the public trust doctrine the leasing of public trust lands for particular uses. For example, it was settled long ago that tidelands granted in trust to local entities may be leased and improved if the leases and improvements promote uses authorized by the statutory trust grant and the public trust. Leases for the construction of wharves and warehouses and for railroad uses, i.e., structures that directly promote port development, were approved early in the 20th century.¹¹ Later, leases for structures incidental to the promotion of port commerce, such as the Port of Oakland's convention center, were held to be valid because although they did not directly support port business, they encouraged trade, shipping, and commercial associations to become familiar with the port and its assets.¹² Visitor-serving facilities, such as restaurants, hotels, shops, and parking areas, were also approved as

¹¹*San Pedro etc. R.R. Co. v. Hamilton* (1911) 161 Cal. 610; *Koyner v. Miner* (1916) 172 Cal. 448; *Oakland v. Larue Wharf & Warehouse Co.* (1918) 179 Cal. 207; *City of Oakland v. Williams* (1929) 206 Cal. 315.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
10	Public Trust Doctrine	Section 2.4	The Public Trust Doctrine. California State Lands Commission. Also available online at: http://www.slc.ca.gov/policy_statements/public_trust/public_trustDoctrine.pdf

appropriate uses because as places of public accommodation, they allow broad public access to the tidelands and, therefore, enhance the public’s enjoyment of these lands historically set apart for their benefit.¹³

These cases provide three guidelines for achieving compliance with the public trust when leasing tidelands for construction of permanent structures to serve a lessee’s development project: (1) the structure must directly promote uses authorized by the statutory trust grant and trust law generally, (2) the structure must be incidental to the promotion of such uses, or (3) the structure must accommodate or enhance the public’s enjoyment of the trust lands. Nonetheless, when considering what constitutes a trust use, it is critical to keep in mind the following counsel from the California Supreme Court: The objective of the public trust is always evolving so that a trustee is not burdened with outmoded classifications favoring the original and traditional triad of commerce, navigation and fisheries over those uses encompassing changing public needs.¹⁴

¹²*Haggerty v. City of Oakland* (1958) 161 Cal.App.2d 407, 413-414.

¹³*Id.* at p. 414; *Martin v. Smith* (1960) 184 Cal.App.2d 571, 577-78.

¹⁴*National Audubon Society v. Superior Court, supra*, at p. 434.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
10	Public Trust Doctrine	Section 2.4	The Public Trust Doctrine. California State Lands Commission. Also available online at: http://www.slc.ca.gov/policy_statements/public_trust/public_trustDoctrine.pdf

IV. Promotion of Trust Uses and Public Enjoyment of Trust Lands

Installations not directly connected with water-related commerce are appropriate trust uses when they must be located on, over or adjacent to water to accommodate or foster commercial enterprises. Examples include oil production facilities, freeway bridges and nuclear power plants.¹⁵ Hotels, restaurants, shops and parking areas are appropriate because they accommodate or enhance the public’s ability to enjoy tide and submerged lands and navigable waterways. The tidelands trust is intended to promote rather than serve as an impediment to essential commercial services benefiting the people and the ability of the people to enjoy trust lands.¹⁶

Nevertheless, the essential trust purposes have always been, and remain, water related, and the essential obligation of the state is to manage the tidelands in order to implement and facilitate those trust purposes for all of the people of the state.¹⁷ Therefore, uses that do not accommodate, promote, foster or enhance the statewide public’s need for essential commercial services or their enjoyment tidelands are not appropriate uses for public trust lands. These would include commercial installations that could as easily be sited on uplands and strictly local or “neighborhood-serving” uses that

¹⁵See *Boone v. Kingsbury* (1928) 206 Cal.148, 183; *Colberg, Inc. v. State of California ex rel. Dept. Pub. Work*, *supra*, at pp. 421-22; and *Carstens v. California Coastal Com.* (1986) 182 Cal.App.3d 277, 289.

¹⁶*Carstens v. California Coastal Com.*, *supra*, at p. 289.

¹⁷Joseph L. Sax, AThe Public Trust in Stormy Western Waters,@ October 1997.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
10	Public Trust Doctrine	Section 2.4	The Public Trust Doctrine. California State Lands Commission. Also available online at: http://www.slc.ca.gov/policy_statements/public_trust/public_trustDoctrine.pdf

confer no significant benefit to Californians statewide. Examples may include hospitals, supermarkets, department stores, and local government buildings and private office buildings that serve general rather than specifically trust-related functions.

V. Mixed-Use Developments

Mixed-use development proposals for filled and unfilled tide and submerged lands have generally consisted of several structures, including non-trust use structures or structures where only the ground floor contains a trust use. While mixed-use developments on tidelands may provide a stable population base for the development, may draw the public to the development, or may yield the financing to pay for the trust uses to be included in the development, they ought not be approved as consistent with statutory trust grants and the public trust for these reasons. These reasons simply make the development financially attractive to a developer. Projects must have a connection to water-related activities that provide benefits to the public statewide, which is the hallmark of the public trust doctrine. Failure to achieve this goal, simply to make a development financially attractive, sacrifices public benefit for private or purely local advantage. A mixed-use development may not be compatible with the public trust, not because it may contain some non-trust elements, but because it promotes a “commercial enterprise unaffected by a public use”¹⁸ rather than promoting, fostering, accommodating or

¹⁸*City of Long Beach v. Morse* (1947) 31 Cal.2d 254, 261.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
10	Public Trust Doctrine	Section 2.4	The Public Trust Doctrine. California State Lands Commission. Also available online at: http://www.slc.ca.gov/policy_statements/public_trust/public_trustDoctrine.pdf

enhancing a public trust use.¹⁹ That use, however, need not be restricted to the traditional triad of commerce, navigation and fishing. It is an evolving use that is responsive to changing public needs for trust lands and for the benefits these lands provide.²⁰

Moreover, commercial enterprises without a statewide public trust use may violate the terms of statutory trust grants. Typically, grants allow tidelands to be leased, but only for purposes “consistent with the trust upon which said lands are held.” This term is not equivalent to “not required for trust uses” or “not interfering with trust uses.” Since leases of tidelands must be consistent with statutory trust grant purposes, leases which expressly contemplate the promotion of non-trust uses rather than trust uses would not comply with the terms of the trust grants.

¹⁹*Haggerty v. City of Oakland, supra*, at pp. 413-14.

²⁰*National Audubon Society v. Superior Court, supra*, at p. 434.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
10	Public Trust Doctrine	Section 2.4	The Public Trust Doctrine. California State Lands Commission. Also available online at: http://www.slc.ca.gov/policy_statements/public_trust/public_trustDoctrine.pdf

For these reasons, non-trust uses on tidelands, whether considered separately or part of a mixed-use development, are not mitigable. That is, unlike some environmental contexts where developments with harmful impacts may be approved so long as the impacts are appropriately mitigated by the developer, in the tidelands trust context, mitigation of a non-trust use has never been recognized by the courts. To the contrary, the California Supreme Court has said that just as the state is prohibited from selling its tidelands, it is similarly prohibited from freeing tidelands from the trust and dedicating them to other uses while they remain useable for or susceptible of being used for water-related activities.²¹

VI. Incidental Non-Trust Use

All structures built on tide and submerged lands should have as their main purpose the furtherance of a public trust use. Any structure designed or used primarily for a non-trust purpose would be suspect. Mixed-use development proposals, however, frequently justify non-trust uses as “incidental” to the entire project. The only published case in California in which a non-trust use of tidelands has been allowed focused on the fact that the real or main purpose of the *structure* was a public trust use and that the non-trust use would be incidental to the main purpose of the structure.²² In this context, the court noted that because the real or main purpose of the structure was to promote public trust uses, non-trust groups could also use the facility, but the non-trust uses must remain *incidental*

²¹*Atwood v. Hammond* (1935) 4 Cal.2d 31, 42-43.

²²*Haggerty v. City of Oakland, supra*, at p. 413.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
10	Public Trust Doctrine	Section 2.4	The Public Trust Doctrine. California State Lands Commission. Also available online at: http://www.slc.ca.gov/policy_statements/public_trust/public_trustDoctrine.pdf

to the main purpose of the structure.²³ This is the state of the law, and it is supported by good policy reasons as well. If the test for whether a non-trust use is incidental to the main purpose of a development were not applied on a structure-by-structure basis, pressure for more dense coastal development may increase as developers seek to maximize the square feet of allowable non-trust uses. Disputes may arise as to how to calculate the square footage attributable to the proper trust uses versus non-trust uses, with open waterways and parking garages likely being the dominant trust uses and structures being devoted to non-trust uses.

It is beyond contention that the state cannot grant tidelands free of the trust merely because the grant serves some public purpose, such as increasing tax revenues or because the grantee might put the property to a commercial use.²⁴ The same reasoning applies to putting tidelands to enduring non-trust uses by building structures on them. Accordingly, the only enduring non-trust uses that may be made of tidelands without specific legislative authorization are those incidental to the main trust purpose applied on a structure-by-structure basis. Each structure in a mixed-use development on tidelands must have as its primary purpose an appropriate public trust use. If its real or main purpose is a trust use, portions of the structure not needed for trust purposes may be leased temporarily to non-trust tenants, provided that the non-trust use is incidental to the main purpose of the structure.

²³*Ibid.*

²⁴*National Audubon Society v. Superior Court, supra*, at p. 440.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
10	Public Trust Doctrine	Section 2.4	The Public Trust Doctrine. California State Lands Commission. Also available online at: http://www.slc.ca.gov/policy_statements/public_trust/public_trustDoctrine.pdf

VII. The Role of the Legislature

The Legislature is the representative of all the people and, subject to judicial review, is the ultimate arbiter of uses to which public trust lands may be put. The Legislature may create, alter, amend, modify, or revoke a trust grant so that the tidelands are administered in a manner most suitable to the needs of the people of the state.²⁵ The Legislature has the power to authorize the non-trust use of tidelands. It has done so rarely, and then on a case-specific basis.²⁶ Many of its actions have been a recognition of incidental non-trust uses or of a use that must be located on the tidelands. When these legislative actions have been challenged in court, the courts, understandably, have been very deferential, upholding the actions and the findings supporting them.²⁷

The Legislature has provided a statutory framework for the leasing of tidelands for non-trust uses by the cities of Long Beach and San Francisco grounded on findings that the tidelands are *not required for* (San Francisco) or *not required for and will not interfere with* (Long Beach) the uses and purposes of the granting statute.²⁸ Where, as in

²⁵*City of Coronado v. San Diego Unified Port District* (1964) 227 Cal.App.2d 455, 474.

²⁶For example, in Chapter 728, Statutes of 1994, the Legislature authorized tidelands in Newport Beach to continue to be put to non-trust uses for a limited term after it was determined that the tidelands had been erroneously characterized and treated as uplands by the city due to incorrect placement of the tidelands boundary.

²⁷See, e.g., *Boone v. Kingsbury*, *supra*, at p. 183 and *City of Coronado v. San Diego Unified Port District*, *supra*, at pp. 474-75; but see *Mallon v. City of Long Beach* (1955) 44 Cal.2d 199, 206-07, 212.

²⁸Ch. 1560, Stats. 1959; Ch. 422, Stats. 1975. These statutes also provide for, *inter alia*, the lease revenues to be used to further trust uses and purposes.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
10	Public Trust Doctrine	Section 2.4	The Public Trust Doctrine. California State Lands Commission. Also available online at: http://www.slc.ca.gov/policy_statements/public_trust/public_trustDoctrine.pdf

these two statutes, the Legislature has authorized in general terms the use of tidelands for non-trust purposes, the statutes' provisions must be interpreted so as to be consistent with the paramount rights of commerce, navigation, fishery, recreation and environmental protection. This means that the tidelands may be devoted to purposes unrelated to the common law public trust to the extent that these purposes are incidental to and accommodate projects that must be located on, over or adjacent to the tidelands. These non-trust uses are not unlimited, for there are limits on the Legislature's authority to free tidelands from trust use restrictions.²⁹

To ensure that the exercise of the Long Beach and San Francisco statutes is consistent with the common law public trust, the tidelands to be leased for non-trust uses must have been filled and reclaimed and no longer be tidelands or submerged lands and must be leased for a limited term. The space occupied by the non-trust use, whether measured by the percentage of the land area or the percentage of the structure, should be relatively small. Finally, any structure with a non-trust use should be compatible with the overall project. Findings such as these are necessary because legislative authorizations to devote substantial portions of tidelands to long-term non-trust uses have generally been considered by the courts as tantamount to alienation.³⁰

In several out-of-state cases, specific, express legislative authorizations of

²⁹*Illinois Central R.R. Co. v. Illinois*, *supra*, at pp. 452-54.

³⁰*Atwood v. Hammond*, *supra*, at p. 42; see also *Illinois Central R.R. Co. v. Illinois*, *supra*, at pp. 454-53.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
10	Public Trust Doctrine	Section 2.4	The Public Trust Doctrine. California State Lands Commission. Also available online at: http://www.slc.ca.gov/policy_statements/public_trust/public_trustDoctrine.pdf

incidental leasing of publicly-financed office building space to private tenants solely for the purpose of producing revenue have been subject to close judicial scrutiny, although they did not involve tidelands trust use restrictions.³¹ One case involved construction of an international trade center at Baltimore's Inner Harbor with public financing where legislation expressly permitted *portions* of the structure to be leased to private tenants for the production of income. Another was a condemnation case where the statute authorizing the New York Port Authority to acquire a site on which to build the World Trade Center was challenged on the basis that it allowed *portions* of the new structure to be used for no other purpose than the raising of revenue. In both cases, opponents of the projects argued that a publicly financed office building should not be permitted to have *any* private commercial tenants even though the respective legislatures had expressly allowed incidental private use of each building. The state courts in both Maryland and New York held that so long as the primary purpose of the office building was for maritime purposes connected with the port, legislation authorizing the leasing to private tenants was valid.³² Although both cases involve challenges to financing and condemnation statutes and do not involve the public trust, they are instructive because they demonstrate the importance to the courts, even in the context of public financing and condemnation, that when a portion of a structure is to be leased for the purpose of raising

³¹*Lerch v. Maryland Port Authority* (1965) 240 Md. 438; *Courtesy Sandwich Shop, Inc. v. Port of New York Authority* (1963) 12 N.Y.2d 379.

³²*Ibid.*

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
10	Public Trust Doctrine	Section 2.4	The Public Trust Doctrine. California State Lands Commission. Also available online at: http://www.slc.ca.gov/policy_statements/public_trust/public_trustDoctrine.pdf

revenues to offset expenses, this incidental non-public leasing must have been legislatively authorized.

VIII. Exchanges of Lands

Situations where a local government or a private party acquires a right to use former trust property free of trust restrictions are rare.³³ In order for such a right to be valid, the Legislature must have intended to grant the right free of the trust and the grant must serve the purpose of the trust. Public Resources Code section 6307 is an example of the rare situation where abandonment of the public trust is consistent with the purposes of the trust. Section 6307 authorizes the Commission to exchange lands of equal value, whether filled or unfilled, whenever it finds that it is “in the best interests of the state, for the improvement of navigation, aid in reclamation, for flood control protection, or to enhance the configuration of the shoreline for the improvement of the water and upland, on navigable rivers, sloughs, streams, lakes, bays, estuaries, inlets, or straits, and that it will not substantially interfere with the right of navigation and fishing in the waters involved.” The lands exchanged may be improved, filled and reclaimed by the grantee, and upon adoption by the Commission of a resolution finding that such lands (1) have been improved, filled, and reclaimed, and (2) have thereby been excluded from the public channels and are no longer available or useful or susceptible of being used for navigation and fishing, and (3) are no longer in fact tidelands and submerged lands, the lands are

³³*National Audubon Society v. Superior Court*, *supra*, at p. 440.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
10	Public Trust Doctrine	Section 2.4	The Public Trust Doctrine. California State Lands Commission. Also available online at: http://www.slc.ca.gov/policy_statements/public_trust/public_trustDoctrine.pdf

thereupon free from the public trust. The grantee may thereafter make any use of the lands, free of trust restrictions.

In order for such an exchange of lands to take place, the Commission must find that the lands to be exchanged are no longer available or useful or susceptible of being used for navigation and fishing, taking into consideration whether adjacent lands remaining subject to the trust are sufficient for public access and future trust needs; that non-trust use of the lands to be freed of the public trust will not interfere with the public's use of adjacent trust lands; and that the lands that will be received by the state in the exchange not only are of equal, or greater, monetary value but also have value to the tidelands trust, since they will take on the status of public trust lands after the exchange. Only then can the Commission find that the transaction is in the best interests of the state, that the exchange of lands will promote the public trust and that it will not result in any substantial interference with the public interest in the lands and waters remaining.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
11	inclusion of Site 28	Section 2.4	Email from Office of Economic and Workforce Development, City of San Francisco, staff, Mr. Michael Tymoff, to the Navy RPM, Mr. Perry Charles. March 05, 2009.

NUMBER 3

From: Michael Tymoff [mailto:Michael.Tymoff@sfgov.org]
Sent: Thursday, March 05, 2009 5:24 PM
To: Perry, Charles L CIV NAVFAC SW, BRAC
Cc: Sullivan, James B CIV OASN (I&E) BRAC PMO West; Ryan Miya
Subject: RE: Dial In Info for Tomorrow's Tidelands Trust Call

[See responses below...](#)

Michael

Michael Tymoff
Office of Economic and Workforce Development
City Hall, Room 448
1 Dr. Carlton B. Goodlett Place
San Francisco, CA 94102

Tel: 415-554-7038

Fax: 415-554-4565

Email: Michael.Tymoff@sfgov.org

To: "Perry, Charles L CIV NAVFAC SW, BRAC" charles.l.perry@navy.mil , "Michael Tymoff" Michael.Tymoff@sfgov.org

03/05/2009 05:15

cc "Sullivan, James B CIV OASN (I&E) PM BRAC PMO West"

james.b.sullivan2@navy.mil , "Ryan Miya" RMiya@dtsc.ca.gov

Subject RE: Dial In Info for Tomorrow's Tidelands Trust Call

Ryan can add to this but, the main points we're trying to get addressed are:

- Is Site 28 (figure attached) within the footprint of the proposed Tidelands Trust exchange?

Yes, in order to be able to effectuate residential development on TI, we're "lifting" the Trust from portions of TI (approx. 90 acres) and placing them on YBI (which is after transfer, would not be subject to the Trust b/c it's not formerly submerged or tidelands).

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
11	inclusion of Site 28	Section 2.4	Email from Office of Economic and Workforce Development, City of San Francisco, staff, Mr. Michael Tymoff, to the Navy RPM, Mr. Perry Charles. March 05, 2009.

However, no development, commercial, residential or otherwise, is planned for the area of Site 28.

- What restrictions does the Tidelands Trust put on the property (ie. no residential development, no commercial development, etc.)?

Basically that is correct. The Trust prohibits most non-public uses, with exception of commerce, navigation and fisheries on Trust lands.

- What is the timeframe for approval of the exchange?

The exchange would occur soon after transfer of the property from Navy to TIDA.

I think the first one may have already been answered by the figure you emailed over but we can discuss it tomorrow.

Thank you,
Charles

-----Original Message-----

From: Michael Tymoff [<mailto:Michael.Tymoff@sfgov.org>]
Sent: Thursday, March 05, 2009 15:59
To: Perry, Charles L CIV NAVFAC SW, BRAC; Ryan Miya
Cc: Sullivan, James B CIV OASN (I&E) BRAC PMO West
Subject: Re: Dial In Info for Tomorrow's Tidelands Trust Call

Can you send a short list of issues/questions you need answered? I'll send Trust Exchange Act and map shortly.

----- Original Message -----

From: Michael Tymoff
Sent: 03/05/2009 03:58 PM PST
To: "Perry, Charles L CIV NAVFAC SW, BRAC" <charles.l.perry@navy.mil>;
"Ryan Miya" <RMiya@dtsc.ca.gov>
Cc: "Jim Sullivan" <james.b.sullivan2@navy.mil>
Subject: Re: Dial In Info for Tomorrow's Tidelands Trust Call

Michael/Ryan,

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
12	groundwater	Section 2.4	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 3.3.2. SulTech. February 2009.

(Dames and Moore 1994). The majority of precipitation on YBI now falls on road surfaces and other improved areas and is drained artificially. Consequently, there is not a sufficient amount of rainfall infiltration to maintain the small springs and they are no longer present on YBI (Dames and Moore 1994).

Groundwater recharge at YBI occurs primarily from infiltration of precipitation, with some contribution from landscape irrigation. Perched groundwater conditions above the shallow water table may exist locally as a result of the presence of relatively impermeable silt and clay lenses.

During geotechnical and environmental investigations conducted by the Navy on YBI, groundwater was encountered in both the surficial colluvium and the dredged fill. All groundwater monitoring wells on YBI are located in artificial fill at IR Site 11 and in colluvium and eolian sands at the adjacent USCG property, and are generally screened at less than 10 feet bgs. Groundwater was encountered at deeper depths in construction borings installed by Caltrans.

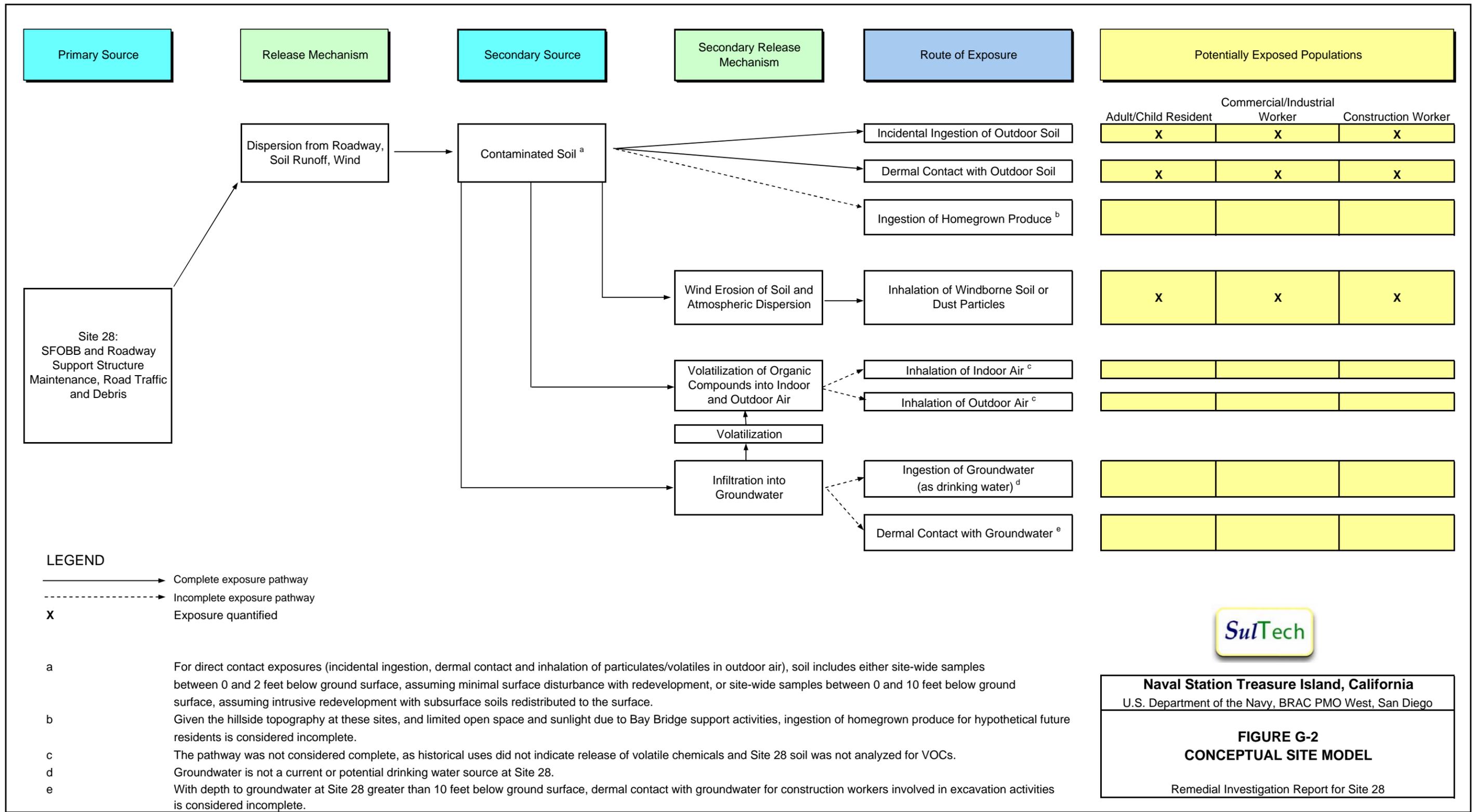
Installation Restoration Site 28

Based on the site conceptual model, metals associated with periodic maintenance of the SFOBB and the elevated roadway support structures along the southwest perimeter of YBI are expected in surface soils, with little chance of migration to groundwater. Soil samples were collected to a depth of 1.75 feet bgs, and groundwater was not encountered during the investigations at IR Site 28. Based on the local geology, a layer of unconsolidated colluvium overlies the Franciscan bedrock; groundwater would be expected to be encountered within bedrock fractures within IR Site 28 (PRC 1997).

3.3.2 Groundwater Quality and Beneficial Uses

Under the San Francisco Bay Basin Water Quality Control Plan, all groundwater within the Bay Basin that meets the criteria in State Water Resources Control Board (SWRCB) Resolution No. 88-63 has a potential beneficial use for municipal or domestic supply (SWRCB 1988; Water Board 1995). However, the Water Board completed a Pilot Beneficial Use Designation Project for several groundwater basins in San Francisco and San Mateo Counties that included TI and YBI (Water Board 1996). During a review of data from geotechnical and environmental investigations, the Water Board found that minimum yield criteria were not met except for possibly in the area composed of artificial fill, in which slug test data indicated the fill could possibly meet the minimum yield criteria (Water Board 1996). IR Site 28 does not contain any artificial fill, nor is it adjacent to any locations containing artificial fill. Any water available in the colluvium or bedrock at IR Site 28 would likely not meet the minimum yield criteria and would not be a feasible source of water from an economical point of view or from a groundwater industry standard.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
13	CSM for human health	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Figure G-2. SulTech. February 2009.



Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
14	Site-related risks and total risks	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 6.0. SulTech. February 2009.

6.0 HUMAN HEALTH RISK ASSESSMENT

The guiding principles in EPA’s “Risk Assessment Guidance for Superfund” (RAGS) (EPA 1989) were applied at IR Site 28, along with companion Navy policy and State of California guidance, as outlined in Section 6.1. Results of the HHRA are presented in Section 6.2, uncertainties associated with the HHRA are presented in Section 6.3, and conclusions and recommendations related to human health are summarized in Section 6.4. This risk assessment evaluated all potential human receptors for each of the sites. As stated in Section 1.9, many of these human receptors and exposure pathways are unlikely to exist because of steep, rocky slopes unsuitable for construction, impending inclusion in Tidelands Trust lands, and proximity to the SFOBB.

6.1 METHODS AND ASSUMPTIONS

This section summarizes the methodology used to conduct the HHRA for IR Site 28. The HHRA methodology is consistent with EPA (1989), DTSC (1992), and risk assessment guidelines from the DON (2001a, 2001b).

EPA and DTSC risk assessment guidance require the evaluation of potential cancer risks and noncancer hazards that may result from exposure to all COPCs identified for a particular site. However, DTSC guidance on the COPC selection process differs from the DON approach (DON 2001b), which is based on EPA RAGS Part A (EPA 1989) and EPA RAGS Part D (EPA 2001). Furthermore, federal guidance indicates that EPA’s Superfund guidance (including the December 5, 2003, guidance on selecting toxicity factors developed by the Office of Solid Waste and Emergency Response [EPA 2003]) should be followed when conducting risk assessments at federal facilities, but DTSC prefers an alternative method for selecting toxicity factors, advocating, for example, the use of the most health-protective of available federal and State of California toxicity values for evaluating potential cancer risks (DTSC 2005a). To satisfy federal (DON and EPA) and state (DTSC) requirements, risk estimates were prepared by two different methods, which will be referred to as Method 1 and Method 2, respectively (Figure G-1 of Appendix G), as proposed and later modified by the DON (DON 2005a). The specifics for selecting COPCs and toxicity values for the two methodologies are discussed in Section 6.1.2 and Section 6.1.4, respectively.

An additional estimate of total risk was prepared, consisting of all detected chemicals except for essential nutrients (such as calcium, magnesium, potassium and sodium); metals found to be within the background level range at YBI were included in the estimate of total risk. This estimate was prepared, using toxicity values from the DTSC-preferred hierarchy, as a comparative estimate to the “site-related risk” (risk contributed by former site operations at NAVSTA TI) represented by Method 2.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
14	Site-related risks and total risks	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 6.0. SulTech. February 2009.

6.1.1 Data Evaluation

The first step of the HHRA process consisted of reviewing and evaluating available data and identifying COPCs in the environmental media (such as soil) at IR Site 28. A data review was conducted to determine whether the available data are representative of site conditions.

As part of the data evaluation process, all analytical data were reviewed to verify that they met EPA data quality criteria for use in risk assessment (EPA 1992b). Data from samples collected during RI activities were validated in accordance with EPA data validation guidelines (EPA 1999, 2004c), described in the QAPP (IT Corporation 2002; SulTech 2004; Tetra Tech 2003). To summarize the data validation process, all analytical data were subject to a cursory review, and 10 percent of the data were fully validated. The cursory review evaluated key quality assurance (QA) and QC information such as holding times, calibration requirements, and spiking accuracy. The full validation evaluated additional QA/QC criteria and used the raw data to check calculations and analyte identifications. The overall objective of data validation was to verify that the analytical data met EPA guidelines for adequacy based on precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters. At each stage of the validation, qualifiers were assigned to the results in accordance with EPA guidelines (1999, 2004c), the QAPP (IT Corporation 2002; SulTech 2004; Tetra Tech 2003), and associated analytical methods.

The results of the data validation process are documented in a quality control summary report (QCSR) presented in Appendix E. The QCSR and data quality assessment each include a discussion of PARCC parameters, an evaluation of how well data met PARCC parameter goals established in the QAPPs, and a summary of how meeting these PARCC goals helps achieve data quality objectives for the RI. All data without qualifiers and all data qualified as estimated (J) were used in the HHRA. Data qualified as not detected (U) were incorporated into the HHRA, but the approach for treating nondetect data depended on the relative frequency of detection, as described in Appendix F. In cases where no more than 15 percent of the data were nondetect, simple substitution of one-half the detection limit was used for each nondetect measurement, consistent with guidance from EPA (2002c). When the frequency of nondetects exceeded 15 percent, a bounding approach was used to calculate a plausible upper bound for the 95 percent upper confidence limit (UCL) of the mean, as described in EPA (2002c). The bounding method uses Monte Carlo simulation to generate a distribution of all possible values that could be calculated for a UCL based on employing a particular mathematical model for the calculation (for example, based on an assumption that the underlying distribution is normal, lognormal, or nonparametric) and the measurements contained in a sample. Each of the calculations in the Monte Carlo simulation substitutes a uniform random variable between zero and the detection limit for each nondetect measurement. Consistent with EPA guidance, only data qualified as rejected were considered unusable for risk assessment purposes (EPA 1989, 1992b). Relative to the HHRA for IR Site 28, no samples were rejected.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
14	Site-related risks and total risks	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 6.0. SulTech. February 2009.

6.1.1.1 **Soil Data**

There are no known land uses of IR Site 28 and its historical use has been characterized as passive/no use, since its location and topography prevent standard development. Soil samples were collected to a depth of 1.75 feet bgs and analyzed for metals, so a surface soil (0 to 2 feet bgs) data set and surface soil exposures to metals were evaluated for this site. During the discussion of RTCs to the Draft RI report on October 22, 2008, the DON agreed to perform an additional EPC calculation and risk assessment of lead in surface soils between 0 and 6 inches bgs at IR Site 28. The results of this analysis are presented in conjunction with the results from 0 to 2 feet bgs to allow a quick comparison.

The surface soil (0 to 2 feet bgs) data set was used to evaluate potential direct contact exposures associated with unrestricted residential or commercial/industrial land use, discussed in detail in [Section 6.1.3](#), including scenarios where future redevelopment activities could result in the redistribution of subsurface soils to the surface. This data set was also used to evaluate potential direct contact exposures to construction workers. The surface soil data set was used to evaluate potential exposures to construction workers such as current Caltrans workers and to “future” construction workers involved with excavation activities during redevelopment or “current” receptors digging temporary trenches to repair subsurface utility lines at the site (for example, utility workers).

[Attachment G1](#) of [Appendix G](#) presents the soil samples used in the HHRA.

6.1.1.2 **Groundwater Data**

There has been no groundwater sampling conducted at IR Site 28. As described in [Section 1.5.1](#) and [Section 1.5.2](#), chemical contamination at IR Site 28 has historically been limited to non-DON activities associated with maintenance of the West Side On-Off Ramps which resulted in the deposition of lead and zinc containing paints and coatings on the soil surface.

The hydrogeology for IR Site 28 is discussed in further detail in [Section 3.3](#). Generally, groundwater for YBI does not meet the minimum yield requirements for beneficial use of groundwater as reported by the [Water Board \(1996\)](#). This precludes direct contact to groundwater for receptors via drinking water or other municipal use. Franciscan bedrock is relatively impervious except in areas of localized fracturing ([Blum 1993](#); [Phillips and others 1992](#)).

6.1.2 **Identifying Chemicals of Potential Concern**

COPCs are chemicals that are carried through the quantitative exposure and baseline risk analysis portions of the HHRA. COPCs were re-selected from soil using the data sets described in [Section 6.1.1.1](#). To satisfy federal (DON and EPA) and state (DTSC) requirements for COPC selection, risk estimates were prepared by two different methods, referred to as Method 1

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
14	Site-related risks and total risks	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 6.0. SulTech. February 2009.

(satisfying federal requirements) and Method 2 (satisfying state requirements). The following text describes the primary differences in the COPC selection criteria for each method.

- **Method 1 COPC Selection Criteria.** Standard EPA risk assessment methodology (EPA 1989, 2001) and DON guidance (DON 2001c) was set forth in selecting COPCs for Method 1. COPC selection eliminated chemicals that met any of the following criteria:
 - Metals recognized as essential nutrients (calcium, magnesium, sodium, and potassium). Calcium, magnesium, sodium, and potassium were excluded as COPCs provided they were not present at concentrations associated with adverse health effects. It was determined that the Reference Daily Intake values or Daily Values of these compounds (U.S. Food and Drug Administration [FDA] 2004) would not be exceeded from exposure to concentrations in soil at IR Site 28, and that these compounds could therefore be excluded as COPCs (see Appendix G). Although both EPA (1989) and DTSC (1992) classify iron as an essential nutrient, iron has been shown to be toxic at sufficiently high doses (National Center for Environmental Assessment [NCEA] 1996); therefore, iron was not excluded at this stage of the COPC selection process.
 - Chemicals that were detected infrequently in soil. Chemicals that were detected in only one sample were considered for exclusion as COPCs. Chemicals were not dismissed without consideration of other criteria, including toxicity, frequency of detection (relative to sample size), adequate detection limits, potential for bioaccumulation, persistence in the environment, records of historical use, and known sources of contamination.
 - Metals with concentrations within YBI background concentrations. Site soil concentrations were compared to concentrations of inorganic chemicals at YBI background locations (PRC 1996a) following DON guidance (DON 1998, 1999, 2002, 2004). If an inorganic chemical data set was not statistically distinguishable from background levels based on a two-population statistical test, that chemical was excluded as a COPC, consistent with DTSC and DON (2004) guidance. Details of the two-population tests and background comparison findings are presented in Appendix F.
 - Chemicals with maximum detected concentrations below risk-based screening levels. Analytes with maximum detected concentrations above risk-based screening concentrations (for example, EPA Region 9's PRGs [EPA 2004b]), are more likely to contribute to human health risks and hazards than detected analytes with concentrations below risk-based concentrations. A chemical was excluded as a COPC if its maximum detected concentration was below the EPA Region 9 PRG for residential soil (EPA 2004b). Exceptions were made for volatile chemicals detected in soil. These chemicals were retained as COPCs for the inhalation of vapors in indoor air pathway for hypothetical commercial/ industrial workers and residents as this pathway is not accounted for in the derivation of PRGs (see Section G7.1.1 of Appendix G).

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
14	Site-related risks and total risks	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 6.0. SulTech. February 2009.

- **Method 2 COPC Selection Criteria.** [DTSC \(1992\)](#) guidance for COPC selection was set forth in selecting COPCs for Method 2. COPC selection eliminated chemicals that met any of the following criteria:
 - Metals recognized as essential nutrients (calcium, magnesium, sodium, and potassium).
 - Metals with concentrations within YBI background concentrations. As in Method 1, site soil concentrations were compared to concentrations of inorganic chemicals at YBI background locations ([PRC 1996a](#)) following DON guidance ([DON 1998, 1999, 2002, 2004](#)). Details of the two-population tests and background comparison findings are presented in [Appendix F](#).

The distinctions in COPC selection methodology for each risk assessment method are presented on [Figure G-1](#) of [Appendix G](#).

Soil COPCs – Direct Contact Exposures

Lead was the only COPC identified by Method 1 in surface soil (0 to 2 feet bgs) at IR Site 28 and is presented in [Appendix G](#).

Antimony, lead and thallium are identified as COPCs by Method 2 in surface soil and are presented in [Appendix G](#).

6.1.3 Exposure Assessment

The exposure assessment evaluates the nature and magnitude of potential exposures associated with a site. The assessment includes a description of the exposure setting and land use, identification of potential receptors and exposure pathways, identification of exposure points, and estimation of EPCs and chemical intakes. A detailed summary of these steps are presented in [Section G8.0](#) of [Appendix G](#). The exposure assessment is anchored in the HHRA CSM ([Figure G-2](#) of [Appendix G](#)).

There are currently no buildings at IR Site 28 and no receptors, other than periodic Caltrans maintenance and construction workers. The future use of IR Site 28 is limited because of steep, rocky slopes unsuitable for construction, impending inclusion in Tidelands Trust lands, and proximity to the SFOBB on- and off-ramps and roadway.

As described in [Section G4.0](#) of [Appendix G](#), the Reuse Plan designated IR Site 28 for shoreline open space ([CCSF 1996](#)). As suggested in the Reuse Plan, residential development on YBI might include single-family attached and detached homes, as well as live/work studios and artist cottages ([CCSF 1996](#)). Furthermore, allowable uses under the “institutional use” and “publicly oriented use” categories might be expected to introduce commercial/industrial workers to the area and recreational use might be expected for the shoreline open space category assigned to IR Site 28 ([CCSF 1996](#)). However, given the limitations of IR Site 28 listed, residential and commercial redevelopment and recreational use of IR Site 28 are considered highly unlikely.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
14	Site-related risks and total risks	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 6.0. SulTech. February 2009.

Both a reasonable maximum exposure (RME) and a central tendency exposure (CTE) scenario were evaluated. An RME scenario represents a plausible upper-end exposure, while a CTE scenario represents an average or more typical exposure. Evaluating an RME scenario will address potential health impacts to most of an exposed population. However, it will not include those extremely sensitive individuals within a particular receptor population.

A complete summary of exposure pathways evaluated for each receptor is provided in [Section G8.0](#) of [Appendix G](#). The routes of exposure to soil quantitatively evaluated in this HHRA for the hypothetical commercial/industrial worker, construction worker, and resident receptors are as follows:

- Commercial/industrial worker: Incidental ingestion of soil, dermal contact with soil, and inhalation of particulates from soil in outdoor air were evaluated at IR Site 28.
- Construction worker: Incidental ingestion of soil, dermal contact with soil, and inhalation of particulates from soil in outdoor air were evaluated at IR Site 28.
- Adult/child resident: Incidental ingestion of soil, dermal contact with soil, and inhalation of particulates from soil in outdoor air were evaluated at IR Site 28.

Standard EPA methods ([EPA 2002b](#)) were used to estimate EPCs for direct-contact exposures (for example, ingestion of soil), and the EPC was based directly on the measured COPC levels in soil. Following the most recent guidance, UCL concentrations were calculated using distribution-dependent formulae, following [Gilbert \(1987\)](#) and [EPA \(2002b\)](#) as described in [Appendix F](#).

6.1.4 Toxicity Assessment

The toxicity assessment for the HHRA included identification of toxicity values used to characterize noncancer health effects and cancer risk, respectively. As summarized by [EPA \(1989\)](#), reference doses (RfD) have been developed to evaluate noncancer effects, and cancer slope factors (SF) have been developed to evaluate chemicals classified as known or potential human carcinogens. In the event a chemical is considered to cause both cancer and noncancer adverse health effects, both SFs and RfDs may be listed for that chemical.

Toxicity factors for Method 1 were compiled from EPA-approved sources following the recommended hierarchy:

- Integrated Risk Information System ([IRIS] [EPA 2007](#))
- EPA's Provisional Peer-Reviewed Toxicity Values (PPRTV) presented in EPA Region 9's PRG table ([2004b](#)). PPRTVs were developed by the Office of Research and Development, NCEA, and Superfund Health Risk Technical Support Center when requested by EPA's Superfund program ([EPA 2004a](#))

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
14	Site-related risks and total risks	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 6.0. SulTech. February 2009.

- Other EPA and non-EPA sources, including ATSDR minimal risk levels (ATSDR 2004), Office of Environmental Health Hazard Assessment's (OEHHA) online resource, "Toxicity Criteria Database" (OEHHA 2005), and EPA's Health Effects Assessment Summary Tables ([HEAST] EPA 1997a)

Toxicity factors for Method 2 were compiled following DTSC recommendations (DTSC 2005a, 2005c). Notably, the most health-protective of federal and OEHHA SFs were selected for evaluating cancer risks. To evaluate noncancer effects from inhalation exposures, inhalation RfDs or reference concentrations were compiled from IRIS (EPA 2007), the OEHHA "Toxicity Criteria Database" (as reference exposure levels) (OEHHA 2005), or other EPA sources (PPRTVs, HEAST, or route-extrapolated values), in decreasing order of priority. Finally, because OEHHA has not developed its own set of toxicity values for assessing noncancer endpoints for oral or dermal exposures, the EPA hierarchy was followed to select noncancer oral and dermal toxicity values.

Tables G-6.1 through G-6.8 of Appendix G present the toxicity values used for the estimation of Method 1 and Method 2 risk. When toxicity values were not available from any of the recommended sources, toxicity values from chemically similar compounds were selected as surrogates. Where route-specific toxicity values were not available, route-to-route extrapolations were used to derive toxicity values for organic compounds, but not for metals, as consistent with EPA Region 9 conventions for route-to-route extrapolations (EPA 2004b). Cases where surrogates or route-to-route extrapolations were used are noted in Tables G-6.1 through G-6.8 of Appendix G, and are discussed further in Sections G9.3 and G9.4 of Appendix G.

Using these criteria, toxicity values were compiled for each COPC identified, and cancer risks and noncancer adverse health effects were estimated for Methods 1 and 2.

6.1.5 Risk Characterization

The risk-characterization step combines the results of all the previously described steps to estimate cancer risks and noncancer health effects (as hazard indices [HI]). Because carcinogens and noncarcinogens manifest their effects through uniquely different mechanisms, adverse health effects are estimated separately for chemical carcinogens and noncarcinogens. For each receptor, cancer risks and HIs were estimated separately for each COPC and each complete exposure pathway. Cancer risk estimates and HIs were then summed across media and exposure pathways for a combined effect estimate. In the risk characterization discussion, IR Site 28 risks were compared to the acceptable risk levels where an HI should be below unity (1) for noncancer effects, and the incremental risk should be below one in a million (10^{-6}) for cancer effects. Where noncancer HIs exceeded unity for a receptor, effects were segregated by target organ to determine whether systemic effects would be unacceptable for a specific target organ or system. In addition, cancer risks between 10^{-6} (1 in 1,000,000) and 10^{-4} (1 in 10,000) are described as being within the risk management range.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
14	Site-related risks and total risks	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 6.0. SulTech. February 2009.

Because cancer risks are calculated over a lifetime, adult and child exposures are combined to represent a lifetime cancer risk. For noncancer hazards, exposures are predicted to result in a health effect only during the time when exposure is occurring. For this reason, child hazard indices are greater than adult hazard indices, and thus, only the children's hazard is presented.

Lead was not included in the cumulative risk characterization. Given the unique toxicological and pharmacological properties of lead, the hazard quotient (HQ) and HI method is inappropriate for this chemical. Instead, blood-lead levels that may result from exposure to lead-containing soil are calculated. In this case, DTSC's LeadSpread model (Version 7.0) was used to calculate blood-lead levels for hypothetical adult and child residents (DTSC 1999). The estimated blood-lead levels were then compared against the benchmark blood-lead level of 10 µg/dL established by the DTSC. Although LeadSpread was also designed to estimate blood-lead levels for occupational exposures, DTSC is not currently recommending the use of this model for assessment of exposure to lead at industrial sites (DTSC 2005b). Instead, DTSC has recommended considering the current EPA Region 9 PRG for industrial soil as a benchmark for remedial-based decision-making for potential industrial sites (DTSC 2005b). The lead EPCs for the soil data sets (0 to 6 inches and 0 to 2 feet bgs), relevant for occupational exposures of hypothetical commercial/industrial workers and construction workers were compared to this PRG.

6.2 HUMAN HEALTH RISK ASSESSMENT SUMMARY FOR INSTALLATION RESTORATION SITE 28

This section summarizes the results for RME and cancer risks and noncancer adverse health effects to commercial/industrial workers, construction workers, and residents for Method 1 and Method 2 for IR Site 28. Attachment G3 of Appendix G presents the results of the CTE case for Method 1, and Attachment G4 presents the results of the CTE case for Method 2.

6.2.1 Installation Restoration Site 28 Summary of Cancer Risks, Noncancer Hazards, and Health Effects Associated with Exposure to Lead in Soil

Aside from lead, there were no other metals selected as COPCs for Method 1 at IR Site 28. All other detected metals were either below background levels or below their respective EPA Region 9 PRGs for residential soil. The three metals selected as COPCs for Method 2 at IR Site 28 are antimony, lead, and thallium. Health effects associated with lead are analyzed separately from other COPCs at this site. Neither antimony nor thallium is considered to be carcinogenic by EPA or OEHHA. Therefore, exposure to these metals in soil at IR Site 28 is not deemed to pose a potential cancer risk. The tables below summarize the Method 2 and Total RME cancer risks and noncancer HIs for the evaluated receptors for exposure to antimony and thallium in IR Site 28 surface soil (0 to 2 feet bgs) via incidental ingestion, dermal contact, and inhalation of particulates in outdoor air. These risk estimate results are also presented in Appendix G.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
14	Site-related risks and total risks	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 6.0. SulTech. February 2009.

The estimated Method 2 RME noncancer health hazards for commercial/industrial worker, construction worker, or resident exposure to antimony and thallium in surface soil (0 to 2 feet bgs) at IR Site 28 were all less than the HI benchmark of 1. As a result, noncancer health hazards from exposure to metals above background levels in soil at IR Site 28 are acceptable.

Installation Restoration Site 28 Lead Summary

Lead was selected as a COPC for both Method 1 and Method 2 at IR Site 28 (see [Appendix G](#)). Blood-lead modeling of the lead EPC, 830 mg/kg, resulted in a 99th percentile blood-lead concentration below 10 µg/dL for the adult resident (4.2 µg/dL), but above 10 µg/dL for the child resident (20.6 µg/dL). In addition, the lead EPC exceeded the PRG for industrial soil, 800 mg/kg. As shown on [Figure 4-2](#), the detected concentrations of lead exceeding the EPA Region 9 PRG for residential soil, 400 mg/kg, were limited to samples collected from three adjacent locations, 28-SB05, 28-SB06, and 28-SB07. To support risk management decisions, a focused “hot spot” analysis was performed in which a “hot spot” EPC (956 mg/kg) was calculated for the localized lead contamination found in surface soil at locations 28-SB05, 28-SB06, and 28-SB07 and an adjusted site-wide lead EPC (398 mg/kg) was calculated for the remaining surface soil samples analyzed for lead at IR Site 28. Finally, an EPC (302 mg/kg) for lead in the 0 to 6 inch bgs horizon was calculated. Blood-lead modeling was then performed for these three additional lead EPCs.

For quick reference, the lead EPCs and predicted 99th percentile blood-lead concentrations for all modeled EPCs by exposure area are presented in the following table.

Exposure Area	Lead EPC (mg/kg)	Predicted 99th Percentile Blood-Lead Concentration (µg/dL)	
		Adult Resident	Child Resident
IR Site 28: Site-wide (0-2 feet bgs)	830	4.2	20.6
IR Site 28: Adjusted Site-wide (0-2 feet bgs)	398	3.0	11.4
IR Site 28: “Hot Spot” Area (0-2 feet bgs)	956	4.5	23.3
IR Site 28: Site-wide (0-6 inches bgs)	302	2.7	9.4

Blood-lead modeling using the adjusted site-wide lead EPC and “hot spot” lead EPC resulted in 99th percentile concentrations below 10 µg/dL for the adult resident and 99th percentile concentrations exceeding 10 µg/dL for the child resident (see [Appendix G](#)). However, the “adjusted” lead EPC fell below both the EPA Region 9 PRG for residential soil and the EPA Region 9 PRG for industrial soil. Additionally, a construction worker PRG was developed, based on conservative exposure assumptions and EPA PRG methodology, resulting in a value of 966 mg/kg. All IR Site 28 EPCs are below the construction worker PRG.

Potential exposure to lead for recreational users at IR Site 28 is expected to be substantially less than that estimated for residents, due primarily to a lower expected exposure frequency.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
14	Site-related risks and total risks	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 6.0. SulTech. February 2009.

Reducing the residential exposure frequency from 350 days per year to 50 days per year, which represents an upper bound estimate for recreational exposure, reduces 99th percentile blood-lead levels to 2.3 µg/dL for an adult and 5.9 µg/dL for a child, even while using the lead “hot spot” EPC of 956 mg/kg.

6.2.2 Site Risk and Total Risk Analysis

The EPA and DTSC have expressed an interest in ensuring that not only “site-related risk” contributed by CERCLA releases and former site operations at NAVSTA TI be characterized, but that total risk (all detected analytes be evaluated in the risk assessment regardless of any screening criteria) be communicated as well. To provide baseline total risk estimates for construction workers, residents, and commercial/industrial workers, all detected contaminants in soil and groundwater were evaluated, except essential nutrients ([Section 6.1.2](#)). The results of the baseline “total risk” estimates are summarized below and presented in [Appendix G](#) (with a detailed discussion found in [Attachment G5](#)). The results of this assessment provide additional information for making risk management decisions concerning the necessity for or selection of remedial alternatives at IR Site 28.

IR Site 28: Method 2 and Total Risk Estimates

Receptor	RME Cancer Risk Estimates		RME Noncancer HI Estimates	
	Method 2	Total	Method 2	Total
Commercial/Industrial Worker – Exposure to Soil (0-2 feet bgs) ¹	NA	1E-05	0.01	0.1
Construction Worker- Exposure to Soil (0-2 feet bgs) ¹	NA	2E-06	0.04	0.4
Resident – Exposure to Soil (0-2 feet bgs) ¹	NA	5E-05	0.2	1

Notes:

- 1 Exposure to soil via incidental ingestion, dermal contact, and inhalation of particulates or vapors in outdoor air
- NA The chemicals of potential concern selected for Method 2 are noncarcinogenic.

6.3 UNCERTAINTY ANALYSIS

The HHRA incorporates a number of uncertainties inherent in the risk assessment process. Depending on the type of uncertainty, impacts to HHRA results can include an over- or underestimation of cancer risks or HIs. The main uncertainties for the HHRA at IR Site 28 are summarized below. Additional details on these uncertainties are discussed in [Section G12.0 of Appendix G](#).

Uncertainty is introduced during data evaluation and selection of COPCs. Each strength and weakness associated with the data is carried through the risk assessment, including site characterization data and methods used to identify COPCs. The primary uncertainty associated with the COPC selection process is the possibility that a chemical may be inappropriately

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
15	Chemicals of potential concern (COPC)	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Table G3.1.1 through Table G3.1.3. SuITech. February 2009.

TABLE G-3.1.1: EPA RAGS PART D TABLE 3, EXPOSURE POINT CONCENTRATION SUMMARY
Method 1, Site 28 Surface Soil (0-6 inches bgs)

Revised Remedial Investigation Report for Installation Restoration Site 28, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Medium:	Soil
Exposure Medium:	Surface Soil (0-6 inches bgs)

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution) ^a	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic ^b	Rationale ^c
Surface Soil	Lead	mg/kg	1.53E+02	3.02E+02 L, G	3.98E+02	3.02E+02	mg/kg	(2)	(4)

Notes:

See Appendix F for a detailed description of the statistical methods used.

- DF Detection frequency
ft bgs Feet below ground surface
J Estimated value
MAX Maximum detected concentration
mg/kg Milligrams per kilogram
MVUE Minimum variance unbiased estimator
n Sample size
UCL One-sided upper confidence limit of the mean. Following EPA (2004), this can be either a 95, 97.5, or 99 percent UCL.
> Greater than
≥ Greater than or equal to
a Distribution Codes: G= gamma, L= lognormal, N= normal, NP= nonparametric
b Statistic codes: (1) Student's t (UCL95), (2) approximate gamma (UCL95), (3) adjusted gamma (UCL95), (4) Land's H-statistic (UCL95), (5) nonparametric Chebyshev (UCL95), (6) nonparametric Chebyshev (UCL97.5), (7) nonparametric Chebyshev (UCL99), (8) MVUE Chebyshev (UCL95), (9) MVUE Chebyshev (UCL97.5), (10) MVUE Chebyshev (UCL99), (11) Hall's bootstrap, (12) bootstrap t, (13) MAX
c Rationale codes: (1) n<3, MAX used as default; (2) estimated UCL > MAX, MAX used as default; (3) DF ≥ 85 percent, distribution-dependent equations used to calculate a UCL following EPA (2004); (4) DF < 85 percent, "bounding" approach used to calculate a UCL following EPA (2002b)

References:

- U.S. Environmental Protection Agency (EPA). 2002b. "Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites." OSWER 9285.6-10. Office of Emergency and Remedial Response (OERR). Washington, DC. December.
EPA. 2007. "ProUCL Version 4.00.02 User Guide." Prepared by Singh, A., Singh, A.K., Lee, S.E., Armbya, N., and R.W. Maichle. Technical Support Center. Las Vegas, Nevada. April.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
15	Chemicals of potential concern (COPC)	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Table G3.1.1 through Table G3.1.3. SulTech. February 2009.

TABLE G-3.1.2: EPA RAGS PART D TABLE 3, EXPOSURE POINT CONCENTRATION SUMMARY
Method 1, Site 28 Surface Soil (0-2 ft bgs)

Revised Remedial Investigation Report for Installation Restoration Site 28, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Medium:	Soil
Exposure Medium:	Surface Soil (0-2 ft bgs)

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution) ^a	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic ^b	Rationale ^c
Surface Soil	Lead	mg/kg	2.62E+02	8.30E+02 L	1.12E+03	8.30E+02	mg/kg	(8)	(3)

Notes:

See Appendix F for a detailed description of the statistical methods used.

- DF Detection frequency
ft bgs Feet below ground surface
J Estimated value
MAX Maximum detected concentration
mg/kg Milligrams per kilogram
MVUE Minimum variance unbiased estimator
n Sample size
UCL One-sided upper confidence limit of the mean. Following EPA (2004), this can be either a 95, 97.5, or 99 percent UCL.
> Greater than
≥ Greater than or equal to
a Distribution Codes: G= gamma, L= lognormal, N= normal, NP= nonparametric
b Statistic codes: (1) Student's t (UCL95), (2) approximate gamma (UCL95), (3) adjusted gamma (UCL95), (4) Land's H-statistic (UCL95), (5) nonparametric Chebyshev (UCL95), (6) nonparametric Chebyshev (UCL97.5), (7) nonparametric Chebyshev (UCL99), (8) MVUE Chebyshev (UCL95), (9) MVUE Chebyshev (UCL97.5), (10) MVUE Chebyshev (UCL99), (11) Hall's bootstrap, (12) bootstrap t, (13) MAX
c Rationale codes: (1) n<3, MAX used as default; (2) estimated UCL > MAX, MAX used as default; (3) DF ≥ 85 percent, distribution-dependent equations used to calculate a UCL following EPA (2004); (4) DF < 85 percent, "bounding" approach used to calculate a UCL following EPA (2002b)

References:

- U.S. Environmental Protection Agency (EPA). 2002b. "Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites." OSWER 9285.6-10. Office of Emergency and Remedial Response (OERR). Washington, DC. December.
EPA. 2004. "ProUCL Version 3.0 User Guide." Prepared by Singh, A., Singh, A.K., and R.W. Maichle. Technical Support Center. Las Vegas, Nevada. April.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
15	Chemicals of potential concern (COPC)	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Table G3.1.1 through Table G3.1.3. SulTech. February 2009.

TABLE G-3.1.3: EPA RAGS PART D TABLE 3, EXPOSURE POINT CONCENTRATION SUMMARY
Method 2, Site 28 Surface Soil (0-2 ft bgs)

Revised Remedial Investigation Report for Installation Restoration Site 28, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Medium:	Soil
Exposure Medium:	Surface Soil (0-2 ft bgs)

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution) ^a	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic ^b	Rationale ^c
Surface Soil	Antimony	mg/kg	5.63E-01	6.94E-01 N	1.10E+00 J	6.94E-01	mg/kg	(1)	(4)
	Lead	mg/kg	2.62E+02	8.30E+02 L	1.12E+03	8.30E+02	mg/kg	(8)	(3)
	Thallium	mg/kg	4.06E-01	8.88E-01 NP	1.90E+00	8.88E-01	mg/kg	(5)	(4)

Notes:

See Appendix F for a detailed description of the statistical methods used.

- DF Detection frequency
ft bgs Feet below ground surface
J Estimated value
MAX Maximum detected concentration
mg/kg Milligrams per kilogram
MVUE Minimum variance unbiased estimator
n Sample size
UCL One-sided upper confidence limit of the mean. Following EPA (2004), this can be either a 95, 97.5, or 99 percent UCL.
> Greater than
≥ Greater than or equal to
a Distribution Codes: G= gamma, L= lognormal, N= normal, NP= nonparametric
b Statistic codes: (1) Student's t (UCL95), (2) approximate gamma (UCL95), (3) adjusted gamma (UCL95), (4) Land's H-statistic (UCL95), (5) nonparametric Chebyshev (UCL95), (6) nonparametric Chebyshev (UCL97.5), (7) nonparametric Chebyshev (UCL99), (8) MVUE Chebyshev (UCL95), (9) MVUE Chebyshev (UCL97.5), (10) MVUE Chebyshev (UCL99), (11) Hall's bootstrap, (12) bootstrap t, (13) MAX
c Rationale codes: (1) n<3, MAX used as default; (2) estimated UCL > MAX, MAX used as default; (3) DF ≥ 85 percent, distribution-dependent equations used to calculate a UCL following EPA (2004); (4) DF < 85 percent, "bounding" approach used to calculate a UCL following EPA (2002)

References:

- U.S. Environmental Protection Agency (EPA). 2002bb. "Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites." OSWER 9285.6-10. Office of Emergency and Remedial Response (OERR). Washington, DC. December.
EPA. 2004. "ProUCL Version 3.0 User Guide." Prepared by Singh, A., Singh, A.K., and R.W. Maichle. Technical Support Center. Las Vegas, Nevada. April.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
16	Calculation of potential risks	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Section G10.1 and Section G10.2. SulTech. February 2009.

exposure to lead at industrial sites (DTSC 2005b). Instead, DTSC has recommended that the current EPA Region 9 PRG for industrial soil be considered a benchmark for remedial-based decision-making for potential industrial sites (DTSC 2005b). The lead EPCs for the surface soil (0 to 6 inches and 0 to 2 feet bgs) and combined surface and subsurface soil (0 to 10 feet bgs) data sets for Site 28 were compared to this PRG.

G10.0 RISK CHARACTERIZATION

The final step in the HHRA is the characterization of the potential risks associated with exposure to chemicals detected at a site. Noncancer health hazards and cancer risks are characterized separately. The general methodology for estimating HIs and cancer risks is presented in Section 6.0 of the RI Report, as well as in Sections G10.1 and G10.2 of this appendix. As indicated previously in Section G9.5, lead is evaluated separately, as described in Section G10.3. The risk characterization results are then presented in Section G11.0.

G10.1 CHARACTERIZATION OF NONCANCER HAZARDS

For chemicals that are not classified as carcinogens and for those carcinogens known to cause adverse health effects other than cancer, the potential for exposure to result in adverse health effects other than cancer is evaluated by comparing the intake with an RfD. When calculated for a single chemical, the comparison yields a ratio termed the HQ:

$$\text{Hazard Quotient} = \frac{\text{Intake (mg/kg-day)}}{\text{RfD (mg/kg-day)}} \quad (10-1)$$

To evaluate the potential for adverse health effects other than cancer from simultaneous exposure to multiple chemicals, the HQs for all chemicals are summed, yielding an HI as follows:

$$\text{Hazard Index} = \sum \text{HQ} \quad (10-2)$$

Pathway-specific HIs are then summed to estimate a total HI for each receptor identified at a site. If the total HI exceeds 1, further evaluation using a segregated HI analysis may be performed to assess whether noncancer HIs are a concern at a site (EPA 1989). This analysis is conducted because adverse noncancer health effects of chemicals with different target organs are generally not additive.

G10.2 CHARACTERIZATION OF CANCER RISKS

Risks associated with exposure to chemicals classified as carcinogens are estimated as the incremental probability that an individual will develop cancer over a lifetime as a direct result of an exposure (EPA 1989). The estimated risk is expressed as a unitless probability.

EPA guidance on exposure levels considered protective of human health is followed to aid in the interpretation of the risk assessment results. In the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), EPA defined general remedial action goals for sites on the

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
16	Calculation of potential risks	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Section G10.1 and Section G10.2. SulTech. February 2009.

National Priorities List (Title 40 of the *Code of Federal Regulations* Part 300.430). The goals included a range for residual cancer risk, which is “an excess upper-bound lifetime cancer risk to an individual of between 10^{-4} [1E-04] and 10^{-6} [1E-06],” or 1 in 10,000 to 1 in 1,000,000. The goals set out in the NCP are applied once a decision has been made to remediate a site. A more recent EPA directive ([EPA 1991b](#)) provides additional guidance on the role of the HHRA in supporting risk management decisions, and in particular, determining whether remedial action is necessary at a site. Specifically, the guidance states, “Where cumulative carcinogenic site risk to an individual based on reasonable maximum exposure for both current and future land use is less than 10^{-4} , and the noncancer HQ is less than 1, action generally is not warranted unless there are adverse environmental impacts.” EPA Region 9 has stated, however, that action may be taken to address risks between 10^{-4} and 10^{-6} . For that reason, the range between 10^{-4} and 10^{-6} is referred to as the “risk management range” in this HHRA. Risks and health hazards discussed in the text and main tables of the RI report and the text of [Appendix F](#) are limited to one significant figure as recommended by RAGS Part A ([EPA 1989](#)). However, to enable checks for mathematical accuracy to additional decimals, the tables of [Appendix F](#) include results beyond the single significant figure.

For chemicals classified as carcinogens, three steps are used in estimating cancer risks. First, to derive a cancer risk estimate for a single chemical and pathway, the chemical intake is multiplied by the chemical-specific SF. The calculation is based on the following relationship:

$$\text{Chemical-Specific Cancer Risk} = \text{Intake (mg/kg-day)} \times \text{SF (mg/kg-day)}^{-1} \quad (10-3)$$

Second, to estimate the cancer risk associated with exposure to multiple carcinogens for a single exposure pathway, the individual chemical cancer risks are assumed to be additive, as follows:

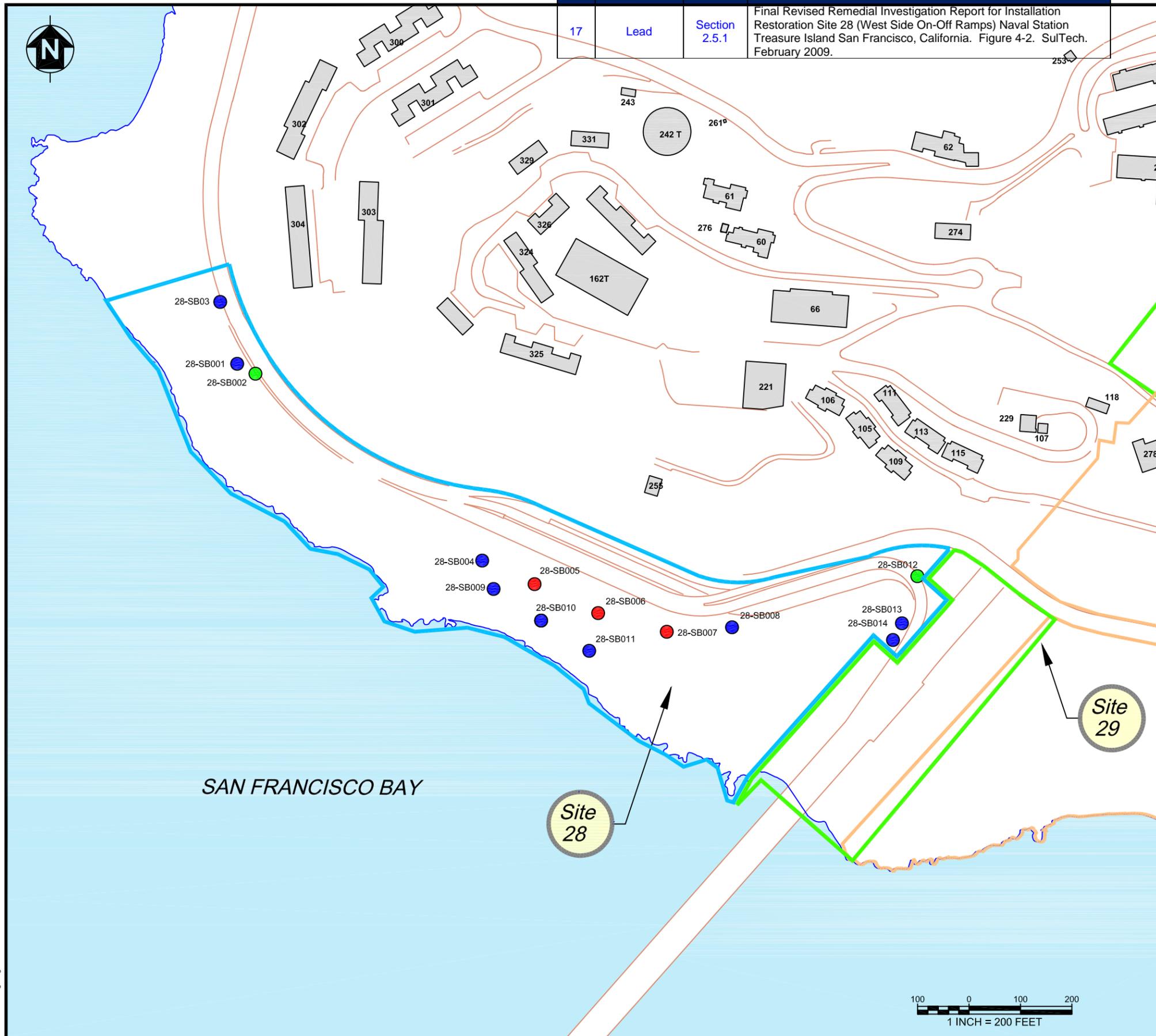
$$\text{Pathway-Specific Cancer Risk} = \sum \text{Chemical-Specific Cancer Risk} \quad (10-4)$$

Third, pathway-specific risks are summed to estimate the total cancer risk.

G10.3 HEALTH EFFECTS ASSOCIATED WITH EXPOSURE TO LEAD

Given the unique toxicological and pharmacological properties of lead, the HQ and HI method is inappropriate for this chemical. Instead, blood-lead levels that may result from exposure to lead-containing soil are calculated. In this case, DTSC’s LeadSpread model (Version 7.0) was used to calculate blood-lead levels for hypothetical adult and child residents ([DTSC 1999](#)). In accordance with Navy policy ([DeGrandchamp 2005](#)), site-specific data were used to replace model defaults as applicable. The estimated blood-lead levels were then compared to benchmark blood-lead levels established by the DTSC. The DTSC recommends that blood-lead levels lower than 10 micrograms per deciliter ($\mu\text{g/dL}$) are protective of the general population ([DTSC 1999](#)). The DTSC also recommends that the resulting blood-lead level should be protective of up to 99 percent of the population. Although LeadSpread was also designed to estimate blood-lead levels for occupational exposures, DTSC is not currently recommending the use of this model for assessment of exposure to lead under an occupational setting ([DTSC 2005b](#)). Instead, DTSC has recommended considering the current EPA Region 9 PRG for industrial soil as a benchmark for remedial-based decision-making for a potential

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
17	Lead	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Figure 4-2. SulTech. February 2009.

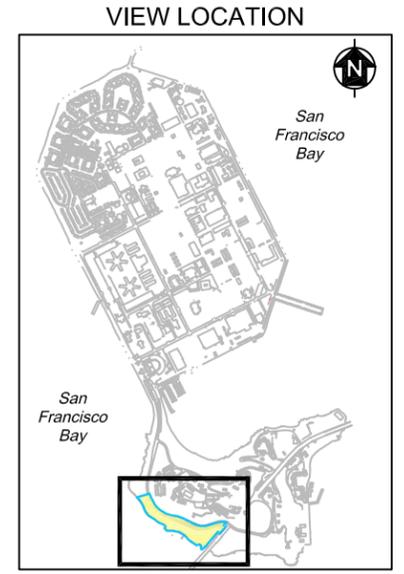


Site 28 - Soil Lead Analytical Results		
Location	Depth Interval (ft bsg)	LEAD (mg/kg)
28-SB001	0.00-0.50	398
28-SB002	0.00-0.50	ND
28-SB003	0.00-0.50	121
28-SB004	0.00-0.50	55.9
28-SB004	1.00-1.50	21.9
28-SB005	0.50-1.00	1,120
28-SB005	1.25-1.75	438
28-SB006	0.50-1.00	758
28-SB006	1.00-1.50	19.3
28-SB007	0.50-1.00	1,010
28-SB007	1.25-1.75	26.4
28-SB008	0.50-1.00	13
28-SB008	1.25-1.75	5.1
28-SB009	0.00-0.50	9.7
28-SB009	1.25-1.75	19.3
28-SB010	0.00-0.50	172
28-SB010	1.25-1.75	22.8
28-SB011	0.00-0.50	3.4
28-SB011	1.25-1.75	4.8
28-SB012	0.00-0.50	ND
28-SB013	0.00-0.50	124
28-SB014	0.00-0.50	336
28-SB014	1.00-1.50	245

ft bgs = Feet Below Ground Surface
 mg/kg = Milligram per Kilogram
 ND = Not Detected

LEGEND

- LOCATION OF IR SITE
- IR SITE 28 BOUNDARY
- IR SITE 29 BOUNDARY
- COAST GUARD SITE BOUNDARY
- ANALYTE NOT DETECTED IN SAMPLE
- ANALYTE CONCENTRATION LESS THAN OR EQUAL TO 400 mg/kg (RESIDENTIAL PRG)
- ANALYTE CONCENTRATION GREATER THAN 400 mg/kg (RESIDENTIAL PRG)
- BUILDING



Naval Station Treasure Island, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, CA.

FIGURE 4-2
ANALYTICAL RESULTS FOR LEAD IN SOIL - SITE 28

Remedial Investigation, Sites 8, 28, and 29

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

LIST OF FIGURES

- G-1 COPC Selection and Risk Estimate Methods
- G-2 Conceptual Site Model

LIST OF TABLES

Selection of Exposure Pathways

- G-1 EPA RAGS Part D Table 1, Selection of Exposure Pathways, Construction Workers, Residents, and Commercial/Industrial Workers

Occurrence, Distribution, and Selection of COPCs

Site 28

- G-2.1.1 EPA RAGS Part D Table 2, Occurrence, Distribution, and Selection of Chemicals of Potential Concern, Method 1, Site 28 Surface Soil (0-2 ft bgs)
- G-2.1.2 EPA RAGS Part D Table 2, Occurrence, Distribution, and Selection of Chemicals of Potential Concern, Method 2, Site 28 Surface Soil (0-2 ft bgs)

Exposure Point Concentration Summaries

Site 28

- G-3.1.1 EPA RAGS Part D Table 3, Exposure Point Concentration Summary, Method 1, Site 28 Surface Soil (0-6 inches bgs)
- G-3.1.2 EPA RAGS Part D Table 3, Exposure Point Concentration Summary, Method 1, Site 28 Surface Soil (0-2 ft bgs)
- G-3.1.3 EPA RAGS Part D Table 3, Exposure Point Concentration Summary, Method 2, Site 28 Surface Soil (0-2 ft bgs)

Values Used for Daily Intake

- G-4.1 EPA RAGS Part D Table 4, Values Used for Daily Intake, RME Soil Exposures, Construction Workers, Residents, and Commercial/Industrial Workers
- G-4.2 EPA RAGS Part D Table 4, Values Used for Daily Intake, CTE Soil Exposures, Construction Workers, Residents, and Commercial/Industrial Workers

Chemical-Specific Factors

- G-5.1 Chemical-Specific Factors Used in the Human Health Risk Assessment, Chemicals Detected in Soil

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

LIST OF TABLES (Continued)

Toxicity Data

Method 1

- G-6.1 EPA RAGS Part D Table 5.1, Noncancer Toxicity Data – Oral/Dermal, Method 1 Values
- G-6.2 EPA RAGS Part D Table 5.2, Noncancer Toxicity Data – Inhalation, Method 1 Values
- G-6.3 EPA RAGS Part D Table 6.1, Cancer Toxicity Data – Oral/Dermal, Method 1 Values
- G-6.4 EPA RAGS Part D Table 6.2, Cancer Toxicity Data – Inhalation, Method 1 Values

Method 2

- G-6.5 EPA RAGS Part D Table 5.1, Noncancer Toxicity Data – Oral/Dermal, Method 2 Values
- G-6.6 EPA RAGS Part D Table 5.2, Noncancer Toxicity Data – Inhalation, Method 2 Values
- G-6.7 EPA RAGS Part D Table 6.1, Cancer Toxicity Data – Oral/Dermal, Method 2 Values
- G-6.8 EPA RAGS Part D Table 6.2, Cancer Toxicity Data – Inhalation, Method 2 Values

RME Cancer Risks and Noncancer Hazards

Site 28

Method 2

- G-7.1.1 EPA RAGS Part D Table 7, Calculation of RME Cancer Risks and Noncancer Hazards Using Toxicity Data from DTSC Preferred Sources (Method 2), Commercial/Industrial Worker, Site 28 Surface Soil (0-2 ft bgs)
- G-7.1.2 EPA RAGS Part D Table 7, Calculation of RME Cancer Risks and Noncancer Hazards Using Toxicity Data from DTSC Preferred Sources (Method 2), Construction Worker, Site 28 Surface Soil (0-2 ft bgs)
- G-7.1.3 EPA RAGS Part D Table 7, Calculation of RME Cancer Risks and Noncancer Hazards Using Toxicity Data from DTSC Preferred Sources (Method 2), Adult Resident, Site 28 Surface Soil (0-2 ft bgs)
- G-7.1.4 EPA RAGS Part D Table 7, Calculation of RME Cancer Risks and Noncancer Hazards Using Toxicity Data from DTSC Preferred Sources (Method 2), Child Resident, Site 28 Surface Soil (0-2 ft bgs)

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

LIST OF TABLES (Continued)

Summaries of RME Receptor Risks and Hazards for COPCs

Site 28

Method 2

- G-8.1.1 EPA RAGS Part D Table 9, Summary of RME Receptor Risks and Hazards for COPCs Using Toxicity Data from DTSC Preferred Sources (Method 2), Commercial/Industrial Worker, Site 28 Surface Soil (0-2 ft bgs)
- G-8.1.2 EPA RAGS Part D Table 9, Summary of RME Receptor Risks and Hazards for COPCs Using Toxicity Data from DTSC Preferred Sources (Method 2), Construction Worker, Site 28 Surface Soil (0-2 ft bgs)
- G-8.1.3 EPA RAGS Part D Table 9, Summary of RME Receptor Risks and Hazards for COPCs Using Toxicity Data from DTSC Preferred Sources (Method 2), Adult Resident, Site 28 Surface Soil (0-2 ft bgs)
- G-8.1.4 EPA RAGS Part D Table 9, Summary of RME Receptor Risks and Hazards for COPCs Using Toxicity Data from DTSC Preferred Sources (Method 2), Child Resident, Site 28 Surface Soil (0-2 ft bgs)

RME Risk Assessment Summaries

Site 28

Method 2

- G-9.1.1 EPA RAGS Part D Table 10, RME Risk Assessment Summary Using Toxicity Data from DTSC Preferred Sources (Method 2), Commercial/Industrial Worker, Site 28 Surface Soil (0-2 ft bgs)
- G-9.1.2 EPA RAGS Part D Table 10, RME Risk Assessment Summary Using Toxicity Data from DTSC Preferred Sources (Method 2), Construction Worker, Site 28 Surface Soil (0-2 ft bgs)
- G-9.1.3 EPA RAGS Part D Table 10, RME Risk Assessment Summary Using Toxicity Data from DTSC Preferred Sources (Method 2), Adult Resident, Site 28 Surface Soil (0-2 ft bgs)
- G-9.1.4 EPA RAGS Part D Table 10, RME Risk Assessment Summary Using Toxicity Data from DTSC Preferred Sources (Method 2), Child Resident, Site 28 Surface Soil (0-2 ft bgs)

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

LIST OF TABLES (Continued)

Lead Risk Assessment Results Using LeadSpread

- G-10.1.1 Lead Risk Assessment Results Using LeadSpread, Residents, Site 28 Surface Soil (0-2 ft bgs)
- G-10.1.2 Lead Risk Assessment Results Using LeadSpread, Residents, Site 28 Surface Soil (0-2 ft bgs), Adjusted to Exclude Area of Localized Lead Contamination
- G-10.1.3 Lead Risk Assessment Results Using LeadSpread, Residents, Site 28 Surface Soil (0-2 ft bgs), Area of Localized Lead Contamination
- G-10.1.4 Lead Risk Assessment Results Using LeadSpread, Residents, Site 28, Surface Soil (0-6 inches bgs)

Calculation of Occupational and Construction Worker PRGs

- G-11.1 Calculations of Preliminary Remediation Goals for the Occupational Worker
- G-11.2 Calculations of Preliminary Remediation Goals for the Construction Worker

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-1: EPA RAGS PART D TABLE 1, SELECTION OF EXPOSURE PATHWAYS

Construction Workers, Residents, and Commercial/Industrial Workers^a

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway	
Current	Surface Soil (0 to 2 feet bgs)	Soil	Surface Soil	Resident	Adult	Ingestion	None	There are no current residential receptors at Sites 8, 28, and 29.	
						Dermal Absorption	None	There are no current residential receptors at Sites 8, 28, and 29.	
					Child	Ingestion	None	There are no current residential receptors at Sites 8, 28, and 29.	
						Dermal Absorption	None	There are no current residential receptors at Sites 8, 28, and 29.	
				Commercial/Industrial Worker	Adult	Ingestion	None	There are no current commercial/industrial worker receptors at Sites 8, 28, and 29.	
						Dermal Absorption	None	There are no current commercial/industrial worker receptors at Sites 8, 28, and 29.	
		Construction Worker		Adult	Ingestion	Quant.	Workers supporting the Bay Bridge work and maintenance of the on- and off-ramps are current receptors at Sites 8, 28, and 29. The Construction Worker receptor encompasses the periodic maintenance workers, utility workers, and other CalTrans workers who may be on site.		
					Dermal Absorption	Quant.	Workers supporting the Bay Bridge work and maintenance of the on- and off-ramps are current receptors at Sites 8, 28, and 29. The Construction Worker receptor encompasses the periodic maintenance workers, utility workers, and other CalTrans workers who may be on site.		
		Particulates/Vapors		Respirable Particulates Suspended from Surface Soil and VOCs in Outdoor Air	Resident	Adult	Inhalation	None	There are no current residential receptors at Sites 8, 28, and 29.
						Child	Inhalation	None	There are no current residential receptors at Sites 8, 28, and 29.
					Commercial/Industrial Worker	Adult	Inhalation	None	There are no current commercial/industrial worker receptors at Sites 8, 28, and 29.
					Construction Worker	Adult	Inhalation	Quant.	Workers supporting the Bay Bridge work and maintenance of the on- and off-ramps are current receptors at Sites 8, 28, and 29. The Construction Worker receptor encompasses the periodic maintenance workers, utility workers, and other CalTrans workers who may be on site.
Future	Surface Soil (0 to 2 feet bgs)	Soil	Surface Soil	Resident	Adult	Ingestion	Quant.	Under a redevelopment scenario with minimal surface regrading, this exposure pathway would be complete	
						Dermal Absorption	Quant.	Under a redevelopment scenario with minimal surface regrading, this exposure pathway would be complete	
					Child	Ingestion	Quant.	Under a redevelopment scenario with minimal surface regrading, this exposure pathway would be complete	
						Dermal Absorption	Quant.	Under a redevelopment scenario with minimal surface regrading, this exposure pathway would be complete	
				Commercial/Industrial Worker	Adult	Ingestion	Quant.	Under a redevelopment scenario with minimal surface regrading, this exposure pathway would be complete	
						Dermal Absorption	Quant.	Under a redevelopment scenario with minimal surface regrading, this exposure pathway would be complete	
				Construction Worker	Adult	Ingestion	Quant.	Under a redevelopment scenario with minimal surface regrading, this exposure pathway would be complete. This pathway is addressed with the current construction worker scenario.	
						Dermal Absorption	Quant.	Under a redevelopment scenario with minimal surface regrading, this exposure pathway would be complete. This pathway is addressed with the current construction worker scenario.	

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-1: EPA RAGS PART D TABLE 1, SELECTION OF EXPOSURE PATHWAYS (Continued)

Construction Workers, Residents, and Commercial/Industrial Workers ^a

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway	
Future (continued)	Surface Soil (0 to 2 feet bgs) (continued)	Particulates/Vapors	Respirable Particulates Suspended from Surface Soil and VOCs in Outdoor Air	Resident	Adult	Inhalation	Quant.	Under a redevelopment scenario with minimal surface regrading, this exposure pathway would be complete.	
					Child	Inhalation	Quant.	Under a redevelopment scenario with minimal surface regrading, this exposure pathway would be complete	
				Commercial/Industrial Worker	Adult	Inhalation	Quant.	Under a redevelopment scenario with minimal surface regrading, this exposure pathway would be complete	
				Construction Worker	Adult	Inhalation	Quant.	Under a redevelopment scenario with minimal surface regrading, this exposure pathway would be complete. This pathway is addressed with the current construction worker scenario.	
Future	Subsurface Soil (0 to 10 feet bgs)	Soil	Combined Surface and Subsurface Soil	Resident	Adult	Ingestion	Quant.	Under a redevelopment scenario with significant surface regrading, this exposure pathway would be complete (Sites 8 and 29 only)	
						Dermal Absorption	Quant.	Under a redevelopment scenario with significant surface regrading, this exposure pathway would be complete (Sites 8 and 29 only)	
					Child	Ingestion	Quant.	Under a redevelopment scenario with significant surface regrading, this exposure pathway would be complete (Sites 8 and 29 only)	
						Dermal Absorption	Quant.	Under a redevelopment scenario with significant surface regrading, this exposure pathway would be complete (Sites 8 and 29 only)	
				Commercial/Industrial Worker	Adult	Ingestion	Quant.	Under a redevelopment scenario with significant surface regrading, this exposure pathway would be complete (Sites 8 and 29 only)	
						Dermal Absorption	Quant.	Under a redevelopment scenario with significant surface regrading, this exposure pathway would be complete (Sites 8 and 29 only)	
				Construction Worker	Adult	Ingestion	Quant.	Under a redevelopment scenario with significant surface regrading, this exposure pathway would be complete (Sites 8 and 29 only)	
						Dermal Absorption	Quant.	Under a redevelopment scenario with significant surface regrading, this exposure pathway would be complete (Sites 8 and 29 only)	
				Homegrown Produce	Resident	Adult	Ingestion	None	The topography as Sites 8, 28, and 29 and its proximity to Bay Bridge structures would prevent home gardens using native soil
						Child	Ingestion	None	The topography as Sites 8, 28, and 29 and its proximity to Bay Bridge structures would prevent home gardens using native soil
		Particulates and Vapors	Respirable Particulates Suspended from Surface Soil and VOCs in Outdoor Air	Resident	Adult	Inhalation	Quant.	Under a redevelopment scenario with significant surface regrading, this exposure pathway would be complete (Sites 8 and 29 only)	
					Child	Inhalation	Quant.	Under a redevelopment scenario with significant surface regrading, this exposure pathway would be complete (Sites 8 and 29 only)	
				Commercial/Industrial Worker	Adult	Inhalation	Quant.	Under a redevelopment scenario with significant surface regrading, this exposure pathway would be complete (Sites 8 and 29 only)	
				Construction Worker	Adult	Inhalation	Quant.	Under a redevelopment scenario with significant surface regrading, this exposure pathway would be complete (Sites 8 and 29 only)	
Future	Subsurface Soil (0 bgs to ground water)	Vapors	Vapors from Subsurface Soil to Indoor Air Via Vapor Intrusion	Resident	Adult	Inhalation	Quant.	The Treasure Island Reuse Plan allows for commercial and residential buildings at Sites 8 and 29. Volatile compounds in soils down to groundwater may migrate into indoor air making this pathway complete	

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-1: EPA RAGS PART D TABLE 1, SELECTION OF EXPOSURE PATHWAYS (Continued)

Construction Workers, Residents, and Commercial/Industrial Workers^a

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future (continued)	Subsurface Soil (0 bgs to ground water) (continued)	Vapors (continued)	Vapors from Subsurface Soil to Indoor Air Via Vapor Intrusion (continued)	Resident (continued)	Child	Inhalation	Quant.	The Treasure Island Reuse Plan allows for commercial and residential buildings at Sites 8 and 29. Volatile compounds in soils down to groundwater may migrate into indoor air making this pathway complete.
				Commercial/Industrial Worker	Adult	Inhalation	Quant.	The Treasure Island Reuse Plan allows for commercial and residential buildings at Sites 8 and 29. Volatile compounds in soils down to groundwater may migrate into indoor air making this pathway complete.
				Construction Worker	Adult	Inhalation	None	Construction Workers are considered only outdoor receptors.
Future	Groundwater	Groundwater	Tap Water from Shallow Groundwater	Resident	Adult	Ingestion	None	Groundwater at YBI does not meet requirements as a potable water source. This pathway is considered incomplete.
						Dermal Absorption During Bathing or Showering	None	Groundwater at YBI does not meet requirements as a potable water source. This pathway is considered incomplete.
					Child	Ingestion	None	Groundwater at YBI does not meet requirements as a potable water source. This pathway is considered incomplete.
				Commercial/Industrial Worker	Adult	Dermal Absorption During Bathing or Showering	None	Groundwater at YBI does not meet requirements as a potable water source. This pathway is considered incomplete.
						Ingestion	None	Use of groundwater for industrial purposes does not likely occur, and is not likely to occur in the future.
					Dermal Absorption	None	Use of groundwater for industrial purposes does not likely occur, and is not likely to occur in the future.	

Notes:

a Exposures to a construction worker are considered protective of exposures to a utility/maintenance worker.

Definitions:

- bgs Below ground surface
- COPC Chemical of potential concern
- EPA U.S. Environmental Protection Agency
- HHRA Human health risk assessment
- None Risks contributed by this pathway not quantitatively evaluated in the human health risk assessment
- Quant. Quantitative. Exposure route quantitatively evaluated in this HHRA.
- VOC Volatile organic compound
- YBI Yerba Buena Island

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-2.1.1: EPA RAGS PART D TABLE 2, OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Method 1, Site 28 Surface Soil (0-2 ft bgs)

Revised Remedial Investigation Report for Installation Restoration Site 28, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Medium:	Soil
Exposure Medium:	Surface Soil (0-2 feet bgs)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detected	Total	Detection Frequency (Percent)	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (nc/ca) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Surface Soil	7429-90-5	Aluminum	4.84E+03 J	7.79E+03	mg/kg	28-SB013	23	23	100	1.40E+00 - 3.60E+00	7.79E+03	--	7.6E+04 nc	--	--	N	BBL, BSL
	7440-36-0	Antimony	6.50E-01 J	1.10E+00 J	mg/kg	28-SB007	13	23	57	4.30E-01 - 6.30E-01	1.10E+00	--	3.1E+01 nc	--	--	N	BSL
	7440-38-2	Arsenic	2.50E+00	3.50E+00	mg/kg	28-SB004	16	23	70	5.70E-01 - 6.20E-01	3.50E+00	--	3.9E-01 ca*	--	--	N	BBL
	7440-39-3	Barium	4.41E+01	9.85E+01	mg/kg	28-SB014	23	23	100	6.00E-02 - 8.00E-02	9.85E+01	--	5.4E+03 nc	--	--	N	BBL, BSL
	7440-70-2	Calcium	1.63E+03 J	6.92E+03 J	mg/kg	28-SB005	16	23	70	-- - --	6.92E+03	--	--	--	--	N	NUT ^a
	7440-47-3	Chromium ^b	2.92E+01 J	5.95E+01 J	mg/kg	28-SB005	23	23	100	-- - --	5.95E+01	--	2.1E+02 ca	--	--	N	BBL, BSL
	7440-48-4	Cobalt	6.40E+00 J	1.43E+01 J	mg/kg	28-SB008	23	23	100	1.00E-01 - 1.10E-01	1.43E+01	--	9.0E+02 ca**	--	--	N	BBL, BSL
	7440-50-8	Copper	3.90E+00 J	2.83E+01	mg/kg	28-SB013	20	23	87	1.60E-01 - 1.80E-01	2.83E+01	--	3.1E+03 nc	--	--	N	BBL, BSL
	7439-89-6	Iron	9.33E+03 J	1.43E+04	mg/kg	28-SB013	23	23	100	2.80E+00 - 3.50E+00	1.43E+04	--	2.3E+04 nc	--	--	N	BBL, BSL
	7439-92-1	Lead	3.40E+00	1.12E+03	mg/kg	28-SB005	21	23	91	2.40E-01 - 3.30E-01	1.12E+03	--	4.0E+02 nc	--	--	Y	ABL, ASL
	7439-95-4	Magnesium	2.45E+03 J	4.25E+03	mg/kg	28-SB013	23	23	100	-- - --	4.25E+03	--	--	--	--	N	NUT ^a
	7439-96-5	Manganese	1.10E+02 J	2.80E+02 J	mg/kg	28-SB007	23	23	100	6.00E-02 - 1.30E-01	2.80E+02	--	1.8E+03 nc	--	--	N	BBL, BSL
	7439-97-6	Mercury	5.00E-02 J	2.70E-01 J	mg/kg	28-SB005	18	23	78	2.00E-02 - 5.00E-02	2.70E-01	--	2.3E+01 nc	--	--	N	BBL, BSL
	7440-02-0	Nickel	2.75E+01	5.08E+01	mg/kg	28-SB009	23	23	100	2.60E-01 - 7.40E-01	5.08E+01	--	1.6E+03 nc	--	--	N	BBL, BSL
	7440-09-7	Potassium	4.34E+02 J	1.35E+03 J	mg/kg	28-SB001	23	23	100	-- - --	1.35E+03	--	--	--	--	N	NUT ^a
	7440-28-0	Thallium	5.80E-01 J	1.90E+00	mg/kg	28-SB005	5	23	22	3.80E-01 - 4.50E-01	1.90E+00	--	5.2E+00 nc	--	--	N	BSL
	7440-62-2	Vanadium	2.00E+01 J	2.94E+01 J	mg/kg	28-SB006	23	23	100	1.20E-01 - 1.70E-01	2.94E+01	--	7.8E+01 nc	--	--	N	BBL, BSL
	7440-66-6	Zinc	2.29E+01	1.38E+03	mg/kg	28-SB005	23	23	100	6.00E-02 - 2.50E-01	1.38E+03	--	2.3E+04 nc	--	--	N	BBL, BSL

Notes:

- (1) Minimum/maximum detected concentration
- (2) Maximum detected concentration used as screening value
- (3) Site soil concentrations were compared to background levels following Navy guidance (Navy, 1998, 1999, 2002, 2004). Two-population statistical tests were used to compare site soil concentrations of inorganic chemicals to background concentrations determined for Yerba Buena Island soil. Refer to Appendix F for more information on the background analysis.
- (4) EPA Region IX Preliminary Remediation Goals (PRGs) for residential soil (EPA 2004e).
- (5) Rationale Codes.
 Selection Reason: Concentration for screening above risk-based screening level (ASL)
 Deletion Reason: Site concentrations are below or within background levels (BBL)
 Concentration for screening below risk-based screening level (BSL)
 Essential Nutrient (NUT)

Definitions:

- ARAR/TBC = Applicable or relevant and appropriate requirement/to be considered
- ca = Cancer PRG
- ca* = Cancer PRG, but noncancer PRG is < 100X cancer PRG
- ca** = Cancer PRG, but noncancer PRG is < 10X cancer PRG
- CAS = Chemical Abstracts Service
- COPC = Chemical of Potential Concern
- EPA = U.S. Environmental Protection Agency
- ft bgs = feet below ground surface
- J = Estimated Value
- mg/kg = Milligrams per kilogram
- nc = Non-cancer PRG
- PRG = Preliminary Remediation Goal
- RAGS = Risk Assessment Guidance for Superfund
- = Not available

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-2.1.1: EPA RAGS PART D TABLE 2, OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN (Continued)

Method 1, Site 28 Surface Soil (0-2 ft bgs)

Revised Remedial Investigation Report for Installation Restoration Site 28, Naval Station Treasure Island, San Francisco, California

Notes (continued):

- a Essential nutrients not present at concentrations associated with adverse health effects. Assuming a child daily intake of 200 milligrams of soil and using the maxima, daily intakes of up to 1.4 mg calcium, 0.9 mg magnesium, and 0.3 mg potassium would be contributed to the diet from site-related essential nutrient consumption during incidental soil ingestion. These contributions fall below the FDA Reference Daily Intake values or Daily Values of 1000 mg/day (calcium), 400 mg/day (magnesium), and 3500 mg/day (potassium) (FDA 2004).
- b Hexavalent chromium was not analyzed for at Site 28. As a result, the results for chromium are assumed to be "total chromium", 1:6 ratio of Cr VI:Cr III (EPA 2004e)

References:

U.S. Department of the Navy (Navy). 1998. "Procedural Guidance for Statistically Analyzing Environmental Background Data." Naval Facilities Engineering Command, Southwest Division (SWDIV) and Engineering Field Activity West (EFA West). September.

Navy. 1999. "Handbook for Statistical Analysis of Environmental Background Data." SWDIV and EFA West. April.

Navy. 2001. "Guidance for Conducting Human Health Risk Assessments: Dioxin." Pioneer Technologies Corporation. December.

Navy. 2002. "Guidance for Environmental Background Analysis. Volume I: Soil, NFESC User's Guide." UG-2049-ENV, NAVFAC, Washington, D.C. April.

Navy. 2004. "Navy Policy on the Use of Background Chemical Levels." 5090 Ser N4543C/N4U732212. From: Chief of Naval Operations. To: Commander, Naval Facilities Engineering Command. January 30.

U.S. Environmental Protection Agency (EPA). 2004e. "EPA Region IX Preliminary Remediation Goals (PRG) 2004." December. Online Address: <http://www.epa.gov/region09/waste/sfund/prg/index.htm>.

U.S. Food and Drug Administration (FDA). 2004. "Nutrition Labeling of Food." Title 21 of the Code of Federal Regulations, Chapter I, Part 101.9. Online Address: http://a257.g.akamaitech.net/7/257/2422/12feb20041500/edocket.access.gpo.gov/cfr_2004/aprqr/pdf/21cfr101.9.pdf

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-2.1.2: EPA RAGS PART D TABLE 2, OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Method 2, Site 28 Surface Soil (0-2 ft bgs)

Revised Remedial Investigation Report for Installation Restoration Site 28, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Medium:	Soil
Exposure Medium:	Surface Soil (0-2 feet bgs)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detected	Total	Detection Frequency (Percent)	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (nc/ca) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Surface Soil	7429-90-8	Aluminum	4.84E+03	7.79E+03	mg/kg	28-SB013	23	23	100	1.40E+00 - 3.60E+00	7.79E+03	--	NA	--	--	N	BBL
	7440-36-0	Antimony	6.50E-01	1.10E+00	mg/kg	28-SB007	13	23	57	4.30E-01 - 6.30E-01	1.10E+00	--	NA	--	--	Y	NBL
	7440-38-2	Arsenic	2.50E+00	3.50E+00	mg/kg	28-SB004	16	23	70	5.70E-01 - 6.20E-01	3.50E+00	--	NA	--	--	N	BBL
	7440-39-3	Barium	4.41E+01	9.85E+01	mg/kg	28-SB014	23	23	100	6.00E-02 - 8.00E-02	9.85E+01	--	NA	--	--	N	BBL
	7440-70-2	Calcium	1.63E+03	6.92E+03	mg/kg	28-SB005	16	23	70	-- - --	6.92E+03	--	NA	--	--	N	NUT ^a
	7440-47-3	Chromium	2.92E+01	5.95E+01	mg/kg	28-SB005	23	23	100	-- - --	5.95E+01	--	NA	--	--	N	BBL
	7440-48-4	Cobalt	6.40E+00	1.43E+01	mg/kg	28-SB008	23	23	100	1.00E-01 - 1.10E-01	1.43E+01	--	NA	--	--	N	BBL
	7440-50-8	Copper	3.90E+00	2.83E+01	mg/kg	28-SB013	20	23	87	1.60E-01 - 1.80E-01	2.83E+01	--	NA	--	--	N	BBL
	7439-89-6	Iron	9.33E+03	1.43E+04	mg/kg	28-SB013	23	23	100	2.80E+00 - 3.50E+00	1.43E+04	--	NA	--	--	N	BBL
	7439-92-1	Lead	3.40E+00	1.12E+03	mg/kg	28-SB005	21	23	91	2.40E-01 - 3.30E-01	1.12E+03	--	NA	--	--	Y	ABL
	7439-95-4	Magnesium	2.45E+03	4.25E+03	mg/kg	28-SB013	23	23	100	-- - --	4.25E+03	--	NA	--	--	N	NUT ^a
	7439-96-5	Manganese	1.10E+02	2.80E+02	mg/kg	28-SB007	23	23	100	6.00E-02 - 1.30E-01	2.80E+02	--	NA	--	--	N	BBL
	7439-97-6	Mercury	5.00E-02	2.70E-01	mg/kg	28-SB005	18	23	78	2.00E-02 - 5.00E-02	2.70E-01	--	NA	--	--	N	BBL
	7440-02-0	Nickel	2.75E+01	5.08E+01	mg/kg	28-SB009	23	23	100	2.60E-01 - 7.40E-01	5.08E+01	--	NA	--	--	N	BBL
	7440-09-7	Potassium	4.34E+02	1.35E+03	mg/kg	28-SB001	23	23	100	-- - --	1.35E+03	--	NA	--	--	N	NUT ^a
	7440-28-0	Thallium	5.80E-01	1.90E+00	mg/kg	28-SB005	5	23	22	3.80E-01 - 4.50E-01	1.90E+00	--	NA	--	--	Y	ABL
	7440-62-2	Vanadium	2.00E+01	2.94E+01	mg/kg	28-SB006	23	23	100	1.20E-01 - 1.70E-01	2.94E+01	--	NA	--	--	N	BBL
	7440-66-4	Zinc	2.29E+01	1.38E+03	mg/kg	28-SB005	23	23	100	6.00E-02 - 2.50E-01	1.38E+03	--	NA	--	--	N	BBL

Notes:

- (1) Minimum/maximum detected concentration
- (2) Maximum detected concentration used as screening value
- (3) Site soil concentrations were compared to background levels following Navy guidance (Navy, 1998, 1999, 2002, 2004). Two-population statistical tests were used to compare site soil concentrations of inorganic chemicals to background concentrations determined for Yerba Buena Island soil. Refer to Appendix F for more information on the background analysis.
- (4) Not Applicable. COPC selection independent of toxicity screening for Method 2 risk evaluation
- (5) Rationale Codes.
 Selection Reason: Site concentrations are above background levels (ABL)
 No background levels available for comparison (NBL)
 Deletion Reason: Site concentrations are below background levels (BBL)
 Essential Nutrient (NUT)

Definitions:

- ARAR/TBC = Applicable or relevant and appropriate requirement/to be considered
- CAS = Chemical Abstracts Service
- COPC = Chemical of Potential Concern
- EPA = U.S. Environmental Protection Agency
- ft bgs = feet below ground surface
- HHRA = Human Health Risk Assessment
- J = Estimated Value
- mg/kg = Milligrams per kilogram
- NA = Not applicable
- RAGS = Risk Assessment Guidance for Superfund
- = Not available

a Essential nutrients not present at concentrations associated with adverse health effects. Assuming a child daily intake of 200 milligrams of soil and using the maxima, daily intakes of up to 1.4 mg calcium, 0.9 mg magnesium, and 0.3 mg potassium would be contributed to the diet from site-related essential nutrient consumption during incidental soil ingestion. These contributions fall below the FDA Reference Daily Intake values or Daily Values of 1000 mg/day (calcium), 400 mg/day (magnesium), and 3500 mg/day (potassium) (FDA 2004)

References:

U.S. Department of the Navy (Navy). 1998. "Procedural Guidance for Statistically Analyzing Environmental Background Data." Naval Facilities Engineering Command, Southwest Division (SWDIV) and Engineering Field Activity West (EFA West). September.

Navy. 1999. "Handbook for Statistical Analysis of Environmental Background Data." SWDIV and EFA West. April.

Navy. 2001. "Guidance for Conducting Human Health Risk Assessments: Dioxin." Pioneer Technologies Corporation. December.

Navy. 2002. "Guidance for Environmental Background Analysis. Volume I: Soil, NFESC User's Guide." UG-2049-ENV, NAVFAC, Washington, D.C. April.

Navy. 2004. "Navy Policy on the Use of Background Chemical Levels." 5090 Ser N4543C/N4U732212. From: Chief of Naval Operations. To: Commander, Naval Facilities Engineering Command. January 30

U.S. Food and Drug Administration (FDA). 2004. "Nutrition Labeling of Food." Title 21 of the Code of Federal Regulations, Chapter I, Part 101.9. Online Address: http://a257.g.akamaitech.net/7/257/2422/12feb20041500/edocket.access.gpo.gov/cfr_2004/aprqr/pdf/21cfr101.9.pdf

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-3.1.2: EPA RAGS PART D TABLE 3, EXPOSURE POINT CONCENTRATION SUMMARY
Method 1, Site 28 Surface Soil (0-2 ft bgs)

Revised Remedial Investigation Report for Installation Restoration Site 28, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Medium:	Soil
Exposure Medium:	Surface Soil (0-2 ft bgs)

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution) ^a	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic ^b	Rationale ^c
Surface Soil	Lead	mg/kg	2.62E+02	8.30E+02 L	1.12E+03	8.30E+02	mg/kg	(8)	(3)

Notes:

See Appendix F for a detailed description of the statistical methods used.

- DF Detection frequency
ft bgs Feet below ground surface
J Estimated value
MAX Maximum detected concentration
mg/kg Milligrams per kilogram
MVUE Minimum variance unbiased estimator
n Sample size
UCL One-sided upper confidence limit of the mean. Following EPA (2004), this can be either a 95, 97.5, or 99 percent UCL.
> Greater than
≥ Greater than or equal to
a Distribution Codes: G= gamma, L= lognormal, N= normal, NP= nonparametric
b Statistic codes: (1) Student's t (UCL95), (2) approximate gamma (UCL95), (3) adjusted gamma (UCL95), (4) Land's H-statistic (UCL95), (5) nonparametric Chebyshev (UCL95), (6) nonparametric Chebyshev (UCL97.5), (7) nonparametric Chebyshev (UCL99), (8) MVUE Chebyshev (UCL95), (9) MVUE Chebyshev (UCL97.5), (10) MVUE Chebyshev (UCL99), (11) Hall's bootstrap, (12) bootstrap t, (13) MAX
c Rationale codes: (1) n<3, MAX used as default; (2) estimated UCL > MAX, MAX used as default; (3) DF ≥ 85 percent, distribution-dependent equations used to calculate a UCL following EPA (2004); (4) DF < 85 percent, "bounding" approach used to calculate a UCL following EPA (2002b)

References:

- U.S. Environmental Protection Agency (EPA). 2002b. "Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites." OSWER 9285.6-10. Office of Emergency and Remedial Response (OERR). Washington, DC. December.
EPA. 2004. "ProUCL Version 3.0 User Guide." Prepared by Singh, A., Singh, A.K., and R.W. Maichle. Technical Support Center. Las Vegas, Nevada. April.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-3.1.3: EPA RAGS PART D TABLE 3, EXPOSURE POINT CONCENTRATION SUMMARY
Method 2, Site 28 Surface Soil (0-2 ft bgs)

Revised Remedial Investigation Report for Installation Restoration Site 28, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Medium:	Soil
Exposure Medium:	Surface Soil (0-2 ft bgs)

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution) ^a		Maximum Concentration (Qualifier)	Exposure Point Concentration			
							Value	Units	Statistic ^b	Rationale ^c
Surface Soil	Antimony	mg/kg	5.63E-01	6.94E-01	N	1.10E+00 J	6.94E-01	mg/kg	(1)	(4)
	Lead	mg/kg	2.62E+02	8.30E+02	L	1.12E+03	8.30E+02	mg/kg	(8)	(3)
	Thallium	mg/kg	4.06E-01	8.88E-01	NP	1.90E+00	8.88E-01	mg/kg	(5)	(4)

Notes:

See Appendix F for a detailed description of the statistical methods used.

- DF Detection frequency
ft bgs Feet below ground surface
J Estimated value
MAX Maximum detected concentration
mg/kg Milligrams per kilogram
MVUE Minimum variance unbiased estimator
n Sample size
UCL One-sided upper confidence limit of the mean. Following EPA (2004), this can be either a 95, 97.5, or 99 percent UCL.
> Greater than
≥ Greater than or equal to
a Distribution Codes: G= gamma, L= lognormal, N= normal, NP= nonparametric
b Statistic codes: (1) Student's t (UCL95), (2) approximate gamma (UCL95), (3) adjusted gamma (UCL95), (4) Land's H-statistic (UCL95), (5) nonparametric Chebyshev (UCL95), (6) nonparametric Chebyshev (UCL97.5), (7) nonparametric Chebyshev (UCL99), (8) MVUE Chebyshev (UCL95), (9) MVUE Chebyshev (UCL97.5), (10) MVUE Chebyshev (UCL99), (11) Hall's bootstrap, (12) bootstrap t, (13) MAX
c Rationale codes: (1) n<3, MAX used as default; (2) estimated UCL > MAX, MAX used as default; (3) DF ≥ 85 percent, distribution-dependent equations used to calculate a UCL following EPA (2004); (4) DF < 85 percent, "bounding" approach used to calculate a UCL following EPA (2002)

References:

- U.S. Environmental Protection Agency (EPA). 2002bb. "Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites." OSWER 9285.6-10. Office of Emergency and Remedial Response (OERR). Washington, DC. December.
EPA. 2004. "ProUCL Version 3.0 User Guide." Prepared by Singh, A., Singh, A.K., and R.W. Maichle. Technical Support Center. Las Vegas, Nevada. April.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

**TABLE G-4.1: EPA RAGS PART D TABLE 4, VALUES USED FOR DAILY INTAKE, RME SOIL EXPOSURES
Commercial/Industrial Workers, Construction Workers, and Residents**

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:
Medium: Soil
Exposure Medium: Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)
Incidental Ingestion of Outdoor Soil	Commercial/ Industrial Worker	Adult	Sites 8, 28, and 29	C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale. EPA 2001a; EPA 2004e Professional judgment EPA 1991a; DTSC 1992 EPA 1991a; DTSC 1992 Not applicable EPA 1991a; DTSC 1992 EPA 1989 EPA 1989	Intake (mg/kg-day) = (C _S x FI x I _S x EF x ED x MCF) / (BW x AT)
				I _S	Ingestion Rate - Soil	100	mg/day		
				FI	Fraction Ingested	1	unitless		
				EF	Exposure Frequency	250	days/year		
				ED	Exposure Duration	25	years		
				MCF	Mass Conversion Factor	1E-06	kg/mg		
				BW	Body Weight	70	kg		
				AT _C	Averaging Time - Cancer	25,550	days		
				AT _{NC}	Averaging Time - Noncancer	9,125	days		
	Construction Worker	Adult	Sites 8, 28, and 29	C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale. EPA 2001a Professional judgment EPA 1991a DTSC 2000 Not applicable EPA 1991a; DTSC 1992 EPA 1989 EPA 1989	Intake (mg/kg-day) = (C _S x FI x I _S x EF x ED x MCF) / (BW x AT)
				I _S	Ingestion Rate - Soil	330	mg/day		
				FI	Fraction Ingested	1	unitless		
				EF	Exposure Frequency	250	days/year		
				ED	Exposure Duration	1	years		
				MCF	Mass Conversion Factor	1E-06	kg/mg		
				BW	Body Weight	70	kg		
				AT _C	Averaging Time - Cancer	25,550	days		
				AT _{NC}	Averaging Time - Noncancer	365	days		
	Resident	Adult	Sites 8, 28, and 29	C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale. EPA 1991a Professional judgment EPA 1991a; DTSC 1992 EPA 1991a; DTSC 1992 Not applicable EPA 1991a; DTSC 1992 EPA 1989 EPA 1989	Intake (mg/kg-day) = (C _S x FI x I _S x EF x ED x MCF) / (BW x AT)
				I _S	Ingestion Rate - Soil	100	mg/day		
				FI	Fraction Ingested	1	unitless		
				EF	Exposure Frequency	350	days/year		
				ED	Exposure Duration	24	years		
				MCF	Mass Conversion Factor	1E-06	kg/mg		
				BW	Body Weight	70	kg		
				AT _C	Averaging Time - Cancer	25,550	days		
				AT _{NC}	Averaging Time - Noncancer	8,760	days		
Child		Child	Sites 8, 28, and 29	C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale.	Intake (mg/kg-day) = (C _S x FI x I _S x EF x ED x MCF) / (BW x AT)

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-4.1: EPA RAGS PART D TABLE 4, VALUES USED FOR DAILY INTAKE, RME SOIL EXPOSURES (Continued)
Commercial/Industrial Workers, Construction Workers, and Residents

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:
Medium: Soil
Exposure Medium: Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)	
Incidental Ingestion of Outdoor Soil (continued)	Resident (continued)	Child (continued)	Sites 8, 28, and 29 (continued)	I _S	Ingestion Rate - Soil	200	mg/day	EPA 1991a		
				FI	Fraction Ingested	1	unitless	Professional judgment		
				EF	Exposure Frequency	350	days/year	EPA 1991a; DTSC 1992		
				ED	Exposure Duration	6	years	EPA 1991a; DTSC 1992		
				MCF	Mass Conversion Factor	1E-06	kg/mg	Not applicable		
				BW	Body Weight	15	kg	EPA 1991a; DTSC 1992		
				AT _C	Averaging Time - Cancer	25,550	days	EPA 1989		
				AT _{NC}	Averaging Time - Noncancer	2,190	days	EPA 1989		
Dermal Contact with Outdoor Soil	Commercial/ Industrial Worker	Adult	Sites 8, 28, and 29	C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale. EPA 2004c	Intake (mg/kg-day) = (C _S x ABS x SA x AF x EF x ED x MCF) / (BW x AT)	
				ABS	Dermal Absorption Factor	Chemical-specific	unitless			
				SA	Exposed Skin Surface Area	5,700	cm ²	DTSC 2000; EPA 2004c		
				AF	Soil-to-Skin Adherence Factor	0.2	mg/cm ²	DTSC 2000; EPA 2004c		
				EF	Exposure Frequency	250	days/year	EPA 1991a; DTSC 1992		
				ED	Exposure Duration	25	years	EPA 1991a; DTSC 1992		
				MCF	Mass Conversion Factor	1E-06	kg/mg	Not applicable		
				BW	Body Weight	70	kg	EPA 1991a; DTSC 1992		
	AT _C	Averaging Time - Cancer	25,550	days	EPA 1989					
	AT _{NC}	Averaging Time - Noncancer	9,125	days	EPA 1989					
	Construction Worker	Adult	Sites 8, 28, and 29		C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale. EPA 2004c	Intake (mg/kg-day) = (C _S x ABS x SA x AF x EF x ED x MCF) / (BW x AT)
					ABS	Dermal Absorption Factor	Chemical-specific	unitless		
					SA	Exposed Skin Surface Area	5,700	cm ²	DTSC 2000; EPA 2004c	
					AF	Soil-to-Skin Adherence Factor	0.8	mg/cm ²	DTSC 2000	
					EF	Exposure Frequency	250	days/year	EPA 1991a	
					ED	Exposure Duration	1	years	DTSC 2000	
MCF					Mass Conversion Factor	1E-06	kg/mg	Not applicable		
BW					Body Weight	70	kg	EPA 1991a; DTSC 1992		
AT _C	Averaging Time - Cancer	25,550	days	EPA 1989						
AT _{NC}	Averaging Time - Noncancer	365	days	EPA 1989						

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-4.1: EPA RAGS PART D TABLE 4, VALUES USED FOR DAILY INTAKE, RME SOIL EXPOSURES (Continued)
Commercial/Industrial Workers, Construction Workers, and Residents

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:
Medium: Soil
Exposure Medium: Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)		
Dermal Contact with Outdoor Soil (continued)	Resident	Adult	Sites 8, 28, and 29	C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale. EPA 2004c	Intake (mg/kg-day) = (C _S x ABS x SA x AF x EF x ED x MCF) / (BW x AT)		
				ABS	Dermal Absorption Factor	Chemical-specific	unitless	EPA 2004c			
				SA	Exposed Skin Surface Area	5,700	cm ²	DTSC 2000; EPA 2004c			
				AF	Soil-to-Skin Adherence Factor	0.07	mg/cm ²	DTSC 2000; EPA 2004c			
				EF	Exposure Frequency	350	days/year	EPA 1991a; DTSC 1992			
				ED	Exposure Duration	24	years	EPA 1991a; DTSC 1992			
				MCF	Mass Conversion Factor	1E-06	kg/mg	Not applicable			
		BW		Body Weight	70	kg	EPA 1991a; DTSC 1992				
		AT _C		Averaging Time - Cancer	25,550	days	EPA 1989				
		AT _{NC}		Averaging Time - Noncancer	8,760	days	EPA 1989				
		Child		Sites 8, 28, and 29	C _S	Chemical Concentration in Soil	EPC	mg/kg		RAGS Part D Table 3 series for each risk estimate will document the rationale. EPA 2004c	Intake (mg/kg-day) = (C _S x ABS x SA x AF x EF x ED x MCF) / (BW x AT)
					ABS	Dermal Absorption Factor	Chemical-specific	unitless		EPA 2004c	
					SA	Exposed Skin Surface Area	2,900	cm ²		DTSC 2000	
					AF	Soil-to-Skin Adherence Factor	0.2	mg/cm ²		DTSC 2000; EPA 2004c	
EF	Exposure Frequency		350		days/year	EPA 1991a; DTSC 1992					
ED	Exposure Duration		6		years	EPA 1991a; DTSC 1992					
MCF	Mass Conversion Factor		1E-06		kg/mg	Not applicable					
BW	Body Weight	15	kg	EPA 1991a; DTSC 1992							
AT _C	Averaging Time - Cancer	25,550	days	EPA 1989							
AT _{NC}	Averaging Time - Noncancer	2,190	days	EPA 1989							
Inhalation of Particulates/Vapors Originating from Soil (in Outdoor Air)	Commercial/ Industrial Worker	Adult	Sites 8, 28, and 29	C _A	Chemical Concentration in Air	Chemical-specific	mg/m ³	Calculated from CS	Intake (mg/kg-day) = (C _A x InhR x ET x EF x ED) / (BW x AT) where CA = CS / PEF for particulates, and CA = CS / VF for volatiles PEF = 1.32E+09 m ³ /kg (EPA 2004e) VF = Chemical-specific volatilization factor (EPA 2004e)		
				C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale.			
				InhR	Inhalation Rate	1.7	m ³ /hour	DTSC 2005d			
				ET	Exposure Time	8	hours/day	EPA 1991a			
				EF	Exposure Frequency	250	days/year	EPA 1991a; DTSC 1992			
				ED	Exposure Duration	25	years	EPA 1991a; DTSC 1992			
				BW	Body Weight	70	kg	EPA 1991a; DTSC 1992			

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-4.1: EPA RAGS PART D TABLE 4, VALUES USED FOR DAILY INTAKE, RME SOIL EXPOSURES (Continued)
Commercial/Industrial Workers, Construction Workers, and Residents

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:
Medium: Soil
Exposure Medium: Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)
Inhalation of Particulates/Vapors Originating from Soil (in Outdoor Air) (continued)	Commercial/ Industrial Worker (continued)	Adult (continued)	Sites 8, 28, and 29 (continued)	AT _C	Averaging Time - Cancer	25,550	days	EPA 1989	Intake (mg/kg-day) = (C _A x InhR x ET x EF x ED) / (BW x AT) where CA = CS / PEF for particulates, and CA = CS / VF for volatiles PEF = 6.58E+08 m3/kg (EPA 2004e) VF = Chemical-specific volatilization factor (EPA 2004e)
				AT _{NC}	Averaging Time - Noncancer	9,125	days	EPA 1989	
	Construction Worker	Adult	Sites 8, 28, and 29	C _A	Chemical Concentration in Air	Chemical-specific	mg/m ³	Calculated from CS	
				C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale.	
				InhR	Inhalation Rate	2.5	m ³ /hour	EPA 1991a; DTSC 1992	
				ET	Exposure Time	8	hours/day	EPA 1991a	
				EF	Exposure Frequency	250	days/year	EPA 1991a	
				ED	Exposure Duration	1	years	DTSC 2000	
				BW	Body Weight	70	kg	EPA 1991a; DTSC 1992	
				AT _C	Averaging Time - Cancer	25,550	days	EPA 1989	
	AT _{NC}	Averaging Time - Noncancer	365	days	EPA 1989				
	Resident	Adult	Sites 8, 28, and 29	C _A	Chemical Concentration in Air	Chemical-specific	mg/m ³	Calculated from CS	
				C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale.	
				InhR	Inhalation Rate	0.83	m ³ /hour	EPA 1991a	
				ET	Exposure Time (3)	24	hours/day	EPA 1991a; DTSC 1992	
EF				Exposure Frequency	350	days/year	EPA 1991a; DTSC 1992		
ED				Exposure Duration	24	years	EPA 1991a; DTSC 1992		
BW				Body Weight	70	kg	EPA 1991a; DTSC 1992		
AT _C				Averaging Time - Cancer	25,550	days	EPA 1989		
AT _{NC}				Averaging Time - Noncancer	8,760	days	EPA 1989		
Child (2)				Child (2)	Sites 8, 28, and 29	C _A	Chemical Concentration in Air	Chemical-specific	mg/m ³
	C _S	Chemical Concentration in Soil	EPC			mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale.		
	InhR	Inhalation Rate	0.42			m ³ /hour	EPA 1991a		

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-4.1: EPA RAGS PART D TABLE 4, VALUES USED FOR DAILY INTAKE, RME SOIL EXPOSURES (Continued)
Commercial/Industrial Workers, Construction Workers, and Residents

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:
Medium: Soil
Exposure Medium: Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)
Inhalation of Particulates/Vapors Originating from Soil (in Outdoor Air) (continued)	Resident (continued)	Child (2) (continued)	Sites 8, 28, and 29 (continued)	ET	Exposure Time (3)	24	hours/day	EPA 1991a; DTSC 1992	
				EF	Exposure Frequency	350	days/year	EPA 1991a; DTSC 1992	
				ED	Exposure Duration	6	years	EPA 1991a; DTSC 1992	
				BW	Body Weight	15	kg	EPA 1991a; DTSC 1992	
				AT _C	Averaging Time - Cancer	25,550	days	EPA 1989	
				AT _{NC}	Averaging Time - Noncancer	2,190	days	EPA 1989	
Inhalation of Vapors Originating from Soil Penetrating Building Interior	Commercial/ Industrial Worker	Adult	Sites 8, 28, and 29	C _A	Chemical Concentration in Indoor Air	Chemical-specific	mg/m ³	Modeled from chemical concentration in soil	Intake (mg/kg-day) = (C _A x InhR x ET x EF x ED) / (BW x AT) C _A modeled using DTSC's 2003 Vapor Intrusion Model (DTSC 2003), which is based upon Johnson and Ettinger (1991).
				InhR	Inhalation Rate	1.7	m ³ /hour	DTSC 2005d	
				ET	Exposure Time	8	hours/day	EPA 1991a	
				EF	Exposure Frequency	250	days/year	EPA 1991a; DTSC 1992	
				ED	Exposure Duration	25	years	EPA 1991a; DTSC 1992	
				BW	Body Weight	70	kg	EPA 1991a; DTSC 1992	
				AT _C	Averaging Time - Cancer	25,550	days	EPA 1989	
				AT _{NC}	Averaging Time - Noncancer	9,125	days	EPA 1989	
				Resident	Adult	Sites 8, 28, and 29	C _A	Chemical Concentration in Indoor Air	
	InhR	Inhalation Rate	0.83				m ³ /hour	EPA 1991a	
	ET	Exposure Time (3)	24				hours/day	EPA 1991a; DTSC 1992	
	EF	Exposure Frequency	350				days/year	EPA 1991a; DTSC 1992	
	ED	Exposure Duration	24				years	EPA 1991a; DTSC 1992	
	BW	Body Weight	70				kg	EPA 1991a; DTSC 1992	
	AT _C	Averaging Time - Cancer	25,550				days	EPA 1989	
	AT _{NC}	Averaging Time - Noncancer	8,760				days	EPA 1989	
	Child (2)	Sites 8, 28, and 29	C _A				Chemical Concentration in Indoor Air	Chemical-specific	mg/m ³
			InhR	Inhalation Rate	0.42	m ³ /hour	EPA 1991a		
ET			Exposure Time (3)	24	hours/day	EPA 1991a; DTSC 1992			
EF			Exposure Frequency	350	days/year	EPA 1991a; DTSC 1992			
ED			Exposure Duration	6	years	EPA 1991a; DTSC 1992			
BW			Body Weight	15	kg	EPA 1991a; DTSC 1992			
AT _C			Averaging Time - Cancer	25,550	days	EPA 1989			
AT _{NC}			Averaging Time - Noncancer	2,190	days	EPA 1989			

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

**TABLE G-4.1: EPA RAGS PART D TABLE 4, VALUES USED FOR DAILY INTAKE, RME SOIL EXPOSURES (Continued)
Commercial/Industrial Workers, Construction Workers, and Residents**

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Notes:

- (1) See Section G.8.4 for discussion of the intake assumptions.
- (2) While children's inhalation rates can be estimated, the toxicity factors applied in a risk assessment are based on chronic risks and not adjusted for a child's unique physiology.
- (3) These exposure times for inhalation are shown to represent the total daily inhalation rate on an hourly basis. Actual round-the-clock exposure would consist of some fraction of activity where particles or vapors would be inhaled from outdoor air, and an additional fraction where vapors would be inhaled from indoor air, but no adjustments were made to residential exposure time to account for this distribution of activity. This will result in a conservative overestimate of risk.

Definitions:

cm ²	Square centimeter	mg/day	Milligrams per day
days/year	Days per year	mg/kg	Milligrams per kilogram
DTSC	Department of Toxic Substances Control	mg/kg-day	Milligrams per kilogram per day
EPA	U.S. Environmental Protection Agency	mg/m ³	Milligrams per cubic meter
EPC	Exposure point concentration	m ³ /hour	Cubic meters per hour
hours/day	Hours per day	m ³ /kg	Cubic meters of air per kg soil (reduced from mg/m ³ -air per mg/kg-soil)
kg	Kilogram	PEF	Particulate emission factor
kg/mg	Kilograms per milligram	RAGS	Risk Assessment Guidance for Superfund
mg/cm ²	Milligrams per square centimeter	RME	Reasonable maximum exposure

References:

- California Department of Toxic Substances Control (DTSC). 1992. "Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities." Office of the Science Advisor. July.
- DTSC. 2000. "Interoffice Memorandum Regarding Guidance for the Dermal Exposure Pathway." From S.M. DiZio, M.J. Wade, and D.J. Oudiz. To Human Health and Ecological Division. January 7.
- DTSC. 2003. "Johnson and Ettinger (1991) Model for Vapor Intrusion Into Buildings." Version 3.0-Modification 1. July.
- DTSC. 2005d. "Comment Memorandum regarding Draft Site 21 Remedial Investigation Report, Naval Station Treasure Island, San Francisco, California." From B. Davis, Staff Toxicologist, Human Health and Ecological Division. To David Rist, Office of Military Facilities, Northern California. March 1.
- Johnson, P.C. and R.A. Ettinger. 1991. "Heuristic Model for Predicting the Intrusion Rate of Contaminant Vapors into Buildings." Environ. Sci. Technol. Volume 25. Pages 1445 through 1452.
- U.S. Environmental Protection Agency (EPA). 1989. "Risk Assessment Guidance for Superfund (RAGS), Volume 1: Human Health Evaluation Manual (Part A)." Office of Emergency and Remedial Response (OERR). Washington, D.C. December.
- EPA. 1991a. "Interoffice Memorandum Regarding Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors." From T. Fields, Jr., and B. Diamond. To Director, Waste Management Division, Regions I, IV, V, and VII; Director, Emergency and Remedial Response Division, Region III; Director, Hazardous Waste Management Division, Regions III, VI, VIII, and IX; Director, Hazardous Waste Division, Region X. March 25.
- EPA. 2001a. "Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites." Office of Solid Waste and Emergency Response. March.
- EPA. 2004c. "Risk Assessment Guidance for Superfund (RAGS), Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Final." Office of Superfund Remediation and Technology Innovation. Office of Solid Waste and Emergency Response (OSWER) 9285.7-02EP. July.
- EPA. 2004e. "EPA Region IX Preliminary Remediation Goals (PRG) 2004." December. Online Address: <http://www.epa.gov/region09/waste/sfund/prg/index.htm>.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-4.2: EPA RAGS PART D TABLE 4, VALUES USED FOR DAILY INTAKE, CTE SOIL EXPOSURES

Construction Workers, Residents, and Commercial/Industrial Workers

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)
Incidental Ingestion of Outdoor Soil	Commercial/ Industrial Worker	Adult	Sites 08, 28, 29	C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale.	Intake (mg/kg-day) = (C _S x FI x I _S x EF x ED x MCF) / (BW x AT)
				I _S	Ingestion Rate - Soil	50	mg/day	EPA 1991a	
				FI	Fraction Ingested	1	unitless	Professional judgment	
				EF	Exposure Frequency	219	days/year	EPA 2004c	
				ED	Exposure Duration	4.5	years	USDC 1994	
				MCF	Mass Conversion Factor	1E-06	kg/mg	Not applicable	
				BW	Body Weight	70	kg	EPA 1991a; DTSC 1992	
				AT _C	Averaging Time - Cancer	25,550	days	EPA 1989	
				AT _{NC}	Averaging Time - Noncancer	1,643	days	EPA 1989	
	Construction Worker	Adult	Sites 08, 28, 29	C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale.	Intake (mg/kg-day) = (C _S x FI x I _S x EF x ED x MCF) / (BW x AT)
				I _S	Ingestion Rate - Soil	100	mg/day	EPA 1997b	
				FI	Fraction Ingested	1	unitless	Professional judgment	
				EF	Exposure Frequency	90	days/year	Professional judgment	
				ED	Exposure Duration	1	years	DTSC 2000	
				MCF	Mass Conversion Factor	1E-06	kg/mg	Not applicable	
				BW	Body Weight	70	kg	EPA 1991a; DTSC 1992	
				AT _C	Averaging Time - Cancer	25,550	days	EPA 1989	
				AT _{NC}	Averaging Time - Noncancer	365	days	EPA 1989	
	Resident	Adult	Sites 08, 28, 29	C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale.	Intake (mg/kg-day) = (C _S x FI x I _S x EF x ED x MCF) / (BW x AT)
				I _S	Ingestion Rate - Soil	50	mg/day	EPA 1997b	
				FI	Fraction Ingested	1	unitless	Professional judgment	
				EF	Exposure Frequency	350	days/year	EPA 1991a; DTSC 1992	
				ED	Exposure Duration	7	years	EPA 1989	
				MCF	Mass Conversion Factor	1E-06	kg/mg	Not applicable	
BW				Body Weight	70	kg	EPA 1991a; DTSC 1992		
AT _C				Averaging Time - Cancer	25,550	days	EPA 1989		
AT _{NC}				Averaging Time - Noncancer	2,555	days	EPA 1989		

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-4.2: EPA RAGS PART D TABLE 4, VALUES USED FOR DAILY INTAKE, CTE SOIL EXPOSURES (Continued)
Construction Workers, Residents, and Commercial/Industrial Workers

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)
Incidental Ingestion of Outdoor Soil (continued)	Resident (continued)	Child	Sites 08, 28, 29	C _s	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale.	Intake (mg/kg-day) = (C _s x FI x I _s x EF x ED x MCF) / (BW x AT)
				I _s	Ingestion Rate - Soil	100	mg/day	EPA 1997b	
				FI	Fraction Ingested	1	unitless	Professional judgment	
				EF	Exposure Frequency	350	days/year	EPA 1991a; DTSC 1992	
				ED	Exposure Duration	2	years	EPA 1989	
				MCF	Mass Conversion Factor	1E-06	kg/mg	Not applicable	
				BW	Body Weight	15	kg	EPA 1991a; DTSC 1992	
				AT _c	Averaging Time - Cancer	25,550	days	EPA 1989	
AT _{NC}	Averaging Time - Noncancer	730	days	EPA 1989					
Dermal Contact with Outdoor Soil	Commercial/ Industrial Worker	Adult	Sites 08, 28, 29	C _s	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale.	Intake (mg/kg-day) = (C _s x ABS x SA x AF x EF x ED x MCF) / (BW x AT)
				ABS	Dermal Absorption Factor	Chemical-specific	unitless	EPA 2004c	
				SA	Exposed Skin Surface Area	3,300	cm ²	EPA 2004c	
				AF	Soil-to-Skin Adherence Factor	0.02	mg/cm ²	EPA 2004c	
				EF	Exposure Frequency	219	days/year	EPA 2004c	
				ED	Exposure Duration	4.5	years	USDC 1994	
				MCF	Mass Conversion Factor	1E-06	kg/mg	Not applicable	
	BW	Body Weight	70	kg	EPA 1991a; DTSC 1992				
	AT _c	Averaging Time - Cancer	25,550	days	EPA 1989				
	AT _{NC}	Averaging Time - Noncancer	1,643	days	EPA 1989				
	Construction Worker	Adult	Sites 08, 28, 29	C _s	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale.	Intake (mg/kg-day) = (C _s x ABS x SA x AF x EF x ED x MCF) / (BW x AT)
				ABS	Dermal Absorption Factor	Chemical-specific	unitless	EPA 2004c	
				SA	Exposed Skin Surface Area	3,300	cm ²	EPA 2004c	
AF				Soil-to-Skin Adherence Factor	0.1	mg/cm ²	EPA 2004c		
EF				Exposure Frequency	90	days/year	Professional judgment		
ED				Exposure Duration	1	years	DTSC 2000		
MCF	Mass Conversion Factor	1E-06	kg/mg	Not applicable					
BW	Body Weight	70	kg	EPA 1991a; DTSC 1992					

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-4.2: EPA RAGS PART D TABLE 4, VALUES USED FOR DAILY INTAKE, CTE SOIL EXPOSURES (Continued)

Construction Workers, Residents, and Commercial/Industrial Workers

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)		
Dermal Contact with Outdoor Soil (continued)	Construction Worker (continued)	Adult (continued)	Sites 08, 28, 29 (continued)	AT _C	Averaging Time - Cancer	25,550	days	EPA 1989			
				AT _{NC}	Averaging Time - Noncancer	365	days	EPA 1989			
	Resident	Adult	Sites 08, 28, 29	C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale. EPA 2004c			
				ABS	Dermal Absorption Factor	Chemical-specific	unitless	EPA 2004c			
				SA	Exposed Skin Surface Area	5,700	cm ²	DTSC 2000; EPA 2004c			
				AF	Soil-to-Skin Adherence Factor	0.01	mg/cm ²	EPA 2004c			
				EF	Exposure Frequency	350	days/year	EPA 1991a; DTSC 1992			
				ED	Exposure Duration	7	years	EPA 1989			
				MCF	Mass Conversion Factor	1E-06	kg/mg	Not applicable			
				BW	Body Weight	70	kg	EPA 1991a; DTSC 1992			
				AT _C	Averaging Time - Cancer	25,550	days	EPA 1989			
				AT _{NC}	Averaging Time - Noncancer	2,555	days	EPA 1989			
				Child	Sites 08, 28, 29	C _S	Chemical Concentration in Soil	EPC		mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale. EPA 2004c
						ABS	Dermal Absorption Factor	Chemical-specific		unitless	EPA 2004c
SA	Exposed Skin Surface Area	2,800	cm ²			EPA 2004c					
AF	Soil-to-Skin Adherence Factor	0.04	mg/cm ²			EPA 2004c					
EF	Exposure Frequency	350	days/year			EPA 1991a; DTSC 1992					
ED	Exposure Duration	2	years			EPA 1989					
MCF	Mass Conversion Factor	1E-06	kg/mg			Not applicable					
BW	Body Weight	15	kg			EPA 1991a; DTSC 1992					
AT _C	Averaging Time - Cancer	25,550	days			EPA 1989					
AT _{NC}	Averaging Time - Noncancer	730	days			EPA 1989					
Inhalation of Soil Particulates/Vapors Originating from Soil (in Outdoor Air)	Commercial/ Industrial Worker	Adult	Sites 08, 28, 29	C _A	Chemical Concentration in Outdoor Air	Chemical-specific	mg/m ³	Calculated from C _S	Intake (mg/kg-day) = (C _A x InhR x ET x EF x ED) / (BW x AT) where C _A = C _S / PEF for particulates, and C _A = C _S / VF for volatiles PEF = 1.32E+09 m ³ /kg (EPA 2004e) VF = Chemical-specific volatilization factor (EPA 2004e)		
				C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale. EPA 1997b			
				InhR	Inhalation Rate	1.3	m ³ /hour	EPA 1997b			
				ET	Exposure Time	8	hours/day	EPA 1991a			

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-4.2: EPA RAGS PART D TABLE 4, VALUES USED FOR DAILY INTAKE, CTE SOIL EXPOSURES (Continued)

Construction Workers, Residents, and Commercial/Industrial Workers

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name (1)
Inhalation of Soil Particulates/Vapors Originating from Soil (in Outdoor Air) (continued)	Commercial/ Industrial Worker (continued)	Adult (continued)	Sites 08, 28, 29 (continued)	EF	Exposure Frequency	219	days/year	EPA 2004c	
				ED	Exposure Duration	4.5	years	USDC 1994	
				BW	Body Weight	70	kg	EPA 1991a; DTSC 1992	
				AT _C	Averaging Time - Cancer	25,550	days	EPA 1989	
	Construction Worker	Adult	Sites 08, 28, 29	C _A	Chemical Concentration in Outdoor Air	Chemical-specific	mg/m ³	Calculated from C _S	
				C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale. EPA 1997b	
				InhR	Inhalation Rate	1.3	m ³ /hour	EPA 1997b	
				ET	Exposure Time	8	hours/day	EPA 1991a	
				EF	Exposure Frequency	90	days/year	Professional judgment	
				ED	Exposure Duration	1	years	DTSC 2000	
				BW	Body Weight	70	kg	EPA 1991a; DTSC 1992	
				AT _C	Averaging Time - Cancer	25,550	days	EPA 1989	
AT _{NC}	Averaging Time - Noncancer	365	days	EPA 1989					
Resident	Adult	Sites 08, 28, 29	C _A	Chemical Concentration in Outdoor Air	Chemical-specific	mg/m ³	Calculated from C _S		
			C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale. EPA 1997b		
			InhR	Inhalation Rate	0.63	m ³ /hour	EPA 1997b		
			ET	Exposure Time (3)	24	hours/day	EPA 1991a		
			EF	Exposure Frequency	350	days/year	EPA 1991a; DTSC 1992		
			ED	Exposure Duration	7	years	EPA 1989		
			BW	Body Weight	70	kg	EPA 1991a; DTSC 1992		
			AT _C	Averaging Time - Cancer	25,550	days	EPA 1989		
	AT _{NC}	Averaging Time - Noncancer	2,555	days	EPA 1989				
	Child (2)	Sites 08, 28, 29	C _A	Chemical Concentration in Outdoor Air	Chemical-specific	mg/m ³	Calculated from C _S		
			C _S	Chemical Concentration in Soil	EPC	mg/kg	RAGS Part D Table 3 series for each risk estimate will document the rationale. EPA 1997b		
			InhR	Inhalation Rate	0.33	m ³ /hour	EPA 1997b		
ET			Exposure Time (3)	24	hours/day	EPA 1991a			

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-4.2: EPA RAGS PART D TABLE 4, VALUES USED FOR DAILY INTAKE, CTE SOIL EXPOSURES (Continued)

Construction Workers, Residents, and Commercial/Industrial Workers

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name (1)
Inhalation of Soil Particulates/Vapors Originating from Soil (in Outdoor Air) (continued)	Resident (continued)	Child (2) (continued)	Sites 08, 28, 29 (continued)	EF	Exposure Frequency	350	days/year	EPA 1991a; DTSC 1992	
				ED	Exposure Duration	2	years	EPA 1989	
				BW	Body Weight	15	kg	EPA 1991a; DTSC 1992	
				AT _C	Averaging Time - Cancer	25,550	days	EPA 1989	
				AT _{NC}	Averaging Time - Noncancer	730	days	EPA 1989	
Inhalation of Vapors Originating from Soil Penetrating Building Interior	Commercial/ Industrial Worker	Adult	Sites 08, 28, 29	C _A	Chemical Concentration in Indoor Air	Chemical-specific	mg/m ³	Modeled from chemical concentration in soil	Intake (mg/kg-day) = (C _A x InhR x ET x EF x ED) / (BW x AT)
				InhR	Inhalation Rate	1.3	m ³ /hour	EPA 1997b	
				ET	Exposure Time	8	hours/day	EPA 1991a	
				EF	Exposure Frequency	219	days/year	EPA 2004c	
				ED	Exposure Duration	4.5	years	USDC 1994	
				BW	Body Weight	70	kg	EPA 1991a; DTSC 1992	
				AT _C	Averaging Time - Cancer	25,550	days	EPA 1989	
	AT _{NC}	Averaging Time - Noncancer	1,643	days	EPA 1989				
	Resident	Adult	Sites 08, 28, 29	C _A	Chemical Concentration in Indoor Air	Chemical-specific	mg/m ³	Modeled from chemical concentration in soil	Intake (mg/kg-day) = (C _A x InhR x ET x EF x ED) / (BW x AT)
				InhR	Inhalation Rate	0.63	m ³ /hour	EPA 1997b	
				ET	Exposure Time (3)	24	hours/day	EPA 1991a	
				EF	Exposure Frequency	350	days/year	EPA 1991a; DTSC 1992	
				ED	Exposure Duration	7	years	EPA 1989	
				BW	Body Weight	70	kg	EPA 1991a; DTSC 1992	
AT _C				Averaging Time - Cancer	25,550	days	EPA 1989		
AT _{NC}	Averaging Time - Noncancer	2,555	days	EPA 1989					
Child (2)	Child (2)	Sites 08, 28, 29	C _A	Chemical Concentration in Indoor Air	Chemical-specific	mg/m ³	Modeled from chemical concentration in soil	Intake (mg/kg-day) = (C _A x InhR x ET x EF x ED) / (BW x AT)	
			InhR	Inhalation Rate	0.33	m ³ /hour	EPA 1997b		
			ET	Exposure Time (3)	24	hours/day	EPA 1991a		
			EF	Exposure Frequency	350	days/year	EPA 1991a; DTSC 1992		
			ED	Exposure Duration	2	years	EPA 1989		
			BW	Body Weight	15	kg	EPA 1991a; DTSC 1992		
			AT _C	Averaging Time - Cancer	25,550	days	EPA 1989		
AT _{NC}	Averaging Time - Noncancer	730	days	EPA 1989					

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

**TABLE G-4.2: EPA RAGS PART D TABLE 4, VALUES USED FOR DAILY INTAKE, CTE SOIL EXPOSURES (Continued)
Construction Workers, Residents, and Commercial/Industrial Workers**

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Notes:

- (1) See Section G.8.4 for discussion of the intake assumptions.
- (2) While children's inhalation rates can be estimated, the toxicity factors applied in a risk assessment are based on chronic risks and not adjusted for a child's unique physiology.
- (3) These exposure times for inhalation are shown to represent the total daily inhalation rate on an hourly basis. Actual round-the-clock exposure would consist of some fraction of activity where particles or vapors would be inhaled from outdoor air, and an additional fraction where vapors would be inhaled from indoor air, but no adjustments were made to residential exposure time to account for this distribution of activity. This will result in a conservative overestimate of risk.

Definitions:

cm ²	Square centimeter	mg/day	Milligrams per day
CTE	Central tendency exposure	mg/kg	Milligrams per kilogram
days/year	Days per year	mg/kg-day	Milligrams per kilogram per day
DTSC	Department of Toxic Substances Control	mg/m ³	Milligrams per cubic meter
EPA	U.S. Environmental Protection Agency	m ³ /hour	Cubic meters per hour
EPC	Exposure point concentration	m ³ /kg	Cubic meters of air per kg soil (reduced from mg/m ³ -air per mg/kg-soil)
hours/day	Hours per day	PEF	Particulate emission factor
kg	Kilogram	RAGS	Risk Assessment Guidance for Superfund
kg/mg	Kilograms per milligram	USDC	U.S. Department of Commerce
mg/cm ²	Milligrams per square centimeter		

References:

- California Department of Toxic Substances Control (DTSC). 1992. "Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities." Office of the Science Advisor. July.
- DTSC. 2000. "Interoffice Memorandum Regarding Guidance for the Dermal Exposure Pathway." From S.M. DiZio, M.J. Wade, and D.J. Oudiz. To Human Health and Ecological Division. January 7.
- DTSC. 2003. "Johnson and Ettinger (1991) Model for Vapor Intrusion Into Buildings." Version 3.0-Modification 1. July.
- Johnson, P.C. and R.A. Ettinger. 1991. "Heuristic Model for Predicting the Intrusion Rate of Contaminant Vapors into Buildings." Environ. Sci. Technol. Volume 25. Pages 1445 through 1452.
- U.S. Department of Commerce (USDC). 1994. "Statistical Abstract of the United States." Bureau of the Census. 114th Edition.
- U.S. Environmental Protection Agency (EPA). 1989. "Risk Assessment Guidance for Superfund (RAGS), Volume 1: Human Health Evaluation Manual (Part A)." Office of Emergency and Remedial Response (OERR). Washington, D.C. December.
- EPA. 1991a. "Interoffice Memorandum Regarding Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors." From T. Fields, Jr., and B. Diamond. To Director, Waste Management Division, Regions I, IV, V, and VII; Director, Emergency and Remedial Response Division, Region III; Director, Hazardous Waste Management Division, Regions III, VI, VIII, and IX; Director, Hazardous Waste Division, Region X. March 25.
- EPA. 1997b. "Exposure Factors Handbook." Office of Research and Development. National Center for Environmental Assessment. Washington, D.C. August.
- EPA. 2004c. "Risk Assessment Guidance for Superfund (RAGS), Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Final." Office of Superfund Remediation and Technology Innovation. Office of Solid Waste and Emergency Response (OSWER) 9285.7-02EP. July.
- EPA. 2004e. "EPA Region IX Preliminary Remediation Goals (PRG) 2004." December. Online Address: <http://www.epa.gov/region09/waste/sfund/prg/index.htm>.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-5.1: CHEMICAL SPECIFIC FACTORS USED IN THE HUMAN HEALTH RISK ASSESSMENT
Chemicals Detected in Soil

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29,
 Naval Station Treasure Island, San Francisco, California

Chemicals of Potential Concer	Volatilization Factors ¹ (VF) (m ³ /kg)	Particulate Emmission Factor ² (PEF) (m ³ /kg)	PEF for Construction Workers Only ³ (m ³ /kg)	Skin Absorption Factors ⁴ (ABS) (unitless)
2-Methylnaphthalene	4.30E+04	--	--	0
4,4'-DDD	--	1.32E+09	6.58E+08	d 0.03
4,4'-DDE	--	1.32E+09	6.58E+08	e 0.03
4,4'-DDT	--	1.32E+09	6.58E+08	f 0.03
Acenaphthene	1.80E+05	--	--	0
alpha-Chlordane	--	1.32E+09	6.58E+08	0.04
Aluminum	--	1.32E+09	6.58E+08	0
Anthracene	a 7.00E+05	--	--	0
Antimony	--	1.32E+09	6.58E+08	0
Arsenic	--	1.32E+09	6.58E+08	0.03
Barium	--	1.32E+09	6.58E+08	0
Benzo(a)anthracene	--	1.32E+09	6.58E+08	0.13
Benzo(a)pyrene	--	1.32E+09	6.58E+08	0.13
Benzo(b)fluoranthene	--	1.32E+09	6.58E+08	0.13
Benzo(g,h,i)perylene	--	1.32E+09	6.58E+08	0.13
Benzo(k)fluoranthene	--	1.32E+09	6.58E+08	0.13
Beryllium	--	1.32E+09	6.58E+08	0
Cadmium	--	1.32E+09	6.58E+08	0.001
Chromium	--	1.32E+09	6.58E+08	0
Chrysene	--	1.32E+09	6.58E+08	0
Cobalt	--	1.32E+09	6.58E+08	0
Copper	--	1.32E+09	6.58E+08	0
Dibenzo(a,h)anthracene	--	1.32E+09	6.58E+08	0.13
Dieldrin	--	1.32E+09	6.58E+08	0.1
Endrin	2.20E+06	--	--	0.1
Endrin aldehyde	2.20E+06	--	--	g 0.1
Ethylbenzene	5.40E+03	--	--	0
Fluoranthene	--	1.32E+09	6.58E+08	0.13
Fluorene	3.60E+05	--	--	0
Freon 12	1.10E+03	--	--	0
gamma-Chlordane	--	1.32E+09	6.58E+08	0.04
Heptachlor	--	1.32E+09	6.58E+08	0.1
Indeno(1,2,3-cd)pyrene	--	1.32E+09	6.58E+08	0.13
Iron	--	1.32E+09	6.58E+08	0
Isopropylbenzene	3.6E+03	--	--	0
m,p-Xylenes	c 6.10E+03	--	--	0
Manganese	--	1.32E+09	6.58E+08	0
Mercury	--	1.32E+09	6.58E+08	0
Molybdenum	--	1.32E+09	6.58E+08	0
Naphthalene	4.30E+04	--	--	0
n-Butylbenzene	1.10E+04	--	--	0
Nickel	--	1.32E+09	6.58E+08	0
n-Propylbenzene	1.10E+04	--	--	0
o-Xylene	c 6.10E+03	--	--	0
Pentachlorophenol	--	1.32E+09	6.58E+08	0.25
Phenanthrene	a 7.00E+05	--	--	0.13
Phenol	--	1.32E+09	6.58E+08	0.1
p-Isopropyl Toluene	b 2.10E+04	--	--	0
Pyrene	3.80E+06	--	--	0
sec-Butylbenzene	8.30E+03	--	--	0
Selenium	--	1.32E+09	6.58E+08	0
Silver	--	1.32E+09	6.58E+08	0
Thallium	--	1.32E+09	6.58E+08	0
Vanadium	--	1.32E+09	6.58E+08	0
Zinc	--	1.32E+09	6.58E+08	0

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

**TABLE G-5.1: CHEMICAL SPECIFIC FACTORS USED IN THE HUMAN HEALTH RISK ASSESSMENT (Cont'd)
Chemicals Detected in Soil**

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29,
Naval Station Treasure Island, San Francisco, California

Notes:

- 1 VFs from EPA (2004e) PRG Intercalculation Tables: Physical Chemical Data
- 2 PEF derived according to EPA (2004e) PRGs methodology assuming 50% vegetation
- 3 Construction worker PEF derived according to EPA (2004e) PRGs methodology assuming no vegetation.
- 4 ABS from RAGS Part E 2004 Exhibit 3-4 and recommendations for VOCs (ABS = 0), additional SVOCs (ABS = 0.1), and additional metals (ABS = 0)

- a Acenaphthalene uses as surrogate for anthracene and phenanthrene
b Toluene used as a surrogate for p-isopropyl toluene
c Chemical specific VF for total xylene is used as a surrogate value.
d Values for DDD used
e Values for DDE used
f Values for DDT used
g Values for endrin used

-- Not applicable (not calculated)

m³/kg Cubic meters per kilogram

References:

- Department of Toxic Substances Control (DTSC). 1993b. "Parameter Values and Unit Ranges for CalTOX." July.
U.S. Environmental Protection Agency (EPA). 1996. "Soil Screening Guidance: Technical Background Document." EPA/540/R-95/128. Office of Solid Waste and Emergency Response (OSWER), Washington, D.C. May.
EPA. 1998. "Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities, Volume 2." EPA/530-D-98-001B. OSWER. July.
EPA. 2002d. "Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites." OSWER 9355.4-24. December.
EPA. 2004e. "EPA Region IX Preliminary Remediation Goals (PRG) 2004." December.
Online Address: <http://www.epa.gov/region09/waste/sfund/prg/index.htm>

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-6.1: EPA RAGS PART D TABLE 5.1, NONCANCER TOXICITY DATA - ORAL/DERMAL

Method 1 Values

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/ Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)
Antimony	Chronic	4.0E-04	mg/kg-day	15%	4.0E-04	mg/kg-day	Whole body/Blood/Immune System	1,000	IRIS	7/25/2005
Benzo(a)pyrene	--	--	--	--	--	--	--	--	--	--
Cadmium (food)	Chronic	1.0E-03	mg/kg-day	2.5%	1.0E-03	mg/kg-day	Kidney	10	IRIS	7/25/2005
Dibenzo(a,h)anthracene	--	--	--	--	--	--	--	--	--	--
Iron	Chronic	3.0E-01	mg/kg-day	100%	3.0E-01	mg/kg-day	Liver	1	NCEA	7/23/1996
Lead	--	--	--	--	--	--	--	--	--	--
Thallium ^a	Chronic	8.0E-05	mg/kg-day	100%	8.0E-05	mg/kg-day	Blood	3,000	IRIS	7/25/2005

Notes:

a Toxicity information for thallium chloride.

Definitions:

- Not available; not applicable
- EPA U.S. Environmental Protection Agency
- IRIS Integrated Risk Information System
- mg/kg-day Milligram per kilogram per day
- NCEA EPA National Center for Environmental Assessment
- PRG Preliminary remediation goal
- RAGS Risk Assessment Guidance for Superfund
- RfD Reference dose

(1) Per EPA's Dermal Guidance document (EPA 2004c), an ABSGI value of 100% is recommended for organic and inorganic COPCs without ABS_{GI} values listed in Exhibit 4-1 of EPA 2004c. Per EPA's Dermal Guidance document (EPA 2004c), an ABSGI value of 100% is recommended for COPCs with ABS_{GI} values of greater than 50% in Exhibit 4-1 of EPA 2004c.

(2) In the actual derivation of absorbed RfDs for dermal exposure, oral absorption efficiency was assumed to be 100 percent for all chemicals per DTSC recommendations (2005e).

References:

- Department of Toxic Substances Control (DTSC). 2005e. "Comment Memorandum Regarding Remedial Investigation Work Plan, Site 12, Naval Station Treasure Island, San Francisco, California." From B. Davis, Staff Toxicologist, Human Health and Ecological Risk Division. To David Rist, Office of Military Facilities, Northern California. June 20.
- EPA. 2004c. "Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Final." Office of Superfund Remediation and Technology Innovation. Office of Solid Waste and Emergency Response (OSWER) 9285.7-02EP. July.
- EPA. 2007. "Integrated Risk Information System (IRIS)." Online Address: <http://www.epa.gov/iris/index.html>.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-6.2: EPA RAGS PART D TABLE 5.2, NONCANCER TOXICITY DATA - INHALATION

Method 1 Values

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD		Primary Target Organ(s)	Combined Uncertainty/ Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s)
2-Methylnaphthalene	--	--	--	--	--	--	--	--	--
Acenaphthene	Chronic	2.1E-01	mg/m ³	6.0E-02	mg/kg-day	Liver	3,000	R9-R	12/28/2004
Anthracene	Chronic	1.1E+00	mg/m ³	3.0E-01	mg/kg-day	No observed effect	3,000	R9-R	12/28/2004
Antimony	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	--	--	--	--	--	--	--	--	--
Cadmium	Chronic	2.0E-05	mg/m ³	5.7E-06	mg/kg-day	Kidney/Respiratory System	30	OEHHA	2/2005
Chrysene	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	--	--	--	--	--	--	--	--	--
Ethylbenzene	Chronic	1.0E+00	mg/m ³	2.9E-01	mg/kg-day	Developmental	300	IRIS	7/25/2005
Fluorene	Chronic	1.4E-01	mg/m ³	4.0E-02	mg/kg-day	Blood	3,000	R9-R	12/28/2004
Freon 12	Chronic	2.0E-01	mg/m ³	5.7E-02	mg/kg-day	Liver	10,000	HEAST	7/31/1997
Isopropylbenzene	Chronic	4.0E-01	mg/m ³	1.1E-01	mg/kg-day	Kidney	1,000	IRIS	7/25/2005
Lead	--	--	--	--	--	--	--	--	--
m,p-Xylene ^a	Chronic	1.0E-01	mg/m ³	2.9E-02	mg/kg-day	CNS	300	IRIS	7/25/2005
n-Butylbenzene	Chronic	1.4E-01	mg/m ³	4.0E-02	mg/kg-day	Liver/Kidney	3,000	R9-R	12/28/2004
n-Propylbenzene	Chronic	1.4E-01	mg/m ³	4.0E-02	mg/kg-day	Liver/Kidney	3,000	R9-R	12/28/2004
Naphthalene	Chronic	3.0E-03	mg/m ³	8.6E-04	mg/kg-day	Nasal Epithelium	3,000	IRIS	7/25/2005
o-Xylene ^a	Chronic	1.0E-01	mg/m ³	2.9E-02	mg/kg-day	CNS	300	IRIS	7/25/2005
p-Isopropyltoluene ^b	Chronic	4.0E-01	mg/m ³	1.1E-01	mg/kg-day	Kidney	1,000	IRIS	7/25/2005
Phenanthrene ^c	Chronic	1.1E+00	mg/m ³	3.0E-01	mg/kg-day	No observed effect	3,000	R9-R	12/28/2004
Pyrene	Chronic	1.1E-01	mg/m ³	3.0E-02	mg/kg-day	Kidney	3,000	R9-R	12/28/2004
sec-Butylbenzene	Chronic	1.4E-01	mg/m ³	4.0E-02	mg/kg-day	Kidney	3,000	R9-R	12/28/2004
Thallium	--	--	--	--	--	--	--	--	--

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-6.2: EPA RAGS PART D TABLE 5.2, NONCANCER TOXICITY DATA - INHALATION (Continued)

Method 1 Values

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Notes:

- a Toxicity information for total xylenes.
- b Isopropylbenzene used as a surrogate for toxicity information.
- c Anthracene used as a surrogate for toxicity information.

Definitions:

- Not available; not applicable
- CNS Central nervous system
- EPA U.S. Environmental Protection Agency

Definitions (continued):

- HEAST EPA Health Effects Assessment Summary Tables (EPA 1997a)
- IRIS EPA Integrated Risk Information System (EPA 2007)
- mg/kg-day Milligrams per kilogram per day
- mg/m³ Milligrams per cubic meter
- OEHHA Office of Environmental Health Hazard Assessment Chronic Reference Exposure Level (REL) Values (OEHHA 2005a)
- R9-R Source of toxicity value listed as "route extrapolation" in the EPA Region 9 Preliminary Remediation Goals (PRG) Table (EPA 2004e).
- RAGS Risk Assessment Guidance for Superfund
- RfC Reference concentration
- RfD Reference dose

References:

- Office of Environmental Health Hazard Assessment (OEHHA). 2005a. "Chronic Reference Exposure Levels." February. Online Address: http://www.oehha.ca.gov/air/chronic_rels/AllChrels.html.
- U.S. Environmental Protection Agency (EPA). 1997a. "Health Effects Assessment Summary Tables (HEAST)." FY 1997 Update, United States Environmental Protection Agency, Office of Solid Waste and Emergency Response, 9200.6-303 (97-1), EPA-540-R-97-036, PB97-921199, July 31.
- EPA. 2004e. "EPA Region IX Preliminary Remediation Goals (PRG) 2004." December. Online Address: <http://www.epa.gov/region09/waste/sfund/prg/index.htm>.
- EPA. 2007. "Integrated Risk Information System (IRIS)." Online Address: <http://www.epa.gov/iris/index.html>.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-6.3: EPA RAGS PART D TABLE 6.1, CANCER TOXICITY DATA - ORAL/DERMAL

Method 1 Values

Revised Remedial Investigation Report for Installation Restoratioin Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral Cancer Slope Factor	
	Value	Units		Value (2)	Units		Source(s)	Date(s) (YYYY)
Antimony	--	--	--	--	--	--	--	--
Benzo(a)pyrene	7.3E+00	(mg/kg-day) ⁻¹	100%	7.3E+00	(mg/kg-day) ⁻¹	B2	IRIS	7/25/2005
Cadmium ^a	--	--	--	--	--	B1	IRIS	7/25/2005
Dibenzo(a,h)anthracene	7.3E+00	(mg/kg-day) ⁻¹	100%	7.3E+00	(mg/kg-day) ⁻¹	B2	BaP Eq	9/3/2003
Iron	--	--	--	--	--	--	--	--
Lead	--	--	--	--	--	--	--	--
Thallium	--	--	--	--	--	--	--	--

Notes:

(1) Per EPA's Dermal Guidance document (EPA 2004c), an ABSGI value of 100% is recommended for organic and inorganic COPCs without ABS_{GI} values listed in Exhibit 4-1 of EPA 2004c. Per EPA's Dermal Guidance document (EPA 2004c), an ABSGI value of 100% is recommended for COPCs with ABS_{GI} values of greater than 50% in Exhibit 4-1 of EPA 2004c.

(2) In the actual derivation of absorbed cancer slope factors for dermal exposure, oral absorption efficiency was assumed to be 100 percent for all chemicals per DTSC recommendations (2005e).

a No oral cancer slope factor was selected for cadmium for Method 1 (and therefore, no dermal cancer slope factor was derived from an oral cancer slope factor). According to EPA, there are no positive studies of orally ingested cadmium suitable for quantitation (EPA 2007).

Definitions:

- Not available; not applicable
- BaP Eq Toxicity factor based on benzo(a)pyrene equivalents (BaP Eq) (EPA 1993).
- EPA U.S. Environmental Protection Agency
- IRIS EPA Integrated Risk Information System (EPA 2007)
- (mg/kg-day)⁻¹ Reciprocal milligrams per kilogram per day
- OEHHA Office of Environmental Health Hazard Assessment Toxicity Criteria Database (OEHHA 2005b)
- RAGS Risk Assessment Guidance for Superfund

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-6.3: EPA RAGS PART D TABLE 6.1, CANCER TOXICITY DATA - ORAL/DERMAL (Continued)

Method 1 Values

Revised Remedial Investigation Report for Installation Restoratioin Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

References:

Department of Toxic Substances Control (DTSC). 2005e. "Comment Memorandum Regarding Remedial Investigation Work Plan, Site 12, Naval Station Treasure Island, San Francisco, California." From B. Davis, Staff Toxicologist, Human Health and Ecological Risk Division. To David Rist, Office of Military Facilities, Northern California. June 20.

Office of Environmental Health Hazard Assessment (OEHHA). 2005b. "Toxicity Criteria Database." Online Address: <http://www.oehha.ca.gov/risk/chemicalDB/index.asp>.

U.S. Environmental Protection Agency (EPA). 1993. "Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons." Office of Research and Development. EPA/600/R-93/089.

EPA. 2004c. "Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Final." Office of Superfund Remediation and Technology Innovation. Office of Solid Waste and Emergency Response (OSWER) 9285.7-02EP. July.

EPA. 2007. "Integrated Risk Information System (IRIS)." Online Address: <http://www.epa.gov/iris/index.html>.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech, February 2009.

TABLE G-6.4: EPA RAGS PART D TABLE 6.2, CANCER TOXICITY DATA - INHALATION

Method 1 Values

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation Cancer Slope Factor	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
2-Methylnaphthalene	--	--	--	--	DI	IRIS	7/25/2005
Acenaphthene	--	--	--	--	--	--	--
Anthracene	--	--	--	--	D	IRIS	7/25/2005
Antimony	--	--	--	--	--	--	--
Benzo(a)pyrene	--	--	3.1E+00	(mg/kg-day) ⁻¹	B2	NCEA	11/1/1994
Cadmium	1.8E-03	(ug/m ³) ⁻¹	6.3E+00	(mg/kg-day) ⁻¹	B1	IRIS	7/25/2005
Chrysene	--	--	3.1E-03	(mg/kg-day) ⁻¹	B2	BaP Eq	9/3/2003
Dibenzo(a,h)anthracene	--	--	3.1E+00	(mg/kg-day) ⁻¹	B2	BaP Eq	9/3/2003
Ethylbenzene	--	--	--	--	D	IRIS	7/25/2005
Fluorene	--	--	--	--	D	IRIS	7/25/2005
Freon 12	--	--	--	--	--	--	--
Iron	--	--	--	--	--	--	--
Isopropylbenzene	--	--	--	--	D	IRIS	7/25/2005
Lead	--	--	--	--	--	--	--
m,p-Xylene ^a	--	--	--	--	DI	IRIS	7/25/2005
n-Butylbenzene	--	--	--	--	--	--	--
n-Propylbenzene	--	--	--	--	--	--	--
Naphthalene ^b	--	--	--	--	C	IRIS	7/25/2005
o-Xylene ^a	--	--	--	--	DI	IRIS	7/25/2005
p-Isopropyltoluene ^c	--	--	--	--	D	IRIS	7/25/2005
Phenanthrene	--	--	--	--	D	IRIS	7/25/2005
Pyrene	--	--	--	--	D	IRIS	7/25/2005
sec-Butylbenzene	--	--	--	--	--	--	--
Thallium	--	--	--	--	--	--	--

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech, February 2009.

TABLE G-6.4: EPA RAGS PART D TABLE 6.2, CANCER TOXICITY DATA - INHALATION (Continued)

Method 1 Values

Revised Remedial Investigation Report for Installation Restoroiin Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Notes:

- a Toxicity information for total xylenes.
- b No unit risk or inhalation cancer slope factor was selected for naphthalene for Method 1. An inhalation unit risk estimate for naphthalene has not been derived by EPA because of the weakness of the evidence that naphthalene may be carcinogenic in humans (EPA 2007).
- c Isopropylbenzene used as a surrogate for toxicity information.

Definitions:

--	Not available; not applicable
BaP Eq	Toxicity factor based on benzo(a)pyrene equivalents (BaP Eq) (EPA 1993)
DI	Date inadequate to assess carcinogenicity (EPA 2007)
EPA	U.S. Environmental Protection Agency
IRIS	EPA Integrated Risk Information System (EPA 2007)
(mg/kg-day) ⁻¹	Reciprocal milligrams per kilogram per day
(ug/m ³) ⁻¹	Reciprocal micrograms per cubic meter
NCEA	EPA National Center for Environmental Assessment
OEHHA	Office of Environmental Health Hazard Assessment Toxicity Criteria Database (OEHHA 2005b)
RAGS	Risk Assessment Guidance for Superfund

References:

Office of Environmental Health Hazard Assessment (OEHHA). 2005b. "Toxicity Criteria Database." Online Address: <http://www.oehha.ca.gov/risk/chemicalDB/index.asp>.

U.S. Environmental Protection Agency (EPA). 1993. "Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons." Office of Research and Development. EPA/600/R-93/089.

EPA. 2007. "Integrated Risk Information System (IRIS)." Online Address: <http://www.epa.gov/iris/index.html>.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-6.5: EPA RAGS PART D TABLE 5.1, NONCANCER TOXICITY DATA - ORAL/DERMAL

Method 2 Values

Revised Remedial Investigation Report for Installation Restoratioin Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/ Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)
2-Methylnaphthalene	Chronic	4.00E-03	mg/kg-day	100%	4.00E-03	mg/kg-day	Respiratory System	1,000	IRIS	07/25/05
4,4-DDD ^a	Chronic	5.00E-04	mg/kg-day	100%	5.0E-04	mg/kg-day	Liver	100	IRIS	07/25/05
4,4-DDE ^a	Chronic	5.00E-04	mg/kg-day	100%	5.0E-04	mg/kg-day	Liver	100	IRIS	07/25/05
4,4'-DDT	Chronic	5.00E-04	mg/kg-day	100%	5.0E-04	mg/kg-day	Liver	100	IRIS	07/25/05
Acenaphthene	Chronic	6.00E-02	mg/kg-day	100%	6.0E-02	mg/kg-day	Liver	3,000	IRIS	07/25/05
alpha-Chlordane ^b	Chronic	5.00E-04	mg/kg-day	100%	5.0E-04	mg/kg-day	Liver	300	IRIS	07/25/05
Aluminum	Chronic	1.00E+00	mg/kg-day	100%	1.0E+00	mg/kg-day	CNS	100	PPRTV	01/13/04
Anthracene	Chronic	3.00E-01	mg/kg-day	100%	3.0E-01	mg/kg-day	No observed effect	3,000	IRIS	07/25/05
Antimony	Chronic	4.0E-04	mg/kg-day	15%	4.0E-04	mg/kg-day	Whole body/Blood/Immune System	1,000	IRIS	07/25/05
Arsenic	Chronic	3.0E-04	mg/kg-day	7%	3.0E-04	mg/kg-day	Skin	3	IRIS	07/25/05
Barium	Chronic	2.0E-01	mg/kg-day	100%	2.0E-01	mg/kg-day	Kidney	300	IRIS	07/25/05
Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene ^c	Chronic	3.0E-02	mg/kg-day	100%	3.0E-02	mg/kg-day	Kidney	3,000	IRIS	07/25/05
Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--	--
Beryllium	Chronic	2.0E-03	mg/kg-day	0.7%	2.0E-03	mg/kg-day	GI Tract	300	IRIS	07/25/05
Cadmium (food)	Chronic	1.0E-03	mg/kg-day	2.5%	1.0E-03	mg/kg-day	Kidney	10	IRIS	07/25/05
Chromium ^d	Chronic	1.5E+00	mg/kg-day	1.3%	1.5E+00	mg/kg-day	No observed effect	100	IRIS	07/25/05
Chrysene	--	--	--	--	--	--	--	--	--	--
Cobalt	Chronic	2.0E-02	mg/kg-day	100%	2.0E-02	mg/kg-day	Blood	10	PPRTV	01/15/02
Copper	Chronic	4.0E-02	mg/kg-day	100%	4.0E-02	mg/kg-day	GI Tract/Kidney	1,000	HEAST	7/1997
Dibenzo(a,h)anthracene	--	--	--	--	--	--	--	--	--	--
Dieldrin	Chronic	5.0E-05	mg/kg-day	100%	5.0E-05	mg/kg-day	Liver	100	IRIS	07/25/05
Endrin	Chronic	3.0E-04	mg/kg-day	100%	3.0E-04	mg/kg-day	Liver	100	IRIS	07/25/05
Endrin aldehyde ^e	Chronic	3.0E-04	mg/kg-day	100%	3.0E-04	mg/kg-day	Liver	100	IRIS	07/25/05
Ethylbenzene	Chronic	1.0E-01	mg/kg-day	100%	1.0E-01	mg/kg-day	Kidney/Liver	1,000	IRIS	07/25/05

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-6.5: EPA RAGS PART D TABLE 5.1, NONCANCER TOXICITY DATA - ORAL/DERMAL (Continued)

Method 2 Values

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/ Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)
Fluoranthene	Chronic	4.0E-02	mg/kg-day	100%	4.0E-02	mg/kg-day	Kidney/Liver/Blood	3,000	IRIS	07/25/05
Fluorene	Chronic	4.0E-02	mg/kg-day	100%	4.0E-02	mg/kg-day	Blood	3,000	IRIS	07/25/05
Freon 12	Chronic	2.0E-01	mg/kg-day	100%	2.0E-01	mg/kg-day	Whole Body	100	IRIS	07/25/05
gamma-Chlordane ^b	Chronic	5.0E-04	mg/kg-day	100%	5.0E-04	mg/kg-day	Liver	300	IRIS	07/25/05
Heptachlor	Chronic	5.0E-04	mg/kg-day	100%	5.0E-04	mg/kg-day	Liver	300	IRIS	07/25/05
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	--	--
Iron	chronic	3.0E-01	mg/kg-day	100%	3.0E-01	mg/kg-day	Liver	1	NCEA	07/23/96
Lead	--	--	--	--	--	--	--	--	--	--
m,p-Xylene ^f	Chronic	2.0E-01	mg/kg-day	100%	2.0E-01	mg/kg-day	Whole Body	1,000	IRIS	07/25/05
Manganese ^g	Chronic	4.7E-02	mg/kg-day	4%	4.7E-02	mg/kg-day	CNS	3	IRIS	07/25/05
Mercury ^h	Chronic	3.0E-04	mg/kg-day	7%	3.0E-04	mg/kg-day	Immune System	1,000	IRIS	07/25/05
Molybdenum	Chronic	5.0E-03	mg/kg-day	100%	5.0E-03	mg/kg-day	Blood	30	IRIS	07/25/05
Naphthalene	Chronic	2.0E-02	mg/kg-day	100%	2.0E-02	mg/kg-day	Whole Body	3,000	IRIS	07/25/05
Nickel ⁱ	Chronic	2.0E-02	mg/kg-day	4%	2.0E-02	mg/kg-day	Whole Body	300	IRIS	07/25/05
o-Xylene ^f	Chronic	2.0E-01	mg/kg-day	100%	2.0E-01	mg/kg-day	Whole Body	1,000	IRIS	07/25/05
Pentachlorophenol	Chronic	3.0E-02	mg/kg-day	100%	3.0E-02	mg/kg-day	Liver/Kidney	100	IRIS	07/25/05
Phenanthrene ^j	Chronic	3.0E-01	mg/kg-day	100%	3.0E-01	mg/kg-day	No observed effect	3,000	IRIS	07/25/05
Phenol	Chronic	3.0E-01	mg/kg-day	100%	3.0E-01	mg/kg-day	Whole Body	300	IRIS	07/25/05
Pyrene	Chronic	3.0E-02	mg/kg-day	100%	3.0E-02	mg/kg-day	Kidney	3,000	IRIS	07/25/05
Selenium	Chronic	5.0E-03	mg/kg-day	30%	5.0E-03	mg/kg-day	Whole Body	3	IRIS	07/25/05
Silver	Chronic	5.0E-03	mg/kg-day	4%	5.0E-03	mg/kg-day	Skin	3	IRIS	07/25/05
Thallium ^k	Chronic	8.0E-05	mg/kg-day	100%	8.0E-05	mg/kg-day	Blood	3,000	IRIS	07/25/05
Vanadium	Chronic	1.0E-03	mg/kg-day	2.6%	1.0E-03	mg/kg-day	Kidney	300	NCEA	05/31/00
Zinc	Chronic	3.0E-01	mg/kg-day	100%	3.0E-01	mg/kg-day	Blood	3	IRIS	07/25/05

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-6.5: EPA RAGS PART D TABLE 5.1, NONCANCER TOXICITY DATA - ORAL/DERMAL (Continued)

Method 2 Values

Revised Remedial Investigation Report for Installation Restoratioin Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/ Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)

Notes:

- a 4,4'-DDT used as a surrogate for toxicity information.
- b Chlordane used as a surrogate for toxicity information.
- c Pyrene used as a surrogate for toxicity information.
- d Toxicity information for trivalent chromium.
- e Endrin used as a surrogate for toxicity information.
- f Toxicity information for total xylenes.
- g Toxicity information for manganese in non-food sources (such as soil and drinking water) .
- h Toxicity information for mercuric chloride.
- i Toxicity information for nickel soluble salts.
- j Anthracene used as a surrogate for toxicity information.
- k Toxicity information for thallium chloride.

Definitions:

- Not available; not applicable
- CNS Central nervous system
- EPA U.S. Environmental Protection Agency
- GI Tract Gastrointestinal tract
- HEAST EPA Health Effects Assessment Summary Tables (EPA 1997a)
- IRIS EPA Integrated Risk Information System (EPA 2007)
- mg/kg-day Milligrams per kilogram per day
- NCEA EPA National Center for Environmental Assessment
- PPRTV EPA Provisional Peer-Reviewed Toxicity Value (EPA 2004a)
- RAGS Risk Assessment Guidance for Superfund
- RfD Reference dose

(1) Per EPA's Dermal Guidance document (EPA 2004c), an ABSGI value of 100% is recommended for organic and inorganic COPCs without ABS_{GI} values listed in Exhibit 4-1 of EPA 2004c. Per EPA's Dermal Guidance document (EPA 2004c), an ABSGI value of 100% is recommended for COPCs with ABS_{GI} values of greater than 50% in Exhibit 4-1 of EPA 2004c.

(2) In the actual derivation of absorbed RfDs for dermal exposure, oral absorption efficiency was assumed to be 100 percent for all chemicals per DTSC recommendations (2005e).

References:

- Department of Toxic Substances Control (DTSC). 2005e. "Comment Memorandum Regarding Remedial Investigation Work Plan, Site 12, Naval Station Treasure Island, San Francisco, California." From B. Davis, Staff Toxicologist, Human Health and Ecological Risk Division. To David Rist, Office of Military Facilities, Northern California. June 20.
- U.S. Environmental Protection Agency (EPA). 1997a. "Health Effects Assessment Summary Tables (HEAST)." FY 1997 Update, United States Environmental Protection Agency, Office of Solid Waste and Emergency Response, 9200.6-303 (97-1), EPA-540-R-97-036, PB97-921199, July 31.
- EPA. 2004a. "Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV)." Downloaded from <http://hhpprtv.ornl.gov/> on June 28, 2004.
- EPA. 2004c. "Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Final." Office of Superfund Remediation and Technology Innovation. Office of Solid Waste and Emergency Response (OSWER) 9285.7-02EP. July.
- EPA. 2007. "Integrated Risk Information System (IRIS)." Online Address: <http://www.epa.gov/iris/index.html>.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-6.6: EPA RAGS PART D TABLE 5.2, NONCANCER TOXICITY DATA - INHALATION

Method 2 Values

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Chemical of Potential Concern	Chronic/Subchronic	Inhalation RfC		Extrapolated RfD		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s)
2-Methylnaphthalene	--	--	--	--	--	--	--	--	--
4,4'-DDD ^a	Chronic	1.8E-03	mg/m ³	5.0E-04	mg/kg-day	Liver	100	R9-R	12/28/2004
4,4'-DDE ^a	Chronic	1.8E-03	mg/m ³	5.0E-04	mg/kg-day	Liver	100	R9-R	12/28/2004
4,4'-DDT	Chronic	1.8E-03	mg/m ³	5.0E-04	mg/kg-day	Liver	100	R9-R	12/28/2004
Acenaphthene	Chronic	2.1E-01	mg/m ³	6.0E-02	mg/kg-day	Liver	3,000	R9-R	12/28/2004
alpha-Chlordane ^b	Chronic	7.0E-04	mg/m ³	2.0E-04	mg/kg-day	Liver	1,000	IRIS	7/25/2005
Aluminum	Chronic	5.0E-03	mg/m ³	1.4E-03	mg/kg-day	CNS	300	PPRTV	1/13/2004
Anthracene	Chronic	1.1E+00	mg/m ³	3.0E-01	mg/kg-day	No observed effect	3,000	R9-R	12/28/2004
Antimony	--	--	--	--	--	--	--	--	--
Arsenic	Chronic	3.0E-05	mg/m ³	8.6E-06	mg/kg-day	Developmental	1,000	OEHA b	7/25/2005
Barium	Chronic	4.9E-04	mg/m ³	1.4E-04	mg/kg-day	Developmental	1,000	HEAST	7/1997
Benzo(a)anthracene	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene ^c	Chronic	1.1E-01	mg/m ³	3.0E-02	mg/kg-day	Kidney	3,000	R9-R	12/28/2004
Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--
Beryllium	Chronic	2.0E-05	mg/m ³	5.7E-06	mg/kg-day	Immune System/Respiratory System	10	IRIS	7/25/2005
Cadmium	--	--	--	--	--	--	--	--	--
Chromium	--	--	--	--	--	--	--	--	--
Chrysene	--	--	--	--	--	--	--	--	--
Cobalt	Chronic	2.0E-05	mg/m ³	5.7E-06	mg/kg-day	Respiratory system	100	PPRTV	1/15/2002
Copper	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	--	--	--	--	--	--	--	--	--
Dieldrin	Chronic	1.8E-04	mg/m ³	5.0E-05	mg/kg-day	Liver	100	R9-R	12/28/2004
Endrin	Chronic	1.1E-03	mg/m ³	3.0E-04	mg/kg-day	Liver	100	R9-R	12/28/2004
Endrin aldehyde ^d	Chronic	1.1E-03	mg/m ³	3.0E-04	mg/kg-day	Liver	100	R9-R	12/28/2004

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-6.6: EPA RAGS PART D TABLE 5.2, NONCANCER TOXICITY DATA - INHALATION (Continued)

Method 2 Values

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Chemical of Potential Concern	Chronic/Subchronic	Inhalation RfC		Extrapolated RfD		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s)
Ethylbenzene	Chronic	1.0E+00	mg/m ³	2.9E-01	mg/kg-day	Developmental	300	IRIS	7/25/2005
Fluoranthene	Chronic	1.4E-01	mg/m ³	4.0E-02	mg/kg-day	Kidney/Liver/Blood	3,000	R9-R	12/28/2004
Fluorene	Chronic	1.4E-01	mg/m ³	4.0E-02	mg/kg-day	Blood	3,000	R9-R	12/28/2004
Freon 12	Chronic	2.0E-01	mg/m ³	5.7E-02	mg/kg-day	Liver	10,000	HEAST	7/31/1997
gamma-Chlordane ^b	Chronic	7.0E-04	mg/m ³	2.0E-04	mg/kg-day	Liver	1,000	IRIS	7/25/2005
Heptachlor	Chronic	1.8E-03	mg/m ³	5.0E-04	mg/kg-day	Liver	300	R9-R	12/28/2004
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	--
Iron	--	--	--	--	--	--	--	--	--
Isopropylbenzene	Chronic	4.0E-01	mg/m ³	1.1E-01	mg/kg-day	Kidney	1,000	IRIS	7/25/2005
Lead	--	--	--	--	--	--	--	--	--
m,p-Xylene ^e	Chronic	1.0E-01	mg/m ³	2.9E-02	mg/kg-day	CNS	300	IRIS	7/25/2005
Manganese	Chronic	5.0E-05	mg/m ³	1.4E-05	mg/kg-day	CNS	1,000	IRIS	7/25/2005
Mercury ^f	Chronic	3.0E-04	mg/m ³	8.6E-05	mg/kg-day	CNS	30	IRIS	7/25/2005
Molybdenum	--	--	--	--	--	--	--	--	--
n-Butylbenzene	Chronic	1.4E-01	mg/m ³	4.0E-02	mg/kg-day	Liver/Kidney	3,000	R9-R	12/28/2004
n-Propylbenzene	Chronic	1.4E-01	mg/m ³	4.0E-02	mg/kg-day	Liver/Kidney	3,000	R9-R	12/28/2004
Naphthalene	Chronic	3.0E-03	mg/m ³	8.6E-04	mg/kg-day	Nasal Epithelium	3,000	IRIS	7/25/2005
Nickel	Chronic	5.0E-05	mg/m ³	1.4E-05	mg/kg-day	Respiratory system	30	OEHHA a	2/2005
o-Xylene ^e	Chronic	1.0E-01	mg/m ³	2.9E-02	mg/kg-day	CNS	300	IRIS	7/25/2005
p-Isopropyltoluene ^g	Chronic	4.0E-01	mg/m ³	1.1E-01	mg/kg-day	Kidney	1,000	IRIS	7/25/2005
Pentachlorophenol	Chronic	1.1E-01	mg/m ³	3.0E-02	mg/kg-day	Liver/Kidney	100	R9-R	12/28/2004
Phenanthrene ^h	Chronic	1.1E+00	mg/m ³	3.0E-01	mg/kg-day	No observed effect	3,000	R9-R	12/28/2004
Phenol	Chronic	2.0E-01	mg/m ³	5.7E-02	mg/kg-day	Liver/CNS	100	OEHHA b	7/25/2005
Pyrene	Chronic	1.1E-01	mg/m ³	3.0E-02	mg/kg-day	Kidney	3,000	R9-R	12/28/2004
sec-Butylbenzene	Chronic	1.4E-01	mg/m ³	4.0E-02	mg/kg-day	Kidney	3,000	R9-R	12/28/2004
Selenium	Chronic	2.0E-02	mg/m ³	5.7E-03	mg/kg-day	Liver/Blood/Skin/CNS	3	OEHHA a	2/2005

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-6.6: EPA RAGS PART D TABLE 5.2, NONCANCER TOXICITY DATA - INHALATION (Continued)

Method 2 Values

Revised Remedial Investigation Report for Installation Restoratioin Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD		Primary Target Organ(s)	Combined Uncertainty/ Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s)
Silver	--	--	--	--	--	--	--	--	--
Thallium	--	--	--	--	--	--	--	--	--
Vanadium	--	--	--	--	--	--	--	--	--
Zinc	--	--	--	--	--	--	--	--	--

Notes:

- a 4,4'- DDT used as a surrogate for toxicity information.
- b Chlordane used as a surrogate for toxicity information.
- c Pyrene used as a surrogate for toxicity information.
- d Endrin used as a surrogate for toxicity information.
- e Toxicity information for total xylenes.
- f Toxicity information for elemental mercury.
- g Isopropylbenzene used as a surrogate for toxicity information.
- h Anthracene used as a surrogate for toxicity information

Definitions:

- Not available; not applicable
- CNS Central nervous system
- EPA U.S. Environmental Protection Agency
- HEAST EPA Health Effects Assessment Summary Tables (EPA 1997a)
- IRIS EPA Integrated Risk Information System (EPA 2007)
- mg/kg-day Milligrams per kilogram per day
- mg/m³ Milligrams per cubic meter
- OEHHA a Office of Environmental Health Hazard Assessment Chronic Reference Exposure Level (REL) Values (OEHHA 2005a)
- OEHHA b Office of Environmental Health Hazard Assessment Toxicity Criteria Database (OEHHA 2005b)
- PPRTV EPA Provisional Peer-Reviewed Toxicity Value (EPA 2004a)
- R9-R Source of toxicity value listed as "route extrapolation" in the EPA Region 9 Preliminary Remediation Goals (PRG) Table (EPA 2004e)
- RAGS Risk Assessment Guidance for Superfund
- RfC Reference concentration
- RfD Reference dose

References:

- Office of Environmental Health Hazard Assessment (OEHHA). 2005a. "Chronic Reference Exposure Levels." February. Online Address: http://www.oehha.ca.gov/air/chronic_rels/AllChrels.html.
- OEHHA. 2005b. "Toxicity Criteria Database." Online Address: <http://www.oehha.ca.gov/risk/chemicalDB/index.asp>.
- U.S. Environmental Protection Agency (EPA). 1997a. "Health Effects Assessment Summary Tables (HEAST)." FY 1997 Update, United States Environmental Protection Agency, Office of Solid Waste and Emergency Response, 9200.6-303 (97-1), EPA-540-R-97-036, PB97-921199, July 31.
- EPA. 2004a. "Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV)." Downloaded from <http://hhprrtv.ornl.gov/> on June 28, 2004.
- EPA. 2004e. "EPA Region IX Preliminary Remediation Goals." December. Online Address: <http://www.epa.gov/region09/waste/sfund/prg/index.htm>.
- EPA. 2007. "Integrated Risk Information System (IRIS)." Online Address: <http://www.epa.gov/iris/index.html>.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 8.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island, San Francisco, California, IR Sites 8, 28, and 29 through G11.2. SulTech, February 2009.

TABLE G-6.7: EPA RAGS Part D TABLE 6.1, CANCER TOXICITY DATA - ORAL/DERMAL

Method 2 Values

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral Cancer Slope Factor	
	Value	Units		Value (2)	Units		Source(s)	Date(s) (YYYY)
2-Methylnaphthalene	--	--	--	--	--	DI	IRIS	7/25/2005
4,4'-DDD	2.4E-01	(mg/kg-day) ⁻¹	100%	2.4E-01	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
4,4'-DDE	3.4E-01	(mg/kg-day) ⁻¹	100%	3.4E-01	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
4,4'-DDT	3.4E-01	(mg/kg-day) ⁻¹	100%	3.4E-01	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Acenaphthene	--	--	--	--	--	--	--	--
alpha-Chlordane ^a	1.3E+00	(mg/kg-day) ⁻¹	100%	1.3E+00	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Aluminum	--	--	--	--	--	--	--	--
Anthracene	--	--	--	--	--	D	IRIS	7/25/2005
Antimony	--	--	--	--	--	--	--	--
Arsenic	9.5E+00	(mg/kg-day) ⁻¹	100%	9.5E+00	(mg/kg-day) ⁻¹	A	OEHHA	7/25/2005
Barium	--	--	--	--	--	D	IRIS	7/25/2005
Benzo(a)anthracene	1.2E+00	(mg/kg-day) ⁻¹	100%	1.2E+00	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Benzo(a)pyrene	1.2E+01	(mg/kg-day) ⁻¹	100%	1.2E+01	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Benzo(b)fluoranthene	1.2E+00	(mg/kg-day) ⁻¹	100%	1.2E+00	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Benzo(g,h,i)perylene	--	--	--	--	--	D	IRIS	7/25/2005
Benzo(k)fluoranthene	1.2E+00	(mg/kg-day) ⁻¹	100%	1.2E+00	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Beryllium	--	--	--	--	--	B1	IRIS	7/25/2005
Cadmium ^b	--	--	--	--	--	B1	IRIS	7/25/2005
Chromium	--	--	--	--	--	D	IRIS	7/25/2005
Chrysene	1.2E-01	(mg/kg-day) ⁻¹	100%	1.2E-01	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Cobalt	--	--	--	--	--	B1	PPRTV	1/15/2002
Copper	--	--	--	--	--	D	IRIS	7/25/2005
Dibenzo(a,h)anthracene	7.3E+00	(mg/kg-day) ⁻¹	100%	7.3E+00	(mg/kg-day) ⁻¹	B2	BaP Eq	9/3/2003
Dieldrin	1.6E+01	(mg/kg-day) ⁻¹	100%	1.6E+01	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Endrin	--	--	--	--	--	D	IRIS	7/25/2005
Endrin aldehyde ^c	--	--	--	--	--	D	IRIS	7/25/2005
Ethylbenzene	--	--	--	--	--	D	IRIS	7/25/2005

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 3.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island, San Francisco, California, IR Sites 8, 28, and 29 through G11.2. SulTech, February 2009.

TABLE G-6.7: EPA RAGS Part D TABLE 6.1, CANCER TOXICITY DATA ORAL/DERMAL (Continued)

Method 2 Values

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral Cancer Slope Factor	
	Value	Units		Value (2)	Units		Source(s)	Date(s) (YYYY)
Fluoranthene	--	--	--	--	--	D	IRIS	7/25/2005
Fluorene	--	--	--	--	--	D	IRIS	7/25/2005
Freon 12	--	--	--	--	--	--	--	--
gamma-Chlordane ^a	1.3E+00	(mg/kg-day) ⁻¹	100%	1.3E+00	(mg/kg-day) ⁻¹	B2	OEHHA	09/2003
Heptachlor	4.5E+00	(mg/kg-day) ⁻¹	100%	4.5E+00	(mg/kg-day) ⁻¹	B2	IRIS	7/25/2005
Indeno(1,2,3-c,d)pyrene	1.2E+00	(mg/kg-day) ⁻¹	100%	1.2E+00	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Iron	--	--	--	--	--	--	--	--
Lead	--	--	--	--	--	--	--	--
m,p-Xylene ^d	--	--	--	--	--	DI	IRIS	7/25/2005
Manganese	--	--	--	--	--	D	IRIS	7/25/2005
Mercury ^e	--	--	--	--	--	D	IRIS	7/25/2005
Molybdenum	--	--	--	--	--	--	--	--
Naphthalene	1.2E-01	(mg/kg-day) ⁻¹	100%	1.2E-01	(mg/kg-day) ⁻¹	C (IRIS)	OEHHA	7/25/2005
Nickel	--	--	--	--	--	--	--	--
o-Xylene ^d	--	--	--	--	--	DI	IRIS	7/25/2005
Pentachlorophenol	1.2E-01	(mg/kg-day) ⁻¹	100%	1.2E-01	(mg/kg-day) ⁻¹	B2	IRIS	7/25/2005
Phenanthrene	--	--	--	--	--	D	IRIS	7/25/2005
Phenol	--	--	--	--	--	D	IRIS	7/25/2005
Pyrene	--	--	--	--	--	D	IRIS	7/25/2005
Selenium	--	--	--	--	--	D	IRIS	7/25/2005
Silver	--	--	--	--	--	D	IRIS	7/25/2005
Thallium	--	--	--	--	--	--	--	--
Vanadium	--	--	--	--	--	--	--	--
Zinc	--	--	--	--	--	D	IRIS	7/25/2005

TABLE G-6.7: EPA RAGS Part D TABLE 6.1, CANCER TOXICITY DATA - ORAL/DERMAL (Continued)

Method 2 Values

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 7.7	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island, San Francisco, California, Appendix C through G 11.2. SulTech. February 2009.

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral Cancer Slope Factor	
	Value	Units		Value (2)	Units		Source(s)	Date(s) (YYYY)

Notes:

- a Chlordane used as surrogate for toxicity information.
- b No oral cancer slope factor was selected for cadmium for Method 2 (and therefore, no dermal cancer slope factor was derived from an oral cancer slope factor). According to EPA, there are no positive studies of orally ingested cadmium suitable for quantitation (EPA 2007).
- c Endrin used as a surrogate for toxicity information.
- d Toxicity information for total xylenes.
- e Toxicity information for elemental mercury.

- (1) Per EPA's Dermal Guidance document (EPA 2004c), an ABSGI value of 100% is recommended for organic and inorganic COPCs without ABS_{GI} values listed in Exhibit 4-1 of EPA 2004c. Per EPA's Dermal Guidance document (EPA 2004c), an ABSGI value of 100% is recommended for COPCs with ABS_{GI} values of greater than 50% in Exhibit 4-1 of EPA 2004c.
- (2) In the actual derivation of absorbed cancer slope factors for dermal exposure, oral absorption efficiency was assumed to be 100 percent for all chemicals per DTSC recommendations (2005e).

Definitions:

--	Not available; not applicable
BaP Eq	Toxicity factor based on benzo(a)pyrene equivalents (BaP Eq) (EPA 1993).
OEHHA	Office of Environmental Health Hazard Assessment Toxicity Criteria Database (OEHHA 2005b)
DI	Data inadequate to assess carcinogenicity (EPA 2007)
EPA	U.S. Environmental Protection Agency
IRIS	EPA Integrated Risk Information System (EPA 2007)
PPRTV	EPA Provisional Peer-Reviewed Toxicity Value (EPA 2004a)
(mg/kg-day) ⁻¹	Reciprocal milligrams per kilogram per day
RAGS	Risk Assessment Guidance for Superfund

References:

Department of Toxic Substances Control (DTSC). 2005e. "Comment Memorandum Regarding Remedial Investigation Work Plan, Site 12, Naval Station Treasure Island, San Francisco, California." From B. Davis, Staff Toxicologist, Human Health and Ecological Risk Division. To David Rist, Office of Military Facilities, Northern California. June 20.

Office of Environmental Health Hazard Assessment (OEHHA). 2005b. "Toxicity Criteria Database." Online Address: <http://www.oehha.ca.gov/risk/chemicalDB/index.asp>.

U.S. Environmental Protection Agency (EPA). 1993. "Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons." Office of Research and Development. EPA/600/R-93/089.

EPA. 2004a. "Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV)." Downloaded from <http://hhpprtv.ornl.gov/> on June 28, 2004.

EPA. 2004c. "Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Final." Office of Superfund Remediation and Technology Innovation. Office of Solid Waste and Emergency Response (OSWER) 9285.7-02EP. July.

EPA. 2007. "Integrated Risk Information System (IRIS)." Online Address: <http://www.epa.gov/iris/index.html>.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-6.8: EPA RAGS PART D TABLE 6.2, CANCER TOXICITY DATA - INHALATION

Method 2 Values

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation Cancer Slope Factor	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
2-Methylnaphthalene	--	--	--	--	DI	IRIS	7/25/2005
4,4'-DDD	6.9E-05	(ug/m ³) ⁻¹	2.40E-01	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
4,4'-DDE	9.7E-05	(ug/m ³) ⁻¹	3.40E-01	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
4,4'-DDT	9.7E-05	(ug/m ³) ⁻¹	3.40E-01	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Acenaphthene	--	--	--	--	--	--	--
alpha-Chlordane ^a	3.4E-04	(ug/m ³) ⁻¹	1.20E+00	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Aluminum	--	--	--	--	--	--	--
Anthracene	--	--	--	--	D	IRIS	7/25/2005
Antimony	--	--	--	--	--	--	--
Arsenic	4.3E-03	(ug/m ³) ⁻¹	1.5E+01	(mg/kg-day) ⁻¹	A	IRIS	7/25/2005
Barium	--	--	--	--	D	IRIS	7/25/2005
Benzo(a)anthracene	1.1E-04	(ug/m ³) ⁻¹	3.9E-01	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Benzo(a)pyrene	1.1E-03	(ug/m ³) ⁻¹	3.9E+00	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Benzo(b)fluoranthene	1.1E-04	(ug/m ³) ⁻¹	3.9E-01	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Benzo(g,h,i)perylene	--	--	--	--	D	IRIS	7/25/2005
Benzo(k)fluoranthene	1.1E-04	(ug/m ³) ⁻¹	3.9E-01	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Beryllium	2.4E-03	(ug/m ³) ⁻¹	8.4E+00	(mg/kg-day) ⁻¹	B1 (IRIS)	OEHHA	7/25/2005
Cadmium	4.2E-03	(ug/m ³) ⁻¹	1.5E+01	(mg/kg-day) ⁻¹	B1	OEHHA	7/25/2005
Chromium ^b	--	--	4.2E+01	(mg/kg-day) ⁻¹	--	R9-I	12/28/2004
Chrysene	1.1E-05	(ug/m ³) ⁻¹	3.9E-02	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Cobalt	2.8E-03	(ug/m ³) ⁻¹	9.8E+00	(mg/kg-day) ⁻¹	B1	PPRTV	1/15/2002
Copper	--	--	--	--	D	IRIS	7/25/2005
Dibenzo(a,h)anthracene	2.1E-03	(ug/m ³) ⁻¹	7.3E+00	(mg/kg-day) ⁻¹	B2	R9-R	12/28/2004
Dieldrin	4.6E-03	(ug/m ³) ⁻¹	1.6E+01	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-6.8: EPA RAGS PART D TABLE 6.2, CANCER TOXICITY DATA - INHALATION (Continued)

Method 2 Values

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation Cancer Slope Factor	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Endrin	--	--	--	--	D	IRIS	7/25/2005
Endrin aldehyde ^c	--	--	--	--	D	IRIS	7/25/2005
Ethylbenzene	--	--	--	--	D	IRIS	7/25/2005
Fluoranthene	--	--	--	--	D	IRIS	7/25/2005
Fluorene	--	--	--	--	D	IRIS	7/25/2005
Freon 12	--	--	--	--	--	--	--
gamma-Chlordane ^a	3.4E-04	(ug/m ³) ⁻¹	1.2E+00	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Heptachlor	1.3E-03	(ug/m ³) ⁻¹	4.6E+00	(mg/kg-day) ⁻¹	B2	IRIS	7/25/2005
Indeno(1,2,3-c,d)pyrene	1.1E-04	(ug/m ³) ⁻¹	3.9E-01	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Iron	--	--	--	--	--	--	--
Isopropylbenzene	--	--	--	--	D	IRIS	7/25/2005
Lead	--	--	--	--	B2	IRIS	7/25/2005
m,p-Xylene ^d	--	--	--	--	DI	IRIS	7/25/2005
Manganese	--	--	--	--	D	IRIS	7/25/2005
Mercury	--	--	--	--	D	IRIS	7/25/2005
Molybdenum	--	--	--	--	--	--	--
n-Butylbenzene	--	--	--	--	--	--	--
n-Propylbenzene	--	--	--	--	--	--	--
Naphthalene	3.4E-05	(ug/m ³) ⁻¹	1.2E-01	(mg/kg-day) ⁻¹	C (IRIS)	OEHHA	7/25/2005
Nickel	2.6E-04	(ug/m ³) ⁻¹	9.1E-01	(mg/kg-day) ⁻¹	A	OEHHA	7/25/2005
o-Xylene ^d	--	--	--	--	--	--	--
p-Isopropyltoluene ^e	--	--	--	--	D	IRIS	7/25/2005
Pentachlorophenol	4.60E-06	(ug/m ³) ⁻¹	1.8E-02	(mg/kg-day) ⁻¹	B2	OEHHA	7/25/2005
Phenanthrene	--	--	--	--	D	IRIS	7/25/2005
Phenol	--	--	--	--	D	IRIS	7/25/2005
Pyrene	--	--	--	--	D	IRIS	7/25/2005

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-6.8: EPA RAGS PART D TABLE 6.2, CANCER TOXICITY DATA - INHALATION (Continued)

Method 2 Values

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation Cancer Slope Factor	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
sec-Butylbenzene	--	--	--	--	--	--	--
Selenium	--	--	--	--	D	IRIS	7/25/2005
Silver	--	--	--	--	D	IRIS	7/25/2005
Thallium	--	--	--	--	--	--	--
Vanadium	--	--	--	--	--	--	--
Zinc	--	--	--	--	--	--	--

Notes:

- a Chlordane used as a surrogate for toxicity information.
- b Toxicity information for total chromium (1:6 ratio Cr VI:Cr III).
- c Endrin used as a surrogate for toxicity information.
- d Toxicity information for total xylenes.
- e Isopropylbenzene used as a surrogate for toxicity information.

Definitions:

- Not available; not applicable
- DI Date inadequate to assess carcinogenicity (EPA 2007)
- EPA U.S. Environmental Protection Agency
- IRIS EPA Integrated Risk Information System (EPA 2007)
- ($\mu\text{g}/\text{m}^3$)⁻¹ Reciprocal micrograms per cubic meter
- ($\text{mg}/\text{kg}\text{-day}$)⁻¹ Reciprocal milligrams per kilogram per day
- OEHHA Office of Environmental Health Hazard Assessment Toxicity Criteria Database (OEHHA 2005b).
- PPRTV EPA Provisional Peer-Reviewed Toxicity Value (EPA 2004a)
- R9-I Source of toxicity value listed as "IRIS" in the EPA Region 9 Preliminary Remediation Goals (PRG) Table (EPA 2004e)
- R9-R Source of toxicity value listed as "route extrapolation" in the EPA Region 9 PRG Table (EPA 2004e)
- RAGS Risk Assessment Guidance for Superfund

References:

- Office of Environmental Health Hazard Assessment (OEHHA). 2005b. "Toxicity Criteria Database." Online Address: <http://www.oehha.ca.gov/risk/chemicalDB/index.asp>.
- U.S. Environmental Protection Agency (EPA). 2004a. "Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV)." Downloaded from <http://hhprtvtv.ornl.gov/> on June 28, 2004.
- EPA. 2004e. "EPA Region 9 Preliminary Remediation Goals." December. Online Address: <http://www.epa.gov/region09/waste/sfund/prg/index.htm>.
- EPA. 2007. "Integrated Risk Information System (IRIS)." Online Address: <http://www.epa.gov/iris/index.html>.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-7.1.1

EPA RAGS PART D TABLE 7, CALCULATION OF RME CANCER RISKS AND NON-CANCER HAZARDS USING TOXICITY DATA FROM DTSC PREFERRED AND EPA SOURCES (METHOD 2)
 COMMERCIAL/INDUSTRIAL WORKER, SITE 28 SURFACE SOIL (0-2 ft bgs)

Revised Remedial Investigation Report for Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Receptor Population:	Industrial Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				Non-Cancer Hazard Calculations						
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		Value	Units				
Soil (0-2 ft bgs)	Soil	Site Soil	Ingestion	Antimony	6.94E-01	mg/kg	2.43E-07	mg/kg-day	--	--	--	6.80E-07	mg/kg-day	4.00E-04	mg/kg-day	1.70E-03	
				Lead	8.30E+02	mg/kg	2.90E-04	mg/kg-day	--	--	--	8.12E-04	mg/kg-day	--	--	--	
				Thallium	8.88E-01	mg/kg	3.10E-07	mg/kg-day	--	--	--	8.69E-07	mg/kg-day	8.00E-05	mg/kg-day	1.09E-02	
			Exposure Route Total														1.26E-02
			Dermal	Antimony	6.94E-01	mg/kg	0.00E+00	mg/kg-day	--	--	--	0.00E+00	mg/kg-day	4.00E-04	mg/kg-day	0.00E+00	
				Lead	8.30E+02	mg/kg	3.31E-06	mg/kg-day	--	--	--	9.25E-06	mg/kg-day	--	--	--	
	Thallium	8.88E-01		mg/kg	0.00E+00	mg/kg-day	--	--	--	0.00E+00	mg/kg-day	8.00E-05	mg/kg-day	0.00E+00			
	Exposure Route Total															0.00E+00	
	Exposure Point Total																1.26E-02
	Exposure Medium Total																1.26E-02
	Air	Outdoor Air	Inhalation (Particulates)	Antimony	5.26E-10	mg/m ³	2.50E-11	mg/kg-day	--	--	--	7.00E-11	mg/kg-day	--	--	--	
				Lead	6.28E-07	mg/m ³	2.99E-08	mg/kg-day	--	--	--	8.36E-08	mg/kg-day	--	--	--	
Thallium				6.72E-10	mg/m ³	3.20E-11	mg/kg-day	--	--	--	8.95E-11	mg/kg-day	--	--	--		
Exposure Route Total														0.00E+00			
Inhalation (Volatiles)				--	--	--	--	--	--	--	--	--	--	--	--	--	
Exposure Route Total														0.00E+00			
Exposure Point Total															0.00E+00		
Exposure Medium Total															0.00E+00		
Medium Total																1.26E-02	
Total of Receptor Risks Across All Media										0.00E+00	Total of Receptor Hazards Across All Media				1.26E-02		

- Notes:**
- Not applicable or not available
 - CSF Cancer slope factor
 - DTSC Department of Toxic Substances Control
 - EPA U.S. Environmental Protection Agency
 - EPC Exposure point concentration
 - ft bgs Feet below ground surface
 - HHRA Human health risk assessment
 - mg/kg Milligram per kilogram
 - mg/kg-day Milligram per kilogram per day
 - (mg/kg-day)-1 1/(Milligram per kilogram per day)
 - mg/m³ Milligram per cubic meter
 - RAGS Risk Assessment Guidelines for Superfund
 - RfD Reference dose
 - RfC Reference concentration
 - RME Reasonable maximum exposure

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-7.1.2

EPA RAGS PART D TABLE 7, CALCULATION OF RME CANCER RISKS AND NON-CANCER HAZARDS USING TOXICITY DATA FROM DTSC PREFERRED AND EPA SOURCES (METHOD 2)
CONSTRUCTION WORKER, SITE 28 SURFACE SOIL (0-2 ft bgs)

Revised Remedial Investigation Report for Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				Non-Cancer Hazard Calculations									
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient				
							Value	Units	Value	Units		Value	Units							
Soil (0-2 ft bgs)	Soil	Site Soil	Ingestion	Antimony	6.94E-01	mg/kg	3.20E-08	mg/kg-day	--	--	--	2.24E-06	mg/kg-day	4.00E-04	mg/kg-day	5.61E-03				
				Lead	8.30E+02	mg/kg	3.83E-05	mg/kg-day	--	--	--	2.68E-03	mg/kg-day	--	--	--				
				Thallium	8.88E-01	mg/kg	4.09E-08	mg/kg-day	--	--	--	2.87E-06	mg/kg-day	8.00E-05	mg/kg-day	3.58E-02				
			Exposure Route Total															0.00E+00	4.14E-02	
			Dermal	Antimony	6.94E-01	mg/kg	0.00E+00	mg/kg-day	--	--	--	0.00E+00	mg/kg-day	4.00E-04	mg/kg-day	0.00E+00				
				Lead	8.30E+02	mg/kg	5.29E-07	mg/kg-day	--	--	--	3.70E-05	mg/kg-day	--	--	0.00E+00				
	Thallium	8.88E-01		mg/kg	0.00E+00	mg/kg-day	--	--	--	0.00E+00	mg/kg-day	8.00E-05	mg/kg-day	0.00E+00						
	Exposure Route Total																0.00E+00	0.00E+00		
	Exposure Point Total																	0.00E+00	4.14E-02	
	Exposure Medium Total																	0.00E+00	4.14E-02	
	Air	Outdoor Air	Inhalation (Particulates)	Antimony	1.06E-09	mg/m ³	2.95E-12	mg/kg-day	--	--	--	2.07E-10	mg/kg-day	--	--	--				
				Lead	1.26E-06	mg/m ³	3.52E-09	mg/kg-day	--	--	--	2.47E-07	mg/kg-day	--	--	--				
Thallium				1.35E-09	mg/m ³	3.77E-12	mg/kg-day	--	--	--	2.64E-10	mg/kg-day	--	--	--					
Exposure Route Total																0.00E+00	0.00E+00			
Inhalation (Volatiles)				--	--	--	--	--	--	--	--	--	--	--	--	--				
Exposure Route Total																0.00E+00	0.00E+00			
Exposure Point Total																	0.00E+00	0.00E+00		
Exposure Medium Total																	0.00E+00	4.14E-02		
Medium Total																	0.00E+00	4.14E-02		
Total of Receptor Risks Across All Media										0.00E+00	Total of Receptor Hazards Across All Media				4.14E-02					

- Notes:**
- Not applicable or not available
 - CSF Cancer slope factor
 - DTSC Department of Toxic Substances Control
 - EPA U.S. Environmental Protection Agency
 - EPC Exposure point concentration
 - ft bgs Feet below ground surface
 - HHRA Human health risk assessment
 - mg/kg Milligram per kilogram
 - mg/kg-day Milligram per kilogram per day
 - (mg/kg-day)-1 1/(Milligram per kilogram per day)
 - mg/m³ Milligram per cubic meter
 - RAGS Risk Assessment Guidelines for Superfund
 - RfD Reference dose
 - RfC Reference concentration
 - RME Reasonable maximum exposure

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-7.1.3

EPA RAGS PART D TABLE 7, CALCULATION OF RME CANCER RISKS AND NON-CANCER HAZARDS USING TOXICITY DATA FROM DTSC PREFERRED AND EPA SOURCES (METHOD 2)
 ADULT RESIDENT, SITE 28 SURFACE SOIL (0-2 ft bgs)

Revised Remedial Investigation Report for Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				Non-Cancer Hazard Calculations									
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient				
							Value	Units	Value	Units		Value	Units							
Soil (0-2 ft bgs)	Soil	Site Soil	Ingestion	Antimony	6.94E-01	mg/kg	3.26E-07	mg/kg-day	--	--	--	9.51E-07	mg/kg-day	4.00E-04	mg/kg-day	2.38E-03				
				Lead	8.30E+02	mg/kg	3.90E-04	mg/kg-day	--	--	--	1.14E-03	mg/kg-day	--	--	--				
				Thallium	8.88E-01	mg/kg	4.17E-07	mg/kg-day	--	--	--	1.22E-06	mg/kg-day	8.00E-05	mg/kg-day	1.52E-02				
			Exposure Route Total															0.00E+00	1.76E-02	
			Dermal	Antimony	6.94E-01	mg/kg	0.00E+00	mg/kg-day	--	--	--	0.00E+00	mg/kg-day	4.00E-04	mg/kg-day	0.00E+00				
				Lead	8.30E+02	mg/kg	1.55E-06	mg/kg-day	--	--	--	4.53E-06	mg/kg-day	--	--	0.00E+00				
	Thallium	8.88E-01		mg/kg	0.00E+00	mg/kg-day	--	--	--	0.00E+00	mg/kg-day	8.00E-05	mg/kg-day	0.00E+00						
	Exposure Route Total																0.00E+00	0.00E+00		
	Exposure Point Total																	0.00E+00	1.76E-02	
	Exposure Medium Total																	0.00E+00	1.76E-02	
	Air	Outdoor Air	Inhalation (Particulates)	Antimony	5.26E-10	mg/m ³	4.92E-11	mg/kg-day	--	--	--	1.44E-10	mg/kg-day	--	--	--				
				Lead	6.28E-07	mg/m ³	5.88E-08	mg/kg-day	--	--	--	1.72E-07	mg/kg-day	--	--	--				
Thallium				6.72E-10	mg/m ³	6.29E-11	mg/kg-day	--	--	--	1.83E-10	mg/kg-day	--	--	--					
Exposure Route Total																0.00E+00	0.00E+00			
Inhalation (Volatiles)				--	--	--	--	--	--	--	--	--	--	--	--	--				
				--	--	--	--	--	--	--	--	--	--	--	--	--				
Exposure Route Total																	0.00E+00	0.00E+00		
Exposure Point Total																		0.00E+00	0.00E+00	
Exposure Medium Total																		0.00E+00	0.00E+00	
Medium Total																		0.00E+00	1.76E-02	
Total of Receptor Risks Across All Media										0.00E+00	Total of Receptor Hazards Across All Media				1.76E-02					

- Notes:
- Not applicable or not available
 - CSF Cancer slope factor
 - DTSC Department of Toxic Substances Control
 - EPA U.S. Environmental Protection Agency
 - EPC Exposure point concentration
 - ft bgs Feet below ground surface
 - HHRA Human health risk assessment
 - mg/kg Milligram per kilogram
 - mg/kg-day Milligram per kilogram per day
 - (mg/kg-day)-1 1/(Milligram per kilogram per day)
 - mg/m³ Milligram per cubic meter
 - RAGS Risk Assessment Guidelines for Superfund
 - RfD Reference dose
 - RfC Reference concentration
 - RME Reasonable maximum exposure

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-7.1.4

EPA RAGS PART D TABLE 7, CALCULATION OF RME CANCER RISKS AND NON-CANCER HAZARDS USING TOXICITY DATA FROM DTSC PREFERRED AND EPA SOURCES (METHOD 2)
CHILD RESIDENT, SITE 28 SURFACE SOIL (0-2 ft bgs)

Revised Remedial Investigation Report for Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				Non-Cancer Hazard Calculations									
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient				
							Value	Units	Value	Units		Value	Units							
Soil (0-2 ft bgs)	Soil	Site Soil	Ingestion	Antimony	6.94E-01	mg/kg	7.61E-07	mg/kg-day	--	--	--	8.88E-06	mg/kg-day	4.00E-04	mg/kg-day	2.22E-02				
				Lead	8.30E+02	mg/kg	9.09E-04	mg/kg-day	--	--	--	1.06E-02	mg/kg-day	--	--	--				
				Thallium	8.88E-01	mg/kg	9.73E-07	mg/kg-day	--	--	--	1.13E-05	mg/kg-day	8.00E-05	mg/kg-day	1.42E-01				
			Exposure Route Total															0.00E+00	1.64E-01	
			Dermal	Antimony	6.94E-01	mg/kg	0.00E+00	mg/kg-day	--	--	--	0.00E+00	mg/kg-day	4.00E-04	mg/kg-day	0.00E+00				
				Lead	8.30E+02	mg/kg	2.64E-06	mg/kg-day	--	--	--	3.08E-05	mg/kg-day	--	--	0.00E+00				
	Thallium	8.88E-01		mg/kg	0.00E+00	mg/kg-day	--	--	--	0.00E+00	mg/kg-day	8.00E-05	mg/kg-day	0.00E+00						
	Exposure Route Total																0.00E+00	0.00E+00		
	Exposure Point Total																	0.00E+00	1.64E-01	
	Exposure Medium Total																		0.00E+00	1.64E-01
	Air	Outdoor Air	Inhalation (Particulates)	Antimony	5.26E-10	mg/m ³	2.91E-11	mg/kg-day	--	--	--	3.39E-10	mg/kg-day	--	--	--				
				Lead	6.28E-07	mg/m ³	3.47E-08	mg/kg-day	--	--	--	4.05E-07	mg/kg-day	--	--	--				
Thallium				6.72E-10	mg/m ³	3.71E-11	mg/kg-day	--	--	--	4.33E-10	mg/kg-day	--	--	--					
Exposure Route Total																0.00E+00	0.00E+00			
Inhalation (Volatiles)			--	--	--	--	--	--	--	--	--	--	--	--	--					
			--	--	--	--	--	--	--	--	--	--	--	--	--					
Exposure Route Total																	0.00E+00	0.00E+00		
Exposure Point Total																		0.00E+00	0.00E+00	
Exposure Medium Total																		0.00E+00	0.00E+00	
Medium Total																		0.00E+00	1.64E-01	
Total of Receptor Risks Across All Media																		0.00E+00	Total of Receptor Hazards Across All Media	1.64E-01

- Notes:**
- Not applicable or not available
 - CSF Cancer slope factor
 - DTSC Department of Toxic Substances Control
 - EPA U.S. Environmental Protection Agency
 - EPC Exposure point concentration
 - ft bgs Feet below ground surface
 - HHRA Human health risk assessment
 - mg/kg Milligram per kilogram
 - mg/kg-day Milligram per kilogram per day
 - (mg/kg-day)-1 1/(Milligram per kilogram per day)
 - mg/m³ Milligram per cubic meter
 - RAGS Risk Assessment Guidelines for Superfund
 - RfD Reference dose
 - RfC Reference concentration
 - RME Reasonable maximum exposure

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-8.1.1

EPA RAGS PART D TABLE 9

SUMMARY OF RME RECEPTOR RISKS AND HAZARDS FOR COPCs USING TOXICITY DATA FROM DTSC-PREFERRED AND EPA SOURCES (METHOD 2) COMMERCIAL/INDUSTRIAL WORKER, SITE 28 SURFACE SOIL (0-2 ft bgs)

Revised Remedial Investigation Report for Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Receptor Population:	Industrial Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Inhalation	Exposure Routes Total	
Soil (0-2 ft bgs)	Soil	Site Soil	Antimony	--	--	--	--	Whole body/Blood/Immune System	1.70E-03	0.00E+00	--	1.70E-03	
			Lead	--	--	--	--		--	--	--	--	
			Thallium	--	--	--	--	Blood	1.09E-02	0.00E+00	--	1.09E-02	
			Chemical Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00		1.26E-02	0.00E+00	0.00E+00	1.26E-02	
		Exposure Point Total										1.26E-02	
		Exposure Medium Total										1.26E-02	
	Air	Outdoor Air (Particulates and VOCs)	Antimony	--	--	--	--	--	--	--	--	--	--
			Lead	--	--	--	--	--	--	--	--	--	--
			Thallium	--	--	--	--	--	--	--	--	--	--
			Chemical Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00		0.00E+00	0.00E+00	0.00E+00	0.00E+00	
	Exposure Point Total										0.00E+00		
	Exposure Medium Total										0.00E+00		
Medium Total												1.26E-02	
Receptor Total							Receptor Risk Total	0.00E+00				Receptor HI Total	1.26E-02

- Notes:**
- Not applicable or not available
 - COPC Chemicals of Potential Concern
 - CNS Central nervous system
 - DTSC Department of Toxic Substances Control
 - EPA U.S. Environmental Protection Agency
 - ft bgs Feet below ground service
 - GI Gastrointestinal
 - HHRA Human health risk assessment
 - HI Hazard index
 - RAGS Risk Assessment Guidelines for Superfund
 - RI Remedial Investigation
 - RME Reasonable maximum exposure
 - VOC Volatile organic compound

Total Organ 1 (Liver) HI Across All Media =	--
Total Organ 2 (Kidney) HI Across All Media =	--
Total Organ 3 (Fetus) HI Across All Media =	--
Total Organ 4 (Nervous System) HI Across All Media =	--
Total Organ 5 (Endocrine system) HI Across All Media =	--
Total Organ 6 (Blood) HI Across All Media =	1.26E-02
Total Organ 7 (Skin) HI Across All Media =	--
Total Organ 8 (No Observed Effect) HI Across All Media =	--
Total Organ 9 (Unknown Systems) HI Across All Media =	--
Total Organ 10 (Gastrointestinal System) HI Across All Media =	--
Total Organ 11 (Vision/Eye) HI Across All Media =	--
Total Organ 12 (Body Weight) HI Across All Media =	--
Total Organ 13 (Developmental) HI Across All Media =	--
Total Organ 14 (Respiratory/lung) HI Across All Media =	--
Total Organ 15 (Whole Body) HI Across All Media =	1.70E-03
Total Organ 16 (Immune System) HI Across All Media =	1.70E-03
Total Organ 17 (Reproductive System) HI Across All Media =	--
Total Organ 18 (Finger and Toe Nail) HI Across All Media =	--
Total Organ 19 (Nasal Tissue) HI Across All Media =	--

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-8.1.2

EPA RAGS PART D TABLE 9

SUMMARY OF RME RECEPTOR RISKS AND HAZARDS FOR COPCs USING TOXICITY DATA FROM DTSC-PREFERRED AND EPA SOURCES (METHOD 2)
CONSTRUCTION WORKER, SITE 28 SURFACE SOIL (0-2 ft bgs)

Revised Remedial Investigation Report for Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Inhalation	Exposure Routes Total	
Soil (0-2 ft bgs)	Soil	Site Soil	Antimony	--	--	--	--	Whole body/Blood/Immune System	5.61E-03	0.00E+00	--	5.61E-03	
			Lead	--	--	--	--		--	--	--	--	
			Thallium	--	--	--	--		Blood	3.58E-02	0.00E+00	--	3.58E-02
			Chemical Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00			4.14E-02	0.00E+00	0.00E+00	4.14E-02
		Exposure Point Total										4.14E-02	
	Exposure Medium Total					0.00E+00						4.14E-02	
	Air	Outdoor Air (Particulates and VOCs)	Antimony	--	--	--	--	--	--	--	--	--	--
			Lead	--	--	--	--	--	--	--	--	--	--
			Thallium	--	--	--	--	--	--	--	--	--	--
			Chemical Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00		0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exposure Point Total					0.00E+00						0.00E+00		
Exposure Medium Total					0.00E+00						0.00E+00		
Medium Total							0.00E+00					4.14E-02	
Receptor Total							0.00E+00					4.14E-02	
				Receptor Risk Total					Receptor HI Total				4.14E-02

- Notes:**
- Not applicable or not available
 - COPC Chemicals of Potential Concern
 - CNS Central nervous system
 - DTSC Department of Toxic Substances Control
 - EPA U.S. Environmental Protection Agency
 - ft bgs Feet below ground service
 - GI Gastrointestinal
 - HHRA Human health risk assessment
 - HI Hazard index
 - RAGS Risk Assessment Guidelines for Superfund
 - RI Remedial Investigation
 - RME Reasonable maximum exposure
 - VOC Volatile organic compound

Total Organ 1 (Liver) HI Across All Media =	--
Total Organ 2 (Kidney) HI Across All Media =	--
Total Organ 3 (Fetus) HI Across All Media =	--
Total Organ 4 (Nervous System) HI Across All Media =	--
Total Organ 5 (Endocrine system) HI Across All Media =	--
Total Organ 6 (Blood) HI Across All Media =	4.14E-02
Total Organ 7 (Skin) HI Across All Media =	--
Total Organ 8 (No Observed Effect) HI Across All Media =	--
Total Organ 9 (Unknown Systems) HI Across All Media =	--
Total Organ 10 (Gastrointestinal System) HI Across All Media =	--
Total Organ 11 (Vision/Eye) HI Across All Media =	--
Total Organ 12 (Body Weight) HI Across All Media =	--
Total Organ 13 (Developmental) HI Across All Media =	--
Total Organ 14 (Respiratory/lung) HI Across All Media =	--
Total Organ 15 (Whole Body) HI Across All Media =	5.61E-03
Total Organ 16 (Immune System) HI Across All Media =	5.61E-03
Total Organ 17 (Reproductive System) HI Across All Media =	--
Total Organ 18 (Finger and Toe Nail) HI Across All Media =	--
Total Organ 19 (Nasal Tissue) HI Across All Media =	--

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-8.1.3

EPA RAGS PART D TABLE 9

SUMMARY OF RME RECEPTOR RISKS AND HAZARDS FOR COPCs USING TOXICITY DATA FROM DTSC-PREFERRED AND EPA SOURCES (METHOD 2)

ADULT RESIDENT, SITE 28 SURFACE SOIL (0-2 ft bgs)

Revised Remedial Investigation Report for Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Inhalation	Exposure Routes Total	
Soil (0-2 ft bgs)	Soil	Site Soil	Antimony	--	--	--	--	Whole body/Blood/Immune System	2.38E-03	0.00E+00	--	2.38E-03	
			Lead	--	--	--	--		--	--	--	--	--
			Thallium	--	--	--	--		Blood	1.52E-02	0.00E+00	--	1.52E-02
			Chemical Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00			1.76E-02	0.00E+00	0.00E+00	1.76E-02
			Exposure Point Total									1.76E-02	
			Exposure Medium Total									1.76E-02	
		Air	Outdoor Air (Particulates and VOCs)	Antimony	--	--	--	--	--	--	--	--	--
	Lead			--	--	--	--	--	--	--	--	--	
	Thallium			--	--	--	--	--	--	--	--	--	
	Chemical Total			0.00E+00	0.00E+00	0.00E+00	0.00E+00		0.00E+00	0.00E+00	0.00E+00	0.00E+00	
		Exposure Point Total									0.00E+00		
		Exposure Medium Total									0.00E+00		
Medium Total											1.76E-02		
Receptor Total						Receptor Risk Total	0.00E+00				Receptor HI Total	1.76E-02	

- Notes:**
- Not applicable or not available
 - COPC Chemicals of Potential Concern
 - CNS Central nervous system
 - DTSC Department of Toxic Substances Control
 - EPA U.S. Environmental Protection Agency
 - ft bgs Feet below ground service
 - GI Gastrointestinal
 - HHRA Human health risk assessment
 - HI Hazard index
 - RAGS Risk Assessment Guidelines for Superfund
 - RI Remedial Investigation
 - RME Reasonable maximum exposure
 - VOC Volatile organic compound

Total Organ 1 (Liver) HI Across All Media =	--
Total Organ 2 (Kidney) HI Across All Media =	--
Total Organ 3 (Fetus) HI Across All Media =	--
Total Organ 4 (Nervous System) HI Across All Media =	--
Total Organ 5 (Endocrine system) HI Across All Media =	--
Total Organ 6 (Blood) HI Across All Media =	1.76E-02
Total Organ 7 (Skin) HI Across All Media =	--
Total Organ 8 (No Observed Effect) HI Across All Media =	--
Total Organ 9 (Unknown Systems) HI Across All Media =	--
Total Organ 10 (Gastrointestinal System) HI Across All Media =	--
Total Organ 11 (Vision/Eye) HI Across All Media =	--
Total Organ 12 (Body Weight) HI Across All Media =	--
Total Organ 13 (Developmental) HI Across All Media =	--
Total Organ 14 (Respiratory/lung) HI Across All Media =	--
Total Organ 15 (Whole Body) HI Across All Media =	2.38E-03
Total Organ 16 (Immune System) HI Across All Media =	2.38E-03
Total Organ 17 (Reproductive System) HI Across All Media =	--
Total Organ 18 (Finger and Toe Nail) HI Across All Media =	--
Total Organ 19 (Nasal Tissue) HI Across All Media =	--

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-8.1.4

EPA RAGS PART D TABLE 9

SUMMARY OF RME RECEPTOR RISKS AND HAZARDS FOR COPCs USING TOXICITY DATA FROM DTSC-PREFERRED AND EPA SOURCES (METHOD 2)

CHILD RESIDENT, SITE 28 SURFACE SOIL (0-2 ft bgs)

Revised Remedial Investigation Report for Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Inhalation	Exposure Routes Total	
Soil (0-2 ft bgs)	Soil	Site Soil	Antimony	--	--	--	--	Whole body/Blood/Immune System	2.22E-02	0.00E+00	--	2.22E-02	
			Lead	--	--	--	--		--	--	--	--	
			Thallium	--	--	--	--	Blood	1.42E-01	0.00E+00	--	1.42E-01	
			Chemical Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00		1.64E-01	0.00E+00	0.00E+00	1.64E-01	
		Exposure Point Total										1.64E-01	
		Exposure Medium Total										1.64E-01	
	Air	Outdoor Air (Particulates and VOCs)	Antimony	--	--	--	--	--	--	--	--	--	--
			Lead	--	--	--	--	--	--	--	--	--	--
			Thallium	--	--	--	--	--	--	--	--	--	--
			Chemical Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00		0.00E+00	0.00E+00	0.00E+00	0.00E+00	
	Exposure Point Total										0.00E+00		
	Exposure Medium Total										0.00E+00		
Medium Total												1.64E-01	
Receptor Total							0.00E+00					1.64E-01	
				Receptor Risk Total				Receptor HI Total				1.64E-01	

- Notes:**
- Not applicable or not available
 - COPC Chemicals of Potential Concern
 - CNS Central nervous system
 - DTSC Department of Toxic Substances Control
 - EPA U.S. Environmental Protection Agency
 - ft bgs Feet below ground service
 - GI Gastrointestinal
 - HHRA Human health risk assessment
 - HI Hazard index
 - RAGS Risk Assessment Guidelines for Superfund
 - RI Remedial Investigation
 - RME Reasonable maximum exposure
 - VOC Volatile organic compound

Total Organ 1 (Liver) HI Across All Media =	--
Total Organ 2 (Kidney) HI Across All Media =	--
Total Organ 3 (Fetus) HI Across All Media =	--
Total Organ 4 (Nervous System) HI Across All Media =	0.00E+00
Total Organ 5 (Endocrine system) HI Across All Media =	--
Total Organ 6 (Blood) HI Across All Media =	1.64E-01
Total Organ 7 (Skin) HI Across All Media =	--
Total Organ 8 (No Observed Effect) HI Across All Media =	--
Total Organ 9 (Unknown Systems) HI Across All Media =	--
Total Organ 10 (Gastrointestinal System) HI Across All Media =	--
Total Organ 11 (Vision/Eye) HI Across All Media =	--
Total Organ 12 (Body Weight) HI Across All Media =	--
Total Organ 13 (Developmental) HI Across All Media =	--
Total Organ 14 (Respiratory/lung) HI Across All Media =	--
Total Organ 15 (Whole Body) HI Across All Media =	2.22E-02
Total Organ 16 (Immune System) HI Across All Media =	2.22E-02
Total Organ 17 (Reproductive System) HI Across All Media =	--
Total Organ 18 (Finger and Toe Nail) HI Across All Media =	--
Total Organ 19 (Nasal Tissue) HI Across All Media =	--

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-9.1.1

EPA RAGS PART D TABLE 10

RME RISK ASSESSMENT SUMMARY USING TOXICITY DATA FROM DTSC-PREFERRED AND EPA SOURCES (METHOD 2)

COMMERCIAL/INDUSTRIAL WORKER, SITE 28 SURFACE SOIL (0-2 ft bgs)

Revised Remedial Investigation Report for Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Receptor Population:	Industrial Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient						
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Inhalation	Exposure Routes Total		
Soil (0-2 ft bgs)	Soil	Site Soil	--	--	--	--	--	--	--	--	--	--		
			Chemical Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
			Exposure Point Total					0.00E+00					0.00E+00	
	Exposure Medium Total								0.00E+00					0.00E+00
	Air	Outdoor Air (Particulates and VOCs)	--	--	--	--	--	--	--	--	--	--		
			Chemical Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
			Exposure Point Total					0.00E+00					0.00E+00	
	Exposure Medium Total								0.00E+00					0.00E+00
	Medium Total								0.00E+00					0.00E+00
	Receptor Total				Receptor Risk Total				0.00E+00	Receptor HI Total				0.00E+00

- Notes:**
- Not applicable or not available
 - DTSC Department of Toxic Substances Control
 - EPA U.S. Environmental Protection Agency
 - ft bgs Feet below ground surface
 - HHRA Human health risk assessment
 - HI Hazard index
 - RAGS Risk Assessment Guidelines for Superfund
 - RI Remedial Investigation
 - RME Reasonable maximum exposure
 - VOC Volatile organic compound

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-9.1.2

EPA RAGS PART D TABLE 10

RME RISK ASSESSMENT SUMMARY USING TOXICITY DATA FROM DTSC-PREFERRED AND EPA SOURCES (METHOD 2)

CONSTRUCTION WORKER, SITE 28 SURFACE SOIL (0-2 ft bgs)

Revised Remedial Investigation Report for Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient						
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Inhalation	Exposure Routes Total		
Soil (0-2 ft bgs)	Soil	Site Soil	--	--	--	--	--	--	--	--	--	--		
			Chemical Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
			Exposure Point Total					0.00E+00					0.00E+00	
	Exposure Medium Total								0.00E+00					0.00E+00
	Air	Outdoor Air (Particulates and VOCs)	--	--	--	--	--	--	--	--	--	--	--	
			Chemical Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
			Exposure Point Total					0.00E+00					0.00E+00	
	Exposure Medium Total								0.00E+00					0.00E+00
	Medium Total								0.00E+00					0.00E+00
	Receptor Total				Receptor Risk Total				0.00E+00	Receptor HI Total				0.00E+00

- Notes:**
- Not applicable or not available
 - DTSC Department of Toxic Substances Control
 - EPA U.S. Environmental Protection Agency
 - ft bgs Feet below ground surface
 - HHRA Human health risk assessment
 - HI Hazard index
 - RAGS Risk Assessment Guidelines for Superfund
 - RI Remedial Investigation
 - RME Reasonable maximum exposure
 - VOC Volatile organic compound

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-9.1.3

EPA RAGS PART D TABLE 10

RME RISK ASSESSMENT SUMMARY USING TOXICITY DATA FROM DTSC-PREFERRED AND EPA SOURCES (METHOD 2)

ADULT RESIDENT, SITE 28 SURFACE SOIL (0-2 ft bgs)

Revised Remedial Investigation Report for Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil (0-2 ft bgs)	Soil	Site Soil	--	--	--	--	--	--	--	--	--	--
			Chemical Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Exposure Point Total				0.00E+00					0.00E+00	
		Exposure Medium Total				0.00E+00					0.00E+00	
	Air	Outdoor Air (Particulates and VOCs)	--	--	--	--	--	--	--	--	--	--
			Chemical Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Exposure Point Total				0.00E+00					0.00E+00	
		Exposure Medium Total				0.00E+00					0.00E+00	
	Medium Total				0.00E+00					0.00E+00		
	Receptor Total				Receptor Risk Total	0.00E+00				Receptor HI Total	0.00E+00	

- Notes:**
- Not applicable or not available
 - DTSC Department of Toxic Substances Control
 - EPA U.S. Environmental Protection Agency
 - ft bgs Feet below ground surface
 - HHRA Human health risk assessment
 - HI Hazard index
 - RAGS Risk Assessment Guidelines for Superfund
 - RI Remedial Investigation
 - RME Reasonable maximum exposure
 - VOC Volatile organic compound

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-9.1.4

EPA RAGS PART D TABLE 10

RME RISK ASSESSMENT SUMMARY USING TOXICITY DATA FROM DTSC-PREFERRED AND EPA SOURCES (METHOD 2)

CHILD RESIDENT, SITE 28 SURFACE SOIL (0-2 ft bgs)

Revised Remedial Investigation Report for Sites 8, 28, and 29, Naval Station Treasure Island, San Francisco, California

Scenario Timeframe:	
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient						
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Inhalation	Exposure Routes Total		
Soil (0-2 ft bgs)	Soil	Site Soil	--	--	--	--	--	--	--	--	--	--		
			Chemical Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
			Exposure Point Total					0.00E+00					0.00E+00	
	Exposure Medium Total								0.00E+00					0.00E+00
	Air	Outdoor Air (Particulates and VOCs)	--	--	--	--	--	--	--	--	--	--	--	
			Chemical Total	0.00E+00	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
			Exposure Point Total					0.00E+00					0.00E+00	
	Exposure Medium Total								0.00E+00					0.00E+00
	Medium Total								0.00E+00					0.00E+00
	Receptor Total				Receptor Risk Total				0.00E+00	Receptor HI Total				0.00E+00

- Notes:
- Not applicable or not available
 - DTSC Department of Toxic Substances Control
 - EPA U.S. Environmental Protection Agency
 - ft bgs Feet below ground surface
 - HHRA Human health risk assessment
 - HI Hazard index
 - RAGS Risk Assessment Guidelines for Superfund
 - RI Remedial Investigation
 - RME Reasonable maximum exposure
 - VOC Volatile organic compound

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-10.1.1: LEAD RISK ASSESSMENT RESULTS USING LEADSPREAD

Residents, Site 28 Surface Soil (0-2 ft bgs)

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29
Naval Station Treasure Island, San Francisco, California

INPUT	
MEDIUM	LEVEL
Lead in Air (ug/m ³) ^a	0.0083
Lead in Soil/Dust (ug/g)	830
Lead in Water (ug/l) ^b	7
% Home-grown Produce (ug/m ³)	0%
	1.5

OUTPUT							
	Percentile Estimate of Blood Pb (ug/dl)					PRG-99	PRG-95
	50th	90th	95th	98th	99th	(ug/g)	(ug/g)
BLOOD Pb, ADULT	1.4	2.6	3.0	3.7	4.2	2939	4331
BLOOD Pb, CHILD	6.9	12.6	14.9	18.1	20.6	331	511
BLOOD Pb, PICA CHILD	12.7	23.3	27.5	33.5	38.1	166	257
BLOOD Pb, OCCUPATIONAL	1.2	2.1	2.5	3.1	3.5	4206	6195

EXPOSURE PARAMETERS			
	units	adults	children
Days per week	days/wk	7	
Days per week, occupational		5	
Geometric Standard Deviation		1.6	
Blood lead level of concern (ug/dl)		10	
Skin area, residential	cm ²	5700	2900
Skin area occupational	cm ²	2900	
Soil adherence	ug/cm ²	70	200
Dermal uptake constant	(ug/dl)/(ug/d)	0.0001	
Soil ingestion	mg/day	50	100
Soil ingestion, pica	mg/day		200
Ingestion constant	(ug/dl)/(ug/d)	0.04	0.16
Bioavailability	unitless	0.44	
Breathing rate	m ³ /day	20	6.8
Inhalation constant	(ug/dl)/(ug/d)	0.082	0.192
Water ingestion	l/day	1.4	0.4
Food ingestion	kg/day	1.9	1.1
Lead in market basket	ug/kg	3.1	
Lead in home-grown produce	ug/kg	373.5	

PATHWAYS						
ADULTS	Residential			Occupational		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	3.8E-5	0.03	2%	1.4E-5	0.01	1%
Soil Ingestion	8.8E-4	0.73	52%	6.3E-4	0.52	45%
Inhalation, bkgnd		0.01	1%		0.01	1%
Inhalation	2.5E-6	0.00	0%	1.8E-6	0.00	0%
Water Ingestion		0.39	28%		0.39	34%
Food Ingestion, bkgnd		0.23	17%		0.23	20%
Food Ingestion	0.0E+0	0.00	0%			0%

CHILDREN	typical			with pica		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	5.6E-5	0.05	1%		0.05	0%
Soil Ingestion	7.0E-3	5.84	85%	1.4E-2	11.69	92%
Inhalation	2.0E-6	0.00	0%		0.00	0%
Inhalation, bkgnd		0.01	0%		0.01	0%
Water Ingestion		0.45	7%		0.45	4%
Food Ingestion, bkgnd		0.54	8%		0.54	4%
Food Ingestion	0.0E+0	0.00	0%		0.00	0%

Notes:

a Based on site-specific data. The average concentration of lead in air reported for the San Francisco-Arkansas Street air quality monitoring station in 2002 (California Air Resources Board 2004)

b Based on site-specific data. The 90th percentile level reported in the City of San Francisco Annual Water Quality Report for 2003 (San Francisco Public Utilities Commission 2003)

References:

California Air Resources Board. 2004. "California Air Resources Board Annual Toxics Summary, San Francisco-Arkansas Street, Lead." On-Line Address: <http://www.arb.ca.gov/adam/welcome.html>

San Francisco Public Utilities Commission. 2003. "2003 San Francisco Public Utilities Commission Water Quality Report." On-Line Address: http://sfwater.org/detail.cfm/MSC_ID/51/MTO_ID/63/MC_ID/10/C_ID/1862/holdSession/1

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-10.1.2: LEAD RISK ASSESSMENT RESULTS USING LEADSPREAD
Residents, Site 28 Surface Soil (0-2 ft bgs), Adjusted to Exclude Area of Localized Lead Contamination
 Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29
 Naval Station Treasure Island, San Francisco, California

INPUT	
MEDIUM	LEVEL
Lead in Air (ug/m ³) ^a	0.0083
Lead in Soil/Dust (ug/g)	398
Lead in Water (ug/l) ^b	7
% Home-grown Produce (ug/m ³)	0%
	1.5

OUTPUT							
	Percentile Estimate of Blood Pb (ug/dl)					PRG-99	PRG-95
	50th	90th	95th	98th	99th	(ug/g)	(ug/g)
BLOOD Pb, ADULT	1.0	1.8	2.2	2.6	3.0	2939	4331
BLOOD Pb, CHILD	3.8	7.0	8.3	10.0	11.4	331	511
BLOOD Pb, PICA CHILD	6.6	12.1	14.3	17.4	19.8	166	257
BLOOD Pb, OCCUPATIONAL	0.9	1.6	1.9	2.3	2.7	4206	6195

EXPOSURE PARAMETERS			
	units	adults	children
Days per week	days/wk	7	
Days per week, occupational		5	
Geometric Standard Deviation		1.6	
Blood lead level of concern (ug/dl)		10	
Skin area, residential	cm ²	5700	2900
Skin area occupational	cm ²	2900	
Soil adherence	ug/cm ²	70	200
Dermal uptake constant	(ug/dl)/(ug/d)	0.0001	
Soil ingestion	mg/day	50	100
Soil ingestion, pica	mg/day		200
Ingestion constant	(ug/dl)/(ug/d)	0.04	0.16
Bioavailability	unitless	0.44	
Breathing rate	m ³ /day	20	6.8
Inhalation constant	(ug/dl)/(ug/d)	0.082	0.192
Water ingestion	l/day	1.4	0.4
Food ingestion	kg/day	1.9	1.1
Lead in market basket	ug/kg	3.1	
Lead in home-grown produce	ug/kg	179.1	

PATHWAYS						
ADULTS	Residential			Occupational		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	3.8E-5	0.02	2%	1.4E-5	0.01	1%
Soil Ingestion	8.8E-4	0.35	35%	6.3E-4	0.25	28%
Inhalation, bkgnd		0.01	1%		0.01	1%
Inhalation	2.5E-6	0.00	0%	1.8E-6	0.00	0%
Water Ingestion		0.39	39%		0.39	44%
Food Ingestion, bkgnd		0.23	23%		0.23	26%
Food Ingestion	0.0E+0	0.00	0%			0%

CHILDREN	typical			with pica		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	5.6E-5	0.02	1%		0.02	0%
Soil Ingestion	7.0E-3	2.80	73%	1.4E-2	5.60	85%
Inhalation	2.0E-6	0.00	0%		0.00	0%
Inhalation, bkgnd		0.01	0%		0.01	0%
Water Ingestion		0.45	12%		0.45	7%
Food Ingestion, bkgnd		0.54	14%		0.54	8%
Food Ingestion	0.0E+0	0.00	0%		0.00	0%

Notes:

- a Based on site-specific data. The average concentration of lead in air reported for the San Francisco-Arkansas Street air quality monitoring station in 2002 (California Air Resources Board 2004)
- b Based on site-specific data. The 90th percentile level reported in the City of San Francisco Annual Water Quality Report for 2003 (San Francisco Public Utilities Commission 2003)

References:

- California Air Resources Board. 2004. "California Air Resources Board Annual Toxics Summary, San Francisco-Arkansas Street, Lead." On-Line Address: <http://www.arb.ca.gov/adam/welcome.html>
- San Francisco Public Utilities Commission. 2003. "2003 San Francisco Public Utilities Commission Water Quality Report." On-Line Address: http://sfwater.org/detail.cfm/MSC_ID/51/MTO_ID/63/MC_ID/10/C_ID/1862/holdSession/1

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-10.1.3: LEAD RISK ASSESSMENT RESULTS USING LEADSPREAD

Residents, Site 28 Surface Soil (0-2 ft bgs), Area of Localized Lead Contamination

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29

Naval Station Treasure Island, San Francisco, California

INPUT	
MEDIUM	LEVEL
Lead in Air (ug/m ³) ^a	0.0083
Lead in Soil/Dust (ug/g)	956
Lead in Water (ug/l) ^b	7
% Home-grown Produce (ug/m ³)	0%
	1.5

OUTPUT							
	Percentile Estimate of Blood Pb (ug/dl)					PRG-99	PRG-95
	50th	90th	95th	98th	99th	(ug/g)	(ug/g)
BLOOD Pb, ADULT	1.5	2.8	3.3	4.0	4.5	2939	4331
BLOOD Pb, CHILD	7.8	14.2	16.8	20.5	23.3	331	511
BLOOD Pb, PICA CHILD	14.5	26.5	31.4	38.1	43.4	166	257
BLOOD Pb, OCCUPATIONAL	1.3	2.3	2.7	3.3	3.7	4206	6195

EXPOSURE PARAMETERS			
	units	adults	children
Days per week	days/wk	7	
Days per week, occupational		5	
Geometric Standard Deviation		1.6	
Blood lead level of concern (ug/dl)		10	
Skin area, residential	cm ²	5700	2900
Skin area occupational	cm ²	2900	
Soil adherence	ug/cm ²	70	200
Dermal uptake constant	(ug/dl)/(ug/d)	0.0001	
Soil ingestion	mg/day	50	100
Soil ingestion, pica	mg/day		200
Ingestion constant	(ug/dl)/(ug/d)	0.04	0.16
Bioavailability	unitless	0.44	
Breathing rate	m ³ /day	20	6.8
Inhalation constant	(ug/dl)/(ug/d)	0.082	0.192
Water ingestion	l/day	1.4	0.4
Food ingestion	kg/day	1.9	1.1
Lead in market basket	ug/kg	3.1	
Lead in home-grown produce	ug/kg	430.2	

PATHWAYS						
ADULTS	Residential			Occupational		
	Pathway contribution			Pathway contribution		
	Pathway	PEF	ug/dl	percent	PEF	ug/dl
Soil Contact	3.8E-5	0.04	2%	1.4E-5	0.01	1%
Soil Ingestion	8.8E-4	0.84	55%	6.3E-4	0.60	48%
Inhalation, bkgnd		0.01	1%		0.01	1%
Inhalation	2.5E-6	0.00	0%	1.8E-6	0.00	0%
Water Ingestion		0.39	26%		0.39	31%
Food Ingestion, bkgrnd		0.23	15%		0.23	19%
Food Ingestion	0.0E+0	0.00	0%			0%

CHILDREN	typical			with pica		
	Pathway contribution			Pathway contribution		
	Pathway	PEF	ug/dl	percent	PEF	ug/dl
Soil Contact	5.6E-5	0.05	1%		0.05	0%
Soil Ingestion	7.0E-3	6.73	86%	1.4E-2	13.46	93%
Inhalation	2.0E-6	0.00	0%		0.00	0%
Inhalation, bkgnd		0.01	0%		0.01	0%
Water Ingestion		0.45	6%		0.45	3%
Food Ingestion, bkgrnd		0.54	7%		0.54	4%
Food Ingestion	0.0E+0	0.00	0%		0.00	0%

Notes:

a Based on site-specific data. The average concentration of lead in air reported for the San Francisco-Arkansas Street air quality monitoring station in 2002 (California Air Resources Board 2004)

b Based on site-specific data. The 90th percentile level reported in the City of San Francisco Annual Water Quality Report for 2003 (San Francisco Public Utilities Commission 2003)

References:

California Air Resources Board. 2004. "California Air Resources Board Annual Toxics Summary, San Francisco-Arkansas Street, Lead." On-Line Address: <http://www.arb.ca.gov/adam/welcome.html>

San Francisco Public Utilities Commission. 2003. "2003 San Francisco Public Utilities Commission Water Quality Report." On-Line Address: http://sfwater.org/detail.cfm/MSC_ID/51/MTO_ID/63/MC_ID/10/C_ID/1862/holdSession/1

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-10.1.4: LEAD RISK ASSESSMENT RESULTS USING LEADSPREAD

Residents, Site 28 Surface Soil (0-6 inches bgs)

Revised Remedial Investigation Report for Installation Restoration Sites 8, 28, and 29
Naval Station Treasure Island, San Francisco, California

INPUT	
MEDIUM	LEVEL
Lead in Air (ug/m ³) ^a	0.0083
Lead in Soil/Dust (ug/g)	302
Lead in Water (ug/l) ^b	7
% Home-grown Produce (ug/m ³)	0%
	1.5

OUTPUT							
	Percentile Estimate of Blood Pb (ug/dl)					PRG-99	PRG-95
	50th	90th	95th	98th	99th	(ug/g)	(ug/g)
BLOOD Pb, ADULT	0.9	1.7	2.0	2.4	2.7	2939	4331
BLOOD Pb, CHILD	3.1	5.7	6.8	8.3	9.4	331	511
BLOOD Pb, PICA CHILD	5.3	9.6	11.4	13.9	15.8	166	257
BLOOD Pb, OCCUPATIONAL	0.8	1.5	1.8	2.2	2.5	4206	6195

EXPOSURE PARAMETERS			
	units	adults	children
Days per week	days/wk	7	
Days per week, occupational		5	
Geometric Standard Deviation		1.6	
Blood lead level of concern (ug/dl)		10	
Skin area, residential	cm ²	5700	2900
Skin area occupational	cm ²	2900	
Soil adherence	ug/cm ²	70	200
Dermal uptake constant	(ug/dl)/(ug/d)	0.0001	
Soil ingestion	mg/day	50	100
Soil ingestion, pica	mg/day		200
Ingestion constant	(ug/dl)/(ug/d)	0.04	0.16
Bioavailability	unitless	0.44	
Breathing rate	m ³ /day	20	6.8
Inhalation constant	(ug/dl)/(ug/d)	0.082	0.192
Water ingestion	l/day	1.4	0.4
Food ingestion	kg/day	1.9	1.1
Lead in market basket	ug/kg	3.1	
Lead in home-grown produce	ug/kg	136.0	

PATHWAYS						
ADULTS	Residential			Occupational		
	Pathway contribution			Pathway contribution		
	Pathway	PEF	ug/dl	percent	PEF	ug/dl
Soil Contact	3.8E-5	0.01	1%	1.4E-5	0.00	1%
Soil Ingestion	8.8E-4	0.27	29%	6.3E-4	0.19	23%
Inhalation, bkgnd		0.01	1%		0.01	1%
Inhalation	2.5E-6	0.00	0%	1.8E-6	0.00	0%
Water Ingestion		0.39	43%		0.39	47%
Food Ingestion, bkgrnd		0.23	25%		0.23	28%
Food Ingestion	0.0E+0	0.00	0%			0%

CHILDREN	typical			with pica		
	Pathway contribution			Pathway contribution		
	Pathway	PEF	ug/dl	percent	PEF	ug/dl
Soil Contact	5.6E-5	0.02	1%		0.02	0%
Soil Ingestion	7.0E-3	2.13	68%	1.4E-2	4.26	81%
Inhalation	2.0E-6	0.00	0%		0.00	0%
Inhalation, bkgnd		0.01	0%		0.01	0%
Water Ingestion		0.45	14%		0.45	8%
Food Ingestion, bkgrnd		0.54	17%		0.54	10%
Food Ingestion	0.0E+0	0.00	0%		0.00	0%

Notes:

a Based on site-specific data. The average concentration of lead in air reported for the San Francisco-Arkansas Street air quality monitoring station in 2002 (California Air Resources Board 2004)

b Based on site-specific data. The 90th percentile level reported in the City of San Francisco Annual Water Quality Report for 2003 (San Francisco Public Utilities Commission 2003)

References:

California Air Resources Board. 2004. "California Air Resources Board Annual Toxics Summary, San Francisco-Arkansas Street, Lead." On-Line Address: <http://www.arb.ca.gov/adam/welcome.html>

San Francisco Public Utilities Commission. 2003. "2003 San Francisco Public Utilities Commission Water Quality Report." On-Line Address: http://sfwater.org/detail.cfm/MSC_ID/51/MTO_ID/63/MC_ID/10/C_ID/1862/holdSession/1

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-11.1: CALCULATIONS OF PRELIMINARY REMEDIATION GOALS FOR THE OCCUPATIONAL WORKER*

Revised Remedial Investigation Report for Sites 8, 28, and 29 Naval Station Treasure Island, San Francisco, California

Exposure Variable	Description of Exposure Variable	Units	Region OR Ethnic GSDi and PbBo Data from NHANES III Analysis							
			All/All	All/White	All/Black	All/Mexican	Northeast/All	Midwest/All	South/All	West/All
PbB _{fetal, 0.95}	95 th percentile PbB in fetus	µg/dL	10	10	10	10	10	10	10	10
R _{fetal/maternal}	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
GSD _i	Geometric standard deviation PbB	--	2.1	2.1	2.2	2.3	2.0	2.2	2.1	2.1
PbB ₀	Baseline PbB	µg/dL	1.5	1.5	1.8	1.7	2.0	1.5	1.4	1.4
IR _s	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
AF _{s, D}	Absorption fraction (same for soil and dust)	--	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
EF _{s, D}	Exposure frequency (same for soil and dust)	days/yr	219	219	219	219	219	219	219	219
AT _{s, D}	Averaging time (same for soil and dust)	days/yr	365	365	365	365	365	365	365	365
PRG		ppm	1,197	1,288	938	794	1,092	1,079	1,366	1,287

Notes:

- * Table taken, unmodified from <http://www.epa.gov/oerrpage/superfund/health/contaminants/lead/products.htm#alm>
- µg/day Microgram per day
- µg/dL Microgram per deciliter
- g/day Gram per day
- NHANES National Health and Nutrition Evaluation Survey
- Pb Lead
- ppm Part per million
- PRG Preliminary remediation goal

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
18	HHRA results	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Appendix G, Tables G1 through G11.2. SulTech. February 2009.

TABLE G-11.2: CALCULATIONS OF PRELIMINARY REMEDIATION GOALS FOR THE CONSTRUCTION WORKER

Revised Remedial Investigation Report for Sites 8, 28, and 29 Naval Station Treasure Island, San Francisco, California

Exposure Variable	Description of Exposure Variable	Units	Region OR Ethnic GSDi and PbBo Data from NHANES III Analysis							
			All/All	All/White	All/Black	All/Mexican	Northeast/All	Midwest/All	South/All	West/All
$PbB_{fetal, 0.95}$	95 th percentile PbB in fetus	µg/dL	10	10	10	10	10	10	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	2.1	2.1	2.2	2.3	2.0	2.2	2.1	2.1
PbB_0	Baseline PbB	µg/dL	1.5	1.5	1.8	1.7	2.0	1.5	1.4	1.4
IR_s	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
$AF_{s,D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
$EF_{s,D}$	Exposure frequency (same for soil and dust)	days/yr	90	90	90	90	90	90	90	90
$AT_{s,D}$	Averaging time (same for soil and dust)	days/yr	365	365	365	365	365	365	365	365
PRG		ppm	1,456	1,567	1,141	966	1,329	1,312	1,662	1,566

Notes:

- 1 Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_s, K_{sp})
When $IR_s = IR_{s+D}$ and $W_s = 1.0$, the equations yield the same PRG.
- µg/day Microgram per day
µg/dL Microgram per deciliter
g/day Gram per day
NHANES National Health and Nutrition Evaluation Survey
Pb Lead
ppm Part per million
PRG Preliminary remediation goal

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
20	Uncertainties	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 6.3. SulTech. February 2009.

Reducing the residential exposure frequency from 350 days per year to 50 days per year, which represents an upper bound estimate for recreational exposure, reduces 99th percentile blood-lead levels to 2.3 µg/dL for an adult and 5.9 µg/dL for a child, even while using the lead “hot spot” EPC of 956 mg/kg.

6.2.2 Site Risk and Total Risk Analysis

The EPA and DTSC have expressed an interest in ensuring that not only “site-related risk” contributed by CERCLA releases and former site operations at NAVSTA TI be characterized, but that total risk (all detected analytes be evaluated in the risk assessment regardless of any screening criteria) be communicated as well. To provide baseline total risk estimates for construction workers, residents, and commercial/industrial workers, all detected contaminants in soil and groundwater were evaluated, except essential nutrients (Section 6.1.2). The results of the baseline “total risk” estimates are summarized below and presented in Appendix G (with a detailed discussion found in Attachment G5). The results of this assessment provide additional information for making risk management decisions concerning the necessity for or selection of remedial alternatives at IR Site 28.

IR Site 28: Method 2 and Total Risk Estimates

Receptor	RME Cancer Risk Estimates		RME Noncancer HI Estimates	
	Method 2	Total	Method 2	Total
Commercial/Industrial Worker – Exposure to Soil (0-2 feet bgs) ¹	NA	1E-05	0.01	0.1
Construction Worker- Exposure to Soil (0-2 feet bgs) ¹	NA	2E-06	0.04	0.4
Resident – Exposure to Soil (0-2 feet bgs) ¹	NA	5E-05	0.2	1

Notes:

- 1 Exposure to soil via incidental ingestion, dermal contact, and inhalation of particulates or vapors in outdoor air
 NA The chemicals of potential concern selected for Method 2 are noncarcinogenic.

6.3 UNCERTAINTY ANALYSIS

The HHRA incorporates a number of uncertainties inherent in the risk assessment process. Depending on the type of uncertainty, impacts to HHRA results can include an over- or underestimation of cancer risks or HIs. The main uncertainties for the HHRA at IR Site 28 are summarized below. Additional details on these uncertainties are discussed in Section G12.0 of Appendix G.

Uncertainty is introduced during data evaluation and selection of COPCs. Each strength and weakness associated with the data is carried through the risk assessment, including site characterization data and methods used to identify COPCs. The primary uncertainty associated with the COPC selection process is the possibility that a chemical may be inappropriately

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
20	Uncertainties	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 6.3. SulTech. February 2009.

excluded or included as a COPC for evaluation in the risk assessment. The background comparison criterion is not likely to result in the inadvertent exclusion of chemicals as COPCs. To address this possibility, a total risk scenario was included; no detected analytes were excluded under this scenario (presented in [Attachment G5](#) of [Appendix G](#)). However, the use of PRGs values as COPC selection criteria may underestimate risk results. Chemicals detected below PRGs were excluded as COPCs for the Method 1 risk scenario. Method 2 risk estimates present results associated with COPCs in the absence of PRG screening criteria. The risk characterization comparisons presented in [Appendix G](#) fully explain the potential for screening criteria to underestimate risk.

Uncertainties were identified in association with four areas of the exposure assessment process: (1) selection of exposure scenarios, (2) selection of exposure pathways, (3) estimation of EPCs, and (4) selection of exposure variables used to estimate chemical intake. These uncertainties are discussed in detail in [Section G12.2](#) of [Appendix G](#) and summarized below. The uncertainties are expected to result in conservative estimates rather than underestimation of unforeseen human health risks.

Exposure scenarios were identified based on observed and assumed land use and activity that may occur at IR Site 28. The exposure pathways quantified in this risk assessment were identified on the basis of the CSM, relevant site characterization data, and contaminant fate and transport considerations. Given the steep, rocky slopes of the site, impending land use restrictions, and proximity to the SFOBB, future residential or commercial redevelopment, and recreational use of IR Site 28 is considered highly unlikely. Despite the unlikelihood of commercial/industrial workers and residents, these scenarios were evaluated in this HHRA so that health risk estimates generated in this report can be considered applicable for an unrestricted land use. To the degree that actual land use and activity patterns are not represented by those assumed, and exposure pathways may not accurately predict the migration of contaminants within and from the area, uncertainties are introduced.

The sample collection strategy was designed as a purposive investigation, whereby many samples were collected in areas of suspected or known contamination. EPCs based on these nonrandom soil samples are likely to overestimate concentrations at the exposure point, as well as the actual dose to the receptor. Irrespective of the potential EPC bias, data from these sample locations are considered representative of site-wide conditions and appropriate for the site-wide evaluations.

The estimation of surface lead concentrations within IR Site 28 excludes a portion of the surface soil lead concentration data that have been collected at the site. In 1992, Blaine Technical Services, Inc. collected 40 shallow soil samples in support of a health and safety evaluation for workers engaged in the seismic retrofit of the on- and off-ramps at IR Site 28. The data show levels of lead ranging from 48 mg/kg to 8700 mg/kg, with an average value of 2573 mg/kg, which is well above residential exposure criteria for lead ([PRC 1997](#)). The inclusion of the Blaine data in the risk assessment would have increased the lead EPC beyond current regulatory thresholds. We have been unable to locate a copy of the original report to verify sample locations, collection methods, and analysis methods. Since these data are unverifiable and do not

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
20	Uncertainties	Section 2.5.1	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 6.3. SulTech. February 2009.

meet the data quality standards for inclusion in a risk assessment, we did not include the Blaine lead data within the dataset used to evaluate IR Site 28. The area where these data were collected is not adjacent to any locations where historical DON activity is documented or presumed to have occurred, and the elevated lead levels are likely associated with deposition of leaded paints from the bridge structure and emissions from vehicles transiting the SFOBB.

The exposure variables used to estimate chemical intake are standard upperbound estimates. An exception was made for the construction worker where “professional judgment” was used to determine certain exposure parameters. Default exposure parameters are expected to err on the conservative side, rather than under predicting unforeseen human health risks, thereby overestimating risks. In general, considerable variation may occur in the activity patterns and physiological response of individuals. It is possible that the exposure variables used in this evaluation do not represent actual exposure conditions.

The primary uncertainties associated with the toxicity assessment are related to derivation of toxicity values for COPCs. Standard RfDs and SFs developed by EPA and OEHHA were used to estimate potential cancer and noncancer health effects from exposure to COPCs at the site. These values are derived by applying conservative (health-protective) assumptions and are intended to protect the most sensitive potentially exposed individuals. Uncertainties pertaining to differences in preferred toxicity criteria for the Method 1 and Method 2 tracks are discussed in detail in [Appendix G](#).

In summary, the HHRA was developed based on a series of scientifically appropriate input assumptions, almost all conservative, that are expected to result in overestimation of risks.

6.4 CONCLUSIONS AND RECOMMENDATIONS

The RI objectives included addressing the following questions:

- Do the collected data indicate that contaminant concentrations exceed risk management criteria considered protective of human health?
- Do the potential risks to human health warrant an evaluation of remedial alternatives in an FS?
- Both questions were addressed through the investigation and assessment of IR Site 28 as discussed in this RI report. The conclusions are presented below.

Installation Restoration Site 28

Given that neither EPA nor OEHHA has derived cancer SFs for the inorganic chemicals identified as COPCs in soil, cancer risks were not estimated for potential exposures to these chemicals at IR Site 28. The noncancer HIs for commercial/industrial worker, construction worker, or resident exposure were below the noncancer hazard threshold of 1.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

7.0 ECOLOGICAL RISK ASSESSMENT

The ERA for IR Site 28 was finalized in 2001 with the completion of the validation study for YBI IR Sites 8, 11, 28, and 29. The ERA was completed in three phases. In Phase I, the problem formulation was developed based on existing data, biotic surveys, and fate and transport analysis. This information helped form the basis for the ecological portion of the CSM and helped focus additional work necessary to complete the SLERA under Phase II. The Draft Phase I report was completed in 1993 (PRC 1993). Based on the information presented in the Draft Phase I report and subsequent habitat evaluations, sites on TI were not subjected to further evaluation. The DON and regulatory agencies agreed that the industrial setting and managed habitat on TI is inadequate to support healthy ecological populations irrespective of the presence of chemical stressors (EPA 1994). On YBI, all IR sites were recommended for further evaluation in a SLERA.

In Phase II, a SLERA was conducted for IR Sites 8, 11, 28, and 29 as part of the Draft Final RI Report (PRC 1997). The SLERA focused on three representative species, the deer mouse (*Peromyscus maniculatus*), American kestrel (*Falco sparverius*), and American peregrine falcon (*Falco peregrinus anatum*). The deer mouse and American kestrel were selected to represent small mammals and raptors, respectively; the peregrine falcon was selected because it is a state endangered species and two pairs are known to nest on the SFOBB. Potential risks posed by ingestion of chemicals of potential ecological concern (COPEC) in prey and soil were assessed using an exposure dose and effect model (food-chain model [FCM]).

The results of the FCM conducted in the Phase II SLERA indicated potential risk to peregrine falcons under conservative exposure and effects conditions at IR Sites 8, 11, 28, and 29. To further evaluate potential risk to the peregrine falcon, a validation study using site collected bird tissue data was recommended. The FCM conducted in the Phase II SLERA also indicated possible risk to small mammals from the concentrations of chemicals at the site (see Table J3-11 in Appendix J of the Draft RI [PRC 1997]). However, based on the small total area of the sites, the disturbed nature of the sites, and continuing disturbance of the sites, the DON and regulatory agencies agreed that further evaluation of small mammals was not necessary (DTSC 1998).

The final phase of the ERA, the validation study, was finalized in December 2001. The conclusion of the validation study was that IR Sites 8, 11, 28, and 29 posed minimal risk to peregrine falcons (Tetra Tech 2001a). Because the ERA for IR Site 28 has been finalized, this RI report does not re-evaluate the ecological risk, but does provide a summary of the ERA conducted at IR Site 28. At the request of the DTSC, EPCs were recalculated to include data collected since the completion of the ERA. Recalculated EPCs are evaluated to ensure the overall conclusions of the risk assessment have not changed (Section 7.8).

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

7.1 ECOLOGICAL RISK ASSESSMENT METHODOLOGY AND APPROACH FOR NAVSTA TI

The following section provides a summary of the approach and methodology used to assess the risk to ecological receptors at NAVSTA TI. Because the ERA was conducted before the EPA 1997 guidance was available, the ERA followed the basic ecological risk framework outlined by the EPA (EPA 1992b) along with the State of California protocol (DTSC 1996). The framework includes the same four main components as the current guidance, which identifies the following steps:

1. **Problem formulation:** The first step involves identifying key factors to be considered in the ERA and compiling available information and data on the site, the nature and extent of site-specific stressors, and the natural resources potentially at risk. The preliminary analysis (1) identifies stressors such as COPECs and (2) determines biological species and endpoints to be considered in the ERA. This information is used to formulate a CSM and to identify the scope and goals of the ERA.
2. **Exposure assessment:** The second step identifies biological receptors likely to encounter the chemical stressors. The likely exposure routes (for example, dermal contact or ingestion) and the spatial and temporal variation in exposure at the sites are identified. In addition, the release, migration, and fate of COPECs are evaluated with respect to biotic and abiotic factors that influence exposure of ecological receptors.
3. **Ecological effects assessment:** The third step evaluates the potential adverse effects of exposure to chemical stressors on ecological receptors. The relationship between the degree of exposure and the resulting ecological effects is assessed using field measures and available ecotoxicological literature.
4. **Risk characterization:** In the final step, information gained during the exposure assessment and the ecological effects assessment is integrated to evaluate the relationship between environmental stressors and adverse ecological effects. This integration relies primarily on strength of weight of evidence arguments developed based on existing information. The degree of confidence in the risk assessment is evaluated by identifying important sources of uncertainty, as well as any underlying assumptions used in the analysis. Risk management recommendations can then be made based on the risk characterization.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

7.2 PROBLEM FORMULATION

The problem formulation was developed during the Phase I ERA and further refined in the Phase II SLERA. The primary goal of the problem formulation phase is to develop an ecological CSM and to identify the following:

- Environmental setting and chemicals known or suspected to exist at the site
- Chemical fate and transport mechanisms that might exist at the site
- Mechanisms of ecotoxicity associated with chemicals and likely categories of receptors that could be affected
- Complete exposure pathways that might exist at the site (in a complete exposure pathway, the chemical can be traced or expected to travel from the source to a receptor)
- Assessment and measurement endpoints to focus the assessment

These five points are discussed in more detail in the following subsections.

7.2.1 Site History

The following section briefly describes the site location and history for IR Site 28; a more detailed site history can be found in the NAVSTA TI Draft Final RI Report ([PRC 1997](#)). Site boundaries were modified in 2005; references to site boundaries in the following text refer to current site boundaries.

Installation Restoration Site 28 – West Side On-Off Ramps

IR Site 28 is located in the western portion YBI and is bounded to the west by the Bay; the east by Treasure Island Road, which is within the boundaries of IR Site 28; and to the south by the USCG property. The SFOBB and West Side On-Off Ramps and surrounding area comprise IR Site 28. The boundary of IR Site 28 has been revised since previous assessments; a small portion of the former southern boundary of the site is now part of IR Site 29. Except for the roads that traverse through IR Site 28, most of the site is steeply sloped to the southwest toward Bay and densely vegetated with trees and brush. More information specific to IR Site 28 history and physical environment is found in [Section 1.0](#) and [Section 3.0](#).

7.2.2 Environmental Setting

This section summarizes the Phase I problem formulation and Phase II SLERA findings regarding the ecology of IR Site 28, including habitat types and typical species, special status species, and trophic linkages among species and habitats.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

7.2.2.1 **Plants**

To characterize the flora of YBI and evaluate the site for potential threatened, endangered, or special status plant species, the DON conducted a literature review and field survey at YBI. The plant survey included field observations on April 22 and 30, May 13 and 28, and June 17, 1996. The results were used to create the list of plants expected and observed on NAVSTA TI (Table 7-1). Plant communities at IR Site 28 are discussed below. Figure 7-1 shows the vegetation communities on YBI. The location of the native plant communities delineated during the special-status plant survey are shown on Figure 7-2.

IR Site 28 is comprised of non-native plant communities, northern coastal scrub, and small areas of coast live oak woodland. It is characterized by eucalyptus woodlands in the less sloped areas just west of Treasure Island Road (near the on- and off-ramps), which grade into northern coastal scrub on the steep slopes closer to the Bay. Small stands of coast live oak woodland are interspersed with the coastal scrub. The southern edge of IR Site 28 consists of very steep slopes covered with dense vegetation, deep leaf litter under eucalyptus trees, or altered habitat (such as slopes covered with jute netting for erosion control purposes) (PRC 1996b). Much of the habitat at IR Site 28 is disturbed due to road maintenance and erosion control activities, and is expected to continue to be disturbed in this manner in the future.

7.2.2.2 **Reptiles and Amphibians**

Table 7-2 lists the reptiles and amphibians observed or expected to occur at NAVSTA TI. Terrestrial reptiles and amphibians that may breed on YBI include the northern alligator lizard (*Gerrhonotus coeruleus*) and the California slender salamander (*Batrachoseps attenuatus*) (Anderson 1960). Although no reptile and amphibian surveys were performed at NAVSTA TI, suitable habitat exists on YBI for both of these species.

7.2.2.3 **Birds**

DON wildlife biologists Nola Chow and Jeff Lewis conducted two, 1-day bird surveys on June 15 and 22, 1994. The surveys included observations at three areas of NAVSTA TI: (1) YBI general area, (2) USCG area (on YBI), and (3) TI. These observations were included in the list of birds expected and observed on NAVSTA TI (see Table 7-3). Typical species that occur on YBI include the American robin (*Turdus migratorius*), white-crowned sparrow (*Zonotrichia leucophrys*), American goldfinch (*Carduelis tristis*), towhee (*Pipilo* spp.), song sparrow (*Melospiza melodia*), red-winged blackbird (*Agelaius phoeniceus*), and American kestrel (*Falco sparverius*). The American peregrine falcon (*Falco peregrinus anatum*) is known to nest on the SFOBB and is expected to feed on some avian species that forage at NAVSTA TI.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

7.2.2.4 Mammals

Table 7-4 lists the mammals expected to inhabit or to be observed at NAVSTA TI. Small mammals native to California that may inhabit IR Site 28 include the California ground squirrel (*Spermophilus beecheyi*), the deer mouse, the California pocket mouse (*Perognathus californicus*), and several bats (Order Chiroptera). Deer mice are found in almost any terrestrial habitat in North America where other mammals are found; they often nest in rotting logs, among rocks, or in a burrow (Ingles 1965). Habitat for the California pocket mouse has been described as slopes covered with chaparral or live oaks. Habitat for the California ground squirrel, an herbivorous species, has been described as pastures and grain fields, slopes with scattered trees, and rocky ridges (Burt 1990).

7.2.2.5 Special Status Species

The California Department of Fish and Game’s (CDFG) “California Natural Diversity Database” (CDFG 2005b) was accessed for information on potential special status species in the area. Special status species are defined as (1) plants and animals officially listed or proposed for listing under state or federal Endangered Species Acts, (2) state or federal candidate species for possible listing, (3) species included in the California Native Plant Society’s rare and endangered plant list, and (4) CDFG “Species of Special Concern” (CDFG 2005a). This last category also includes species listed by CDFG that are not state or federally designated threatened or endangered but that fall into one or more of the following categories:

- Species that are biologically rare, restricted in distribution, declining throughout their range, or that reside in California during a critical stage in their life cycle.
- Populations in California that may be peripheral to the major population of a species range but that are threatened with extirpation in California.
- Species closely associated with habitats that are declining in California such as wetland, riparian, and primary forest habitats.

Wildlife classified as endangered by either the state or federal government that are known to inhabit the region and have been reported historically to forage at or near NAVSTA TI. These are the American peregrine falcon (*Falco peregrinus anatum*), California least tern (*Sterna antillarum*), and California brown pelican (*Pelecanus occidentalis californicus*). However, no sightings of any of these birds have been reported at TI or YBI in the California Natural Diversity Database (CNDDDB). The peregrine falcon, delisted from federally endangered status in 1999, remains a state endangered species. Two pairs are known to nest on the SFOBB. The California least tern is a state and federally endangered bird that is known to occur at Alameda Naval Air Station; it has not been observed at TI or YBI (CNDDDB). The brown pelican is also listed as state and federally endangered, but it is bird that feeds offshore and was addressed in the offshore Operable Unit RI Report (Tetra Tech 2001b). A special-status plant survey of YBI conducted in 1996, indicated the presence of the dune gilia (*Gilia capitata ssp. chamissonis*), which had been proposed by the California Native Plant Society (CNPS) as a rare species in

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

1996 (PRC 1996b). It is now listed as a special plant by CNPS, and thought to be endangered both in California and elsewhere. According to CNDDDB, the plant was observed on the south side of the island.

7.2.2.6 Trophic Linkages

The terrestrial community at NAVSTA TI forms a relatively simple ecosystem, dominated by a variety of weedy and ornamental plant species. Plants provide leafy vegetation, seeds, and fruits for the primary consumers. Typical primary consumers are herbivorous mammals, such as the deer mouse and California ground squirrel, and a variety of terrestrial insects (for example, grasshoppers). Granivores, such as mourning doves and rock doves, feed on plant seeds. Terrestrial invertebrates, such as insects and earthworms, are consumed by a variety of birds including brewer's and red-winged blackbirds, European starlings, and the American robin. Top predators include the American kestrel and peregrine falcon. A terrestrial food web is presented on Figure 7-3.

7.2.3 Conceptual Site Model

The CSM illustrates exposure pathways to be evaluated in the ERA and provides other key information such as chemical sources, release and transport mechanisms, and the relative importance of exposure pathways to specific receptor groups. The CSM includes the following components:

- Stressors/selection of COPECs
- Fate and transport
- Exposure pathways
- Assessment and measurement endpoints

The following sections briefly describe the components of the CSMs for IR Site 28 as illustrated on Figure 7-4.

7.2.3.1 Stressors/Selection of Chemicals of Potential Ecological Concern

Stressors can be defined as any factor that causes adverse ecological impacts at the site. Bulk chemistry data from results of soil samples (0 to 2 feet bgs) collected for the RI were used to select the list of ecological COPECs for terrestrial receptors in the Phase II SLERA. Essential nutrients present at requirement levels and chemical concentrations less than background concentrations were excluded from further assessment on a site-by-site basis. Inorganic chemicals at concentrations that exceed background or ambient concentrations in more than 10 percent of samples on site were included, as were all organic chemicals such as pesticides or

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

PAH compounds. Lead, thallium and zinc exceeded background in enough of the samples to warrant designation as COPECs at IR Site 28.

7.2.3.2 *Fate and Transport*

Physical fate processes of concern include transport to groundwater, volatilization to air, transfer to surface water, and movement of contaminated soil particles through windblown dust or as suspended soil particles in surface water. Chemicals may also be transported in plant and animal tissues (biotic transport). For example, chemicals in the bodies of mobile receptors such as migrating birds, flying insects, and far-ranging predators may be carried off site and deposited in other locations in the form of feces or corpses.

Although exposure is a simple concept, accurately describing the fate and transport of chemicals from their source to a site of toxic action in living organisms can be complicated. In general, a chemical must leave the environmental matrix, move across several biological membranes, and concentrate in a tissue to the extent that its toxic action is exerted for exposure to occur. A chemical that can move from the environmental matrix to the tissue of a receptor is said to be bioavailable. Toxic effects observed during laboratory testing of field samples can be caused by a number of factors, including exposure to bioavailable chemicals. Interactions with soil, sediment, and aqueous matrices are considered in interpreting adverse effects associated with exposure to chemicals.

7.2.3.3 *Exposure Pathways and Exposure Routes*

Potentially complete exposure pathways at IR Site 28 were evaluated based on fate and transport processes. A chemical must be able to travel from a source to a representative receptor and must be taken up through one or more routes for an exposure pathway to be considered complete. Thus, these pathways present the greatest potential risk of adverse effects for receptors of concern at a site. Potential exposure pathways that result in receptor contact include exposure to soils, surface water, groundwater, air, and food-chain transfer.

Potential exposure pathways are diagrammed in a CSM for IR Site 28 on [Figure 7-4](#). Soil is the predominant medium at IR Site 28 that enables a chemical to travel from the source to a receptor. The surface water exposure pathway was not evaluated at IR Site 28 because no perennial surface water bodies are found at the sites.

Windblown dust could represent a complete exposure pathway because soil is exposed in areas at IR Site 28. However, exposure to windblown dust is negligible when compared with food-chain transfer and direct exposure to soils (see the discussion below). Therefore, it was not considered further in the SLERA.

Exposure routes are the point of entry of a chemical into a receptor. For plants, they include root uptake and leaf sorption. Exposure routes for animals include inhalation, dermal contact, and ingestion of contaminated soil, surface water, and food ([Figure 7-4](#)). Plants exposed to

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

chemicals in soil may accumulate concentrations in the tissues that cause adverse effects on growth, reproduction, or survival. Independent of direct effects on the plant, chemicals in plant tissues may be transferred to herbivores, omnivores, and detritivores, which in turn may be consumed by omnivores and carnivores. This food-chain transfer, and associated bioaccumulation, may result in unacceptably high doses of chemicals to higher-trophic-level predators, even when concentrations in soil are safe for lower-trophic-level receptors, such as plants and invertebrates.

Due to the generally disturbed nature of IR Site 28 and consideration of the planned reuse (CCSF 1996), toxicity tests to specifically evaluate risk to plants and invertebrates were not recommended. IR Site 28 is presently designated for future use as shoreline open space.

Thus, the soil invertebrates and plants at the site are likely to continue to be species that can adapt to disturbance regimes. These types of plant and invertebrate species are currently flourishing (Tetra Tech 2001a).

The dose assessment for higher-trophic-level receptors such as birds and mammals assumed that ingestion of contaminated prey and soil was the dominant exposure route and that the contributions of other exposure routes were negligible (Suter 1993). Bioaccumulation factors (BAF) from the literature were used to estimate the burden in prey tissues for each of the chemicals based on concentrations in site soil. BAFs describe bioaccumulation in terms of the ratio between the concentration of a substance in an organism caused by chemical uptake and the concentration in the surrounding environment. BAFs used in the SLERA were presented in Appendix J of the Draft Final RI Report (PRC 1997).

7.2.3.4 Assessment and Measurement Endpoints

EPA defines assessment endpoints as “explicit expressions of the actual environmental values (for example, ecological resources) that are to be protected” (EPA 1997b). Assessment endpoints are environmental characteristics that, if significantly impaired, would indicate a need for action by risk managers. Various definitions of valuable ecological resources include those without which ecosystem function would be significantly impaired; those that provide critical resources, such as habitat or fisheries; and those perceived by humans as valuable, such as endangered species and other issues addressed by legislation. Useful assessment endpoints define both the valuable ecological entities at the site and a characteristic of the entity to protect, such as reproductive success or production per unit area.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

In Phase II, terrestrial assessment endpoints were selected to represent environmental characteristics of biological and social significance. Such endpoints include individuals or populations of organisms that, if found to be significantly affected by exposure to stressors (such as COPECs) at a site, would indicate a need for remediation (EPA 1992b). Transfer of COPECs from soil to plants and lower trophic organisms such as invertebrates was not considered in the SLERA; instead, the risk assessment focused on higher-level receptors. Trophic relationships among receptors and potential exposure pathways are shown on Figure 7-3. Considering these factors, the following assessment endpoints were selected:

- Deer Mouse (*Peromyscus maniculatus*) - The deer mouse is the most abundant and ubiquitous mammal in California. The deer mouse feeds on the ground and may be exposed through direct contact with contaminated soils, as well as through ingestion of contaminated food items, such as seeds and insects (Zeiner and others 1990b). Many of the deer mouse's life history traits are applicable to a wide variety of small mammals that may inhabit YBI. A more complete description of deer mouse natural history is included in Appendix J of the Draft Final RI Report (PRC 1997). The deer mouse was selected to represent (1) the omnivorous small mammal guild, which includes the California ground squirrel (*Spermophilus beecheyi*), and (2) the herbivorous small mammal guild, which includes the California pocket mouse (*Perognathus californicus*).
- American Kestrel (*Falco sparverius*) - The American kestrel feeds on a variety of prey items, ranging from earthworms to small mammals to birds (Zeiner and others 1990a). A more complete description of the natural history of the American kestrel is included in Appendix J of the Draft Final RI Report (PRC 1997). The kestrel was selected to represent carnivorous birds, including the red-tailed hawk (*Buteo jamaicensis*).
- Peregrine Falcon (*Falco peregrinus anatum*) - The peregrine falcon is listed as endangered by both state and federal agencies. It feeds primarily on birds (Zeiner and others 1990a). A more complete description of the natural history of the peregrine falcon is included in Appendix J of the Draft Final RI Report (PRC 1997). Because the peregrine is a state endangered species, individual falcons were selected as the level of protection, rather than protecting the entire population. It does not represent any other species.

Assessment endpoints are usually not amenable to direct measurement; therefore, measurement endpoints were identified. EPA defines a measurement endpoint as “a measurable ecological characteristic that is related to the valued characteristic chosen as the assessment endpoint and is a measure of biological effects (such as mortality, reproduction, or growth)” (EPA 1997b). In the SLERA, reproductive or physiological impacts were evaluated using the HQ approach, using literature-derived toxicity reference values (TRV), and site-specific soil data. Chemicals without an existing TRV were evaluated qualitatively. Conservative daily doses were modeled based on chemical concentrations at the site and information on natural history for avian and mammalian receptors. HQs were developed by dividing the estimated daily dose for each chemical by the TRV.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

7.3 ECOLOGICAL EXPOSURE ASSESSMENT

Potential terrestrial exposure pathways include (1) direct ingestion of contaminated soil and (2) indirect exposure through consumption of organisms that have ingested soil. These pathways are expected to be complete at IR Site 28, therefore were evaluated for all three receptors of concern (deer mouse, American kestrel, and peregrine falcon). Doses of each COPEC for each receptor were calculated based on natural history traits, such as body size, prey type, ingestion rates, foraging areas, and the levels of contamination at the sites. The dose equation is as follows:

$$Dose = \frac{[(IR_{prey} \times C_{prey}) \times (IR_{soil} \times C_{soil})] \times SUF}{BW}$$

where:

- Dose = estimated dose from ingestion (mg COEPC per kg of body weight per day)
- IR_{prey} = amount of prey ingested per day (kg per day)
- C_{prey} = concentration in prey
- IR_{soil} = amount of soil ingested (kg soil per day)
- C_{soil} = concentration of contaminant in soil (mg/kg)
- SUF = site use factor (unitless)
- BW = body weight (kg)

Exposure parameters for each receptor are provided in [Table 7-5](#), [Table 7-6](#), and [Table 7-7](#). To bracket the uncertainty associated with many of these parameters, two doses were produced for each COPEC. A high dose was calculated using the most conservative of the dose parameters, and a low dose was calculated using the least conservative of the dose parameters. A detailed explanation of how these calculations were performed and a summary of the calculated doses can be found in Appendix J, Section 1.0 of the Draft Final RI Report ([PRC 1997](#)).

7.4 ECOLOGICAL EFFECTS ASSESSMENT

The expected effects of each COPEC for all assessment endpoints was estimated using TRVs. TRVs and the methodology behind their derivation are described in detail in Section 2.0 of Appendix J in the Draft Final RI Report ([PRC 1997](#)). Appendix J also includes toxicological profiles of all chemicals identified as COPECs.

7.5 ECOLOGICAL RISK CHARACTERIZATION

The receptor-specific dose was compared to the TRV using the HQ methodology ([EPA 1989](#)) to identify potential adverse biological effects to the receptor. Two characterizations were completed for each COPEC for each receptor. The “worst case” HQ used the most conservative

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

exposure assessment (high dose) and the most conservative effects assessment (low TRV). The “best case” HQ used the least conservative dose (low dose) and TRV (high TRV). Comparing HQs for the best and worst case scenarios to unity permits an evaluation of the hazardous nature of the COPECs. The following table presents the decision criteria used to categorize COPECs:

Scenario	Category 1: “Worst-Case” Scenario HQ<1 and “Best-Case” Scenario HQ<1	Category 2: “Worst-Case” Scenario HQ ≥1 and “Best-Case” Scenario HQ<1	Category 3: “Worst-Case” Scenario HQ>1 and “Best-Case” Scenario HQ>1
Risk Potential	Low Potential	Unknown Potential	High Potential
Decision	No Action Recommended	Risk Management Recommended	Risk Management or Action Recommended

Category 1 HQs calculated for both the worst and best case scenarios are less than or equal to unity. Thus, it is highly unlikely that Category 1 COPECs present a risk and therefore no action was recommended. The other extreme is Category 3. In Category 3, HQs for both scenarios are greater than unity, which indicates a high potential for risk and therefore action was recommended. In Category 2, HQs fall between these two extremes (for example, the worst case HQ is greater than unity, but the best case HQ is less than unity). Category 2 is not amenable to simple distinctions of risk, and a decision based on risk management was recommended. When the data were not sufficient to derive TRVs, calculated doses were qualitatively compared to available toxicological information. Characterization of risk for IR Site 28 is summarized below. Appendix J, Section 3.0 (PRC 1997) provides a detailed description of the risk characterizations for each site.

COPECs assessed quantitatively fell into Category 2; that is, the HQ for the worst case scenario was greater than or equal to 1 but the HQ calculated for the best case scenario was less than 1. HQs for each site are shown on Table 7-8, Table 7-9, and Table 7-10. Table 7-11 provides a summary of the HQ results for IR Site 28. For a detailed evaluation of chemicals that were evaluated qualitatively, see Section 3.1 of Appendix J (PRC 1997).

7.6 PHASE II SLERA CONCLUSIONS/RISK MANAGEMENT DECISIONS

The conclusions of the Phase II SLERA for the IR Site 28 are summarized below.

The SLERA did not include an evaluation of plants and invertebrates. No site-specific bioassays for plants and invertebrates were recommended because (1) much of the habitat at IR Site 28 is disturbed, (2) the future planned use of each site is unchanged, so the soil invertebrates and plants at the site are likely to continue to be species that can adapt to disturbance regimes, and (3) those types of plant and invertebrate species are currently flourishing at the site (Tetra Tech 2001a).

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

7.6.1 Deer Mouse

No further action was recommended for the deer mouse or the other species it represents at IR Site 28. HQs for the deer mouse are provided on Table J3-11 in Appendix J of the Draft RI (PRC 1997). Given the rapid generation time of mice (50 days [Jameson 1953]) and other small mammals, it is likely that recruitment from nearby populations of small mammals is sufficient to maintain healthy populations, despite any potential chemical-related effects. Thus, any potential adverse effects on individuals exposed to contamination at IR Site 28 are not likely to affect the small mammal populations as a whole. Pursuant to a comment memorandum on the Validation Study (DTSC HERD 1998), HERD withdrew the recommendation for small mammal validation studies for IR Sites 11, 28, and 29 based on site-specific conditions and future use.

7.6.2 American Kestrel

No further action was recommended for the American kestrel at IR Site 28. Raptors tend to have larger territories than the conservative assumptions used in the dose model. Because kestrel territory size is inversely proportional to territory quality, the relatively low quality of urbanized habitats at NAVSTA TI are not expected to provide complete foraging grounds for any individual. The HQ calculated for the high dose is very conservative and is not realistic because it assumes the smallest territory size. While some individuals in raptor populations may include this site as part of their foraging territory and experience some exposure, the effect on a few individuals will not reduce the local raptor populations as a whole.

7.6.3 Peregrine Falcon

Due to uncertainty in the available information for the peregrine falcon, HQs and qualitative risk assessments for all COPECs indicated that while no immediate action was warranted, further risk management was recommended. The peregrine falcon is listed as endangered by California State agencies. As such, it must be demonstrated that individual peregrines are not affected by on-site contamination. Given the uncertainty associated with the HQ calculations, it was not possible to discount exposure from IR Site 28 and further investigation was recommended to better clarify potential exposure to contamination before remedial action is considered. The peregrine falcons that nest on the SFOBB are most likely to forage at NAVSTA TI or YBI while they are nesting between January and July (Bell and others 1996). Common bird species ingested by the SFOBB falcon pair include doves, pigeons, starlings, and red-winged blackbirds (Bell and others 1996). Many of these birds may stop at NAVSTA TI for short periods of time before being caught by a peregrine. In addition, red-winged blackbirds, which are a favorite prey item for the East Bay pair of falcons (Bell and others 1996), are known to nest on YBI. Modeling of tissue contaminant levels in or collecting tissue samples from birds on YBI was recommended to provide a more realistic estimate of possible effects of contamination on peregrine falcons.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

7.7 VALIDATION STUDY

COPECs identified as posing potential ecological risk to the peregrine falcon in the Phase II SLERA were further evaluated in the validation study. The validation study consisted of an evaluation of the transfer of contaminants from the soil through the food chain to birds ingested by peregrine falcons.

The sampling design was primarily nonprobabilistic (judgmental); results were used to test only the hypothesis that contaminant concentrations in bird tissues from specific sites do not constitute a dose to the peregrine falcon that exceeds the high TRV for the chemical. The doses to the peregrine falcons were compared to the low and high TRVs for each chemical, as described in the Draft Final RI Report (PRC 1997).

A bird survey was conducted in 1998 to identify birds that forage primarily within IR Sites 11, 28, and 29 (Tetra Tech 1998). Based on this survey and consultations with local peregrine falcon experts, resident birds commonly preyed on by peregrine falcons include American robin, European starling, house finch, and white-crowned sparrow.

Five bird species were targeted for collection. Three birds were collected by sharpshooter from IR Sites 11, 28, and 29 in March 1999 (nine birds were collected). Of the species targeted for collection, only white-crowned sparrows were collected. No American robins or red-winged blackbirds were seen or heard on the sites during the field investigation. European starlings and house finches were heard calling in or near the sites but were never observed. Golden crowned sparrow and song sparrow, although non-target birds, were also collected. They were abundant at the site and are similar in size and feeding characteristics to the white-crowned sparrow.

7.7.1 Exposure and Effects of Site Contamination on the Peregrine Falcon

The problem considered in the validation study was whether harmful concentrations of COPECs were transferred from soil at the site to peregrine falcons via ingestion of avian prey. A HQ approach using literature-derived TRVs and site-specific soil and prey data was used. Chemicals without an existing TRV were evaluated qualitatively.

The refined dose estimate to the peregrine falcon was modeled after a similar dose refinement conducted for Hunters Point Shipyard (Battelle and others 1999). A description of the dose equation exposure parameters is provided in Table 7-12. HQs were developed by dividing the estimated daily dose for each chemical by the TRV.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

7.7.2 Risks to the Peregrine Falcon

A summary of the risk characterization results is presented below and on [Table 7-13](#).

Based on FCMs using site-specific prey tissue, all of the COPECs at IR Site 28 (thallium and zinc) were less than the no-effect-level daily dose (low TRV) or effects levels available in the toxicological literature (Category 1).

Lead daily doses for IR Site 28 were between the low and high TRV (Category 2); however, this result stems from a low TRV that is significantly more conservative than other widely accepted TRVs. When a more relevant TRV is used to derive a raptor-specific low TRV, the $HQ_{\text{dose/low TRV}}$ was less than 1.0, indicating a Category 1 situation with a low potential for risk at IR Site 28.

7.7.3 Validation Study Recommendations/Conclusions

Based on the information and data evaluated as part of the validation study, the DON considered chemical levels in soils at IR Site 28 to pose minimal risk to the peregrine falcon. No further investigation or action was recommended and agreed to by the BCT.

7.8 EXPOSURE POINT CONCENTRATION COMPARISON

To ensure IR Site 28 continues to remain protective of ecological receptors and as requested by the DTSC, EPCs were calculated to include data collected since the validation study was finalized in 2001. [Table 7-12](#) provides a comparison of the EPCs used in the Phase II SLERA and validation study, versus EPCs calculated in 2005 as part of this RI. The results of this comparison show that overall EPCs have decreased. [Table 7-13](#) provides HQ results for the validation study based on the updated EPCs. The conclusions of the risk assessment remain unchanged based on an evaluation of EPCs that includes data collected between 2001 and the present.

7.9 CONCLUSIONS AND RECOMMENDATIONS

Based on the information and data presented in the Draft Final RI Report ([PRC 1997](#)), the validation study ([Tetra Tech 2001a](#)), and the reevaluation of EPCs in this RI, the DON considers chemical levels in soils at IR Sites 8, 11, 28, and 29 to pose minimal risk to ecological receptors. No further investigation or action for ecological concerns is recommended for IR Site 28.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

FIGURES

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SuTech, February 2009.

LEGEND

-  Developed: Paved areas or buildings.
-  Eucalyptus Woodland: Consists mainly of non-native species.
-  Mixed Woodland: Consists mainly of non-native species.
-  Brushland: Includes both non-native and native plant communities, as shown on Figure 7-2.
-  Ruderal: Areas cleared of native vegetation where both native and non-native species are recolonizing.
-  Lawn: Includes open fields, dirt areas, and maintained grassy areas on.
-  Buildings
-  Roads
-  Site 8, 11, 28, and 29

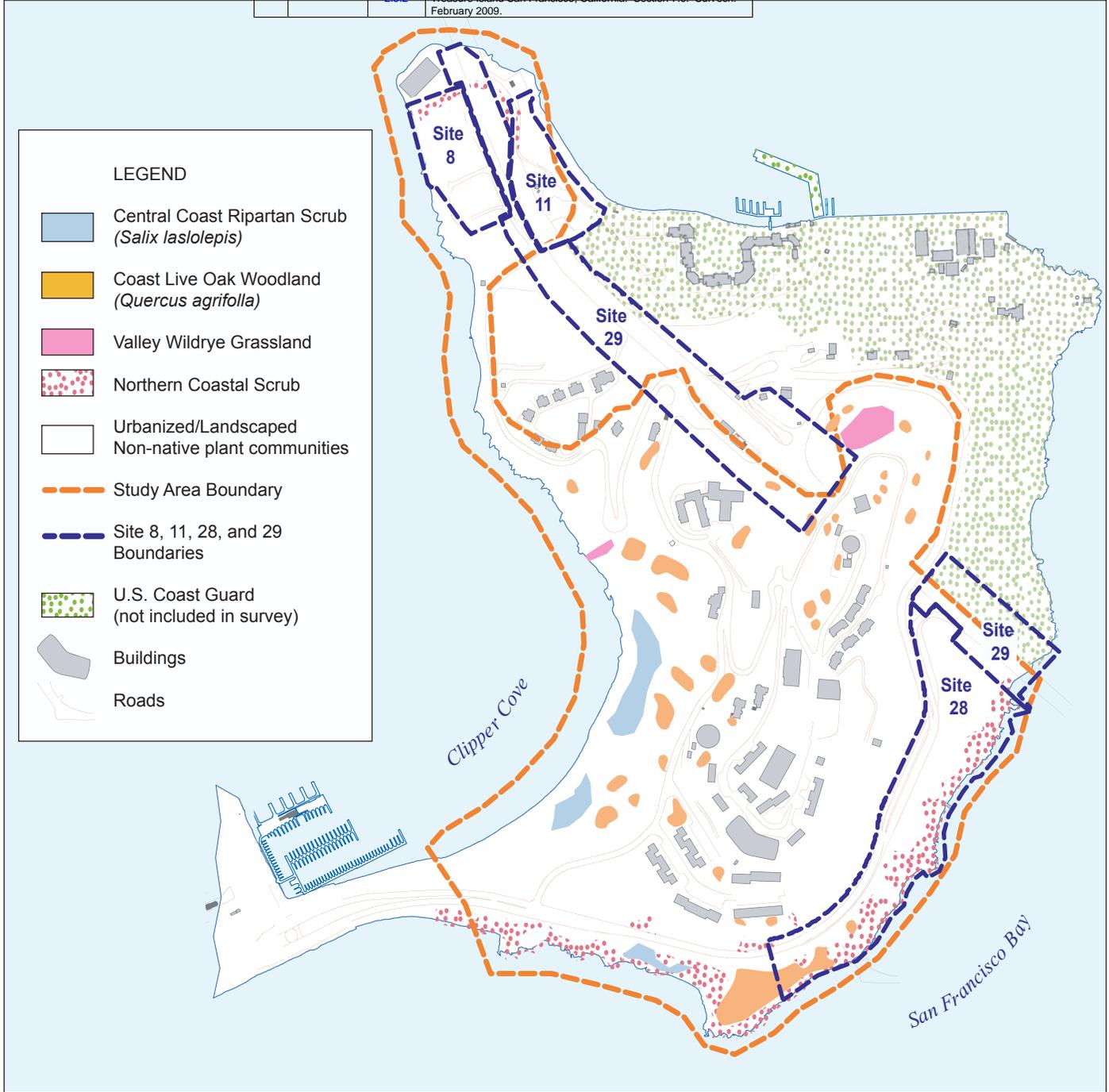


Naval Station Treasure Island, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, CA.

FIGURE 7-1
VEGETATION HABITATS
YERBA BUENA ISLAND

Remedial Investigation, Sites 8, 28, and 29

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech, February 2009.



Four native plant communities were identified at Yerba Buena Island as shown on the legend. Native plant communities are those which are dominated by native, presumably naturally occurring plant species. Plant communities dominated by non-native plant species, including Eucalyptus Woodland, Non-native Scrub/Shrubland, and Ruderal Habitats, are included with the urbanized/landscaped/non-native plant communities

Plant survey conducted April 1996.

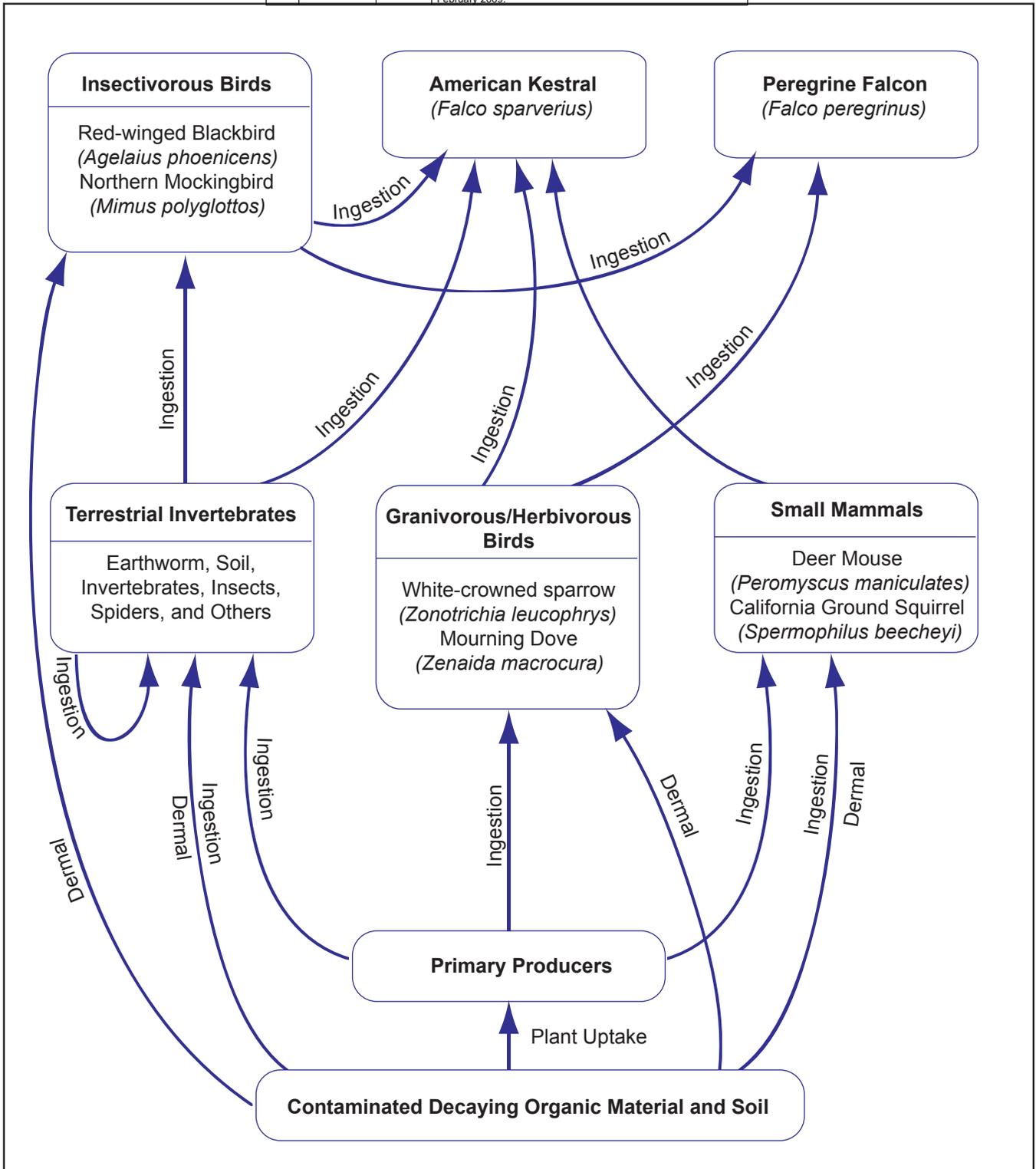


Naval Station Treasure Island, California
U.S. Department of the Navy, BRAC PMO West, San Diego, CA.

FIGURE 7-2
NATIVE PLANT COMMUNITIES
YERBA BUENA ISLAND

Remedial Investigation, Sites 8, 28, and 29

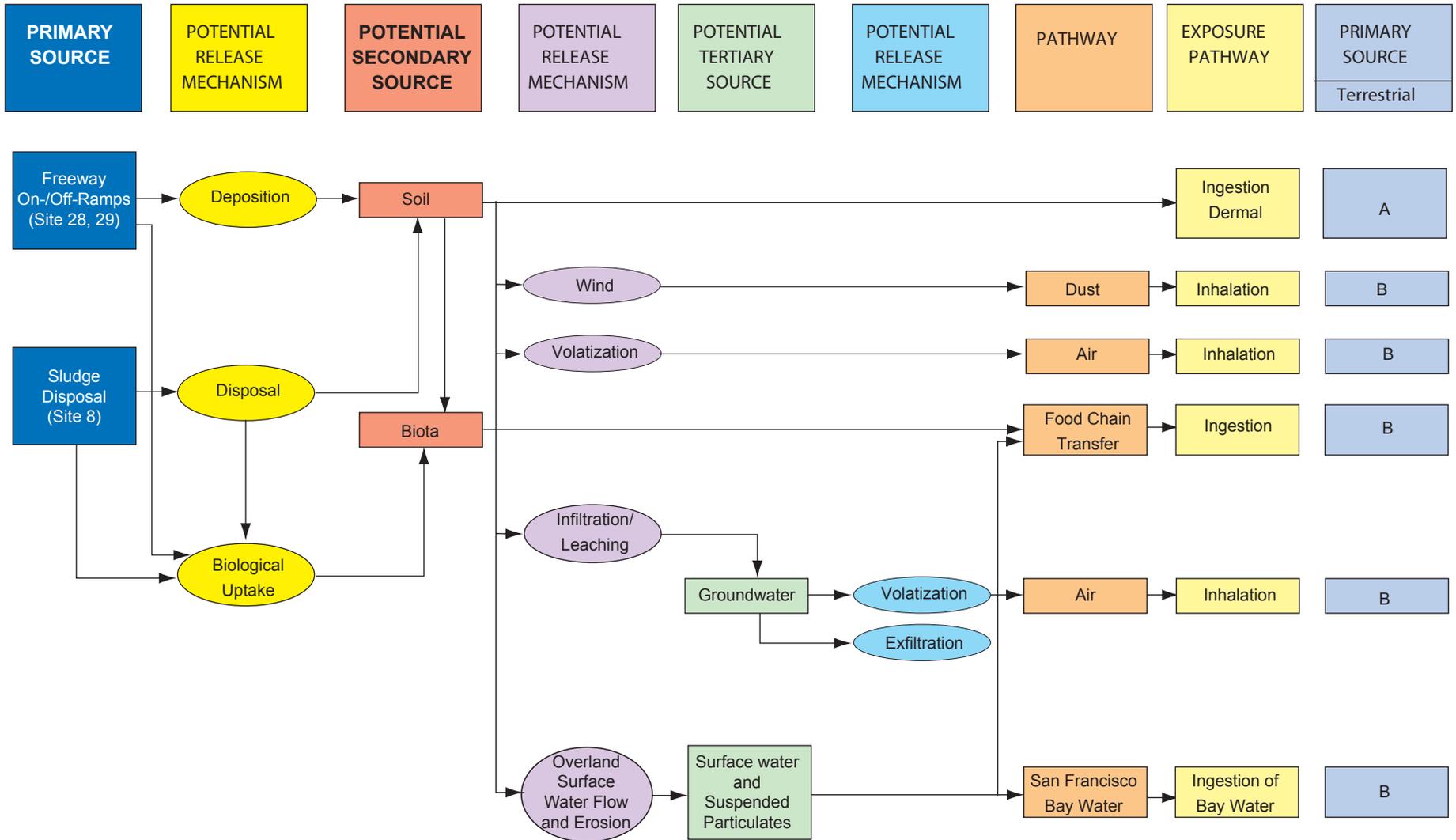
Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.



Naval Station Treasure Island, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, CA.

FIGURE 7-3
FOOD WEB
YERBA BUENA ISLAND
 Remedial Investigation, Sites 8, 28, and 29

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SuITech. February 2009.



Notes

→ Primary exposure pathway

A Exposure is expected to be minor relative to other exposures that are evaluated

B Exposure is not likely under this scenario



Naval Station Treasure Island
 U.S. Department of the Navy, BRAC PMO West, San Diego, CA.

FIGURE 7-4
CONCEPTUAL SITE MODEL FOR
TERRESTRIAL RECEPTORS
YERBA BUENA ISLAND
 Remedial Investigation, Sites 8, 28, and 29

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

TABLES

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

TABLE 7-1: PLANT SPECIES POTENTIALLY OCCURRING AT NAVAL STATION TREASURE ISLAND
Revised Remedial Investigation Report for Installation Restoration Site 28
Naval Station Treasure Island, San Francisco, California

Family	Common Name	Scientific Name	Native Species
AIZOACEAE	Ice Plant	<i>Carpobrotus edulis</i>	No
ANACARDIACEAE	Poison Oak	<i>Toxicodendron diversilobum</i>	Yes
APOCYNACEAE	Periwinkle	<i>Vinca</i> sp.	No
AQUIFOLIACEAE	English Holly	<i>Ilex cornuta</i>	No
ARALICEAE	English Ivy	<i>Hedera helix</i>	No
CAPRIFOLIACEAE	Red Elderberry	<i>Sambucus racemosa</i>	Yes
CISTACEAE	Rockrose	<i>Cistus</i> sp.	No
ERICAEAE	Heath	<i>Erica</i> sp.	No
FABACEAE	Sydney Golden Star Acacia Exotic Broom	<i>Acacia longifolia</i> <i>Acacia verticillata</i> <i>Genista canariensis</i>	No No No
FAGACEAE	Coast Live Oak	<i>Quercus agrifolia</i>	Yes
HIPPOCASTANACEAE	California Buckeye	<i>Aesculus californica</i>	Yes
LAMIACEAE	Rosemary	<i>Rosmarinus</i> sp.	No
MYPORACEAE	Myoporum	<i>Myoporum laetum</i>	No
MYRTACEAE	Blue Gum Eucalyptus Australian Tea Tree	<i>Eucalyptus globulus</i> <i>Leptospermum laevigatum</i>	No No
OLEACEAE	Olive	<i>Olea europaea</i>	No
PLATANACEAE	Western Sycamore	<i>Plantanus racemosa</i>	No
PINACEAE	Bishop Pine	<i>Pinus muricata</i>	Yes
POACEAE	Fescue California Oatgrass Common Velvet Grass Cheat Grass Kentucky Bluegrass Reedgrass Perennial Ryegrass Wild Oat	<i>Festuca</i> sp. <i>Danthonia californica</i> <i>Holcus lanatus</i> <i>Bromus tectorum</i> <i>Poa pratensis</i> ssp. <i>pratensis</i> <i>Calamagrostis nutkaensis</i> <i>Lolium perenne</i> <i>Avena fatua</i>	Yes Yes No No No Yes No No
RHAMNACEAE	Deer Brush	<i>Ceanothus integerrimus</i>	Yes
ROSACEAE	California Blackberry Cotoneaster Toyon Coast Strawberry	<i>Rubus ursinus</i> <i>Cotoneaster</i> sp. <i>Heteromeles arbutifolia</i> <i>Fragaria chiloensis</i>	Yes Yes Yes Yes
SALICACEAE	Willow	<i>Salix</i> spp.	Yes
SCHROPHULARIACEAE	Coyote Bush Hebe	<i>Baccharis pilularis</i> <i>Hebe</i> spp.	Yes No
SIMMONDSIACEAE	Jojoba	<i>Simmondsia</i> sp.	No

Notes:

A variety of exotic ornamental plants were identified during the survey but were not included in the list.

The information on the common and scientific names and the native or introduced status of the plants listed above was taken from the Jepson Manual (1993).

The list of plants above is based on the Treasure Island plant list from Naval Facilities Engineering Command, Western Division (1986).

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

TABLE 7-2: AMPHIBIANS AND REPTILES POTENTIALLY OCCURRING AT NAVAL STATION TREASURE ISLAND

Revised Remedial Investigation Report for Installation Restoration Site 28
Naval Station Treasure Island, San Francisco, California

Common Name	Scientific Name	Breeds On-site	Feeding Guild ^a
Amphibians			
California Slender Salamander	<i>Batrachoseps attenuatus</i>	Yes	Carnivore
Reptiles			
Northern Alligator Lizard	<i>Gerrhonotus coeruleus</i>	Yes	Carnivore

Notes:

The occurrence of the animals listed above is based on information published in Anderson (1960) and PRC (1993).
The breeding and the feeding information listed above is based on information published in Zeiner (1988).

a Carnivore eats only animal matter

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

TABLE 7-3: BIRDS POTENTIALLY OCCURRING AT NAVAL STATION TREASURE ISLAND
Revised Remedial Investigation Report for Installation Restoration Site 28
Naval Station Treasure Island, San Francisco, California

FAMILY / Common Name	Scientific Name	Status ^a	Breeds On-site ^b	Feeding Guild ^c
GAVIIDAE				
Common Loon	<i>Gavia immer</i>	CSC	No	Carnivore
Red-Throated Loon	<i>Gavia stellata</i>	None	No	Carnivore
PODICIPEDIDAE				
Pied-Billed Grebe	<i>Podilymbus podiceps</i>	None	No	Carnivore
Horned Grebe	<i>Podiceps auritus</i>	None	No	Carnivore
Red-Necked Grebe	<i>Podiceps grisengena</i>	None	No	Carnivore
Western Grebe	<i>Aechmophorus occidentalis</i>	None	No	Carnivore
Clarks Grebe	<i>Aechmophorus clarkii</i>	None	No	Carnivore
PHALACROCORACIDAE				
California Brown Pelican	<i>Pelecanus occidentalis californicus</i>	FE SE	No	Piscivore
PHALACROCORACIDAE				
Double-Crested Cormorant	<i>Phalacrocorax auritus</i>	CSC	No	Piscivore
Brandts Cormorant	<i>Phalacrocorax penicillatus</i>	None	No	Piscivore
Pelagic Cormorant	<i>Phalacrocorax pelagicus</i>	None	Yes	Piscivore
ARDEIDAE				
Great Blue Heron	<i>Ardea herodias</i>	None	No	Omnivore
Black-Crowned Night Heron	<i>Nycticorax nycticorax</i>	None	Yes	Omnivore
ANATIDAE				
Mallard	<i>Anas platyrhynchos</i>	None	Yes	Omnivore
Surf Scoter	<i>Melanitta perspicillata</i>	None	No	Carnivore
Common Goldeneye	<i>Bucephala clangula</i>	None	No	Carnivore
Bufflehead	<i>Bucephala albeola</i>	None	No	Omnivore
Ruddy Duck	<i>Oxyura jamaicensis</i>	None	No	Omnivore
American Coot	<i>Fulica americana</i>	None	No	Omnivore
FALCONIDAE				
Peregrine Falcon	<i>Falco peregrinus anatum</i>	SE	No	Carnivore
American Kestrel	<i>Falco sparverius</i>	None	No	Carnivore
PHASIANIDAE				
California Quail	<i>Callipepla californica</i>	None	Yes	Herbivore
CHARADRIIDAE				
Black-Bellied Plover	<i>Pluvialis squatarola</i>	None	No	Carnivore
Killdeer	<i>Charadrius vociferous</i>	None	Yes	Carnivore
Spotted Sandpiper	<i>Actitis macularia</i>	None	No	Carnivore
Sanderling	<i>Calidris alba</i>	None	No	Carnivore
Western Sandpiper	<i>Calidris mauri</i>	None	No	Carnivore

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

TABLE 7-3: BIRDS POTENTIALLY OCCURRING AT NAVAL STATION TREASURE ISLAND (CONT'D)
Revised Remedial Investigation Report for Installation Restoration Site 28
Naval Station Treasure Island, San Francisco, California

FAMILY / Common Name	Scientific Name	Status ^a	Breeds On-site ^b	Feeding Guild ^c
LARIDAE				
Bonapartes Gull	<i>Larus philadelphia</i>	None	No	Carnivore
Mew Gull	<i>Larus canus</i>	None	No	Omnivore
Ring-billed Gull	<i>Larus delawarensis</i>	None	No	Omnivore
Western Gull	<i>Larus occidentalis</i>	None	No	Omnivore
Glaucous-Winged Gull	<i>Larus hyperboreus</i>	None	No	Omnivore
Herring Gull	<i>Larus argentatus</i>	None	Yes	Omnivore
California Least Turn	<i>Sterna antillarum</i>	FE SE	No	Carnivore
Caspian Tern	<i>Sterna caspia</i>	None	No	Carnivore
Forsters Tern	<i>Sterna forsteri</i>	None	No	Carnivore
COLUMBIDAE				
Rock Dove	<i>Columba livia</i>	None	Yes	Granivore
Mourning Dove	<i>Zenaida macroura</i>	None	Yes	Granivore
TYTONIDAE				
Barn Owl	<i>Tyto alba</i>	None	Yes	Carnivore
TROCHILIDAE				
Annas Hummingbird	<i>Calypte anna</i>	None	Yes	Insectivore
Allens Hummingbird	<i>Selasphorus sasin</i>	None	Unknown	Insectivore
ALCEDINIDAE				
Belted Kingfisher	<i>Ceryle alcyon</i>	None	No	Piscivore
Northern Flicker	<i>Colaptes auratus</i>	None	No	Omnivore
TYRANNIDAE				
Black Phoebe	<i>Sayornis nigricans</i>	None	No	Carnivore
HIRUNDINIDAE				
Barn Swallow	<i>Hirundo rustica</i>	None	Yes	Carnivore
CORVIDAE				
Stellers Jay	<i>Cyanocitta stelleri</i>	None	No	Omnivore
American Crow	<i>Corvus brachyrhynchos</i>	None	No	Omnivore
Common Raven	<i>Corvus corax</i>	None	Yes	Omnivore
PARIDAE				
Chestnut-Backed Chickadee	<i>Parus refescens</i>	None	Yes	Omnivore
AEGITHALIDAE				
Bushtit	<i>Psaltriparus minimus</i>	None	Yes	Omnivore
SITTIDAE				
Red-Breasted Nuthatch	<i>Sitta canadensis</i>	None	Yes	Omnivore
CERTHIIDAE				
Brown Creeper	<i>Certhia americana</i>	None	Yes	Omnivore

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

TABLE 7-3: BIRDS POTENTIALLY OCCURRING AT NAVAL STATION TREASURE ISLAND (CONT'D)
Revised Remedial Investigation Report for Installation Restoration Site 28
Naval Station Treasure Island, San Francisco, California

FAMILY / Common Name	Scientific Name	Status ^a	Breeds On-site ^b	Feeding Guild ^c
MUSCICAPIDAE				
Golden-Crowned Kinglet	<i>Regulus satrapa</i>	None	No	Omnivore
Ruby-Crowned Kinglet	<i>Regulus calendula</i>	None	No	Omnivore
Hermit Thrush	<i>Catharus guttatus</i>	None	No	Omnivore
American Robin	<i>Turdus migratorius</i>	None	Yes	Omnivore
Varied Thrush	<i>Ixoreus naevius</i>	None	No	Omnivore
STURNIDAE				
European Starling	<i>Sturnus vulgaris</i>	None	Yes	Omnivore
EMBERIZIDAE				
Yellow-Rumped Warbler	<i>Dendroica coronata</i>	None	No	Omnivore
Savannah Sparrow	<i>Passerculus sandwichensis</i>	None	No	Omnivore
Fox Sparrow	<i>Passerella iliaca</i>	None	No	Omnivore
Song Sparrow	<i>Melospiza melodia</i>	CSC	Yes	Omnivore
Golden-Crowned Sparrow	<i>Zonitrichia atricapilla</i>	None	Yes	Omnivore
White-Crowned Sparrow	<i>Zonitrichia leucophrys</i>	None	Yes	Omnivore
Oregon Junco	<i>Junco hyemalis thurberi</i>	None	Yes	Omnivore
Dark-Eyed Junco	<i>Junco hyemalis</i>	None	Yes	Omnivore
Western Meadowlark	<i>Sturnella neglecta</i>	None	Yes	Omnivore
Orange-Crowned Warbler	<i>Vermivora celata</i>	None	Yes	Omnivore
Rufous-Sided Towhee	<i>Pipilo erythrophthalmus</i>	None	Yes	Omnivore
Brewers Blackbird	<i>Euphagus cyanocephalus</i>	None	Yes	Omnivore
Red-Winged Blackbird	<i>Agelaius phoeniceus</i>	None	Yes	Omnivore
Brown-Headed Cowbird	<i>Molothrus ater</i>	None	Yes	Omnivore
FRINGILLADAE				
Pine Siskin	<i>Carduelis pinus</i>	None	Yes	Omnivore
American Goldfinch	<i>Carduelis tristis</i>	None	Yes	Carnivore
PASSERIDAE				
House Sparrow	<i>Passer domesticus</i>	None	No	Omnivore

Notes:

The occurrence of the birds listed above is based on information published in Bailey (1992), Feinstein (1992), PRC (1993), and SFEP (1992).

Information on the status of the birds listed above is based on California Fish and Game's legal status database.

Information on the breeding and the feeding of the birds listed above was taken from information published by Zeiner and others (1990a).

- a CSC California species of special concern
SE State endangered species
FE Federal endangered species
None No legal status
- b Individual breeds at Naval Station Treasure Island
- c Carnivore Eats only animal matter
Granivore Eats only grains
Herbivore Eats only plant matter
Omnivore Eats both plant and animal matter
Piscivore Eats only fish

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

TABLE 7-4: MAMMALS POTENTIALLY OCCURRING AT NAVAL STATION TREASURE ISLAND
Revised Remedial Investigation Report for Installation Restoration Site 28
Naval Station Treasure Island, San Francisco, California

Common Name	Scientific Name	Breeds On-site ^a	Feeding Guild ^b
California Ground Squirrel	<i>Spermophilus beecheyi</i>	Yes	Omnivore
California Pocket Mouse	<i>Chaetodipus californicus</i>	Yes	Herbivore/Granivore
Deer Mouse	<i>Peromyscus maniculatus</i>	Yes	Omnivore

Notes:

The occurrence of the mammals listed above is based on information found in Naval Facilities Engineering Command, Western Division (1986).

The breeding and feeding information is based on information in Zeiner and others (1990b).

a Organism breeds at Treasure Island

b Granivore Eats only grains
Herbivore Eats only plant matter
Omnivore Eats both plant and animal matter

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

TABLE 7-5: PARAMETERS USED IN DEER MOUSE DOSE CALCULATIONS

Revised Remedial Investigation Report for Installation Restoration Site 28
Naval Station Treasure Island, San Francisco, California

Parameter	Low	High	Units	Reference/Notes
Invertebrate Ingestion Rate	0.00026	0.00693	kg/day	Represents low and high intake rates for studies conducted in Virginia, Indiana and Colorado (EPA 1993)
Plant Ingestion Rate	0.00067	0.00848	kg/day	Represents low and high intake rates for studies conducted in Virginia, Indiana, and Colorado (EPA 1993)
Incidental Soil Ingestion Rate ¹	0.00013	0.00013	kg/day	2% of ingestion rate for white-footed mouse (Beyer and others 1994)
Soil Concentration	Lesser of the 95% UCL and maximum concentration	Lesser of the 95% UCL and maximum concentration	mg/kg	See Table 7-12
Bioaccumulation Factor (invertebrate:soil)	Chemical-specific	Chemical-specific	Unitless	See Table J1-6 (Tetra Tech 1997)
Bioaccumulation factor (plant:soil)	Chemical-specific	Chemical-specific	Unitless	See Table J1-6 (Tetra Tech 1997)
Site use factor (SUF)	1 (for IR Sites 8, 28, and 29)	1 (for IR Sites 8, 28, and 29)	Unitless	Home range smaller than IR site acreage; SUF of 1 used for high and low estimate.
Body Weight	0.014	0.035	kg	Range encompasses breeding and nonbreeding males and females (EPA 1993)

Notes:

- 1 Soil ingestion rates, based on a percentage of food ingestion, are based solely on the upper estimate of the food ingestion rate.

EPA	U.S. Environmental Protection Agency
IR	Installation Restoration
kg	kilogram
kg/day	Kilogram per day
mg/kg	milligram per kilogram
Tetra Tech	Tetra Tech EM Inc.
UCL	Upper confidence limit

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

TABLE 7-6: PARAMETERS USED IN AMERICAN KESTREL DOSE CALCULATIONS

Revised Remedial Investigation Report for Installation Restoration Site 28
Naval Station Treasure Island, San Francisco, California

Parameter	Low	High	Units	Reference/Notes
Invertebrate ingestion rate	0.00493	0.01309	kg/day	Data derived from RTI (1994) and EPA (1993)
Vertebrate ingestion rate	0.00877	0.02142	kg/day	Data derived from RTI (1994) and EPA (1993)
Incidental soil ingestion rate ¹	0.00014	0.00014	kg/day	Represents 1 percent soil intake in diet as estimated for the eastern meadowlark (RTI 1994)
Soil concentration	Lesser of the 95% UCL and maximum concentration	Lesser of the 95% UCL and maximum concentration	mg/kg	See Table 7-12
Concentration in vertebrate	Estimated low daily intake for the deer mouse x 180 days	Estimated high daily intake for the deer mouse x 180 days	mg/kg	See Tables J1-9 and J1-10 (Tetra Tech 1997)
Bioaccumulation factor (invertebrate:soil)	Chemical specific	Chemical specific	Unitless	See Table J1-6 (Tetra Tech 1997)
Site use factor (SUF)	8.95x10 ⁻⁴ for IR Site 8 1.25x10 ⁻² for IR Site 28 1.16x10 ⁻² for IR Site 29	4.18x10 ⁻² for IR Site 8 5.86x10 ⁻¹ for IR Site 28 5.44x10 ⁻¹ for IR Site 29	Unitless	Low SUF assumes a home range of 23.9 acres and the high SUF a home range of 1,117 acres (EPA 1993 , Zeiner and others 1990a)
Body weight	0.096	0.145	kg	Low value represents an average body weight for males, and the high value represents the average for females (EPA 1993)

Notes:

1 Soil ingestion rates, based on a percentage of food ingestion, are based solely on the upper estimate of the food ingestion rate.

EPA U.S. Environmental Protection Agency
IR Installation Restoration
kg kilogram
kg/day kilogram per day
mg/kg milligram per kilogram
RTI Research Triangle Institute
Tetra Tech Tetra Tech EM Inc.
UCL Upper confidence limit

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

TABLE 7-7: PARAMETERS USED IN PEREGRINE FALCON DOSE CALCULATIONS

Revised Remedial Investigation Report for Installation Restoration Site 28
Naval Station Treasure Island, San Francisco, California

Parameter	Low	High	Units	Reference/Notes
Vertebrate ingestion rate	0.113	0.141	kg/day	The low value represents male daily intake rates, and the high value represents female rates (Cramp 1980)
Incidental soil ingestion rate ¹	0.0012	0.0012	kg/day	Soil intake as estimated for the red-tailed hawk (RTI 1994)
Soil concentration	Lesser of the 95% UCL and maximum concentration	Lesser of the 95% UCL and maximum concentration	mg/kg	See Table 7-12
Concentration in vertebrate	Estimated low daily intake for the deer mouse x 180 days	Estimated high daily intake for the deer mouse x 180 days	mg/kg	See Tables J1-11 and J1-12 (Tetra Tech 1997)
Bioaccumulation factor (invertebrate:soil)	Chemical specific	Chemical specific	Unitless	See Table J1-6 (Tetra Tech 1997)
Site use factor (SUF)	1.25x10 ⁻⁵ for IR Site 8 1.75x10 ⁻⁴ for IR Site 28 1.63x10 ⁻⁴ for IR Site 29	4.73x10 ⁻⁴ for IR Site 8 6.63x10 ⁻³ for IR Site 28 6.16x10 ⁻³ for IR Site 29	Unitless	The low home range was estimated at 2,112 acres, and the high range at 80,000 acres (CDFG 1990, Zeiner and others 1990a)
Body weight	0.582	1.35	kg	Low body weight represents males, and high body weight represents females (RTI 1994, Ratcliffe 1993)

Notes:

1 Soil ingestion rates, based on a percentage of food ingestion, are based solely on the upper estimate of the food ingestion rate.

CDFG California Department of Fish and Game
IR Installation Restoration
kg kilogram
kg/day Kilogram per day
mg/kg milligram per kilogram
RTI Research Triangle Institute
Tetra Tech Tetra Tech EM Inc.
UCL Upper confidence limit

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

TABLE 7-8: HAZARD QUOTIENTS FOR INSTALLATION RESTORATION SITE 28

Revised Remedial Investigation Report for Installation Restoration Site 28
Naval Station Treasure Island, San Francisco, California

	"Best-Case" HQ Low Dose/High TRV	"Worst-Case" HQ High Dose/Low TRV
Peregrine Falcon		
Lead	1.49E-03	6.92E+04
Thallium	Insufficient Data	Insufficient Data
Zinc	3.56E-04	7.11E+02
American Kestrel		
Lead	4.13E-02	2.93E+06
Thallium	Insufficient Data	Insufficient Data
Zinc	1.17E-02	3.00E+04
Deer Mouse		
Lead	2.04E-02	4.81E+05
Thallium	5.73E-03	2.98E+00
Zinc	1.61E-02	2.40E+03

Notes:

HQ Hazard quotient
TRV Toxicity reference value

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

TABLE 7-9: SUMMARY OF QUANTITATIVE RISK CHARACTERIZATION
Revised Remedial Investigation Report for Installation Restoration Site 28
Naval Station Treasure Island, San Francisco, California

Scenario	Category 1: Worst-Case Scenario $HQ_{\leq 1}$ and Best-Case Scenario $HQ_{\leq 1}$	Category 2: Worst-Case Scenario $HQ_{\leq 1}$ and Best-Case Scenario $HQ_{\geq 1}$	Category 3: Worst-Case Scenario $HQ_{\geq 1}$ and Best-Case Scenario $HQ_{\geq 1}$
IR Site 28			
Peregrine Falcon		Lead, Zinc	
American Kestrel		Lead, Zinc	
Deer Mouse		Lead, Thallium, Zinc	

Notes:

- \leq Less than or equal to
- \geq Greater than or equal to
- DDT Dichlorodiphenyltrichloroethane
- HQ Hazard quotient
- LMW Low molecular weight
- PAH Polycyclic aromatic hydrocarbon

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

TABLE 7-10: PARAMETERS USED IN REFINED PEREGRINE FALCON DOSE CALCULATIONS
Revised Remedial Investigation Report for Installation Restoration Site 28
Naval Station Treasure Island, San Francisco, California

Parameter	Value	Units	Reference/Notes
Vertebrate ingestion rate	0.115	kg/day	Daily ingestion rates reported in the literature ranged from 0.083 to 0.147 kg/day for the male peregrine falcon (Battelle and others 1999). The arithmetic mean of the minimum and maximum values (0.115 kg/day) was selected as the ingestion rate in the refined dose model.
Incidental soil ingestion rate	0.0012	kg/day	Based on an incidental soil ingestion rate for raptors from the Research Triangle Institute (RTI 1994).
Soil concentration	Lesser of the 95% UCL and maximum concentration	mg/kg	See Table 7-12.
Concentration in vertebrate	Site collected bird tissue concentration	mg/kg	Maximum tissue concentration for each site. Because no bird tissues were collected from IR Site 8, the maximum tissue concentration from nearby IR Sites 11 and 29 were used in the IR Site 8 model.
Site use factor (SUF)	0.25	Unitless	The SUF of 0.25 used for this assessment assumes that 25 percent of the diet of the peregrine falcon originates from each site (therefore, 100 percent peregrine falcon diet originates from YBI). This is an extremely conservative assumption considering the large home range of the peregrine falcon relative to the small home range of the sparrow. The lowest estimate of home range for the peregrine falcons is 32 km ² (Bell and others 1996). Zeiner and others (1990a) reported sparrow home ranges from 0.061 to 0.081 km ² . If the SUF were calculated as the ratio of the minimum peregrine falcon home range to the maximum sparrow home range (32 km ² / 0.08 km ²), a SUF of 0.0025 would be appropriate.
Body weight	0.611	kg	Body weights for the peregrine falcon reported in the literature ranged from 0.550 to 1.5 kg (Battelle and others 1999). Because the female peregrine falcon is larger than the male, an average adult body weight based on both sexes may not be adequately protective of the male. Instead, the body weight used in the refined models (0.611 kg) is an average of 12 males (Dunning 1984).

Notes:

kg	kilogram
kg/day	Kilogram per day
km ²	Square kilometers
mg	Milligram
mg/day	Milligram per day
UCL	Upper confidence limit
YBI	Yerba Buena Island

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

TABLE 7-10: PARAMETERS USED IN REFINED PEREGRINE FALCON DOSE CALCULATIONS (CONTINUED)

Revised Remedial Investigation Report for Installation Restoration Site 28
Naval Station Treasure Island, San Francisco, California

Sources:

- Bell, D., D. Gregoire, and B. Walton. 1996. "Bridge Use by Peregrine Falcons in the San Francisco Bay Area." *Raptors in Human Landscapes: Adaptations to Built and Cultivated Environments*. Chapter 2. D.M. Bird and others (eds.). Harcourt Brace and Co.
- Battelle, Entrix Inc., Neptune and Company. 1999. "Hunters Point Shipyard Parcel F. Data Summary Memorandum." Working Draft. November 23.
- Dunning, J.B. 1984. "Bodyweights of 686 Species of North American Birds." Western Bird Banding Association, Monograph Number 1.
- Research Triangle Institute (RTI). 1994. "Development of Ecological Exit Criteria for Hazardous Waste Identification Project." Review Draft. Project 5810-43. U.S. Environmental Protection Agency Office of Solid Waste and Emergency Response. Contract No. 68-D2-0065RTI.
- Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White. 1990a. *California's Wildlife. Volume II: Birds*. California Statewide Wildlife Habitat Relationships System. California Department of Fish and Game. Sacramento, California

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

TABLE 7-11: VALIDATION STUDY HAZARD QUOTIENTS FOR INSTALLATION RESTORATION SITE 28

Revised Remedial Investigation Report for Installation Restoration Site 28
Naval Station Treasure Island, San Francisco, California

COPEC	HQ _{dose/low TRV}	HQ _{dose/high TRV}	Category 1	Category 2	Category 3
IR Site 28					
Lead	304.85	0.77		X	
Zinc	0.32	0.03	X		

Lead HQs based on Raptor-Specific Low TRV

Site	HQ _{dose/raptor low TRV}	Category 1	Category 2	Category 3
IR Site 28	0.09	X		

Notes: The Raptor-Specific Low TRV is based on a study of the effects of lead on American kestrels that showed no reproductive effects at a dose of 50 milligrams per kilogram per day (Pattee 1984).

Category 1 - Below HQ_{dose/low TRV}

Category 2 - Between HQ_{dose/low TRV} and HQ_{dose/high TRV}

Category 3 - Above HQ_{dose/high TRV}

COPEC Chemical of potential ecological concern

DDT Dichlorodiphenyltrichloroethane

HQ Hazard quotient

TRV Toxicity reference value

Source:

Pattee, O.H. 1984. "Eggshell thickness and reproduction in American kestrels exposed to chronic dietary lead." *Archives of Environmental Contamination and Toxicology*. Volume 13, No. 1. Pages 29-34. January.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

TABLE 7-12: EXPOSURE POINT CONCENTRATIONS USED IN FOOD-CHAIN MODELS

Revised Remedial Investigation Report for Installation Restoration Site 28
Naval Station Treasure Island, San Francisco, California

Chemical	SLERA Concentration in Soil mg/kg (min of UCL or [max])	Validation Study Concentration in Soil mg/kg (min of UCL or [max])	2005 Re-evaluation Concentration in Soil mg/kg (min of UCL or [max])
IR Site 28			
Lead	1120	1120	830
Thallium	1.9	1.9	0.89
Zinc	1380	1380	887

Note:

- * Based on Total DDT
- DDT Dichlorodiphenyltrichloroethane
- LMW Low molecular weight
- Max Maximum detected concentration
- mg/kg Milligrams per kilogram
- Min Minimum
- PAH Polycyclic aromatic hydrocarbon
- SLERA Screening-level ecological risk assessment
- UCL Upper confidence limit of the mean

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
21	ERA	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Section 7.0. SulTech. February 2009.

TABLE 7-13: VALIDATION STUDY HAZARD QUOTIENTS FOR INSTALLATION RESTORATION SITE 28 BASED ON UPDATED EXPOSURE POINT CONCENTRATIONS
Revised Remedial Investigation Report for Installation Restoration Site 28
Naval Station Treasure Island, San Francisco, California

COPEC	HQ _{dose/low TRV}	HQ _{dose/high TRV}	Category 1	Category 2	Category 3
IR Site 28					
Lead	298.00	0.75		X	
Zinc	0.30	0.03	X		

Lead HQs based on Raptor-Specific Low TRV

Site	HQ _{dose/raptor low TRV}	Category 1	Category 2	Category 3
IR Site 28	0.09	X		

Notes: The Raptor-Specific Low TRV is based on a study of the effects of lead on American kestrels that showed no reproductive effects at a dose of 50 milligrams per kilogram per day (Pattee 1984).

Category 1 - Below HQ_{dose/low TRV}

Category 2 - Between HQ_{dose/low TRV} and HQ_{dose/high TRV}

Category 3 - Above HQ_{dose/high TRV}

COPEC Chemical of potential ecological concern

DDT Dichlorodiphenyltrichloroethane

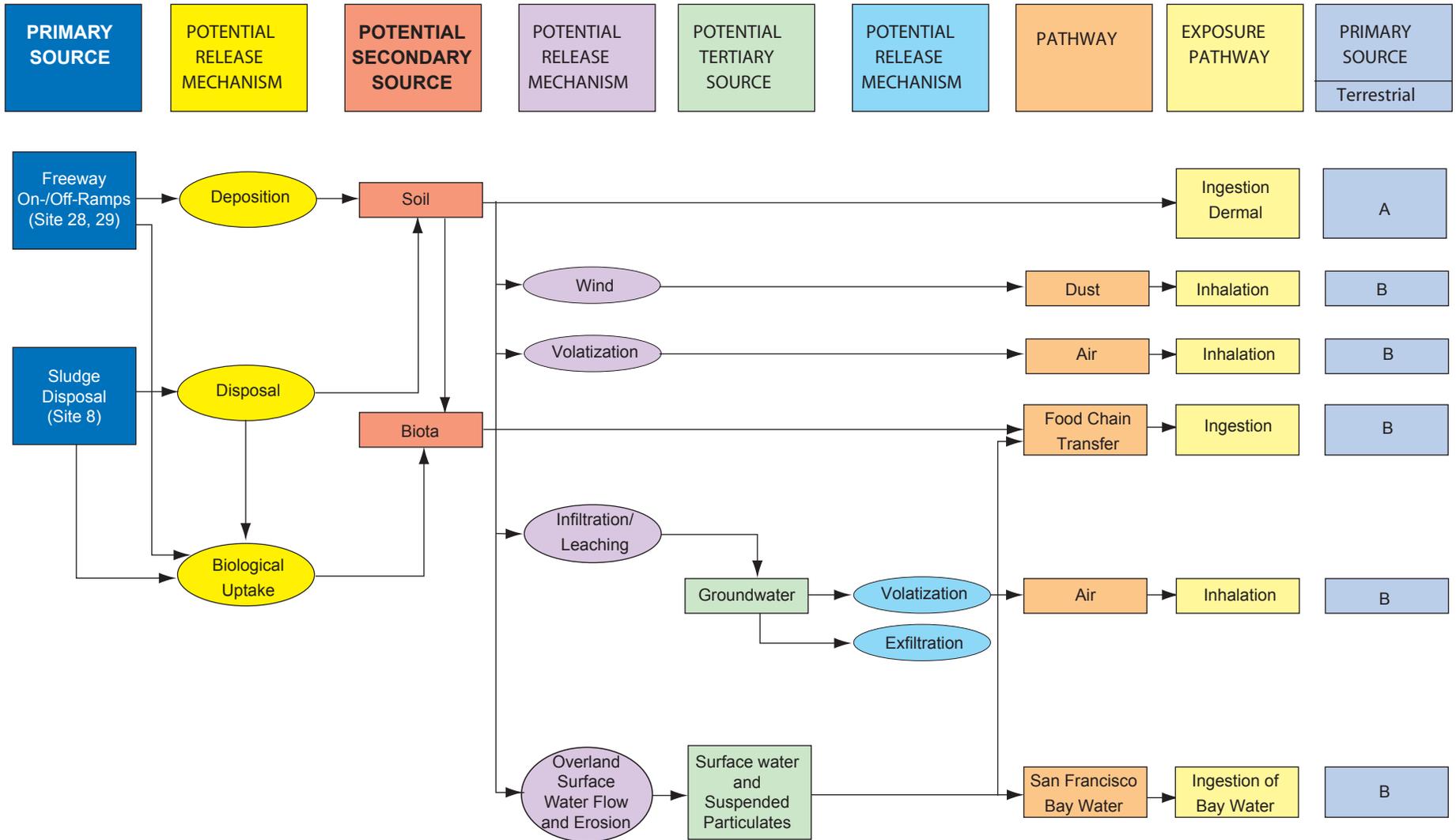
HQ Hazard quotient

TRV Toxicity reference value

Source:

Pattee, O.H. 1984. "Eggshell thickness and reproduction in American kestrels exposed to chronic dietary lead." *Archives of Environmental Contamination and Toxicology*. 13(1):29:34. January.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
22	CSM for terrestrial receptors	Section 2.5.2	Final Revised Remedial Investigation Report for Installation Restoration Site 28 (West Side On-Off Ramps) Naval Station Treasure Island San Francisco, California. Figure 7-4. SuITech. February 2009.



Notes

→ Primary exposure pathway

A Exposure is expected to be minor relative to other exposures that are evaluated

B Exposure is not likely under this scenario

Naval Station Treasure Island
U.S. Department of the Navy, BRAC PMO West, San Diego, CA.

FIGURE 7-4
CONCEPTUAL SITE MODEL FOR
TERRESTRIAL RECEPTORS
YERBA BUENA ISLAND

Remedial Investigation, Sites 8, 28, and 29

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
23	Peregrine falcons	Section 2.5.2	Final Validation Study for IR Sites 11, 28, and 29, Naval Station Treasure Island, San Francisco, California. Prepared for Department of the Navy, Engineering Field Activity West, Naval Facilities Engineering Command, San Bruno, California. Section 6.3.3. December 17, 2001.

was estimated using literature-derived BAFs rather than site-specific tissue data. As described in Section 6.3.1, few studies have been published on the effects of LMW PAHs on birds. However, no deleterious effects are likely at the LMW PAH doses modeled for the peregrine at Site 11.

Summary of Risks to the Peregrine Falcon in Site 11

There is no significant risk ($HQ_{dose/high\ TRV}$ less than 1.0) to the peregrine falcon from any COPEC at Site 11. The apparent potential risk ($HQ_{dose/low\ TRV}$ greater than 1.0) to the peregrine falcon from lead and total DDT is moderated by the realization that the dose estimate and the TRV are conservative. The dose is based on maximum chemical concentrations in tissue and either the maximum or UCL₉₅ concentrations in soil. When the low TRV for lead is adjusted to be raptor-specific, the $HQ_{dose/low\ TRV}$ is less than 1.0, indicating low potential for risk to the peregrine falcon from lead (Table 8). The total DDT dose is well below effects levels reported in the literature. Based upon a review of the TRVs and toxicological literature, the Site 11 doses to the peregrine falcon for lead and total DDT indicate a low potential for risk.

The HQs for barium, cadmium, copper, and zinc at Site 11 were less than 1.0, indicating a low potential for risk.

A qualitative evaluation of risk to the peregrine falcon from beryllium, cobalt, silver, thallium, HMW PAHs, and LMW PAHs indicates that risk from these chemicals is negligible.

6.3.3 Potential Risk to the Peregrine Falcon at Site 28

Lead, thallium, and zinc were evaluated by food-chain modeling to the peregrine falcon. The calculations of dose estimates for Site 28 are provided in Table 6. HQs for lead and zinc are provided in Table 8.

There is a potential ($HQ_{dose/low\ TRV}$ greater than 1.0) but not probable risk ($HQ_{dose/high\ TRV}$ less than 1.0) to the peregrine falcon from lead, based on an estimated dose between the low and high TRV; however, this result stems from an ultraconservative low TRV (Section 6.3.1). If the kestrel data are used to derive a raptor-specific low TRV, the $HQ_{dose/low\ TRV}$ is less than 1.0, indicating a Category 1 situation with a low potential for risk (Table 8).

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
23	Peregrine falcons	Section 2.5.2	Final Validation Study for IR Sites 11, 28, and 29, Naval Station Treasure Island, San Francisco, California. Prepared for Department of the Navy, Engineering Field Activity West, Naval Facilities Engineering Command, San Bruno, California. Section 6.3.3. December 17, 2001.

The HQ_{dose/low TRV} for zinc at Site 28 is less than 1.0, indicating a Category 1 situation with a low potential for risk.

Qualitative Evaluation

No TRV is available for thallium; however, a qualitative evaluation of the effects of thallium on avian receptors (Table 9) indicates that risk to the peregrine falcon from thallium in Site 28 is minimal.

Summary of Risks to the Peregrine Falcon in Site 28

There is no significant risk (HQ_{dose/high TRV} less than 1.0) to the peregrine falcon from any COPEC at Site 28. The apparent potential risk (HQ_{dose/low TRV}) to the peregrine falcon from lead is moderated by the realization that the dose estimate and the TRV are conservative. When the dose is adjusted to reflect a raptor-specific TRV, HQ_{dose/low TRV} is less than 1.0, indicating low potential for risk to the peregrine falcon from lead. Zinc and thallium pose minimal risk to the peregrine falcon at Site 28.

6.3.4 Potential Risk to the Peregrine Falcon at Site 29

Barium, beryllium, copper, lead, mercury, nickel, and zinc were evaluated by food-chain modeling to the peregrine falcon. The daily dose estimates for COPECs are presented in Table 6. HQs for COPECs are presented in Table 8. All HQs for barium, copper, mercury, nickel and zinc at Site 29 were less than 1.0, indicating a Category 1 situation with a negligible potential for risk. No TRVs were available for beryllium; therefore, the effects of these chemicals on the peregrine falcon were evaluated qualitatively.

There is a potential but not probable risk to the peregrine falcon from lead, based on an estimated dose between the low and high TRV; however, this result stems from an ultraconservative low TRV (Section 6.3.1). If the kestrel data are used to derive a raptor-specific low TRV, the HQ_{dose/low TRV} is less than 1.0, indicating a Category 1 situation with a low potential for risk (Table 8).

The HQ_{dose/low TRV} for barium, copper, lead, mercury, nickel, and zinc at Site 29 is less than 1.0, indicating a Category 1 situation with a low potential for risk.

Because no TRV is available for beryllium, the effects of this chemical on the peregrine falcon were evaluated qualitatively. As explained in Section 6.3.1, the lung is the main target organism for effects of beryllium on wildlife (NPS 1997). Because the peregrine falcon catches avian prey in flight and is not

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
24	Final Community Relations Plan	Section 2.6	Final Community Relations Plan 2008 Update Naval Station Treasure Island San Francisco, California. Executive Summary. Tetra Tech EM Inc. May 30, 2008.

EXECUTIVE SUMMARY

This Community Relations Plan (CRP) has been prepared in support of the Department of the Navy's (Navy) Installation Restoration (IR) Program at the former Naval Station Treasure Island in San Francisco, California, hereafter referred to as "NAVSTA TI." NAVSTA TI is made up of both Treasure Island and Yerba Buena Island.

The U.S. Department of Defense developed the IR Program in 1981 to investigate and clean up problems posed by past hazardous waste operations and disposal at military facilities. This CRP identifies community interest in the Navy's investigation and cleanup activities for contaminated soil, sediments, and groundwater at NAVSTA TI, and outlines community involvement activities to inform and involve the community. This document is an update to the original CRP for NAVSTA TI prepared in 1992. An addendum was issued in 1997. Updates were conducted in 2002 and 2006.

The Navy's Base Realignment and Closure (BRAC) Program Management Office (PMO) West is managing the IR Program at NAVSTA TI. The California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC), U.S. Environmental Protection Agency, and the Cal/EPA San Francisco Bay Regional Water Quality Control Board provide regulatory oversight. The Petroleum Cleanup Program is also managed by Navy BRAC PMO and is being conducted at NAVSTA TI concurrent with the IR Program, but is not a part of this CRP.

PURPOSE OF THIS CRP

The purpose of this plan is to:

- Describe the community located on NAVSTA TI, and the larger community of San Francisco;
- Describe past community outreach activities that have been conducted in support of the IR Program;
- Identify the current level of community interest in, or concern about, IR or environmental activities at NAVSTA TI;
- Outline community relations activities to facilitate two-way communication between the Navy and the surrounding community or other interested parties; and
- Meet all public involvement regulatory requirements for the environmental cleanup program at NAVSTA TI.

The Navy will update this plan, as appropriate, throughout the investigation and cleanup process.

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
24	Final Community Relations Plan	Section 2.6	Final Community Relations Plan 2008 Update Naval Station Treasure Island San Francisco, California. Executive Summary. Tetra Tech EM Inc. May 30, 2008.

SUMMARY OF INTERVIEWS

The content of this CRP was developed primarily by conducting 23 phone interviews from August through October 2007. Interviewees included local residents, City and County of San Francisco staff, and representatives of community, environmental, and commercial interests, and service providers on NAVSTA TI.

The majority of interviewees stated they have confidence in the Navy's ability to clean up contamination at NAVSTA TI, as well as in the ability of regulatory agencies to oversee the cleanup process. Major findings from the interviews are as follows:

- There is a moderate level of concern or interest in the Navy's environmental cleanup program at NAVSTA TI. Specifically, interviewees requested more information about how cleanup activities are progressing, how residents and tenants may be impacted, and how long the cleanup activities will last.
- The top three concerns or interests regarding environmental cleanup activities at NAVSTA TI include (1) keeping residents/tenants informed, (2) timeline/delays and the overall plan for cleanup and transfer, and (3) health effects to current residents from current work or conditions.
- The Navy's newsletter, the *Island Times*, information on internet websites, and presentations at established community meetings are the preferred methods for communicating with the public at large.

COMPONENTS OF THE ONGOING COMMUNITY RELATIONS PROGRAM

Based on information obtained during the 23 interviews, conducted in 2007, the community relations program for NAVSTA TI should include the following components:

- Preparing and distributing the *Island Times* newsletter, project-specific fact sheets, and work notices that provide information on the IR Program;
- Providing regular briefings to local community organizations and at established community meetings;
- Sponsoring workshops, site tours, and open houses for the public as needed;
- Posting public notices in a local newspaper to announce milestones in the cleanup process, as well as scheduled meeting dates, the availability of documents for public review, and events;
- Posting signs and notices announcing key milestones and contact information at bus stops and at the Ship Shape Building on Treasure Island;

Item	Reference or Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administration Record ^a
24	Final Community Relations Plan	Section 2.6	Final Community Relations Plan 2008 Update Naval Station Treasure Island San Francisco, California. Executive Summary. Tetra Tech EM Inc. May 30, 2008.

- Distributing a community-friendly progress chart and timeline for remaining activities;
- Holding public meetings at all technical milestones, as required by current state and federal regulations;
- Maintaining the web page for NAVSTA TI through the Navy's website;
- Maintaining the established information repositories, which contain environmental documents, fact sheets, newsletters, investigation and cleanup plans, and other information for review by the public;
- Maintaining the mailing list for NAVSTA TI to distribute information on the IR Program, and developing an electronic mailing list; and
- Maintaining the Restoration Advisory Board throughout the Navy's cleanup process.

APPENDIX C
PUBLIC MEETING TRANSCRIPT

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

NAVSTA TREASURE ISLAND PUBLIC MEETING
THE CASA DE LA VISTA, BUILDING 271
TREASURE ISLAND, CA

PUBLIC MEETING, held on May 12, 2010, at
the Casa De la Vista, Building 271, Treasure Island,
California, commencing at 6:30 p.m., before Janice
Castater, Court Reporter and Notary Public in and for the
State of California.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

APPEARANCES:

Navy BRAC
1455 Frazee Road, Suite 900
San Diego, California 92108
(619) 532-0973

DAVE CLARK

SGIS

BRAC PMO West
1455 Frazee Road, Suite 900
San Diego, California 92108
(619) 532-0924

ANTHONY KONZEN, CHG

Sullivan International Group, Inc.

550 Kearny Street, Suite 520
San Francisco, California 94104

MEHRDAD MICHAEL JAVAHERIAN, Ph.D(c), MPH, NIH
WENQIAN DOU, Ph.D.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

APPEARANCES: (CONT'D.)

TETRA TECH

1999 Harrison Street, Suite 500

Oakland, California 94612

(510) 302-6300

TOMMIE JEAN VALMASSY, Communications Manager

ROSS STEENSON, PG, CHG

KIM McDANIEL

RUSSELL BREED

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

PUBLIC MEETING

MAY 12, 2010

MR. CLARK: Good evening, everyone, and welcome to the Navy's Site 28 public meeting for the proposed plan for Naval Station Treasure Island. My name is Dave Clark. I am the lead remedial project manager for Naval Station Treasure Island. Tonight's meeting is a public meeting giving the community of San Francisco and Treasure Island the opportunity to comment on our proposed plan for remedial action at IR, which is Investigative Restoration Area Site 28 here at Treasure Island -- or actually Yerba Buena Island, the adjacent island.

Thank you everyone for -- for attending tonight, and welcome on behalf of BRAC PMO. The meeting format tonight is a little bit different from what we typically have for other public meetings, if you have attended. The proposed plan meeting's purpose is to give the public a formal opportunity to comment on the Navy's published proposed plan and to clarify

1
2 anything which may be in the proposed plan.
3 We will allow the public to make verbal and
4 written comments, and those comments will be
5 incorporated into a responsiveness summary
6 which will be included in the Navy's record
7 of decision, the formal document which
8 records the remedial action that the Navy
9 will choose.

10 So tonight's agenda will include a
11 brief presentation on the specifics of the
12 proposed plan. Afterwards we will have an
13 opportunity for the public to comment on the
14 proposed plan verbally. And we also ask
15 that you submit your comments in writing, and
16 there are forms in the back of the room to
17 do so. Tonight we will be taking comments
18 until 7:30 p.m. at which time we will
19 conclude the public meeting. However, the
20 public comment period is open through May
21 29th, 2010.

22 Tonight we also have several members
23 of the BRAC Environmental team with us here,
24 and so at this time I would like to go
25 around the room and have everyone introduce

1
2 themselves as part of our team, starting with
3 Mehrdad.

4 MR. JAVAHERIAN: Mehrdad Javaherian
5 with the Sullivan International Group,
6 consultant to the Navy.

7 MR. KONZEN: Tony Konzen, PM with
8 Navy BRAC.

9 MS. DOU: Wenqian Dou with Sullivan
10 International Group, consultant to the Navy.

11 MR. CLARK: All right. So without
12 further ado, we will give you a little
13 background on the proposed plan for IR Site
14 28. We will go through, first of all, the
15 description and the location of where exactly
16 this site is. It is sort of a little known
17 site. If you visit Treasure Island often,
18 you will drive across it every day and with
19 -- without you even knowing it. We will
20 talk about the background, exactly why we are
21 taking a CERCLA look at this site. And for
22 this particular site after the study, we have
23 concluded no further action for -- is
24 necessary. And we will tell you about the
25 next steps that will take this parcel to the

1

2 record of decision.

3 The Navy is dedicated to following
4 the CERCLA process for any investigative
5 restoration site. There are several steps
6 for the site, as you can see in this slide,
7 starting with the preliminary assessment site
8 inspection process. Followed by that is the
9 remedial investigation where the more detailed
10 calculations and risk assessments are
11 performed. Following the remedial
12 investigation, the feasibility study is
13 conducted, and that is the part of the
14 process where we will take a look at the
15 results from the RI. And we will decide
16 which actual remedies would be appropriate to
17 take action at the site, whether it be
18 excavation for soil contamination, treating of
19 the ground water in place, treating of the
20 soil in place, or treating of vapor
21 intrusion, or something like that.

22 Those different alternatives are laid
23 out in the feasibility study. Typically we
24 do not recommend an actual alternative that
25 is listed in the feasibility study. That is

1
2 typically done in the proposed plan, which is
3 where we are right now with Site 28. The
4 proposed plan is the formal document which
5 goes out to the public and regulatory
6 agencies and is the formal announcement that
7 the Navy is intending to take a specific
8 remedial action at a site.

9 The proposed plan also gives the
10 public an opportunity to comment on the
11 proposed alternative. And during that public
12 comment period, which is 30 days from the
13 date of a public notice in the newspaper,
14 there is a public meeting at which you are
15 all attending tonight.

16 Following the proposed plan, the --
17 the record of decision is put together. The
18 record of decision includes a summary of
19 public comments and is put together and is
20 called a Responsiveness Summary. And that
21 gets included in the record of decision
22 itself. That is a formal document which the
23 Navy signs in order to memorialize the actual
24 remedial action for the particular site.

25 Following the signing of the ROD,

1
2 the Navy will go ahead and perform a
3 remedial design, and then they will implement
4 the chosen action that is part of the
5 design. And typically for many sites, you
6 will have a five-year review after the date
7 of the signing of the record of decision
8 which will take a look at the effectiveness
9 of the chosen remedy.

10 For this particular site and in the
11 proposed plan process, the first step of the
12 remedy selection process, we will be
13 identifying the remedial action that best
14 meets the CERCLA evaluation criteria. And
15 for this particular site, Navy is proposing
16 that no action will be chosen as the
17 alternative for Site 28. So that is the --
18 the proposal that the Navy is giving tonight
19 and in the proposed plan. And the proposed
20 plan as published gives great detail on the
21 -- the information that was -- and studies
22 that were used to come up with this
23 alternative.

24 So different parts of the public
25 involvement process, we first published a

1
2 notice of availability in the major local
3 newspaper. The proposed plan is available
4 for review in the information of
5 repositories. The two repositories are the
6 San Francisco Public Library in downtown San
7 Francisco and also the Treasure Island
8 Information Repository which is at Building 1
9 at Treasure Island.

10 Public comment period goes 30 days
11 in which anyone can submit their comments in
12 writing and tonight, of course, orally and --
13 at the public meeting. The transcript of
14 the public meeting is made available, and the
15 responsiveness summary to the comments
16 received will be included in the record of
17 decision.

18 So that is a little bit of the
19 process that we go through. It can take
20 many years of study to -- to get to actually
21 the proposed plan phase, which is a very
22 exciting phase for us. As engineers, we
23 often spend many days going through reports
24 and calculating risk and things like that.
25 And the -- by the time you get to the

1
2 proposed plan, you know that you are getting
3 near to some sort of action or lack of
4 action, as is the case with Site 28.

5 Site 28 is located right on the side
6 of Yerba Buena Island as you pull off of the
7 freeway as you are going eastbound on the
8 80. And the site itself is -- was
9 constructed -- it actually is the footprint
10 of certain structures supporting some bridges
11 that are part of that -- that off --
12 off-ramp system and the roads leading down to
13 Treasure Island. They were constructed
14 during the building of Treasure Island and
15 have been owned by the Navy since we took it
16 over in 1943.

17 The site generally is the entire
18 geographic area. However, inside of that
19 area, the area -- focuses area is -- are a
20 couple structures with elevated structures
21 which are steel structures and have been
22 painted. The rest of the site is basically
23 a very steep slope which is highly -- has a
24 lot of vegetation on it, very few flat
25 areas, and not very accessible. Current site

1
2 activities are limited to maintenance of the
3 on- and off-ramps, and right now no one
4 readily has access to -- to the site.

5 So here again is a little bit better
6 area of the site. So you can see the
7 roadway which goes through right at the edge
8 of the site. And historically this -- the
9 site actually got into the CERCLA process
10 when the Navy was conducting some maintenance
11 work for the ramp structures themselves. The
12 initial concern was the presence of
13 lead-based paint both in chips and in dust
14 that would be present during the sandblasting
15 operations for the structures themselves.

16 The Navy contractors subsequently took
17 samples around the foundations of the
18 structures, and elevated levels of lead and
19 zinc were found. Through subsequent
20 investigations, it was determined that this
21 was due to the lead-based paint and in --
22 that was applied to the structures and
23 incidental -- and -- and resulting partially
24 from the fact that this was a roadway and --
25 and there was heavy traffic through the

1

2 years.

3

4 After -- following the initial
5 investigation, the Navy conducted a separate
6 investigation to determine whether or not
7 there was lead in soil around the area. And
8 in 1992, the -- was when the initial health
9 and safety soil sampling was conducted. And
10 following that, the Navy decided that, yes,
11 this should indeed come into the CERCLA
12 process, and we brought it in. And in 1995,
13 we conducted the remedial investigation.

14

15

16

17

18

19

20

21

22

23

24

25

26 In 1997, we conducted the screening
27 level ecological risk assessment. And during
28 that period, there were additional samples
29 taken below the -- down the slope from the
30 actual bridge structure. In 2001, we had a
31 final validation study for -- for the site.
32 That report also included IR Sites 8, 11,
33 28, and 29. And in 2009, we issued the
34 final remedial investigation report. And
35 this year we are proud to put out the
36 proposed plan and issue the record of
37 decision which will be the final step needed
38 before we transfer the site.

1
2 So the investigation itself -- again,
3 this is something you -- you can typically
4 see along roadways. The only thing that we
5 saw there was due to the lead in soils
6 associated with the former painting activities
7 and maintenance of the elevated structures.
8 No ground water impacts were encountered
9 primarily because there is no ground water
10 present at that site. The human health risk
11 assessment concluded that the exposure
12 pathways were basically minimized because the
13 slopes were very steep, and the actual area
14 which was originally investigated for worker
15 health and safety 19 -- 1992 was paved over.
16 And it continues to be paved over to this
17 day, cutting off the -- the pathway.
18 Finally, the land use restrictions that will
19 be in place as well by the property going
20 into the Tidelands Trust will also reduce
21 exposure. So the absence of any unacceptable
22 risks based on the current and future
23 exposure pathways help to bring this site to
24 where it is today and supporting the
25 no-further-action conclusion.

1
2 And last but not least, the
3 ecological risk assessment was conducted as
4 well as a -- part of the formal
5 investigation, as we always do, and concluded
6 that there was minimal risk to -- to the
7 falcon and other ecological receptors.

8 So this is something interesting
9 which -- which is something I like to show.
10 It is very difficult to get a sense for the
11 site itself. Typically when you see a site,
12 it is something flat and something you can
13 actually go there on, something has happened.
14 A lot of the contamination many times can be
15 due to actual activities on the site, for
16 example a gas station or a dry cleaner. In
17 this case, nothing really ever happened here
18 except that a roadway was built and the
19 structure was painted. Other than that,
20 nothing -- no action was ever taken on this
21 site mainly because it is a steep cliff.
22 These -- these slopes right here give you an
23 idea of just how steep it is. Generally
24 speaking you can't climb up it without some
25 sort of assistance.

1
2 The Tidelands Trust is overseen by
3 the California State Lands Commission. After
4 we transfer the property to the City of San
5 Francisco, Site 28 will be subject to the
6 provisions of the Tideland's Trust.

7 Residential and nonmaritime uses are
8 prohibited, but it will be sort of difficult
9 to put a house there anyway. So that --
10 that is logical. And also sale of trust
11 lands to private entities is -- is not
12 allowed.

13 So here is the real -- the meat and
14 potatoes of what you have. And here is the
15 slope, and you can see that is very steep.
16 Generally speaking, no one is going to be
17 hanging -- hanging out there very easily.
18 These are the metal structures. This is the
19 source of the -- of the lead. Subsequent
20 maintenance operations have been conducted
21 through the years. So -- so most of the
22 lead-based paint -- historical lead-based
23 paint should have been removed during
24 maintenance operations.

25 But this gives you a good sense for

1
2 what the site is. This is the actual --
3 about the extent of the site where the real
4 -- where you really have any sort of source
5 coming from. And here is one more example.
6 And the -- the camera is not tilted either.
7 This is actually standing straight, and you
8 can see the steep slope here which goes down
9 right to the ocean. There actually is no
10 beach. It pretty much goes right to the
11 ocean. So not only is it difficult to get
12 up the slope, getting down would be
13 difficult. Because once you start going
14 down, you probably won't stop, and you would
15 end up -- end up in the bay possibly.

16 So the public comment on the
17 proposed plan is from April 29th to May 29th
18 of this year. We welcome any written --
19 written comments tonight or through the year
20 -- or through the comment period. The
21 response to the public comments again will be
22 provided in the responsiveness summary. That
23 will be in the record of decision. So you
24 will have a chance to see what everyone had
25 to say about the proposed plan. A lot of

1
2 times we get the mail-in comments, and they
3 are included as well.

4 We will document -- document the
5 preferred alternative in the record of
6 decision. We are anticipating that to happen
7 in -- in August of this year. And final
8 thing we will do is to issue a public notice
9 in the local newspaper to announce the
10 availability of the record of decision. It
11 will be another public document that is
12 available as are all of our documents that
13 involve the site.

14 And as always, if you have any
15 questions, here are the contacts for -- in
16 the Navy and the regulatory contacts, if you
17 want to be part of the -- the RAB here at
18 Treasure Island or anything else, of course.
19 If you have any comments specifically on the
20 proposed plan, comment on it, please feel to
21 write them down and send them in, and each
22 one of them will be addressed.

23 With that, that concludes the formal
24 presentation, what the proposed plan is. And
25 if anyone wants to have a comment for the

1
2 record, they are more than happy to introduce
3 themselves, make a comment, at which point
4 the comments will be recorded. I would
5 encourage everyone to also write the comment
6 down, and that way -- that way we have
7 double duty going on on recording the
8 comments. And we will be taking comments
9 until -- until 7:30. So feel free to either
10 provide your comments or write them down.
11 And we will be -- we will be here taking
12 them until 7:30. And please help yourselves
13 to coffee or anything in the back.

14 So again here is a sort of a -- an
15 idea of what the -- the site looks like.
16 Primarily concerned underneath -- underneath
17 the bridge, which would be right here.

18 Okay. So since we don't have any
19 questions right now, we are going to
20 temporarily stop the official recording of
21 the meeting. And if you do have anything
22 you want to officially -- for the record, we
23 will open it back up, at which time it can
24 be recorded. Otherwise, we are -- we will
25 still receive written comments tonight and

1
2 also through the end of the public comment
3 period. Thank you.

4 (Whereupon, A recess was taken.)

5 MR. CLARK: All right, everyone. It
6 is 7:30. If there aren't anymore comments
7 for the record, thank you everyone for
8 coming. Thank you for my team for putting
9 the presentation together and consultants.
10 Thank you for the water board for being here
11 and public for showing up. I appreciate
12 everyone's comments. And again feel free to
13 write anything down or mail it in. We will
14 be accepting comments through the end of the
15 public comment period, which is May 29th.
16 So thank you for coming, and have a good
17 night.

18 We are off the record again.

19 (Whereupon, the PUBLIC MEETING
20 concluded.)
21
22
23
24
25

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

REPORTER'S CERTIFICATE

I, JANICE CASTATER, Certified
Shorthand Reporter No. 11879 in and for the
State of California, hereby certify that the
foregoing is a full, true and correct
transcript of the proceedings to the best of
my ability.

Executed this 29th day of May, 2010,
at Oakland, California.

JANICE CASTATER,
C.S.R. NO. 11879

APPENDIX D
RESPONSES TO AGENCIES COMMENTS FOR DRAFT ROD

Responses to Regulatory Agency Comments on the Draft Record of Decision for Site 28, West Side On-Off Ramps, Naval Station Treasure Island, San Francisco, California, July 2010

Comments by: Greg Brorby (Exponent) and Gary Foote, Principal Geologist, AMEC Geomatrix, Inc

Specific Comments

No.	Comment	Response
1	Section 1.1, 2 nd paragraph: I believe this is supposed to be “brush” not “bush”	The sentence has been revised to read: “Other than the roads running through Site 28, most of the site is steeply sloped to the southwest toward the Bay and densely vegetated with trees and brush.”
2	Section 1.2, 3 rd paragraph: I don’t know what “in consultation” means in this context. On page 17, the text states that the agencies are in “agreement” with the NFA remedy. The word “agreement” would make more sense here.	This sentence has been revised to read: “DTSC, the Water Board, and the U.S. Environmental Protection Agency (EPA) are in agreement with the NFA remedy for Site 28.”
3	Section 1.4: I don’t know how they can say “unlimited use” here. Perhaps they can say something like “...present in quantities that would not allow current or expected future uses of the site.”	This sentence has been revised to read: “In addition, a 5-year review will not be required for Site 28 per CERCLA § 121(c) or NCP § 300.430(f)(5)(iii)(C) because there are no hazardous substances, pollutants, or contaminants present in quantities that would prevent current or expected future uses of the site.”
4	Section 2.1, last sentence of 1 st paragraph: “brush” not “bush”	The commented sentence has been revised to read: “Other than the roads running through Site 28, most of the site is steeply sloped to the southwest toward the Bay and densely vegetated with trees and brush.”
5	Section 2.1, 3 rd sentence of 3 rd paragraph: “ San Francisco”	The commented sentence has been revised to read: “In 1941, in response to a Navy request, the City of San Francisco leased TI, YBI, and the surrounding offshore area to the Navy for the duration of World War II.”
6	Section 2.2, 2 nd to last sentence of 2 nd paragraph: We are not aware of any construction activities related to SFOBB at Site 28. Furthermore, we were	Comment noted. This statement has been revised to read:

Responses to Regulatory Agency Comments on the Draft Record of Decision for Site 28, West Side On-Off Ramps, Naval Station Treasure Island, San Francisco, California, July 2010

Comments by: Greg Brorby (Exponent) and Gary Foote, Principal Geologist, AMEC Geomatrix, Inc

Specific Comments

No.	Comment	Response
	not aware that the deed for Site 28 has been granted to CalTrans.	“Construction activities for the new SFOBB are currently underway on Sites 8 and 29 on the eastern side of YBI, and the deed for these two sites has been granted to Caltrans by the FHWA.”
7	Section 2.5, 1 st sentence of 2 nd paragraph: “, which is the same as 1-in-1,000,000.”	This sentence has been revised to read: “ ‘Risk values’ are probabilities usually expressed in scientific notation (for example, 1×10^{-6} , which is the same as 1 in 1,000,000).”
8	Section 2.5, 2 nd sentence of 2 nd paragraph: This language is tricky because what we're really talking about is a statistical probability, not a specific individual. This sentence could be changed to "...indicated that a hypothetical individual experiencing the estimated reasonable maximum exposure (RME) has a theoretical 1-in-1,000,000 chance of developing cancer as a result of site-related exposure, referred to as a "theoretical excess lifetime cancer risk"..."	This sentence has been revised to read: “An excess lifetime cancer risk of 1×10^{-6} indicates that a hypothetical individual experiencing the estimated reasonable maximum exposure (RME) would have a theoretical 1-in-1,000,000 chance of developing cancer as a result of site-related exposure, referred to as a ‘theoretical excess lifetime cancer risk’ because it would be in addition to the risks of cancer individuals would face from other causes (such as smoking or exposure to too much sun).”
9	Section 2.5, 5 th sentence of 3 rd paragraph: I don't think it is obvious what is meant by "medium" in this sentence – perhaps it can be re-worded to say "... for all chemicals within an environmental medium (e.g., soil, groundwater) or across all media that affect the same target organ or act through the same mechanism to which a given individual may be exposed."	This sentence has been revised to read as follows to be consistent with EPA definition of HI: “The hazard index (HI) is the sum of more than one HQ for multiple chemicals and/or multiple exposure pathways.”
10	Section 2.5.1, 1 st sentence of 1 st paragraph: All of the RI data used in the HHRA were collected in 1995; the ROD states previously that the 1992 data were not used.	This sentence has been revised to read: “A quantitative baseline HHRA was completed based on RI data collected for Site 28 in 1995.”
11	Section 2.5.1, 3 rd sentence of 1 st paragraph: This language should be consistent with the PP (i.e., "exposure scenarios included potential risks to	This sentence has been revised to read: “Specifically, potential exposures under both current and alternative

Responses to Regulatory Agency Comments on the Draft Record of Decision for Site 28, West Side On-Off Ramps, Naval Station Treasure Island, San Francisco, California, July 2010

Comments by: Greg Brorby (Exponent) and Gary Foote, Principal Geologist, AMEC Geomatrix, Inc

Specific Comments

No.	Comment	Response
	construction workers (i.e., exposure under current land use) and these hypothetical receptors: commercial/industrial workers, future residents, and recreational site visitors."	land uses were considered, including potential risks to construction workers (i.e., exposure under current land use) and these hypothetical receptors: commercial/industrial workers, future residents, and recreational site visitors."
12	Section 2.5.1, last sentence of 1 st paragraph: "..., and is present at a depth..."	This sentence has been revised to read: "Groundwater is not a current or potential drinking water source at Site 28, and is present at a depth greater than 10 feet bgs at this steeply sloped site; hence, the groundwater exposure pathway is not evaluated."
13	Section 2.5.1, 2 nd sentence of 2 nd paragraph: Site-related risks are based on all chemicals except those that are naturally occurring; total risks include naturally occurring chemicals, so this sentence needs to be re-worded.	This sentence has been revised to read: "The baseline total risk estimates for construction workers, residents, and commercial/industrial workers were evaluated based on potential exposure to all chemicals; these included naturally occurring chemicals, but excluded naturally occurring minerals. Site-related risks were estimated based on potential exposure to all chemicals resulting from site-related activities, but excluded those that are naturally occurring."
14	Section 2.5.1, 1 st sentence of 5 th paragraph: I think wording similar to that in the proposed plan would be better (something like "Antimony and thallium are considered noncarcinogenic by EPA, and lead was evaluated using DTSC's LeadSpread model or by comparison to screening levels; hence, cancer risks were not estimated...").	This sentence has been revised to read: "Among the three identified COPCs, antimony and thallium are considered noncarcinogenic by EPA, while lead ₍₁₇₎ was evaluated using DTSC's LeadSpread model; hence, cancer risks were not estimated for potential exposures to the three COPCs at Site 28."
15	Section 2.5.1, last sentence of 5 th paragraph: Typo – should be "detail".	This sentence has been revised to read: "Based on the HHRA results ₍₁₈₎ and as discussed in more detail below,

Responses to Regulatory Agency Comments on the Draft Record of Decision for Site 28, West Side On-Off Ramps, Naval Station Treasure Island, San Francisco, California, July 2010

Comments by: Greg Brorby (Exponent) and Gary Foote, Principal Geologist, AMEC Geomatrix, Inc

Specific Comments

No.	Comment	Response
		the noncancer HIs for commercial/industrial worker, construction worker, and resident exposure were below the noncancer hazard threshold of 1.0.”
16	Section 2.5.1, 3 rd sentence of 8 th paragraph: "... results from these locations were excluded and the 0 to 2 ft bgs EPC was re-calculated. The "adjusted" lead EPC is 398 mg/kg, ..."	This sentence has been revised to read: “Sample results from these locations were excluded and the 0 to 2 feet bgs EPC was recalculated. The ‘adjusted’ lead EPC for 0 to 2 feet bgs is 398 mg/kg, which is below both the RSL for residential soil and the RSL for industrial soil.”
17	Section 2.5.1, last sentence of 8 th paragraph: This is the first time “hot spot” is mentioned. Some further explanation is necessary (e.g., which sample points were included in the “hot spot” EPC).	This sentence has been revised to read: “In addition, blood-lead modeling of a recreational receptor was conducted using the highest lead EPC of 956 mg/kg, which was calculated to represent localized lead “hot spot” found in surface soil at locations 28-SB05, 28-SB06, and 28-SB07; this modeling resulted in a 99 th percentile blood-lead concentration, which is below 10 µg/dL for both the adult (2.3 µg/dL) and the child (5.9 µg/dL) recreational receptors.”
18	Section 2.5.1, 1 st sentence of 9 th paragraph: The reference to Method 1 and Method 2 in this sentence seems to imply that there were two LeadSpread evaluations, which is not the case. We suggest deleting the reference to Method 1 and Method 2 in this sentence (i.e., "In addition to the LeadSpread analysis for lead in soil summarized above, site-related..."	This sentence has been revised to read: “In addition to the LeadSpread analysis for lead in soil summarized above, site-related and total risks were calculated for antimony and thallium, the two COPCs identified by Method 2 only, in soil.”
19	Table 4, Method 2 column: It would be clearer if this column heading was "Site-Related" rather than "Method 2" because the "total" risk estimates are also based on Method 2 (as implied in the Table title).	The table column headings have been revised to “Site-Related.”

Responses to Regulatory Agency Comments on the Draft Record of Decision for Site 28, West Side On-Off Ramps, Naval Station Treasure Island, San Francisco, California, July 2010

Comments by: Greg Brorby (Exponent) and Gary Foote, Principal Geologist, AMEC Geomatrix, Inc

Specific Comments

No.	Comment	Response
20	Table 4, notes: “Not applicable” seems more appropriate than “Not available”.	The abbreviation of “NA” has been revised and is now spelled out as “not applicable.”
21	Section 2.5.1, last paragraph: The language from the PP may be better. "Based on the HHRA results and the Tidelands Trust restrictions on future use of Site 28, potential health impacts to current and potential future site occupants are considered minimal."	This sentence has been revised to be consistent with the Proposed Plan language: “Based on the HHRA results and the Tidelands Trust restrictions on future use of Site 28, potential health impacts to current and potential future site occupants are considered minimal.”
22	Section 2.5.2, last sentence of 4 th paragraph: Were the re-calculated EPCs lower for Site 28 or were the re-calculated EPCs lower for all sites as a whole? The PP suggests the latter.	This sentence has been revised to be consistent with the Proposed Plan language: “The results of this comparison show that, overall, EPCs have decreased.”
23	Section 3.0, last sentence of 1 st paragraph: There is something wrong about the construction of this sentence. “No member of the RAB attended any part of the meeting?”	This sentence has been deleted.

Responses to Regulatory Agency Comments on the Draft Record of Decision for Site 28, West Side On-Off Ramps, Naval Station Treasure Island, San Francisco, California, July 2010

Comments by: Ross Steenson, P.G., C.H.G., San Francisco Bay Regional Water Quality Control Board (Regional Water Board)

Specific Comments

No.	Comment	Response
1	Section 2.1 (Site Description and History), p. 8 – In the second paragraph, the sentence describing the boundary adjustment states that all lands deeded to Caltrans from Site 28 or 29 were included within Site 29. The next to last sentence of the first partial paragraph on page 9 indicates that bridge construction activities are occurring on Sites 28 and 29 and that both sites have been deeded to Caltrans. These sentences appear to be conflicting. Please review and revise, as appropriate.	See Response to AMEC Geomatrix Comment #6.
2	Section 2.5.1 (Summary of Human Health Risks Assessment), p. 14 – Please consider revising the first sentence in the first full paragraph into two sentences as follows: “The detected chemicals, except for lead, associated with Site 28 operations were noncarcinogenic; hence, cancer risks were not estimated for potential exposures to these chemicals at Site 28. Lead at Site 28 was evaluated using DTSC’s LeadSpread model.”	See Response to AMEC Geomatrix Comment #14. This sentence has been revised according to the comment from AMEC Geomatrix.
3	Section 3.0 (Responsiveness Summary), p. 19 – Please revise the last sentence of the first partial paragraph.	See Response to AMEC Geomatrix Comment #23. This sentence has been revised according to the comment from AMEC Geomatrix .

Responses to Regulatory Agency Comments on the Draft Record of Decision for Site 28, West Side On-Off Ramps, Naval Station Treasure Island, San Francisco, California, July 2010

Comments by: Remedios Sunga, Remedial Project Manager, Department of Toxic Substances Control (DTSC)

Specific Comments

No.	Comment	Response
1	<p>Section 1.2 – Statement of Basis and Purpose, Page 5:</p> <p>A. The third bullet states residential use will likely be prohibited under the Tidelands Trust. Please revise this statement since the land uses of Site 28 will be limited to Trust uses after the exchange. Residential and non-maritime uses will be prohibited.</p> <p>B. The footnote a states that acronyms and abbreviations are provided at the end of the ROD which is missing from the paper copy. For the Final ROD, please provide a complete paper copy of the ROD including the reference table and materials in Appendix B since it is not a large file.</p>	<p>The last sentence of the third bullet has been revised to read:</p> <p>“Although exceedances are found for child residents, residential and non-maritime uses will be prohibited under the Tidelands Trust.”</p> <p>The Acronyms and Abbreviation list, as well as the reference table of Appendix B, has been included in the hard copy of the Final ROD.</p>
2	<p>Section 1.4 – Statutory Determinations, Page 6: Please delete "because there are no hazardous substances, pollutants, or contaminants present in quantities that would not allow unlimited use and/or unrestricted exposure" from the last sentence since it is not a valid statement.</p>	<p>This sentence has been revised to read:</p> <p>“In addition, a 5-year review will not be required for Site 28 per CERCLA § 121(c) or NCP § 300.430(f)(5)(iii)(C) because there are no hazardous substances, pollutants, or contaminants present in quantities that would prevent current or expected future uses of the site.” This is a valid statement, consistent with what is stated in the Proposed Plan.</p>
3	<p>Section 1.5 – Authorizing Signatures, Page 7: Please replace DTSC’s signatory with Ryan Miya, Team Leader, Department of Toxic Substances Control, Brownfields Restoration and Environmental Cleanup Program, Berkeley Office.</p>	<p>DTSC’s signatory has been replaced with Mr. Ryan Miya.</p>
4	<p>Section 2.1 – Site Description and History, Page 8: Please discuss the following: 1) the dates when the ramps were constructed and when the Navy acquired ownership of the Site; and 2) the Navy's operations or activities at the site, such as repairs, maintenance and reinforcements of the</p>	<p>The following text has been added to the end of the first paragraph of Section 2.1:</p> <p>“The On-Off Ramps were likely constructed at the same time as the San Francisco-Oakland Bay Bridge (SFOBB), in 1936. There is no</p>

Responses to Regulatory Agency Comments on the Draft Record of Decision for Site 28, West Side On-Off Ramps, Naval Station Treasure Island, San Francisco, California, July 2010

Comments by: Remedios Sunga, Remedial Project Manager, Department of Toxic Substances Control (DTSC)

Specific Comments

No.	Comment	Response
	roadway and ramp structures.	documentation of Navy-specific activities at Site 28, other than routine repairs, maintenance, and reinforcements of the roadway and ramp structures.”
5	<p>Section 2.2 – Site Characteristics, Pages 8-9, Second Paragraph:</p> <p>A. The last two sentences regarding constructions activities at Site 28 for the new San Francisco-Oakland Bay Bridge (SFOBB) should be clarified. DTSC is not aware of any SFOBB construction activities at Site 28. The SFOBB construction activities, as they progress to the west, and will likely not impact Site 28 should be described.</p> <p>B. Please clarify whether the special status plant was found at Site 28</p>	<p>See Response to AMEC Comment #6.</p> <p>The sentence in this paragraph has been revised as follows to indicate that this special-status plant (dune gilia) was found at Site 28:</p> <p>“A special-status plant survey of YBI conducted in 1996 indicated the presence of the dune gilia (<i>Gilia capitata ssp. chamissonis</i>) on the west-facing slope below Treasure Island Road (where Site 28 is located), which is listed as a special-status plant by the California Native Plant Society.”</p>
6	Section 2.3 – Previous Investigations, Page 9: The basis for the identification of Site 28 as an Installation Restoration site should be discussed.	<p>Site 28 was identified as an IR site because, in 1993, soil at this location was found to be impacted by metals. The first sentence of the first paragraph under Section 2.3 has been revised to read:</p> <p>“Site 28 was identified as an IR Site in 1993 after metal impacts to soils at the site were identified during the Health and Safety Soil Sampling in 1993, and data collected₍₇₎ during the Phase IIB investigation at Site 28 were incorporated into a Final RI report.”</p>
7	Table 1 – Previous Investigations and Removal Action, Page 10: Please delete “Removal Actions” from the title and “Remedial Action” from the	“Removal Action” has been deleted from the title and “Remedial Action” from the header of Table 1.

Responses to Regulatory Agency Comments on the Draft Record of Decision for Site 28, West Side On-Off Ramps, Naval Station Treasure Island, San Francisco, California, July 2010

Comments by: Remedios Sunga, Remedial Project Manager, Department of Toxic Substances Control (DTSC)

Specific Comments

No.	Comment	Response
	heading since no removal or remedial actions have been conducted at Site 28.	
8	Section 2.4 – Current and Potential Future Land and Resource Use, Tidelands Trust, Pages 10-11: A. Please delete the word “generally” from the first and second bullets	The word “generally” was used in the Proposed Plan; however, per the comment, the word “generally” has been deleted from the first and second bullets.
	B. The second paragraph on page 11 states that the inclusion of Site 28 in the Tidelands Trust is in progress. Please specify if the inclusion of Site 28 into the Tidelands Trust will occur prior to transfer. The projected schedule in completing the Trust exchange should be discussed. DTSC’s site closure or certification of completion of CERCLA process can only be completed after the exchange.	According to Office of Economic and Workforce Development staff, the exchange will occur soon after transfer of the property from DON to TIDA. The last sentence of this paragraph has been revised to read: “The inclusion of Site 28 ₍₁₂₎ in the Tidelands Trust is expected to occur soon after transfer of the property from the DON to Treasure Island Development Authority.”
	C. Please specify that once lands are brought into Tidelands Trust jurisdictions, it cannot be removed from the Trust and land use restrictions will remain in perpetuity.	This sentence has been added as a third bullet, to indicate that the land-use control will remain in perpetuity once included in the Tidelands Trust. “Once Site 28 is brought into Tidelands Trust jurisdiction, it cannot be removed from the Trust, and land-use restrictions will remain in perpetuity.”
9	Section 2.5.1 – Summary of Human Health Risks Assessment, Pages 13-15: A. Page 13. The first paragraph states that the Human Health Risk Assessment (HHRA) was completed based on Remedial Investigation (RI) data from 1992 to 1995. The 1992 data should be discussed in the Previous Investigation section and in Table 1. Please verify if the 1992 data was used in the HHRA.	See response to AMEC Geomatrix Comment #10. This sentence has been revised to include 1995 data only.

Responses to Regulatory Agency Comments on the Draft Record of Decision for Site 28, West Side On-Off Ramps, Naval Station Treasure Island, San Francisco, California, July 2010

Comments by: Remedios Sunga, Remedial Project Manager, Department of Toxic Substances Control (DTSC)

Specific Comments

No.	Comment	Response
	<p>B. Page 15. The second paragraph states that the four samples with lead above the EPA Region 9 RSL were collected in locations directly under the ramps where the land surface is currently covered with concrete. From Figure 4-2 of the RI report, these samples were collected in the central eastern portion of Site 28. The sample locations do not appear to be located directly under the ramp nor covered with concrete as can be seen on Figure 4-2 and the aerial photograph in Figure 3 of the Draft ROD. Please clarify/verify accordingly.</p>	<p>The reference related to sampling locations “covered by concrete” has been deleted from the Final ROD.</p>
10	<p>Acronyms and Abbreviations, page 20: Please include CSM – Conceptual Site Model in the list.</p>	<p>“CSM – Conceptual Site Model” has been added to the “Acronyms and Abbreviations” list.</p>
11	<p>Appendix A – Administrative Record Index: Please provide the Administrative Record list for DTSC review before finalizing the ROD.</p>	<p>The Administrative Record Index is included as an attachment to this RTC submittal for review.</p>
12	<p>Appendix B – Table of References, Item 7/Data Collected: Item 7 includes the analytical reports from the laboratory. Please replace these reports or include the summary data table from Appendix C (Analytical Results for Site 28 Soil Samples) of the RI report.</p>	<p>The reference to “Item 7 of Appendix B” has been replaced by Appendix C from the Final RI report.</p>
13	<p>Typos: A. Page 13, first paragraph: “it presents”</p>	<p>See Response to AMEC Geomatrix Comment #12. This sentence has been revised to read: “Groundwater is not a current or potential drinking-water source at Site 28, and is present at a depth greater than 10 feet bgs at this steeply sloped site; hence, the groundwater exposure pathway is not evaluated.”</p>
	<p>B. Page 13-14, last sentence: Change “reasonable” to “reasonably” expected to occur at a site.</p>	<p>The word “reasonable” has been changed to “reasonably” and the sentence now reads: “RME assumptions provide a conservative and health-protective approach that estimates the highest health risks that are reasonably expected to occur at a site.”</p>

Responses to Regulatory Agency Comments on the Draft Record of Decision for Site 28, West Side On-Off Ramps, Naval Station Treasure Island, San Francisco, California, July 2010

Comments by: Remedios Sunga, Remedial Project Manager, Department of Toxic Substances Control (DTSC)

Specific Comments

No.	Comment	Response
	C. Page 14, first complete paragraph: “deail”.	See Response to AMEC Geomatrix Comment #15. The sentence has been revised to include the word “detail.”

Responses to Regulatory Agency Comments on the Draft Record of Decision for Site 28, West Side On-Off Ramps, Naval Station Treasure Island, San Francisco, California, July 2010

Comments by: Charles D. Smite, P.E., Caltrans Office of Environmental Engineering

Specific Comment

No.	Comment	Response
1	Section 2.2, paragraph 2: States "Construction activities for the new San Francisco–Oakland Bay Bridge (SFOBB) are currently underway on Sites 28 and 29 on the eastern side of YBI, and the deed for these two sites has been granted to Caltrans by the FHWA." This is incorrect. Construction for the new bridge will not occur on Site 28, which is not on the eastern side of YBI, and Site 28 was not deeded to Caltrans.	See Response to AMEC Geomatrix Comment #6.

Responses to Regulatory Agency Comments on the Draft Record of Decision for Site 28, West Side On-Off Ramps, Naval Station Treasure Island, San Francisco, California, July 2010

Comments by: Melinda M. Garvey, Remedial Project Manager, USEPA Region IX

General Comments

No.	Comment	Response
1	<p>Please clearly state whether the decision for a No Action ROD for Site 28 is relying on institutional controls (ICs) inherent in Tidelands Trust; in which case it is an IC ROD and needs to be stated as such.</p> <p>Or, the basis for No Action decision is due to undesirable residential reuse of the land based on geographical characteristics (steep slope, proximity to bridge, etc.) and the open space future anticipated reuse.</p>	<p>The ROD does not include institutional controls (IC) and is considered a no action ROD based on the investigation findings summarized in four bullets on page 5. Inclusion of the site in the Tidelands Trust will further support non-development of Site 28. Section 1.3 indicates that a no further action remedy is appropriate based on the lack of risk to human health and the environment, and that no institutional controls will be required for the selected remedy.</p> <p>The following sentence has been added to Section 1.3 that property use will be restricted due to placement in the Tidelands Trust: “Although this is a NFA ROD and no land use controls will be included as part of the CERCLA remedy, property use of Site 28 will be restricted due to placement in the Tidelands Trust.”</p>
2	<p>Please add additional language to the ROD clarifying the exposure risk for adults compared with children for a residential land use scenario.</p>	<p>The difference in estimated blood levels for child and adult residents is already presented in Tables 2 and 3, and discussed in the paragraph immediately following these two tables. No change has been implemented as a result of this comment.</p>
3	<p>Please cite the specific statutory provision establishing the public tidal trust in California.</p>	<p>An additional footnote reference has been added for a link to a discussion of the origins of the Tidelands Trust doctrine. The Tidelands Trust is not established by statute. Instead, the Tidelands Trust is based upon common law origins and is administered in California by legislative action. The last sentence under “Tidelands Trust” has been revised to read: “The Tidelands Trust is overseen by the California State Lands Commission and administered by the State Legislature. The Public Trust Doctrine⁽¹⁰⁾ includes the principle that certain resources are preserved for public use, and that the government is required to maintain such resources for the public’s reasonable use in the State of California. The Tidelands Trust imposes the following restrictions on the</p>

Responses to Regulatory Agency Comments on the Draft Record of Decision for Site 28, West Side On-Off Ramps, Naval Station Treasure Island, San Francisco, California, July 2010

Comments by: Melinda M. Garvey, Remedial Project Manager, USEPA Region IX

General Comments

No.	Comment	Response
		development of Treasure Island: ...”
4	We will expect the FOST for Site 28 to include a Notice pursuant to the Guidelines.	A Notice pursuant to the Guidelines will be included in the FOST.