



**Final**

**Record of Decision for  
Installation Restoration Site 28,  
Todd Shipyards**

**Alameda Point  
Alameda, California**

**September 2007**

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

Prepared under:  
**Naval Facilities Engineering Command  
Contract Number N68711-03-D-5104  
Contract Task Order 093**



A Joint Venture of Sullivan Consulting Group and Tetra Tech EM Inc.

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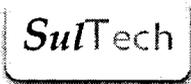
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## **TABLE OF CONTENTS**

---

ACRONYMS AND ABBREVIATIONS .....	vii
DECLARATION .....	D-1
SITE NAME AND LOCATION.....	D-1
STATEMENT OF BASIS AND PURPOSE .....	D-1
ASSESSMENT OF THE SITE .....	D-2
DESCRIPTION OF THE SELECTED REMEDY: ACTIVE REMEDIATION FOR SOIL AND ACTIVE REMEDIATION FOR GROUNDWATER .....	D-3
STATUTORY DETERMINATIONS.....	D-4
DATA CERTIFICATION CHECKLIST .....	D-5
1.0 SITE NAME, LOCATION, AND DESCRIPTION .....	1-1
1.1 SITE NAME.....	1-1
1.2 SITE LOCATION.....	1-1
1.3 SITE DESCRIPTION .....	1-1
2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES .....	2-1
2.1 SITE HISTORY .....	2-1
2.2 INVESTIGATION ACTIVITIES.....	2-3
2.2.1 CERCLA Investigation Activities .....	2-3
2.2.2 RCRA Investigation Activities .....	2-5
2.2.3 EBS Investigation Activities.....	2-5
2.2.4 Alameda Point Base-wide Groundwater Monitoring Program.....	2-6
3.0 COMMUNITY PARTICIPATION .....	3-1
3.1 RESTORATION ADVISORY BOARD.....	3-1
3.2 PUBLIC MAILINGS.....	3-2
3.3 COMMUNITY PARTICIPATION FOR SITE 28 .....	3-2
4.0 SCOPE AND ROLE OF OPERABLE UNIT AND RESPONSE ACTION.....	4-1
5.0 SITE CHARACTERISTICS.....	5-1
5.1 GEOLOGY.....	5-1
5.2 HYDROGEOLOGY .....	5-2
5.3 NATURE AND EXTENT OF CONTAMINATION IN SOIL AND GROUNDWATER .....	5-2

**TABLE OF CONTENTS (Continued)**

---

6.0 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES..... 6-1

6.1 LAND USES ..... 6-1

6.2 GROUNDWATER USES ..... 6-1

6.3 SURFACE WATER USES ..... 6-4

7.0 SUMMARY OF SITE RISKS ..... 7-1

7.1 HUMAN HEALTH RISK ASSESSMENT APPROACH ..... 7-1

7.1.1 Identification of COPCs..... 7-1

7.1.2 Exposure Assessment..... 7-2

7.1.3 Toxicity Assessment ..... 7-3

7.1.4 Risk Characterization..... 7-4

7.2 SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT APPROACH ..... 7-6

7.3 POINT OF DEPARTURE ..... 7-7

8.0 REMEDIAL ACTION OBJECTIVES ..... 8-1

9.0 DESCRIPTION OF REMEDIAL ALTERNATIVES ..... 9-1

9.1 REMEDIAL ALTERNATIVES FOR SOIL ..... 9-2

9.1.1 Alternative S1 – No Action..... 9-2

9.1.2 Alternative S2 – ICs..... 9-2

9.1.3 Alternative S3 – Soil/Synthetic Membrane Cover with ICs..... 9-2

9.1.4 Alternative S4a – Removal and Disposal of Soil to Achieve  
Unrestricted Site Use (0 to 6 feet bgs)..... 9-3

9.1.5 Alternative S4b – Removal and Disposal of Soil to Achieve  
RAOs with ICs (0 to 2 feet bgs)..... 9-3

9.1.6 Alternative S5 – Asphalt Cover with ICs ..... 9-3

9.1.7 Alternative S6 - Phytoremediation and ICs ..... 9-4

9.1.8 Alternative S7a – Ex-Situ Solidification/Stabilization of  
Excavated Soil (0 to 6 feet bgs)..... 9-4

9.1.9 Alternative S7b – Ex-Situ Solidification/Stabilization of  
Excavated Soil (0 to 2 feet bgs)..... 9-4

9.2 REMEDIAL ALTERNATIVES FOR GROUNDWATER ..... 9-5

9.2.1 Alternative GW1 – No Action..... 9-5

9.2.2 Alternative GW2 – Monitoring and ICs/Monitoring and ICs  
(Shoreline and Inland Areas) ..... 9-5

9.2.3 Alternative GW3 – Monitoring and ICs/Soil Source Removal with  
Monitoring and ICs..... 9-5

**TABLE OF CONTENTS (Continued)**

---

9.2.4 Alternative GW4 - Monitoring and ICs/Passive MIC Zone with Monitoring and ICs..... 9-6

9.2.5 Alternative GW5 – Monitoring and ICs/Soil Source Removal and MIC with Monitoring and ICs ..... 9-6

10.0 COMPARATIVE ANALYSIS OF ALTERNATIVES..... 10-1

10.1 COMPARISON OF SOIL ALTERNATIVES..... 10-1

10.1.1 Overall Protection of Human Health and the Environment..... 10-1

10.1.2 Compliance with ARARs ..... 10-2

10.1.3 Long-Term Effectiveness and Permanence ..... 10-2

10.1.4 Reduction of Toxicity, Mobility, or Volume through Treatment ..... 10-2

10.1.5 Short-Term Effectiveness ..... 10-3

10.1.6 Implementability ..... 10-3

10.1.7 Cost ..... 10-3

10.1.8 State Acceptance..... 10-4

10.1.9 Community Acceptance..... 10-4

10.2 COMPARISON OF GROUNDWATER ALTERNATIVES ..... 10-4

10.2.1 Overall Protection of Human Health and the Environment..... 10-4

10.2.2 Compliance with ARARs ..... 10-4

10.2.3 Long-Term Effectiveness and Permanence ..... 10-4

10.2.4 Reduction of Toxicity, Mobility, or Volume through Treatment ..... 10-5

10.2.5 Short-Term Effectiveness ..... 10-5

10.2.6 Implementability ..... 10-6

10.2.7 Cost ..... 10-6

10.2.8 State Acceptance..... 10-6

10.2.9 Community Acceptance..... 10-6

11.0 PRINCIPAL THREAT WASTE ..... 11-1

12.0 SELECTED REMEDY..... 12-1

12.1 SUMMARY OF THE RATIONALE FOR THE SELECTED REMEDY ..... 12-1

12.1.1 Soil ..... 12-1

12.1.2 Groundwater ..... 12-2

12.2 DESCRIPTION OF THE SELECTED REMEDY ..... 12-2

12.2.1 Soil - Removal and Disposal of Soil (Upper 2 feet) and ICs..... 12-2

12.2.2 Groundwater - MIC with Monitoring and ICs..... 12-6

12.3 ESTIMATED COSTS..... 12-7

**TABLE OF CONTENTS (Continued)**

---

12.4 EXPECTED OUTCOMES OF THE SELECTED REMEDIES ..... 12-8  
    12.4.1 Soil ..... 12-8  
    12.4.2 Groundwater ..... 12-8

13.0 STATUTORY DETERMINATIONS ..... 13-1  
    13.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT ..... 13-1  
    13.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE  
        REQUIREMENTS..... 13-1  
        13.2.1 Chemical-Specific ARARs ..... 13-2  
        13.2.2 Location-Specific ARARs ..... 13-8  
        13.2.3 Action-Specific ARARs..... 13-9  
    13.3 COST-EFFECTIVENESS..... 13-14  
    13.4 USE OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT  
        TECHNOLOGIES (OR RESOURCE RECOVERY TECHNOLOGIES) TO THE  
        MAXIMUM EXTENT PRACTICABLE ..... 13-15  
    13.5 PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT ..... 13-15  
    13.6 5-YEAR REVIEW REQUIREMENTS ..... 13-15

14.0 DOCUMENTATION OF SIGNIFICANT CHANGES ..... 14-1

15.0 REFERENCES ..... 15-1

**ATTACHMENTS**

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- A Administrative Record Index
- B Transcript from Public Meeting, Sign-in Sheet, and Public Notice
- C Responsiveness Summary

## **FIGURES**

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- 1-1 Alameda Point Location Map
- 1-2 Site Location Map
- 1-3 Site Features
  
- 6-1 Alameda Point Reuse Map
  
- 7-1 Site 28 Conceptual Site Model
  
- 8-1 Site 28 Conceptual Groundwater Model for Copper
  
- 12-1 Soil Excavation Areas
- 12-2 Boundaries of Institutional Controls for Soil and Groundwater at Site 28
- 12-3 Achievement of Site 28 Groundwater Remediation Goals

## **TABLES**

---

- 1-1 Site 28 Description
- 2-1 Summary of Comprehensive Environmental Response, Compensation, and Liability Act and Environmental Baseline Survey Investigation Activities
- 3-1 Summary of Alameda Point Fact Sheets, Newsletters, and Proposed Plans Related to Site 28
- 5-1 Chemicals Detected in Soil
- 5-2 Chemicals Detected in Groundwater in 2002
- 5-3 Analytical Results for Arsenic in Groundwater
- 5-4 Analytical Results for Copper in Groundwater
- 6-1 Current and Anticipated Land Uses
- 7-1 Exposure Scenarios for the Human Health Risk Assessment
- 7-2 Summary of Site 28 Human Health Risk Assessment Results
- 7-3 Summary of Site 28 Risk by Pathway as Presented in the Remedial Investigation Report
- 8-1 Site 28 Chemicals of Concern in Soil
- 10-1 Comparative Analysis of Soil Remedial Alternatives by Balancing Criteria
- 10-2 Cost Comparison of Soil Remedial Alternatives
- 10-3 Comparative Analysis of Groundwater Remedial Alternatives by Balancing Criteria
- 10-4 Cost Comparison of Groundwater Remedial Alternatives
- 12-1 Cost Estimate Summary for Soil Alternative S4b
- 12-2 Cost Estimate Summary for Groundwater Alternative GW4 with Excavation
- 13-1 Chemical-Specific Applicable or Relevant and Appropriate Requirements
- 13-2 Location-Specific Applicable or Relevant and Appropriate Requirements
- 13-3 Action-Specific Applicable or Relevant and Appropriate Requirements

## ACRONYMS AND ABBREVIATIONS

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§	Section
µg/L	Microgram per liter
95% UCL	95 percent upper confidence limit
AOC	Area of concern
ARAR	Applicable or relevant and appropriate requirement
ARI	Administrative record index
B(a)P	Benzo(a)pyrene
BCT	BRAC Cleanup Team
Bechtel	Bechtel Environmental, Inc.
bgs	Below ground surface
BRAC	Base Realignment and Closure
BSU	Bay Sediment Unit
Cal. Code Regs.	<i>California Code of Regulations</i>
Cal/EPA	California Environmental Protection Agency
CCC	Criterion continuous concentration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	<i>Code of Federal Regulation</i>
ch.	Chapter
COC	Chemical of concern
COPC	Chemical of potential concern
COPEC	Chemical of potential ecological concern
CTR	California Toxics Rule
div.	Division
DTSC	Department of Toxic Substances Control
EBS	Environmental baseline survey
EDC	Economic development conveyance
EPA	U.S. Environmental Protection Agency
ERA	Ecological risk assessment
et seq.	And the following one or ones
FFA	Federal Facilities Agreement
FS	Feasibility study
FWBZ	First water-bearing zone
gpd	Gallons per day

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

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HDPE	High-density polyethylene
HEAST	Health Effects Assessment Summary Tables
HHRA	Human health risk assessment
HI	Hazard index
IAS	Initial assessment study
IC	Institutional control
IR	Installation Restoration
IRIS	Integrated Risk Information System
LIFOC	Lease in Furtherance of Conveyance
MCL	Maximum contaminant level
mg/kg	Milligram per kilogram
mg/L	Milligram per liter
MIC	Metals immobilization compound
MOU	Memorandum of Agreement
NACIP	Navy Assessment and Control of Installation Pollutant
NAS	Naval Air Station
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
OEHHA	Office of Environmental Health Hazard Assessment
OU	Operable unit
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
POE	Point of exposure
POM	Point of measurement
PRG	Preliminary remediation goal
RAB	Restoration Advisory Board
RAO	Remedial action objective
RCRA	Resource Conservation and Recovery Act
Reg.	Regulation
Res.	Resolution
RI	Remedial investigation
RMP	Risk Management Plan
ROD	Record of decision

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

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SARA	Superfund Amendments and Reauthorization Act
SMP	Soil Management Plan
SVOC	Semivolatile organic compound
SWBZ	Second water-bearing zone
SWMU	Solid waste management unit
SWRCB	State Water Resources Control Board
TBC	To be considered
TDS	Total dissolved solids
Tetra Tech	Tetra Tech EM Inc.
Tit.	Title
USC	<i>United States Code</i>
VOC	Volatile organic compound
Water Board	San Francisco Bay Regional Water Quality Control Board

## DECLARATION

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### SITE NAME AND LOCATION

This decision document addresses Installation Restoration (IR) Site 28, the Todd Shipyards, at the former Naval Air Station, now referred to as Alameda Point, in Alameda, California. The U.S. Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS) identification number is CA2170023236.

### STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the selected remedies for soil and groundwater at Installation Restoration Site 28, Todd Shipyards, in Alameda, California (hereinafter referred to as Site 28). The selected remedy for soil, Remedial Alternative S4b, includes removal and disposal of soil (upper 2 feet) and institutional controls (ICs). The selected remedy for groundwater, Remedial Alternative GW4, includes the use of Metals Immobilization Compound (MIC), hot-spot excavations, groundwater monitoring, and ICs. The numbering of the groundwater remedial alternatives was revised in the Final Site 28 Proposed Plan from that presented in the Feasibility Study (FS) Report, and groundwater Remedial Alternative GW4 was presented as GW3 in the Final Site 28 Proposed Plan dated March 2006. This ROD will retain the remedial alternative numbering of the FS but will also include in parentheses the associated numbered alternative from the Proposed Plan.

This document was developed in accordance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by Superfund Amendments and Reauthorization Act of 1986 (Title [Tit.] 42 *United States Code* Section 9601, et seq.), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (Tit. 40 *Code of Federal Regulations* Part 300).

The decision is based on information contained in the administrative record file (see Attachment A for a site-specific administrative record index [ARI]) as well as on extensive field investigations, laboratory analyses, data interpretation, evaluation of current and future conditions, and a thorough assessment of potential human health and ecological risks. Based on these findings, further action is required at Site 28.

## ASSESSMENT OF THE SITE

The U.S. Department of the Navy (Navy) has concluded that remedial action is required for soil and groundwater to protect public health and the environment on the basis of the following:

- Site history
- Field investigations
- Laboratory analytical results
- Evaluation of potential ecological and human health risks
- Current and reasonably anticipated future land use

The results of investigations at Site 28, Todd Shipyards, verified the presence of metals and polycyclic aromatic hydrocarbons (PAH) in concentrations in soil that pose a potential risk to human health. Concentrations of contaminants in groundwater were verified during investigative activities, but do not pose a risk to human health based on the current and reasonably anticipated future land uses. The ecological risk assessment identified a potential risk to saltwater aquatic organisms from copper concentrations in groundwater in the area of the groundwater discharge into the Oakland Inner Harbor. The ecological risk assessment did not identify other ecological risks because Site 28 supports only limited habitat and the presence of terrestrial receptors is limited and future land uses would not create additional ecological habitat. The agencies (EPA and the San Francisco Bay Regional Water Quality Control Board [Water Board]) have had ongoing concerns regarding the arsenic concentration in groundwater detected at the inland well. Therefore, the Navy has conducted data gap sampling (July 2007) under an approved workplan. Preliminary results show that the arsenic concentration in groundwater at the newly installed shoreline well does not exceed the California Toxics Rule (CTR) criterion (36 micrograms per liter [ $\mu\text{g/L}$ ]) or the Alameda Point maximum background concentration, which confirms previous sampling results in the shoreline wells, and substantiates the Navy's position that arsenic in groundwater is not a concern at the point of exposure (POE).

There are no known Resource Conservation and Recovery Act (RCRA) permitted or non-permitted units at IR Site 28. The Navy did not own the Site 28 property between 1970 and 1995. Therefore, the Navy's RCRA Part A permit issued in 1980 (EPA Identification No. CA 2170023236) (California Environmental Protection Agency [Cal/EPA] 1980) and the RCRA Part B permit issued in 1993 (Tetra Tech EM Inc. [Tetra Tech] 2002) do not include Site 28 because this property fell outside of the Navy's property line. The RCRA facility assessment completed in 1990 on behalf of the Department of Toxic Substances Control (DTSC) was conducted for all property within the Navy's property lines and therefore did not include Site 28. No records indicate that the Navy conducted operations subject to RCRA on the Site 28 property prior to 1970 or from 1995 to 1997, when the base closed. No known RCRA facility assessment has been conducted for Site 28 either as a part of Navy operations or as part of former shipyard

operations conducted under previous ownership. In addition, no petroleum sites are being investigated at Site 28 under the Navy's petroleum program.

#### **DESCRIPTION OF THE SELECTED REMEDY: ACTIVE REMEDIATION FOR SOIL AND ACTIVE REMEDIATION FOR GROUNDWATER**

This ROD recommends further action for soil and groundwater at Site 28.

Seven remedial alternatives were developed and analyzed in the FS Report to address a potential risk to human health from metals and PAHs in soil. Soil Alternative S4b was selected as the preferred remedy and includes the following components:

- Removal of soil contaminated by metals or PAHs to a maximum depth of 2 feet below ground surface (bgs) in designated shoreline areas where concentrations exceed the remediation goal for arsenic (9.1 milligrams per kilogram [mg/kg]), lead (800 mg/kg), or PAHs (2.1 mg/kg).
- Backfill the excavations with clean soil to prevent exposure to the underlying contaminated soil remaining after the excavation. Seed the area with selected indigenous plant species for erosion protection.
- ICs to restrict land use by prohibiting new construction for hospital, school, daycare center, and residential human habitation purposes. In addition, ICs will restrict subsurface activities below 2 feet below ground surface at Site 28, and the offsite reuse of excavated soil.

Four remedial alternatives were developed and analyzed to address a potential risk to ecological receptors in the Oakland Inner Harbor from copper in groundwater at Site 28. Groundwater Alternative GW4 (GW3 in the Final Site 28 Proposed Plan dated March 2006) was selected as the preferred remedy for groundwater, and includes the following components:

- Addition of MIC into saturated soils to immobilize copper in groundwater.
- Enhance the effectiveness of selected MIC treatment of groundwater remedy by excavating soils containing copper concentrations in excess of remediation goals in the shoreline area.
- Implement a groundwater monitoring program to verify treatment effectiveness during and after MIC treatment and to confirm the remediation goal for copper in surface water at the POE (3.1 µg/L) is achieved. In addition, the groundwater monitoring will confirm that the arsenic concentrations in the inland area do not exceed 2,000 µg/L.
- ICs to restrict access to and the use of groundwater.

## STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The selected remedy will obviate the need for and satisfy the corrective action requirements of RCRA or otherwise applicable state hazardous waste or water quality protection laws. The remedy uses permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable and satisfies the statutory preference for remedies using treatments that reduce toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element. A 5-year review pursuant to CERCLA § 121 is required whenever the level of contamination at a site is unacceptable for unrestricted use. The planned reuse of Site 28 is recreational, and therefore the soil and groundwater remedies are selected to meet the remediation goals for the recreational user. Reviews will be conducted every 5 years to demonstrate that the selected remedy remains effective for the reuse of the site.

## DATA CERTIFICATION CHECKLIST

Checklist Item	Description
Chemicals of potential concern and their respective concentrations.	Chemicals of potential concern are characterized throughout Site 28 based on data from several investigations. A description of these investigation activities is provided in Section 2.0 of this ROD. A description of the nature and extent of contamination at Site 28 is presented in Section 5.3 of the ROD.
Risk assessments are representative of the chemicals of potential concern.	A human health risk assessment and screening-level ecological risk assessment were conducted as part of the remedial investigation using data representative of current conditions at Site 28. Results of these risk assessments are presented in Section 7.0.
Remediation goals established for chemicals of concern and the basis for these goals.	The response actions for groundwater and soil selected in this ROD are necessary to protect the public health or the welfare or the environment from actual or threatened releases of hazardous substances into the environment. The risk assessments are presented in Section 7.0, and the remediation goals are presented in Section 8.0.
How source materials constituting principal threats are addressed.	Former buildings and surrounding areas were investigated and evaluated as potential sources. Results of environmental investigations have identified PAHs, arsenic, and lead contamination in soil as a possible risk to human health. Potential migration of copper in groundwater to the Oakland Inner Harbor presents a potential risk to aquatic organisms. Section 5.3 of this ROD describes the nature and extent of remaining contamination, and Section 11.0 discusses principal threat waste.
Current and reasonably anticipated future land use assumptions and current and potential beneficial uses of groundwater used in the risk assessment and ROD.	Site 28 is currently a dog park and a partially paved parking lot. According to the Alameda Point General Plan Amendment, the long-term reuse of Site 28 is anticipated to be recreational. As part of the human health risk assessment, the risks were evaluated under four different scenarios: recreational, occupational (which includes light industrial), residential, and construction workers. Future land use and beneficial uses of groundwater are discussed in Section 6.0.
Potential land and groundwater use that will be available at the site as a result of the selected remedy.	According to the Alameda Point General Plan Amendment, the long-term reuse of Site 28 is anticipated to be recreational. Groundwater is not currently used for drinking water, irrigation, or industrial supply. Potential land and groundwater uses at Site 28 are discussed in Section 6.0.
Estimated capital, annual operation and maintenance, and total present worth costs; discount rate; and the number of years over which the remedy cost estimates are projected.	This ROD selects remedial action for soil and groundwater at Site 28. Section 12.0 of this ROD describes the selected soil and groundwater remedies. Estimated capital and operation and maintenance costs are presented in Table 12-1.
Key factors that led to selecting the remedy.	Based on elevated concentrations of PAHs and metals in soil and copper in groundwater in the shoreline area, remedial action is necessary at Site 28 to protect human health and the environment. Excavation of PAHs and metals in the upper 2 feet of soil within the designated shoreline areas in combination with ICs will reduce risk to recreational users by limiting exposure pathways. Targeted excavation of soil containing copper concentrations above remediation goals will augment the selected innovative groundwater remedy of treatment with MIC. Section 12.0 describes the selected soil and groundwater remedies, and Section 13.0 describes the statutory determinations that were made regarding the selected remedy. Section 4.0 documents that the Navy has reviewed all written and oral comments submitted during the public comment period and that the Navy has determined that no significant changes to the selected soil and groundwater remedial actions are necessary.

CALIFORNIA REGIONAL WATER  
OCT 01 2007

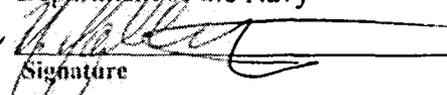
This signature sheet documents the Navy's and the EPA's co-selection of the remedial actions for soil and groundwater at Site 28 of Alameda Point in this ROD, and the State of California, by the Department of Toxic Substances Control's, and San Francisco Bay Regional Water Quality Control Board's concurrence with this ROD. The respective parties may sign this sheet in counterparts.

**AUTHORIZING SIGNATURES**

  
\_\_\_\_\_  
Signature

9/25/2007  
Date

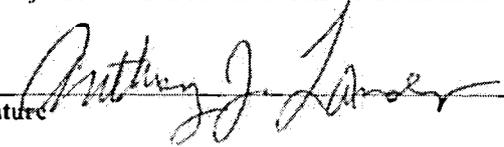
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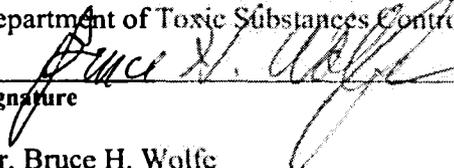
Mr. Michael M. Montgomery  
Chief, Superfund Federal Facilities and  
Site Cleanup Branch, Region 9  
Unites States Environmental Protection Agency

*The State of California, Department of Toxic Substances Control had an opportunity to review and comment on the Record of Decision and our comments were addressed.*

  
\_\_\_\_\_  
Signature

9-28-07  
Date

Mr. Anthony Landis, P.E.  
Chief, Northern California Operations,  
Office of Military Facilities  
California Environmental Protection Agency  
Department of Toxic Substances Control

  
\_\_\_\_\_  
Signature

10/3/07  
Date

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

## **1.0 SITE NAME, LOCATION, AND DESCRIPTION**

This Record of Decision (ROD) presents the selected remedy for Installation Restoration (IR) Site 28, Todd Shipyards. IR Site 28 is part of Operable Unit (OU) 6 at Alameda Point (formerly Naval Air Station [NAS] Alameda), in Alameda, California. The document was developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 (Tit. 42 *United States Code* [USC] Section [§] 9601 et seq.) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (Tit. 40 *Code of Federal Regulations* [CFR] § 300 et seq.). The decision for IR Site 28 is based on the information contained in the administrative record. The administrative record index for this site is presented in Attachment A.

### **1.1 SITE NAME**

This ROD addresses IR Site 28, Todd Shipyards, at Alameda Point (hereinafter referred to as Site 28).

### **1.2 SITE LOCATION**

Site 28 is located on Alameda Point in Alameda, California, adjacent to the Oakland Inner Harbor across from the City of Oakland (see Figure 1-1). Alameda Point is roughly rectangular, about 2 miles long (east to west) and 1 mile wide (north to south), and occupies 1,734 acres of onshore land. Site 28 is located in the northeastern portion of Alameda Point south of Site 20, a CERCLA site offshore of the Todd Shipyards (see Figure 1-2).

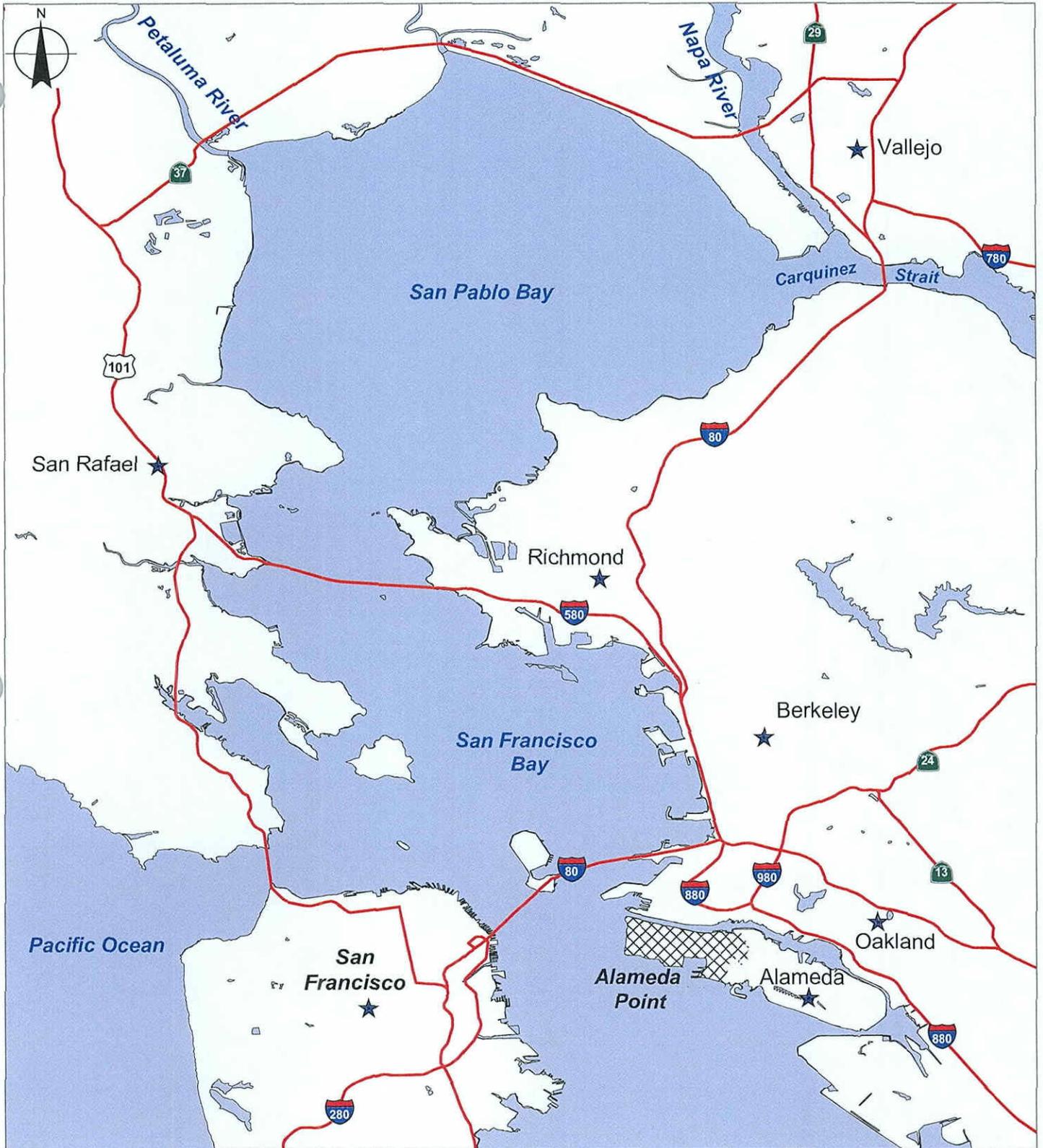
### **1.3 SITE DESCRIPTION**

Site 28 covers an area of 2.9 acres and is irregular in shape (see Table 1-1). Site 28 includes a dog park and a partially paved parking lot (see Figure 1-3). The site is 900 feet long (east to west) and wedge-shaped, increasing in width (north to south) from 35 feet at the western boundary to 300 feet at the eastern boundary. To the north, the site is bounded by Oakland Inner Harbor. The southern boundary parallels Main Street (approximately 100 feet to the south), extending through the fenced dog park and the partially paved parking lot used by Alameda/Oakland ferry riders. The eastern boundary also runs through the parking lot, and the short western boundary lies in a vacant area. Two storm sewers owned by the City of Alameda traverse Site 28 in a north-south orientation, ending as outfalls into the Oakland Inner Harbor (see Figure 1-3). The storm sewers have no formal name and are hereinafter referred to as the East Storm Sewer and the West Storm Sewer.

Past uses of the site included shipbuilding, repair and maintenance of commercial and military marine vessels by Todd Shipyard Corporation, and equipment storage and staging. The Navy has not performed any shipbuilding or maintenance activities at the site. Railroad causeways, railroad tracks, and spurs existed at Site 28 from 1883 to the mid-1960s. Approximately 12,000 square feet of Building 63 was located within the boundary of Site 28. Constructed in 1947 and demolished in 1988, this building most likely was used to store materials related to shipbuilding and maintenance.

***FIGURES***

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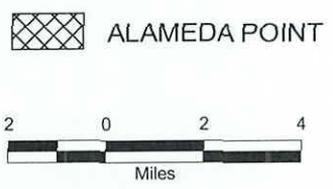


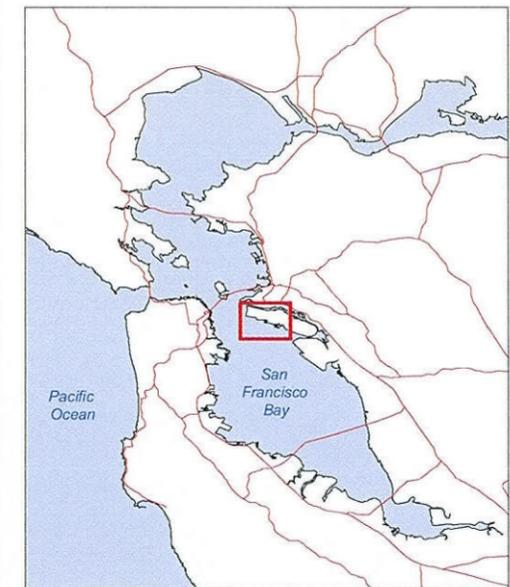
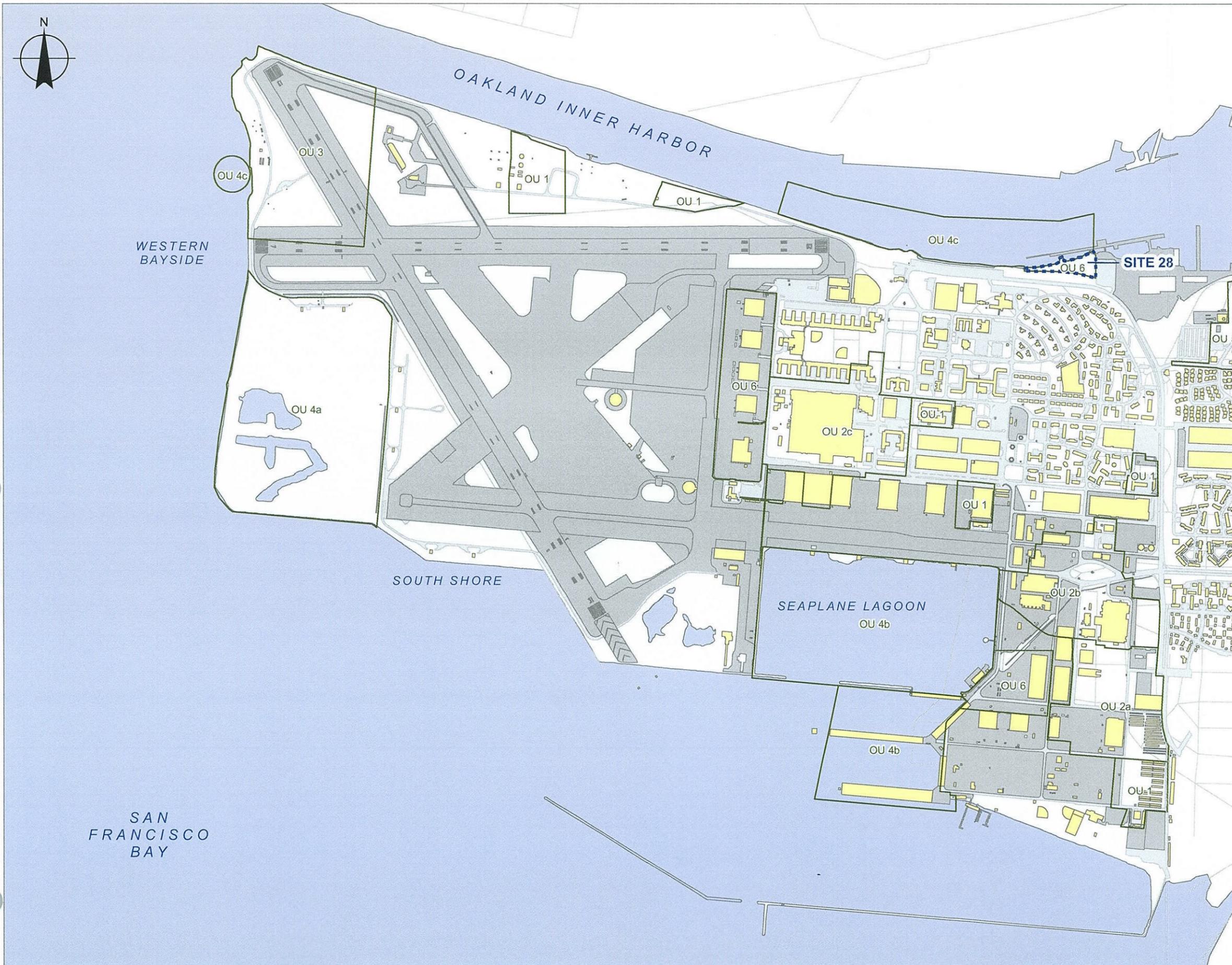
**Alameda Point, Alameda, CA**  
 U.S. Department of the Navy, BRAC PMO West, San Diego, CA

**FIGURE 1-1**

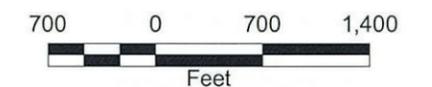
**ALAMEDA POINT LOCATION MAP**

Record of Decision for  
 Installation Restoration Site 28, Todd Shipyards





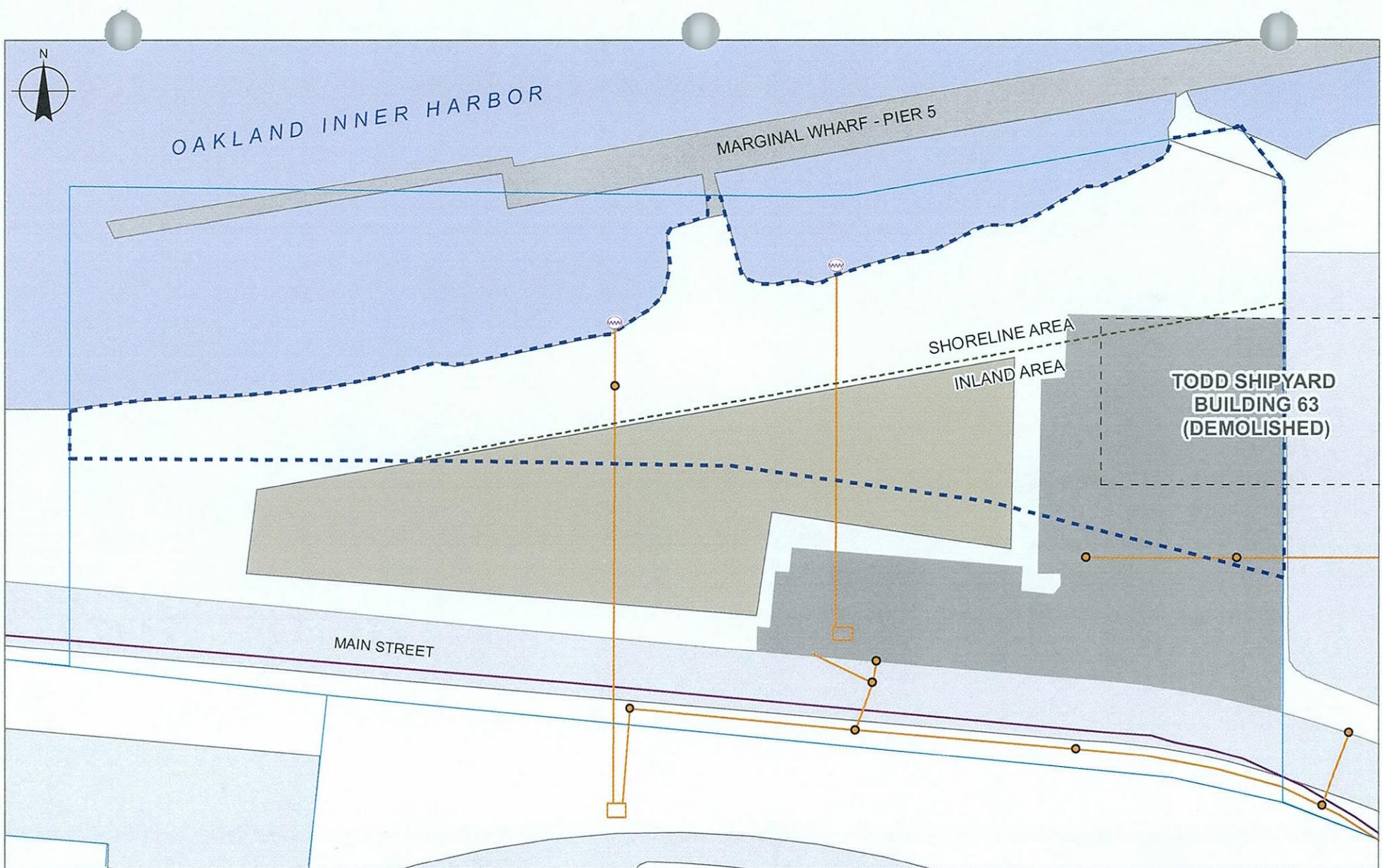
- CERCLA SITE 28 BOUNDARY
- OPERABLE UNIT BOUNDARY
- PAVED; RUNWAY
- ROADS
- STRUCTURE
- WATER
- ROAD



Alameda Point, Alameda, CA  
 U.S. Department of the Navy, BRAC PMO West, San Diego, CA

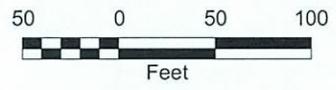
**FIGURE 1-2**  
**SITE LOCATION MAP**

Record of Decision for  
 Installation Restoration Site 28, Todd Shipyards



- CERCLA Site 28 Boundary
- Storm Manhole
- Storm Water Outfall
- Storm Sewer Line (City of Alameda)
- Sanitary Sewer Line
- Dog Park

- Road
- Wharf
- Parking Lot
- Unpaved
- Water
- Environmental Baseline Survey Parcel Boundary



**Alameda Point, Alameda, CA**  
 U.S. Department of the Navy, BRAC PMO West, San Diego, CA

**FIGURE 1-3**  
**SITE FEATURES**

Record of Decision for  
 Installation Restoration Site 28, Todd Shipyards

***TABLES***

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**TABLE 1-1: SITE 28 DESCRIPTION**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

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<b>Operable Unit Number</b>	<b>Site Name</b>	<b>Approximate Area (acres)</b>	<b>Approximate Depth to Groundwater (feet bgs)</b>	<b>Site Description</b>
6	28	2.9	3 to 8	Site 28 is located in the northeastern portion of Alameda Point and was primarily used for shipbuilding, repair and maintenance of commercial and military marine vessels, and equipment storage and staging. Approximately 12,000 square feet of Building 63 was located within the boundary of Site 28. Constructed in 1947 and demolished in 1988, this building most likely was used for storage of materials related to shipbuilding and maintenance. Railroad causeways, railroad tracks, and spurs existed on the site from 1883 to the mid-1960s. Two storm sewers owned by the City of Alameda traverse Site 28 in a north-south orientation ending in the Oakland Inner Harbor.

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Note:  
bgs Below ground surface

## 2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

This section summarizes the site history and enforcement activities conducted at Site 28.

### 2.1 SITE HISTORY

Alameda Point is located on the western tip of Alameda Island, which is on the eastern side of San Francisco Bay. Originally a peninsula, Alameda Island was detached from the mainland in 1876, when a channel was cut to link San Leandro Bay with the San Francisco Bay. The northern portion of Alameda Island was formerly tidal areas, marshlands, and sloughs adjacent to the historical San Antonio Channel, now known as the Oakland Inner Harbor. To create Alameda Point, fill material was dredged from San Francisco Bay. The U.S. Army acquired Alameda Point from the City of Alameda in 1930. The Navy later acquired the land from the U.S. Army in 1936, and built the former NAS Alameda to support the Navy's operations in Europe before World War II. The Naval base was operated as an active naval facility from 1940 to 1997. During the history of former NAS Alameda, it housed approximately 60 military tenant commands for a combined military and civilian workforce of over 18,000 personnel.

Historical use of Site 28 included shipbuilding, repair, and maintenance of commercial and military marine vessels; and storage and staging of equipment (Tetra Tech EM Inc. [Tetra Tech] 2002). Former features in or near Site 28 include a demolished warehouse and historical railroads. The 40,000-square-foot warehouse, also referred to as Building 63, was built in 1947 and demolished by 1988. It was likely used for storage related to shipbuilding and maintenance. Approximately 12,000 square feet of the total warehouse area lay within the Site 28 boundary. Railroads formerly traversed the length of Site 28; in 1883, the South Coast Pacific Railroad constructed a rail causeway over 2 miles long that extended into San Francisco Bay from the northwest corner of Alameda Island which provided rail and ferry services to the public as well as freight transport. The former location of the causeway, now the northern margin of Alameda Point adjoining the Oakland Inner Harbor, included the southern portion of present-day Site 28. Based on aerial photographs, it appeared all railroad tracks in the vicinity of Site 28 were removed by 1960; no surface evidence of former railroads is visible at Site 28 (Bechtel Environmental Inc. [Bechtel] 2005).

The City of Alameda owned the property that is now Site 28 until 1930, when it was acquired by the Army, and then by the Navy in 1936. The land remained Navy property until 1970, when it was acquired by Todd Shipyards Corporation as part of a land purchase that included the privately owned, non-Navy-leased property adjacent to Site 28 (HawaiiLawyer.com 2003). In 1995, ownership of the land comprising Site 28 reverted to the Navy because of a property title dispute (Real Estate Research and Information 2002).

The Navy began investigations of contaminated sites in 1982 under the Navy Assessment and Control of Installation Pollutants (NACIP) program. The Navy's procedures and priorities for conducting environmental investigations and cleanups have evolved, partly in response to events such as the closure of NAS Alameda in April 1997, under the Base Closure and Realignment Act of 1996, and the designation of Alameda Point as a National Priority List site in July 1999

(U.S. Environmental Protection Agency [EPA] 1999a). When NAS Alameda was listed for closure, responsibility for the environmental cleanup program at Alameda Point passed to the Base Realignment and Closure (BRAC) Cleanup Team (BCT). At Alameda Point, the BCT consists of representatives from Navy, EPA, Department of Toxic Substances Control Board (DTSC), and San Francisco Bay Regional Water Quality Control Board (Water Board). The listing of Alameda Point on the National Priorities List invokes the applicable requirements of the NCP and requires EPA concurrence prior to the final classification of any property as uncontaminated. The Navy and the EPA negotiated and signed a Federal Facility Agreement in 2001; DTSC and the Water Board signed the agreement in 2005.

The BCT developed a comprehensive strategy to accelerate site investigation, cleanup, and reuse of the CERCLA sites at Alameda Point, and part of that strategy involved grouping the sites into OUs. Site 28 is part of OU-6 and was designated as a mixed use OU because potential reuse will include commercial, light industrial, recreational, and medium-density residential uses. It was determined that storm sewers would be addressed within their respective CERCLA site. Site 28 storm sewers are not connected to the Alameda Point Navy storm sewer system, therefore Site 28 storm sewers were not evaluated in the Storm Sewer Evaluation Report (Tetra Tech 2000b). However, two storm sewers owned by the City of Alameda traverse Site 28 in a north-south orientation. The City of Alameda storm sewers (East Storm Sewer and West Storm Sewer) that are located within the boundary of Site 28 are addressed in this decision document.

Historical activities performed within Site 28 that may have led to contamination at the site are summarized below:

1. **Materials used for land reclamation.** Polycyclic aromatic hydrocarbons (PAH), arsenic, and iron are present in soil at concentrations exceeding residential preliminary remediation goals (PRG) across Site 28, in both the southern portion of the site created by natural and artificial fill prior to 1939, and the northern portion of the site created by the emplacement of fill material between 1939 and 1968.
2. **Non-Navy shipbuilding activities.** Undocumented historical shipyard activities included welding, paint stripping and marine paint application, equipment storage, and weed suppression or pest control. The sources of metals in soil and groundwater at Site 28 are most likely from the historical non-Navy use of the site for shipbuilding, repair, and maintenance of commercial and military marine vessels. Wastes associated with shipbuilding and repair activities are likely the source of elevated metals concentrations in soil.
3. **Use of biocides.** The presence of organotin compounds, commonly used as biocides in paints and undercoatings for ocean-going ships, is a strong indicator that the metals in soil along the shoreline at Site 28 are related to shipyard wastes. Additionally, organotin compounds are present only in the northern portion of Site 28, in areas of fill material emplaced after 1939, and after shipyard activities had begun.

4. **Railroad and rail shipyard spurs.** Soil contamination may be linked to a series of former railroad tracks, including the Alameda Mole and the rail shipyard spurs which crossed this site between 1883 and the mid-1960s. Railroad tracks and spurs could also be a source of elevated arsenic levels, which could be attributed to rail-tie preservative and to arsenic-containing herbicides used to keep the tracks clear of vegetation.
5. **Rail Road Fire.** Debris from a fire in 1902 that burned the railroad causeway from the ferry trestle to the waterline (Hees 1997) could be the source of both elevated iron concentrations and elevated concentrations of PAHs associated with incomplete combustion of fires.

## 2.2 INVESTIGATION ACTIVITIES

Environmental investigation and remedial activities associated with OU-6 are implemented under the installation-wide environmental program called the IR Program. The purpose of this program is to identify, investigate, assess, characterize, and cost-effectively clean up or control releases of hazardous substances to reduce the risk to human health and the environment.

CERCLA applies to sites where a hazardous substance is known or suspected to have been released to the environment. RCRA corrective action requirements apply to Solid Waste Management Units (SWMUs) at RCRA-permitted facilities. CERCLA and RCRA address the investigation and cleanup of contaminated property through slightly different, but functionally equivalent processes. Site 28 does not include any SWMUs and no enforcement activities are related to Site 28.

In addition to investigations under CERCLA, Alameda Point and Site 28 also underwent investigations as part of the environmental baseline survey (EBS). The following sections describe the CERCLA, RCRA, and EBS investigation activities conducted at Site 28. No petroleum sites are being investigated at Site 28 under the Navy's petroleum program.

### 2.2.1 CERCLA Investigation Activities

The Navy initiated environmental site investigations at Alameda Point under the NACIP program in 1982. An initial assessment study (IAS) was conducted under the NACIP program to assess the entire base for potential areas where chemicals may have contaminated soil or groundwater (Naval Energy and Environmental Support Activity [NEESA] 1983). A verification step/characterization study was then completed in 1985 at sites that were identified for further study in the IAS. At the time of the IAS, Site 28 was owned by Todd Shipyards Corporation and was therefore not evaluated in the IAS Report.

On June 6, 1988, the Navy received a Remedial Action Order from the California Department of Health Services (now DTSC) that identified 23 sites at Alameda Point as requiring a remedial investigation (RI) and feasibility study (FS), in conformance with the requirements of CERCLA.

In 1988, the Navy converted its NACIP program into the IR Program to be more consistent with CERCLA, and investigations were conducted in a phased approach to support development of RI/FS reports for the 23 CERCLA sites. Site 28 was designated as a CERCLA site in August 2000. The activities conducted at Site 28 under CERCLA are described briefly below and a summary of findings from these activities are provided in Table 2-1.

#### **2.2.1.1 Remedial Investigation Report, 2004**

An RI Report for Site 28 was prepared and became final in September 2004 (Bechtel 2004). This report provided a complete discussion of the history and setting of Site 28, summarized previous investigations conducted at the site, summarized the nature and extent of contamination, and included both a human health risk assessment (HHRA) and an ecological risk assessment (ERA). The RI Report recommended further evaluation of soil and groundwater at Site 28 to address risks identified in the HHRA and ERA (Bechtel 2004).

#### **2.2.1.2 Feasibility Study, 2005**

A Feasibility Study (FS) Report was prepared and became final in June 2005 (Bechtel 2005). The FS Report summarized the results of the Site 28 RI Report, developed remedial action objectives (RAO), remediation goals, and remedial alternatives, and evaluated the alternatives against the NCP criteria.

#### **2.2.1.3 Proposed Plan, 2006**

In March 2006, the Navy distributed a Proposed Plan for Site 28, which included its recommendation for remediation of soil and groundwater (Navy 2006). The Proposed Plan also summarized the history of the site, including the environmental investigations conducted, and notified the community of the public meeting and public comment period. The public comments on the Navy's preferred soil and groundwater alternatives are addressed in this ROD (see Attachment B).

#### **2.2.1.4 Technical Memorandum, 2007**

A technical memorandum for Site 28 was prepared and submitted to the regulatory agencies in January 2007 (SulTech 2007). The purpose of the technical memorandum was to describe the resolution of issues identified by the regulatory agencies during their review of the RI Report, FS Report, and Proposed Plan. The technical memorandum addresses issues identified for Site 28 and was placed in the administrative record to supplement this ROD. The issues and their resolutions are discussed here and in Section 8.0, Remedial Action Objectives.

As part of the technical memorandum, a groundwater modeling conceptual approach was proposed to calculate the trigger level at the point of measurement (POM) (a groundwater monitoring well) to determine if the remediation goal for copper is being achieved at the point of exposure (POE) (the point of groundwater discharge into the Oakland Inner Harbor closest to the

POM). The three-fold purpose of the groundwater modeling strategy developed in the technical memorandum was to (1) establish a conceptual model to be used during the remedial design phase that would determine the maximum allowable copper concentration in a groundwater monitoring well; (2) protect benthic aquatic organisms from exposure to elevated copper concentrations; and (3) establish a trigger level for the groundwater monitoring well that would prompt additional action if concentrations of copper exceed the trigger level.

In addition, updated analytical data for arsenic in groundwater were presented in the technical memorandum and compared to the preliminary remediation goals (PRG) based on the California Toxics Rule (CTR) criterion for the shoreline wells. The protection of agricultural water supplies for the inland well, and the remediation goal for lead in soil was evaluated for the recreational user. The technical memorandum also describes the Navy's evaluation of two storm sewers owned by the City of Alameda (known as the East and West Storm Sewers) and concluded that neither storm sewer is likely to act as a preferential migration pathway for chemicals associated with Site 28 (SulTech 2007).

### **2.2.2 RCRA Investigation Activities**

A RCRA facility assessment was conducted at Alameda Point in 1992 (DTSC 1992). Its primary objectives were to identify SWMUs and Areas of Concern (AOCs) and to collect preliminary information on all actual or potential contaminant releases from these SWMUs and AOCs to evaluate the need and scope of a RCRA facility investigation. RCRA-permitted or non-permitted units are not present at Site 28 (Bechtel 2004). In addition, no petroleum sites are being investigated at Site 28 under the Navy's petroleum program.

### **2.2.3 EBS Investigation Activities**

As mandated by BRAC, the Navy conducted a series of base-wide investigations at Alameda Point as part of the EBS. The objective of the EBS was to inventory all Alameda Point property, parcel by parcel, and identify known or suspected chemical releases associated with historical and recent uses. The EBS program at Alameda Point was implemented in two phases in 1993. Phase 1 of the investigation included site visits, employee interviews, and historical research (Environmental Resources Management West, Inc. 1994). In addition, recommendations for additional investigations (Phase 2) were made. Phase 1 did not include any investigation at the parcel that is now Site 28 because of uncertainty about ownership of the property. Table 2-1 summarizes the EBS activities conducted at Site 28.

Phase 2 of the EBS investigations was subdivided into Phases 2A, 2B, and 2C, and consisted of intrusive sampling to determine the potential for contamination of soil and groundwater. The parcel that is now Site 28 was included in Phase 2C. Results from Phase 2 were documented in a second EBS completed in 2001 (International Technology Corporation 2001). The EBS designated the 4.63-acre parcel, which includes the 2.9 acres of land that is now Site 28, as the Todd Shipyards Zone (Zone 24), Parcel 215. Site 28 does not include the offshore portion of EBS Parcel 215. The offshore portion of Parcel 215 is now part of Site 20 which was evaluated in the Draft RI for Site 20 and 24 (Battelle; BBL, Inc.; and Neptune and Company 2006).

During 1998 and 1999, soil and groundwater samples were collected from the land portion of Parcel 215. Analytical results of the samples were evaluated using a risk-screening process (International Technology Corporation 2001). The results of the sampling indicated elevated concentrations of metals, PAHs, and pesticides in soil and shallow groundwater for Parcel 215. Subsequently, the 2.9-acre land portion of EBS Parcel 215 was designated Site 28 and included in the IR Program. Based on these results, it was recommended that an RI be conducted under CERCLA to define the nature and extent of soil and groundwater contamination.

#### **2.2.4 Alameda Point Base-wide Groundwater Monitoring Program**

The base-wide groundwater monitoring program for Alameda Point includes Site 28. Sample collection began in 2004 to monitor wells for dissolved metals and total dissolved solids (TDS). Metals concentrations have shown moderate variations over time (Innovative Technical Solutions, Inc. [ITSI] 2006a; 2006b).

***TABLES***

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**TABLE 2-1: SUMMARY OF COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT AND ENVIRONMENTAL BASELINE SURVEY INVESTIGATION ACTIVITIES**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Date	Investigation/ Activity	Objective	Summary of Findings
<b>CERCLA Investigation Activities</b>			
2004	RI	Collect soil and groundwater samples and test aquifer to refine the characterization of contamination at Site 28 and provide data for the risk assessment.	Arsenic, lead, PAHs, and pesticides were found in soil in the shoreline area, and groundwater was found to be contaminated by copper. Groundwater in the inland area was found to be contaminated by arsenic. Hydrogeologic modeling performed to assess the mobility of arsenic indicated that travel time from the inland well to the harbor would be approximately 150 to 400 years. The RI Report recommended further evaluation of soil and groundwater at Site 28 to address risks identified in the HHRA and ERA.
2005	FS	Summarize the results of the Site 28 RI Report, develop RAOs and remedial alternatives, and evaluate the alternatives against the NCP criteria.	Eight remedial alternatives were developed and evaluated for soil, and five remedial alternatives were developed and evaluated for groundwater. Based on the results of the comparative analysis of alternatives against the NCP criteria, the Navy recommended soil removal from 0 to 2 feet bgs in the designated areas within the shoreline area and monitoring and MIC treatment for groundwater in the shoreline area at Site 28. Arsenic in groundwater at the inland well was considered in development of the remedial alternatives. Monitoring and ICs for the inland area were included in the proposed remedy.
2006	Proposed Plan	Present the Navy's recommendation for remediation of soil and groundwater; summarize the history of the site, including the environmental investigations conducted; and notify the community of the public meeting and public comment period.	Based on the NCP evaluation in the FS Report, the Navy proposed excavation of PAHs and metals in soil to a depth of 2 feet bgs within the designated areas within the shoreline area and transportation of soil off site for disposal at a permitted landfill. The Navy also proposed subsurface treatment with MIC into saturated soils to immobilize copper in groundwater, and implementation of a groundwater monitoring program to verify treatment effectiveness during and after MIC treatment. In addition, the groundwater monitoring will confirm that the remediation goals have been met. ICs restricting uses of and activities at Site 28 will be implemented.

**TABLE 2-1: SUMMARY OF COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT AND ENVIRONMENTAL BASELINE SURVEY INVESTIGATION ACTIVITIES (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Date	Investigation/ Activity	Objective	Summary of Findings
<b>CERCLA Investigation Activities (Continued)</b>			
2007	Technical Memorandum	Describe the resolution of issues identified by the regulatory agencies during their review of the RI Report, FS Report, and Proposed Plan for Site 28 and support the remedy selected in the ROD.	<p>A conceptual groundwater modeling approach was proposed for use in the remedial design to calculate a trigger level at the point of measurement (a groundwater monitoring well) to determine if the remediation goal for copper is being achieved at the point of exposure (point of discharge to Oakland Inner Harbor). This conceptual groundwater modeling approach will be further refined during the Remedial Design phase.</p> <p>The remediation goal for lead in soil was evaluated for the recreational child with 5 and 2 days of exposure. Based on the newly calculated site-specific risks for a recreational child at Site 28, the preliminary remediation goal presented in the proposed plan of 800 mg/kg is bounded by the range of the more conservative 5-day and the more realistic 2-day recreational exposure calculations and is considered protective of recreational visitors.</p> <p>The Navy reviewed City of Alameda construction documents to determine if the storm sewers would influence groundwater flow or act as preferential migration pathways for groundwater. Based on the results of the evaluation, the Navy concluded that neither storm sewer is likely to act as a preferential migration pathway for chemicals associated with Site 28.</p>



**TABLE 2-1: SUMMARY OF COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT AND ENVIRONMENTAL BASELINE SURVEY INVESTIGATION ACTIVITIES (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Date	Investigation/ Activity	Objective	Summary of Findings
<b>EBS Investigation Activities</b>			
1994 to 1998	EBS Phase 2C	Further examine the environmental condition of Alameda Point property by collecting and analyzing environmental samples; soil and groundwater samples were collected from 21 locations.	Based on the EBS results, the Navy recommended performing an RI to define the nature and extent of soil and groundwater contamination within the boundaries of the property formerly owned by Todd Shipyards Corporation and designated the property as Site 28.
2004 to present	Base-wide Groundwater Monitoring	Base-wide groundwater monitoring is conducted and includes Site 28. Samples are collected and analyzed for metals and TDS.	Metals concentrations show moderate variations over time. The maximum arsenic concentrations detected in groundwater from April 2002 to May 2006 in the inland well at Site 28 ranged from 250 to 470 µg/L. Arsenic concentrations in groundwater at the shoreline wells have not exceeded the CTR criterion of 36 µg/L. This historical trend is supported by analytical results documented in the basewide annual groundwater monitoring program report (ITSI 2006).

Notes:

- µg/L Micrograms per liter
- CERCLA Comprehensive Environmental Response, Compensation, and Liability Act
- EBS Environmental baseline survey
- FS Feasibility study
- IC Institutional control
- mg/kg Milligrams per kilogram
- NCP National Oil and Hazardous Substances Pollution Contingency Plan
- PAH Polycyclic aromatic hydrocarbon
- RAO Remedial action objective
- RI Remedial investigation

### **3.0 COMMUNITY PARTICIPATION**

A community relations plan was developed to document interests, issues, and concerns raised by the community with regard to ongoing investigations and cleanup activities at Alameda Point, and to describe a specific community relations program designed to address community issues and concerns (Tetra Tech 2003). The initial plan was prepared in February 1989 and revised in 1996, 1998, 2002, and 2003. The revisions incorporated the most recent assessment of community issues, concerns, and informational needs related to the ongoing environmental investigation and remediation program at Alameda Point.

#### **3.1 RESTORATION ADVISORY BOARD**

In 1993, individuals from local communities began to play an increasingly significant role in the environmental restoration process with the establishment of the Alameda Point Restoration Advisory Board (RAB). Original membership in the board included regulatory agency staff and business and homeowners' representatives, residents, and local elected officials that were solicited by the Navy through newspaper notices.

The RAB currently consists of members of the Navy, the regulatory agencies, and the community. The RAB meetings occur monthly and are open to the public. Meetings are held in the evenings after normal working hours at Building 1, Room 140, at 950 West Mall Square at Alameda Point. RAB members review and comment on technical documents.

The Navy and the regulatory agencies report information about Site 28, including the availability of Site 28 documents, to the RAB members during the monthly RAB meetings. Copies of the RAB meeting minutes and documents describing environmental investigations and removal actions are available at the following Alameda Point information repository and administrative record file locations:

Alameda Point Information Repository  
950 West Mall Square  
Building 1, Room 240  
Alameda, California

Administrative Record  
Naval Facilities Engineering Command, Southwest Division  
937 North Harbor Drive, Building 1, 3rd Floor  
San Diego, California 92132-5190

RAB meeting minutes also are available at the Navy BRAC Program Management Office website at: [http://www.bracpmo.navy.mil/bracbases/california/nas\\_alameda/rab\\_mm.aspx](http://www.bracpmo.navy.mil/bracbases/california/nas_alameda/rab_mm.aspx).

## **3.2 PUBLIC MAILINGS**

Public mailings, including information updates, fact sheets, and proposed plans, have been used to ensure a broad dissemination of information throughout the local community. Information updates announcing the IR Program process at Alameda Point have been delivered to residents surrounding Alameda Point and mailed to city, state, and federal officials; regulatory agencies; local groups; and individuals identified in the community relations plan since March 1990 (Tetra Tech 2003). Updates and fact sheets have included information concerning the status of environmental investigations, the upcoming remedy selection process, ways the public can participate in the investigation and remediation, the history and geology of the area, and the availability of the administrative record for Alameda Point. Proposed plans provide an overview of environmental investigation results (including HHRA and ERA results), summarize the remedial alternatives for a site or group of sites, and present the Navy's preferred alternative. The updates, fact sheets, and proposed plans are mailed to approximately 700 households, businesses, public officials, and regulatory agencies in an effort to reach as many community members as possible. Alameda Point updates, fact sheets, and proposed plans related to Site 28 are summarized in Table 3-1.

## **3.3 COMMUNITY PARTICIPATION FOR SITE 28**

The RI Report for Site 28 was finalized in September 2004 (Bechtel 2004), and the FS report was finalized in June 2005 (Bechtel 2005). The Proposed Plan (Navy 2006) was released to the public on March 20, 2006, and opened the public comment period, soliciting public input on the Navy's recommended action. These documents are available to the public at the information repository maintained at Alameda Point and at the administrative record file. The information repository also contains a complete index of the administrative record file (see Attachment A), along with information about how to access the complete file at the Naval Facilities Engineering Command, Southwest Division, San Diego, California.

A 30-day public comment period for Site 28 extended from March 20, 2006 to April 19, 2006. In addition, a public meeting was held on April 12, 2006. A notice of the public comment period and public meeting was published in the *Alameda Journal* on March 17, 2006 and in the *Oakland Tribune* on March 20, 2006. A copy of the public notice is presented in Attachment B.

At the public meeting, the BRAC environmental coordinator and Navy remedial project manager gave presentations on the conditions at Site 28, and representatives from the Navy and the environmental regulatory agencies were available to answer questions. A court reporter prepared a transcript of the meeting (see Attachment B). Written comments were not received at the public meeting. Responses to the two written comments received during the public comment period are included in the responsiveness summary of this ROD (see Attachment C).

***TABLES***

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**TABLE 3-1: SUMMARY OF ALAMEDA POINT FACT SHEETS, NEWSLETTERS, AND PROPOSED PLANS RELATED TO SITE 28**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

<b>Fact Sheets</b>	<b>Date</b>	<b>Title</b>
1	March 1990	Fact Sheet 1: Remedial Investigation/Feasibility Study Update
2	September 1990	Fact Sheet 2: Remedial Investigation/Feasibility Study Update
3	May 1991	Fact Sheet 3: Remedial Investigation/Feasibility Study Update
4	March 1993	Fact Sheet 4: Installation Restoration Program Update
5	May 1995	Fact Sheet 5: Base Realignment and Closure Cleanup Plan
7	June 1996	Fact Sheet 7: History and Geology
<b>Newsletters</b>		
	July 1, 2003	Alameda Point Focus Environmental July 2003 Newsletter
	March 1, 2004	Newsletter Regarding the Navy's Environmental Activities at Alameda Point
<b>Proposed Plan</b>		
	March 2006	Proposed Plan for Site 28, Former Todd Shipyards

#### **4.0 SCOPE AND ROLE OF OPERABLE UNIT AND RESPONSE ACTION**

Remedial actions addressed in this ROD include remedial action and ICs to address arsenic, lead, and PAHs in soil and copper in groundwater at Site 28. Since the current and planned use of Site 28 is recreational, these remedial actions will be protective of construction workers and future recreational users.

Site 28 is a portion of OU-6, which also includes Sites 26 and 27. These three IR sites were added at the same time to the IR Program and grouped into a new OU in August 2000 (Tetra Tech 2003). The final Site 26 ROD was issued on August 23, 2006 (SulTech 2006). The Site 27 ROD is being prepared separately.

The Site 28 ROD also addresses the two storm sewers owned by the City of Alameda that traverse the site in a north-south orientation (East Storm Sewer and West Storm Sewer). Based on the results of the evaluation documented in the "Technical Memorandum to Supplement the Administrative Record for Site 28, Todd Shipyards," the Navy has determined neither the East nor West Storm Sewer is likely to act as a preferential migration pathway for chemicals associated with Site 28 (SulTech 2007).

## 5.0 SITE CHARACTERISTICS

This section summarizes information on the geology, hydrogeology, and nature and extent of contamination in soil and groundwater at Site 28. A complete discussion of sampling locations and methodologies, chemicals detected at each site, nature and extent of contamination, fate and transport, and evaluation of human and ecological risks is presented in the RI Report (Bechtel 2004).

### 5.1 GEOLOGY

Alameda Point occupies a depression between two uplifted areas; the Berkeley Hills on the east and the San Bruno and other mountains on the San Francisco Peninsula to the west. The depression and uplifted areas are formed by two subparallel, active faults: the San Andreas and the Hayward Faults. The installation and surrounding San Francisco Bay are underlain by 400 to 500 feet of unconsolidated sediments that overlie the metamorphosed sandstone, siltstone, shale, greywacke, and igneous bedrock, which forms the Franciscan Formation (Bechtel 2004).

Surface and near-surface soil at Alameda Point consists of artificial fill emplaced during historical filling of the tidal marshlands and the subtidal area of San Francisco Bay during site development. The fill material consists of sediments that were dredged from the San Francisco Bay and Oakland Inner Harbor and is characterized by sands, clays, and silts dredged from the tidal flats in the region (Bechtel 2004). The unconsolidated sediments that lie beneath the artificial fill consist of the following five units, from top to bottom: (1) the Bay Sediment Unit (BSU), (2) the Merritt Sand Formation, (3) the upper unit of the San Antonio Formation, (4) the lower unit of the San Antonio Formation (Yerba Buena Mud), and (5) the Alameda Formation.

A layer with high organic content, called the “marsh crust,” typically marks the top of the BSU throughout the eastern portion of Alameda Point. The marsh crust is a layer of contaminated sediment that was formed by the discharge of petroleum waste from two gas plants and an oil refinery. This waste migrated over much of the surface of the surrounding marshlands and was deposited through tidal actions under what would later become the Alameda Annex and the eastern portion of Alameda Point. The marsh crust has been identified south and east of Site 28, but has not been identified beneath Site 28 (Bechtel 2004).

Artificial fill at Site 28 extends from the ground surface to depths ranging from 9 feet to 18 feet or more below ground surface (bgs). The BSU was encountered below the fill layer at approximately 9 feet bgs, or 4 to 8 feet below mean sea level, in three borings (28B21, 28SW01, and 28SW04) at the western and southern margins (inland) of Site 28. The BSU is present at more than 18 feet below bgs along the central and eastern shoreline.

## 5.2 HYDROGEOLOGY

Groundwater across Alameda Point is encountered at depths between 3 to 8 feet bgs in the artificial fill. The following hydrogeologic units are present in the unconsolidated sediment column beneath Alameda Point, from top to bottom:

- First water bearing zone (FWBZ)
- Semi-confined aquitard
- Second Water Bearing Zone (SWBZ)
- Yerba Buena Mud Aquitard, a regional aquitard
- Alameda Aquifer

At Site 28, the unconfined FWBZ, is encountered within the Artificial Fill material at 2 to 6 feet bgs and extends to a depth of approximately 18 feet. The upper portion of the BSU acts as an aquitard between the FWBZ and the SWBZ; it varies from approximately 12 to 35 feet thick. The semi-confined SWBZ occupies the lower portion of the BSU, Merritt Sand, and upper unit of the San Antonio Formation and has a maximum thickness of 88 feet. The lower unit of the San Antonio Formation acts as the regional aquitard. The magnitude and direction of the vertical component of groundwater flow between the FWBZ and the SWBZ at Site 28 could not be estimated because no wells are screened in the SWBZ (Bechtel 2004).

Groundwater flow at Alameda Point is highly variable. Seasonal variations are caused by precipitation levels, and diurnal variations are related to tidal cycles. Groundwater flow direction is to the north-northwest towards the Oakland Inner Harbor. The average horizontal gradient is approximately 0.018 foot per foot (ft/ft) in the eastern portion of the site and approximately 0.05 ft/ft in the western portion (Bechtel 2005).

## 5.3 NATURE AND EXTENT OF CONTAMINATION IN SOIL AND GROUNDWATER

The Navy identified activities associated with known or potential chemical releases at Site 28 and conducted environmental investigations to identify and assess the nature and extent of chemicals in soil and groundwater (see Section 2.2). The Navy investigated areas associated with shipbuilding, repair, and maintenance of commercial and military marine vessels, storage and staging of equipment to assess the nature and extent of chemicals in soil and groundwater (Bechtel 2004).

The chemicals detected in soil at Site 28 during the RI include metals, volatile organic compounds (VOC), semivolatile organic compounds (SVOC) including PAHs, pesticides, polychlorinated biphenyls (PCB), and organotin compounds (Table 5-1). Most of the detected chemical concentrations were located in the shoreline area of Site 28 (see Figure 1-3).

According to the Site 28 FS, more than 90 percent of the total risk for Site 28 is due to arsenic, lead and PAHs in soil. In addition, copper in groundwater was identified as a chemical of potential concern (COPC) for aquatic ecological receptors in the adjacent Oakland Inner Harbor. Because many of the infrequently reported COPCs were co-located with other COPCs, a refined list of COPCs was used to evaluate and develop RAOs for soil in the Site 28 FS.

Although the expected reuse of Site 28 is recreational, comparisons to residential PRGs were performed in the RI for screening purposes. Based on the Final RI the identified chemicals of concern were the following:

- Soil (shoreline area)
  - Arsenic
  - Lead
  - PAHs
- Groundwater (shoreline area)
  - Copper

Arsenic was reported above detection limits in 61 of 61 samples and exceeded the federal residential PRG (0.39 mg/kg) and the federal industrial PRG (1.6 mg/kg) in all 61 samples. The maximum reported concentration of arsenic was 5,020 mg/kg.

Lead was reported above detection limits in 61 of 61 samples and exceeded the federal residential PRG (400 mg/kg) in 11 samples and the federal industrial PRG (750 mg/kg) in 5 samples, and California residential PRG (150 mg/kg) in 20 samples. The maximum reported concentration of lead was 1,240 mg/kg.

Three PAHs (benzo[b]fluoranthene, benzo[a]pyrene [B{a}P], and dibenz[a,h]anthracene) were the only organic compounds reported in soil at concentrations exceeding the U.S. EPA residential PRGs for soil in the southern portion of Site 28. Seven PAHs were reported at concentrations exceeding PRGs in soil in the northern portion of Site 28. Benz(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene (B[a]P), dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene were reported at concentrations exceeding the U.S. EPA PRGs for residential soil. Chrysene and benzo(k)fluoranthene were reported at concentrations exceeding the California residential PRGs for soil.

The chemicals detected in groundwater during the three sampling events documented in the Site 28 RI Report (in April, May and June 2002) were metals, VOCs, PAHs, and organotin compounds (Table 5-2) (Bechtel 2004). Groundwater modeling performed during the RI for Site 28 (BEI 2004) indicated that mercury in shoreline groundwater did not represent a potential impact on the adjacent Oakland Inner Harbor. Nickel and zinc were reported in shoreline groundwater at concentrations that are within their respective Alameda Point background ranges.

Copper concentrations in shoreline groundwater were reported above the background range, and the screening-level ERA concluded that the copper concentrations could have the potential to be harmful to benthic organisms in Oakland Inner Harbor sediment near well 28SW03. Groundwater at inland well 28SW04 was shown to be impacted with arsenic above its primary maximum contaminant level (MCL). Table 5-2 lists the VOCs, PAHs, and organotins detected in groundwater during three sampling events conducted in 2002, as documented in the Site 28 RI Report. The table also presents the regulatory standards for comparison. The detected range of (1) VOCs did not exceed the MCLs; (2) PAHs did not exceed the tap water PRGs; and (3) organotins did not exceed the acute CTR criteria.

Arsenic concentrations detected in groundwater from 2002 to 2007 in the inland areas at Site 28 ranged from 250 to 470 µg/L (Table 5-3) (SulTech 2007; ITSI 2006b). Arsenic was not identified in the ERA as a chemical of concern (COC) for ecological receptors at the point of discharge or POE at Site 28 because arsenic concentrations have not exceeded the CTR criterion of 36 µg/L (EPA 2006) in the shoreline wells (28SW01, 28SW02, and 28SW03). In addition, retardation factors and travel times for arsenic in each well were calculated using standard hydrogeological methods and site-specific data for the RI report (Bechtel 2004). The resulting values indicate that the time required for arsenic in groundwater at the inland well (28SW04) to reach Oakland Inner Harbor is between 150 and 400 years. Therefore, migration of arsenic in groundwater from the inland well is minimal. However, arsenic was recommended for further consideration in the Site 28 FS report based on agency concerns with elevated concentrations at inland well 28SW04 (Bechtel 2004). The Navy has conducted a data gap sampling investigation to further define the extent of arsenic contamination in groundwater and to further delineate arsenic concentrations in groundwater as groundwater approaches the shoreline (ITSI 2007). Preliminary results show that the arsenic concentration in groundwater at the newly installed shoreline well (28SW05) does not exceed 10 µg/L. In addition, preliminary data for grab groundwater samples collected from four hydropunch borings indicate a maximum concentration of 12 µg/L. The Navy, in collaboration with the regulatory agencies, has addressed the concern over arsenic in groundwater at Site 28 to ensure protection of human health and the environment.

Copper was detected in groundwater from 2002 to 2007 in inland and shoreline areas at Site 28. Copper concentrations ranged from 1.1 to 210 µg/L (Table 5-4). The Alameda Point background concentration range for copper in groundwater is 1.8 to 27.3 µg/L. Only copper concentrations in shoreline well 28SW03 (40 to 210 µg/L) consistently exceeded the background range. Copper concentrations at shoreline well 28SW01 exceeded background range in one detection (43 µg/L) in 2004. Copper concentrations for inland well 28SW04 and shoreline well 28SW02 have consistently been within background range. The Navy is conducting a data gap sampling investigation to further define the extent of copper contamination in groundwater as groundwater approaches the shoreline (ITSI 2007).

***TABLES***

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**TABLE 5-1: CHEMICALS DETECTED IN SOIL**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Chemical	Frequency of Detection (%)	Detection Limit	Range of Detected Concentrations <sup>1</sup>	EPA Residential PRG <sup>2</sup>	California-Modified Residential PRG <sup>3</sup>	At/Below Background <sup>4</sup> (yes/no)
<b>Metals (mg/kg)</b>						
Aluminum	100	--	1,820 to 25,300	76,000	--	Yes
Antimony	87	0.72 to 22	0.45 to 41.2	31	--	No
Arsenic	100	--	2.0 to 5,020	0.39	--	No
Barium	100	--	17 to 826	5,400	--	Yes
Beryllium	41	0.042 to 1	0.074 to 3.0	150	--	Yes
Cadmium	66	0.040 to 2.5	0.037 to 4.8	37	1.7	Yes
Chromium	100	--	27 to 1,160	210	--	Yes
Chromium, hexavalent	33	--	2.0 to 24	30	--	Yes
Cobalt	100	--	6.2 to 98.9	900	--	Yes
Copper	100	--	19.3 to 6,370	3,100	--	No
Iron	100	--	12,500 to 154,000	23,000	--	No
Lead	100	--	6.7 to 1,240	400	150	No
Manganese	100	--	121 to 1,860	1,800	--	No
Mercury	97	--	0.07 to 29.7	23	--	No
Molybdenum	59	--	0.17 to 3.9	390	--	Yes
Nickel	100	--	27.9 to 1,110	1,600	--	No
Selenium	48	0.46 to 1.6	0.49 to 3.1	390	--	No
Silver	7	--	0.81 to 2.2	390	--	Yes
Thallium	62	--	0.38 to 12.2	5.2	--	No
Vanadium	100	--	19.3 to 770	550	--	Yes
Zinc	100	--	45.9 to 16,300	23,000	--	Yes

**TABLE 5-1: CHEMICALS DETECTED IN SOIL (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Chemical	Frequency of Detection (%)	Detection Limit	Range of Detected Concentrations <sup>1</sup>	EPA Residential PRG <sup>2</sup>	California-Modified Residential PRG <sup>3</sup>	At/Below Background <sup>4</sup> (yes/no)
<b>Volatile Organic Compounds (µg/kg)</b>						
Acetone	18	8 to 500	19 to 920	1,600,000	--	NA
Benzene	5	2 to 17	10 to 11	600	--	NA
2-Butanone	3	8 to 110	50 to 50	7,300,000	--	NA
Carbon disulfide	18	--	2 to 11	360,000	--	NA
Ethylbenzene	5	--	15 to 240	8,900	--	NA
Methylene chloride	10	3 to 41	20 to 45	9,100	--	NA
4-Methyl-2-pentanone	3	8 to 110	19 to 19	790,000	--	NA
Styrene	3	2 to 32	2 to 20	1,700,000	--	NA
Tetrachloroethene	3	2 to 17	34 to 34	1,500	--	NA
Toluene	8	--	1 to 110	520,000	--	NA
Trichloroethene	3	2 to 32	10 to 10	53	--	NA
Trichlorofluoromethane	3	3 to 32	1 to 1	390,000	--	NA
Xylenes, total	8	--	13 to 1,220	270,000	--	NA
<b>Semivolatile Organic Compounds (µg/kg)</b>						
Bis(2-ethylhexyl) phthalate	11	340 to 4,000	37 to 95	35,000	--	NA
Diethyl phthalate	11	--	62 to 1,100	49,000,000	--	NA
Hexachlorobenzene	4	340 to 6,900	170 to 170	300	--	NA
<b>Polycyclic Aromatic Hydrocarbons (µg/kg)</b>						
Acenaphthene	24	7 to 220	42 to 520	3,700,000	--	NA
Acenaphthylene	46	53 to 220	4 to 590	--	--	NA
Anthracene	59	--	9 to 2,300	22,000,000	--	NA

**TABLE 5-1: CHEMICALS DETECTED IN SOIL (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Chemical	Frequency of Detection (%)	Detection Limit	Range of Detected Concentrations <sup>1</sup>	EPA Residential PRG <sup>2</sup>	California-Modified Residential PRG <sup>3</sup>	At/Below Background <sup>4</sup> (yes/no)
<b>Polycyclic Aromatic Hydrocarbons (µg/kg) (Continued)</b>						
Benz(a)anthracene	86	54 to 220	38 to 3,300	620	--	NA
Benzo(b)fluoranthene	95	210 to 210	80 to 6,600	620	--	NA
Benzo(g,h,i)perylene	97	--	69 to 4,800	--	--	NA
Benzo(a)pyrene	92	120 to 210	30 to 4,900	62	--	NA
Chrysene	97	--	51 to 4,500	62,000	3,800	NA
Dibenz(a,h)anthracene	51	53 to 210	16 to 870	62	--	NA
Fluoranthene	86	7 to 220	47 to 5,700	2,300,000	--	NA
Fluorene	32	--	30 to 1,000	2,700,000	--	NA
Indeno(1,2,3-c,d)pyrene	78	53 to 220	30 to 4,000	620	--	NA
2-Methylnaphthalene	35	--	31 to 1,600	--	--	NA
Naphthalene	41	53 to 220	8 to 510	56,000	--	NA
Phenanthrene	78	--	23 to 5,100	--	--	NA
Pyrene	92	--	69 to 5,500	2,300,000	--	NA
<b>Pesticides/Polychlorinated Biphenyls (µg/kg)</b>						
Aldrin	11	1.7 to 130	0.6 to 32	29	--	NA
Alpha-BHC	4	1.7 to 130	0.62 to 1.2	90	--	NA
Gamma-BHC (lindane)	4	1.7 to 130	6.0 to 55	440	--	NA
Alpha-chlordane	23	1.7 to 130	0.79 to 24	1,6005	--	NA
Gama-chlordane	25	1.7 to 130	092 to 210	1,6005	--	NA
4,4'-DDD	34	3.4 to 250	2.1 to 720	2,400	--	NA
4,4'-DDE	10	3.4 to 250	1.4 to 19	1,700	--	NA
4,4'-DDT	38	3.4 to 250	1.9 to 260	1,700	--	NA

**TABLE 5-1: CHEMICALS DETECTED IN SOIL (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Chemical	Frequency of Detection (%)	Detection Limit	Range of Detected Concentrations <sup>1</sup>	EPA Residential PRG <sup>2</sup>	California-Modified Residential PRG <sup>3</sup>	At/Below Background <sup>4</sup> (yes/no)
<b>Pesticides/Polychlorinated Biphenyls (µg/kg) (Continued)</b>						
Dieldrin	26	3.4 to 250	2.6 to 59	30	--	NA
Endosulfan I	2	3.4 to 250	2.7 to 2.7	370,0005	--	NA
Endosulfan II	7	3.4 to 250	1.9 to 4	370,0006	--	NA
Endosulfan sulfate	3	3.4 to 250	4.2 to 8.2	370,0006	--	NA
Endrin	23	3.4 to 250	0.79 to 120	18,000	--	NA
Endrin aldehyde	2	3.4 to 250	23 to 23	18,0007	--	NA
Endrin ketone	48	3.4 to 250	1.3 to 170	18,0007	--	NA
Heptachlor	3	0.26 to 53	2.8 to 25	110	--	NA
Heptachlor epoxide	13	0.32 to 23	1.1 to 18	53	--	NA
Methoxychlor	41	18 to 1,300	6 to 720	310,000	--	NA
Aroclor-1016	3	--	79 to 120	3,900	--	NA
Aroclor-1254	23	16 to 1,200	160 to 2,600	220	--	NA
Aroclor-1260	33	16 to 1,200	14 to 2,300	220	--	NA
<b>Organotin Compounds (µg/kg)</b>						
Dibutyltin	50	26 to 1,000	140 to 3,300	--	--	NA
Monobutyltin	44	26 to 1,000	3.6 to 590	--	--	NA
Tetrabutyltin	8	250 to 3,000	12 to 12	--	--	NA
Tributyltin	46	26 to 1000	12 to 3,100	--	--	NA

**TABLE 5-1: CHEMICALS DETECTED IN SOIL (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Notes:

- 1 Range of detected concentration as reported in the Site 28 Remedial Investigation Report (Bechtel 2004).
- 2 EPA. 2002. Region IX Preliminary Remediation Goals.
- 3 California Environmental Protection Agency. 2002. Toxicity Criteria Database.
- 4 A "yes" indicates the metal in soil at Site 28 is attributed to background.
- 5 PRG for chlordane
- 6 PRG for endosulfan
- 7 PRG for endrin
- Not available

- µg/kg Micrograms per kilogram
- mg/kg Milligrams per kilogram
- DDD Dichlorodiphenyltrichloroethane
- DDE Dichlorodiphenyldichloroethene
- DDT Dichlorodiphenyltrichloroethane
- NA Not applicable

**TABLE 5-2: CHEMICALS DETECTED IN GROUNDWATER IN 2002**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Chemical	Frequency of Detection (%)	Detection Limit	Range of Detected Concentrations <sup>1</sup>	CTR <sup>2</sup> CMC (acute toxicity)	CTR <sup>2</sup> CCC (chronic toxicity)	Federal MCL <sup>3</sup>	California MCL <sup>4</sup>	Federal Tap Water PRG <sup>5</sup>	At/Below Background <sup>6</sup> (yes/no)
<b>Metals (µg/L)</b>									
Aluminum	11	53 to 100	99.1 to 99.1	--	--	1,000	1,000	NA	Yes
Antimony	17	2.4 to 8	5.4 to 8.7	--	--	6	6	NA	No
Arsenic	83	4.3 to 9.2	8.2 to 353	69	36	10	50	NA	No
Barium	100	--	44.5 to 427	--	--	2,000	1,000	NA	Yes
Beryllium	25	--	2.9 to 3.5	--	--	4	4	NA	Yes
Cadmium	8	0.5 to .5	0.52 to 0.52	42	9.3	5	5	NA	Yes
Chromium	33	0.7 to 5	0.74 to 5	--	--	100	50	--	Yes
Chromium, hexavalent	33	5 to 20	5 to 10	1,100	50	--	--	110	Yes
Cobalt	25	--	6 to 7.3	--	--	--	--	730	Yes
Copper	92	--	3.2 to 61.8	4.8	3.1	--	--	1,500	No
Iron	75	--	64.8 to 2,090	--	--	--	--	11,000	No
Manganese	100	--	15.5 to 12,000	--	--	--	--	880	No
Mercury	67	--	0.05 to 0.3	--	0.25--	2	2	--	No
Nickel	75	--	2.1 to 101	74	8.2	--	100	NA	No
Thallium	8	5 to 5.3	5 to 5	--	--	2	2	NA	No
Vanadium	83	--	2 to 49.8	--	--	--	--	260	Yes
Zinc	75	--	3.1 to 144	90	81	--	--	11,000	Yes
<b>Volatile Organic Compounds (µg/L)</b>									
Methyl tertiary butyl ether	25	--	11 to 11	--	--	--	13	NA	NA
Xylenes, total	15	0.5 to 1.1	0.3 to 0.6	--	--	10,000	1,800	NA	NA

**TABLE 5-2: CHEMICALS DETECTED IN GROUNDWATER IN 2002 (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Chemical	Frequency of Detection (%)	Detection Limit	Range of Detected Concentrations <sup>1</sup>	CTR <sup>2</sup> CMC (acute toxicity)	CTR <sup>2</sup> CCC (chronic toxicity)	Federal MCL <sup>3</sup>	California MCL <sup>4</sup>	Federal Tap Water PRG <sup>5</sup>	At/Below Background <sup>6</sup> (yes/no)
<b>Polycyclic Aromatic Hydrocarbons (µg/L)</b>									
Acenaphthene	17	--	0.32 to .053	--	--	--	--	370	NA
Acenaphthylene	8	0.09 to 0.25	0.045 to 0.045	--	--	--	--	--	NA
Anthracene	42	0.09 to 0.25	0.028 to 0.18	--	--	--	--	1,800	NA
Benz(a)anthracene	8	0.09 to 0.25	0.029 to 0.029	--	--	--	--	0.092	NA
Chrysene	17	0.09 to 0.25	0.035 to 0.039	--	--	--	--	9.2	NA
Fluoranthene	25	0.09 to 0.25	0.07 to 0.11	--	--	--	--	1,500	NA
Fluorene	25	0.09 to 0.25	0.21 to 0.32	--	--	--	--	240	NA
2-Methylnaphthalene	17	--	0.32 to 1.7	--	--	--	--	--	NA
Naphthalene	17	--	0.5 to 0.98	--	--	--	--	6.2	NA
Phenanthrene	25	--	0.06 to 0.4	--	--	--	--	--	NA
Pyrene	33	0.09 to 0.25	0.1 to 0.3	--	--	--	--	180	NA
<b>Organotin Compounds (µg/L)</b>									
Dibutyltin	25	0.05 to 0.05	0.027 to 0.027	0.38	0.001	--	--	--	NA
Monobutyltin	13	0.05 to 0.3	0.056 to 0.056	0.38	0.001	--	--	--	NA

- Notes:
- 1 Range of detected concentration as reported in the Site 28 Remedial Investigation Report (Bechtel 2004).
  - 2 40 *Code of Federal Regulations* § 131.38
  - 3 "Lists of Contaminants and Their MCLs" (EPA 2002). Available online at: <http://www.epa.gov/safewater/contaminants/index.html>
  - 4 "Maximum Contaminant Levels" (California Department of Health Services 2002). Available online at: <http://www.dhs.ca.gov/ps/ddwem/chemicals/MCL/regextract.pdf>
  - 5 "Region IX Preliminary Remediation Goals" (EPA 2002).
  - 6 A "yes" indicates the metal in soil at Site 28 is attributed to background.
- Not available  
 µg/L Micrograms per liter  
 CCC Criteria continuing concentration (chronic toxicity)
- CMC Criteria maximum concentration (acute toxicity)  
 CTR California Toxics Rule  
 MCL Maximum contaminant level
- mg/kg Milligrams per liter  
 NA Not applicable  
 PRG Preliminary remediation goal

**TABLE 5-3: ANALYTICAL RESULTS FOR ARSENIC IN GROUNDWATER**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Sampling Date	Shoreline Monitoring Wells			Inland Monitoring Well
	28SW01	28SW02	28SW03	28SW04
April 2002	27.8	27.2	9.2 U	298 <sup>a</sup>
May 2002	27.2	18.7	4.3 U	352 <sup>a</sup>
June 2002	20.0	12.4	8.2	353 <sup>a</sup>
Summer 2004	6.2	1.0 U	1.0 U	420 <sup>a</sup>
Winter 2004	18.0	8.6	6.9	280 <sup>a</sup>
Spring 2005	18.0	19.0	2.9 J	250 <sup>a</sup>
Summer 2005	21.0	33.0	50.0 U	440 <sup>a</sup>
Spring 2006	28.0	31.0 J	13.0 J	350 J <sup>a</sup>
Summer 2006	24.0	14.0	6.4	470 <sup>a</sup>
Fall 2006	21.0	6.9	7.2	430 <sup>a</sup>
Winter 2006	20.0	1.9	6.5	380 <sup>a</sup>
Spring 2007	21.0	8.5	6.2	420 <sup>a</sup>

**Notes:**

All results are presented in micrograms per liter (µg/L).

- a Site concentrations exceeded maximum background concentration (40.7 µg/L) for Alameda Point.
- J Arsenic concentration estimated.
- U The analyte was not reported above the detection limit.

**TABLE 5-4: ANALYTICAL RESULTS FOR COPPER IN GROUNDWATER**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Sampling Date	Monitoring Well Identification			
	28SW01	28SW02	28SW03	28SW04
April 2002	3.2	10.2	40 <sup>a</sup>	19.9
May 2002	5	22.7	57.8 <sup>a</sup>	24.8
June 2002	5.9	7.5	61.8 <sup>a</sup>	30.6 <sup>a</sup>
Summer 2004	43	5.2	93 <sup>a</sup>	10 U
Winter 2004	3.3 J	3.8 J	130 <sup>a</sup>	10 U
Spring 2005	10 U	6.8 J	98 <sup>a</sup>	10 U
Summer 2005	10 U	6.9 J	210 <sup>a</sup>	10 U
Spring 2006	5.7 J	10	120 <sup>a</sup>	1.1 J
Summer 2006	10 U	10 U	130 <sup>a</sup>	10 U
Fall 2006	2.1 J	3.9 J	120 <sup>a</sup>	0.35 J
Winter 2006	2.4	0.72	95 <sup>a</sup>	2.0
Spring 2007	21	0.28 J	86 <sup>a</sup>	0.59 J

**Notes:**

All results are presented in micrograms per liter (µg/L).

a Site concentrations exceeded maximum background concentration (27.3 µg/L) for Alameda Point.

J Copper concentration estimated.

U The analyte was not reported above the detection limit.

## **6.0 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES**

This section discusses (1) current and reasonably anticipated future land uses and (2) current and potential groundwater and surface water uses at Site 28. This information was incorporated into the development of exposure scenarios for the HHRA.

### **6.1 LAND USES**

According to the Alameda Point General Plan Amendment, the established planned land use for Site 28 includes areas designated for parks and public open space; general industry; and public/institutional/school (Figure 6-1) (City of Alameda 2003). According to the Alameda County Planning Department, planned reuse of Site 28 is public facility (ferry terminal and parking lot), not a school facility. Currently, Site 28 is used as a dog park and a partially paved parking lot. According to the Alameda Point General Plan Amendment (City of Alameda 2003), potential redevelopment of designated open space areas includes parks, open public space, promenades, and a trail system. The anticipated future land use for Site 28 is recreational, and will most likely include a dog park and bicycle trails (Table 6-1).

### **6.2 GROUNDWATER USES**

Groundwater beneath the central portions of Alameda Point (including Site 28) is not currently used for drinking water, irrigation, or industrial supply. Drinking water is supplied to Alameda Point by the East Bay Municipal Utilities District.

According to the Basin Plan for the San Francisco Bay, prepared by the San Francisco Bay Regional Water Quality Control Board (Water Board 1995), and the East Bay Plain Groundwater Basin Beneficial Use Evaluation Report (Water Board 1999) groundwater at Alameda Point has the following existing or potential beneficial uses:

1. Agricultural water supply
2. Industrial service and process supply
3. Freshwater replenishment to surface water
4. Municipal and domestic water supply

Groundwater beneath Site 28 has little potential as a source of municipal or domestic water supply based upon the discussion that follows. The State of California (State) and EPA have different TDS and well yield criteria for evaluating groundwater for use as a potential municipal or domestic water supply source, as summarized below.

Under SWRCB Resolution No. 88-63 (SWRCB 1988), all surface water and groundwater of the State are considered to be suitable or potentially suitable for municipal or domestic water supply if the water meets the following criteria:

- TDS content is less than 3,000 milligrams per liter (mg/L) and the water is reasonably expected to supply a public water system, and
- There is no contamination, either by natural processes or by human activity (unrelated to a specific pollution incident), that cannot be reasonably treated for domestic use using either best management practices or best economically achievable treatment practices, and
- The water source provides sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day (gpd).

Federal groundwater classification criteria identify three classes of groundwater (EPA 1988). Class I groundwater is an irreplaceable source of drinking water or is ecologically vital. Class II groundwater is a current or potential source of drinking water that has other beneficial uses. Class III groundwater is not a potential source of drinking water and is of limited beneficial use. EPA considers groundwater to be Class I or Class II if the following criteria are met:

- The TDS content concentration is less than 10,000 mg/L and the water is reasonably expected to supply a public water system, and
- There is no groundwater contaminated by naturally occurring conditions, or by the effect of broad-scale human activity (that is unrelated to a specific activity), that cannot be cleaned up using treatment methods reasonably employed in public water-supply systems, and
- The water source provides sufficient water to supply a single well capable of producing an average, sustained yield of 150 gpd.

Based on the federal criteria for TDS and yield, groundwater within the FWBZ was determined to be a potential source of drinking water (EPA Class II Aquifer) (Tetra Tech 2000a). Based on the same federal criteria, groundwater in the SWBZ was determined to be a Class III aquifer (not a potential source of drinking water) because TDS concentrations exceed 10,000 mg/L.

A beneficial use evaluation conducted for the purposes of CERCLA cleanup decisions considered both state and federal criteria as well as other site-specific factors that determined groundwater in the central region of Alameda Point is unlikely to be used as a potential drinking water source (Tetra Tech 2000a). These factors include:

- The safe yield and maximum pumping rate are inadequate to support common uses of water, as well as multiple domestic users.

- Existing saltwater intrusion of the FWBZ based on groundwater flow from the San Francisco Bay, which would be accelerated by groundwater extraction.
- No supply wells currently exist within or down gradient of contaminated groundwater.
- State and county limitations on well construction because of a thin, vulnerable aquifer.

Based on the evaluation of groundwater beneficial uses at Alameda Point, the Water Board concurs with the Navy that groundwater in the FWBZ beneath Site 28 is not a likely source of drinking water because of the potential for salt water intrusion, the absence of conduits to the Alameda Aquifer, the absence of nearby supply wells, and the planned implementation of ICs to restrict extraction of the groundwater. In a letter dated October 23, 2006, the Water Board stated:

“We, therefore, will grant an exemption to State Board Resolution 88-63 criteria for the area currently bounded by IR Site 28 and is no more than 200 linear feet from the Oakland Inner Harbor sea water intrusion protective border. This exemption, and the 200 ft sea water intrusion protective border, is site specific and will not be applicable to other areas at Site 28 beyond the 200 foot border or at other inland sites at Alameda Point. While this exemption considers the groundwater in the FWBZ below Site 28 to not be a potential drinking water source, there is a need to ensure that all the other beneficial uses of the FWBZ and the Oakland Inner Harbor are protected for current and potential beneficial uses. The beneficial uses of the groundwater include agricultural water supply, estuarine and marine habitat, and freshwater replenishment in the Oakland Inner Harbor.” (Water Board 2006)

In addition, according to the Basin Plan and as identified in the Water Board letter cited above, the groundwater has other existing or potential beneficial uses. Other potential beneficial uses of groundwater include industrial supply and agricultural use (crop irrigation or livestock watering).

Use for crop watering or industrial uses would require costly pretreatment for TDS. Site 28 is a shoreline site, and groundwater samples from most of the monitoring wells (three out of four) would classify the groundwater underlying Site 28 as Class III, based on TDS. The inland well has a maximum TDS concentration of 2,300 mg/L and the maximum pumping rate from this inland well is 2,600 gallons per day, which could meet the beneficial use criterion for sustainable well yield. However, pumping this inland well may not be sustainable because the pumping would draw saltwater into this well due to the short distance (200 feet) to the bay (Navy 2003). The high TDS and the likely intrusion of saltwater minimize the potential use of the FWBZ underlying Site 28 as a future source of drinking, industrial, or agricultural water supply.

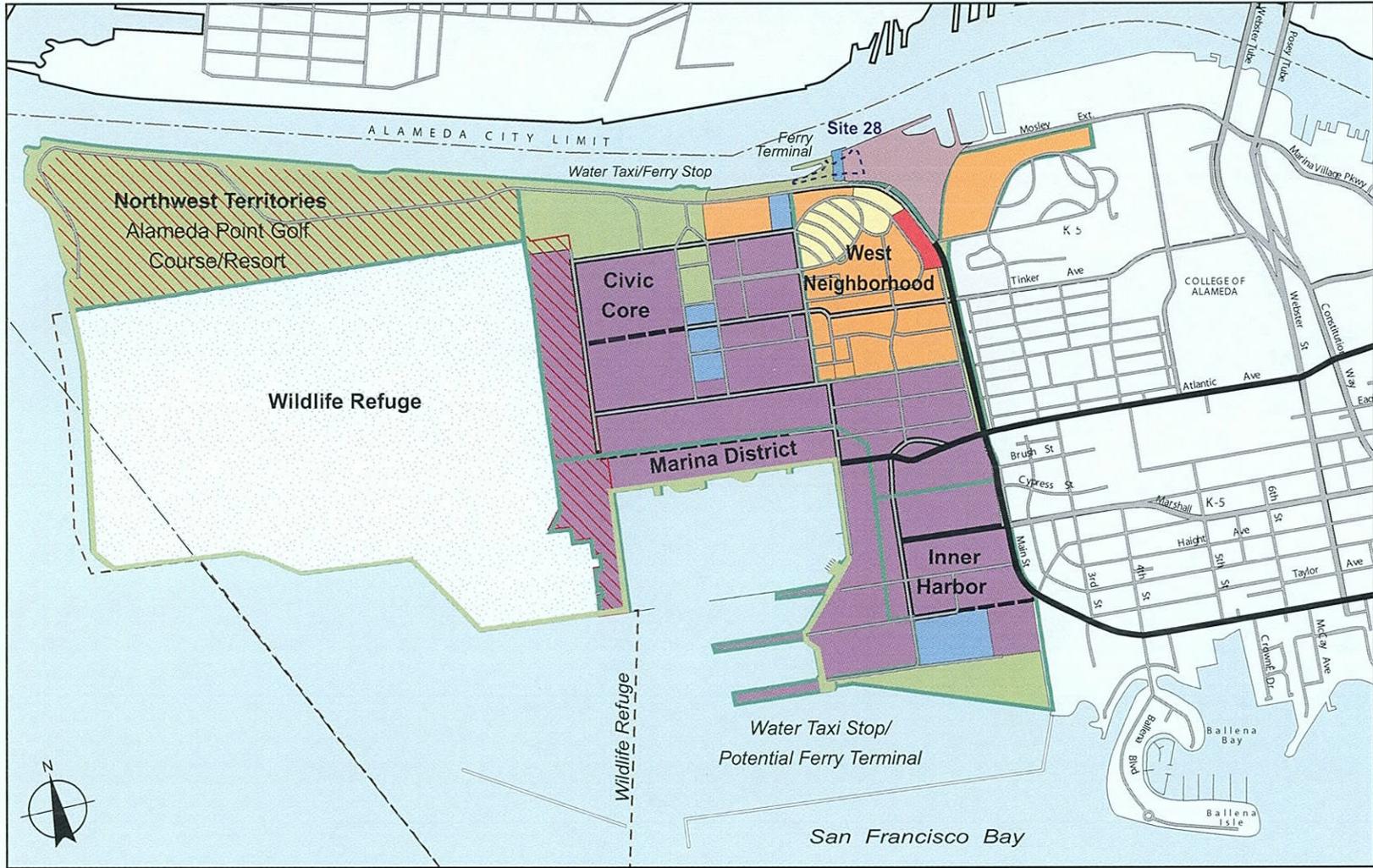
### 6.3

### SURFACE WATER USES

Site 28 does not have naturally occurring surface streams or ponds. The northern edge of Site 28 borders the Oakland Inner Harbor. Groundwater flows toward the Oakland Inner Harbor and discharges to surface water. The Basin Plan for the San Francisco Bay, prepared by the Water Board designates the beneficial use of freshwater replenishment on a site-by-site basis (Water Board 1995). According to the Basin Plan and the East Bay Plain Groundwater Basin Beneficial Use Evaluation Report groundwater at Alameda Point has the potential beneficial use of freshwater replenishment to surface water (Water Board 1999). The beneficial use of the Oakland Inner Harbor is as an estuarine habitat. Aquatic receptors are protected in the Oakland Inner Harbor by ensuring that the water quality objectives established in the *Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California* (Federal Register, Volume 65, Number 97, 18 May 2000) are not exceeded in surface water at the POE for all groundwater COCs.

***FIGURES***

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- |                             |                                      |                       |
|-----------------------------|--------------------------------------|-----------------------|
| Low-Density Residential     | Public/Institutional/School (grades) | Major Street          |
| Medium-Density Residential  | Alameda Point Mixed Use              | Proposed Major Street |
| Neighborhood Business       | Parks and Public Open Space          | Minor Street          |
| General Industry            | Open Space/Habitat                   | Planning Subarea      |
| Wildlife Refuge Impact Area |                                      |                       |

Notes:  
 Boundaries are approximate.  
 According to the Alameda County Planning Department, planned use of Site 28 is public facility (ferry terminal and parking lot), not a school.

Reference:  
 City of Alameda, 1991 General Plan as amended 2005, Chapter 9: Figure 9-2



**Alameda Point, Alameda, CA**  
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

**FIGURE 6-1**

**ALAMEDA POINT REUSE MAP**

Record of Decision for  
 Installation Restoration Site 28, Todd Shipyards

***TABLES***

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**TABLE 6-1: CURRENT AND ANTICIPATED LAND USES**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

<b>Site</b>	<b>Current Land Uses or Land Use Prior to Closure</b>	<b>Anticipated Future Land Use</b>	<b>Reuse Parcel No.</b>
28	Recreational	Open Space/Recreational	EDC-1

Note:

EDC Economic development conveyance

## **7.0 SUMMARY OF SITE RISKS**

As part of the RI Report, an HHRA and an ERA were conducted for Site 28 using data collected during the 2002 RI (Bechtel 2004). The objective of the risk assessments was to estimate the risks to human and ecological receptors from exposure to chemicals in soil and groundwater. The risk estimates provide the basis for taking action and identify the COCs and exposure pathways that should be addressed by the remedial action. The HHRA was performed as a baseline assessment, and the ERA was performed as a screening-level assessment (Bechtel 2004).

A conceptual site model (see Figure 7-1) was presented in the RI Report and used to support the risk assessments by identifying the potential receptors and exposure pathways associated with each of the sources of contaminants at Site 28, which included shipbuilding, repair, and maintenance of commercial and military marine vessels; and storage and staging of equipment. The conceptual site model and the detailed approach and results of the Site 28 risk assessments are presented in the "Final Remedial Investigation Report, IR Site 28, Todd Shipyards" (Bechtel 2004). Section 7.1 and Section 7.2 summarize the approach used and results for the HHRA and ERA.

### **7.1 HUMAN HEALTH RISK ASSESSMENT APPROACH**

The HHRA conducted at Site 28 identified COPCs in soil and groundwater, evaluated exposure scenarios based on possible future land uses, assessed toxicity, and characterized cancer and noncancer health risks based on conservative assumptions. Details of the HHRA methodology are provided in Section 6.2 and Appendix J of the RI Report for Site 28 (Bechtel 2004). The HHRA approach and the results are discussed below.

#### **7.1.1 Identification of COPCs**

The methodology used to identify COPCs and evaluate risk is consistent with the "Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Part A and Part B" (EPA 1989, 1991), and supporting documents and guidelines published by the California Environmental Protection Agency ([Cal/EPA] 1996). All chemicals reported in at least one sample, except for the essential human nutrients (calcium, magnesium, potassium, and sodium), were included as COPCs.

Soil data was aggregated in depth intervals of 0 to 6 feet bgs for future residential receptors and construction workers to represent the vadose zone or depth of groundwater, and 0 to 2 feet bgs for occupational workers and recreational users to represent surface soil. Migration of COPCs in soil into indoor air was evaluated from 0 to 6 feet bgs for all exposure pathways (Bechtel 2004). The data were independently validated and detection limits were considered adequate for use in the risk assessment.

## **7.1.2 Exposure Assessment**

An exposure assessment identifies the populations at potential risk and the mechanisms by which members of those populations could be exposed to COPCs in each medium. It is also a process by which the chemical concentrations at the exposure point and the chemical doses are calculated.

Future reuse plans include open space for recreational uses. Future residential, recreational, occupational, and construction worker exposure scenarios were identified for evaluation in the HHRA (Bechtel 2004), as shown in Table 7-1. The residential exposure scenario is considered to be the most conservative and least likely scenario at the site. The exposure assumptions for each of these scenarios are summarized below.

### **7.1.2.1 Residential Scenario**

Potential future residents (children and adults) are assumed to be exposed to COPCs in soil from 0 to 6 feet bgs (Bechtel 2004). The residential receptor was assumed to live on the site for 30 years. The residential scenario also assumes that water used in the home would come from a private well that draws water from the FWBZ beneath the site. This is a conservative assumption since, as described in Section 5.2, groundwater beneath the central portions of Alameda Point (including Site 28) is not currently used for drinking water and is exempted as a municipal supply (beneficial use) for portions of Alameda Point within 200 feet of the shoreline (Water Board 2003). As a result, groundwater at Site 28 is not reasonably expected to serve as a municipal water supply.

Potential exposure pathways for soil include incidental ingestion of soil, dermal contact with soil, inhalation of particulates from soil, inhalation of VOCs in indoor air, and ingestion of homegrown produce (Bechtel 2004). Potential exposure pathways for domestic use of groundwater include ingestion of groundwater, inhalation and dermal contact with groundwater while showering, and inhalation of vapors. These two residential exposure pathways were initially evaluated in the HHRA presented in the RI report. However, further evaluations concluded that they do not represent a significant potential for human exposure since the future site use is recreational.

### **7.1.2.2 Recreational Scenario**

Potential future recreational users (children and adults) are assumed to be exposed to COPCs in soil from 0 to 2 feet bgs (Bechtel 2004). Potential exposure pathways for soil include incidental ingestion of soil, dermal contact with soil, inhalation of particulates from soil, and inhalation of VOCs in ambient air (Bechtel 2004). The recreational receptor was assumed to be present at the site for one hour per day, 350 days per year, over 6 years (Bechtel 2004). The groundwater exposure pathway for the recreational receptor is incomplete. The calculation of risks from lead in soil was based on the assumption that the recreational child would use the site between 2 and 5 days per week (SulTech 2007).

### **7.1.2.3 Occupational Scenario**

If a site is redeveloped for commercial business, the individuals most likely exposed would be owners and employees of the businesses. Under the occupational scenario, COPCs in the upper 2 feet of soil are considered to be available. Potential soil exposure pathways include incidental soil ingestion, dermal contact with soil, inhalation of particulates from soil, and inhalation of VOCs in indoor air. The occupational receptor was assumed to use the site for 8 hours per day, 250 days per year, for 25 years (Bechtel 2004). Groundwater exposure pathways are considered incomplete for the occupational scenario.

### **7.1.2.4 Construction Worker Scenario**

Under the construction worker scenario, COPCs in soil from 0 to 6 feet bgs are assumed to be available to an adult worker (Bechtel 2004). Potential exposure pathways include incidental soil ingestion, dermal contact with soil, inhalation of particulates from soil, inhalation of vapors from soil, and inhalation of vapors in ambient air. Groundwater pathways are considered to be limited or incomplete for the construction worker. Although construction workers may have transient dermal contact with groundwater, this exposure was considered insignificant due to the very short duration and limited extent expected. The construction worker was assumed to use the site for 8 hours per day, 20 days a year for 7 years (Bechtel 2004).

## **7.1.3 Toxicity Assessment**

The toxicity assessment focused on the toxicity of COPCs at Site 28. Qualitative and quantitative toxicity values and EPA- and DTSC-derived toxicity values were gathered for all Site 28 COPCs, and assessments using EPA- and DTSC-derived toxicity values were prepared (dual tracking) (Bechtel 2004). Detailed toxicity profiles prepared by the Agency for Toxic Substance and Disease Registry were reviewed (Bechtel 2004). Sources of EPA toxicity values included EPA Region 9 PRGs (EPA 2002a) and are confirmed by Integrated Risk Information System (IRIS) (EPA 2002b) and Health Effects Assessment Summary Tables (HEAST) (EPA 1997b). DTSC toxicity values developed by the Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA) were also used in the risk assessment (Cal/EPA 2002).

IRIS is a computerized EPA database containing verified toxicity values and up-to-date human health toxicological and EPA regulatory information for most commonly used chemicals. HEAST is a source of nonverified provisional toxicity information that was used when toxicity information was not available from IRIS. The IRIS database and HEAST were also searched for toxicity criteria not listed in the EPA Region 9 PRG table (EPA 2002a). Cancer and noncancer toxicity values for some chemicals are available from OEHHA. These values are sometimes identical to EPA values. OEHHA toxicity values were only used in risk calculations based on DTSC assumptions.

Exposures to lead in soil were evaluated in the HHRA using Cal/EPA's Lead Risk Assessment Spreadsheet Version 7 (LeadSpread 7) to calculate site-specific PRGs for lead for the resident child (DTSC 1999). The "Technical Memorandum to Supplement the Administrative Record for

IR Site 28, Todd Shipyards” presented a revised assessment based on the recreational child user on site in a range of 2 days per week to 5 days per week (SulTech 2007).

#### 7.1.4 Risk Characterization

The final step in the HHRA is the characterization of potential risks associated with exposure to detected chemicals. Risk characterization combines the exposure and toxicity assessments to produce quantitative estimates of risk from COPCs. Chemicals might present non-cancer health effects in addition to cancer risks. Therefore, the potential for both types of effects are evaluated. Non-cancer health hazards and cancer risks are characterized separately, as described below.

It is important to note that the non-cancer hazard index (HI) is estimated differently than lifetime cancer risk. Non-cancer effects manifest over a specific time period, and once the exposure period is over, the hazard has also passed (that is, no latency is assumed). A non-cancer HI of 1 or less is set by the EPA as protective of non-cancer health hazards (EPA 1991).

Excess lifetime cancer risks are probabilities generally expressed in scientific notation (for example,  $1 \times 10^{-6}$ ). An excess lifetime cancer risk of  $1 \times 10^{-6}$  indicates that, as a plausible upper bound, an individual has a one in a million probability of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site. The exposure conditions that are reasonably expected to occur at the site, as defined by the EPA, are termed the “reasonable maximum exposure” (EPA 1989). To assist with the characterization of cancer risks, a federally established risk management range was developed to protect human health and help risk managers determine whether site risks are significant enough to warrant cleanup. Guidelines for managing cancer risks are promulgated in the NCP (Tit. 40 CFR 300.430[e][2][i][A][2]). According to these regulations, when an excess cancer risk is above  $10^{-4}$ , action is generally warranted, and when excess cancer risks are within the risk management range from  $10^{-6}$  to  $10^{-4}$ , site-specific factors are considered when making decisions about whether action is required.

Table 7-2 presents the total cancer risk and non-cancer HI for the resident, recreational user, occupational worker, and construction worker at Site 28. Based on all exposure pathways for Site 28, total cancer risks, which include risk from background metals, calculated for the occupational worker and recreational user were within the risk management range at  $2 \times 10^{-5}$ . The total cancer risk for construction workers at Site 28 was also within the risk management range at  $5 \times 10^{-5}$ .

The non-cancer HI for the occupational worker was below 1, the non-cancer HI for the recreational user was equal to 1, and the construction worker non-cancer HI was 2 (Bechtel 2004).

A conservative cancer risk estimate was calculated for a resident and was based on the ingestion of homegrown produce and the domestic use of groundwater. The total cancer risk calculated for a resident exceeded the risk management range and the non-cancer HI was above 1. Most of this risk is based on the ingestion of homegrown produce and domestic use of groundwater pathways.

Although these pathways were evaluated in the HHRA and presented in the RI Report, there is a high level of uncertainty associated with the homegrown produce pathway, and the residential use of groundwater is hypothetical and unlikely to occur in the future (Bechtel 2004). Consequently, these pathways were later considered incomplete.

Lead was evaluated separately at Site 28 to establish a remediation goal based on a conservative exposure of 5 days per week and a more realistic exposure of 2 days per week. The remediation goal is bounded by the range of the more conservative 5-day and the more realistic 2-day recreational exposure calculations and is considered protective of recreational visitors and occupational workers (SulTech 2007).

#### **7.1.4.1 Chemicals of Concern**

Cancer and noncancer COCs were identified for Site 28 based upon planned future reuse. The cancer COCs for the occupational and recreational receptors included arsenic and PAHs in soil through the ingestion and dermal contact pathways (Bechtel 2005). In addition, lead is a non cancer COC for soil for the occupational and recreational scenarios. For the recreational scenario, it is likely the calculated risk overestimates any actual risk under current exposure conditions of land use as a dog park. Cancer risk drivers for the recreational and occupational scenario include arsenic, lead, VOCs (trichloroethene), PAHs, pesticides (aldrin and dieldrin), and PCBs in soil through the ingestion pathway, and arsenic in groundwater through the ingestion pathway (Bechtel 2004). VOCs, pesticides (aldrin and dieldrin), and PCBs in soil were considered within the risk management range for the occupational and recreational user scenarios (Bechtel 2005) and are not addressed by this ROD. Arsenic, lead and PAHs are addressed by this ROD.

#### **7.1.4.2 Incremental Risk**

“Incremental risk” is the additional risk created by man-made sources in an area that already has risk from naturally occurring sources (background). Metals are natural components of the earth’s crust and can present risks at background concentrations. Some of these natural metals are carcinogenic and some are systemic toxicants that have non-cancer health effects, such as arsenic, which can pose both cancer and non-cancer risks. Human-caused release of a metal that is present at background concentrations increases the risk. The incremental risk for a site is estimated by subtracting the risk created from background metals concentrations from the total site risk.

To determine which metals in soil and groundwater were detected at concentrations greater than background, the background data set was statistically compared with a representative sample of analytical results for Site 28 (Bechtel 2004). For soil, samples were selected from the area designated as the pink area (runway area and central portion) to be representative of background conditions for Site 28 because the pink area is located on the northern margin of the central portion of Alameda Point. The risk estimates for soil presented in Table 7-3 include arsenic, and a separate evaluation determined risk from elevated concentrations of lead. Cadmium, while detected at concentrations exceeding residential PRGs in soil, did not exceed Alameda background concentrations, therefore does not present an incremental risk. Chromium and mercury detections did not consistently exceed PRGs and Alameda Point background

concentrations, and therefore, do not present incremental risk. Arsenic and lead were the metals present in soil at concentrations that present an incremental risk and, therefore, require consideration when evaluating the need for a remedial action at Site 28.

## 7.2 SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT APPROACH

The screening-level ERA conducted for Site 28 identified chemicals of potential ecological concern (COPEC) in soil and groundwater, evaluated exposure scenarios based on possible future land uses, assessed toxicity, and characterized potential risks. Details of the ERA methodology are provided in Section 5.3 and Appendix K of the RI Report for Site 28 (Bechtel 2004).

Because of the limited habitat at Site 28, site-specific ecological sampling to support a baseline ERA was not feasible. Also, future land use, which is open space/recreational, would not result in additional habitat and it is unlikely ecological receptors would use the site in any significant manner. Therefore, a screening-level ERA was conducted for Site 28, which is Tier 1 of the Navy policy for conducting ERAs (Navy 1999, 2001) and is consistent with EPA guidance for screening-level and baseline ERAs (EPA 1997a). The screening-level ERA approach and results are discussed below.

The screening-level ERA uses existing data and was intended to provide a conservative estimate. The primary objective is to determine whether complete exposure pathways exist for soil and groundwater and to estimate risk from chemicals through these complete exposure pathways.

The following potentially complete exposure pathways were identified for exposure of terrestrial receptors to soil: direct contact, inhalation, incidental soil ingestion, and ingestion of food items that have absorbed site chemicals (Bechtel 2004). Direct contact and inhalation exposure for terrestrial receptors were not evaluated in the ERA.

Groundwater beneath Site 28 flows toward the Oakland Inner Harbor, therefore, exposure of aquatic organisms to groundwater at the Site 28 shoreline interface was considered a potential pathway (Bechtel 2004). Aquatic organism exposures may include direct contact, ingestion of water, and ingestion of food items that have absorbed chemicals from Site 28 groundwater.

Unlike the HHRA, which evaluates only one species, the ERA evaluates multiple species with different degrees of exposure and toxicological responses. The following representative receptors, which are birds and mammals of the major terrestrial trophic levels, were identified in the ERA: Deer mouse (*Peromyscus maniculatus*), California ground squirrel (*Citellus beecheyi*), Alameda song sparrow (*Melospiza melodia pusillula*), American robin (*Turdus migratorius*), and red-tailed hawk (*Buteo jamaicensis*). The following aquatic representative receptors were identified in the ERA: Harbor seal (*Phoca vitulina*), California brown pelican (*Pelecanus occidentalis californicus*), California least tern (*Sternula antillarum browni*), and the Western snowy plover (*Charadrius alexandrinusnivosus*) (Bechtel 2004).

Initial results of the screening-level ERA indicated several inorganic and organic chemicals in soil and groundwater pose potential unacceptable ecological risk to terrestrial wildlife, aquatic

wildlife, and aquatic life. Further analysis resulted in refined risk estimates indicating potentially unacceptable ecological risk to terrestrial wildlife receptors from soil COPCs. However, risk to terrestrial receptors is overestimated based on the current and future use for the area (parking lot, open space, and dog park). Future land use plans are not likely to create suitable habitat for ecological receptors.

The refined risk estimates indicated potential unacceptable risk to aquatic life from exposure to copper in surface water at the POE (Bechtel 2004). Based on the elevated copper concentrations in groundwater and the potential for contamination to exceed the remediation goal at the POE, a remedial action is necessary to protect aquatic life.

### **7.3 POINT OF DEPARTURE**

The NCP at 40 CFR § 300.430(d) calls for a site-specific baseline risk assessment, as appropriate, to characterize the current and potential threats to human health and the environment. The primary purpose of the baseline risk assessment is to provide an understanding of the actual and potential risks to human health and the environment and any uncertainties associated with the risk assessment (EPA 1991b). The results of the risk assessment are used to establish the basis for taking a remedial action (EPA 1991b). Generally, where the baseline risk assessment indicates that a cumulative site risk exceeds an excess lifetime cancer risk of  $10^{-4}$ , action is warranted (EPA 1991b). For sites where the cumulative site risk to an individual is less than  $10^{-4}$  for both the current and future land use, action generally is not warranted (EPA 1991b).

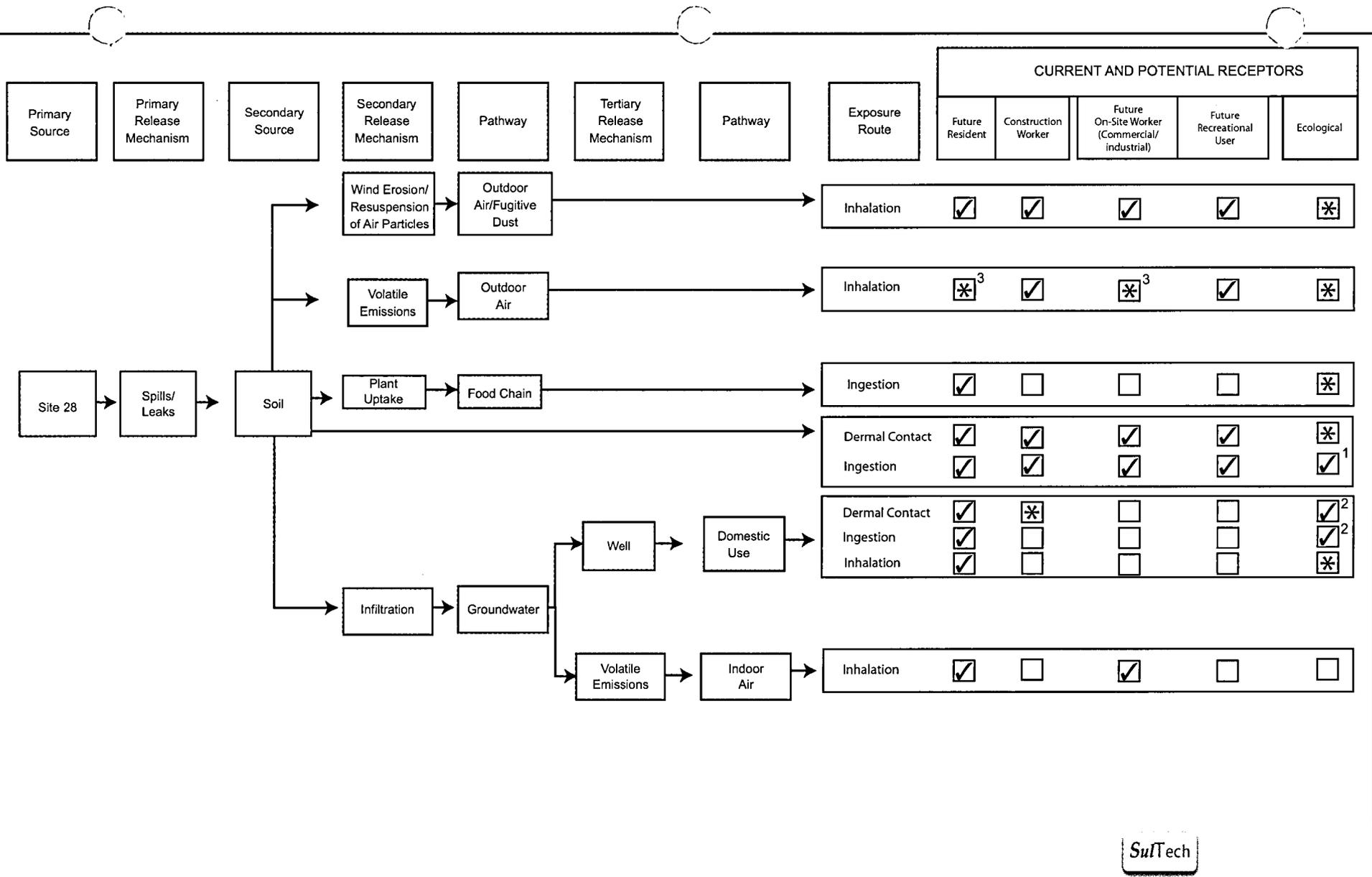
Once a decision is made that the risks posed by the CERCLA releases warrant a response action, the NCP at 40 CFR § 300.430(e)(2)(i)(A)(2) states that “(t)he  $10^{-6}$  risk level shall be used for the point of departure for determining remediation goals for alternatives when applicable or relevant and appropriate requirements (ARAR) are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure.”

40 CFR § 300.430(e)(2)(i)(A)(3) sets forth a number of factors to consider when establishing remediation goals in the context of the risk management range. “Preliminary remediation goals for carcinogens are set at a  $10^{-6}$  excess cancer risk as a point of departure, but may be revised to a different risk level within the acceptable risk range based on the consideration of appropriate factors including but not limited to exposure factors, uncertainty, and technical limitations.”

There is a high level of confidence that the risk assessment results, including the exposure factors and uncertainty analysis, provide an adequate, even conservative, representation of site conditions and can be used to support decisions that the risks within the risk management range are protective of human health.

***FIGURES***

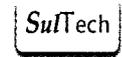
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Notes:

- <sup>1</sup> Ingestion of soil and food items by terrestrial receptors.
- <sup>2</sup> Assumes groundwater discharges to bay; direct contact with aquatic organisms, ingestion of food items by birds and mammals.
- <sup>3</sup> Exposure due to vapors in outdoor air is lower than to those in indoor air and is evaluated only if the risk associated with vapors in outdoor air exceeds  $1 \times 10^{-6}$ .

- ☐ Incomplete pathway
- ☒ Complete exposure pathway, not considered a significant source of risk
- ☑ Potentially complete pathway, exposure quantified



Alameda Point, Alameda, CA  
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**FIGURE 7-1**  
**SITE 28**  
**CONCEPTUAL SITE MODEL**

Record of Decision for  
Installation Restoration Site 28, Todd Shipyards

**TABLES**

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**TABLE 7-1: EXPOSURE SCENARIOS FOR THE HUMAN HEALTH RISK ASSESSMENT**  
 Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Site	Exposure Setting				Proposed Future Land Use
	Residential	Occupational	Construction Worker	Recreational	
28	✓	✓	✓	✓	Open space, Recreational

**TABLE 7-2: SUMMARY OF SITE 28 HUMAN HEALTH RISK ASSESSMENT RESULTS**  
Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

<b>Exposure Scenario</b>	<b>Cancer Risk</b>	<b>Non-Cancer Hazard Index</b>
Residential	$1 \times 10^{-2}$	305
Recreational User	$2 \times 10^{-5}$	1
Occupational	$2 \times 10^{-5}$	0.6
Construction Worker	$5 \times 10^{-5}$	2

**TABLE 7-3: SUMMARY OF SITE 28 RISK BY PATHWAY AS PRESENTED IN THE REMEDIAL INVESTIGATION REPORT**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

<b>Exposure Pathway</b>	<b>Cancer Risk</b>	<b>Noncancer Hazard Index</b>
<b>Residential</b>		
Ingestion of soil	$2 \times 10^{-3}$	38
Dermal contact with soil	$2 \times 10^{-4}$	4
Inhalation of particulates	$3 \times 10^{-6}$	0.1
Inhalation of indoor air from soil	$1 \times 10^{-6}$	0.7
Inhalation of indoor air from groundwater	$2 \times 10^{-9}$	0.004
<b>Soil Contact and Air Subtotal</b>	<b><math>2 \times 10^{-3}</math></b>	<b>43</b>
Ingestion of groundwater	$8 \times 10^{-3}$	114
Dermal contact with groundwater while showering	$5 \times 10^{-5}$	0.8
Inhalation of groundwater while showering	$8 \times 10^{-3}$	0.03
<b>Residential Use of Groundwater Subtotal</b>	<b><math>8 \times 10^{-3}</math></b>	<b>115</b>
Ingestion of homegrown produce	$2 \times 10^{-3}$	147
<b>Total:</b>	<b><math>1 \times 10^{-2}</math></b>	<b>305</b>
<b>Recreational</b>		
Ingestion of soil	$2 \times 10^{-6}$	0.3
Dermal contact with soil	$1 \times 10^{-5}$	0.7
Inhalation of particulates	$7 \times 10^{-8}$	0.004
Inhalation of outdoor air from soil	$6 \times 10^{-6}$	0.08
Inhalation of outdoor air from groundwater	$8 \times 10^{-12}$	0.00001
<b>Total:</b>	<b><math>2 \times 10^{-5}</math></b>	<b>1</b>
<b>Occupational</b>		
Ingestion of soil	$1 \times 10^{-5}$	0.5
Dermal contact with soil	$7 \times 10^{-6}$	0.1
Inhalation of particulates	$2 \times 10^{-7}$	0.01
Inhalation of indoor air from soil	$9 \times 10^{-8}$	0.01
Inhalation of indoor air from groundwater	$8 \times 10^{-11}$	0.00008
<b>Total:</b>	<b><math>2 \times 10^{-5}</math></b>	<b>0.6</b>
<b>Construction</b>		
Ingestion of soil	$3 \times 10^{-5}$	0.8
Dermal contact with soil	$8 \times 10^{-6}$	0.2
Inhalation of particulates	$1 \times 10^{-5}$	1
Inhalation of outdoor air from soil	$5 \times 10^{-7}$	0.02
Inhalation of outdoor air from groundwater	$7 \times 10^{-13}$	0.000002
<b>Total:</b>	<b><math>5 \times 10^{-5}</math></b>	<b>2</b>

## 8.0 REMEDIAL ACTION OBJECTIVES

This section summarizes the RAOs identified for Site 28 based on the future site use and the results of the HHRA. RAOs provide the foundation used to develop the remedial alternatives. An RAO is a statement that contains an objective for the protection of one or more specific receptors from exposure to one or more specific chemicals in a specific medium (soil, groundwater, or air) at a site. Reasonably anticipated future use of the site is an important consideration in selecting the RAOs and, thus, the remedy for the site.

A remediation goal is a chemical concentration that provides a quantitative means of identifying areas for potential remedial action, screening the types of appropriate technologies, and assessing the potential of each remedial alternative to achieve the RAO.

The following RAOs were developed for Site 28:

- Minimize the potential risk of exposure (through ingestion or dermal contact) of a recreational visitor or occupational worker to unacceptable levels of arsenic, lead, and PAHs in soil
- Either prevent exposure (through ingestion or dermal contact) of future residents to unacceptable levels of arsenic, lead, and PAHs in soil or prohibit residential use of the property
- Prevent potential exposure of aquatic offshore receptors (in the Oakland Inner Harbor) to copper in surface water at the POE exceeding the CTR continuous concentration criterion of 3.1 µg/L

The remediation goals to address soil contamination are listed below with an explanation of their basis in the following text:

- Arsenic: 9.1 mg/kg (soil in the shoreline area)
- Lead: 800 mg/kg (soil in the shoreline area)
- PAHs: 2.1 mg/kg (soil in the shoreline area)

The Navy will use these remediation goals along with the reasonably anticipated land use to establish the extent of the soil excavation at Site 28. Table 8-1 presents the concentration distribution of COCs in soil at Site 28 including those soil samples which exceed the remediation goals.

The remediation goal for arsenic in soil is based on background concentrations at Alameda Point and will be limited to the extent of the designated areas within the shoreline defined in the Final FS (Bechtel 2005).

The remediation goal for lead (800 mg/kg) as determined using the DTSC Leadsread model is protective of children who would use the site for recreation (SulTech 2007).

PAHs were evaluated based on a B(a)P equivalent concentration, which normalizes the toxicity of each carcinogenic PAH relative to the toxicity of B(a)P. B(a)P is the only carcinogenic PAH for which the EPA publishes a cancer slope factor. Therefore, the remediation goal for PAHs in soil is a B(a)P equivalent concentration of 2.1 milligrams per kilogram (mg/kg) based on the EPA Region 9 industrial 2004 PRG adjusted for a  $1 \times 10^{-5}$  risk (EPA 2004).

The remediation goals to address groundwater contamination are as follows:

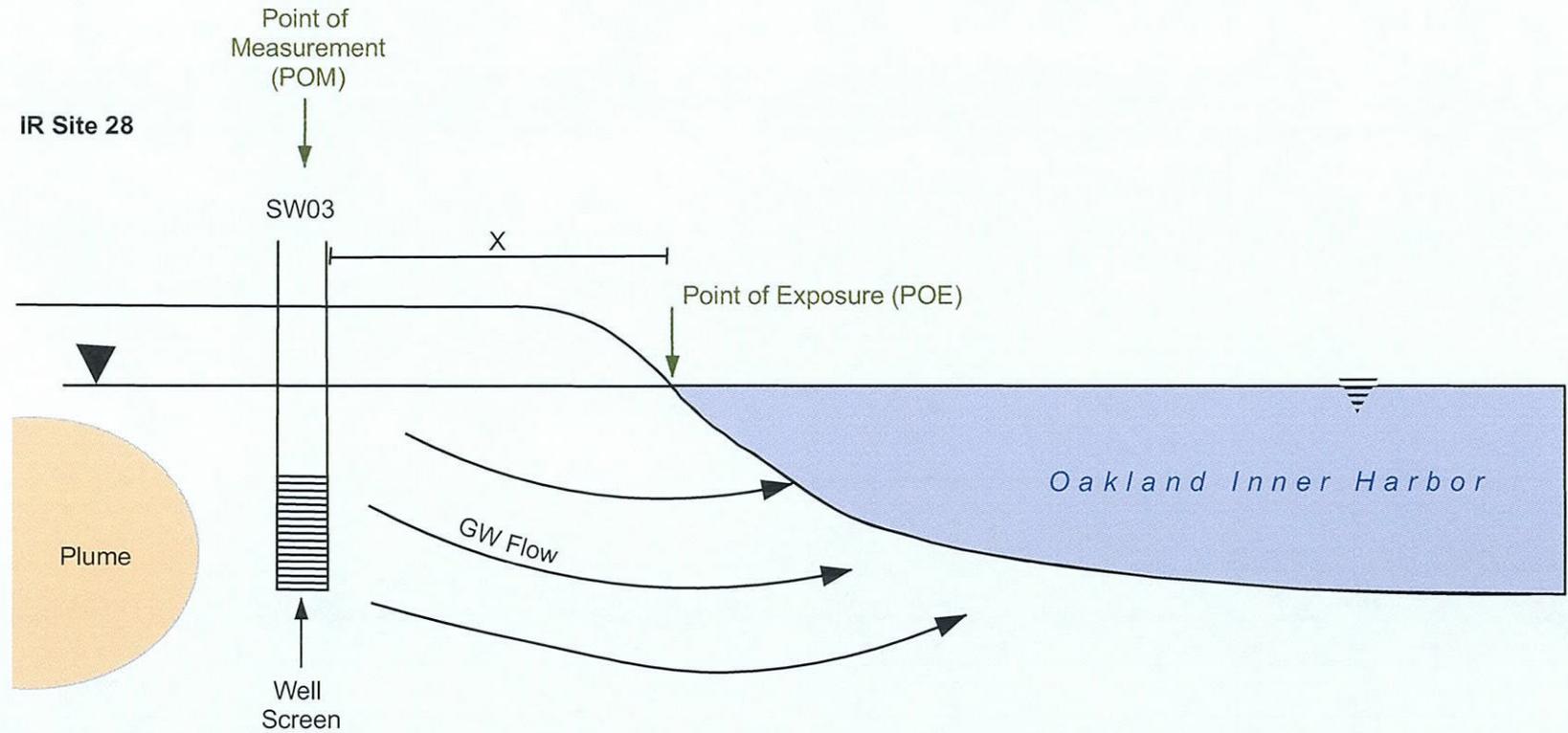
- Copper: 1,500 mg/kg (soil in the shoreline area)
- Copper: 3.1 µg/L (surface water at the POE)

A remediation goal for copper in soil of 1,500 mg/kg was developed in the FS based on the modeling performed to support groundwater remedial alternative development. The excavation of targeted copper soil source areas augments the proposed groundwater remedy presented in the Final Proposed Plan. The remediation goal for copper in surface water at the POE is derived from numerical water quality criteria for priority pollutants promulgated in the CTR (40 CFR § 131.38) and implemented in the Enclosed Bays and Estuaries Plan (SWRCB 2000) as part of the Basin Plan (Water Board 1995). This remediation goal is based on the CTR criterion continuous concentration (CCC) for the protection of aquatic life in saltwater. Because the CCC of 3.1 µg/L for copper is a surface water criterion, it does not apply to groundwater. Therefore, the remediation goal of 3.1 µg/L for copper in surface water will be applied at the POE where groundwater discharges from Site 28 to the Oakland Inner Harbor (see Figure 8-1). The remediation goal for copper (3.1 µg/L) in surface water is the final remediation goal at the POE. Site 28 RAOs will be achieved through remediation of soil and groundwater in the shoreline area and monitoring of groundwater in the inland area.

Arsenic was not identified as a COC for ecological receptors at the point of discharge or POE in the Oakland Inner Harbor. The maximum arsenic concentrations detected in groundwater from April 2002 to May 2006 in the inland areas at Site 28 ranged from 250 to 470 µg/L. Arsenic in the groundwater at the site (inland and shoreline) does not exceed 2,000 µg/L (the agricultural beneficial use criteria) and therefore is not a COC for groundwater. However, additional groundwater monitoring will be conducted to confirm that arsenic concentrations do not exceed 2,000 µg/L in the inland area groundwater. In addition, the Navy has conducted a data gap sampling investigation to further define the extent of copper and arsenic contamination in groundwater and to further delineate arsenic concentrations in groundwater as it approaches the shoreline. Preliminary results show that the arsenic concentration in groundwater at the newly installed shoreline well (28SW05) and in grab groundwater samples collected from four hydropunch borings does not exceed 12 µg/L. The Navy, in collaboration with the regulatory agencies, has addressed the concern over arsenic in groundwater at Site 28 to ensure protection of human health and the environment.

***FIGURES***

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▼ Groundwater Table

▤ Surface Water



**Alameda Point, Alameda, CA**  
 U.S. Department of the Navy, BRAC PMO West, San Diego, CA

**FIGURE 8-1**  
**SITE 28 CONCEPTUAL GROUNDWATER**  
**MODEL FOR COPPER**

Record of Decision for  
 Installation Restoration Site 28, Todd Shipyards

***TABLES***

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**TABLE 8-1: SITE 28 CHEMICALS OF CONCERN IN SOIL**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

COC	Soil Sample Location	Concentration of COC in soil (mg/kg)								
		0 ft bgs	0.5 ft bgs	2 ft bgs	2.5 ft bgs	3 ft bgs	3.5 ft bgs	4 ft bgs	4.5 ft bgs	5 ft bgs
Arsenic <sup>1</sup>	28B11	-	-	-	<b>10.2</b>	-	-	-	-	-
	28B12	-	-	-	-	<b>23</b>	-	-	-	-
	28B13	-	<b>9.6</b>	-	-	-	-	-	-	-
	28B14	-	-	-	-	-	-	<b>115</b>	-	-
	28B15	-	<b>10.1</b>	-	-	-	<b>16</b>	-	-	-
	28B16	-	<b>22.6</b>	<b>117</b>	-	-	-	-	-	-
	28B23	-	-	-	-	-	-	-	<b>5020</b>	-
	28B25	-	<b>10</b>	-	-	-	-	-	-	-
	28B28	-	-	-	-	-	-	-	-	<b>19.6</b>
	215-002-001	-	-	-	-	<b>17.4</b>	-	-	-	-
	215-0034	-	-	-	-	-	<b>15.2</b>	-	-	-
PAHs <sup>2</sup>	28B01	0.28	0.58	1.4	-	-	-	0.3	-	-
	28B02	0.12	0.51	<b>7.4</b>	-	-	-	NA	-	-
	28B03	0.25	<b>3.7</b>	<b>2.2</b>	-	-	-	<b>2.4</b>	-	-
	28B04	2.4	0.66	0.33	-	-	-	0.076	-	-
	28B05	0.22	0.87	0.56	-	-	-	NA	-	-
	28B06	0.19	0.49	0.094	-	-	-	0.29	-	-
	28B07	<b>2.1</b>	0.97	0.78	-	-	-	0.33	-	-
	28B08	0.38	0.26	0.26	-	-	-	NA	-	-
	28B09	0.37	0.43	0.35	-	-	-	0.62	-	-
	28B10	1.3	<b>2.3</b>	1.0	-	-	-	2.0	-	-

**TABLE 8-1: SITE 28 CHEMICALS OF CONCERN IN SOIL (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

COC	Soil Sample Location	Concentration of COC in soil (mg/kg)								
		0 ft bgs	0.5 ft bgs	2 ft bgs	2.5 ft bgs	3 ft bgs	3.5 ft bgs	4 ft bgs	4.5 ft bgs	5 ft bgs
Lead <sup>1</sup>	28B11	-	227	-	571	-	-	-	-	-
	28B12	-	-	-	-	533	-	-	-	-
	28B13	-	716	-	-	-	181	-	-	-
	28B14	-	-	-	-	-	-	315	-	-
	28B15	-	243	-	-	-	261	-	-	-
	28B16	-	395	<b>991</b>	-	-	-	-	-	-
	28B19	-	-	-	-	-	-	-	<b>802</b>	-
	28B21	-	171	-	-	-	-	-	-	-
	28B23	-	-	-	-	-	-	-	<b>1240</b>	-
	28B25	-	529	-	-	-	-	-	-	-
	28B26	-	190	-	-	-	-	-	-	184
	28B28	-	-	-	-	-	-	-	-	<b>811</b>
	215-002-001	-	-	-	-	491	-	-	-	-
	215-002-002	-	-	-	-	241	-	-	-	-
215-0028/215-0059	-	-	-	-	<b>911</b>	-	-	-	-	

Notes:

Concentrations shown in bold equal or exceed preliminary remediation goals presented in the Final Feasibility Study.

- 1 Arsenic and lead concentration values taken from Figure 2-17 of the Final Feasibility Study (Bechtel 2005).
- 2 PAH concentration values as benzo(a)pyrene equivalent taken from Figure 2-14 of the Final Feasibility Study (Bechtel 2005).

bgs Below ground surface  
 COC Chemicals of concern  
 ft. Foot  
 mg/kg Milligrams per kilogram  
 PAH Polycyclic aromatic hydrocarbon



## 9.0 DESCRIPTION OF REMEDIAL ALTERNATIVES

Remedial alternatives for Site 28 were developed in accordance with the requirements identified in CERCLA, as amended by SARA of 1986, 42 USC § 9601, et seq. and the NCP. Seven alternatives for soil and five alternatives for groundwater were developed at Site 28 (Bechtel 2005). Options were developed for two of the alternatives in soil, Alternatives Soil S4 and S6. The evaluation of the technologies and the screening process that led to the development of these alternatives is presented in Section 5.1 of the FS Report for Site 28 (Bechtel 2005).

The soil alternatives, which are described in Section 9.1, include:

- Alternative S1 – No Action
- Alternative S2 – Institutional Controls (ICs)
- Alternative S3 – Soil/Synthetic Membrane Cover with ICs
- Alternative S4 – Removal and Disposal of Soil (Option a achieves unrestricted site use, and Option b includes ICs restricting residential site use)
- Alternative S5 – Asphalt Cover with ICs
- Alternative S6 – Phytoremediation and ICs
- Alternative S7 – *Ex-Situ* Solidification/Stabilization of Excavated Soil (Option a achieves unrestricted site use and Option b achieves recreational and occupational site uses)

The groundwater alternatives for inland and shoreline areas, which are described in Section 9.2, include:

- Alternative GW1 – No Action
- Alternative GW2 – Monitoring and ICs (inland area and shoreline area)
- Alternative GW3 – Monitoring and ICs (inland area)/Soil Source Removal with Monitoring and ICs (shoreline area)
- Alternative GW4 (Alternative GW3 in the Final Site 28 Proposed Plan dated March 2006) – Monitoring and ICs (inland area)/Metals Immobilization Compound (MIC) with Monitoring and ICs (shoreline area); (this alternative was enhanced during the ROD stage to include hot-spot excavation)
- Alternative GW5 (Alternative GW4 in the Final Site 28 Proposed Plan dated March 2006): Monitoring and ICs (inland area)/Soil Source Removal and MIC with Monitoring and ICs (shoreline area)

Common elements among Alternatives GW4 (Alternative GW3 in the Final Site 28 Proposed Plan, dated March 2006) and GW5 (Alternative GW4 in the Final Site 28 Proposed Plan, dated March 2006) include MIC, ICs and monitoring. MIC promotes the production of copper complexes that strongly bind to the soil particles, which immobilizes copper in the subsurface and renders it immobile within the groundwater system. ICs would be used to restrict uses of and activities at Site 28. Monitoring would be conducted to document concentrations and the effectiveness of the MIC.

## **9.1 REMEDIAL ALTERNATIVES FOR SOIL**

Seven remedial alternatives for soil were developed and screened, and six were retained for detailed analysis, Alternative S5, asphalt cover, was not retained for detailed analysis because it was judged to be less effective than Alternative S3, the soil/synthetic membrane cover. The following sections discuss the seven alternatives.

### **9.1.1 Alternative S1 – No Action**

In this alternative, no actions are performed. This alternative provides a baseline for comparing all other alternatives. There is no cost associated with this alternative.

### **9.1.2 Alternative S2 – ICs**

Under Alternative S2, the Navy would implement ICs at Site 28. ICs are legal and administrative mechanisms used to implement land use and access restrictions to limit exposure of future landowner(s) and /or user(s) of the property to hazardous substances. The general objective of ICs for soil is to prevent human exposure to soil posing unacceptable risk until the Navy, EPA, DTSC, and the San Francisco Bay Regional Water Quality Control Board concur that there is no longer an unacceptable risk from such exposure. When implemented alongside remedial action, ICs maintain the integrity of the remedial action until remediation is complete and the remediation goals have been achieved. Monitoring and inspections are conducted to assure that ICs are followed.

Under this alternative, ICs would be used at Site 28 to restrict land use, subsurface activities below 2 feet bgs, and offsite reuse of excavated soil. The effectiveness of ICs would be reviewed every 5 years, ongoing, as required by CERCLA. For cost estimating purposes, the duration of this alternative is estimated at 30 years.

### **9.1.3 Alternative S3 – Soil/Synthetic Membrane Cover with ICs**

Under Alternative S3, a cover would be placed over surface soils to prevent exposure to contaminated soils. The cover design would combine a soil and synthetic membrane layer in a cap and include considerations for utilities and site drainage. A post-construction maintenance program for the cap would be implemented to monitor performance and effectiveness. Annual reports would be prepared and reviewed periodically.

Alternative S3 incorporates the same ICs as Alternative S2, and would include an additional requirement to maintain the integrity of the cover (Bechtel 2005). For cost estimating purposes, the duration of this alternative is estimated at 30 years, and reviews would be performed every 5 years as required by CERCLA.

#### **9.1.4 Alternative S4a – Removal and Disposal of Soil to Achieve Unrestricted Site Use (0 to 6 feet bgs)**

Alternative S4a would include removal and disposal of contaminated soils from 0 to 6 feet bgs to allow for unrestricted future use at Site 28. Prior to removal, a sampling program would be implemented to identify soils containing COCs at concentrations exceeding remediation goals. Contaminated soils would be excavated and disposed of at an off-site, permitted landfill. This alternative would eliminate the need for long-term monitoring and ICs. The duration of this alternative would be the performance period for the remedial action.

#### **9.1.5 Alternative S4b – Removal and Disposal of Soil to Achieve RAOs with ICs (0 to 2 feet bgs)**

Alternative S4b would include removal and disposal of contaminated soils from 0 to 2 feet bgs within the designated areas within the shoreline defined in the Final FS (Bechtel 2005), coupled with the implementation of ICs as described in Section 9.1.3. Excavation of soils from 0 to 2 feet bgs is protective of the planned future recreational reuse of Site 28. Excavation would be limited to the designated areas within the shoreline. Concentrations of COCs detected outside of these shoreline areas have not exceeded remediation goals in soils from 0 to 2 feet bgs. Soils below 2 feet bgs that contain COCs at concentrations exceeding remediation goals will be addressed by implementing ICs restricting residential land use. Contaminated soils would be characterized and disposed of at an off-site, permitted landfill. For cost estimating purposes, the duration of this alternative is estimated at 30 years, and reviews would be performed every 5 years as required by CERCLA.

#### **9.1.6 Alternative S5 – Asphalt Cover with ICs**

Alternative S5 (not presented in the Proposed Plan) is similar to Alternative S3, and also proposes a cover be placed over surface soils to prevent exposure to contaminated soils. Under this alternative, an asphalt cover will be designed and constructed over areas of contaminated soil. A post-construction maintenance program for the cap would be implemented to monitor performance and effectiveness. Annual reports would be prepared and reviewed periodically.

Alternative S5 incorporates the same ICs as Section 9.1.3. Guidelines would be implemented for health and safety to work in the vicinity of the cap and to prevent damage to the cover (Bechtel 2005). For cost estimating purposes, the duration of this alternative is estimated at 30 years, and reviews would be performed every 5 years as required by CERCLA.

### **9.1.7 Alternative S6 - Phytoremediation and ICs**

Phytoremediation is a process that uses plants to remove metals and, with limited success, PAHs from soil and groundwater. Heavy metals are removed from soil by phytoextraction. The metals are absorbed through the roots and concentrated in the plant material. Typically, the metal concentrations in the plant are less than in the contaminated soil. Several growth/harvest cycles may be necessary to achieve the remediation goals.

Alternative S6 (Alternative S5 in the Final Site 28 Proposed Plan dated March 2006) would use plants to uptake arsenic, lead, and PAHs in soil to achieve the remediation goals for Site 28. The remedial design would evaluate and identify the appropriate plants; specify pre-planting sampling requirements; planting and harvesting frequencies; and disposal options for the harvested plants. The planting area would be restricted and fenced for approximately 3 years. Assuming one planting per growing season, the duration of the phytoremediation is assumed to be 5 years. After 3 years, ICs as described in Section 9.1.2 would be implemented. For cost estimating purposes, the duration of the ICs is estimated to be 30 years, and reviews would be performed every 5 years as required by CERCLA.

### **9.1.8 Alternative S7a – Ex-Situ Solidification/Stabilization of Excavated Soil (0 to 6 feet bgs)**

Alternative S7a (Alternative S6a in the Final Site 28 Proposed Plan dated March 2006) is similar to Alternative S4a in that contaminated soils would be excavated to a depth of 6 feet bgs; however, excavated soils would be treated on site to meet land disposal restrictions. Treatment would include bioremediation to treat PAHs and stabilization to immobilize metals. A sampling program would be developed to identify soils containing COCs at concentrations exceeding remediation goals prior to removal. Contaminated soil would be excavated and treated. The treated soils would be transported off site for disposal at a permitted non-RCRA hazardous waste disposal facility. This alternative would achieve unrestricted reuse at Site 28, therefore no ICs would be required.

### **9.1.9 Alternative S7b – Ex-Situ Solidification/Stabilization of Excavated Soil (0 to 2 feet bgs)**

Alternative S7b (Alternative S6b in the Final Site 28 Proposed Plan dated March 2006) is similar to Alternative S4b in that contaminated soils would be excavated to a depth of 2 feet bgs; however, excavated soils would be treated on site to meet land disposal restrictions. Treatment would include bioremediation to treat PAHs and stabilization to immobilize metals. A sampling program would be developed during the remedial design to identify soils containing COCs at concentrations exceeding remediation goals. Contaminated soil would be excavated and treated. Treated soils would be transported off site for disposal at a permitted non-RCRA hazardous waste disposal facility. Once remedial action objectives are met, ICs as described in Section 9.1.2 would be implemented. For cost estimating purposes, the duration of this alternative is estimated at 30 years, and reviews would be performed every 5 years as required by CERCLA.

## **9.2 REMEDIAL ALTERNATIVES FOR GROUNDWATER**

Groundwater at Site 28 was characterized in the RI Report as two distinct areas of contamination: the shoreline area and the inland area (Bechtel 2004). Groundwater beneath the shoreline near well 28SW03 contains copper concentrations that may pose a risk to offshore receptors in the Oakland Inner Harbor (see Figure 1-3). Inland groundwater contains arsenic concentrations below the beneficial use criteria of 2,000 µg/L. Five remedial alternatives for groundwater were developed and screened, and four were retained for detailed analysis. Alternative GW 3 was eliminated from further analysis because it was judged to be less effective than Alternative GW5 (Alternative GW4 in the Final Site 28 Proposed Plan, dated March 2006). The following sections discuss the five alternatives evaluated for groundwater.

### **9.2.1 Alternative GW1 – No Action**

Under this alternative, no actions are performed. This alternative provides a baseline for comparing all other alternatives. No cost is associated with this alternative (Bechtel 2005).

### **9.2.2 Alternative GW2 – Monitoring and ICs/Monitoring and ICs (Shoreline and Inland Areas)**

Alternative GW2 consists of groundwater monitoring in the shoreline and inland areas to evaluate natural attenuation of the COCs. ICs would be implemented to restrict the use of groundwater. This alternative requires the implementation of a long-term monitoring program to track the variations in groundwater conditions, document the reduction of concentrations over time, and verify the stability of the plume.

Under Alternative GW2, monitoring at the shoreline would assess the status of copper-impacted groundwater; the attenuation of copper in groundwater over time; and the potential for copper contaminated groundwater to discharge to the surface water in the Oakland Inner Harbor. A groundwater model would determine the trigger level for copper at the point of measurement (POM) (within a monitoring well) to ensure that the remediation goal for copper is not exceeded at the POE (discharge to surface water) (SulTech 2007). For cost estimating purposes, the duration of this alternative is estimated at 30 years, and reviews would be performed every 5 years as required by CERCLA (Bechtel 2005).

### **9.2.3 Alternative GW3 – Monitoring and ICs/Soil Source Removal with Monitoring and ICs**

Alternative GW3 involves targeted excavation of copper-impacted soils along the shoreline to reduce copper concentrations in shoreline groundwater. Similar to Alternative GW2, Alternative GW3 also includes monitoring natural attenuation of COCs and ICs restricting use of groundwater in the inland area. This alternative requires the implementation of a long-term monitoring program to track the variations in groundwater conditions, document the reduction of concentrations over time, and verify the stability of the plume.

This alternative also includes targeted excavation of copper-impacted soils in the shoreline area to minimize dissolution of copper (mobilization) into groundwater during precipitation events. A remediation goal for copper in soil of 1,500 mg/kg was developed for Alternative GW3 (and Alternative GW5 [Alternative GW4 in the Final Site 28 Proposed Plan, dated March 2006], which similarly evaluated source removal). Excavated soil would be characterized and disposed of off-site. A monitoring program would be implemented after the targeted excavation of the impacted soil to document post-remediation copper concentrations in groundwater. For cost estimating purposes, the duration of this alternative is estimated at 30 years, and reviews would be performed every 5 years as required by CERCLA (Bechtel 2005).

#### **9.2.4 Alternative GW4 - Monitoring and ICs/Passive MIC Zone with Monitoring and ICs**

Alternative GW4 (Alternative GW3 in the Final Site 28 Proposed Plan dated March 2006) would use a passive groundwater treatment zone to address dissolved copper in groundwater beneath the shoreline. Similar to Alternative GW2, Alternative GW4 (Alternative GW3 in the Final Site 28 Proposed Plan, dated March 2006) includes a groundwater monitoring program and the implementation of ICs as described in Section 9.2.2 (Alternative GW4 was enhanced during the ROD stage to include hot-spot excavation). Monitoring would be the same as discussed in Alternatives GW2 and GW3.

The use of MIC to treat subsurface soils to immobilize copper is an example of a passive groundwater treatment zone. During remedial design, the appropriate MIC would be identified and a monitoring program would be developed. Trigger levels for copper would be developed at the POM and used to monitor the necessity for repeated applications. It was estimated that two to three applications would be required during the course of 2 to 5 years. For cost estimating purposes, the duration of this alternative is estimated at 30 years, and reviews would be performed every 5 years as required by CERCLA (Bechtel 2005).

#### **9.2.5 Alternative GW5 – Monitoring and ICs/Soil Source Removal and MIC with Monitoring and ICs**

Alternative GW5 (Alternative GW4 in the Final Site 28 Proposed Plan dated March 2006) involves the targeted excavation of soil to 6 feet bgs along the shoreline to remove copper-impacted soils, and implementation of a passive treatment system to immobilize copper in the saturated zone. Similar to Alternative GW2, Alternative GW5 (Alternative GW4 in the Final Site 28 Proposed Plan, dated March 2006) includes a groundwater monitoring program and the implementation of ICs as described in Section 9.2.2. Monitoring would be the same as discussed in Alternatives GW2 and GW3.

The remedial design phase would identify the sampling requirement to delineate copper concentrations along the shoreline and the location of the targeted excavation. Excavated soil would be characterized and appropriately disposed of off-site at a permitted landfill. For cost estimating purposes, the duration of this alternative is estimated at 30 years, and reviews would be performed every 5 years as required by CERCLA (Bechtel 2005).

## 10.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

This section summarizes the comparative analysis that was conducted to evaluate the relative performance of each remedial alternative in relation to the nine criteria outlined in CERCLA § 121(b), as amended. The purpose of the comparative analysis is to identify the relative advantages and disadvantages of each alternative. The evaluation criteria are based on requirements promulgated in the NCP. As stated in the NCP (40 CFR § 300.430[f]), the evaluation criteria are arranged in a hierarchical manner that is then used to select a remedy for the site based on the categories presented below.

- Threshold criteria
  - Overall protection of human health and the environment
  - Compliance with ARARs
  
- Primary balancing criteria
  - Long-term effectiveness and permanence
  - Reduction of toxicity, mobility, or volume through treatment
  - Short-term effectiveness
  - Implementability
  - Cost-effectiveness
  
- Modifying criteria
  - State acceptance
  - Community acceptance

### 10.1 COMPARISON OF SOIL ALTERNATIVES

This section presents the results of the comparative analysis of the retained soil alternatives. Table 10-1 summarizes the comparative analysis of soil remedial alternatives against the five primary balancing NCP criteria. Soil Alternative S5 – Asphalt Cover was eliminated from detailed analysis because it was judged less effective than Soil Alternative S3 – Soil Synthetic Membrane Cover.

#### 10.1.1 Overall Protection of Human Health and the Environment

Alternative S1 would not be protective of human health and the environment because it does not offer remedial measures to reduce risks associated with site contamination. Alternative S2 would provide sufficient protection of human health and the environment. Alternatives S3, S4a, S4b, S6, S7a, and S7b would meet the threshold criterion for overall protection of human health and the environment and provide a broad range of active remediation alternatives for

consideration, and thus potentially providing a higher level of protection of human health and the environment.

### **10.1.2 Compliance with ARARs**

ARARs are not applicable to Alternative S1. There are no identified federal ARARs for Alternative S2, but state ARARS would apply for ICs. Alternatives S3, S4a, S4b, S6, S7a, and S7b would meet the threshold criterion of compliance with ARARs.

### **10.1.3 Long-Term Effectiveness and Permanence**

Alternative S1 – The “No Action” alternative was not rated in the FS. This alternative would receive a low rating because it does not restrict future site uses or take any measures to prevent exposure to contaminated soil. Therefore, this alternative is not effective in meeting the RAOs in the short or long term.

The long-term effectiveness of Alternatives S2, S4b, S6, and S7b was rated medium because each would be effective in limiting access or exposure to contaminated soil. However, the effectiveness of ICs to restrict land use until the contamination has naturally degraded would depend on continued adherence and proper implementation for an undefined period.

S3 was rated high because the soil/synthetic membrane cover would effectively prevent exposure to contaminated soil and is permanent. ICs would be required to maintain the membrane’s integrity. S7a was rated high because the remedy would remove the contaminated soil and treat it onsite eliminating the need to dispose of the soil as a hazardous waste. Alternative S4a is considered to be the most effective and permanent over the long term because it would remove contaminated soil to depths within 6 feet, achieving unrestricted future use criteria.

### **10.1.4 Reduction of Toxicity, Mobility, or Volume through Treatment**

Alternative S1 was not rated in the FS, but would rate low, as does Alternative S2, because there is no active treatment to remove or reduce COCs in soil. Alternative S3 was rated low because it would not remove or reduce concentrations of COCs in soil, but provide a cover that would reduce the risk of exposure to wind- borne dust and reduce the mobility of contaminants in soil resulting from infiltration and dissolution into groundwater during precipitation events.

Alternatives S4b and S7b were rated medium in reduction of toxicity, mobility or volume through treatment because a smaller amount of contaminated soils would be removed than under Alternatives S4a and S7a, and these alternatives do not provide for unrestricted reuse. Treatment of soil is expected at an off-site facility. Therefore, although this treatment does not meet the technical definition of the criterion for on-site treatment, it was used to differentiate between alternatives in the FS.

Alternatives S4a and S7a were rated high in reduction of toxicity, mobility or volume through treatment because contaminated soils would be removed to a depth of 6 feet bgs to achieve

unrestricted reuse at the site. Alternative S6 also was rated high because it uses plant stocks to reduce COC concentrations in soils, thereby reducing risks.

### **10.1.5 Short-Term Effectiveness**

Alternative S1 was not rated in the FS, but would rate low in short-term effectiveness because no action would be taken to reduce the toxicity of COCs. Alternatives S4a and S7a also rated low because large-scale excavation would result in significantly more effects to the community, such as trucking of soil, than the other alternatives.

Alternatives S3, S4b, and S7b rated medium in short-term effectiveness because of the potential impacts to the community, such as trucking. They are expected to significantly reduce exposure to contaminated soil while having a minimal effect on site workers, the surrounding community, or the environment during implementation. Alternative S6 also rated medium because, although no significant truck trips are required through the community, the time required to achieve the remediation goals is uncertain.

Alternative S2 was rated high in short-term effectiveness because it is expected to control risks to human health to within acceptable limits while not affecting site workers, the surrounding community, or the environment during implementation.

### **10.1.6 Implementability**

Alternative S1 is not rated in the Site 28 FS report but would rate high in implementability because this alternative does not require an engineered remediation measure or the administration of ICs.

Alternatives S3 and S4b were rated medium in implementability. Cap design and implementation pose engineering challenges, and long-term maintenance is required. Excavation under Alternative S4b is moderately implementable because of limited soil volume.

Alternatives S4a, S6, S7a, and S7b rated low in implementability. Large-scale excavation and/or on-site treatment under Alternatives S4a, S7a, and S7b are more complex to implement than other alternatives. Alternative S6 rated low in implementability because the technical feasibility of phytoremediation in a saline environment is not known, large-scale phytoremediation applications are still limited, and bench- and pilot-scale testing are needed to determine effectiveness.

Alternative S2 was rated high because the development and implementation of ICs is a straightforward process which is readily implementable.

### **10.1.7 Cost**

Alternative S1 was not rated in the FS, but would rate high because it has no cost associated with it. Alternative S2, ICs, received a high rating because it has the lowest cost associated with

implementation. Alternatives S3, S4b, S6, and S7b rated medium because they had the next lowest costs to S2. Alternatives S4a and S7a were rated low. Table 10-2 provides a cost comparison for each soil alternative.

### **10.1.8 State Acceptance**

The State of California concurs with the Navy's selected alternative for soil (Alternative S4b).

### **10.1.9 Community Acceptance**

The Proposed Plan was presented to the community in March 2006 and discussed in a public meeting on April 12, 2006. The responsiveness summary portion of this ROD addresses the public's comments and concerns about the selected remedy for Site 28 (see Attachment C).

## **10.2 COMPARISON OF GROUNDWATER ALTERNATIVES**

This section presents the results of the comparative analysis of the retained groundwater alternatives. Table 10-3 summarizes the comparative analysis of groundwater remedial alternatives against the five primary NCP criteria.

### **10.2.1 Overall Protection of Human Health and the Environment**

Alternative GW1 was not rated in the FS, but would rate low because it would not fully protect human health and the environment since no action would be taken. Alternatives GW2, GW4 (GW3 in the Final Site 28 Proposed Plan dated March 2006), and GW5 (GW 4 in the Final Site 28 Proposed Plan dated March 2006) meet the threshold criteria for overall protection of human health and the environment and provide a broad range of alternatives for consideration. The augmentation of Alternative GW4 by excavation of hot-spot areas does not change the rating assigned during the FS process.

### **10.2.2 Compliance with ARARs**

ARARs are not applicable to Alternative GW1. Alternatives GW2, GW4 (Alternative GW3 in the Final Site 28 Proposed Plan, dated March 2006), and GW5 (Alternative GW4 in the Final Site 28 Proposed Plan, dated March 2006) meet the threshold criteria of compliance with ARARs (see Section 13.2). The augmentation of Alternative GW4 by excavation of hot-spot areas does not change the rating assigned during the FS process.

### **10.2.3 Long-Term Effectiveness and Permanence**

Alternative GW1 was not rated in the FS, but would rate low for long-term effectiveness and permanence for reduction of toxicity in groundwater since no action would be taken to address contaminants at Site 28.

Alternatives GW2, GW4 (Alternative GW3 in the Final Site 28 Proposed Plan, dated March 2006), and GW5 (Alternative GW4 in the Final Site 28 Proposed Plan, dated March 2006) were all rated medium for long-term effectiveness and permanence because they rely on the effectiveness of their respective remediation technologies, as well as ICs. The augmentation of Alternative GW4 by excavation of hot-spot areas does not change the rating assigned during the FS process.

#### **10.2.4 Reduction of Toxicity, Mobility, or Volume through Treatment**

Alternative GW1 was not rated in the FS, but would rate low for reduction of toxicity, mobility, or volume through treatment in groundwater since no action would be taken to address COCs.

Alternative GW2 was rated low for reduction of toxicity, mobility, or volume through treatment because no active treatment would be provided.

Alternative GW4 (GW3 in the Final Site 28 Proposed Plan dated March 2006) was rated medium because of the MIC should reduce contaminant mobility. The augmentation of Alternative GW4 by excavation of hot-spot areas does not change the rating assigned during the FS process.

Alternative GW5 (Alternative GW4 in the Final Site 28 Proposed Plan, dated March 2006) was rated medium for reduction of toxicity, mobility, or volume through treatment because copper-impacted soil would be removed from the site and disposed of at an off-site facility. The soil is not treated on site to reduce toxicity or mobility, which prevented this alternative from receiving a higher rating.

#### **10.2.5 Short-Term Effectiveness**

Alternative GW1 was not rated in the FS, but would rate low for short-term effectiveness since no actions would be taken to reduce the toxicity of COCs in groundwater at Site 28.

Alternative GW5 (Alternative GW4 in the Final Site 28 Proposed Plan, dated March 2006) was rated low for short-term effectiveness because transportation of contaminated soil from the site poses a greater potential short-term risk than for Alternative GW4 (Alternative GW3 in the Final Site 28 Proposed Plan, dated March 2006).

Alternative GW4 (Alternative GW3 in the Final Site 28 Proposed Plan, dated March 2006) was rated medium for short-term effectiveness because of effects to the community resulting from trucking of the MIC to the site and of excavated soil from the site to treatment or disposal facilities. However, the MIC itself is not expected to affect the community negatively, and implementation of the alternative is unlikely to adversely affect site workers, the surrounding community, or the environment. The augmentation of Alternative GW4 by excavation of hot-spot areas does not change the rating assigned during the FS process.

Alternative GW2 was rated high for short-term effectiveness because the monitoring program would be implemented in a short timeframe and would likely not affect the community.

## **10.2.6 Implementability**

Alternative GW1 was not rated in the FS, but would rate high for implementability since no action would be taken to reduce the toxicity of COCs in groundwater at Site 28.

Alternative GW5 (Alternative GW4 in the Final Site 28 Proposed Plan, dated March 2006) was rated low for implementability because this alternative would require some engineering controls and permitting requirements because the proposed excavations are near the shoreline.

Alternative GW4 (Alternative GW3 in the Final Site 28 Proposed Plan, dated March 2006) was rated medium for implementability because this alternative would be more complex to implement than Alternative GW2 and less complex than Alternative GW5 (Alternative GW4 in the Final Site 28 Proposed Plan, dated March 2006). The augmentation of Alternative GW4 by excavation of hot-spot areas does not change the rating assigned during the FS process.

Alternative GW2 was rated high because a monitoring program is technically feasible and readily implementable.

## **10.2.7 Cost**

Alternative GW1 was not rated in the FS, but would rate high because it has no cost associated with it. Alternative GW2 was also rated high because it had the lowest cost associated with implementation of ICs. Alternative GW4 (Alternative GW3 in the Final Site 28 Proposed Plan, dated March 2006) rated medium because it had the next lowest cost, and Alternative GW5 (Alternative GW4 in the Final Site 28 Proposed Plan, dated March 2006) was rated low. Table 10-4 provides a cost comparison for each groundwater alternative. The augmentation of Alternative GW4 by excavation of hot-spot areas does not change the rating assigned during the FS process.

## **10.2.8 State Acceptance**

The State of California concurs with the Navy's selected groundwater remedial alternative (Alternative GW4 [Alternative GW3 in the Final Site 28 Proposed Plan dated March 2006]). The augmentation of Alternative GW4 by excavation of hot-spot areas does not change the rating assigned during the FS process.

## **10.2.9 Community Acceptance**

The Proposed Plan was presented to the community in March 2006 and discussed in a public meeting on April 12, 2006. The responsiveness summary portion of this ROD addresses the public's comments and concerns about the selected remedy for Site 28 (see Attachment C).

***TABLES***

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**TABLE 10-1: COMPARATIVE ANALYSIS OF SOIL REMEDIAL ALTERNATIVES BY BALANCING CRITERIA**  
Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Alternative	Long-Term Effectiveness and Permanence	Reduction in Toxicity, Mobility, or Volume through Treatment	Short-Term Effectiveness	Implementability	Cost*
	Parameters considered: <ul style="list-style-type: none"> <li>• Residual risk at completion</li> <li>• Long-term management of remaining contaminants</li> <li>• Reliability of ICs</li> <li>• Need to replace components</li> <li>• Continuing repair/maintenance needs</li> </ul>	Parameters considered: <ul style="list-style-type: none"> <li>• Treatment processes</li> <li>• Amount of hazardous material</li> <li>• Degree of reduction in toxicity, mobility, or volume</li> <li>• Degree of irreversibility</li> <li>• Treatment residuals</li> </ul>	Parameters considered: <ul style="list-style-type: none"> <li>• Short-term risks to community</li> <li>• Effects on workers</li> <li>• Effects on the environment</li> <li>• Duration of remediation</li> </ul>	Parameters considered: <ul style="list-style-type: none"> <li>• Technical feasibility</li> <li>• Operational reliability</li> <li>• Future alternative remedial options</li> <li>• Ability to monitor effectiveness</li> <li>• Ability to obtain governmental approvals</li> <li>• Availability of services and materials</li> </ul>	
Alternative S1 – No Action	<b>Not evaluated – see Section 10.0 for discussion of comparative analysis</b>	<b>Not Evaluated</b>	<b>Not evaluated</b>	<b>Not evaluated</b>	\$0
Alternative S2 – Institutional Controls	<b>Medium</b> ICs would prohibit future residential use. The long-term effectiveness of ICs would depend upon continued adherence.	<b>Low</b> There would likely be no measurable decrease with respect to the mass or volume of the affected soils from existing conditions over time because no active treatment processes are performed that would reduce the mobility and toxicity of affected soils over time.	<b>High</b> Alternative S2 is expected to be effective in the short term because risks to the community and site workers should be minimal because the alternative would not involve construction or other intrusive activities.	<b>High</b> Easy to implement.	\$405,000 Duration of ICs was estimated at 30 years. Present value cost is lower than Alternatives S3, S4a, S4b, S6a, and S6b.
Alternative S3 – Soil/synthetic Membrane Cover and ICs	<b>High</b> The soil/synthetic membrane cover is expected to effectively prevent exposure to chemicals in soil, and the long-term effectiveness of the cover depends on the continuous maintenance and adherence to the ICs.	<b>Low</b> Since there are no active treatment processes, there would likely be no measurable decrease with respect to the mass or volume of the contaminated soils from existing conditions over time. However, Alternative S3 would be expected to reduce the mobility of contaminated soils (such as by wind-borne dust) and eliminate exposure pathways.	<b>Medium</b> Adverse effects to site workers, the surrounding community, and the environment associated with implementation of Alternative S3 due to dust from construction of the cover and transportation of clean soil through the community would be minimized through the use of proper planning and engineering controls. Once in place, the soil/synthetic membrane cover would be expected to effectively prevent exposure to underlying contaminated soil.	<b>Medium</b> Alternative S3 would be moderately implementable. Design and maintenance of the cap would involve engineering requirements. Long-term maintenance would be required. Placement and compaction of HDPE liners and soil is routinely performed throughout the United States. A construction quality assurance plan would be developed and followed for liner placement. Clean cover soil is readily available in the San Francisco Bay area.	\$1,094,000 Duration of ICs was estimated at 30 years. Higher present value cost compared with Alternative S2; however, cost is low relative to Alternatives S4a, S4b, S6a, and S6b. Soil/synthetic membrane cover appears to offer a cost-effective measure for meeting RAOs.
Alternative S4a – Removal and Disposal of Soil to Achieve Unrestricted Future Use Criteria	<b>High</b> Alternative S4a is considered to be the most effective and permanent over the long term, achieving unrestricted future use criteria. Soil with chemical concentrations exceeding unrestricted use criteria located within 6 feet bgs would be removed under Alternative S4a.	<b>High</b> Under Alternative S4a, chemicals at concentrations exceeding unrestricted future use criteria within the top 6 feet of soil would be excavated, transported to a disposal facility, treated as required to meet LDRs, and disposed of off site. More material is potentially treated than for Alternative S4b.	<b>Low</b> Alternative S4a would involve excavation, off-site disposal, and backfilling, which all have the potential to create significant amounts of contaminated dust and track contaminated soil off site. Significantly more truck trips would be required through the community than for Alternative S4b. However, adverse effects to site workers, the surrounding community, and the environment associated with implementation of Alternative S4a would be minimized through the use of proper planning and engineering controls.	<b>Low</b> Excavation, transportation, and off-site disposal of contaminated soil are routinely performed at hazardous waste release sites in the United States. Because it involves excavation to the groundwater table near the shoreline, Alternative S4a may present challenges related to excavation stability and compaction of backfill. However, excavation to this depth, followed by backfilling, is still considered feasible.	\$4,832,000 Comparable in present value cost with Alternative S6a. Higher present value cost and capital cost than the other soil alternatives. Cleanup would achieve reduction to concentrations lower than remediation goals; therefore, higher cost may not be justified.

**TABLE 10-1: COMPARATIVE ANALYSIS OF SOIL REMEDIAL ALTERNATIVES BY BALANCING CRITERIA (CONTINUED)**  
Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

<b>Alternative</b>	<b>Long-Term Effectiveness and Permanence</b>	<b>Reduction in Toxicity, Mobility, or Volume through Treatment</b>	<b>Short-Term Effectiveness</b>	<b>Implementability</b>	<b>Cost*</b>
Alternative S4b – Removal and Disposal of Soil (upper 2 feet) and ICs	<b>Medium</b> Contaminated shallow soil would be removed. Clean backfill is expected to effectively prevent exposure to underlying chemicals in soil remaining after excavation activities. ICs are expected to effectively prohibit future residential use. The long-term effectiveness of this alternative depends on the continuous maintenance and adherence to ICs.	<b>Medium</b> Under Alternative S4b, soil with chemical concentrations exceeding remediation goals within the top 2 feet of the surface would be excavated, transported to a disposal facility, treated as required to meet LDRs, and disposed of. In addition, the backfill soil would be expected to reduce the mobility of remaining contaminated soils (such as via wind-borne dust) and eliminate exposure pathways.	<b>Medium</b> Alternative S4b would involve excavation, off-site disposal, and backfilling, which all have the potential to create significant amounts of contaminated dust and track contaminated soil off the site. However, adverse effects to site workers, the surrounding community, and the environment associated with implementation of Alternative S4b would be minimized through the use of proper planning and engineering controls. Fewer truck trips are required than for Alternative S4a.	<b>Medium</b> Excavation under this alternative extends to 2 feet bgs in designated areas within the shoreline, and is more readily implemented than Alternative S4a.	\$1,768,000 Comparable in present value cost with Alternative S6b. Lower relative cost than Alternatives S4a and S6a.
Alternative S6 – Phytoremediation and ICs	<b>Medium</b> Phytoremediation has been effective at a limited number of remediation sites. The saline conditions may impede remediation; bench-scale testing would be used to study the effectiveness of this alternative. ICs are expected to effectively prohibit future residential and agricultural uses of the site.	<b>High</b> A reduction in toxicity and volume is achieved through use of plant stocks. Arsenic is extracted into leaves and stocks of the China brake fern for disposal. PAHs are degraded in the root mass of selected plant species. Any required treatment of plant matter to meet LDRs (such as stabilization of arsenic) would be performed at an off-site disposal facility before land disposal.	<b>Medium</b> Alternative S5 would involve tilling shallow soil, planting selected species for desired soil treatment, and harvesting contaminant removing plants. Engineering controls would minimize fugitive dust emissions and worker exposure. Fencing would prohibit unauthorized entrance during the treatment period. The time to achieve RAOs is uncertain under this alternative.	<b>Low</b> Bench- and pilot-scale testing would be performed to better estimate the required treatment period, as well as the technical feasibility of phytoremediation in the saline conditions of Site 28.	\$1,587,000 Duration of ICs was estimated at 30 years. Cost is higher than Alternatives S2 and S3, and lower than Alternatives S4a and S4b.
Alternative S7a – Removal, On-Site Treatment and Disposal of Soil	<b>High</b> Alternative S6a is considered to be permanent and effective over the long term, and similar to Alternative S4a.	<b>High</b> Under Alternative S6a, soil with chemical concentrations exceeding unrestricted use criteria within the top 6 feet of the surface would be excavated, treated on site to meet LDRs as required, and transported off site for disposal. More material is potentially treated than for Alternative S6b.	<b>Low</b> Adverse effects to site workers, the surrounding community, and the environment associated with excavation, backfilling, and off-site transportation would be minimized through the use of proper planning and engineering controls. Alternative S6a would involve excavation, on-site soil treatment, off-site disposal, and backfilling, which all have the potential to create contaminated dust and track contaminated soil off the site.	<b>Low</b> More complex to implement than Alternative S4a because excavated soil with chemical concentrations exceeding RCRA LDRs would be treated on-site using solidification and stabilization and transported off site as non-RCRA hazardous waste. This alternative has the same large-scale excavation challenges as Alternative S4a.	\$4,370,000 Cost is comparable with Alternative S4a, with little apparent added benefit. Cleanup would achieve reduction to chemical concentrations lower than remediation goals; therefore, higher cost may not be justified.

**TABLE 10-1: COMPARATIVE ANALYSIS OF SOIL REMEDIAL ALTERNATIVES BY BALANCING CRITERIA (CONTINUED)**  
 Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Alternative	Long-Term Effectiveness and Permanence	Reduction in Toxicity, Mobility, or Volume through Treatment	Short-Term Effectiveness	Implementability	Cost*
Alternative S7b – Removal, and Disposal of Soil (upper 2 feet) with On-Site Treatment of Soil	<b>Medium</b> The long-term effectiveness of Alternative S6b depends on the continued adherence to the ICs. This alternative is similar in long-term effectiveness and permanence to Alternative S4b.	<b>Medium</b> Under Alternative S6b, soil with chemical concentrations exceeding remediation goals in the top 2 feet would be excavated, treated on site to meet LDRs as required, and transported off site for disposal. In addition, the excavation backfill soil would be expected to reduce the mobility of remaining contaminated soils (such as via wind-borne dust) and eliminate exposure pathways.	<b>Medium</b> Adverse effects to site workers, the surrounding community, and the environment associated with excavation, backfilling, and off-site transportation would be minimized through the use of proper planning and engineering controls. Alternative S6b would involve excavation, on-site soil treatment, off-site disposal, and backfilling, which all have the potential to create contaminated dust and track contaminated soil off the site. Fewer truck trips are required than for Alternative S6a.	<b>Low</b> More complex to implement than Alternative S4b because excavated soil with chemical concentrations exceeding RCRA LDRs would be treated on site using solidification and stabilization and transported off site as non-RCRA hazardous waste.	<b>\$1,753,000</b> Duration of ICs was estimated at 30 years. Cost is comparable with Alternative S4b, with little apparent added benefit.

Notes:

- \* Based on net present value (2005).
- bgs Below ground surface
- IC Institutional control
- LDR Land disposal restriction
- PAH Polycyclic aromatic hydrocarbon
- RAO Remedial action objective
- RCRA Resource Conservation and Recovery Act

**TABLE 10-2: COST COMPARISON OF SOIL REMEDIAL ALTERNATIVES**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

<b>Remedial Alternatives<sup>a</sup></b>	<b>Estimated Cost</b>
Alternative S1 – No Action	\$0
Alternative S2 – Institutional Controls	\$405,000
Alternative S3 – Soils/Synthetic Membrane Cover with Institutional Controls	\$1,094,000
Alternative S4a – Removal and Disposal of Soil	\$4,832,000
Alternative S4b – Removal and Disposal of Soil (Upper 2 feet) and Institutional Controls	\$1,768,000
Alternative S6 – Phytoremediation and Institutional Controls	\$1,587,000
Alternative S7a – <i>Ex-Situ</i> Solidification/Stabilization of Excavated Soil	\$4,370,000
Alternative S7b – <i>Ex-Situ</i> Solidification/Stabilization of Excavated Soil (upper 2 feet) and On-Site Treatment and Institutional Controls	\$1,753,000

## Notes:

<sup>a</sup> Alternative S5 – Asphalt Cover, was not evaluated because it was judged to be less effective than Alternative S3.

**TABLE 10-3: COMPARATIVE ANALYSIS OF GROUNDWATER REMEDIAL ALTERNATIVES BY BALANCING CRITERIA**  
Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Alternative	Long-Term Effectiveness and Permanence	Reduction in Toxicity, Mobility, or Volume through Treatment	Short-Term Effectiveness	Implementability	Cost*
	Parameters considered: <ul style="list-style-type: none"> <li>Residual risk at completion</li> <li>Long-term management of remaining chemicals</li> <li>Reliability of ICs</li> <li>Need to replace components</li> <li>Continuing repair and maintenance needs</li> </ul>	Parameters considered: <ul style="list-style-type: none"> <li>Treatment processes</li> <li>Amount of hazardous material</li> <li>Degree of reduction in toxicity, mobility, or volume</li> <li>Degree of irreversibility</li> <li>Treatment residuals</li> </ul>	Parameters considered: <ul style="list-style-type: none"> <li>Short-term risks to community</li> <li>Effects on workers</li> <li>Effects on environment</li> <li>Duration of remediation</li> </ul>	Parameters considered: <ul style="list-style-type: none"> <li>Technical feasibility</li> <li>Operational reliability</li> <li>Future alternative remedial options</li> <li>Ability to monitor effectiveness</li> <li>Ability to obtain governmental approvals</li> <li>Availability of services and materials</li> </ul>	
Alternative GW1 – No Action	<b>Not evaluated – see Section 10.0 for discussion of comparative analysis</b>	<b>Not evaluated</b>	<b>Not evaluated</b>	<b>Not evaluated</b>	<b>\$0</b>
Alternative GW2 – Monitoring and ICs/ Monitoring and ICs	<b>Medium</b> This alternative presumes that only monitoring is warranted to document conditions in shoreline groundwater and that no further action would be required to protect offshore receptors. The long-term effectiveness of this alternative would depend on the continued adherence to ICs; ICs would prohibit future domestic, municipal, and agricultural use of shallow groundwater.	<b>Low</b> No active treatment processes are included.	<b>High</b> Alternative GW2 should be effective in the short term because a relatively short time would be required before the remedy is implemented.	<b>High</b> Alternative GW2 would be readily implemented with no significant difficulties regarding technical feasibility or reliability anticipated. ICs have been routinely implemented at hazardous waste release sites, and monitoring wells have been installed on site without significant difficulties.	<b>\$789,000</b> Lower present value cost than Alternatives GW3 and GW4 (Alternative GW3 in the Final Site 28 Proposed Plan, dated March 2006).
Alternative GW4 (Alternative GW3 in the Final Site 28 Proposed Plan, dated Mar. 2006) – Monitoring and ICs/Passive MIC Zone with Monitoring and ICs	<b>Medium</b> This alternative presumes risk management decision-makers will conclude action is warranted to protect offshore receptors. The long-term effectiveness of this alternative would depend on the continued adherence to ICs and effectiveness of MIC injection to reduce copper concentrations in groundwater.	<b>Medium</b> The <i>in-situ</i> MIC process should reduce contaminant mobility.	<b>Medium</b> The MIC product would need to be transported to the site. However, implementation of the alternative is not likely to have adverse effects to site workers, the surrounding community, or the environment.	<b>Medium</b> This alternative involves the design and implementation of an <i>in-situ</i> remediation process. ICs have been routinely implemented at hazardous waste release sites, and monitoring wells have been installed on site without significant difficulties. Equipment for placement of MIC (direct-push drilling equipment) is readily available. Achieving a uniform distribution of MIC material is a potential concern; however, during the design phase the soil types will be reviewed and the appropriate spacing and frequency of injection points will be developed.	<b>\$1,436,000<sup>a</sup></b> Higher present value cost than Alternative GW2; however, cost is lower than Alternative GW4.
Alternative GW5 (Alternative GW4 in the Final Site 28 Proposed Plan, dated Mar. 2006) – Monitoring and ICs/Soil Source Removal and MIC with Monitoring and ICs	<b>Medium</b> This alternative presumes risk management decision-makers will conclude action is warranted to protect offshore receptors. The long-term effectiveness of this alternative would depend on the continued adherence to ICs and reduction in copper concentrations from targeted source removal and MIC addition.	<b>Medium</b> The MIC process should reduce contaminant mobility. Additional treatment of contaminated soil is possible.	<b>Low</b> Transportation of contaminated soil poses greater potential short-term risk than for Alternative GW3.	<b>Low</b> More difficult to implement than Alternative GW3. Excavation to groundwater near the shoreline will require more stringent engineering controls.	<b>\$1,789,000</b> Higher present value cost and capital cost compared to the other groundwater alternatives.

Notes:  
IC Institutional control  
MIC Metals remediation compound

\* Based on net present value (2005)  
a Costs for Alternative GW4 reflect the costs calculated in the feasibility study (Bechtel 2005) and do not include the cost of augmenting the alternative with excavation of hot spots. Section 12.3 and Table 12-2 present the amended costs of the augmented remedy for Alternative GW4.

**TABLE 10-4: COST COMPARISON OF GROUNDWATER REMEDIAL ALTERNATIVES**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

<b>Remedial Alternatives<sup>a</sup></b>	<b>Estimated Cost</b>
Alternative GW1 – No Action	\$0
Alternative GW2 –Monitoring and ICs/Monitoring and ICs	\$789,000
Alternative GW4 <sup>b</sup> – Monitoring and ICs/Passive MIC Zone with Monitoring and ICs	\$1,436,000 <sup>c</sup>
Alternative GW5 – Monitoring and ICs/Soil Source Removal and MIC with Monitoring and ICs	\$1,789,000

## Notes:

- a Alternative GW3 was not evaluated because it was judged to be less effective than Alternative GW4 (GW3 from the Final Site 28 Proposed Plan dated March 2006).
- b Alternative GW4 (GW3 from the Final Site 28 Proposed Plan dated March 2006).
- c Costs for Alternative GW4 reflect the costs calculated in the feasibility study (Bechtel 2005) and do not include the cost of augmenting the alternative with excavation of hot spots. Section 12.3 and Table 12-2 present the amended costs of the augmented remedy for Alternative GW4.

IC Institutional control  
MIC Metals immobilization compound

## 11.0 PRINCIPAL THREAT WASTE

Principal threat wastes are source materials considered to be highly toxic, highly mobile, or those that would present a significant risk to human health or the environment should exposure occur. Contaminated soil and groundwater is not generally considered to be source material unless it has the potential to be mobile. Metals and PAHs in soil and metals in groundwater at Site 28 are not considered principal threat wastes.

## 12.0 SELECTED REMEDY

Based on the RI Report (Bechtel 2004), FS Report (Bechtel 2005), and administrative record for Site 28 (see Attachment A), as well as an evaluation of all comments on the Proposed Plan submitted by interested parties during the public comment period (Navy 2006), the Navy has selected Alternative S4b as the remedy for soil and Alternative GW4 (GW3 in the Final Site 28 Proposed Plan dated March 2006) as the remedy for groundwater. The components of the selected soil and groundwater alternatives are summarized below:

- Alternative S4b
  - Excavation of soils from 0 to 2 feet bgs in designated areas within the shoreline
  - Backfill excavated area with clean fill and seeding to prevent erosion
  - ICs
  
- Alternative GW4 (GW3 in the Final Site 28 Proposed Plan March 2006)
  - Continued groundwater monitoring
  - Excavate targeted areas with copper concentrations greater than 1,500 mg/kg
  - Injection of MIC to immobilize copper in the subsurface
  - ICs

## 12.1 SUMMARY OF THE RATIONALE FOR THE SELECTED REMEDY

The following sections present the rationale, description, estimated costs, expected outcome, and performance objectives for the selected soil and groundwater remedies.

### 12.1.1 Soil

Based on results of previous investigations, the Navy determined that exposure to shallow soil containing arsenic, lead, and PAHs at Site 28 poses a potential risk to human health. Accordingly, remedial action is appropriate for Site 28 soil. Excavation of soils from 0 to 2 feet bgs is protective of the planned future recreational reuse of Site 28.

Alternative S4b was selected as the preferred soil alternative because it reduces the volume of hazardous substances at Site 28. This alternative will result in a reduction in the mobility and volume of metals and PAHs by removing the COCs and disposing of them at a permitted landfill. This alternative is expedient; has a relatively moderate cost and implementability, protects human health and the environment, and complies with environmental regulations and laws.

The selected remedy provides long-term protection by reducing concentrations of arsenic, lead, and PAHs and the associated risk by permanently removing portions of the contaminant mass and preventing further migration; replacing contaminated shallow soil with clean fill; and implementing ICs. The ICs restrict residential reuse and limit land disturbing activities and are therefore protective of construction workers and residents.

The costs for Alternative S4b, which are in the medium cost group, are slightly higher than Alternative S7b; however, Alternative S7b is more difficult to implement due to the on-site treatment of contaminated soil.

### **12.1.2 Groundwater**

The Navy determined that groundwater at Site 28 may pose a potential risk to saltwater aquatic organisms because groundwater containing elevated copper concentrations may migrate to the groundwater/surface water interface along the shoreline of the Oakland Inner Harbor, where biota could be exposed. Accordingly, remedial action is appropriate for Site 28 groundwater. Alternative GW4 (GW3 in the Final Site 28 Proposed Plan dated March 2006) was selected as the preferred alternative for groundwater because it reduces the mobility, toxicity, and volume of copper in groundwater by implementing an expedient treatment strategy; has a moderate relative cost and implementability; protects the environment and complies with environmental regulations and laws.

The selected remedy addresses the offshore receptors that may be at risk due to elevated copper concentrations in surface water at the POE. MIC will be used to treat copper in groundwater and a monitoring program will be implemented.

Since the identification of Alternative GW4 (Alternative GW3 in the final Site 28 proposed plan dated March 2006) as the preferred remedy for groundwater at Site 28, new information has been obtained suggesting that injection of MIC (the innovative technology proposed as part of the selected remedy) has varying success in treating metals when trace levels of other metals are also present. Therefore, the Navy has elected to enhance the preferred remedy by excavating targeted hot-spot areas with copper-impacted soil similar to the excavation described and evaluated under Alternative GW5 (Alternative GW4 in the final Site 28 proposed plan) in the final Site 28 FS report.

## **12.2 DESCRIPTION OF THE SELECTED REMEDY**

The following sections provide a brief description of the selected remedy.

### **12.2.1 Soil - Removal and Disposal of Soil (Upper 2 feet) and ICs**

The selected remedy for soils at Site 28 is Alternative S4b. Alternative S4b consists of the removal of soil with COCs exceeding remediation goals to a maximum of 2 feet bgs in designated areas within the shoreline (see Figure 12-1). The designated areas within the

shoreline were identified based upon sample point COC concentrations exceeding the remediation goals in soil from 0 to 2 feet bgs (see Table 8-1). Concentrations of COCs outside the designated areas do not exceed remediation goals in soils from 0 to 2 feet bgs. Following excavation, soil will be stockpiled, and characterized before off-site disposal. Any soil treatment required to meet land disposal restrictions would be conducted by the disposal facility under this alternative. The excavated areas will be backfilled and seeded with native vegetation to prevent erosion.

Excavation and removal of COC-contaminated soil from 0 to 2 feet bgs will reduce the overall risk to occupational workers and recreational users because these elevated concentrations were factored into the HHRA to calculate the  $2 \times 10^{-5}$  total risk value for the ingestion, dermal contact, and inhalation exposure pathways for the recreational user under existing conditions, prior to any of the proposed excavation. Concentrations of COCs (arsenic, lead, and PAHs) below 2 feet bgs (Table 8-1) may or may not present risk to residential receptors. However, ICs will be implemented as a component of the soil remedy to restrict land use, subsurface activities below 2 feet bgs, and offsite reuse of excavated soil. The effectiveness of the ICs would be reviewed every 5 years, ongoing, as required by CERCLA. For cost estimating purposes, the duration of this alternative is estimated at 30 years. However, ICs may be required for a longer period.

#### **12.2.1.1 Institutional Controls**

ICs are legal and administrative mechanisms used to implement land use and access restrictions that are used to limit the exposure of future landowner(s) or user(s) of the property to hazardous substances until the levels of the COCs in soil do not present an unacceptable risk to residential receptors. Legal mechanisms include proprietary controls such as restrictive covenants, negative easements, equitable servitudes, lease restrictions, and deed notices. Administrative mechanisms include notices, adopted local land use plans and ordinances, construction permitting, or other existing land use management systems that may be used to ensure compliance with use restrictions. Monitoring and inspections are conducted to assure that the ICs are being followed.

#### **Lease in Furtherance of Conveyance**

The Navy has determined that it will rely upon proprietary controls in the form of lease restrictions contained in the "Lease in Furtherance of Conveyance [LIFOC] Between the United States of America and the Alameda Reuse and Redevelopment Authority for the Former Naval Air Station Alameda" (Navy and Alameda Reuse and Redevelopment Authority 2001). These controls will continue until the property is conveyed either to a non-federal entity with environmental restrictive covenants as provided in the Memorandum of Agreement Between the United States Department of the Navy and the California Department of Toxic Substances Control" (hereinafter referred to as "Navy/DTSC MOA") (Navy and DTSC 2000) and attached covenant models or to a federal entity pursuant to a MOA with the federal transferee or a similar agreement. More specifically the LIFOC will serve as interim ICs between the time the ROD is signed and the date upon which the Navy transfers the property. Through the LIFOC, the Navy will maintain conditions that are consistent with the IC objectives for the chosen remedial alternative. The LIFOC contains provisions that the Navy can use to prevent the following

activities by the lessee that could result in increased levels of risk to human health or the environment:

- Changes in land use by requiring the lessee and sublessee(s) to get written consent of the Navy before beginning excavation, construction, alteration, or repairs of leased property (see Section 8.1 of the LIFOC).
- The lessee from conducting operations that interfere with environmental restoration activities by the Navy, the EPA, state regulators, or their contractors, by requiring written approval for any work by lessee or sublessee in proximity to the site (see Section 11 of the LIFOC).
- The lessee or sublessee from any excavation, digging, drilling or other disturbance of the subsurface without written approval of the Navy (see Section 13.11 of the LIFOC).

### **Transfer to Non-Federal Entity**

When the Alameda Point property is transferred to a non-federal entity, the IC objectives will be achieved through land use restrictions for this site which will be incorporated into the following legal mechanisms:

1. If the property is transferred, restrictive covenants will be included in one or more Quitclaim Deed(s) from the Navy to the property recipient.
2. Restrictive covenants will be included in a “Covenant to Restrict Use of Property”<sup>1</sup> entered into by the Navy and DTSC as provided in the Navy/DTSC MOA (Navy and DTSC 2000) and consistent with the substantive provisions of *California Code of Regulations* (Cal. Code Regs.) Tit. 22, § 67391.1.

The “Covenant to Restrict Use of Property” will incorporate the land use restrictions into environmental restrictive covenants that run with the land and that are enforceable by DTSC and the Navy against future transferees. The Quitclaim Deed(s) will include the identical land use restrictions in environmental restrictive covenants that run with the land and that will be enforceable by the Navy against future transferees.

ICs will be applied to the property (see Figure 12-2) and included in findings of suitability to transfer, findings of suitability for early transfer, “Covenant to Restrict Use of Property” between the Navy and DTSC, and any Quitclaim Deeds conveying real property containing Site 28.

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<sup>1</sup> See “Memorandum of Agreement Between the United States Department of the Navy and the California Department of Toxic Substances Control, Use of Model ‘Covenant to Restrict Use of Property’ at Installations Being Closed and Transferred by the United States Department of the Navy,” dated March 10, 2000.

The IC objectives for soil listed below will be achieved through land-use restrictions for Site 28.

1. New construction in the Site 28 area subject to ICs shall not be allowed for any of the following purposes set forth in Health and Safety Code § 25232(b)(1), until levels of contamination are acceptable for unrestricted reuse of the site unless otherwise approved by the Navy and Federal Facilities Agreement (FFA) signatories:
  - a. A residence, including any mobile home or factory-built housing constructed or installed for use as residential human habitation;
  - b. A hospital for humans;
  - c. A school for persons under 21 years of age;
  - d. A daycare facility for children; or
  - e. Any permanently occupied human habitation other than those used for commercial or industrial purposes.
2. All subsurface activities that involve excavation of soil from deeper than 2 feet bgs shall require approval by the Navy and FFA signatories. Reuse of soils excavated from 0 to 2 feet bgs during subsurface activities at Site 28 will be limited to sites designated for commercial/industrial or recreational uses. Soil may not be removed from Site 28 without prior approval of the Navy and FFA signatories (except for proper landfill disposal).

### **Implementation and Oversight**

The Navy and FFA signatories and their authorized agents, employees, contractors and subcontractors shall have the right to enter upon Site 28 to conduct investigations, tests, or surveys; inspect field activities; or construct, operate, and maintain any response or remedial action as required or necessary under the cleanup program, including but not limited to monitoring wells, pumping wells, treatment facilities, and landfill cap/containment systems. These access restrictions will be included in the deed and covenant.

The Navy shall address IC implementation and maintenance actions including periodic inspections in the preliminary and final remedial design reports to be developed and submitted to the FFA signatories for review pursuant to the FFA (see “Navy Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions” attached to Department of Defense’s (DoD), January 16, 2004, Memorandum titled “Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Record of Decision (ROD) and Post-ROD Policy” [DoD 2004]). The preliminary and final remedial design reports are primary documents as provided in Section 10.3 of the FFA.

The preliminary and final remedial design reports will include a “Land Use Control Remedial Design” section to describe IC implementation actions including:

- Requirements for CERCLA 5-year remedy review
- Frequency and requirements for periodic monitoring or visual inspections
- Reporting for monitoring and inspections
- Notification procedures to the regulators for planned property conveyance, changes, and/or corrective action required for the remedy
- Development of wording for land use restrictions and parties to be provided copies of the deed language once executed
- Identification of responsibilities for the Navy, EPA, DTSC, Water Board, other government agencies, and the new property owner for implementation, monitoring, reporting, and enforcement of ICs
- Providing a list of ICs with the expected duration
- Maps identifying where ICs are to be implemented

The Navy will be responsible for implementing, inspecting, reporting, maintaining, and enforcing the IC objectives described in the ROD in accordance with the approved remedial design reports. Although the Navy may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or other means, the Navy shall retain ultimate responsibility for remedy integrity. Should any of the IC objectives fail, the Navy shall ensure that appropriate actions are taken to reestablish protectiveness of the remedy and may initiate legal action to either compel action by a third party(ies) and/or recover the Navy’s costs for mitigating any discovered IC violation(s).

### **12.2.2 Groundwater - MIC with Monitoring and ICs**

Alternative GW4 (GW3 in the Final Site 28 Proposed Plan dated March 2006) includes a passive treatment system for copper in groundwater near the shoreline that uses a MIC technology in the subsurface area. The MIC will promote the production of copper complexes that strongly bind to soil particles. The copper is then immobilized in the subsurface and no longer mobile within the groundwater system. The effectiveness of this innovative technology will be enhanced by excavating target areas with copper-impacted soil to minimize dissolution of copper into groundwater during future precipitation events. Bench and pilot studies will be performed to determine the appropriate MIC treatment for the site.

Copper-impacted soil within the area of monitoring well 28SW03, where high concentrations of dissolved copper were detected, will be excavated to achieve the remediation goal of

1,500 mg/kg. The excavated soil will be segregated, stockpiled, and characterized before off site disposal at a permitted disposal facility. Any soil treatment required to meet land disposal restrictions will be conducted by the disposal facility.

This alternative assumes 10 years of groundwater monitoring to verify treatment effectiveness. A concentration trend analysis will be developed to track the concentration of dissolved metals in the monitoring wells at the site.

#### **12.2.2.1 Institutional Controls**

ICs for groundwater will be established and implemented in accordance with the procedures outlined in Section 12.2.1.1. ICs for groundwater will be used to maintain the integrity of the groundwater remedial action until remediation is complete and the remediation goals have been achieved. As with soil, the following IC objectives for groundwater will be achieved through land use restrictions:

1. Prohibit the installation of new groundwater wells of any type without prior review and written approval from the FFA signatories
2. Prohibit the alteration, disturbance, or removal of groundwater monitoring wells, groundwater extraction wells, treatment facilities, and associated equipment without prior review and written approval from the FFA signatories
3. Prohibit the removal of or damage to security features (such as locks on monitoring wells, survey monuments, signs or monitoring equipment, and associated pipelines and appurtenances) without prior written approval from the Navy

### **12.3 ESTIMATED COSTS**

The costs associated with Alternative S4b for soil is estimated to be \$1,768,000, and the cost for Alternative GW4 (GW3 in the Final Site 28 Proposed Plan dated March 2006) for groundwater, including the cost associated with the targeted excavations, is estimated to be \$1,804,000. These costs are based on the best available information regarding the anticipated scope of the remedy, including capital and operation and maintenance costs, and are based on present values (in 2005 dollars).

A summary of the estimated costs for soil and groundwater are presented in Table 12-1 and Table 12-2, respectively. These are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent of the actual project cost for remedial design/remedial action phase of site cleanup. Costs may change as a result of new information and data collected during implementation of the selected remedy. Significant changes may be documented in a memorandum to the administrative record, explanation of significant differences, or as an amendment to this ROD (EPA 1999a). A summary of the estimated costs for the soil and groundwater remedies are presented in Table 12-1 and Table 12-2, respectively.

## 12.4 EXPECTED OUTCOMES OF THE SELECTED REMEDIES

The selected remedies for soil and groundwater at Site 28 provide for cleanup of shallow soil and the groundwater to be protective of the current use and planned future reuse of the site (recreation and open space) and to allow for transfer of the site. The expected outcome of the selected remedy at Site 28 is to restore the soil and shallow aquifer quality by reducing COC concentrations to levels that no longer pose a threat to human health or the environment based on recreational reuse.

### 12.4.1 Soil

The selected remedy for Site 28 soil includes excavation of contaminated soil to a maximum depth of approximately 2 feet bgs in the designated areas within the shoreline defined in Figure 12-1. The expected outcome for removal of contaminated soil at Site 28 is to minimize the potential exposure of occupational and recreational users to soil with elevated concentrations of arsenic, lead, and PAHs.

The remedy selected for Site 28 soils involves excavation, waste characterization, and off-site disposal. The objective of excavating the soil is to remove contaminated soil from 0 to 2 feet bgs that contains COCs at concentrations above remediation goals established for arsenic (9.1 mg/kg), lead (800 mg/kg), and PAHs (2.1 mg/kg) within the designated areas within the shoreline defined in Figure 12-1. Soil from 0 to 2 feet bgs outside the designated areas within the shoreline already meets the remediation goals for the COCs (arsenic, lead and PAHs) and access to deeper soils containing COCs above remediation goals will be restricted by ICs. The objective of off-site disposal is to place contaminated soil in an appropriate facility for treatment, if necessary, and disposal. Thus, potential exposures to human receptors will be eliminated.

Cancer risk associated with exposure to arsenic and PAHs in soil is currently  $2 \times 10^{-5}$  (within the risk management range of  $10^{-6}$  to  $10^{-4}$ ) for both the occupational and recreational users. Removal of contaminated soil from 0 to 2 feet bgs that contains COCs at concentrations above remediation goals will reduce cancer risk associated with ingestion and dermal contact exposures of occupational and recreational users. Since COCs are not present in soil from 0 to 2 feet bgs outside of the designated areas within the shoreline, confirmation soil sampling is not required to demonstrate that cancer risks have been reduced and the RAOs have been achieved with the soil remedy.

Following implementation of the remedy, the Navy, in collaboration with the regulatory agencies, will determine if the performance objectives have been achieved.

### 12.4.2 Groundwater

The selected remedy includes the delineation of copper-impacted soil within the shoreline area near monitoring well 28S03, excavation of these targeted hot-spot areas, and application of MIC to the subsurface of Site 28 to achieve the remediation goal. The expected outcome of the

excavation of soil in targeted hot-spot areas is the reduction of potential sources of copper that may dissolve into groundwater during precipitation events. The expected outcome of the application of MIC is to treat the dissolved copper in the groundwater preventing migration to the Oakland Inner Harbor, thus protecting aquatic life. The selected remedy also includes the monitoring of COCs in the inland and shoreline areas at Site 28 to ensure that remediation goals are met and to confirm the beneficial use criteria of 2000 µg/L for arsenic is not exceeded in the inland area.

The selected remedy for Site 28 groundwater involves six components: (1) soil sampling, (2) targeted excavation, (3) off site disposal of soil, (4) bench- and pilot-scale tests, (5) treatment of subsurface soil and/or groundwater with MIC, and (6) groundwater monitoring. Figure 12-3 illustrates the decision logic for implementing the selected remedy for groundwater contamination at Site 28.

The overall performance objective of the groundwater remedy is to adequately remove copper contaminated soil and treat copper contaminated groundwater so that the remediation goal at the point of exposure is met for discharge of groundwater to the Bay. Specifically, the excavation of targeted soil hotspots is intended to remove copper impacted soil with concentrations above the established remediation goal for copper of 1,500 mg/kg. Additionally, the performance objective for the bench scale studies is to determine the proper MIC to use to treat the dissolved copper in the groundwater in the shoreline area of Site 28. The performance objective for treatment of subsurface soil with MIC is to treat dissolved copper, thereby reducing the concentrations in groundwater in the shoreline area.

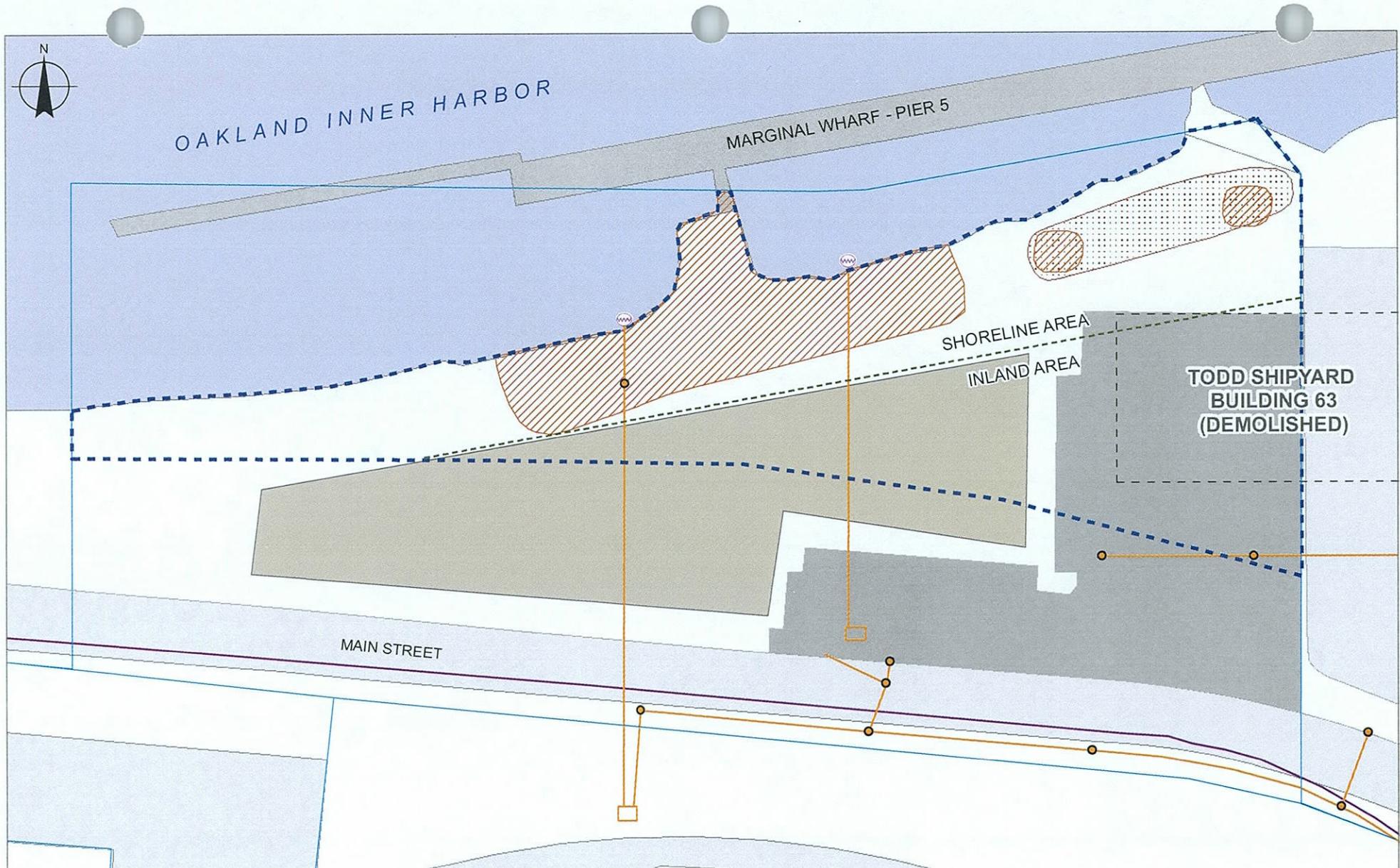
The performance objective for groundwater monitoring is to ensure that concentrations of copper in groundwater do not exceed the remediation goal for copper (3.1 µg/L) in surface water at the POE. As described in Section 8.0, because the remediation goal for copper is based on a surface water criterion, remedial design groundwater modeling will be used to determine the trigger level for copper at the POM (within a monitoring well) to ensure that the remediation goal for copper is not exceeded in surface water at the POE.

The program will also monitor arsenic concentrations in groundwater to ensure that they do not exceed the beneficial use criteria for arsenic (2,000 mg/L). As mentioned in Section 8.0, concentrations of arsenic in groundwater at Site 28 are well below the beneficial use criteria. Thus, the water supply is protected for agricultural use in the inland area.

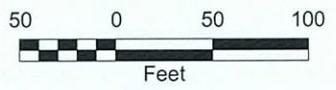
Following implementation of the remedy, the Navy, in collaboration with the regulatory agencies, will determine if the performance objectives (including the remediation goals) have been achieved.

***FIGURES***

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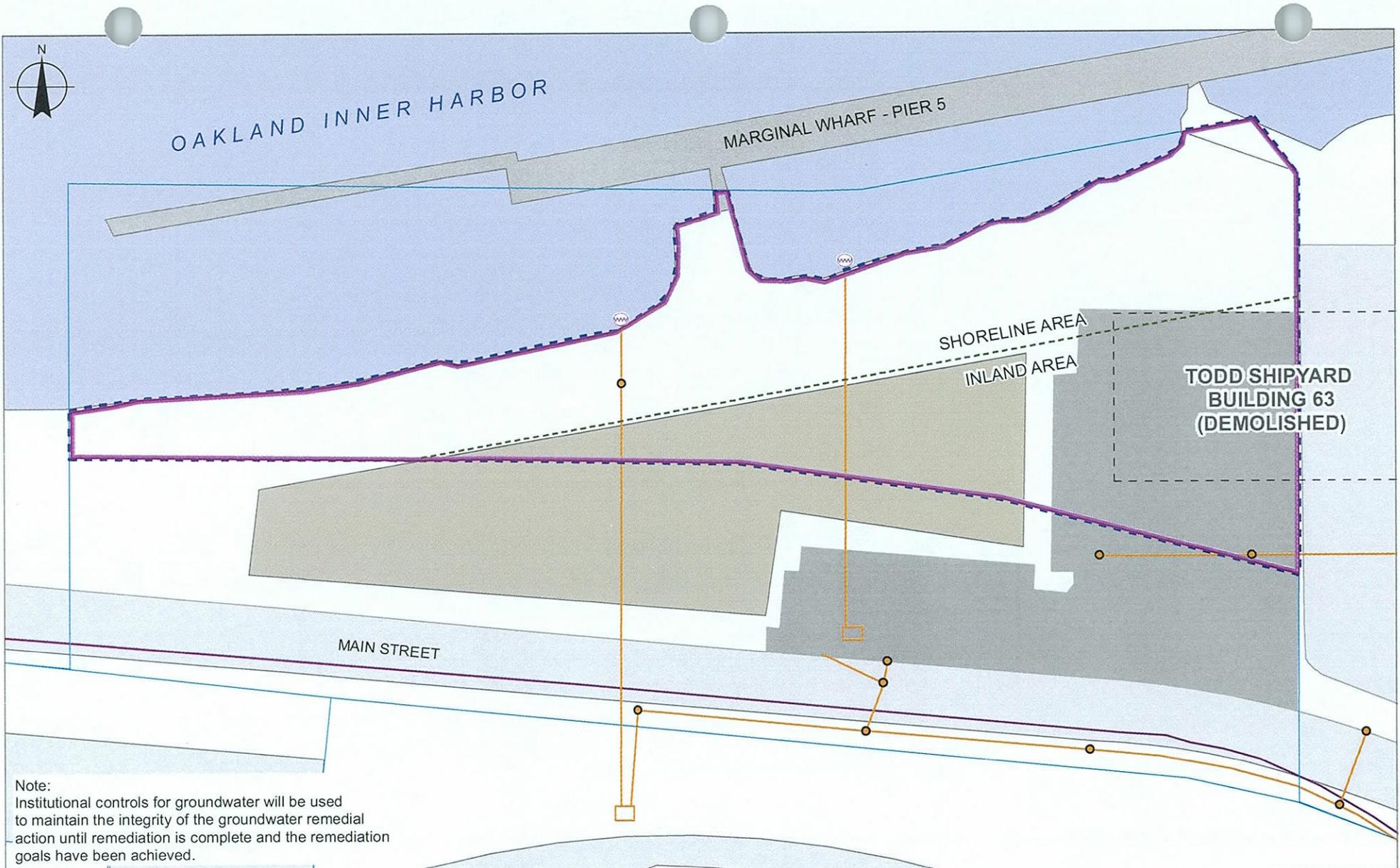
- |                                    |             |  |
|------------------------------------|-------------|--|
| CERCLA Site 28 Boundary            | Road        | Extent of Hot Spot Excavation Associated with Groundwater Remedy |
| Storm Manhole                      | Wharf       | Excavation Area Associated with Soil Remedy                      |
| Storm Water Outfall                | Parking Lot | Environmental Baseline Survey Parcel Boundary                    |
| Storm Sewer Line (City of Alameda) | Unpaved     |  |
| Sanitary Sewer Line                | Water       |  |
| Dog Park                           |             |  |



**Alameda Point, Alameda, CA**  
 U.S. Department of the Navy, BRAC PMO West, San Diego, CA

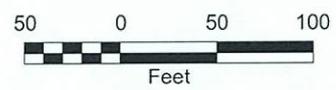
**FIGURE 12-1**  
**SOIL EXCAVATION AREAS**

Record of Decision for  
 Installation Restoration Site 28, Todd Shipyards



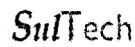
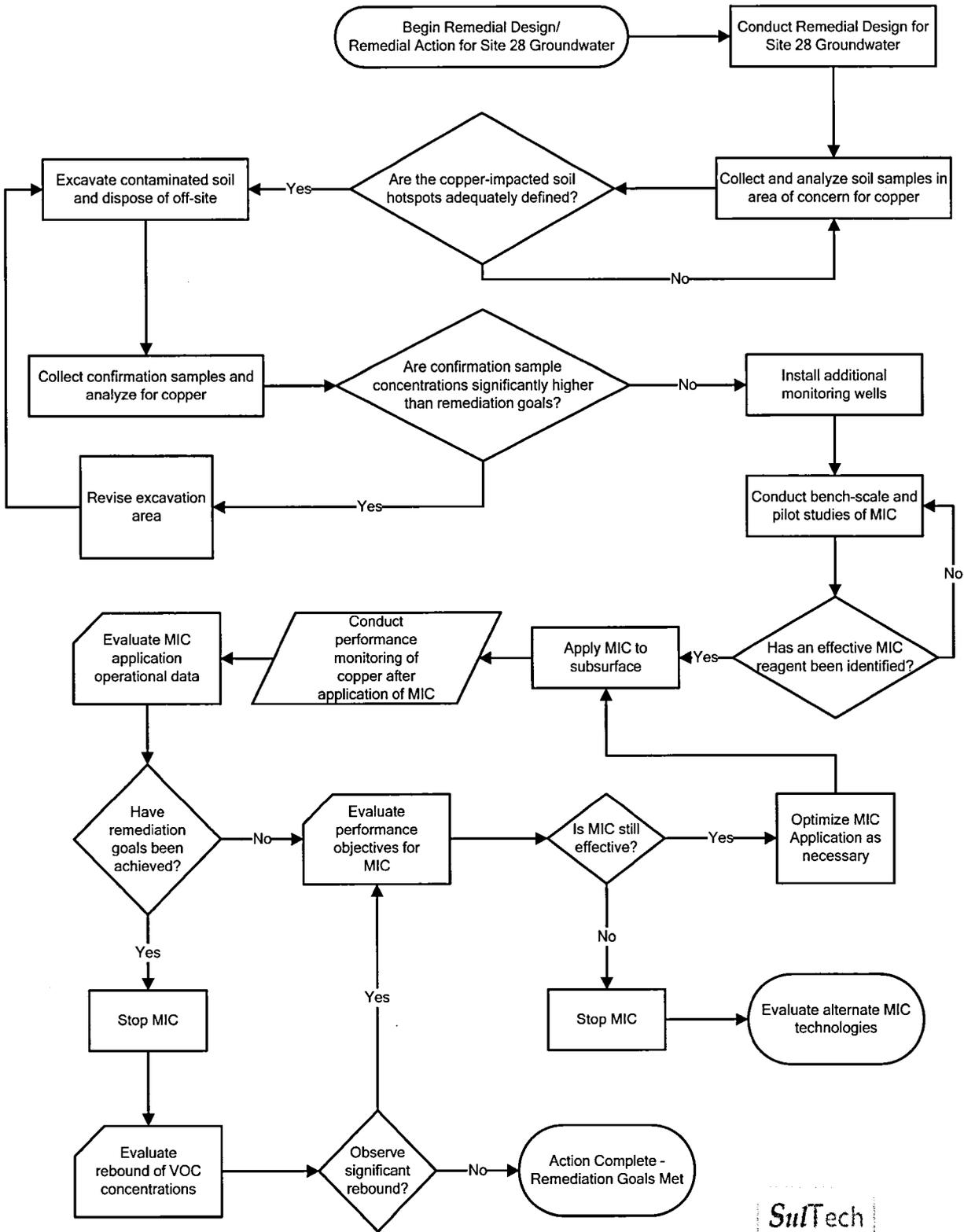
Note:  
 Institutional controls for groundwater will be used to maintain the integrity of the groundwater remedial action until remediation is complete and the remediation goals have been achieved.

- |   |             |
|---|-------------|
| CERCLA Site 28 Boundary                       | Road        |
| Institutional Control Restriction Boundary    | Wharf       |
| Environmental Baseline Survey Parcel Boundary | Parking Lot |
| Storm Manhole                                 | Unpaved     |
| Storm Water Outfall                           | Dog Park    |
| Storm Sewer Line (City of Alameda)            | Water       |
| Sanitary Sewer Line                           |             |



**Alameda Point, Alameda, CA**  
 U.S. Department of the Navy, BRAC PMO West, San Diego, CA

**FIGURE 12-2**  
**BOUNDARIES OF INSTITUTIONAL CONTROLS FOR SOIL AND GROUNDWATER AT SITE 28**  
 Record of Decision for  
 Installation Restoration Site 28, Todd Shipyards



Alameda Point, Alameda, CA  
U.S. Department of the Navy, BRAC PMO West, San Diego, California

**FIGURE 12-3**  
**ACHIEVEMENT OF SITE 28 GROUNDWATER  
REMEDATION GOALS**

Record of Decision for  
Installation Restoration Site 28, Todd Shipyards

**Acronyms and Abbreviations**

MIC Metal Immobilization Compound  
IC Institutional control

***TABLES***

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**TABLE 12-1: COST ESTIMATE SUMMARY FOR SOIL ALTERNATIVE S4B**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Description	Capital Cost	Annual Cost	5-Year Cost	Total Cost
<b>Capital Costs</b>				
Remedial design	\$90,000			\$90,000
IC implementation plan	\$72,000			\$72,000
Excavation to achieve remediation goals	\$287,000			\$287,000
Haul hazardous soil off-site	\$789,000			\$789,000
Landscape (seeding of 0.8 acre)	\$4,000			\$4,000
<b>Total capital costs with markups<sup>a</sup>:</b>				<b>\$1,242,000</b>
<b>Operational and Maintenance Costs</b>				
Institutional controls (30 years) <sup>b</sup>	\$10,167			\$305,000
5-year reviews <sup>b</sup>		\$20,000		\$120,000
<b>Total capital and O&amp;M costs with markups:</b>				<b>\$1,667,000</b>
Contingency (20%)				\$334,000
Total costs with markups and contingency costs				\$2,001,000
Escalation (base January 2005)				\$0
<b>TOTAL COST:</b>				<b>\$2,001,000</b>
<b>Net Present Value (2005 dollars):</b>				<b>\$1,768,000</b>

## Note:

- a Markups include general conditions consisting of overall project management, overhead, bonds and insurance, home office support, taxes, and profit
- b A duration of 30 years assumed for costing purposes; actual duration could extend beyond this assumed time period

bcy Bank cubic yard  
 IC Institutional control  
 O&M Operation and maintenance

**TABLE 12-2: COST ESTIMATE SUMMARY FOR GROUNDWATER ALTERNATIVE GW4 WITH EXCAVATION**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Description	Capital Costs	Annual Cost	5 <sup>th</sup> Year Cost	Total Cost
<b>Capital Cost</b>				
Remedial Design	\$134,000			\$134,000
Pre-design Sampling <sup>a</sup>	\$41,000			\$41,000
IC Implementation Plan	\$72,000			\$72,000
Targeted excavation to achieve ecological cleanup goal	\$70,000			\$70,000
Offsite soil disposal (90% non-hazardous)	\$112,000			\$112,000
Monitoring Well Installation (3)	\$23,000			\$23,000
Addition of MIC	\$238,000			\$238,000
Confirmation Sampling	\$30,000			\$30,000
Landscape (seeding 0.18 acre)	\$2,000			\$2,000
<b>Total Capital Costs with Markup<sup>b</sup>:</b>				<b>\$722,000</b>
<b>Operations and Maintenance</b>				
Groundwater Monitoring (10 years)		\$55,100		\$551,000
ICs (30 years) <sup>c</sup>		\$10,167		\$305,010
5-year Reviews <sup>c</sup>			\$20,000	\$120,000
<b>Total Capital and O&amp;M costs with Markups:</b>				<b>\$1,698,000</b>
<b>Contingency (20%):</b>				<b>\$334,000</b>
<b>Total costs with markups and contingency costs:</b>				<b>\$2,032,000</b>
<b>Escalation (base January 2005):</b>				<b>\$0</b>
<b>Total Alternative GW4 Costs:</b>				<b>\$2,032,000</b>
<b>Net Present Value<sup>d</sup> (2005 dollars):</b>				<b>\$1,758,000</b>

Notes:

- a Pre-design sampling includes 100 potholes, 2 samples per hole, and an additional 20% quality assurance samples (240 samples total); it is assumed that each sample will be analyzed for total copper only
- b Markups include general conditions consisting of overall project management, overhead, bonds and insurance, home office support, taxes, and profit
- c A duration of 30 years assumed for costing purposes; actual duration could extend beyond this assumed time period
- d The total net present value in 2005 dollars has increased from the value presented in the Site 28 FS report due to augmentation of the groundwater remedy.

- cy cubic yard
- IC Institutional control
- MIC Metals immobilization compound
- O&M Operation and maintenance

## 13.0 STATUTORY DETERMINATIONS

The Navy's primary responsibility in regard to CERCLA is to undertake remedial actions that achieve the statutory requirements for adequate protection of human health and the environment. In addition, CERCLA § 121 establishes several statutory requirements and preferences. This includes the requirement that remedial actions comply with ARARs established under federal or more stringent state laws or regulations unless a statutory waiver is justified. The selected remedy also must be cost-effective and use permanent solutions and alternative treatment technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that, as their principal element, permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances. The following sections discuss how the selected remedy meets these statutory requirements and preferences. Complete discussions are found in the FS Report for Site 28 (Bechtel 2005).

### 13.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The RAOs for Site 28 are to:

- Minimize the potential risk of exposure (through ingestion or dermal contact) of a recreational visitor or occupational worker to unacceptable levels of arsenic, lead, and PAHs in soil.
- Either prevent exposure (through ingestion or dermal contact) of future residents to unacceptable levels of arsenic, lead, and PAHs in soil or prohibit residential use of the property.
- Prevent potential exposure of aquatic offshore receptors (in the Oakland Inner Harbor) to copper in surface water at the POE exceeding the CTR continuous concentration criterion of 3.1 µg/L.

The selected remedies protect human health and the environment.

The soil remedy will remove soil containing high concentrations of arsenic, lead, and PAHs, such that the remaining soil is considered safe for recreational visitors. The groundwater remedy will immobilize copper to prevent migration into the Oakland Inner Harbor, protecting aquatic organisms. Short-term risks are associated with the selected remedies that can be readily controlled. In addition, adverse cross-media effects are not expected.

### 13.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

CERCLA § 121(d)(1) states that remedial actions on CERCLA sites must attain (or the decision document must justify the waiver of) any federal or more stringent state environmental standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate. The remedial alternatives selected by the Navy and described in

Section 12.0 would attain and comply with the substantive provisions of all statutes and promulgated regulations identified as ARARs.

CERCLA § 121(e), 42 U.S.C. § 9621(e), states that no federal, state, or local permit is required for remedial actions selected and carried out in compliance with CERCLA § 121 and conducted entirely on site. Waste generated during the implementation of the remedial actions would be characterized for off-site disposal and would comply with all legally applicable requirements for proper off-site disposal.

The chemical-, location-, and action-specific ARARs for the remedy selected in this ROD are summarized in Table 13-1, Table 13-2, and Table 13-3. Federal ARARs identified for this remedial action reflect a determination by the Navy that a federal environmental standard, requirement, criteria, or limitation exists that is applicable or relevant and appropriate to the conditions at Site 28 or to the remedial actions to be taken at Site 28. State ARARs identified for this remedial action reflect a determination by the Navy that the state environmental standard, requirement, criteria, or limitation was identified by the state, constituted a potential ARAR, and was either more stringent than the federal ARAR or had no comparable federal ARAR.

### **13.2.1 Chemical-Specific ARARs**

This section summarizes the analysis of chemical-specific ARARs identified for Site 28. Chemical-specific ARARs are health- or risk-based numerical values or methodologies that, when applied to site-specific conditions, establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the environment. Chemical-specific ARARs for the selected alternatives are presented in Table 13-1 and described below by medium.

#### **13.2.1.1 Soil**

Excavation activities will generate soil waste that the Navy will dispose of off site. The Navy has identified substantive provisions of the following regulations as federal ARARs that require the characterization of waste for proper off-site disposal:

- RCRA regulations defining a hazardous waste at Cal. Code Regs. Tit. 22, §§ 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100

The Navy also accepted the substantive provision of the following regulations as state ARARs for the characterization of waste for proper off-site disposal:

- Definition of non-RCRA, state-regulated hazardous waste at Cal. Code Regs. Tit. 22, §§ 66261.22(a)(3) and (4), 66261.24(a)(2) to (a)(8), 66261.101, 66261.3(a)(2)(C) or 66261.3(a)(2)(F)
- Definition of designated waste, nonhazardous solid waste, and inert waste at Cal. Code Regs. Tit. 27, §§ 20210, 20220, 20230

If the Navy determines that excavated soil meets the regulatory definition of any of the following regulated wastes—(1) RCRA hazardous waste, (2) non-RCRA state regulated hazardous waste, (3) designated waste, or (4) nonhazardous solid waste—the Navy will dispose of it in classified waste management units and will comply with all legally applicable requirements for proper off-site disposal, such as packaging, labeling, and placarding.

### **13.2.1.2 Groundwater**

#### **Federal**

One of the significant issues in identifying ARARs for groundwater is whether the groundwater is a current source of drinking water or can be classified as a potential source of drinking water. Groundwater at Site 28 is not currently used as a drinking water source. In order to determine whether the groundwater is a potential drinking water source, the Navy evaluated the groundwater against both federal and state groundwater classification criteria. The determination regarding the federal criteria is presented in this subsection, and the determination regarding the state criteria is presented in the next subsection. The Navy, together with the BCT, has determined that groundwater is unlikely to be used as a potential drinking water source in the future according to federal criteria. As discussed in Section 6.2, groundwater in the FWBZ meets the EPA's definition of a Class II aquifer under the federal classification criteria; however, the NAS Alameda BCT concluded that it is unlikely to be used as a potential drinking water source based on several site-specific factors (EPA 2000). Further, the Navy and the BCT have determined that groundwater in the SWBZ meets the EPA's definition of a Class III aquifer (EPA 2000). Because the groundwater is unlikely to be used as a potential drinking water source, the Navy has determined that drinking water standards, such as federal and state primary MCLs and non-zero MCL goals, are not chemical-specific ARARs for this CERCLA action.

The Navy identified substantive provisions of the RCRA groundwater protection standards contained in Cal. Code Regs. Tit. 22 § 66264.94 as federal, chemical-specific ARARs. These regulations are applicable to RCRA-regulated units. The CERCLA remedial action for groundwater at Site 28 is not for releases from RCRA-regulated units; however, the Navy has determined these regulations are relevant and appropriate. Cal. Code Regs. Tit. 22 § 66264.94(a)(1) and (3) states that for each COC and for each medium monitored, the owner or operator shall propose a concentration limit not to exceed the background concentration or a concentration limit greater than background established for a corrective action program.

Cal. Code Regs. Tit. 22 § 66264.94(c) states that a concentration limit greater than the background value can be used only if it is technologically or economically infeasible to achieve the background value and the concentration limit greater than background will not pose a substantial present or potential hazard to human health or the environment. Cal. Code Regs. Tit. 22 § 66264.94(e) states that in no event shall a concentration limit greater than background exceed other applicable statutes or regulations (such as a maximum contaminant level [MCL]), or the lowest concentration demonstrated to be technologically and economically achievable. Although the narrative standard of the 'lowest concentration demonstrated to be technologically

and economically achievable' is the ARAR for groundwater at Site 28, the remedial goal for copper (CTR criterion of 3.1 µg/L) is at the lower end of the range of background copper concentrations in groundwater at Alameda Point (1.8 to 27.3 µg/L). In addition, the treatment technique action level (considered to be the MCL) is 1.3 mg/L, which is substantially higher than the remedial goal (3.1 µg/L). Therefore, by achieving the CTR criterion in surface water at the POE, the copper concentration will be within the range of background concentrations for copper in groundwater and also will be lower than the MCL. MCLs are not considered ARARs because groundwater at Site 28 is not a current or potential source of drinking water.

The ecological receptor exposure pathway for the Oakland Inner Harbor will be mitigated with this remedial action. The CTR criterion for copper is a chemical-specific ARAR applicable to the ecological receptor in the Oakland Inner Harbor. Therefore, the lowest feasible concentration limit is based on this pathway, which will be addressed by the implementation of augmented remedial Alternative GW4. The surface water remediation goal of 3.1 µg/L for copper will be applied at the POE where groundwater discharges from Site 28 to the Oakland Inner Harbor. The Navy will develop a POM trigger level based on remedial design groundwater modeling.

## **State**

### **Basin Plan**

The Navy accepts the substantive provisions of Chapter 2, except for the municipal or domestic supply designation, and Chapter 3 as state chemical-specific ARARs. The Navy also accepts the substantive provisions of California Water Code §§ 13241, 13243, 13263(a), 13269, and 13360 of the Porter-Cologne Act as enabling legislation as implemented through the beneficial uses, water quality objectives, waste discharge requirements, promulgated policies of the Basin Plan, and SWRCB Res. 88-63 as state chemical-specific ARARs.

Chapter 2 of the Basin Plan designates groundwater at NAS Alameda with the following existing or potential beneficial uses:

- Municipal or domestic supply
- Industrial process water supply
- Industrial service water supply
- Agricultural supply

Groundwater at Alameda Point is not designated in the Basin Plan as an existing or potential freshwater replenishment to surface water (Water Board 1995). The Basin Plan indicates that freshwater replenishment designations will be completed at a later date, and until then, a site-by-site determination will be made. Chapter 3 of the Basin Plan provides narrative and numerical

water quality objectives to protect and maintain these beneficial uses of the water (Water Board 1995).

Despite the municipal and domestic supply designation in the Basin Plan, groundwater at Site 28 is not being used as a current drinking water source and is unlikely to be used as a drinking water source in the future. Using the state criteria contained in SWRCB Resolution 88-63, the Navy, with concurrence from the Water Board, has determined that because of the poor quality of groundwater in the FWBZ, groundwater within 200 feet of the shoreline is not a likely source of drinking water (Water Board 2003). There is a potential for salt water intrusion, there are no conduits to the Alameda Aquifer, there are no nearby supply wells, and ICs to restrict extraction will be implemented (Water Board 2006). The Water Board concurred with the Navy's determination that groundwater in the SWBZ is not a potential source of drinking water under state standards (Water Board 2003). Because the groundwater is not a current or potential drinking water source, the Navy has determined that drinking water standards, such as federal and state MCLs and non-zero MCL goals, are not chemical-specific ARARs.

#### **SWRCB Res. 88-63**

The Navy has also accepted the substantive provisions of SWRCB Res. 88-63 as a state ARAR. Res. 88-63 provides that all groundwater within the State of California is considered suitable or potentially suitable for domestic or municipal freshwater supply except where any one of the following water quality and production criteria cannot be achieved:

- TDS exceed 3,000 mg/L (or electrical conductivity is greater than 5,000 micromhos per centimeter) and the Water Board does not reasonably expect the groundwater to supply a public supply system.
- Groundwater is contaminated, either by natural processes or by human activity unrelated to a specific pollution incident, and cannot reasonably be treated for domestic use either by best management practices or best economically available treatment practices.
- Groundwater does not provide sufficient water to supply a single well capable of producing an average sustained yield of 200 gallons per day.

The Navy and the Water Board concur that groundwater at Site 28 is not a potential drinking water source based on SWRCB Res. 88-63 (Water Board 2003). The Water Board in their letter dated October 2006, concurs that groundwater in the FWBZ beneath Site 28 within 200 feet of the shoreline is not a likely source of drinking water because of the potential for salt water intrusion, the absence of conduits to the Alameda Aquifer, the absence of nearby supply wells, and the implementation of ICs to restrict extraction.

## **The Navy's Position Regarding SWRCB Res. 92-49 and 68-16**

The Navy recognizes that the key substantive requirements of Cal. Code Regs. Tit. 22, § 66264.94 (and the identical requirements of Cal. Code Regs. Tit. 23, § 2550.4 and Section III.G of SWRCB Res. 92-49) require cleanup of chemicals to background levels unless that is technologically or economically infeasible and an alternative cleanup level will not pose a substantial present or potential hazard to human health or the environment. In addition, the Navy recognizes that these provisions are more stringent than the corresponding provisions of 40 CFR § 264.94 and, although they are federally enforceable under RCRA, they are also independently based on state law to the extent that they are more stringent than the federal regulations.

The Navy has determined that SWRCB Res. 68-16 is not a chemical-specific ARAR for determining response action goals. However SWRCB Res. 68-16 is an action-specific ARAR for regulating discharged treated groundwater back into the aquifer. The Navy has determined that further migration of already contaminated groundwater is not a discharge governed by the language in Res. 68-16. More specifically, the language of SWRCB Res. 68-16 indicates that it is prospective in intent, applying to new discharges in order to maintain existing high-quality waters. It is not intended to apply to restoration of waters that are already degraded.

The Navy's position is that SWRCB Res. 68-16 and Res. 92-49 and Cal. Code Regs. Tit. 23 § 2550.4 do not constitute chemical-specific ARARs for this selected remedy because they are state requirements and are not more stringent than the federal ARAR provisions of Cal. Code Regs. Tit. 22 § 66264.94. The NCP set forth in 40 CFR § 300.400(g) provides that only state standards more stringent than federal standards may be ARARs (see also CERCLA § 121[d][2][A][ii]).

The substantive technical standard in the equivalent state requirements (that is, Cal. Code Regs. Tit. 23, Division [div.] 3, Chapter [ch.] 15 and SWRCB Res. 92-49 and Res. 68-16) is identical to the substantive technical standard in Cal. Code Regs. Tit. 22, § 66264.94. This section of Cal. Code Regs. Tit. 22 will likely be applied in a manner consistent with equivalent provisions of other regulations, including SWRCB Res. 92-49 and Res. 68-16.

## **State of California's Position Regarding SWRCB Res. 92-49 and 68-16**

The state does not agree with the Navy determination that SWRCB Res. 92-49 and Res. 68-16 and certain provisions Cal. Code Regs. Tit. 23, div. 3, ch. 15 are not ARARs for this selected remedy. SWRCB has interpreted the term "discharges" in the California Water Code to include the movement of waste from soils to groundwater and from contaminated to uncontaminated water (SWRCB 1994). However, the state agrees that the proposed action would comply with SWRCB Res. 92-49 and Res. 68-16, and compliance with Cal. Code Regs. Tit. 22 provisions should result in compliance with Cal. Code Regs. Tit. 23 provisions. The state does not intend to dispute the ROD, but reserves its rights if implementation of the Cal. Code Regs. Tit. 22 provisions is not as stringent as state implementation of Cal. Code Regs. Tit. 23 provisions. Because the Cal. Code Regs. Tit. 22 regulation is part of the state's authorized hazardous waste

control program, it is also the state's position that Cal. Code Regs. Tit. 22, § 66264.94 is a state ARAR and not a federal ARAR (*United States v. State of Colorado*, 990 F.2d 1565 [1993]).

Whereas the Navy and the State of California have not agreed on whether SWRCB Res. 92-49 and Res. 68-16 and Cal. Code Regs. Tit. 23, § 2550.4 are ARARs for this response action, this ROD documents each of the parties' positions on the resolutions but does not attempt to resolve the issue.

### **13.2.1.3 Surface Water**

Contaminated groundwater from Site 28 discharges to surface water. The Navy has identified the substantive provisions of the following requirements as federal ARARs.

#### **Federal**

##### **Water Quality Standards**

On December 22, 1992, the EPA promulgated federal water quality standards under the authority of the federal Clean Water Act § 303(c)(4)(B), 33 U.S.C., ch. 26, § 1313, in order to establish water-quality standards required by the Clean Water Act where the State of California and other states had failed to do so (*57 Federal Register* [Fed. Reg.] 60848 [1992]). These standards have been amended over the years in the Fed. Reg., including the amendments of the National Toxics Rule (60 Fed. Reg. 22228 [1995]). The water quality standards, as amended, are codified at 40 CFR § 131.36. The water quality standards contained in 40 CFR § 131.36(a) are potential applicable federal ARARs for discharge to or cleanup of surface water. Additional and revised water quality standards for salinity for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary were codified at 40 CFR § 131.37.

The EPA promulgated a rule on May 18, 2000, to fill a gap in California water quality standards that was created in 1994 when a state court overturned the state's water quality control plans that contained water quality criteria for priority toxic pollutants. The rule is commonly called the CTR ("California Toxics Rule"). The rule is codified at 40 CFR § 131.38. These federal criteria are legally applicable in the State of California for inland surface waters and enclosed bays and estuaries for all purposes and programs under the Clean Water Act. They are also potential applicable requirements for groundwater that discharges to surface waters.

These standards of the CTR apply to the state's designated uses and supersede any criteria adopted by the State, except when State regulations contain criteria which are more stringent for a particular use in which case the State's criteria will continue to apply.

The water quality standards contained in 40 CFR § 131.38 are applicable federal ARARs for surface water and will be met at the POE, where groundwater discharges to surface water (Oakland Inner Harbor).

## State

### Basin Plan

Chapter 3 of the Basin Plan contains the narrative and numerical water quality objectives for ocean waters, surface water, and groundwater. Table 3-3 of the Basin Plan identifies surface water quality objectives for marine waters in which salinity is equal to or greater than 10 parts per thousand 95 percent of the time. These water quality objectives apply to the all marine waters except for South Bay, south of Dumbarton Bridge. So, these water quality objectives apply to the surface water of the Oakland Inner Harbor. There is no promulgation for copper in Table 3-3 in the Basin Plan. Instead, in a footnote to Table 3-3, the Basin Plan states that the water quality objective for copper was promulgated by the CTR. The Navy has identified the CTR for copper as a federal ARAR. Table 3-3 in the Basin Plan is not an ARAR because there is no independent state promulgation of a water quality objective for copper.

### 13.2.2 Location-Specific ARARs

Location-specific ARARs are restrictions on the concentrations of hazardous substances or on conducting activities solely because they are in specific locations. Specific locations include floodplains, wetlands, historic places, and sensitive ecosystems or habitats. Location-specific ARARs for the selected remedies are presented in Table 13-2. The substantive provisions of the following requirements are the most stringent of the potential federal location-specific ARARs for remediation at Site 28:

- Migratory Bird Treaty Act of 1972 (16 U.S.C. §§ 703-712) protecting almost all species of native migratory birds in the U.S. from unregulated takings, which can include poisoning at hazardous waste sites.
- Coastal Zone Management Act at 16 U.S.C. § 1456(c) and 15 CFR § 930 requiring activities that affect the coastal zone be conducted in a manner consistent with approved state management programs, including the San Francisco Bay Plan.

The substantive provisions of the Migratory Bird Treaty Act cited above are ARARs because migratory birds are present on NAS Alameda and may pass through Site 28. The Navy has concluded that the selected remedy will not affect any migratory birds.

The Coastal Zone Management Act was evaluated and certain substantive provisions were determined to be relevant and appropriate requirements because the remedies selected in this ROD contemplate activity within the coastal zone. Coastal Zone Management Act § 1456(c)(1)(A) requires each federal agency activity within or outside the coastal zone that affects any land or water use or natural resource to conduct its activities in a manner that is consistent with the maximum extent practicable with enforceable policies of approved state management policies.

The substantive provisions of the following requirements are the most stringent of the potential state location-specific ARARs for remediation at Site 28:

- McAteer-Petris Act (California Government Code 66600 through 66661 as authorizing legislation for the San Francisco Bay Plan) and the San Francisco Bay Plan at Cal. Code Regs. Tit. 14 §§ 10110 through 11990 regulating activities that affect the San Francisco Bay.

The State of California's approved coastal management program includes the McAteer-Petris Act, the authorizing legislation for the Bay Plan, and the San Francisco Bay Plan developed by the Bay Conservation and Development Commission. Substantive provisions of this statute and plan are state ARARs. The remedial actions selected in this ROD will be completed in a manner consistent with the substantive provisions of the San Francisco Bay Plan which include limitations on filling the Bay, promoting public access, regulating development, and the minimization of harmful effects on the Bay.

The substantive provisions of the Endangered Species Act of 1973 are not ARARs because neither the California least tern, a federal endangered species, nor its habitat is present at Site 28 (Navy and Tetra Tech EM Inc. 1997).

### **13.2.3 Action-Specific ARARs**

Action-specific ARARs are technology- or activity-based requirements or limitations for remedial activities. These requirements are triggered by the particular remedial activities conducted at the site. Action-specific ARARs for the selected remedies are presented in Table 13-3. The substantive provisions of the following requirements are the most stringent of the potential federal and state action-specific ARARs for remediation of soil and groundwater at Site 28.

#### **13.2.3.1 Soil Remedy**

##### **Excavation and Off-Site Disposal**

##### **RCRA**

The Navy will stockpile excavated soil in RCRA temporary staging piles for off-site disposal. The RCRA temporary staging pile requirements allow generators of RCRA hazardous waste to accumulate solid remediation waste in a staging pile for up to 2 years without meeting land disposal restrictions. The Navy will characterize excavated soil and any other waste generated during construction and operations of the soil and groundwater remedies according to RCRA characterization requirements. The Navy will comply with the substantive provisions of the chemical-specific ARARs identified above to determine if the excavated soil is a regulated waste. If excavated soil is a regulated waste, the Navy will comply with all legally applicable requirements for off-site disposal.

The substantive provisions of the following requirements are federal ARARs and are the most stringent of the potential federal and state action-specific ARARs for the soil remedy:

- RCRA requirements at Cal. Code Regs. Tit. 22, §§ 66262.10(a), 66262.11, and 66264.13(a) and (b) to characterize and analyze generated waste
- RCRA requirements at 40 CFR § 264.554(d)(1)(i-ii), (d)(2), (e), (f), (h), (i), (j), and (k) that allow for temporarily stockpiling soil prior to disposal without meeting land disposal restriction requirements
- RCRA requirements at Cal. Code Regs. Tit. 22, § 66264.258(a) and (b) for closing the temporary stockpiles

### **Clean Air Act**

- Bay Area Air Quality Management District regulation 6-302 prohibiting emissions from any source for a period of more than 3 minutes in an hour equal to or greater than 20 percent opacity
- Bay Area Air Quality Management District Regulation 8-40 requiring that soil contaminated with VOCs in active stockpiles be kept visibly moist or covered

### **Storm Water**

- Clean Water Act § 402(p) and its implementing regulations at 40 CFR § 122.44(k)(2) and (4) requiring best management practices to control or abate stormwater discharges

In November 16, 1990, EPA final regulations were promulgated implementing Clean Water Act § 402(p), which sets forth the requirements for the Phase I Stormwater National Pollution Discharge Elimination System (NPDES) permit requirements (55 Fed. Reg. 47990). EPA's Phase I Stormwater NPDES regulations require that owners and operators of construction activities obtain permit coverage and be in compliance with discharge standards. The Phase II Stormwater Rule was promulgated on December 8, 1999. On March 10, 2003, the new Phase II regulations came into effect. The Phase II requirements effectively lower the size limit on construction activities covered by the requirements from activities disturbing 5 acres or more (Phase I) to those disturbing 1 acre or more (Phase II).

Under the Clean Water Act and its implementing regulations, NPDES permits or coverage under promulgated stormwater general permits are required for construction that disturbs at least 1 acre. The State of California has promulgated a stormwater general permit at Order No. 99-08-DWQ. Under CERCLA § 121(e)(1), no federal, state, or local permit is required for any remedial action conducted entirely on site when it is selected and carried out in compliance with CERCLA § 121. Therefore, the Navy is not required to obtain an individual stormwater permit

or submit a notice of intent to discharge under the state's general permit. However, the Navy will use the substantive requirements of the state's general permit as criteria to be considered (TBC) for complying with the requirement to apply best management practices for stormwater discharges promulgated under the Clean Water Act § 402(p), 40 CFR § 122.44(k)(2) and (4), and related state laws.

The Navy will comply with these Clean Water Act ARARs for each site where soil sampling results indicate that excavation is necessary and that excavation at the site will disturb 1 or more acres.

### **Institutional Controls**

There are no federal ARARs for ICs. The substantive portions of the following state statutes have been accepted by Navy as "relevant and appropriate" state ARARs for implementing ICs and entering into a Covenant to Restrict Use of Property with DTSC:

- California Civil Code Land Use Controls § 1471
- California Health and Safety Code Land Use Controls §§ 25202.5, 25222.1, 25232(b), 25233 (c), 25234, and 25355.5(a)(1)(C)

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

The substantive provision of California Health and Safety Code § 25202.5 is the general narrative standard to restrict "present and future uses of all or part of the land on which the ... facility ... is located ..." This substantive provision will be implemented by incorporation of restrictive environmental covenants in the Covenant to Restrict Use of Property at the time of transfer for purposes of protecting present and future public health and safety.

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

California Health and Safety Code § 25355.5(a)(1)(C) provisions are “relevant and appropriate”: “... execution and recording of a written instrument that imposes an easement, covenant, restriction, or servitude, or combination thereof, as appropriate, upon the present and future uses of the land.”

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

Actual land-use restriction requirements are set forth in California Health & Safety Code 25232(b)(1)(A)-(E). These include prohibitions on construction of residences, hospitals for humans, schools for persons under 21 years of age, day care centers, or any permanently occupied human habitation on hazardous waste property. California Health & Safety Cos 25233(c) sets forth substantive criteria for granting variances from the uses prohibited in California Health & Safety Code 25232(b)(1)(A)-(E) based on specified environmental health criteria.

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

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

DTSC promulgated a regulation on April 19, 2003, regarding “Requirements for Land-Use Covenants” at Cal. Code Regs. Tit. 22, § 67391.1. The substantive provisions of this regulation have been determined to be “relevant and appropriate” state ARARs by the Navy.

U.S. EPA considers the following portions of 22 Cal. Code Regs. 67391.1 to be relevant and appropriate for this ROD: (a)(1), (a)(2), (d), (e)(1) and (e)(2). DTSC’s position is that all of the state statutes and regulations referenced in this section are ARARs.

### 13.2.3.2 **Groundwater Remedy**

The groundwater remedy includes continued groundwater monitoring, three rounds of injection of MIC, and ICs. The substantive provisions of the following RCRA corrective action groundwater monitoring requirements are relevant and appropriate federal action-specific ARARs.

#### **Groundwater Monitoring and MIC Injection**

The substantive provisions of the following requirements are federal ARARs and are the most stringent of the potential federal and state action-specific ARARs for the groundwater remedy:

- Safe Drinking Water Act underground injection control requirements at 40 CFR § 144.12, excluding 144.12(b) and 144.12(c)(1), prohibiting injection that allows movement of contaminants into underground sources of drinking water that may result in violations of MCLs or adversely affect human health

The current remedy requires injection of MIC into the vadose zone soil. The Navy does not anticipate that this injection will result in the movement of any contaminant into a drinking water source. Specific parameters of the treatment system will be described in the remedial design, which will include the methods by which the Navy will monitor plume movement to comply with this ARAR.

The substantive provisions of the following requirements are federal ARARs for groundwater monitoring:

- Cal. Code Regs. Tit. 22 § 66264.100(d) is used to establish and maintain a corrective action program.
- Cal. Code Regs. Tit. 22, § 66264.93 is used to determine chemicals of concern.
- Cal. Code Regs. Tit. 22, §66264.95(a) and (b) are used to determine the point of compliance.
- Cal. Code Regs. Tit. 22, §§ 66264.97(b)(1)(A), 66264.97 (b)(1)(D)(1) and (b)(1)(D)(2), 66264.97(b)(2), 66264.97(b)(4) – (7), 66264.97(e)(6), 66264.97(e)(12)(A) and (B), 66264.97(e)(13), 66264.97(e)(15) are general corrective action monitoring requirements.

The substantive provisions of the following are state ARARs because they are more stringent than the federal requirement of Cal. Code Regs. Tit. 22. § 66264.100(g):

- Cal. Code Regs. Tit. 27, 20430(g)(2) Requiring eight evenly spaced sampling events to demonstrate compliance with groundwater remedial goals.

Once the groundwater remedial goals have been met for a period of 1 year, the Navy will continue a groundwater detection monitoring program to demonstrate continued compliance with the groundwater remedial goal. If necessary, the Navy will conduct an evaluation monitoring program.

The substantive provisions of the following RCRA detection and evaluation groundwater monitoring requirements are relevant and appropriate federal action-specific ARARs.

- Cal. Code Regs. Tit. 22, § 66264.98(e)(1)-(e)(5), 66264.98(i), 66264.98(j), 66264.98(k)(1)-(k)(3), 66264.98(k)(4)(A), 66264.98(k)(4)(D), 66264.98(k)(5), 66264.98(k)(7)(C) and (D), 66264.98(n)(1), 66264.98(n)(2)(B), and (n)(2)(C) provide detection monitoring requirements.
- Cal. Code Regs. Tit. 22, § 66264.99(b), 66264.99(e)(1)-(e)(6), 66264.99(f)(3) and (g) provide evaluation monitoring requirements.
- Cal. Code Regs. Tit. 22, § 66264.97(b)(1)(A), (b)(1)(B) and (C), 66264.97(b)(4)-(7), 66264.97(e)(6), 66264.97(e)(12)(A) and (B), 66264.97(e)(13), and 66264.97(e)(15) provide general monitoring requirements.
- Cal. Code Regs. Tit. 22, § 66264.90(c)(1) and (c)(2) are used to determine when detection and evaluation monitoring are no longer required.

The substantive provisions of the following requirements are federal ARARs for characterizing any waste generated as part of the groundwater monitoring or MIC process:

- RCRA requirements at Cal. Code Regs. Tit. 22, §§ 66262.10(a), 66262.11, 66264.13(a) and (b) to characterize and analyze generated waste

The substantive provisions of the following requirements are federal ARARs for storing any hazardous waste generated in the construction of groundwater wells:

- RCRA container requirements at Cal. Code Regs., Tit. 22 §§ 66264.171, 66264.172, 66264.173, 66264.174, 66264.175(a) and (b), 66264.178.

### **Institutional Controls**

The state ARARs for the groundwater ICs are the same as the State ARARs for the soil ICs discussed in Section 13.2.3.1.

### **13.3 COST-EFFECTIVENESS**

The remediation goals at Site 28 provide for recreational use. The Navy has concluded that Alternative S4b, the selected soil remedy, would provide overall effectiveness proportional to its

costs; thus it is considered cost-effective. The present value for Alternative S4b is approximately \$1,700,000. Alternative S4b effectively provides a level of protection to human health and the environment that is similar to Alternatives S2, S3, S4a, S5, S6a, and S6b. All of the technologies included in the selected remedy are readily implementable and have been used and demonstrated to be effective.

The Navy has concluded that Alternative GW4 (GW3 in the Final Site 28 Proposed Plan dated March 2006), the selected groundwater remedy, would provide overall effectiveness proportional to its costs; thus it is considered cost-effective. The present value for Alternative GW4 (GW3 in the Final Site 28 Proposed Plan dated March 2006) is approximately \$1,804,000. Alternative GW4 (Alternative GW3 in the Final Site 28 Proposed Plan, dated March 2006) effectively provides a level of protection to human health and the environment that is similar to Alternatives GW2, and GW3. All of the technologies included in the selected remedy are readily implementable and have been used and demonstrated to be effective. Although other options provide acceptable levels of protection to human health and the environment at significantly less cost they do not meet Navy objectives of achieving permanent solutions that include a treatment element to reduce contaminant levels.

#### **13.4 USE OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES (OR RESOURCE RECOVERY TECHNOLOGIES) TO THE MAXIMUM EXTENT PRACTICABLE**

The Navy has determined that the selected remedies represent the maximum extent practicable to which permanent solutions and alternative treatment technologies can be used in a cost-effective manner for Site 28. Of all the alternatives that are protective of human health and the environment and comply with ARARs, the Navy has concluded that the selected remedies would provide the best balance of tradeoffs among the short-term effectiveness, long-term effectiveness and permanence, implementability, and cost. The selected remedies are expected to be permanent and effective over the long-term land use.

#### **13.5 PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT**

The remedies satisfy the statutory preference for treatment as a principal element of the remedy; that is, reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment.

#### **13.6 5-YEAR REVIEW REQUIREMENTS**

A 5-year review pursuant to CERCLA § 121 and the NCP is required if the selected remedies result in hazardous waste or chemicals remaining at Site 28 above levels allowing for unrestricted use of the site. Because contaminants will remain on site which will preclude unrestricted use, reviews will be conducted until such time as ICs are lifted or the site is suitable for unrestricted use.

***TABLES***

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**TABLE 13-1: CHEMICAL-SPECIFIC<sup>A</sup> APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Requirement	Prerequisite	Citation <sup>b</sup>	ARAR Determination	Comments
<b>SOIL</b>				
<b>Federal</b>				
<b>Resource Conservation and Recovery Act (Tit. 42 U.S.C., Chapter 82, §§ 6901 through 6991[i])<sup>c</sup></b>				
Defines RCRA hazardous waste. A solid waste is characterized as toxic, based on the TCLP, if the waste exceeds the TCLP maximum concentrations.	Waste	Cal. Code Regs. Tit. 22, § 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100	Applicable	Applicable for determining whether waste is hazardous.
<b>State</b>				
<b>State and Regional Water Quality Control Boards<sup>b</sup></b>				
Definitions of designated waste, nonhazardous solid waste, and inert waste.	Waste	Cal. Code Regs. Tit. 27 §§ 20210, 20220, and 20230	Applicable	Applicable for determining whether waste is designated, nonhazardous solid, or inert.
<b>Department of Toxic Substances Control<sup>c</sup></b>				
Definition of "non-RCRA hazardous waste."	Waste	Cal. Code Regs. Tit. 22, § 66261.22(a)(3) and (4), § 66261.24(a)(2)–(a)(8), § 66261.101, § 66261.3(a)(2)(C) or § 66261.3(a)(2)(F)	Applicable	Applicable for determining whether a waste is a non-RCRA state regulated hazardous waste.

**TABLE 13-1: CHEMICAL-SPECIFIC<sup>A</sup> APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Requirement	Prerequisite	Citation <sup>b</sup>	ARAR Determination	Comments
<b>GROUNDWATER</b>				
<b>Federal</b>				
<b>Resource Conservation and Recovery Act (Tit. 42 U.S.C., Chapter 82, §§ 6901 through 6991[i])<sup>c</sup></b>				
Owners/operators of RCRA TSD facilities must comply with conditions designated to assure that hazardous constituents entering groundwater from a regulated unit do not exceed concentration limits for chemicals of concern set forth under Cal. Code Regs. Tit. 22, § 66264.94 in the uppermost aquifer underlying the waste management area beyond the point of compliance.	Waste	Cal. Code Regs., Tit. 22, § 66264.94 (a)(1), (a)(3), (c), and (e)	Relevant and Appropriate	Applicable only for regulated TSD facilities. Site 28 was not a RCRA TSD and groundwater contamination did not result from a release of a RCRA-regulated waste. However, substantive provisions of these requirements are potentially relevant and appropriate to site circumstances.
<b>State</b>				
<b>State and Regional Water Quality Control Boards<sup>c</sup></b>				
Authorizes the SWRCB and the Water Board to establish beneficial uses in water quality control plans and numerical and narrative standards to protect both surface water and groundwater quality. Authorizes regional water boards to issue permits for discharges to land or surface or groundwater that could affect water quality, including NPDES permits, and to take enforcement action to protect water quality.	Waters of the State	California Water Code, div. 7, §§ 13241, 13243, 13263(a), 13269, and 13360 (Porter-Cologne Water Quality Control Act)	Applicable	The Navy accepts the substantive provisions of §§ 13241, 13243, 13263(a), 13269, and 13360 of the Porter-Cologne Act enabling legislation, as implemented through the beneficial uses, water quality objectives, waste discharge requirements, and promulgated policies of the Basin Plan as ARARs.

**TABLE 13-1: CHEMICAL-SPECIFIC<sup>A</sup> APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Requirement	Prerequisite	Citation <sup>b</sup>	ARAR Determination	Comments
<b>GROUNDWATER (Continued)</b>				
<b>State (Continued)</b>				
<b>State and Regional Water Quality Control Boards<sup>c</sup> (Continued)</b>				
Describes the water basins in the San Francisco Bay Region, establishes beneficial uses of groundwater and surface water, establishes water quality objectives, including narrative and numerical standards, and incorporates statewide water quality control plans and policies.	Waters of the State	Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan)  Chapters 2 and 3 (California Water Code §13240) except MUN designation	Applicable	Substantive provisions in Chapters 2 and 3 of the Water Quality Control Plan for San Francisco Bay are ARARs, except for the municipal beneficial use designation. The beneficial uses for the East Bay subbasin are agricultural, industrial service, and industrial process supplies. These uses also apply to the shallow groundwater system at Alameda Point. The pertinent substantive water quality objectives are narrative as quoted in the requirement column.
Incorporated into all Water Board basin plans. Designates all groundwater and surface waters of the state as drinking water except where the total dissolved solids exceed 3,000 milligrams per liter, and it is not reasonably expected by the Water Board to supply a public water system.	Waters of the State	SWRCB Resolution 88-63 (Sources of Drinking Water Policy)	Applicable	This resolution is an ARAR for groundwater at Site 28. The Water Board has granted an exemption as discussed in Section 6.2 that states 'this exemption does not consider groundwater in the first water-bearing zone (FWBZ) below Site 28 to be a potential drinking water source.'

**TABLE 13-1: CHEMICAL-SPECIFIC<sup>A</sup> APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Requirement	Prerequisite	Citation <sup>b</sup>	ARAR Determination	Comments
<b>SURFACE WATER</b>				
<b>Federal</b>				
<b>Clean Water Act of 1977, as Amended (33 U.S.C., ch. 26, §§ 1251–1387)<sup>c</sup></b>				
Water quality standards.	Discharges to waters of the United States	40 CFR § 131.38	Applicable	Applicable to Oakland Inner Harbor. The groundwater remedy will comply with this ARAR in surface water at the POE.

Notes:

- a Chemical-specific concentrations used for feasibility study evaluation may not be ARARs indicated in this table but may be based on other factors, including human health risk-based concentrations (40 CFR § 300.430[e][2][i][A][1] and [2]) or ecological risk-based concentrations (40 CFR § 300.430 [e][2][i][G]), or practical quantification limits of contaminants (40 CFR § 300.430[e][2][i][A][3]). Many potential action-specific ARARs contain chemical-specific limitations and are addressed in the action-specific ARAR table.
- b Only the substantive provisions of the requirement(s) cited in this table are ARARs.
- c Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as ARARs; specific ARARs are addressed in the table below each general heading; only pertinent substantive requirements of specific citations are considered ARARs.

§	Section
§§	Sections
ARAR	Applicable or relevant and appropriate requirement
Cal. Code Regs.	<i>California Code of Regulations</i>
CFR	<i>Code of Federal Regulations</i>
LDR	Land disposal restrictions
MUN	Municipal (beneficial use designation for groundwater)
NPDES	National Pollutant Discharge System
RCRA	Resource Conservation and Recovery Act
SWRCB	State Water Resources Control Board
TCLP	Toxic Characteristic Leaching Procedure
Tit.	Title
TSD	Treatment, storage, and disposal
U.S.C.	<i>United States Code</i>
Water Board	San Francisco Bay Regional Water Quality Control Board

**TABLE 13-2: LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Location	Requirement	Prerequisite	Citation <sup>a</sup>	ARAR Determination	Comments
<b>Federal ARARs</b>					
<b>Migratory Bird Treaty Act of 1972 (16 U.S.C. §§ 703-712)<sup>b</sup></b>					
Migratory bird area	Protects almost all species of native birds in the U.S. from unregulated "take" that can include poisoning at hazardous waste sites.	Presence of migratory birds.	16 U.S.C. § 703	Relevant and appropriate	Migratory birds are present at NAS Alameda and may pass through Site 28. The Navy has determined that the soil and groundwater remedies will not affect any migratory birds.
<b>Coastal Zone Management Act (16 U.S.C. §§ 1451 – 1464)<sup>b</sup></b>					
Within coastal zone	Conduct activities in a manner consistent with approved state management programs.	Activities affecting the coastal zone, including land under and adjacent to shore land.	16 U.S.C. § 1456(c) 15 CFR § 930	Relevant and Appropriate	Coastal Zone Management Act § 1456(c)(1)(A) requires each federal agency activity within or outside the coastal zone that affects any land or water use or natural resource to conduct its activities in a manner that is consistent to the maximum extent practicable with enforceable policies of approved state management policies.
<b>State ARARs</b>					
<b>McAteer-Petris Act (California Government Code 66600 through 66661)<sup>b</sup></b>					
Within the San Francisco Bay coastal zone	Reduce fill and disposal of dredged material in San Francisco Bay, maintain marshes and mudflats to the fullest extent possible to conserve wildlife, abate pollution, and protect the beneficial uses of the bay.	Activities affecting San Francisco Bay and 100 feet of the shoreline.	San Francisco Bay Plan at Cal. Code Regs. Tit.14.10110 through 11990	Relevant and appropriate	The remedial action selected in this ROD is in compliance with the substantive purposes of the San Francisco Bay Plan.

**TABLE 13-2: LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Notes:

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

§	Section
§§	Sections
ARAR	Applicable or relevant and appropriate requirement
Bay	San Francisco Bay
Cal. Code Regs.	<i>California Code of Regulations</i>
CFR	<i>Code of Federal Regulations</i>
CZMA	Coastal Zone Management Act
Navy	U.S. Department of the Navy
Tetra Tech	Tetra Tech EM Inc.
Tit.	Title
U.S.C.	<i>United States Code</i>

Sources:

Navy and Tetra Tech, Inc. 1997. "Biological Assessment for Disposal and Reuse of Naval Air Station Alameda and Fleet and Industrial Supply Center, Alameda Facility and Annex, Alameda, California." September.



**TABLE 13-3: ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
<b>SOIL</b>					
<b>Waste Characterization and Storage</b>					
<b>Federal</b>					
<b>Resource Conservation and Recovery Act (42 U.S.C., Chapter 82, §§ 6901-6991[ij])<sup>a</sup></b>					
On-site waste generation	Definition of RCRA hazardous waste	Generator of waste	Cal. Code Regs., Tit. 22, §§ 66262.10(a), 66262.11	Applicable	Applicable for characterization of waste generated during excavation, monitoring and MIC process.
	Requirement for analyzing waste to determine whether waste is hazardous.	Generator of waste	Cal. Code Regs., Tit. 22, § 66264.13(a) and (b)	Applicable	Applicable for characterization of waste generated during excavation, monitoring and metals remediation compound process.
Stockpile soil for disposal	Allows generators to accumulate solid remediation waste in an EPA-designated pile for storage only up to 2 years during remedial activities without triggering land disposal restrictions.	RCRA hazardous waste temporarily stored in piles	40 CFR § 264.554(d)(1)(i-ii), (d)(2), (e), (f), (h), (i), (j), and (k)	Relevant and appropriate	The Navy will stockpile excavated soil for off-site disposal in these temporary units.

**TABLE 13-3: ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
<b>SOIL (Continued)</b>					
<b>Waste Characterization and Storage (Continued)</b>					
<b>Federal (Continued)</b>					
<b>Resource Conservation and Recovery Act (42 U.S.C., Chapter 82, §§ 6901-6991[i])<sup>a</sup> (Continued)</b>					
Close stockpile	At closure, owner shall remove or decontaminate all waste residues, contaminated containment system components, contaminated subsoil, and structures and equipment contaminated with waste and leachate, and manage them as hazardous waste. If waste is left on site, perform post-closure care in accordance with the closure and post-closure care requirements that apply to landfills.	Waste pile used to store RCRA hazardous waste	Cal. Code Regs., Tit. 22, § 66264.258(a) and (b), except references to procedural requirements	Relevant and appropriate	The Navy will close the soil stockpile areas according to the substantive provisions of these requirements.

**TABLE 13-3: ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
<b>SOIL (Continued)</b>					
<b>Waste Characterization and Storage (Continued)</b>					
<b>Federal (Continued)</b>					
<b>Resource Conservation and Recovery Act (42 U.S.C., Chapter 82, §§ 6901-6991[i])<sup>a</sup> (Continued)</b>					
Container storage	Containers of RCRA hazardous waste must be: <ul style="list-style-type: none"> <li>• maintained in good condition,</li> <li>• be compatible with hazardous waste to be stored, and</li> <li>• closed during storage, except to add or remove waste.</li> </ul>	Storage in a container of RCRA hazardous waste not meeting small quantity generator criteria held for a temporary period greater than 90 days before treatment, disposal, or storage elsewhere.	Cal. Code Regs., Tit. 22, § 66264.171, 66264.172, and 66264.173	Applicable	Substantive provisions are applicable for the groundwater remedy if waste generated in constructing groundwater wells is determined to be RCRA hazardous.
	Inspect container storage areas weekly for deterioration.	Storage in a container of RCRA hazardous waste not meeting small quantity generator criteria held for a temporary period greater than 90 days before treatment, disposal, or storage elsewhere.	Cal. Code Regs., Tit. 22, § 66264.174	Applicable	Substantive provisions are applicable for the groundwater remedy if waste generated in constructing groundwater wells is determined to be RCRA hazardous.

**TABLE 13-3: ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
<b>SOIL (Continued)</b>					
<b>Waste Characterization and Storage (Continued)</b>					
<b>Federal (Continued)</b>					
<b>Resource Conservation and Recovery Act (42 U.S.C., Chapter 82, §§ 6901-6991[i])<sup>a</sup> (Continued)</b>					
Container storage (Continued)	Place containers on a sloped, crack-free base, and protect from contact with accumulated liquid. Provide containment system with a capacity of 10 percent of the volume of containers of free liquids. Remove spilled or leaked waste in a timely manner to prevent overflow of the containment system.	Storage in a container of RCRA hazardous waste not meeting small quantity generator criteria held for a temporary period greater than 90 days before treatment, disposal, or storage elsewhere.	Cal. Code Regs., Tit. 22, § 66264.175(a), (b)	Applicable	Substantive provisions are applicable for the groundwater remedy if waste generated in constructing groundwater wells is determined to be RCRA hazardous.
	At closure, remove all hazardous waste and residues from the containment system, and decontaminate or remove all containers and liners.	Storage in a container of RCRA hazardous waste not meeting small quantity generator criteria held for a temporary period greater than 90 days before treatment, disposal, or storage elsewhere.	Cal. Code Regs., Tit. 22, § 66264.178	Applicable	Substantive provisions are applicable for the groundwater remedy if waste generated in constructing groundwater wells is determined to be RCRA hazardous.



**TABLE 13-3: ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
<b>SOIL (Continued)</b>					
<b>Excavation</b>					
<b>Federal</b>					
<b>Clean Air Act (42 U.S.C. §§ 7401–7671)<sup>b</sup></b>					
Excavation	Sets forth opacity limitations	Excavation	BAAQMD Regulation 6-302	Applicable	The Navy will comply with this regulation when excavating soil.
Stockpiling of excavated soil	Provides requirements for maintaining, covering, and stockpiling excavated VOC contaminated soil.	VOC contaminated soil stockpile	BAAQMD Regulation 8-40	Applicable	The Navy will comply with this regulation when stockpiling excavated soil.

**TABLE 13-3: ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
<b>SOIL (Continued)</b>					
<b>Excavation (Continued)</b>					
<b>Federal (Continued)</b>					
<b>Clean Water Act (33 USC §§ 1251–1387)</b>					
Excavation of soil	Owners or operators must implement best management practices to control or abate storm water discharges.	Construction activities that affect at least 1 acre	Clean Water Act § 402(p) (33 USC § 1342) 40 CFR §122.44(k)(2) and (k)(4)	Applicable	<p>The Navy will comply with these Clean Water Act ARARs for each site where soil sampling results indicate that excavation is necessary and that excavation at the site will disturb 1 or more acres.</p> <p>The Navy is not required to obtain a Clean Water Act permit for storm water discharges because the excavations will occur on site. However, the Navy will use the substantive requirements of the state's general permit, Order Number 99-08-DWQ, as TBC criteria for complying with the Clean Water Act requirement to apply best management practices for storm water discharges for excavation efforts disturbing 1 or more acres.</p>

**TABLE 13-3: ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
<b>GROUNDWATER</b>					
<b>Operation of Groundwater Treatment Systems Involving Injection</b>					
<b>Federal</b>					
<b>Safe Drinking Water Act (42 USC, ch. 6A, § 300[f]-300[j]-26)<sup>b</sup></b>					
Inject MIC compound	The UIC program prohibits injection activities that allow movement of chemicals into underground sources of drinking water that may result in violations of MCLs or adversely affect human health.	An approved UIC program is required in states listed under Safe Drinking Water Act § 1422. Class I wells and Class IV wells are the relevant classifications for CERCLA sites. Class I wells are used to inject hazardous waste beneath the lowermost formation that contains an underground source of drinking water within 0.25 mile of the well.	40 CFR § 144.12, excluding the reporting requirements in § 144.12(b) and 144.12(c)(1)	Relevant and appropriate	Injection of the MIC compound will not result in the movement of contaminants into underground sources of drinking water. Groundwater monitoring is a component of the remedial action, and the Navy will use the data obtained from the groundwater monitoring to ensure that there is no movement of contaminants into underground sources of drinking water.

**TABLE 13-3: ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
<b>GROUNDWATER (Continued)</b>					
<b>Groundwater Monitoring</b>					
<b>Federal</b>					
Monitoring	The owner or operator shall establish and implement, in conjunction with the corrective action measures, a water quality monitoring program that will demonstrate the effectiveness of the corrective action program and be effective in determining compliance with the water quality protection standard and in determining the success of the corrective action measures under subsection (c) of this section.	Hazardous waste treatment, storage, or disposal facility.	Cal. Code Regs., Tit. 22, § 66264.100(d)	Relevant and Appropriate	This section is an ARAR for groundwater monitoring.
	Requirements for monitoring groundwater, surface water, and the vadose zone.	Hazardous waste treatment, storage, or disposal facility.	Cal. Code Regs., Tit. 22, § 66264.97(b)(1)(A), (b)(1)(B) and (C), 66264.97(b)(4)-(7), 66264.97(e)(6), 66264.97(e)(12)(A) and (B), 66264.97(e)(13), and 66264.97(e)(15)	Relevant and Appropriate	These sections are an ARAR for groundwater monitoring.

**TABLE 13-3: ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
<b>GROUNDWATER (Continued)</b>					
<b>Groundwater Monitoring (Continued)</b>					
<b>Federal (Continued)</b>					
Monitoring (Continued)	Requirements for a detection monitoring program.	Hazardous waste treatment, storage, or disposal facility.	Cal. Code Regs., Tit. 22, § 66264.98(e)(1-5), (i), (j), (k)(1-3), (4)(A) and (D), (5), (7)(C) and (D), (n)(1), (2)(B), and (C)	Relevant and Appropriate	These sections are an ARAR for groundwater monitoring.
	Requirements for an evaluation monitoring program.	Hazardous waste treatment, storage, or disposal facility.	Cal. Code Regs., Tit. 22, § 66264.99(b), (e)(1)–(6), (f)(3), and (g)	Relevant and Appropriate	These sections are an ARAR for groundwater monitoring.
	Requires continued monitoring until the regulated unit has been in compliance with the water quality protection standard for a period of three consecutive years and all waste, waste residues, contaminated subsoil and all other contaminated geologic materials are removed or decontaminated at closure.	Hazardous waste treatment, storage, or disposal facility.	Cal. Code Regs., Tit. 22, § 66264.90(c)(1) and (c)(2)	Relevant and Appropriate	These sections are an ARAR for groundwater monitoring.

**TABLE 13-3: ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
<b>GROUNDWATER (Continued)</b>					
<b>Groundwater Monitoring (Continued)</b>					
<b>Federal (Continued)</b>					
Chemicals of concern	Identify constituents of concern including the waste constituents, reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the regulated unit.	Hazardous waste treatment, storage, or disposal facility.	Cal. Code Regs., Tit. 22, § 66264.93	Relevant and Appropriate	This section is an ARAR for groundwater monitoring.
<b>State</b>					
	For compliance demonstration each "must have remained at or below its respective concentration limit during a proof period of at least one year...and... (2) each Monitoring Point must have been evenly distributed throughout the proof period and have consisted of no less than eight sampling events per year per Monitoring Point."	Waste discharged after 18 July 1997.	§ 20430(g)(1)	Relevant and Appropriate	This section is an ARAR for groundwater monitoring.



**TABLE 13-3: ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

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

**TABLE 13-3: ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
<b>GROUNDWATER (Continued)</b>					
<b>Institutional Controls (Continued)</b>					
<b>State (Continued)</b>					
<b>California Health and Safety Code Land Use Controls (California Health &amp; Safety Code §§ 25202.5, 25222.1, 25233(c), 25234, 25355.5) <sup>a</sup></b>					
Institutional controls	Allows DTSC to enter into an agreement with the owner of a hazardous waste facility to restrict present and future land uses.	Transfer property from the Navy to a nonfederal entity.	California Health & Safety Code § 25202.5	Relevant and Appropriate	The substantive provisions of this section are the general narrative standards to restrict "present and future uses of all or part of the land on which the facility ... is located."
	Provides a streamlined process to be used to enter into an agreement to restrict specific use of property in order to implement the substantive use restrictions.	Transfer property from the Navy to a nonfederal entity.	California Health & Safety Code § 25222.1	Relevant and Appropriate	California Health & Safety Code § 25222.1 provides the authority for the state to enter into voluntary agreements to establish land use covenants with the owner of the property. The substantive provision of California Health & Safety Code § 25222.1 is the general narrative standard: "restricting specified uses of the property."



**TABLE 13-3: ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
<b>GROUNDWATER (Continued)</b>					
<b>Institutional Controls (Continued)</b>					
<b>State (Continued)</b>					
<b>California Health and Safety Code Land Use Controls (California Health &amp; Safety Code §§ 25202.5, 25222.1, 25233(c), 25234, 25355.5)<sup>a</sup> (Continued)</b>					
Institutional controls (Continued)	Provides a process for obtaining a written variance from a land use restriction.	Transfer property from the Navy to a nonfederal entity.	California Health & Safety Code § 25233(c)	Relevant and Appropriate	California Health & Safety Code § 25233(c) sets forth substantive criteria for granting variances from the uses prohibited in § 25232(b)(1)(A)-(E) based on specific environmental and health criteria.
	Provides a process by which DTSC can remove land use restrictions.	Transfer property from the Navy to a nonfederal entity.	California Health & Safety Code § 25234	Relevant and Appropriate	California Health & Safety Code § 25234 sets forth the following "relevant and appropriate" substantive criteria for the removal of a land-use restriction on the grounds that "...the waste no longer creates a significant existing or potential hazard to present or future public health or safety."

**TABLE 13-3: ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
<b>GROUNDWATER (Continued)</b>					
<b>Institutional Controls (Continued)</b>					
<b>State (Continued)</b>					
<b>California Health and Safety Code Land Use Controls (California Health &amp; Safety Code §§ 25202.5, 25222.1, 25233(c), 25234, 25355.5)<sup>a</sup> (Continued)</b>					
Institutional controls (Continued)	Authorizes DTSC to enter into an enforceable agreement that imposes restrictions on present and future uses of the property.	Transfer property from the Navy to a nonfederal entity.	California Health & Safety Code § 25355.5(a)(1)(C)	Relevant and Appropriate	The substantive requirements of the following California Health & Safety Code § 25355.5(a)(1)(C) provisions are "relevant and appropriate": "...execution and recording of a written instrument that imposes an easement, covenant, restriction, or servitude, or combination thereof , as appropriate, upon the present and future uses of the site."



**TABLE 13-3: ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)**

Record of Decision for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda, CA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
<b>GROUNDWATER (Continued)</b>					
<b>Institutional Controls (Continued)</b>					
<b>State (Continued)</b>					
<b>Cal/EPA Department of Toxic Substances Control (Cal. Code Regs., Tit. 22, § 67391.1) <sup>a</sup></b>					
Land use covenants	A land use covenant imposing appropriate limitations on land use shall be executed and recorded when facility closure, corrective action, remedial or removal action, or other response actions are undertaken and hazardous materials, hazardous wastes or constituents, or hazardous substances will remain at the property at levels that are not suitable for unrestricted use of the land.	Property transfer by federal government to nonfederal entity.	Cal. Code Regs., Tit. 22, § 67391.1	Relevant and Appropriate	Relevant and appropriate when the Navy is transferring property to a nonfederal agency.  EPA considers the following portions of 22 Cal. Code Regs. 67391.1 to be relevant and appropriate for this ROD: (a)(1), (a)(2), (d), (e)(1) and (e)(2).

Notes:

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

§	Section	EPA	U.S. Environmental Protection Agency
§§	Sections	RCRA	Resource Conservation and Recovery Act
ARAR	Applicable or relevant and appropriate requirement	ROD	Record of Decision
Cal. Code Regs.	<i>California Code of Regulations</i>	TBC	To be considered
Cal/EPA	California Environmental Protection Agency	Tit.	Title
CFR	<i>Code of Federal Regulations</i>	U.S.C.	<i>United States Code</i>
DTSC	Department of Toxic Substances Control		

## 14.0 DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for Site 28 was released for public comment in March 2006 (Navy 2006). The Proposed Plan recommended Alternative S4b for soils and Alternative GW4 (Alternative GW 3 in the Final Site 28 Proposed Plan dated March 2006) for groundwater as the preferred remedial alternatives at Site 28.

A technical memorandum for Site 28 was prepared and submitted to the regulatory agencies in January 2007 (SulTech 2007). The technical memorandum recommended that Groundwater modeling be used to calculate the trigger level at the point of measurement (a groundwater monitoring well) to determine if the remediation goal for copper is being achieved at the point of exposure (point of discharge to Oakland Inner Harbor). The remediation goal for lead in soil was evaluated for the recreational user. The Navy's evaluation of two storm sewers owned by the City of Alameda (known as the East and West Storm Sewers) concluded that neither storm sewer is likely to act as a preferential migration pathway for chemicals associated with Site 28 (SulTech 2007).

A component of the groundwater Alternative GW4 (Alternative GW3 in the Final Site 28 Proposed Plan, dated March 2006) includes the placement of MIC into the subsurface at Site 28 to immobilize copper, reducing its migration into the Oakland Inner Harbor. Since the release of the Proposed Plan and selection of Alternative GW4 (Alternative GW3 in the Final Site 28 Proposed Plan, dated March 2006), new information suggests that treatment with MIC as an innovative technology in treating metals where trace levels of other metals are also present may present technical challenges at the site. The Navy has elected to augment the selected remedy by excavating targeted areas with copper-impacted soil similar to the excavations described and evaluated in Alternative GW5 (Alternative GW4 in the Final Site 28 Proposed Plan, dated March 2006) in the final Site 28 FS. The targeted excavation of copper-impacted soil will increase the effectiveness of the MIC by minimizing dissolution of copper into groundwater during future precipitation events. Bench and pilot studies will be performed to determine the appropriate MIC treatment for the site.

The Navy and regulatory signatories of this document reviewed all comments submitted during the public comment period. Upon review of these comments, it was determined that no significant changes to the selected remediation of soil Alternative S4b, as it was originally identified in the Proposed Plan, were necessary or appropriate. Additional changes are not required for the selected remediation of groundwater Alternative GW4 (Alternative GW3 in the Final Site 28 Proposed Plan, dated March 2006) based on public comments. Augmentation of the groundwater remedy to include targeted excavation of copper-impacted soil is not considered a significant change for Site 28, since soil excavation was already a remedial action planned as part of the soil remedy.

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**ATTACHMENT A  
ADMINISTRATIVE RECORD INDEX**

26 pages.

*Note: the Navy has included an updated Administrative Record Index in this Final version of the Installation Restoration Site 28, Todd Shipyards Record of Decision.*

## ALAMEDA POINT NAS

## DRAFT ADMINISTRATIVE RECORD FILE INDEX - UPDATE (SORTED BY RECORD DATE/RECORD NUMBER)

## FILTERED DATA BY KEYWORDS/SITES

UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.	Record Type	Record Date	Author	Location	FRC Accession No.
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UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.	Record Type	Record Date	Author	Location	FRC Accession No.	
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N00236 / 000237 CTO-0021/0012 & SWDIV SER 06CA.GL/0892 PLAN N68711-95-D-7526 00306	09-21-2001 08-23-2001 00021	BECHTEL ENVIRONMENTAL, INC. P. STANG NAVFAC - SOUTHWEST DIVISION	BECHTEL ENVIRONMENTAL, INC. P. STANG NAVFAC - SOUTHWEST DIVISION	DRAFT REMEDIAL INVESTIGATION WORK PLAN, TODD SHIPYARD - INCLUDES SWDIV TRANSMITTAL LETTER BY G. LORTON (PORTION OF THE MAILING LIST IS CONFIDENTIAL)	ADMIN RECORD INFO REPOSITORY SENSITIVE	028	SOUTHWEST DIVISION - BLDG. 1 SW060209-01 IMAGED APNT_003	181-03-0179 41074200	BOX 0012
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UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.	Record Type	Record Date	Author	Location	FRC Accession No.
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						020		
						021		
						024		
						028		
						029		
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		G. LORTON	G. LORTON					
N00236 / 000740	06-17-2003	TETRA TECH EM	TETRA TECH EM	20 NOVEMBER 2001 FINAL BASE	ADMIN RECORD	005	SOUTHWEST	181-03-0188 BOX 0015
TC.A021.10075	11-20-2001	INC.	INC.	REALIGNMENT AND CLOSURE (BRAC)	INFO REPOSITORY	028	DIVISION - BLDG. 1	41031858
MM	DO 0021			CLEANUP TEAM (BCT) MONTHLY TRACKING			SW060907-01	
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UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.	Record Type	Record Date	Author	Location	FRC Accession No.
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00082								
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CTO-0021/0034 &	12-03-2001	ENVIRONMENTAL,	WORK PLAN, TODD SHIPYARDS (INCLUDES	INFO REPOSITORY		DIVISION - BLDG. 1	41031858	
SWDIV SER	00021	INC.	FIELD SAMPLING PLAN, QUALITY	SENSITIVE		SW060309-01		
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TC.A021.10075	01-15-2002	INC.	REALIGNMENT AND CLOSURE (BRAC)	INFO REPOSITORY	014	DIVISION - BLDG. 1	41031858	
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UIC No. / Rec. No.

Doc. Control No.	Prc. Date	Author Affil.				Location	FRC Accession No.
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NONE		US EPA - SAN			008	APNT_022	
00035		FRANCISCO			009		
		A. COOK			013		
					014		
					015		
					016		
					017		
					019		
					020		
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					025		
					026		
					027		
					028		
					029		
					AREA 1		
					AREA 2		
					AREA 3		
					OU 1		
					OU 2A		
					OU 2B		
					OU 2C		
					OU 3		
					OU 4A		
					OU 4B		
					OU 4C		
					OU 5		
					OU 6		

UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.					Location	FRC Accession No.
Record Type	Record Date	Author						SWDIV Box No(s)	FRC Warehouse
Contr./Guid. No.	CTO No.	Recipient Affil.		Subject	Classification	Sites		CD No.	FRC Box No(s)
Approx. # Pages	EPA Cat. #	Recipient							
N00236 / 000412	08-29-2002	TETRA TECH EM		DRAFT SUPPLEMENTAL ENVIRONMENTAL	ADMIN RECORD	001		SOUTHWEST	181-03-0188 BOX 0004
TC.0190.11423 -	08-16-2002	INC.		BASELINE SURVEY (SEE AR #1054 - EBS)	INFO REPOSITORY	002		DIVISION - BLDG. 1	41031858
MOD. 2	00190	G. FOULK				003			
RPT		NAVFAC -				004			
N62474-94-D-7609		SOUTHWEST				005			
00400		DIVISION				006			
						007			
						008			
						009			
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						011			
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						OU 1			
						OU 2A			
						OU 2B			
						OU 2C			
						OU 3			
						OU 4A			
						OU 4B			

UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.	Record Type	Record Date	Author	Location	FRC Accession No.
Contr./Guid. No.	CTO No.	Recipient Affil.	Subject	Classification	Sites	SWDIV Box No(s)	FRC Warehouse	FRC Box No(s)
Approx. # Pages	EPA Cat. #	Recipient				CD No.		
N00236 / 000751	06-17-2003	TETRA TECH EM	20 AUGUST 2002 FINAL BASE	ADMIN RECORD	009	SOUTHWEST	181-03-0188	BOX 0015
NONE	08-20-2002	INC.	REALIGNMENT AND CLOSURE (BRAC)	INFO REPOSITORY	011	DIVISION - BLDG. 1	41031858	
MM	NONE		CLEANUP TEAM (BCT) MONTHLY TRACKING		014	SW060921-01		
NONE		NAVFAC -	MEETING AFTER ACTION REPORT		015	IMAGED		
00061		SOUTHWEST	(INCLUDES AGENDA, SIGN-IN SHEET, AND		016	APNT_005		
		DIVISION	VARIOUS HANDOUTS)		020			
					021			
					028			
					OU 5			
N00236 / 000410	08-28-2002	NAVFAC -	TRANSMITTAL OF THE FINAL SITE	ADMIN RECORD	OU 1	SOUTHWEST	181-03-0188	BOX 0004
SWDIV SER	08-21-2002	SOUTHWEST	MANAGEMENT PLAN AMENDMENT IN	INFO REPOSITORY	OU 2A	DIVISION - BLDG. 1	41031858	
06CA.MM/0847	NONE	DIVISION	ACCORDANCE WITH THE FEDERAL	SENSITIVE	OU 2B	SW061120-01		
CORRESP		M. MCCLELLAND	FACILITIES AGREEMENT FOR ACTIVITY		OU 2C	IMAGED		
NONE		US EPA, SF &	(PORTION OF THE MAILING LIST IS		OU 3	APNT_023		
00036		VARIOUS	SENSITIVE)		OU 4A			
		A. COOK &			OU 4B			
		DISTRIBUTION			OU 4C			
					OU 5			
					OU 6			

UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.	Record Type	Record Date	Author	Location	FRC Accession No.
Contr./Guid. No.	CTO No.	Recipient Affil.	Subject	Classification	Sites	SWDIV Box No(s)	FRC Warehouse	FRC Box No(s)
Approx. # Pages	EPA Cat. #	Recipient				CD No.		
N00236 / 000436	10-31-2002	TETRA TECH EM	DRAFT TECHNICAL MEMORANDUM:	ADMIN RECORD	001	SOUTHWEST	181-03-0188	BOX 0006
DS.A033.10075 AND	10-08-2002	INC.	EVALUATION OF ISSUES RELATED TO THE	INFO REPOSITORY	002	DIVISION - BLDG. 1	41031858	
SWDIV SER	DO A033	B. KELLY	RESOURCE CONSERVATION AND	SENSITIVE	003	SW060601-02		
06CA.LO/0019		NAVFAC -	RECOVERY ACT (RCRA); FACILITY PERMIT		004	IMAGED		
RPT		SOUTHWEST	EPA ID CA 2170023236, TIERED PERMITS,		006	APNT_013		
N68711-00-D-0005		DIVISION	AND THE NONPERMITTED AREAS		007			
00237		L. OCAMPO	(INCLUDES SWDIV TRANSMITTAL LETTER		008			
			BY L. OCAMPO)		009			
					013			
					014			
					015			
					016			
					019			
					020			
					022			
					023			
					026			
					027			
					028			
					BLDG. 13			
					OU 1			
					OU 2A			
					OU 2B			
					OU 2C			
					OU 3			
					OU 4A			
					OU 4B			
					OU 4C			
					OU 5			
					OU 6			

UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.					Location	FRC Accession No.
Record Type	Record Date	Author						SWDIV Box No(s)	FRC Warehouse
Contr./Guid. No.	CTO No.	Recipient Affil.		Subject	Classification	Sites		CD No.	FRC Box No(s)
Approx. # Pages	EPA Cat. #	Recipient							
N00236 / 000456	01-29-2003	DTSC - BERKELEY		COMMENTS ON THE DRAFT TECHNICAL	ADMIN RECORD	001		SOUTHWEST	181-03-0188 BOX 0010
NONE	12-16-2002	M. LIAO		MEMORANDUM: EVALUATION OF ISSUES	INFO REPOSITORY	002		DIVISION - BLDG. 1	41031858
COMMENTS	NONE	NAVFAC -		RELATED TO THE RESOURCE		003		SW060615-02	
NONE		SOUTHWEST		CONSERVATION AND RECOVERY ACT		004		IMAGED	
00007		DIVISION		(RCRA) FACILITY PERMIT EPA ID CA		006		APNT_004	
		L. OCAMPO		217002323G TIERED PERMITS AND THE		007			
				NONPERMITTED AREAS		008			
						009			
						013			
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Contr./Guid. No.	CTO No.	Recipient Affil.	Subject	Classification	Sites	SWDIV Box No(s)	FRC Warehouse	FRC Box No(s)
Approx. # Pages	EPA Cat. #	Recipient				CD No.		
N00236 / 000470	02-06-2003	NAVFAC -	TRANSMITTAL OF SITE MANAGEMENT	ADMIN RECORD	017	SOUTHWEST	181-03-0188	BOX 0010
SWDIV SER	01-16-2003	SOUTHWEST	PLAN UPDATE (W/ ENCLOSURE)	INFO REPOSITORY	020	DIVISION - BLDG. 1	41031858	
06CA.AD/0357	NONE	DIVISION			024	SW060615-02		
RPT		A. DICK			025	IMAGED		
NONE		U.S. EPA			029	APNT_004		
00031		A. COOK			OU 1			
					OU 2A			
					OU 2B			
					OU 2C			
					OU 3			
					OU 4A			
					OU 4B			
					OU 4C			
					OU 5			
					OU 6			
N00236 / 000995	08-20-2003	TETRA TECH EM	21 JANUARY 2003 FINAL BASE	ADMIN RECORD	001	SOUTHWEST		
TC.A021.10125	01-21-2003	INC.	REALIGNMENT AND CLOSURE (BRAC)	INFO REPOSITORY	005	DIVISION - BLDG. 1		
MM	DO 0021		CLEANUP TEAM (BCT) MONTHLY TRACKING	SENSITIVE	007	SW061120-02		
N68711-00-D-0005		NAVFAC -	MEETING AFTER ACTION REPORT		009	IMAGED		
00047		SOUTHWEST	(INCLUDES AGENDA, SIGN-IN SHEET, AND		011	APNT_023		
		DIVISION	HANDOUT MATERIALS) [PORTION OF THE		013			
			SIGN-IN SHEET IS SENSITIVE]		014			
					015			
					016			
					017			
					020			
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UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.	Record Type	Record Date	Author	Location	FRC Accession No.
Contr./Guid. No.	CTO No.	Recipient Affil.	Recipient	Subject	Classification	Sites	SWDIV Box No(s)	FRC Warehouse
Approx. # Pages	EPA Cat. #	Recipient	Recipient	Subject	Classification	Sites	CD No.	FRC Box No(s)
N00236 / 000999	08-20-2003	TETRA TECH EM	TETRA TECH EM	FINAL BASE REALIGNMENT AND CLOSURE	ADMIN RECORD	009	SOUTHWEST	
TC.A021.10125	02-18-2003	INC.	INC.	(BRAC) CLEANUP TEAM (BCT) MONTHLY	INFO REPOSITORY	011	DIVISION - BLDG. 1	
MM	DO 0021			TRACKING MEETING MINUTES AFTER		014	SW05072801	
N68711-00-D-0005		NAVFAC -	NAVFAC -	ACTION REPORT FOR THE 18 FEBRUARY		015	IMAGED	
00023		SOUTHWEST	SOUTHWEST	2003 - INCLUDES AGENDA, SIGN-IN SHEET,		016	APNT_001	
		DIVISION	DIVISION	AND HANDOUT MATERIALS		021		
						027		
						028		
						OU 1		
						OU 2A		
						OU 2B		

UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.					Location	FRC Accession No.
Record Type	Record Date	Author						SWDIV Box No(s)	FRC Warehouse
Contr./Guid. No.	CTO No.	Recipient Affil.		Subject	Classification	Sites		CD No.	FRC Box No(s)
Approx. # Pages	EPA Cat. #	Recipient							
N00236 / 000772	08-04-2003	NAVFAC -		JULY 2003 ALAMEDA POINT FOCUS	ADMIN RECORD	001		SOUTHWEST	181-03-0188 BOX 0016
NONE	07-01-2003	SOUTHWEST		ENVIRONMENTAL NEWSLETTER		002		DIVISION - BLDG. 1	41031858
PUB NOTICE	NONE	DIVISION				003		SW070112-01	
NONE		M. MCCLELLAND				004		IMAGED	
00016		PUBLIC INTEREST				005		APNT_008	
						006			
						007			
						008			
						009			
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Doc. Control No.	Prc. Date	Author Affil.				Location	FRC Accession No.
Record Type	Record Date	Author				SWDIV Box No(s)	FRC Warehouse
Contr./Guid. No.	CTO No.	Recipient Affil.				CD No.	FRC Box No(s)
Approx. # Pages	EPA Cat. #	Recipient	Subject	Classification	Sites		
N00236 / 001546	09-09-2003	NAVFAC -	LETTER REQUESTING THAT THE RWQCB	ADMIN RECORD	028	SOUTHWEST	
SWDIV SER	08-25-2003	SOUTHWEST	GRANT AN EXEMPTION FROM THE	INFO REPOSITORY		DIVISION - BLDG. 1	
06CA.JS/1226	NONE	DIVISION	MUNICIPAL OR DOMESTIC WATER SUPPLY			SW05072801	
CORRESP		M. MCCLELLAND	DESIGNATION FOR GROUNDWATER			IMAGED	
NONE		RWQCB -	BENEATH THE TODD SHIPYARD BASED ON			APNT_001	
00005		OAKLAND	SITE-SPECIFIC DATA THAT HAS BEEN				
		J. HUANG	COLLECTED DURING THE REMEDIAL				
			INVESTIGATION				

UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.	Record Type	Record Date	Author	Location	FRC Accession No.
Contr./Guid. No.	CTO No.	Recipient Affil.	Subject	Classification	Sites	SWDIV Box No(s)	FRC Warehouse	FRC Box No(s)
Approx. # Pages	EPA Cat. #	Recipient				CD No.		
N00236 / 001757	01-15-2004	NAVFAC -	SITE MANAGEMENT PLAN UPDATE -	ADMIN RECORD	001	SOUTHWEST		
SWDIV SER	11-05-2003	SOUTHWEST	[INCLUDES SWDIV TRANSMITTAL LETTER	INFO REPOSITORY	002	DIVISION - BLDG. 1		
06CA.AD/1416	NONE	DIVISION	BY M. MCCLELLAND]		003	SW060814-01		
RPT		M. MCCLELLAND			004	IMAGED		
NONE		US EPA - SAN			005	APNT_014		
00033		FRANCISCO			006			
		A. COOK			007			
					008			
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					014			
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Contr./Guid. No.	CTO No.	CTO No.	Recipient Affil.	Constr./Guid. No.	CTO No.	Recipient	SWDIV Box No(s)	FRC Warehouse
Approx. # Pages	EPA Cat. #	EPA Cat. #	Recipient	Subject	Classification	Sites	CD No.	FRC Box No(s)
N00236 / 001764 CTO-0021/0362 & SWDIV SER 06CA.JS\0184 RPT N68711-95-D-7526 01778	02-25-2004 <b>02-13-2004</b> 00021	02-25-2004 <b>02-13-2004</b> 00021	BECHTEL ENVIRONMENTAL, INC. M. DERMER NAVFAC - SOUTHWEST DIVISION	DRAFT REMEDIAL INVESTIGATION REPORT, TODD SHIPYARDS, VOLUMES I THROUGH III OF III (CD COPY OF ATTACHMENTS G1 AND H1 ENCLOSED) [INCLUDES SWDIV TRANSMITTAL LETTER BY T. MACCHIARELLA] (PORTION OF MAILING LIST IS SENSITIVE)	ADMIN RECORD INFO REPOSITORY SENSITIVE	028	SOUTHWEST DIVISION - BLDG. 1 SW060727-01 IMAGED APNT_013	
N00236 / 002525 FILE NO. 2199.9285(JCH) COMMENTS NONE 00003	09-12-2006 <b>04-07-2004</b> NONE	09-12-2006 <b>04-07-2004</b> NONE	CRWQCB - OAKLAND J. HUANG NAVFAC - SOUTHWEST DIVISION T. MACCHIARELLA	REVIEW AND COMMENTS ON DRAFT REMEDIAL INVESTIGATION (RI) REPORT, TODD SHIPYARDS	ADMIN RECORD	028	SOUTHWEST DIVISION - BLDG. 1 SW061120-04 IMAGED APNT_024	
N00236 / 002523 NONE COMMENTS NONE 00013	09-12-2006 <b>04-08-2004</b> NONE	09-12-2006 <b>04-08-2004</b> NONE	USEPA - SAN FRANCISCO A. COOK NAVFAC - SOUTHWEST DIVISION T. MACCHIARELLA	REVIEW AND COMMENTS ON DRAFT REMEDIAL INVESTIGATION (RI) REPORT, TODD SHIPYARDS	ADMIN RECORD	028	SOUTHWEST DIVISION - BLDG. 1 SW061120-04 IMAGED APNT_024	
N00236 / 002526 SWDIV SER 06CA.JS/0441 CORRESP NONE 00002	09-12-2006 <b>04-21-2004</b> NONE	09-12-2006 <b>04-21-2004</b> NONE	NAVFAC - SOUTHWEST DIVISION J. STEWART DTSC - BERKELEY M. LIAO	REQUEST OF IDENTIFICATION OF STATE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)	ADMIN RECORD	028	SOUTHWEST DIVISION - BLDG. 1 SW061120-04 IMAGED APNT_024	
N00236 / 002524 NONE COMMENTS NONE 00012	09-12-2006 <b>05-10-2004</b> NONE	09-12-2006 <b>05-10-2004</b> NONE	DTSC - BERKELEY M. LIAO NAVFAC - SOUTHWEST DIVISION T. MACCHIARELLA	REVIEW AND COMMENTS ON DRAFT REMEDIAL INVESTIGATION (RI) REPORT, TODD SHIPYARD (INCLUDES GSU COMMENTS BY M. FINCH DATED 9 APRIL 2004)	ADMIN RECORD	028	SOUTHWEST DIVISION - BLDG. 1 SW061120-04 IMAGED APNT_024	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s) ----
N00236 / 001836 NONE MISC NONE 00008	06-08-2004 05-28-2004 NONE	DTSC - BERKELEY M. LIAO NAVFAC - SOUTHWEST DIVISION T. MACCHIARELLA	REVIEW AND COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION REPORT, TODD SHIPYARD (INCLUDES HERD COMMENTS DATED 05/12/2004)	ADMIN RECORD INFO REPOSITORY	028 OU 6	SOUTHWEST DIVISION - BLDG. 1 SW060727-01 IMAGED APNT_013	
N00236 / 002585 FILE NO. 2199.9285(JCH) COMMENTS NONE 00003	10-31-2006 08-18-2004 NONE	CRWQCB - OAKLAND J. HUANG NAVFAC - SOUTHWEST DIVISION T. MACCHIARELLA	REVIEW AND RESPONSES TO COMMENTS ON DRAFT FINAL REMEDIAL INVESTIGATION (RI) REPORT, TODD SHIPYARD (PORTION OF THE MAILING LIST IS SENSITIVE)	ADMIN RECORD SENSITIVE	028	SOUTHWEST DIVISION - BLDG. 110	
N00236 / 002584 NONE COMMENTS NONE 00004	10-31-2006 08-26-2004 NONE	DTSC - BERKELEY M. LIAO NAVFAC - SOUTHWEST DIVISION T. MACCHIARELLA	REVIEW AND RESPONSE TO COMMENTS ON APPENDIX M OF DRAFT FINAL REMEDIAL INVESTIGATION (RI) REPORT, TODD SHIPYARD	ADMIN RECORD	028	SOUTHWEST DIVISION - BLDG. 110	
N00236 / 001851 CTO0069/0086-2 & SWDIV SER.06CA.JS/0706 & 0916 RPT N68711-95-D-7526 02040	07-19-2004 09-01-2004 00069	BECHTEL ENVIRONMENTAL, INC. C. STUMPENHAUS NAVFAC - SOUTHWEST DIVISION	FINAL REMEDIAL INVESTIGATION REPORT, TODD SHIPYARDS, VOLUMES I THROUGH III OF III (CD COPY ENCLOSED) [INCLUDES SWDIV TRANSMITTAL LETTER BY T. MACCHIARELLA] {PORTION OF MAILING LIST IS SENSITIVE}	ADMIN RECORD INFO REPOSITORY SENSITIVE	028	SOUTHWEST DIVISION - BLDG. 1 SW060727-01 IMAGED APNT_013	
N00236 / 001876 SWDIV SER. 06CA.GL/0942 RPT NONE 00043	09-27-2004 09-14-2004 NONE	NAVFAC - SOUTHWEST DIVISION T. MACCHIARELLA USEPA - SAN FRANCISCO	FINAL SITE MANAGEMENT PLAN FOR FISCAL YEAR 2005 [INCLUDES SWDIV TRANSMITTAL LETTER BY T. MACCHIARELLA] {PORTION OF MAILING LIST IS SENSITIVE}	ADMIN RECORD INFO REPOSITORY SENSITIVE	OU 1 OU 2A OU 2C OU 3 OU 4A OU 4B OU 4C OU 5 OU 6	SOUTHWEST DIVISION - BLDG. 1 SW060907-02 IMAGED APNT_003	

UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.	Record Type	Record Date	Author	Location	FRC Accession No.	
Contr./Guid. No.	CTO No.	CTO No.	Recipient Affil.	Approx. # Pages	EPA Cat. #	Recipient	SWDIV Box No(s)	FRC Warehouse	
						Subject	CD No.	FRC Box No(s)	
						Classification	Sites		
N00236 / 001877	10-04-2004		BATTELLE			DRAFT OFFSHORE SEDIMENT CORE STUDY WORK PLAN AT OAKLAND INNER HARBOR, PIER AREA, TODD SHIPYARD AND WESTERN BAYSIDE [INCLUDES SWDIV TRANSMITTAL LETTER BY T. MACCHIARELLA] {PORTION OF MAILING LIST IS CONFIDENTIAL}	ADMIN RECORD INFO REPOSITORY SENSITIVE	020 024 028 OU 4B OU 4C	SOUTHWEST DIVISION - BLDG. 1 SW061027-02 IMAGED APNT_016
PROJ. NO. G486085 & SWDIV SER. 06CA.DN/0998 PLAN N47408-01-D-8207 00352	09-29-2004 NONE		NAVFAC - SOUTHWEST DIVISION						
N00236 / 002030	05-03-2005		SULTECH			ALAMEDA ARCVIEW QUERY STATION UPDATE FOR BASEWIDE PROJECT MANAGEMENT; CONTAINS THE ANALYTICAL DATA COLLECTED AND TRANSMITTED TO TETRA TECH {CD COPY ONLY ENCLOSED}	ADMIN RECORD INFO REPOSITORY	027 028	SOUTHWEST DIVISION - BLDG. 1 SW061023-03 IMAGED APNT_020
DS.B010.14009 CORRESP N68711-03-D-5104 00006	10-11-2004 00010		D. DAVENPORT NAVFAC - SOUTHWEST DIVISION G. LORTON						
N00236 / 002477	08-28-2006		U.S. FISH AND WILDLIFE SERVICE			REVIEW AND COMMENTS ON DRAFT OFFSHORE SEDIMENT CORE STUDY WORK PLAN (WP)	ADMIN RECORD	020 024 028 OU 4B OU 4C	SOUTHWEST DIVISION - BLDG. 1 SW061027-04 IMAGED APNT_016
NONE COMMENTS NONE 00004	11-01-2004 NONE		D. HARLOW NAVFAC - SOUTHWEST DIVISION T. MACCHIARELLA						
N00236 / 001890	11-09-2004		BECHTEL ENVIRONMENTAL, INC.			DRAFT FEASIBILITY STUDY REPORT FOR THE TODD SHIPYARDS (INCLUDES SWDIV TRANSMITTAL LETTER BY R. PLASEIED) {PORTION OF THE MAILING LIST IS SENSITIVE}	ADMIN RECORD INFO REPOSITORY SENSITIVE	028	SOUTHWEST DIVISION - BLDG. 1 SW060825-03 IMAGED APNT_017
CTO-0069/0207 AND BRAC SER BPMOW.JAS/0069 RPT N68711-95-D-7526 00486	11-05-2004 00069		J. FRENCH BRAC PMO WEST						
N00236 / 002006	04-12-2005		SULTECH			16 NOVEMBER 2004 FINAL BASE REALIGNMENT AND CLOSURE (BRAC) CLEANUP TEAM (BCT) MONTHLY TRACKING MEETING AFTER ACTION REPORT (INCLUDES AGENDA AND VARIOUS HANDOUT MATERIALS)	ADMIN RECORD INFO REPOSITORY	025 028 030 OU 2A OU 2B OU 5	SOUTHWEST DIVISION - BLDG. 1 SW060921-02 IMAGED APNT_005
TC.B010.10264 MM N68711-03-D-5104 00057	11-16-2004 00010		BRAC PMO WEST						

UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.									FRC Accession No.
Record Type	Record Date	Record Date	Author							Location		FRC Warehouse
Contr./Guid. No.	CTO No.	CTO No.	Recipient Affil.							SWDIV Box No(s)		FRC Box No(s)
Approx. # Pages	EPA Cat. #	EPA Cat. #	Recipient	Subject	Classification	Sites				CD No.		
N00236 / 002437 FILE NO. 2199.9285(JCH) COMMENTS NONE 00006	08-22-2006 01-06-2005 NONE	08-22-2006 01-06-2005 NONE	CRWQCB - OAKLAND J. HUANG BRAC PMO WEST T. MACCHIARELLA	REVIEW AND COMMENTS ON DRAFT OFFSHORE SEDIMENT CORE STUDY WORK PLAN (WP) AT OAKLAND INNER HARBOR, PIER AREA, TODD SHIPYARD, AND WESTERN BAYSIDE	ADMIN RECORD INFO REPOSITORY	020 024 028 OU 4B OU 4C				SOUTHWEST DIVISION - BLDG. 1 SW061027-04 IMAGED APNT_016		
N00236 / 002508 NONE COMMENTS NONE 00017	09-06-2006 01-27-2005 NONE	09-06-2006 01-27-2005 NONE	DTSC - BERKELEY M. LIAO NAVFAC - SOUTHWEST DIVISION T. MACCHIARELLA	REVIEW AND COMMENTS ON DRAFT OFFSHORE SEDIMENT CORE STUDY WORK PLAN AT OAKLAND INNER HARBOR, PIER AREA, TODD SHIPYARD, AND WESTERN BAYSIDE (INCLUDES HERD COMMENTS BY J. POLISINI DATED 1 DECEMBER 2004 AND DHS COMMENTS BY D. BAILEY DATED 30 NOVEMBER 2004)	ADMIN RECORD INFO REPOSITORY	020 024 028 OU 4B OU 4C				SOUTHWEST DIVISION - BLDG. 1 SW061027-04 IMAGED APNT_016		
N00236 / 002441 NONE COMMENTS NONE 00017	08-22-2006 02-07-2005 NONE	08-22-2006 02-07-2005 NONE	USEPA - SAN FRANCISCO A. COOK NAVFAC - SOUTHWEST DIVISION T. MACCHIARELLA	REVIEW AND COMMENTS ON DRAFT FEASIBILITY STUDY (FS) REPORT, TODD SHIPYARDS	ADMIN RECORD INFO REPOSITORY	028				SOUTHWEST DIVISION - BLDG. 1 SW061120-04 IMAGED APNT_024		
N00236 / 002443 NONE COMMENTS NONE 00006	08-22-2006 02-17-2005 NONE	08-22-2006 02-17-2005 NONE	CRWQCB - OAKLAND J. HUANG BRAC PMO WEST T. MACCHIARELLA	REVIEW AND COMMENTS ON DRAFT FEASIBILITY STUDY (FS) REPORT, TODD SHIPYARDS (PORTION OF THE MAILING LIST IS SENSITIVE)	ADMIN RECORD INFO REPOSITORY SENSITIVE	028				SOUTHWEST DIVISION - BLDG. 1 SW061120-04 IMAGED APNT_024		
N00236 / 002709 NONE COMMENTS NONE 00020	03-14-2007 02-28-2005 NONE	03-14-2007 02-28-2005 NONE	DTSC - BERKELEY M. LIAO NAVFAC - SOUTHWEST DIVISION T. MACCHIARELLA	REVIEW AND COMMENTS ON DRAFT FEASIBILITY STUDY (FS) REPORT, TODD SHIPYARDS (INCLUDES GSU COMMENTS BY M. DALRYMPLE DATED 11 FEBRUARY 2005 AND HERD COMMENTS BY J. POLISINI DATED 22 FEBRUARY 2005)	ADMIN RECORD	028				SOUTHWEST DIVISION - BLDG. 110		
N00236 / 002013 BRAC SER BPMOW.JAS/0596 CORRESP NONE 00002	04-19-2005 04-06-2005 NONE	04-19-2005 04-06-2005 NONE	BRAC PMO WEST T. MACCHIARELLA U.S. EPA - SAN FRANCISCO A. COOK	REQUEST FOR A SCHEDULE EXTENSION FOR THE DRAFT FINAL FEASIBILITY STUDY (FS) FOR TODD SHIPYARDS	ADMIN RECORD INFO REPOSITORY	028				SOUTHWEST DIVISION - BLDG. 1 SW060825-05 IMAGED APNT_017		

UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.	Record Type	Record Date	Author	Location	FRC Accession No.
Contr./Guid. No.	CTO No.	CTO No.	Recipient Affil.	Constr. # Pages	EPA Cat. #	Recipient	SWDIV Box No(s)	FRC Warehouse
							CD No.	FRC Box No(s)
N00236 / 002029 PROJ NO. G486085 & BRAC SER BPMOW.DN/0758 RPT N47408-01-D-8207 00269	05-03-2005 <b>05-27-2005</b> NONE	05-03-2005 <b>05-27-2005</b> NONE	BATTELLE  BRAC PMO WEST	FINAL OFFSHORE SEDIMENT STUDY WORK PLAN (WP) AT OAKLAND INNER HARBOR, PIER AREA, TODD SHIPYARD AND WESTERN BAYSIDE, [INCLUDES BRAC PMO WEST TRANSMITTAL LETTER BY T. MACCHIARELLA, SAMPLING AND ANALYSIS PLAN (SAP), QUALITY ASSURANCE PROJECT PLAN (QAPP)	ADMIN RECORD INFO REPOSITORY SENSITIVE	020 024 028 OU 4B OU 4C	SOUTHWEST DIVISION - BLDG. 110 SW061027-04 CHECKED OUT BY H. MURILLO ON 8/17/07 FOR RE-QA/QC IMAGED APNT_022	
N00236 / 002040 CTO-0069/0362 & SWDIV SER BPMOW.JS.0723 RPT N68711-95-D-7526 00577	05-27-2005 <b>06-27-2005</b> 00069	05-27-2005 <b>06-27-2005</b> 00069	BECHTEL ENVIRONMENTAL, INC. J. ARGYRES BRAC - SAN DIEGO	FINAL FEASIBILITY STUDY REPORT FOR THE TODD SHIPYARDS, REPLACEMENT PAGES ISSUED ON JUNE 27, 2005 CONVERTING IT FROM A DRAFT FINAL TO A FINAL (CD COPY ENCLOSED) [PORTION OF THE MAILING LIST IS SENSITIVE]	ADMIN RECORD INFO REPOSITORY SENSITIVE	028	SOUTHWEST DIVISION - BLDG. 1 SW060825-05 IMAGED APNT_017	
N00236 / 002592 NONE COMMENTS NONE 00002	10-31-2006 <b>06-27-2005</b> NONE	10-31-2006 <b>06-27-2005</b> NONE	USEPA - SAN FRANCISCO A. COOK NAVFAC - SOUTHWEST DIVISION T. MACCHIARELLA	REVIEW AND COMMENTS ON DRAFT FINAL FEASIBILITY STUDY (FS) REPORT, TODD SHIPYARD	ADMIN RECORD INFO REPOSITORY	028	SOUTHWEST DIVISION - BLDG. 110	
N00236 / 002593 NONE COMMENTS NONE 00002	10-31-2006 <b>06-27-2005</b> NONE	10-31-2006 <b>06-27-2005</b> NONE	DTSC - BERKELEY M. LIAO NAVFAC - SOUTHWEST DIVISION T. MACCHAIARELLA	REVIEW AND COMMENTS ON DRAFT FINAL FEASIBILITY STUDY (FS) REPORT, TODD SHIPYARDS	ADMIN RECORD INFO REPOSITORY	028	SOUTHWEST DIVISION - BLDG. 110	
N00236 / 002124 BRAC SER 06CM.KE/1224 RPT NONE 00025	09-21-2005 <b>09-01-2005</b> NONE	09-21-2005 <b>09-01-2005</b> NONE	BRAC PMO WEST  PUBLIC INTEREST	PROPOSED PLAN (PP) FOR SOIL AND GROUNDWATER CONTAMINATION AT TODD SHIPYARDS (INCLUDES BRAC PMO WEST TRANSMITTAL LETTER BY T. MACCHIARELLA)	ADMIN RECORD INFO REPOSITORY	028	SOUTHWEST DIVISION - BLDG. 1 SW060921-03 IMAGED APNT_006	

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject	Classification	Sites	Location SWDIV Box No(s) CD No.	FRC Accession No. FRC Warehouse FRC Box No(s)
N00236 / 002675 FILE NO. 2199.9285(JCH) COMMENTS NONE 00002	01-25-2007 <b>11-02-2005</b> NONE	CRWQCB - OAKLAND J. HUANG BRAC PMO WEST T. MACCHIARELLA	REVIEW AND COMMENTS ON DRAFT PROPOSED PLAN (PP), TODD SHIPYARD [PORTION OF THE MAILING LIST IS SENSITIVE]	ADMIN RECORD INFO REPOSITORY SENSITIVE	028	SOUTHWEST DIVISION - BLDG. 110	
N00236 / 002177 NONE COMMENTS NONE 00005	12-14-2005 <b>11-17-2005</b> NONE	USEPA - SAN FRANCISCO A. COOK BRAC PMO WEST T. MACCHIARELLA	REVIEW AND COMMENTS ON THE DRAFT PROPOSED PLAN, TODD SHIPYARDS	ADMIN RECORD	028	SOUTHWEST DIVISION - BLDG. 1 SW061005-03 IMAGED APNT_019	
N00236 / 002186 NONE COMMENTS NONE 00003	01-10-2006 <b>12-16-2005</b> NONE	DTSC - BERKELEY M. LIAO BRAC PMO WEST T. MACCHIARELLA	REVIEW AND COMMENTS ON DRAFT PROPOSED PLANS, TODD SHIPYARD	ADMIN RECORD	028	SOUTHWEST DIVISION - BLDG. 1 SW061005-03 IMAGED APNT_019	
N00236 / 002231 BRAC SER BPMOW.TH/0039 CORRESP NONE 00003	03-10-2006 <b>01-18-2006</b> NONE	BRAC PMO WEST T. MACCHIARELLA VARIOUS AGENCIES	REQUEST FOR EXTENSION ON SUBMITTAL DATES FOR THE FOLLOWING DRAFT FINAL PROPOSED PLANS (PP): SITE 14, SITE 17, SITE 28, OPERABLE UNIT 1 AND OPERABLE UNIT 5	ADMIN RECORD	014 017 028 OU 1 OU 5	SOUTHWEST DIVISION - BLDG. 1 SW060921-04 IMAGED APNT_006	
N00236 / 002322 BRAC SER BMPOW.CD/0072 CORRESP NONE 00020	06-19-2006 <b>01-30-2006</b> NONE	BRAC PMO WEST T. MACCHIARELLA VARIOUS AGENCIES	TRANSMITTAL OF DRAFT FINAL PROPOSED PLAN FOR TODD SHIPYARDS (W/OUT ENCLOSURE) [INCLUDES RESPONSE TO COMMENTS ON THE DRAFT PROPOSED PLAN] {SEE AR #2323 - DRAFT FINAL PROPOSED PLAN}	ADMIN RECORD	028	SOUTHWEST DIVISION - BLDG. 1 SW061005-05 IMAGED APNT_018	
N00236 / 002323 DS.B093.19697 RPT N68711-03-D-5104 00021	06-19-2006 <b>02-01-2006</b> 00093	SULTECH BRAC PMO WEST	DRAFT FINAL PROPOSED PLAN FOR TODD SHIPYARDS (SEE AR #2322 - BRAC PMO WEST TRANSMITTAL LETTER BY T. MACCHIARELLA)	ADMIN RECORD	028	SOUTHWEST DIVISION - BLDG. 1 SW061005-05 IMAGED APNT_018	

UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.	Record Type	Record Date	Author	Location	FRC Accession No.
Contr./Guid. No.	CTO No.	Recipient Affil.	Recipient	Subject	Classification	Sites	SWDIV Box No(s)	FRC Warehouse
Approx. # Pages	EPA Cat. #	Recipient	Subject	Classification	Sites	CD No.	FRC Box No(s)	
N00236 / 002348 BRAC SER BPMOW.MEP/0089 CORRESP NONE 00003	06-20-2006 <b>02-02-2006</b> NONE	BRAC PMO WEST T. MACCHIARELLA VARIOUS AGENCIES	CD CONTAINING VALIDATED ANALYTICAL RESULTS FOR JUNE 2005 OFFSHORE SEDIMENT SAMPLING WITH FIGURE SHOWING SAMPLING LOCATIONS (SEE AR 2029 - FINAL OFFSHORE SEDIMENT STUDY WORK PLAN)	ADMIN RECORD INFO REPOSITORY	020 024 028 OU 4B	CHOICE IMAGING SOLUTIONS SW070817-03		
N00236 / 002326 NONE RPT NONE 00018	06-19-2006 <b>03-01-2006</b> NONE	BRAC PMO WEST PUBLIC INTEREST	PROPOSED PLAN FOR TODD SHIPYARDS (SEE AR #2325 - BRAC PMO WEST TRANSMITTAL LETTER BY T. MACCHIARELLA)	ADMIN RECORD INFO REPOSITORY	028	SOUTHWEST DIVISION - BLDG. 1 SW070413-01 IMAGED APNT_022		
N00236 / 002325 BRAC SER BPMOW.SP/0293 CORRESP NONE 00004	06-19-2006 <b>03-27-2006</b> NONE	BRAC PMO WEST T. MACCHIARELLA VARIOUS AGENCIES	TRANSMITTAL OF FINAL PROPOSED PLAN FOR TODD SHIPYARDS (W/OUT ENCLOSURE) [SEE AR #2326 - FINAL PROPOSED PLAN]	ADMIN RECORD INFO REPOSITORY	028	SOUTHWEST DIVISION - BLDG. 1 SW070413-01 IMAGED APNT_022		
N00236 / 002283 NONE COMMENTS NONE 00002	05-03-2006 <b>04-12-2006</b> NONE	PRIVATE CITIZEN D. SMITH BRAC PMO WEST T. MACCHIARELLA	REVIEW AND COMMENTS ON THE PROPOSED PLANS (PP) [PORTION OF THE DOCUMENT IS SENSITIVE - PRIVATE CITIZEN'S HOME ADDRESS AND PHONE NUMBER IS ON THE FOOTER]	ADMIN RECORD SENSITIVE	014 028	SOUTHWEST DIVISION - BLDG. 1 SW061005-05 IMAGED APNT_018		
N00236 / 002282 NONE COMMENTS NONE 00002	05-03-2006 <b>04-14-2006</b> NONE	RAB G. HUMPHREYS BRAC PMO WEST T. MACCHIARELLA	REVIEW AND COMMENTS ON THE PROPOSED PLAN (PP) FOR TODD SHIPYARDS (PORTION OF THE DOCUMENT IS SENSITIVE - PRIVATE CITIZEN'S HOME ADDRESS IS ON THE HEADER)	ADMIN RECORD SENSITIVE	028	SOUTHWEST DIVISION - BLDG. 1 SW061005-05 IMAGED APNT_018		
N00236 / 002493 BRAC SER BPMOW.LAO/0722 CORRESP NONE 00005	08-28-2006 <b>08-18-2006</b> NONE	BRAC PMO WEST T. MACCHIARELLA VARIOUS AGENCIES	TRANSMITTAL OF DRAFT TECHNICAL MEMORANDUM (TM) (W/OUT ENLOSURE) [PORTION OF THE MAILING LIST IS SENSITIVE] {SEE AR #2494 - DRAFT TM}	ADMIN RECORD INFO REPOSITORY SENSITIVE	028	SOUTHWEST DIVISION - BLDG. 1 SW061120-04 IMAGED APNT_024		

UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.	Record Type	Record Date	Author	Location	FRC Accession No.
Contr./Guid. No.	CTO No.	Recipient Affil.	Recipient	Subject	Classification	Sites	SWDIV Box No(s)	FRC Warehouse
Approx. # Pages	EPA Cat. #	Recipient	Recipient	Subject	Classification	Sites	CD No.	FRC Box No(s)
N00236 / 002494 DS.B093.20814 RPT N68711-03-D-5104 00046	08-28-2006 08-21-2006 00093	SULTECH J. WERTER BRAC PMO WEST	SULTECH J. WERTER BRAC PMO WEST	DRAFT TECHNICAL MEMORANDUM TO SUPPLEMENT THE ADMINISTRATIVE RECORD, TODD SHIPYARDS (CD COPY ENCLOSED) [SEE AR #2493 - BRAC PMO WEST TRANSMITTAL LETTER BY T. MACCHIARELLA]	ADMIN RECORD INFO REPOSITORY	028	SOUTHWEST DIVISION - BLDG. 1 SW061027-04 IMAGED APNT_016	
N00236 / 002553 NONE COMMENTS NONE 00002	10-03-2006 09-07-2006 NONE	USEPA - SAN FRANCISCO X. TRAN BRAC PMO WEST T. MACCHIARELLA	USEPA - SAN FRANCISCO X. TRAN BRAC PMO WEST T. MACCHIARELLA	REVIEW AND COMMENTS ON DRAFT ADDENDUM 1, OFFSHORE SEDIMENT STUDY WORK PLAN AT OAKLAND INNER HARBOR, PIER AREA, TODD SHIPYARD AND WESTERN BAYSIDE	ADMIN RECORD INFO REPOSITORY	020 024 028 OU 4B	SOUTHWEST DIVISION - BLDG. 1 SW070511-02 IMAGED APNT_022	
N00236 / 002546 FILE NO. 2199.9285(JCH) COMMENTS NONE 00003	09-20-2006 09-08-2006 NONE	CRWQCB - OAKLAND J. HUANG BRAC PMO WEST T. MACCHIARELLA	CRWQCB - OAKLAND J. HUANG BRAC PMO WEST T. MACCHIARELLA	REVIEW AND CONCURRENCE WITH PROPOSED ADDITIONAL SAMPLING LOCATIONS AND ANALYSES FOR DRAFT ADDENDUM 1 TO FINAL OFFSHORE SEDIMENT STUDY WORK PLAN (WP), OAKLAND INNER HARBOR, PIER AREA, TODD SHIPYARD, AND WESTERN BAYSIDE	ADMIN RECORD INFO REPOSITORY SENSITIVE	020 024 028	SOUTHWEST DIVISION - BLDG. 1 SW070511-02 IMAGED APNT_022	
N00236 / 002547 NONE COMMENTS NONE 00004	09-20-2006 09-08-2006 NONE	DTSC - SACRAMENTO D. LOFSTROM BRAC PMO WEST T. MACCHIARELLA	DTSC - SACRAMENTO D. LOFSTROM BRAC PMO WEST T. MACCHIARELLA	REVIEW AND COMMENTS ON DRAFT ADDENDUM 1, OFFSHORE SEDIMENT STUDY WORK PLAN (WP), OAKLAND INNER HARBOR, PIER AREA, TODD SHIPYARD, AND WESTERN BAYSIDE (PORTION OF THE MAILING LIST IS SENSITIVE)	ADMIN RECORD INFO REPOSITORY SENSITIVE	020 024 028	SOUTHWEST DIVISION - BLDG. 1 SW070511-02 IMAGED APNT_022	
N00236 / 002544 BRAC SER BPMOW.MEP/0791 CORRESP NONE 00006	09-20-2006 09-18-2006 NONE	BRAC PMO WEST T. MACCHIARELLA VARIOUS AGENCIES	BRAC PMO WEST T. MACCHIARELLA VARIOUS AGENCIES	TRANSMITTAL OF FINAL ADDENDUM 1 TO FINAL OFFSHORE SEDIMENT STUDY WORK PLAN (WP), OAKLAND INNER HARBOR, PIER AREA, TODD SHIPYARD, AND WESTERN BAYSIDE (W/OUT ENCLOSURE) [SEE AR #2545 - FINAL ADDENDUM 1] {PORTION OF THE MAILING LIST IS SENSITIVE}	ADMIN RECORD INFO REPOSITORY SENSITIVE	020 024 028	SOUTHWEST DIVISION - BLDG. 1 SW070511-02 IMAGED APNT_022	
N00236 / 002570 NONE COMMENTS NONE 00002	10-19-2006 09-18-2006 NONE	USEPA - SAN FRANCISCO A. COOK BRAC PMO WEST T. MACCHIARELLA	USEPA - SAN FRANCISCO A. COOK BRAC PMO WEST T. MACCHIARELLA	REVIEW AND COMMENTS ON TECHNICAL MEMORANDUM TO SUPPLEMENT THE ADMINSTRATIVE RECORD	ADMIN RECORD INFO REPOSITORY	028	SOUTHWEST DIVISION - BLDG. 1 SW061120-04 IMAGED APNT_024	

UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.	Record Type	Record Date	Author	Location	FRC Accession No.
Constr./Guid. No.	CTO No.	Recipient Affil.	Recipient	Subject	Classification	Sites	SWDIV Box No(s)	FRC Warehouse
Approx. # Pages	EPA Cat. #	Recipient	Recipient	Subject	Classification	Sites	CD No.	FRC Box No(s)
N00236 / 002545	09-20-2006	BATTELLE		FINAL ADDENDUM 1 TO OFFSHORE	ADMIN RECORD	020	SOUTHWEST	
PROJECT NO.	09-19-2006			SEDIMENT STUDY WORK PLAN (WP),	INFO REPOSITORY	024	DIVISION - BLDG. 1	
G486085	NONE	BRAC PMO WEST		OAKLAND INNER HARBOR, PIER AREA,		028	SW070511-02	
RPT				TODD SHIPYARD, AND WESTERN BAYSIDE			IMAGED	
N47408-01-D-8207				(SEE AR #2544 - BRAC PMO WEST			APNT_022	
00094				TRANSMITTAL LETTER BY T.				
				MACCHIARELLA) [SEE AR #2029 - FINAL WP]				
N00236 / 002615	11-22-2006	CRWQCB -		REVIEW AND COMMENTS ON DRAFT	ADMIN RECORD	028	SOUTHWEST	
FILE NO.	10-23-2006	OAKLAND		TECHNICAL MEMORANDUM TO	INFO REPOSITORY		DIVISION - BLDG. 110	
2199.9285(EWS)	NONE	E. SIMON		SUPPLEMENT THE ADMINISTRATIVE				
COMMENTS		BRAC PMO WEST		RECORD, TODD SHIPYARDS				
NONE		T. MACCHIARELLA						
00004								
N00236 / 002618	11-22-2006	BRAC PMO WEST		FEDERAL FACILITY AGREEMENT (FFA)	ADMIN RECORD	028	SOUTHWEST	
BRAC SER	11-07-2006	T. MACCHIARELLA		EXTENSION FOR RECORD OF DECISION	INFO REPOSITORY		DIVISION - BLDG. 110	
BPMOW.FF\0128	NONE	VARIOUS		(ROD)				
CORRESP		AGENCIES						
NONE								
00003								
N00236 / 002679	01-29-2007	BRAC PMO WEST		FEDERAL FACILITY AGREEMENT	ADMIN RECORD	028	SOUTHWEST	
BRAC SER	01-11-2007	T. MACCHIARELLA		(FFA)REQUEST FOR THIRTY (30) DAY	INFO REPOSITORY		DIVISION - BLDG. 110	
BPMOW.FF\0248	NONE	VARIOUS		EXTENSION FOR SUBMITTAL OF DRAFT				
CORRESP		AGENCIES		RECORD OF DECISION (ROD)				
NONE								
00003								
N00236 / 002681	02-02-2007	BRAC PMO WEST		TRANSMITTAL OF FINAL TECHINCAL	ADMIN RECORD	028	SOUTHWEST	
BRAC SER	01-15-2007	T. MACCHIARELLA		MEMORANDUM (W/OUT ENCLOSURE) [SEE	INFO REPOSITORY		DIVISION - BLDG. 110	
BPMOW.FSF0251	NONE	VARIOUS		AR #2682 - FINAL TECH MEMORANDUM]	SENSITIVE			
CORRESP		AGENCIES		{PORTION OF THE MAILING LIST IS				
NONE				SENSITIVE}				
00002								
N00236 / 002682	02-02-2007	SULTECH		FINAL TECHNICAL MEMORANDUM TO	ADMIN RECORD	028	SOUTHWEST	
DS.B093-20816	01-16-2007	D. RHODES		SUPPLEMENT THE ADMINISTRATIVE	INFO REPOSITORY		DIVISION - BLDG. 110	
RPT	00093	BRAC PMO WEST		RECORD, TODDS SHIPYARD (CD COPY				
N68711-03-D-5104				ENCLOSED) [SEE AR #2681 - BRAC PMO				
00020				WEST TRANSMITTAL LETTER BY T.				
				MACCHIARELLA]				

UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.	Record Type	Record Date	Author	Location	FRC Accession No.
Contr./Guid. No.	CTO No.	Recipient Affil.	Recipient	Subject	Classification	Sites	SWDIV Box No(s)	FRC Warehouse
Approx. # Pages	EPA Cat. #	Recipient	Recipient	Subject	Classification	Sites	CD No.	FRC Box No(s)
N00236 / 002688 PROJECT NO. 02125.2500.0005 RPT N68711-02-D-8213 00200	02-08-2007 01-26-2007 00024	INNOVATIVE TECHNICAL SOLUTIONS C. GILMORE BRAC PMO WEST	INNOVATIVE TECHNICAL SOLUTIONS C. GILMORE BRAC PMO WEST	DRAFT WORKPLAN FOR DATA GAP SAMPLING INVESTIGATION, INSTALLATION RESTORATION (IR) SITE [SEE AR #2687 - BRAC PMO WEST TRANSMITTAL LETTER BY T. MACCHIARELLA]	ADMIN RECORD INFO REPOSITORY	028	SOUTHWEST DIVISION - BLDG. 110	
N00236 / 002687 BRAC SER BPMOW.FSF\0294 CORRESP NONE 00002	02-08-2007 01-29-2007 NONE	BRAC PMO WEST T. MACCHIARELLA VARIOUS AGENCIES	BRAC PMO WEST T. MACCHIARELLA VARIOUS AGENCIES	TRANSMITTAL OF DRAFT WORKPLAN FOR THE DATA GAP SAMPLING INVESTIGATION AT INSTALLATION RESTORATION (IR) SITE [W/OUT ENCLOSURE] {PORTION OF THE MAILING LIST IS SENSITIVE} (SEE AR #2688 - DRAFT WORKPLAN FOR DATA GAP SAMPLING)	ADMIN RECORD INFO REPOSITORY SENSITIVE	028	SOUTHWEST DIVISION - BLDG. 110	
N00236 / 002706 BRAC SER BPMOW.FF\0366 CORRESP NONE 00003	03-14-2007 02-15-2007 NONE	BRAC PMO WEST T. MACCHIARELLA VARIOUS AGENCIES	BRAC PMO WEST T. MACCHIARELLA VARIOUS AGENCIES	FEDERAL FACILITY AGREEMENT (FFA) EXTENSION FOR DRAFT RECORD OF DECISION (ROD)	ADMIN RECORD INFO REPOSITORY	028	SOUTHWEST DIVISION - BLDG. 110	
N00236 / 002735 DS.B093.19700 RPT N68711-03-D-5104 00175	04-12-2007 03-01-2007 00093	SULTECH BRAC PMO WEST	SULTECH BRAC PMO WEST	DRAFT RECORD OF DECISION (ROD) [SEE AR #2734 - BRAC PMO WEST TRANSMITTAL LETTER BY T. MACCHIARELLA]	ADMIN RECORD INFO REPOSITORY	028	SOUTHWEST DIVISION - BLDG. 1	
N00236 / 002734 BRAC SER BPMOW.FSF\0424 CORRESP NONE 00003	04-12-2007 03-19-2007 NONE	BRAC PMO WEST T. MACCHIARELLA VARIOUS AGENCIES	BRAC PMO WEST T. MACCHIARELLA VARIOUS AGENCIES	TRANSMITTAL OF DRAFT RECORD OF DECISION (ROD) [W/OUT ENCLOSURE] {SEE AR #2735 - DRAFT ROD}	ADMIN RECORD INFO REPOSITORY	028	SOUTHWEST DIVISION - BLDG. 1	
N00236 / 002762 NONE COMMENTS NONE 00010	05-18-2007 04-02-2007 NONE	US EPA - SAN FRANCISCO A. COOK BRAC PMO WEST T. MACCHIARELLA	US EPA - SAN FRANCISCO A. COOK BRAC PMO WEST T. MACCHIARELLA	COMMENTS ON DRAFT WORK PLAN (WP) FOR DATA GAP SAMPLING INVESTIGATION	ADMIN RECORD INFO REPOSITORY	028	SOUTHWEST DIVISION - BLDG. 1	

UIC No. / Rec. No.	Doc. Control No.	Prc. Date	Author Affil.						
Record Type	Record Date	Author	Author					Location	FRC Accession No.
Contr./Guid. No.	CTO No.	Recipient Affil.	Recipient	Subject	Classification	Sites	SWDIV Box No(s)	FRC Warehouse	FRC Box No(s)
Approx. # Pages	EPA Cat. #	Recipient	Recipient	Subject	Classification	Sites	CD No.	FRC Warehouse	FRC Box No(s)
N00236 / 002744 FILE NO. 2199.9285 (EWS) COMMENTS NONE 00002	05-07-2007 04-03-2007 NONE	CRWQCB - OAKLAND E. SIMON BRAC PMO WEST T. MACCHIARELLA	CRWQCB - OAKLAND E. SIMON BRAC PMO WEST T. MACCHIARELLA	COMMENTS ON DRAFT WORK PLAN (WP) FOR DATA GAP SAMPLING INVESTIGATION	ADMIN RECORD INFO REPOSITORY	028	SOUTHWEST DIVISION - BLDG. 1		
N00236 / 002858 NONE CORRESPONDENC E NONE 00002	09-20-2007 04-16-2007 NONE	ALAMEDA REUSE AND DEVELOPMENT AUTHORITY D. POTTER BRAC PMO WEST T. MACCHIARELLA	ALAMEDA REUSE AND DEVELOPMENT AUTHORITY D. POTTER BRAC PMO WEST T. MACCHIARELLA	REVIEW AND COMMENTS ON THE DRAFT RECORD OF DECISION	ADMIN RECORD INFO REPOSITORY	028	SOUTHWEST DIVISION - BLDG. 1		
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**ATTACHMENT B**  
**TRANSCRIPT FROM PUBLIC MEETING, SIGN-IN SHEET, AND PUBLIC NOTICE**

34 pages.

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PROPOSED PLANS FOR  
SITE 14, FORMER FIRE  
FIGHTER TRAINING AREA  
AND SITE 28, TODD SHIPYARDS

ALAMEDA POINT, CALIFORNIA  
PUBLIC MEETING

Wednesday, April 12, 2006

COPY

Alameda City Hall West  
950 W. Mall Square  
Building 1  
Community Conference Room 201  
Alameda Point, California

Reported by: Valerie E. Jensen, CSR No. 4401

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PARTICIPANTS

PRESENTERS:

THOMAS MACCHIARELLA, Navy BRAC Environmental  
Coordinator  
CRAIG HUNTER, SulTech

OTHER AGENCY, NAVY STAFF AND CONSULTANT REPRESENTATIVES:

STEVEN PECK, Navy RPM  
CLAUDIA RICHARDSON, Navy RPM  
ANDREW BAUGHMAN, Navy  
DOT LOFSTROM, Department of Toxic Substances Control  
JUDY HUANG, Regional Water Quality Control Board  
ANNA-MARIE COOK, U.S. Environmental Protection  
Agency  
JAMIE EBY, Sullivan International Group  
DEANNA RHOADES, SulTech  
TOMMIE JEAN DAMREL, SulTech

COMMUNITY MEMBERS AND INTERESTED PARTIES:

MICHAEL JOHN TORREY, Alameda Housing Authority  
STEVE BACHOFER, St. Mary's College  
CLAIRE GILMORE, ITSI

1 APRIL 12, 2006

6:45 P.M.

2  
3 MR. MACCHIARELLA: Good evening, everyone.  
4 Thank you for coming.

5 This meeting is being hosted by the  
6 Department of the Navy. More specifically, the Base  
7 Realignment and Closure Program Management Office West.

8 This is a meeting for the Navy to present  
9 the public with its preferred alternative for two sites  
10 at Alameda Point; namely, Installation Restoration Site  
11 14, the Former Fire Fighter Training Area, and Site 28,  
12 Todd Shipyards.

13 My name is Thomas Macchiarella, and I'll be  
14 your host this evening.

15 Before we get started, I'd like to  
16 introduce three people who are on the Navy's team.  
17 And a little bit later I will introduce three others  
18 from the regulatory team.

19 Right now I'd like to introduce Mr. Steve  
20 Peck, who is the Navy's project manager for Site 14.

21 MR. PECK: Good evening, folks.

22 MR. MACCHIARELLA: And Claudia Richardson --

23 MS. RICHARDSON: Hello.

24 MR. MACCHIARELLA: -- is the Navy's project  
25 manager for Site 28.

1                   And Doctor Craig Hunter, who is the Navy's  
2 consultant from SulTech.

3                   MR. HUNTER:   (Nods head.)

4                   MR. MACCHIARELLA:  The four of us will  
5 answer your questions this evening.

6                   Next slide, please.

7                   Before we get started, let's go through  
8 the agenda.

9                   We were occupied earlier with the posterboard  
10 viewing session, and now we're in the introduction and  
11 overview of the Navy's Installation Restoration Program.  
12 After that we're going to have a segment on Site 14.  
13 Then we'll give you a summary of the Proposed Plan and  
14 then answer any questions you may have and then receive  
15 public comments.  After that we'll have a segment on  
16 Site 28, where we'll do the same thing.

17                   Tonight we're focused on Sites 14 and 28.  
18 However, I think it's beneficial to discuss the overall  
19 program, known as the Installation Restoration Program,  
20 so you can better understand how Sites 14 and 28 fit  
21 into the program and where we are in the process.

22                   The Installation Restoration Program, a  
23 little bit on the management of the program.

24                   It's managed by the Base Realignment And  
25 Closure Program Management Office West with support

1 from the Southwest Division Naval Facilities Engineering  
2 Command, both of which are located in San Diego. The  
3 Program Management Office West reports directly to the  
4 Deputy Assistant Secretary of the Navy for Installations  
5 and Environment.

6 For the Program Management Office West,  
7 I'm the BRAC Environmental Coordinator for Alameda  
8 Point, and I have the responsibility and the  
9 authority to conduct the program. I'm also the  
10 Navy's representative on the BRAC cleanup team,  
11 which is a team composed of the Department of the Navy  
12 and regulatory agencies working collaboratively towards  
13 completing the Installation Restoration Program and  
14 satisfying regulatory requirements.

15 The main goals of the Navy's Installation  
16 Restoration Program are to identify, investigate,  
17 assess, characterize and clean up hazardous substances,  
18 to reduce the risk to human health and the environment  
19 from past waste disposal activities or spills and  
20 to be consistent with the Comprehensive Environmental  
21 Response, Compensation and Liability Act, which you  
22 may be familiar with in the commercial sector, which  
23 is known as "Superfund," and, of course, to move all  
24 of the sites towards what we call "site closure."

25 Next slide, please.

1           In this figure you can see the primary steps  
2 of the CERCLA process or the Installation Restoration  
3 Program process. I'll walk you through them quickly.

4           We start off with what's called a  
5 Preliminary Assessment and Site Inspection, which  
6 is a site discovery phase. It involves interviews,  
7 records research, aerial photo research and, in  
8 some instances, soil and groundwater sampling.

9           If a release is discovered in soil  
10 or groundwater from this first step, then we  
11 move forward to what's called the RI and the FS,  
12 Remedial Investigation and Feasibility Study. This  
13 step includes detailed investigations of sites and  
14 characterization of sites. By that I mean gathering  
15 a lot of soil and groundwater samples. And then the  
16 Feasibility Study conducts an analysis on alternatives  
17 for cleanup options.

18           The Proposed Plan, which is where we are  
19 now, is a presentation to the public of the Navy's  
20 preferred alternative to clean up the site, and the  
21 Proposed Plan offers a comment period to the public.

22           After the Proposed Plan and after the Navy  
23 receives public comments on the Proposed Plan, the Navy  
24 will select an alternative and document it in a Record  
25 of Decision. The ROD will include a Responsiveness

1 Summary which responds to comments from the public  
2 comment period.

3 Next slide, please.

4 Some of the key facts and figures related  
5 to the Installation Restoration Program at Alameda  
6 Point.

7 As I mentioned earlier, we have a BRAC  
8 cleanup team, which is composed of the United States  
9 EPA, the Navy, the California Department of Toxic  
10 Substances Control and the San Francisco Bay Regional  
11 Water Quality Control Board. Members of each of these  
12 groups are here tonight. I'd like to introduce them  
13 quickly.

14 From the San Francisco Bay Regional Water  
15 Quality Control Board, we have Judy Huang.

16 Say "Hi," Judy.

17 MS. HUANG: Hi.

18 MR. MACCHIARELLA: From the United States  
19 EPA, we have Anna-Marie Cook.

20 MS. COOK: (Gesturing.)

21 MR. MACCHIARELLA: And from the California  
22 DTSC, we have Dot Lofstrom.

23 MS. LOFSTROM: (Gesturing.)

24 MR. MACCHIARELLA: There are 35 specific  
25 sites listed in the Installation Restoration Program.

1 The Naval Air Station Alameda, also known as "Alameda  
2 Point," is listed on the National Priorities List and,  
3 therefore, the United States EPA is the lead regulatory  
4 agency.

5 The Navy and the regulatory agencies have  
6 an agreement called the "Federal Facility Agreement."  
7 And the FFA and the BRAC cleanup team are two concepts  
8 which streamline the cleanup process by ensuring timely  
9 and collaborative efforts among the parties.

10 We also have a site management plan that  
11 we update annually. And it's a road map which details  
12 the schedules and milestones for each Installation  
13 Restoration site. And the schedule and milestones  
14 are based on input from the regulatory agencies, the  
15 community, the Navy and available resources.

16 Finally, we have a Restoration Advisory  
17 Board, which is a community-based board of interested  
18 citizens who volunteer their time on a monthly basis  
19 and serve in an advisory capacity to the Navy for  
20 cleanup efforts at Alameda Point.

21 Back to Sites 14 and 28.

22 Where we are now is the Proposed Plan.  
23 You're going to hear more this evening about the  
24 Proposed Plans for these two sites.

25 What the Proposed Plan does is provide

1 for community involvement in the decisionmaking  
2 process. It summarizes all the environmental  
3 efforts to date -- by that I mean all of the  
4 studies related to the sites and previous cleanup  
5 actions. The Proposed Plan proposes a decision  
6 called the Preferred Alternative, and the Proposed  
7 Plan leads to the Record of Decision.

8 I'd like to reiterate that all public  
9 comments will be considered before the Navy makes a  
10 final determination in the Record of Decision, with  
11 consultation among the regulatory agencies.

12 The comment period for these Proposed  
13 Plans -- "for these two sites," I should say -- is  
14 March 20 to April 19. You can submit comments orally  
15 this evening or in writing. And the address to which  
16 you mail those is clearly shown in the Proposed Plan.

17 After the Record of Decision, the Navy will  
18 prepare a Remedial Design and then conduct the Remedial  
19 Action or the cleanup work.

20 So, that is a summary and a glance at the  
21 Environmental Installation Restoration Program at  
22 Alameda Point.

23 Are there any questions on that before we  
24 move on?

25 Okay. The next item on the agenda is a

1 presentation on the Proposed Plan for Site 14. For  
2 that, I'd like to ask Doctor Hunter to come up and  
3 show us.

4 DR. HUNTER: As Thomas mentioned, the  
5 Installation Restoration Site 14 was also called  
6 the former -- it's called "The Former Fire Fighter  
7 Training Area." One of the major activities they  
8 had out there was fire fighters from the base would  
9 set fires. They had an area designated, and they,  
10 basically, did their training activities out there.  
11 That was one of the primary reasons this site got  
12 listed.

13 Tonight the presentation outline is to  
14 give you a brief description of the site, talk about  
15 the investigations that occurred, give you the results  
16 of site-specific risk assessments for human health  
17 and ecology, talk about the specific risk remedial  
18 action objectives, the remedial alternatives that  
19 were considered to meet those objectives and the  
20 Navy's preferred alternative and, basically, how  
21 we're going to move the site forward.

22 Site 14 is located along the Oakland  
23 Inner Harbor, the northern central section, just  
24 above some of the runway areas. For reference,  
25 we're in this area right here, so it's at the

1 northeast -- northwest corner of the base.

2 As I said, it's the former fire  
3 fighter training area. It's about 14 acres in total.

4 This is a picture of the area where the  
5 fire fighter training area was located. In addition  
6 to the training area, there was also a detachment of  
7 the Navy's construction battalion unit, the Seabees,  
8 that was located here. They also stored equipment  
9 and motor vehicles out here at different times.

10 Other buildings. Some quonset huts that,  
11 again, were storage for ordnance, explosives and  
12 flammable materials.

13 Building 26, I think, was where a detachment  
14 of Marines held the small arms -- pistols and rifles,  
15 things like that. They cleaned their weapons in there.

16 Other structures. These are two ASTs.  
17 They were water tanks. Historically -- in fact, a  
18 long time ago the Pan Am Clippers landed here, and  
19 there was a well that was called "The Pan Am Well."  
20 They would pump water into these tanks and use it  
21 for some of the maintenance activities.

22 There's also a Corrective Action Area  
23 where fuel oil was spilled. There was an underground  
24 storage tank out there, solid waste management units --  
25 what we call "SWMUs" -- a generator, which included

1 generator accumulation points. These are areas where  
2 the maintenance activities out there would store their  
3 hazardous waste materials before they were transported  
4 to a central collection point.

5 Washdown areas. This is where they were  
6 cleaning their equipment out there, the Seabees.  
7 And, again, the area of concern -- this is located  
8 in the Corrective Action Area where the tank was.

9 And you see on the map this is Corrective  
10 Action Area 2. There was an underground storage tank  
11 that's been removed. This is where the fire fighter  
12 training area was.

13 These are the two tanks you saw in the  
14 picture, the quonset huts, Building 26. They had a  
15 GAP associated with that building where they would  
16 take their solvents from cleaning their weapons and  
17 store that temporarily.

18 These two buildings here were garage  
19 structures. They're not there now, but this is where  
20 the Seabees were located. And they also had a point  
21 where they would take their cleaning solvents. There  
22 was another AST located with a building out here.

23 This shows a plume. We do have  
24 contamination out there. It's largely vinyl chloride  
25 now. It used to be, probably, tetrochloroethene and

1 trichloroethene. It's degraded, so there's not much  
2 of the parent material left, but the vinyl chloride  
3 is a degradation product from that material.

4 We have evaluated the SWMUs for consideration  
5 through RCRA, and we recommended no further action to  
6 DTSC.

7 I believe that's been agreed to, Dot. Is  
8 that --

9 MS. LOFSTROM: (Nods head.)

10 DR. HUNTER: We submitted a letter requesting  
11 no further action on Corrective Action Area 2 to the  
12 Water Board.

13 Has that one been cleared yet?

14 MS. HUANG: There will be further action.  
15 We will be requesting additional sampling for CAA 2.

16 DR. HUNTER: That one will get more study  
17 on that.

18 Other environmental investigations that  
19 have occurred.

20 The Environmental Baseline Survey. This is  
21 one that was conducted early on. It was initiated --  
22 as it was initiated, they would collect initial samples  
23 to determine if further study was required. Based on  
24 that, those results, the TPH program came in and found  
25 Corrective Action Area 2 needed study.

1           The Remedial Investigation reports were  
2 studied, initiated to look at soil and groundwater.  
3 And this is a soil removal action that was conducted  
4 for the fire fighter training area.

5           Some of the contamination that's been  
6 found out there. Polynuclear aromatic hydrocarbons --  
7 PAHs -- are found in the fill material that was  
8 used to construct the base. At Site 14, the average  
9 concentration is below a threshold level of 0.62  
10 milligrams per kilogram. At this time, the Navy  
11 does not feel any action is necessary for PAH's.

12           Dioxins were found in soil at the former  
13 fire fighter training area. And that's consistent  
14 with burning chlorinated solvents and other hydrocarbon  
15 materials, petroleum. Dioxins can be found in those  
16 situations.

17           I mentioned earlier the volatile organic  
18 compounds, including vinyl chloride, 1,2 dichloroethene  
19 and 1,1 dichloroethane. These are found in a shallow  
20 groundwater plume, and concentrations have been  
21 decreasing over time.

22           There was a removal action in 2001 through  
23 March 2002 to take out of the former fire fighter  
24 training area the dioxin material. 1400 cubic yards  
25 of soil were removed. Confirmation samples showed

1 concentrations less than the screening level that was  
2 used for this study. And this level is considerably  
3 more protective of human health. So, no further action  
4 was deemed necessary.

5 As I said, based on the -- during the RI  
6 phase, we did a Risk Assessment for both human health  
7 and ecological receptors. These are the results for  
8 human health.

9 Occupational, construction and recreational  
10 were found to be within the risk management range,  
11 and residential was found just at the upper bound  
12 of the Risk Assessment. So, based on these results,  
13 the Navy has looked at conducting removal actions for  
14 contaminated groundwater. This value includes both  
15 ingestion of soil and inhalation of volatiles from  
16 the groundwater to a residential receptor.

17 The risk driver was vinyl chloride.  
18 And in soil, it is background levels of arsenic.  
19 That's basically -- because the arsenic was driving  
20 the soil risk, no further action has been recommended  
21 for further soil.

22 As I said, within or below the risk  
23 management range were occupational, construction and  
24 recreational scenarios. At the upper bound for the  
25 residential scenario, no remedial action of soil

1 was required, because it's a small incremental risk.

2 For Ecological Risk Assessment, we looked  
3 at the California ground squirrel, the Alameda song  
4 sparrow and the red-tailed hawk. These are common  
5 ecological species found in the area. We also looked  
6 at marine receptors by comparing the concentrations  
7 in groundwater to the surface water criteria.

8 We did not find -- we found little or no  
9 risk to the ecological receptors. It also is an  
10 area of limited habitat. And because of its future  
11 landuse as a golf course, there will be little  
12 opportunity -- the land use will not create  
13 additional habitat for ecological receptors.

14 Based on the results, as I said, the Navy  
15 has determined that Remedial Action is necessary for  
16 groundwater. The Remedial Action Objective is to  
17 protect recreational users at the site. This is  
18 public trust land, so it's unlikely that there will  
19 actually be any residential use of the site but,  
20 again, to prevent that potential risk from breathing  
21 vapors in the groundwater, the Navy will conduct a  
22 removal action.

23 Alternatives considered for that removal  
24 action included the no-action alternative, which is  
25 required by the National Contingency Plan, monitoring

1 and institutional controls. And the third one is  
2 in-situ chemical oxidation, followed by monitoring  
3 and institutional controls along with that. Number  
4 three would be an active process, active removal  
5 action.

6 Remedial goals include vinyl chloride 15  
7 milligrams per liter. This was derived to be protective  
8 of indoor air -- volatilization from ground into indoor  
9 air. And this value here would result in a value that's  
10 is protective of the human resident.

11 We would also be looking to reduce some  
12 of these other compounds which can degrade to vinyl  
13 chloride if left there. And, also, the method would  
14 be useful in reducing VOCs that are still -- that  
15 still remain in the saturated zone of the soil.

16 Under alternative one, no actions are  
17 performed. There's no cost, obviously, but it does  
18 provide a baseline for comparing the other alternatives.

19 Alternative two would include delineating  
20 the extent of groundwater contamination, using  
21 institutional controls to restrict residential  
22 landuse. And, basically, depending upon what we  
23 call "natural attenuation," it would take approximately  
24 62 years for that to occur, and it would cost 1.6  
25 million because of monitoring costs and maintaining

1 the institutional controls on the property.

2 Alternative three included, as I said, an  
3 active remediation process, in-situ chemical oxidation.  
4 It's very similar to alternative two, except that it  
5 does include that active component.

6 MR. TORREY: Say that again? It's very  
7 similar to alternative two?

8 DR. HUNTER: Alternative two --

9 MR. TORREY: It includes what?

10 DR. HUNTER: It includes this active  
11 component to actually treat groundwater.

12 MR. TORREY: Alternative two doesn't  
13 include that?

14 DR. HUNTER: That's correct.

15 By actively treating it, though, we will  
16 reduce the time period to approximately six years,  
17 with a cost increase to 2.2 million.

18 This is a process that's used to compare  
19 the alternatives.

20 There are nine criteria. The Navy goes  
21 through the process. Every alternative is compared  
22 against these criteria.

23 What I'm going to show you is criteria three  
24 through seven. Eight and nine come after the Proposed  
25 Plan and public meeting process. Those would depend

1 upon the public comments.

2 This is a table showing, basically, the  
3 modifying criteria. Effectiveness over the long term  
4 at reducing the concentrations and protecting human  
5 health. No action, obviously, has a low potential  
6 to accomplish that. Moderate for ICs and a high  
7 effectiveness for alternative three.

8 As you can see, alternative three pretty  
9 much ranks highest for all of the criteria.

10 And the Navy selected alternative three  
11 as its preferred alternative for these reasons:

12 It would be protective of human health and the  
13 environment; it would result in a shorter time  
14 frame for the institutional controls, provide  
15 long-term protection; the cost is only slightly  
16 higher than alternative two, but under a shorter  
17 time frame; and it does permanently remove a  
18 significant portion of the contaminant mass.

19 In conclusion, again, the planned long-term  
20 use of the site is for a golf course for recreational  
21 use. The Navy does propose to remediate groundwater  
22 that would protect hypothetical residential uses,  
23 although that has not been anticipated at this time.  
24 No further action is proposed for soil. And the BRAC  
25 cleanup team has agreed with this remedial alternative.

1                   And this is a picture here. I showed you,  
2 earlier on, the plume. It starts about this location  
3 and extends in this area here. These are not wetlands.  
4 These are just big puddles after one of the recent rains  
5 we had. We would have liked to have done it during dry  
6 weather, but...

7                   The next step would be public comments on  
8 the Proposed Plan. We will be addressing those comments  
9 in the Record of Decision, documenting that selected  
10 remedial action in the ROD, putting a notice in the  
11 paper and then preparing the Remedial Design and  
12 implementing Remedial Action.

13                   Any questions or comments?

14                   MR. TORREY: Yeah.

15                   On the comparison alternatives on Page 25,  
16 they're going to be much larger than this for the  
17 people who actually read the comparisons; right?  
18 'Cause I can't see nothing here.

19                   DR. HUNTER: It's, in the Proposed Plan,  
20 much larger. It's in the Proposed Plan.

21                   MR. TORREY: It's going to be larger,  
22 though, I take it?

23                   DR. HUNTER: Yes.

24                   MR. MACCHIARELLA: We're now in a  
25 clarifying question portion of the agenda.

1           If there are questions, I'd be happy to  
2 answer them.

3           If you could please mention at least your  
4 first name when you ask a question, for future  
5 reference? You don't have to, though.

6           Any other questions?

7           Okay. Now I'd like to go into listening  
8 mode and receive any public comments we have for the  
9 Site 14 preferred alternative.

10           Of course, public comments can be submitted  
11 either this evening, right now, for Site 14 or through  
12 the end of the public comment period in writing,  
13 either by e-mail or regular mail.

14           Does anybody have any comments they'd like  
15 to give us on the preferred alternative for Site 14 at  
16 this time?

17           Okay. Then we will move along to the next  
18 item on the agenda, which is a presentation of the  
19 Proposed Plan for Site 28, Todd Shipyards.

20           Doctor Hunter?

21           DR. HUNTER: Site 28, the former Todd  
22 Shipyards. This is a piece of property just located  
23 off to the north from this building.

24           Go ahead to the next.

25           Again, the presentation outline will be

1 to give you a little bit of a background on the site,  
2 talk about the investigations that occurred, give  
3 you the results of the site-specific risk assessments,  
4 talk about the remedial action objectives, review  
5 the remedial alternatives, identify the preferred  
6 alternative and then talk about the next steps.

7           Again, Site 28 is this little  
8 triangular-shaped piece here. Again, we're located  
9 right in this building. So it's just off here along  
10 the Inner Harbor again.

11           I'm trying to think how the history on  
12 this one went.

13           The Navy inherited it, sort of, in 1995.  
14 It used to be -- Todd Shipyards was out here doing  
15 drydock work. It wasn't for the Navy at all; it was  
16 private work out here. I guess it was originally part  
17 of the Navy's property. And then Todd Shipyards closed,  
18 and the Navy inherited it.

19           Currently, at Site 28, there's a dog park,  
20 a parking lot and a portion of the ferry building.

21           This is the old shipyard down in this  
22 area, constructed in 1930, again with fill material.  
23 The Alameda Railroad, the ferry -- also called the  
24 "Mole" -- used to run through here out to Site 1 at  
25 the end of the base.

1                   There's a little bit more of the history.  
2                   It was acquired in 1970, and in 1995 it came back  
3                   to the Navy.

4                   This is the dog park area.

5                   Go back a minute. Go back to the -- most of  
6                   these pictures are taken in this area and looking back  
7                   to the east of the site.

8                   Again, this is the dog park area, and back  
9                   over here would have been the Inner Harbor area.

10                  The past uses. It was used for ship  
11                  building, maintenance of marine vessels, railroad  
12                  causeway, the Alameda Mole. And the future use for  
13                  the site is a recreational dog park and parking lot.

14                  Where we are on this site.

15                  As Thomas pointed out, we're at the Proposed  
16                  Plan and public comment period. We've completed all  
17                  of these steps, including the Remedial Investigation,  
18                  Feasibility Study. And after the public comment period  
19                  ends, we'll move on to the Record of Decision.

20                  An Environmental Baseline Study was done in  
21                  '93 and 2001 and a supplement in 2002. Based on those  
22                  results, we conducted a sediment study out in the Inner  
23                  Harbor. The Baseline Groundwater Monitoring Program  
24                  added the wells in 2001. We did a polynuclear -- PAH  
25                  study in 2002 and a Remedial Investigation study in

1 2004 that did additional samples and analyses for soil  
2 and groundwater at Site 28.

3 Soil contaminants found. They divided  
4 Site 28 into two areas -- what we call the "inland  
5 area" and the "shoreline area." This is most of the  
6 parking lot, the old dock area down here, and then  
7 this is the dog park area in here.

8 What they found were the PAH compounds,  
9 arsenic and iron, along the shoreline. Inland  
10 there were PAHs, PCBs, polychlorinated biphenyls and  
11 pesticides. Groundwater was contaminated with copper,  
12 and the inland area groundwater is contaminated with  
13 arsenic.

14 Risk assessment results. Most of these  
15 again fall within the risk management range of 10 to  
16 the minus four, 10 to the minus six.

17 Residential, because of the arsenic  
18 in groundwater and arsenic in soil and PAHs, is  
19 significantly above the risk management range. And,  
20 also, the construction work, this exceeds a value of  
21 one, which is considered the threshold.

22 The Ecological Risk Assessment looked at  
23 both terrestrial receptors and for receptors in  
24 the Oakland Inner Harbor that included vegetation,  
25 invertebrates, fish, birds and marine mammals. They

1 found little risk to terrestrial receptors because of  
2 the limited habitat, but there is a potential risk to  
3 marine life in the Inner Harbor due to the copper in  
4 the groundwater.

5 Remedial action objectives for soil are  
6 to protect human health by reducing exposure to  
7 PAHs, arsenic and lead and identify at this time  
8 some preliminary remediation goals -- 2.1 milligrams  
9 per kilogram for PAHs. This is based on Region IX's  
10 industrial PRG representing a 10 to the minus fifth  
11 risk. Risk assessment would be protective of the  
12 recreational user at the site. 9.1 milligrams per  
13 kilogram for arsenic is a background level. 800  
14 milligrams per kilogram for lead is -- has been  
15 found, through using DTSC's lead spread model, to  
16 be protective of a recreational user for the site.

17 Groundwater objectives are to protect human  
18 health by reducing exposure to arsenic in groundwater  
19 and preventing exposure to offshore receptors to copper  
20 in the surface water.

21 Remediation goals are two thousand  
22 micrograms per liter for arsenic. This is based on  
23 the water board's recommended levels for using water  
24 for agricultural supply. It's been determined it's  
25 unlikely that that would be -- that water in that area

1 would be used for residential purposes. So, the other  
2 alternative for beneficial use is agricultural water  
3 supply.

4 For the shoreline area, 3.1 micrograms per  
5 liter is based on the California Toxic Rule and would  
6 be protective of the aquatic life.

7 These are the alternatives considered.  
8 There were nine alternatives, different combinations  
9 of ICs and removals. We considered phytoremediation  
10 of the metals in the soil, also, removing the soil and  
11 stabilizing it, and then also typically implementing  
12 institutional controls.

13 For groundwater, there were four alternatives  
14 considered. Again, the no action, largely natural  
15 attenuation, using monitoring of institutional controls.

16 Alternative three is an active process that  
17 adds a metal-reducing compound to the groundwater to  
18 take care of the copper in groundwater, followed by  
19 monitoring and institutional controls. Alternative  
20 four is to remove some of the soil source material  
21 and still add the metal-reducing compound.

22 Again, nine criteria. We'll focus on  
23 long-term effectiveness, reduction of toxicity,  
24 short-term effectiveness, implementability and cost.

25 For the soil, again, no action is the

1 baseline. The Navy went through an evaluation of  
2 all these criteria to come up with the preferred  
3 alternative, which, in the end, becomes a soil  
4 removal action, which we'll talk about in a minute.

5 Alternative 4B is the Navy's preferred  
6 alternative. It includes soil removal to soil with  
7 contaminants above the remedial action objectives to  
8 two feet below the surface. Soil would be excavated,  
9 stockpiled, characterized before off-site disposal.  
10 If any treatment is needed for land disposal  
11 restrictions, that would be conducted at the  
12 disposal facility.

13 Future site use is considered to be  
14 recreational or occupational. And an institutional  
15 control would be implemented to restrict the  
16 landuse to recreation or to prevent residential use  
17 of the property and followed by review of the success  
18 of those every five years, as required by CERCLA.

19 Here's a comparison for groundwater.  
20 Again, alternative -- it should have been labeled  
21 "4A" and "B" -- largely using an active process to  
22 remove the copper and prevent impact to the Oakland  
23 Inner Harbor.

24 We chose alternative three, which injects a  
25 metal-reducing compound, and to continue groundwater

1 monitoring till remedial goals are achieved. Also,  
2 implement institutional controls to prevent use of  
3 the groundwater for agricultural or industrial use  
4 until the remedial goals are achieved.

5 In conclusion, for soil, alternative B was  
6 chosen because it does protect human health and the  
7 environment, provides long-term protection, does source  
8 reduction by permanently removing a portion of impacted  
9 soil, replaces that impacted soil with clean fill at a  
10 moderate relative cost, especially in terms of achieving  
11 the remedial action objectives.

12 For groundwater, alternative three is the  
13 preferred alternative. It also protects human health  
14 and the environment, provides long-term protection,  
15 protects the offshore ecological receptors and, again,  
16 is a relatively moderate cost to achieve the remedial  
17 action objectives.

18 And the members of the BRAC cleanup team  
19 have agreed with the preferred alternative.

20 The next step is -- as Thomas mentioned,  
21 we're in the comment period on this Proposed Plan,  
22 where we look at comment until April 19. After that,  
23 we'll go to a Record of Decision.

24 Questions or comments?

25 MR. MACCHIARELLA: Thank you, Doctor Hunter.

1 Do we have any clarifying questions for Site  
2 28, the Todd Shipyards?

3 MR. BACHOFER: Steve Bachofer.

4 I wanted to ask what the industrial PRGs  
5 were for the lead.

6 DR. HUNTER: It's 800.

7 MR. BACHOFER: The recreational PRG is also  
8 matching the industrial PRG?

9 DR. HUNTER: Yeah. It was backed up by  
10 using -- actually, the lead spread came out higher,  
11 but we decided to...

12 MR. MACCHIARELLA: Another question?

13 MR. TORREY: Yeah. Michael John.

14 I noticed I didn't see any cost for the  
15 Navy -- the Navy is recommending 4B. I was wondering  
16 how much that would cost, alternative 4B for soil.

17 DR. HUNTER: For soil?

18 MS. RHOADES: It's on the slide.

19 MR. TORREY: It's on Page 21.

20 MR. MACCHIARELLA: Alternative 4B is  
21 estimated to cost 1.7 million.

22 MR. TORREY: 1.7 million.

23 And, also, for groundwater, alternative  
24 three, what is the cost on that?

25 MR. MACCHIARELLA: Alternative...

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MR. TORREY: Three for groundwater.

MR. MACCHIARELLA: 1.4 million.

Any other questions?

Okay. How about comments? Any public  
comments on the Site 28 Proposed Plan?

Okay. If there are none now, don't forget  
you still have time to submit them through the end of  
the comment period.

And that concludes our Site 28 segment and  
our meeting.

Thank you again for coming, everybody.

This meeting is adjourned.

(Off the record at 7:30 p.m.)

1 STATE OF CALIFORNIA) SS.

2 I do hereby certify that the meeting  
3 was held at the time and place therein stated; that  
4 the statements made were reported by me, a certified  
5 shorthand reporter and disinterested person, and were,  
6 under my supervision, thereafter transcribed into  
7 typewriting.

8 And I further certify that I am  
9 not of counsel or attorney for either or any of the  
10 participants in said hearing nor in any way personally  
11 interested or involved in the matters therein discussed.

12 IN WITNESS WHEREOF, I have hereunto set  
13 my hand and affixed my seal of office this 4th day of  
14 May 2006.

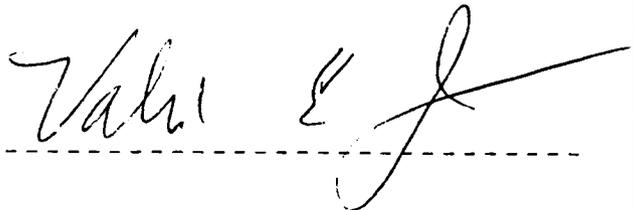
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VALERIE E. JENSEN

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Certified Shorthand Reporter

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**Sign-In Sheet Public Meeting for Former Fire Fighter Training Area (Site 14), and Todd Shipyards (Site 28)  
Alameda Point, California – April 12, 2006**

Name Resident or Affiliation	Address (Optional)	How Did you Hear About this Meeting? (✓)				
		Mailer	Notice in the Alameda Journal	Notice in the Oakland Tribune	Word of Mouth	Other (Please list)
Name Steven Peck Navy RPM	Street 1455 Frazee Rd 900 City, State and Zip San Diego, CA 92108					RPM
Name Tommié Jean Darnel Tetra Tech EMI	Street 125 Main St. Ste 1800 City, State and Zip San Francisco, CA 94105					
Name Michael John Torrey City of Alameda Alameda Housing Auth.	Street 174 Maple Way City, State and Zip Alameda, Ca. 94501-1847	BRAC Mailer				Contact Number (510) 205-9676
Name Jami E Eby Sullivan Int'l Grp.	Street 550 California St. Ste 600 City, State and Zip SF, CA 94112					
Name Thomas L. Macchiarella U.S. Navy	Street 1455 Frazee Rd #900 City, State and Zip San Diego 92108					Navy
Name ANDREW BAUGHMAN U.S. NAVY	Street 1455 FRAZEE RD #900 City, State and Zip SAN DIEGO, CA 92108					NAVY
Name Claudia Richardson Navy RPM	Street 1455 Frazee Rd Suite 900 City, State and Zip San Diego, Ca 92108					RPM
Name Craig Hunter Sul Tech	Street 3321 Parkside Dr City, State and Zip Rocklin, CA					Contractor

**Sign-In Sheet Public Meeting for Former Fire Fighter Training Area (Site 14), and Todd Shipyards (Site 28)  
Alameda Point, California – April 12, 2006**

Name Resident or Affiliation	Address (Optional)	How Did you Hear About this Meeting? (✓)				
		Mailer	Notice in the Alameda Journal	Notice in the Oakland Tribune	Word of Mouth	Other (Please list)
Name Deanna Rhoades	Street 2409 Camino Del Rio So. City, State and Zip San Diego CA.					Contractor
Name Judy C. HUANG	Street  City, State and Zip					SF BAY RWQCB
Name Anna-Marie Cook	Street  City, State and Zip					U.S. EPA
Name Dot Lofstrom	Street  City, State and Zip					DTSC
Name Steven Buchhofer	Street Dept. of Chemistry <sup>Saint Mary's</sup> College City, State and Zip Moraga, CA 94575					
Name Clare Gilmore	Street 1625 Dayton Ave City, State and Zip Alameda, CA 94501					co-worker (I TSI)
Name	Street  City, State and Zip					
Name	Street  City, State and Zip					



## NOTICE OF PROPOSED PLANS AND PUBLIC COMMENT PERIOD

Installation Restoration Sites 14 and 28,  
Alameda Point, California



The U.S. Navy, in coordination with state and environmental regulatory agencies, encourages the public to comment on its Proposed Plans for remediation at Sites 14 and 28 at the former Alameda Naval Air Station, now referred to as Alameda Point, in Alameda, California. The Proposed Plans provide a summary of investigations performed at each site including a remedial investigation, human health and ecological risk assessments, and feasibility study and present the proposed soil and groundwater remedies, which support the eventual transfer to and redevelopment of the property by the Alameda Reuse and Redevelopment Authority.

### **Proposal of No Further Action for Soil and Remediation of Groundwater at Site 14**

Site 14, which is identified as the Fire-fighter Training Area, is located in the northwestern portion of Alameda Point near the Oakland Inner Harbor. The site was historically used for waste and equipment storage and fire-fighter training. Excavation of soil containing dioxins was completed in 2002. Based on the data collected and analyzed for the site, no further action is proposed for the soil as studies have shown insignificant potential risk to humans and animals. Groundwater at Site 14 is impacted by volatile organic compounds and there is a potential risk to humans. Therefore, groundwater remedies are presented in the proposed plan.

### **Proposal of Remediation of Soil and Groundwater at Site 28**

Site 28, which is identified as the Todd Shipyard, is located in the northeastern portion of Alameda Point near the Oakland Inner Harbor. The site is currently used as a dog park and a parking lot. Site 28 was previously used by the Navy for shipbuilding, repair and maintenance of commercial and military marine vessels, and equipment storage. Based on the data that was collected and analyzed, soil is impacted by arsenic, lead, and polynuclear aromatic hydrocarbons; and groundwater is impacted by arsenic and copper. Because there is a potential risk to humans from the soil and groundwater at Site 28, soil and groundwater remedies are presented in the proposed plan.

### **Public Comment Period and Public Meeting**

The Navy invites interested members of the public to review and comment on the Proposed Plans for Sites 14 and 28 during the 30-day public comment period, which is from March 20, 2006 to April 19, 2006. Public comments must be submitted in writing and postmarked, faxed or e-mailed no later than April 19, 2006. Please send all comments to: Mr. Thomas Macchiarella, BRAC Environmental Coordinator, BRAC Program Management Office West, 1455 Frazee Road, Suite 900, San Diego, California 92108-4310, Thomas.macchiarella@navy.mil, (619) 532-0907, or fax (619) 532-0983.

The Navy will host a public meeting on Wednesday, April 12, 2006 from 6:30 p.m. to 8:00 p.m. at 950 West Mall Square, Building 1, Room 201, Alameda Point, CA to discuss the Proposed Plans, answer questions, and accept public comments.

### **FOR MORE INFORMATION**

A copy of the Proposed Plans, Remedial Investigations, Human Health and Ecological Risk Assessments, Feasibility Studies, and other site documents for Sites 14 and 28 are available for review at:

Alameda Point  
950 West Mall Square  
Building 1, Rooms 240-241  
Alameda, California

Alameda Public Library  
2200 A Central Avenue  
Alameda, California  
(510) 747-7777

If you have any questions or wish to discuss the Site 14 or Site 28 projects, please contact Mr. Thomas Macchiarella, BRAC Environmental Coordinator at (619) 532-0907.

**ATTACHMENT C  
RESPONSIVENESS SUMMARY**

2 pages.

**STAKEHOLDER COMMENTS AND LEAD AGENCY RESPONSES ON THE  
PROPOSED PLAN FOR OPERABLE UNIT 1, SITE 28, TODD SHIPYARDS,  
ALAMEDA POINT, ALAMEDA, CALIFORNIA**

**LETTERS RECEIVED DURING PUBLIC COMMENT PERIOD**

**COMMENTS BY: DALE SMITH**

1. **Comment:** I prefer to have the soil removed to a depth of four feet in Site 28. This is an issue that the RAB has raised many times and there is concern about the shallowness of excavation. It is understood that there will be institutional controls placed on the parcel, but experience has indicated that they are not respected and that diligent monitoring (more frequently than the five years proposed elsewhere) will be needed to ensure that the soil surface is not disturbed.

**Response:** Based on information provided in both the Remedial Investigation (RI) and Feasibility Study (FS) Reports, the Navy believes that the removal of soils to 2 feet is protective of human health and the environment, coupled with institutional controls (IC). ICs will prohibit development of the site or activities on the site involving soils or groundwater at depths greater than 2 feet and will require anyone seeking to disturb soils and/or groundwater to request regulatory concurrence before beginning activities. Based on site conditions, the costs to excavate the additional 2 feet, the potential risks to the community involved in trucking additional dirt off site, and dust concerns, the Navy believes Alternative S4b is the correct alternative to implement at Site 28.

2. **Comment:** Sites 14 and 28 are along the same shoreline and have the same soil characteristics, yet the description of the human health and ecological risks are different. It doesn't make sense that this would be the case. Also because both sites will be open space it is false to assume that receptors will not take up residence or use the sites. Rodents in particular have no problem moving in on golf courses, parks or lawn areas and the Canada geese are a notorious problem for the island. As these species expand their populations there will be pressure on individuals to move into unoccupied areas to breed and nest. Also to state that because these species are in abundance there is no threat to their viability isn't valid. All species currently on the endangered species list were at one time significant stable populations.

**Response:** While soil characteristics are similar at Sites 14 and 28, the chemicals present in soil are different; therefore, the risk assessment results are different.

The ecological risk assessment determined there is no unacceptable risk for ecological receptors in soil at Site 28.

**STAKEHOLDER COMMENTS AND LEAD AGENCY RESPONSES ON THE  
PROPOSED PLAN FOR OPERABLE UNIT 1, SITE 28, TODD SHIPYARDS,  
ALAMEDA POINT, ALAMEDA, CALIFORNIA (CONTINUED)**

**LETTERS RECEIVED DURING PUBLIC COMMENT PERIOD (CONTINUED)**

**COMMENTS BY: GEORGE B. HUMPHREYS**

- 1. Comment:** The Navy should have considered excavation and replacement of 4 ft of contaminated soil. The preferred Alternative 4B, with 2 ft excavation, does not adequately protect against the risk from digging holes to plant small shrubs and trees. From the writer's experience, holes dug for landscaping are typically deeper than 2 ft. Interpolating between the Navy's cost for 2-ft excavation and 6-ft excavation, the cost of excavating 4 ft should be about \$3.3 million.

**Response:** Comment noted. Please see response to Dale Smith comment 1.

- 2. Comment:** The exposure risk to dogs should have been evaluated. People walking dogs often carry a chewed-up tennis ball to throw for their dogs to retrieve for exercise. On unpaved areas, such as Site 28, the ball, wet with saliva, will pick up quite a bit of contaminated soil. It seems reasonable to expect the dogs to ingest a considerable amount of contaminated soil in this manner.

**Response:** Dogs are not wildlife species that are typically evaluated in Screening Level Ecological Risk Assessments (SLERA). The Tier 1 SLERA for Site 28 evaluated risk to mammals including the California ground squirrel and the deer mouse. Both of these receptors are considerably smaller than a dog and the risk assessment assumed the receptors ingested both potentially contaminated food items and soil from the site. The mammals were considered to forage 100 percent of their time at Site 28 (site use factor equal to 1.0). If dogs were evaluated, the model would likely consider only incidental ingestion of soil because the dogs would not be foraging at the site. Additionally, dogs would not be inhabiting the site, so their site use factor would be less than 1.0. Although the risk refinement did identify some metals and dibutyltin with hazard quotients greater than 1.0 for mammals, the toxicity reference values were based on the low toxicity reference value, which represents a "no effects" level. As concluded in the SLERA, the risk characterization likely overestimated the actual hazard of adverse ecological effects because of the conservative assumptions used in the model.