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

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NOV 11 2008

Mr. Mark Ripperda (SFD 8-3)
U.S. Environmental Protection Agency, Region IX
75 Hawthorne Street
San Francisco, California 94105-3901

Mr. Thomas Lanphar
Department of Toxic Substances Control
700 Heinz Avenue, Building F, Suite 200
Berkeley, California 94710-2737

Mr. Erich Simon
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, California 94612

Dear BCT members:

Enclosure (1) is the Final Second Five-Year Review Report of Remedial Actions at Hunters Point Shipyard, San Francisco, California for your records. Thank you for your timely inputs and contributions in producing this final document.

If you have any concerns or questions, please call Mr. Keith Forman at (619) 532-0913 or Ms. Lara Urizar at 619-532-0960.

Sincerely,

KEITH FORMAN
BRAC Environmental Coordinator
By direction of the Director

Enclosure: 1. Final Second Five-Year Review Report of Remedial Actions at Hunters Point Shipyard, San Francisco, California, dated 11 November 2008.

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One copy with one CD (PDF) to:
Mr. Peter Stroganoff
ROICC San Francisco Bay Area
Engineering Field Activity West
2450 Saratoga Street, Suite 200
Alameda, California 94501-7545

One copy with one CD (PDF) to:
Ms. Laurie Lowman and Patrick Owens
Radiological Affairs Support Office
(RASO)
NAVSEADET RASO
NWS P.O. Drawer 260
Yorktown, VA 23691-0260

One copy with one CD (PDF) to:
Ms. Karla Brasaemle
Tech Law, Inc.
90 New Montgomery St., Suite 1010
San Francisco, California 94105

CD (PDF) only to:
Ms. Amy Brownell
City of San Francisco
Department of Public Health
1390 Market Street, Suite 210
San Francisco, CA 94102

CD (PDF) only to:
Ms. Andrea Ruiz-Esquide
City of San Francisco
Office of City Attorney
City Hall, Room 234
1 Dr. Carlton B. Goodlett Place
San Francisco, CA 94102-4682

One copy with one CD (PDF) to:
Ms. Dorinda Shipman
Treadwell & Rollo
555 Montgomery St., Suite 1300
San Francisco, CA 94111

CD (PDF) only to:
Mr. Michael Sharpless
Paul Hastings
55 2nd Street, 24th Floor
San Francisco, CA 94104

CD (PDF) only to:
Mr. Jeff Austin
Lennar BVHP
49 Stevenson Street, Suite 525
San Francisco, CA 94105

CD (PDF) only to:
Thor Kaslofsky
1 South Van Ness Avenue
San Francisco, CA 94103

One copy with one CD (PDF) to:
Mr. Michael A. Jacobvitz
MACTEC Engineering & Consulting
5341 Old Redwood Highway, Suite 300
Petaluma, CA 94954

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CD (PDF) only to:
Dr. Michael McGowan
Arc Ecology
4634 3rd Street
San Francisco, CA 94124

Three copies and one CD (PDF) to:
Ms. Diane Silva
937 N. Harbor Drive
Building 1, 3rd Floor
San Diego, CA 92132

One copy to:
Mr. Leon Muhammad
5048 Third Street
San Francisco, CA 94124

One copy and CD (PDF) to:
Mr. Steve Hall
Tetra Tech EM Inc
1230 Columbia Street, Suite 1000
San Diego, CA 92101

One copy and CD (PDF) to:
Anna E. Waden Library
5075 Third Street
San Francisco, California 94124

One copy and one CD to:
Patrick Shea
San Francisco Main Library
100 Larkin Street
San Francisco, CA 94102-4733

Final

Second Five-Year Review of Remedial Actions

Hunters Point Shipyard

San Francisco, California

Prepared for:

Department of the Navy
Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108

Prepared by:

Jonas and Associates Inc.
8(a), HUBzone, WBE, DBF
1350 Arnold Drive, Suite 202
Martinez, California, 94553

In Association with:

CDM Federal Programs Corporation
9444 Farnham St., Suite 210
San Diego, California 92123

Prepared under:

Naval Facilities Engineering Command Southwest
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Task Order: 0004
DCN: JNS-7417-0004-0324

11 November 2008

Final

Second Five-Year Review of Remedial Actions

Hunters Point Shipyard

San Francisco, California

11 November 2008

Contract Number: N68711-05-G-7417
Task Order: 0004
DCN: JNS-7417-0004-0324

Department of the Navy
Base Realignment and Closure
Program Management Office West
San Diego, California

REGISTERED PROFESSIONAL ENGINEER
SAMI M. MALAEB
No. 60888
Exp. 12/31/08
CIVIL
STATE OF CALIFORNIA

Prepared by:
Sami Malaeb, P.E.
Program Manager
Jonas & Associates Inc.

11/11/08
Date

Approved by:
Keith Forman
Department of the Navy
Base Realignment and Closure
Program Management Office West

11/11/08
Date

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Executive Summary

The U.S. Department of the Navy (Navy) has conducted a second 5-year review of the remedial actions (RAs) implemented at Hunters Point Shipyard (HPS) in San Francisco, California. This 5-year review builds on the first review completed December 10, 2003 and focuses on Parcel B where RAs have been implemented and work toward amendment of the remedial alternatives has been undertaken to ensure long-term protectiveness. To the extent that RAs are forthcoming at the other parcels at HPS, they, too, are summarized herein.

The Navy and the regulatory agencies, including the Regional Water Quality Control Board (RWQCB), the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC), and the U.S. Environmental Protection Agency (EPA), signed the record of decision (ROD) for Parcel B on October 9, 1997. The 1997 ROD was followed by two explanations of significant difference (ESDs) signed on October 28, 1998 and May 9, 2000. The ROD and ESDs selected remedial action objectives and a remedy for soil and for groundwater. The first 5-year review in 2003 concluded that the soil and groundwater remedy was protective at that time; however, it identified the need for an amendment of the remedial action selected in the ROD to ensure long-term protection of human health and the environment. After performing a detailed technical assessment over the past 5 years, including additional investigations, and a revised risk assessment, the Navy has developed a proposed revised remedy in support of an amended ROD. This revised remedy is documented in the Technical Memorandum in Support of a ROD Amendment (TMSRA), finalized in December 2007, in a radiological addendum to TMSRA, finalized in March 2008, and in a revised proposed plan (PP), finalized in June 2008.

Some components of the revised remedy are in progress as time critical removal actions (TCRAs), such as methane, mercury, and radiological source removals. The use of TCRAs allows the Navy to get an early start on cleanup at these newly identified source areas. The TCRAs are consistent with the cleanup alternatives described in the revised PP; for example, several of the soil cleanup alternatives include excavation at areas that are also addressed in the TCRAs. Although the TCRAs may not be completed by the time the amended ROD is signed, the Navy anticipates that the TCRAs will meet the remedial action objectives (RAOs) described in the revised PP.

The proposed revised remedy incorporates soil, groundwater, and radiological remedies as summarized below.

Soil Contamination

The proposed revised remedial alternative for soil is summarized below.

Revised Soil Remedial Alternative

The revised soil remedial alternative is focused on achieving the RAOs by removing soil in areas where concentrations of chemicals exceed remediation goals, including the methane and mercury source areas, and disposing of excavated soil at an offsite facility. The major components of the soil portion of the remedy, as described in the revised PP, include:

- Removing soil in areas where concentrations of organic chemicals and metals are higher than the levels considered safe for human health and ecological receptors
- Installing covers over the entire parcel to prevent contact with any metals or radiological contaminants (Installation Restoration site [IR] 07 and IR-18 only) that are not excavated
- Transporting excavated contaminated soil and materials off site to an appropriate landfill
- Operating a soil vapor extraction (SVE) system to remove and treat volatile organic compounds (VOCs) in soil at IR-10
- Building a shoreline revetment in required areas to protect ecological receptors from chemicals in shoreline sediments

The revised remedial alternative summarized above has benefited from (1) additional site investigation data and removal actions since the first 5-year review, (2) a TMSRA that reevaluated site-specific risks and remedial action alternatives, (3) a radiological addendum to TMSRA that addressed radiological contamination, and (4) a revised PP that summarized the proposed remedy. Following community review, the revised PP will be used in support of a ROD amendment.

Radiological Contamination

The proposed preferred remedial alternative for radiological contamination is summarized below.

Remedial Alternative for Radiological Contamination

The Navy completed a radiological addendum to the TMSRA in March 2008. The screened and preferred remedial alternative for radiological contamination presented in the radiological addendum to the TMSRA is focused on achieving the RAOs by decontaminating radiologically impacted buildings and dismantling them as necessary. The major components of the selected remedy for radiological contamination include:

- Surveying and decontaminating buildings, former building sites, sewer lines, and other areas affected by radiological sources
- Screening, separating, and disposing of radiological sources and radiologically contaminated materials and soil

- Installing covers over the entire parcel to prevent contact with any metals or radiological contaminants (IR-07 and IR-18 only) that are not excavated

The remedial alternative for radiological contamination summarized above has benefited from (1) additional radiological surveys and TCRAs, (2) a radiological addendum to the TMSRA that reevaluated radiological health risks and remedial action alternatives, and (3) a revised PP that summarized the proposed remedy. Following the state and public review, the final PP will be used in support of an amended ROD.

Protectiveness Statement for Soil and Radiological Contamination

The soil remedy selected in the 1997 ROD at Parcel B is currently protective of human health and the environment because exposure pathways that could result in unacceptable risks are being controlled through contaminated soil excavation and disposal, the use of fencing, locked gates, warning signs, and secured buildings that limit access to remaining contaminated areas. However, updated information about the site that became available during the remedial action indicates modifications to selected soil and groundwater remedies should be considered to ensure long-term protectiveness. Updated information includes items such as the ubiquitous nature of metals in soil across Parcel B, the presence of methane and mercury, the findings of a screening-level ecological risk assessment (SLERA), and findings from removal actions to address radiological contaminants.

In the last 5 years, the Navy responded to the remedy concerns expressed in the first 5-year review in terms of the long-term protectiveness of the soil remedy. The TMSRA included a human health risk assessment (HHRA) and revised remedial alternatives for the soil. The revised PP identified the most viable soil alternative, including excavation, disposal, covers, soil vapor extraction, institutional controls (ICs), and shoreline revetment. The revised remedial alternative has been designed to be protective of human health and the environment in the short and long term. Once the revised soil remedial alternative is incorporated into the amended ROD and implemented at Parcel B, further evaluation of its effectiveness will be completed in the subsequent 5-year review report.

The ROD for Parcel B did not contain a remedy for addressing radiological contamination. Subsequently, the completion of the historical radiological assessment and conducting various radiological removal actions required a re-evaluation of the Parcel B remedy. The TMSRA radiological addendum evaluated the radiological remedial alternatives.

The remedial alternative for radiological contamination for Parcel B has been designed to be protective of human health and the environment. Such a remedy would achieve RAOs by surveying radiologically impacted buildings and former building sites for unrestricted reuse. Among the measures taken, decontamination would be performed and buildings would be dismantled if necessary. Once the remedial alternative for radiological contamination has been incorporated into the

amended ROD and implemented across Parcel B, its protectiveness will be further evaluated as part of the next 5-year review.

Groundwater

The following text describes the proposed revised remedial alternative for groundwater.

Revised Groundwater Remedial Alternative

The revised groundwater remedial alternative focuses on achieving the RAOs by actively treating VOCs in groundwater through in situ methods. The primary components of the alternative include:

- Treating groundwater at IR site 10 by injecting chemicals to break down the contaminants
- Implementing a groundwater monitoring program to verify that remediation efforts meet the remediation goals defined in the amended ROD
- Using engineering controls (ECs) and ICs to limit exposure to contaminated soil and groundwater by restricting specified land uses and activities on the parcel

Similar to the revised alternative for soil, the revised groundwater alternative summarized above has benefited from (1) additional treatability studies and groundwater monitoring data since the first 5-year review, (2) a supporting technical memorandum that reevaluated human health/ecological risks and remedial action alternatives, and (3) a revised PP that summarized the proposed remedy. Following community review, the revised PP will be used in support of an amended ROD.

Protectiveness Statement for Groundwater

The groundwater remedy at Parcel B selected in the 1997 ROD is not protective of human health and the environment because (1) the current remedy would not be considered protective of VOCs in groundwater that pose an unacceptable risk from vapor intrusion into buildings and (2) the current remedy includes only groundwater monitoring and does not contain any treatment component and, therefore, would rank as poor for reduction of toxicity and mobility. New information became available after the remedial action was implemented, which indicates for long-term protectiveness, the groundwater remedy, the HHRA, and groundwater trigger levels need to be updated; potential ecological risk to aquatic receptors should be evaluated; the selected remedy needs to be modified to address VOC contamination; a point-of-compliance well and other characterization wells need to be installed at IR-07; a flexible groundwater monitoring plan to include radionuclides of concern (ROCs) must be implemented; and appropriate responses to incidences where trigger levels are exceeded must continue to be implemented.

In the last 5 years, the Navy responded to the remedy concerns expressed in the first 5-year review in terms of the long-term protectiveness of the groundwater remedy. The TMSRA included an HHRA and a SLERA and revised remedial alternatives for

the groundwater. The revised PP identified the most viable groundwater alternative, including in situ treatment, groundwater monitoring, and ICs. The proposed remedy was designed to be protective of human health and the environment in both the short and long term. Once the revised groundwater remedial alternative is incorporated into the amended ROD and implemented at Parcel B, further evaluation of its effectiveness will be completed in the subsequent 5-year review report.

Five-Year Review Summary Form

SITE IDENTIFICATION

Site name: Hunters Point Shipyard

EPA ID: CA1170090087

Region: 9	**State:** CA	**City/County:** San Francisco/San Francisco County

SITE STATUS

NPL status: ☒ Final ☐ Deleted ☐ Other (specify)

Remediation status (choose all that apply): ☒ Under Construction ☒ Operating ☐ Complete

Multiple OUs? ☒ YES ☐ NO	**Construction completion date:** NA

Has site been put into reuse? ☐ YES ☒ NO

REVIEW STATUS

Lead agency: ☐ EPA ☐ State ☐ Tribe ☒ Other Federal Agency: U.S. Department of the Navy

Author name: Tajma Vaughns-Rachal/ Sami Malaeb/Mehrdad Javaherian/ Mike Allen/Darren Knight

Author title: Senior Project Manager/Program Manager/Technical Director/CDM Support/ Lead RPM	**Author affiliation:** Jonas & Assoc/CDM/Navy

Review period: 07/08/2003 to 07/08/2008

Date(s) of site inspection: 01/09/08 through 01/14/08

Type of review:

☒ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only

☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead

☐ Regional Discretion

Review number: G 1 (first) ☑ 2 (second) ☐ 3 (third) ☐ Other (specify) _____

Triggering action:

☐ Actual RA On-site Construction at OU#____ ☒ Actual RA Start at OU#: Parcel B

☐ Construction Completion ☒ Previous 5-Year Review Report

☐ Other (specify)

Triggering action date *(from WasteLAN)*: 07/08/1998

Due date *(5 years after triggering action date)*: 07/08/2008

Five-Year Review Summary Form (continued)

Issues: Issues with the remedy outlined in the record of decision (ROD) were identified by the 5-year review. They included the following:

Soil Issues

- Subsurface conditions at Installation Restoration (IR) site 07 and a portion of IR-18 differ from the conceptual model developed for the remedial investigation/feasibility study (RI/FS).
- The proximity of some excavations to the San Francisco Bay shoreline delayed complete characterization and prevented excavation of the soil.
- Potential ecological risk to aquatic receptors from Parcel B contaminants near the shoreline has not been evaluated.
- Portions of IR-10 have not been excavated because a soil vapor extraction (SVE) treatability study is being implemented.
- Background levels of ambient metals in soil are higher and more variable than originally estimated.
- Toxicity data used at the time of remedy selection have been updated, and cumulative risk was not estimated.

Radiological Issues

- Removal of potential radiological contamination addressed in the action memorandum for the basewide radiological removal action is not referenced by the current ROD.

Groundwater Issues

- The existing remedial action monitoring plan (RAMP) should be improved to better focus groundwater monitoring at Parcel B.
- Trigger levels may not reflect current guidance.
- Concentrations of metals in groundwater are affected by background levels of ambient metals in soil, which are higher and more variable than originally estimated.
- Toxicity data used at the time of remedy selection have been updated, and cumulative risk was not estimated. Potential ecological risk to aquatic receptors from Parcel B contaminants has not been evaluated.
- A point of compliance (POC) well and other characterization wells were destroyed during excavation activities at IR-07.

In response to the above issues from the first 5-year review, the Navy has since performed extensive work, culminating in a technical memorandum in support of a ROD amendment (TMSRA), a radiological amendment to TMSRA, and a revised proposed plan (PP). The TMSRA/PP process reevaluated the site conceptual model, revised the site-specific risks assessment, revised the applicable or relevant and appropriate requirements (ARARs), revised the remedial action objectives (RAOs), evaluated various remedial alternatives, and proposed a preferred remedy, which will be presented to the community for review. The proposed remedy includes the following components for soil, groundwater, and radiological contamination:

Proposed Revised Remedial Alternatives

Revised Soil Remedial Alternative

- Removing soil in areas where concentrations of organic chemicals and metals are higher than the levels considered safe for human health and ecological receptors
- Installing covers over the entire parcel to prevent contact with any metals or radiological contaminants (IR-07 and IR-18 only) that are not excavated
- Transporting excavated contaminated soil and materials off site to an appropriate landfill
- Operating a soil vapor extraction (SVE) system to remove and treat volatile organic compounds (VOCs) in soil at IR-10
- Using engineering controls (EC) and institutional controls (IC) to limit exposure to contaminated soil and groundwater by restricting specified land uses and activities on the parcel
- Building a shoreline revetment in required areas to protect ecological receptors from chemicals in shoreline sediments

Radiological Remedial Alternative

- Surveying and decontaminating buildings, former building sites, sewer lines, and other areas affected by radiological sources
- Screening, separating, and disposing of radiological sources and radiologically contaminated materials and soil
- Installing covers over the entire parcel to prevent contact with any metals or radiological contaminants (IR-07 and IR-18 only) that are not excavated

Revised Groundwater Remedial Alternative

- Treating groundwater at IR-10 by injecting chemicals to break down the contaminants
- Implementing a groundwater monitoring program to verify that remediation efforts meet the remediation goals defined in the amended ROD
- Using ECs and ICs to limit exposure to contaminated soil and groundwater by restricting specified land uses and activities on the parcel

Five-Year Review Summary Form (continued)

Once the proposed revised alternatives are finalized, they will serve as the basis for amending the existing Parcel B ROD.

Protectiveness Statements:

Protectiveness Statement for Soil and Radiological Contamination

The soil remedy selected in the 1997 ROD at Parcel B is currently (2008) protective of human health and the environment. Exposure pathways that could result in unacceptable risks are being controlled through contaminated soil excavation and disposal, the use of fencing, locked gates, warning signs, and secured buildings that limit access to remaining contaminated areas. However, updated information about the site that became available during the remedial action indicates that modifications to selected soil and groundwater remedies should be considered to ensure long-term protectiveness. Updated information includes items such as the ubiquitous nature of metals in soil across Parcel B, the presence of methane and mercury, the findings of a screening-level ecological risk assessment (SLERA), and findings from removal actions to address radiological contaminants.

In the last 5 years, the Navy responded to the remedy concerns expressed in the first 5-year review in terms of the long-term protectiveness of the soil remedy. The TMSRA included a human health risk assessment (HHRA) and revised remedial alternatives for the soil. The revised PP identified the most viable soil alternative, including excavation, disposal, covers, soil vapor extraction, ICs, and shoreline revetment. The revised remedial alternative has been designed to be protective of human health and the environment in the short and long term. Once the revised soil remedial alternative is incorporated into the amended ROD and implemented at Parcel B, further evaluation of its effectiveness will be completed in the subsequent 5-year review report.

The ROD for Parcel B did not contain a remedy for addressing radiological contamination. Subsequently, the completion of the historical radiological assessment and conducting various radiological removal actions required a re-evaluation of the Parcel B remedy. The TMSRA radiological addendum evaluated the radiological remedial alternatives.

The remedial alternative for radiological contamination for Parcel B has been designed to be protective of human health and the environment. Such a remedy would achieve RAOs by surveying radiologically impacted buildings and former building sites for unrestricted release. Among the measures taken, decontamination would be performed and buildings would be dismantled if necessary. Once the radiological contamination remedial alternative is incorporated into the amended ROD and implemented at Parcel B, further evaluation of its effectiveness will be completed in the subsequent 5-year review report.

Protectiveness Statement for Groundwater

The groundwater remedy at Parcel B selected in the 1997 ROD is not currently protective of human health and the environment due to the following facts: (1) The current remedy would not be considered protective of VOCs in groundwater that pose an unacceptable risk from vapor intrusion into buildings; (2) the current remedy includes only groundwater monitoring and does not contain any treatment component and, therefore, would rank as poor for reduction of toxicity and mobility. New information became available after the remedial action was implemented, which indicates that, for long-term protectiveness, the groundwater remedy, the HHRA, and groundwater trigger levels need to be updated; potential ecological risk to aquatic receptors should be evaluated; the selected remedy needs to be modified to address VOC contamination; a point-of-compliance well and other characterization wells need to be installed at IR-07; a flexible groundwater monitoring plan to include ROCs must be implemented; and appropriate responses to incidences where trigger levels are exceeded must continue to be implemented.

In the last 5 years, the Navy responded to the remedy concerns expressed in the first 5-year review in terms of the long-term protectiveness of the groundwater remedy. The TMSRA included an HHRA, a SLERA, and revised remedial alternatives for the groundwater. The revised PP identified the most viable groundwater alternative, including in situ treatment, groundwater monitoring, and ICs. The proposed remedy was designed to be protective of human health and the environment in both the short and long term. Once the revised groundwater remedial alternative is incorporated into the amended ROD and implemented at Parcel B, further evaluation of its effectiveness will be completed in the subsequent 5-year review report.

Notes:

Bay	San Francisco Bay
EPA	U.S. Environmental Protection Agency
HHRA	human health risk assessment
ID	identification
IR	Installation Restoration
NA	not applicable
Navy	U.S. Department of the Navy
NPL	National Priorities List
OU	operable unit
POC	point of compliance
RA	remedial action
RAMP	remedial action monitoring plan
RAO	remedial action objective
RI/FS	remedial investigation/feasibility study
ROCs	radionuclides of concern
ROD	record of decision
RPM	remedial project manager
SARA	Superfund Amendments and Reauthorization Act
SVE	soil vapor extraction
Tetra Tech	Tetra Tech EM Inc.
VOC	volatile organic compound
ZVI	zero valent iron

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Acronyms and Abbreviations

AC	activated carbon
ARAR	applicable or relevant and appropriate requirement
ATT	Aqua Terra Technologies
Bay	San Francisco Bay
BCT	Base Realignment and Closure Cleanup Team
Be	beryllium
bgs	below ground surface
BRAC	Base Realignment and Closure
CAA	corrective action area
CAP	corrective action plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CDPH	California Department of Public Health
CFR	Code of Federal Regulations
COPC	chemical of potential concern
CSR	construction summary report
cy	cubic yard
DCA	dichloroethane
DCB	dichlorobenzene
DCE	dichloroethene
DoD	U.S. Department of Defense
DON	Department of the Navy
DTSC	Department of Toxic Substances Control
EBS	environmental baseline survey
EC	engineered control
EE	exploratory excavations
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
ERRG	Engineering/Remediation Resources Group
ESD	explanation of significant difference
FFA	Federal Facilities Agreement
FS	feasibility study
GDGI	groundwater data gaps investigation
GMP	gas monitoring probe
HHRA	human health risk assessment
HLA	Harding Lawson Associates
HPAL	Hunters Point ambient level
HPS	Hunters Point Shipyard
HQ	hazard quotient
HRA	historical radiological assessment
IC	institutional control
ILA	Industrial Landfill Area
IR	Installation Restoration

ISB	in situ bioremediation
ITSI	Innovative Technological Solutions, Inc.
LF	linear feet
LFR	Levine-Fricke-Recon
MARSSIM	Multi-Agency Radiological Site Survey Investigation Manual
MCD	mechanochemical destruction
mg/kg	milligram per kilogram
mrem/y	millirem per year
NAVFAC	Naval Facilities Engineering Command
NAVSEA	Naval Sea Systems Command
Navy	U.S. Department of the Navy
NBFA	Northwest Bay Fill Area
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NPL	National Priorities List
NRDL	Naval Radiological Defense Laboratory
NWT	New World Technology
O&M	operation and maintenance
ORPA	Oil Reclamation Ponds Area
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PID	photoionization detector
POC	point of compliance
POM	point of measurement
PP	proposed plan
PRC	PRC Environmental Management, Inc.
Qs	quarters
RA	remedial actions
RAB	Resident Advisory Board
RAD	radiological
RAMP	remedial action monitoring program
RAO	remedial action objective
RASO	Radiological Affairs Support Office
RD	remedial design
RI	remedial investigation
ROC	radionuclide of concern
ROD	record of decision
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SDGI	standard data gaps investigation
SFDPH	San Francisco Department of Public Health
SFRA	San Francisco Redevelopment Agency
SLERA	screening-level ecological risk assessment
SVE	soil vapor extraction
SVOC	semivolatile organic compound

SWRCB	State Water Resources Control Board
TCE	trichloroethene
TCRA	time-critical removal action
Tetra Tech	Tetra Tech EM, Inc.
TIZ	tidally influenced zone
TMSRA	Technical Memorandum in Support of ROD Amendment
Triple A	Triple A Machine Shop, Inc.
TtECI	Tetra Tech EC, Inc.
UCSF	University of California, San Francisco
µg/L	micrograms per liter
URS	URS Corporation
U.S.C.	United States Code
UST	underground storage tank
VC	vinyl chloride
VM	vapor monitoring
VOC	volatile organic compound
ZVI	zero valent iron

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Section 1
Introduction

This report documents the results of the second 5-year review conducted between July 2003 and June 2008 at Hunters Point Shipyard (HPS). The purpose of the second 5-year review is to provide an update on the status of the remedial actions (RAs) implemented since the first 5-year review; assess the progress of the recommendations made in the first 5-year review, including progress in developing a revised remedy to be addressed in an amended record of decision (ROD).

The U.S. Department of the Navy (Navy) has prepared this second 5-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section (§) 121, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and U.S. Environmental Protection Agency (EPA) guidance (EPA 2001, 2003) and in general accordance with the Navy's policy for conducting 5-year reviews (Navy 2004).

CERCLA § 121(c) states:

> "If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section 104 or 106, the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."

EPA further interpreted this requirement in the NCP, Title 40 of the *Code of Federal Regulations* (CFR) §300.430(f)(4)(ii), which states:

> *"If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every 5 years after the initiation of the selected remedial action."*

The second 5-year review for the HPS attempts to capture the significant work performed by the Navy in collaboration with the regulatory agencies, including the Regional Water Quality Control Board (RWQCB), the California Environmental Protection Agency Department of Toxic Substances Control (DTSC), and EPA. This review is triggered by the date of mobilization for the RA at Parcel B, which was initiated on July 8, 1998. As with the first 5-year review, this review also focuses on

Parcel B because RODs have not been implemented/prepared at the other parcels across HPS. However, Section 2 of this report discusses the status of activities completed at Parcels A, C, D, E, E-2, and F, including a summary of activities performed since the first 5-year review. The date July 8, 1998 will serve as the trigger date for all subsequent 5-year reviews required for other future RAs conducted at HPS. Correspondingly, the next 5-year review after this one is scheduled for July 2013, and future RAs at the other parcels will be included as relevant at that time, as specified in the Federal Facility Agreement (FFA) for HPS (Navy 1991).

Following the introduction or Section 1, this second 5-year review report is organized in the following sections:

- Section 2, Overview of HPS and Parcels. This section provides an overview of HPS, including background information for Parcels A, C, D, E/E-2, and F. It also provides a status of RA activities for these parcels since the first 5-year review.

- Section 3, Parcel B Overview. This section provides an overview of Parcel B site conditions and activities, including RA activities prior to and since the first 5-year review. It also includes an evaluation of the progress made on recommendations from the first 5-year review.

- Section 4, Five-Year Review Process. This section describes the 5-year review process, including administrative process, community notification and involvement, document review, data review, site inspection, and site interviews.

- Section 5, Technical Assessment of RA Actions-Parcel B. This section provides a technical assessment of the current remedy outlined in the ROD but further discusses the rationale and approach to selection of the revised remedial alternatives outlined in the revised proposed plan (PP) for Parcel B. Once the community and state review is completed in the revised PP, the ROD will be amended accordingly and revised RAs will be implemented. Therefore, the effectiveness of the revised RAs will be a primary topic of the next 5-year review.

- Section 6, Issues with Proposed Remedies-Parcel B. This section summarizes the issues associated with the RAs in the ROD and the progress in addressing them over the past 5 years.

- Section 7, Remedial Recommendations and Follow-up Actions-Parcel B. This section provides a summary of the remedial recommendations and follow-up actions for Parcel B, including the response to the recommendations outlined in the first 5-year review report.

- Section 8, Protectiveness Statements-Parcel B. This section provides the protectiveness statements for Parcel B.

- Section 9, Next 5-Year Review. This section provides information on the next 5-year review for HPS.

- Section 10, References. This section presents the references used to prepare this 5-year review report.

Figures and tables are presented after Section 10. Appendices containing supporting information are presented following the figures and tables. Appendix A contains the bibliography listing documents reviewed in support of this 5-year review. Appendix B summarizes the applicable or relevant and appropriate requirements (ARAR). Appendix C contains the site inspection checklist. Appendix D provides the photographic log, which documents observations made during the 5-year review site inspection. Appendix E contains the interview forms. Appendix F contains responses to comments on the draft version of the report, and Appendix G contains responses to comments on the draft final version of the report, including comments from the public during a public comment period (to be completed).

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Section 2
Overview of Hunters Point Shipyard and Other Parcels

HPS is located in southeast San Francisco, California, on a peninsula that extends east into San Francisco Bay (Bay) (Figure 1). The entire HPS covers 936 acres: 496 on land and 440 under water (Navy 1997b).

The Navy, as part of the Installation Restoration (IR) Program, has been identifying and evaluating past hazardous waste sites and controlling the spread of contaminants from sites at HPS since 1984. The property was added to the National Priorities List (NPL) in 1989 as a Superfund site pursuant to CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). In 1991, HPS was designated for closure under the U.S. Department of Defense's Base Realignment and Closure (BRAC) Program, with the intent of transferring the property and facilities to neighboring communities as expeditiously as possible and with minimal adverse effect on the local economy. Environmental investigation and restoration activities at HPS are coordinated as prescribed in the FFA among the Navy, EPA, and the State of California (including DTSC and RWQCB, San Francisco Bay Region) (Navy 1991).

In 1992, the Navy divided the HPS facility into five contiguous geographic parcels (A through E) to expedite the remedial investigation (RI) and feasibility study (FS) program. A sixth parcel, the offshore area (Parcel F), was added in 1996. The Navy plans to divide Parcel D into four new parcels: D-1, D-2, G, and UC-1. Figure 2 identifies all parcels located at HPS. Figure 3 depicts the IR and inspection sites within Parcel B at HPS. Since the first 5-year review, Parcel A has been transferred to the City and County of San Francisco; hence, at the time of this report, Parcel B is the only parcel for which a remedy has been selected and a ROD has been issued. The other parcels are undergoing various phases of investigations, removal actions, and treatability studies; thus, as with the first 5-year review, the focus of this 5-year review remains on Parcel B, with summaries of background information and the status of activities on Parcels A and C through F outlined in the following sections. The Parcel B overview is presented in section 3.

2.1 Summary of Status of Parcel A

Parcel A is located immediately south of Parcel B, west of Parcel C, north of Parcels D and E, and east of off-base property (Figure 2). Parcel A comprises approximately 87 acres of land at HPS.

Since April 1991, the CERCLA process has been implemented at Parcel A, including inspection, risk assessment, and cleanup. Parcel A was deleted from the NPL in 1999. In December 2004, the finding of suitability to transfer for Parcel A was finalized, resulting in the transfer of Parcel A to the City and County of San Francisco. Cleanup

at Parcel A is complete. Parcel A is suitable for unrestricted use and thus not subject to future 5-year reviews.

2.2 Summary of Status of Parcel C

Parcel C is located immediately south of Parcel B and north of Parcel D, to the north and west of the Bay and Parcel F, and east of Parcel A and off-base property (Figure 2). Parcel C comprises 76 acres of shoreline and lowland coast along the east-central portion of HPS. Parcel C is the oldest portion of the shipyard and has been used primarily for industrial operations since the late 1800s. Located within the boundaries of Parcel C are 70 buildings and 14 IR sites (SulTech 2008). Soil at Parcel C consists largely of artificial fill, and the lithology is primarily sand, silt, and clay, with lesser amounts of gravel and boulders. Asphalt, concrete, or buildings cover 90 percent of the surface soil (Tetra Tech and Levine-Fricke-Recon, Inc [LFR] 1998b; Tetra Tech 2002b).

Since April 1992, when Parcel C was established, the following events have occurred as part of the CERCLA process (Tetra Tech and LFR 1998b, Tetra Tech 2002b):

- Phase I radiological investigation (PRC Environmental Management, Inc. [PRC] 1992b).
- Parcel C site inspection (PRC and Harding Lawson Associates [HLA] 1994b).
- Basewide site assessment (PRC and HLA 1994a).
- Parcel C RI, including a human health risk assessment (HHRA) and an ecological risk assessment (ERA) (PRC and LFR 1997).
- Parcel C FS (Tetra Tech and LFR 1998b).
- Basewide environmental baseline survey (EBS) (Tetra Tech 1998b).
- Phase V Radiological Investigation (Sections 6 and 8 of the historical radiological assessment (Naval Sea Systems Command [NAVSEA] 2004). The radionuclides of concern at Parcel C include cesium-137, cobalt-60, plutonium-239, radium-226, strontium-90, thorium-232, and potassium-40 (NAVSEA 2004).
- Final Radiological Addendum to the Revised Feasibility Study Report for Parcel C (Tetra Tech EC, Inc. [TtECI] 2008d).

The following removal actions and treatability studies were implemented at Parcel C (Tetra Tech 2002b, 2003d) and (NAVSEA 2004) prior to the first 5-year review:

- **1991 to 1993:** Twenty-eight underground storage tanks (USTs) were removed or closed in place in Parcel C.
- **1991 to 1995:** Sandblast waste was collected and removed from Parcel C.

- **1996 to 1997**: Six exploratory excavation (EE) sites (EE-06 through EE-11) were identified and excavated in Parcel C.

- **1996 to 1997**: Sediment was removed from three storm drain basins in Parcel C.

- **1997:** Sediment in the drainage culverts at Dry Dock 4 was partially removed.

- **1997 to 2002:** Treatability studies implemented at Parcel C include potassium permanganate injection at Building 253; soil vapor extraction (SVE) at Buildings 134, 211/253, 231, and 272; and zero-valent iron (ZVI) injection at Building 272.

- **1999 to 2000:** Removal actions were conducted at IR-06 and IR-25 for the purpose of excavating soil specified in the 1997 ROD when these IR sites were part of Parcel B (IT Corp 2000).

- **2001 to 2002:** All subsurface fuel lines and contaminated steam lines were removed during a time-critical removal action (TCRA). Approximately 8,800 cubic yards (cy) of soil contaminated with non-volatile organic compounds (VOC) were excavated and removed from the site.

- **2000 to 2001:** A groundwater data gaps investigation at HPS, including Parcel C, was implemented to update the previous assessment of groundwater conditions and to supplement groundwater information gathered during remedial investigations (Tetra Tech 2001f,g).

- **2002 to 2004:** From 2002 through 2004, the Navy completed activities to consolidate and remove waste throughout Parcel C. Industrial process equipment was decontaminated, sumps cleaned, and waste was consolidated, including removal of waste materials stored in or near buildings, and removal or encapsulation of asbestos-containing materials (Tetra Tech FW, Inc. 2004).

- **2003:** In response to findings from the Phase V Radiological Investigation, a radiological removal action was initiated in early 2003 at Buildings 241, 253, and 271 and in Dry Docks 2, 3, and 4 (NAVSEA 2004). Additional work is pending in Buildings 211 and 253. Final status surveys are pending for all Parcel C radiologically impacted sites.

The first 5-year review outlined the following technical issues warranting resolution prior to remedy selection and ROD preparation for Parcel C: (1) completing the evaluation of the Phase III groundwater data gaps investigation (GDGI), (2) completing the evaluation of an SVE system and the ZVI treatability studies, (3) refining the understanding of future land uses, (4) revising the HHRA, (5) evaluating long-term effectiveness for the removal action conducted at Dry Dock 4 drainage culverts, (6) revising the FS, and (7) addressing potential radiological contamination under the base-wide radiological removal action (Tetra Tech 2003d).

The following activities have been implemented at Parcel C since the first 5-year review:

- **2003:** Within the drainage culverts of Dry Dock 4, sediment was encapsulated by sealing all inlets and outlets to the culverts with concrete slurry, thereby, eliminating the pathways of exposure to hazardous substances to the coastal flora and fauna. The culverts were filled with grout to the maximum extent possible. An estimated 269 cy of void space in the culvert system was filled with concrete, and the culvert sediment waste was characterized and disposed of off site (Tetra Tech 2003b).

- **2004-2005**: A second ZVI injection treatability study was performed beneath Building 281 and adjacent to Building 272 (Innovative Technological Solutions [ITSI] 2005), resulting in reduction of trichloroethene (TCE) concentrations by approximately two orders of magnitude (CE2-Kleinfelder 2007a). Significant reductions were also observed for cis-1,2 dichloroethene (cis-1,2-DCE), 1,1-dichloroethene (1,1-DCE), and vinyl chloride (CE2-Kleinfelder 2007a).

- **2004-2005**: An in situ bioremediation (ISB) treatability study (Shaw Environmental 2005) was conducted to evaluate the effectiveness of aerobic and anaerobic degradation on reducing chlorinated VOC levels. The study showed that sequential anaerobic and aerobic ISB were an effective treatment technology for reducing the concentrations of chlorinated VOCs in groundwater at RU-C5 across Parcel C (CE2-Kleinfelder 2007a).

- **2005**: Removal of petroleum-contaminated soil was performed at IR-28 and IR-58 to protect human health and groundwater quality. Soil removal was performed based on reuse and aesthetic criteria, resulting in removal of total petroleum hydrocarbons to a depth of 10 feet below ground surface (bgs). Excavated soils were disposed off site as Class II waste and were replaced on site by clean materials.

- **2005-2007**: Quarterly groundwater monitoring at Parcel C was performed, indicating exceedances of water quality data criteria by select metals and VOCs (CE2-Kleinfelder 2007i). The current magnitude and extent of chemicals in groundwater at Parcel C are generally consistent with previous quarters, although recent vinyl chloride levels in well IR06MW40A (IR-06 VOC plume) suggest an increasing trend (CE2-Kleinfelder 2007i). Changes to the monitoring well network have included decommissioning/removal of 15 wells from the monitoring system.

- **2008:** A final FS was prepared as an update to the 1998 FS. Remedial action objectives (RAOs) were developed from the incremental risk quantified for protection of human health. Nine remediation alternatives were identified in the FS, with the highest rated alternative corresponding to a combination of soil excavation and offsite disposal, covers, soil vapor extraction for VOCs, and institutional controls (ICs) (SulTech Tech 2008).

Based on the activities documented above, the final FS will yield to a forthcoming proposed plan, which will in turn lead to preparation of a ROD for Parcel C.

Activities associated with the forthcoming ROD for Parcel C will be summarized in the third 5-year review report.

2.3 Summary of Status of Parcel D

Parcel D is located immediately south of Parcels A and C, to the north and west of the Bay and Parcel F, and east of off-base property (Figure 2). Currently, Parcel D comprises 98 acres and 23 IR sites (SulTech 2007b). A total of 16 buildings and 1 gun mole (regunning) pier exist within the boundary of this parcel (TtECI 2008a, Table 2-3). Most of the land at Parcel D was formerly part of the industrial support area and was used for shipping, ship repair, and office and commercial activities. The docks at Parcel D were formerly part of the industrial production area (Tetra Tech 2002a). The Navy plans to divide Parcel D into four new parcels: D-1, D-2, G, and UC-1.

Since April 1992, when Parcel D was established, the following events have occurred as part of the CERCLA process (Tetra Tech 2002a):

- Phase I radiological investigation (PRC 1992a).
- Parcel D site inspection (PRC and HLA 1994c).
- Basewide site assessment (PRC and HLA 1994a).
- Parcel D RI, including HHRA and ERA (PRC, LFR and Uribe 1996b).
- Parcel D FS (PRC, LFR and Uribe 1997).
- Parcel D proposed plan for public review (Navy 1997a).
- Phase III radiological investigation (Attachment E of the Parcel E RI [Tetra Tech, LFR, and Uribe 1997]).
- Basewide EBS (Tetra Tech 1998b).
- Phase IV radiological investigation (Tetra Tech 2000).
- Parcel D revised FS (Tetra Tech 2002a).
- Phase V Radiological Investigation (Sections 6 and 8, of the historical radiological assessment [NAVSEA 2004]). The radionuclides of concern at Parcel D include cesium-137, cobalt-60, plutonium-239, radium-226, strontium-90, thorium-232, americium-241, uranium-235, and tritium (H-3) (NAVSEA 2004).

The following removal actions were implemented at Parcel D (Tetra Tech 2003d, NAVSEA 2004) prior to the first 5-year review:

- **1989:** Approximately 1,255 cy of polychlorinated biphenyl (PCB)-contaminated soil were removed from IR-08.

- **1991 to 1993:** Twelve USTs were removed and one was closed in place; three aboveground storage tanks also were removed.
- **1991 to 1995:** Sandblast waste was collected and removed from Parcel D.
- **1994 to 1996:** Contaminated equipment and residue were removed at IR-09, the Pickling and Plate Yard.
- **1996:** Approximately 1 cy of soil affected by a cesium-137 spill was removed from an area behind Building 364.
- **1996 to 1997:** Five EE sites (EE-12 and EE-14 through EE-17) were identified and excavated in Parcel D.
- **1996 to 1997:** Contaminated sediment was removed from storm drain lines.
- **2000 to 2001:** Approximately 1,643 cy of soil were removed from several IR sites during a TCRA; a 150-foot segment of fuel line was removed from Parcel D during the steam and fuel lines investigation.
- **2001 to 2002:** Approximately 15 cy of soil affected by a cesium-137 spill were removed from IR-33 South.
- **2002:** A groundwater data gaps investigation was implemented to provide additional understanding of the groundwater conditions under the parcel (Tetra Tech 2001f,g).
- **2002 to 2003:** From April 2002 to June 2003, decontamination and waste consolidation and disposal activities were conducted. Decontamination and waste consolidation and disposal activities included encapsulating or removing asbestos-containing material; removing and disposing of structural materials, paint booths, and numerous abandoned waste items; removing and disposing of hoods, vents, and ducts associated with industrial processes; removing or disabling existing aboveground storage tanks; and cleaning industrial process-related sumps, vaults, trenches, and equipment foundations (SulTech 2007b).
- **2002 to 2003:** The Phase V investigations resulted in removal actions at Buildings 351A and 364, former Building Sites 313, 313A, 317, and 322, the Gun Mole Pier, and Naval Radiological Defense Laboratory (NRDL) Site on Mahan St. These are summarized in Section 8 of the historical radiological assessment (HRA) (NAVSEA 2004).

The first 5-year review outlined the following technical issues warranting resolution prior to remedy selection and ROD preparation for Parcel D: (1) completing the evaluation of the Phase III GDGI, (2) refining the understanding of future land uses, (3) revising the HHRA, (4) revising the FS, and (5) addressing potential radiological contamination under the basewide radiological removal action (Tetra Tech 2002d, 2003d).

The following activities have been implemented at Parcel D since the first 5-year review:

- **2003 to 2004:** In July 2003, the Navy inventoried all the stockpiles at HPS and identified 37 piles located within Parcel D (Tetra Tech and ITSI 2005). In February 2004, nine stockpiles were removed from Parcel D as part of a TCRA.

- **2004:** Fifty-one cy of petroleum-contaminated soil were removed in concert with aesthetics criteria from IR-69 at Parcel D (TPA-CKY 2005). Confirmation sampling was performed and the excavated area was backfilled.

- **2007:** The HHRA was revised, including an updated evaluation of potential environmental impacts to the Bay from chemicals present in both the A- and B-aquifers (Tetra Tech 2007b). The HHRA provided estimated risks to human health corresponding to future land uses, providing input to revision of the FS.

- **2007**: The FS was revised, yielding RAOs developed from the incremental risk quantified for protection of human health. These goals were also developed from the trigger level comparison for protecting the surface water in the Bay (Sultech 2007b). Six remediation alternatives were identified in the FS, with the highest rated alternative corresponding to a combination of ICs, in situ injection treatments of the groundwater plumes, and groundwater monitoring during and following in situ treatment (Sultech 2007b).

- **2005 to 2007:** Groundwater monitoring was conducted on a semi-annual basis across Parcel D. The primary chemicals of concern being metals and volatile organics. Hexavalent and total chromium concentrations have been relatively stable since the fourth quarter of 2005. The extent of TCE (April to September 2007 sampling event) is consistent with previous recent events (CE2-Kleinfelder 2007i).

- **2008:** Buildings 813 and 819 have been surveyed for release from radiological control pending regulatory approval (TtECI 2008a).

- **2008:** The proposed plan (Tetra Tech 2008b) summarizes the alternatives evaluated under CERCLA and explains the basis for choosing the preferred remedial (cleanup) alternatives for soil, structures, and groundwater contamination in Parcel D at HPS.

- **2008:** The following radiological removal actions have been completed as of June 18, 2008 on Parcel G (Base Realignment and Closure Cleanup Team [BCT] meeting 2008):

  - Completed 14,401 linear feet (LF) of trench excavations of which 1,468 LF was previously unidentified.

  - Excavated 32,564 cy of soil of which 32,450 cy was put in containers for disposal as low-level radioactive waste.

- Thirty-one survey units were developed; 18 have been backfilled or approved for backfill.
- Screening of soil continues.
- PG&E completed the removal of power poles and overhead lines on H Street and deactivated the natural gas line.
- Sewer removals on H Street began June 17, 2008.

The Navy completed a proposed plan for Parcel D in July 2008 (Tetra Tech 2008b). This proposed plan applies to any potential sub-parcels that are within the original boundary of Parcel D (Figure 2). Although separate RODs would be developed for these sub-parcels, no new proposed plan will be issued. The four new parcels envisioned in the current redevelopment strategy are described below.

- **Parcel D-1:** This area is proposed for reuse under the redevelopment plan for maritime or industrial use.
- **Parcel D-2:** This area is proposed for research and development reuse. This area was brought into Parcel D from the former Parcel A to allow further evaluation for possible radiological contamination in one building (Building 813). The Navy surveyed Building 813 for radiological impacts and concluded that no radiological material was present at or above risk levels at or in the building. The California Department of Public Health (CDPH) approved the Final Status Survey Report for Building 813 on April 1, 2008.
- **Parcel G:** This area is proposed for commercial reuse. Long-term uses include educational/cultural use, mixed use, open space, and industrial reuse.
- **Parcel UC-1:** This area along Spear Avenue is proposed for commercial use as an access street and utility corridor as part of the ongoing site redevelopment.

2.4 Summary of Status of Parcel E

Parcel E is located immediately south of Parcel A and Parcel D, to the north and west of the Bay and Parcel F, and east of off-base property (Figure 2). Parcel E comprises 138 acres of shoreline and lowland coast in the southern portion of HPS. A total of 22 IR sites and 43 buildings are located within the boundary of Parcel E (Barajas & Associates 2007a, Figure 1-3 and Table 3-1). Nearly all of the Parcel E land area was developed from artificial fill. Most of Parcel E is covered by sparsely to fully vegetated fields; the rest is covered by asphalt, buildings or other structures used in light industrial operations related to ship repair. Historically, Parcel E was a mixed-use and industrial area that supported HPS shipping and ship repair activities. Areas near the shoreline were used to store construction and industrial materials and to dispose of industrial waste and construction debris. Portions of Parcel E were also used for office and laboratory space by the Naval Radiological Defense Laboratory (Tetra Tech, LFR, and Uribe 1997).

Since 1992, when Parcel E was established, the following events have occurred as part of the CERCLA process:

- Phase I radiological investigation (PRC 1992a).
- Parcel E site inspection (PRC and HLA 1994d).
- Basewide site assessment (PRC and HLA 1994a).
- Phase II radiological investigation (PRC 1996a).
- Parcel E RI, including an HHRA and an ERA (Tetra Tech, LFR and Uribe 1997).
- Phase III radiological investigation (Attachment E of the Parcel E RI [Tetra Tech, LFR and Uribe 1997]).
- Parcel E FS (Tetra Tech 1998a).
- Basewide EBS (Tetra Tech 1998b).
- Phase IV radiological investigation (Tetra Tech 2000).
- Phase V radiological investigation (Sections 6 and 8 of the historical radiological assessment [NAVSEA 2004]). The radionuclides of concern at Parcel E include cesium-137, cobalt-60, plutonium-239, radium-226, strontium-90, americium-241, uranium -235, and tritium (H-3) (NAVSEA 2004).

Technical issues that must be resolved before selecting a remedy and preparing a ROD for Parcel E include (1) completing the evaluation of soil and landfill data gaps investigations, (2) completing the evaluation of the Phase III GDGI, (3) completing the evaluation of an SVE treatability study conducted at Building 406, (4) refining the understanding of future land uses, (5) revising the HHRA, (6) revising the FS, and (7) addressing potential radiological contamination under the basewide radiological removal action.

The following removal actions and treatability studies were implemented at Parcel E (Tetra Tech 2002d, 2003d) and (NAVSEA 2004) prior to the first 5-year review:

- **1995**: A total of 5,000 tons of sandblast waste was collected and consolidated at Parcel E.
- **1997**: Floating product was removed and sheet piling and a surface cap were installed as part of a containment system at IR-03 to keep floating product from migrating to the Bay.
- **1997 to 2002**: The Navy implemented an SVE treatability study at Building 406 on Parcel E.

- **2001 to 2002:** Parcel E Nonstandard Data Gaps Investigation, Wetlands Delineation, and Functions and Values Assessment, Parcels B and E (Tetra Tech 2003i).

- **2001 to 2002**: Approximately 2 cy of soil with low-level radiological contamination were removed at Buildings 509, 529, and 707.

- **2001 to 2002:** Two phases of a groundwater data gaps investigation were implemented at Parcel E to update the previous assessment of groundwater conditions and to supplement groundwater information gathered during remedial investigations (Tetra Tech 2001f, 2004b).

- **2002**: The shoreline portion of the standard data gaps investigation (SDGI) was conducted, involving collection and analysis of sediment samples from the shoreline areas of Parcels E and E-2 (SulTech 2007a).

- **2002:** Radiological investigations (Sections 6 and 8 of historical radiological assessment contain more details [NAVSEA 2004]).

The following activities have been implemented at Parcel E since the first 5-year review:

- **2003-2004:** The Navy conducted a field inventory of soil stockpiles located throughout HPS in July and August 2003. The inventory documented more than 80 stockpiles at Parcel E. Five stockpiles in Parcel E were removed in 2004 (Tetra Tech and ITSI 2005).

- **2003-2004:** The Navy conducted activities in 2003 and 2004 to address aboveground issues identified previously at buildings and in the vicinity of buildings, including removal of waste material, decontamination or removal of equipment and structures, and abatement of friable, accessible, and damaged asbestos-containing materials. The primary objective of this action was to address potential environmental issues associated with the industrial use of buildings that could affect the planned transfer of the property to the City and County of San Francisco (Tetra Tech FW, Inc. 2004).

- **2004**: Removed petroleum-contaminated soils. Approximately 19,383 cy of petroleum-contaminated soil were excavated across Parcel E (TPA-CKY 2005).

- **2005:** A TCRA was performed to excavate petroleum, PCB, and radiologically impacted soils at hot spots across Parcels E and E-2. Approximately 65,200 tons of PCB-contaminated soil and debris were removed for disposal (TtECI 2007a). The debris removed included low-level radioactive waste consisting of 533 cy of soil and firebrick, 78 cy of metal debris, 19 pieces of debris, and two low-level mixed waste drums (TtECI 2007a). Also, 110 drums, containing mostly oil and grease, were discovered in the central area of the excavation, and 537 small containers and laboratory bottles were found within the PCB Hot Spot. Radiological RAOs were

met through confirmation sampling, while additional remediation was necessary to meet RAOs for PCBs (TtECI 2007a).

- **2005:** A TCRA was performed to excavate soil at the Metal Debris Reef in Parcel E. Approximately 11,200 cy of soil, metal slag, and debris were excavated (TtECI 2007b).

- **2006-2007:** A TCRA consisting of soil excavation of low-level radioactive wastes at IR-02 in Parcel E was conducted. Limited non-radiological chemical contamination encountered during the excavation was also removed. Most of the excavated and radiologically screened material was used as backfill. Post excavation sampling confirmed that radiological RAOs were met (TtECI 2007b). The waste materials included 18,010 cy of contaminated soil and debris, 1,050 cy of excavated large debris, 35 over-pack drums, one drum of low-level mixed waste, 1,700 cy of low-level radiological waste, 12,000 gallons of wastewater, 28 compressed gas cylinders, and 61 cy of metal debris (TtECI 2007c).

- **2007:** A work plan for performing a supplemental treatability study to evaluate mechanochemical destruction (MCD) of PCB-contaminated soil and sediments was prepared. The underlying principal of MCD is the destruction of organic compounds in a soil matrix by the application of mechanical energy through grinding of the soil matrix (Shaw Environmental Inc. 2007b).

- **2007:** A revised RI was prepared for Parcel E. The revised RI characterized the nature and extent of chemicals in soil, groundwater, and sediment; quantified estimates of risks to human health and the environment; and identified areas proposed for evaluation of response actions (Barajas & Associates, Inc. 2008a).

- **2004-2007**: Groundwater sampling under the basewide groundwater monitoring program began in June 2004 and has been conducted on a quarterly basis. The two areas of concern in Parcel E include the Northwest Bay Fill Area (NBFA) and the Former Oil Reclamation Ponds Area (ORPA). Water quality criteria were exceeded in NBFA wells in one or both of the two most recent reported events (second and third quarters of 2008) for the following analytes: barium, copper, nickel, selenium, vinyl chloride, and zinc. Water quality criteria were exceeded in ORPA wells in one or both of the two most recent reported events (second and third quarters of 2008) for the following analytes: antimony, arsenic, barium, benzene, copper, nickel, p-dioxane, selenium, thalium, and vinyl chloride (CE2-Kleinfelder 2007i).

2.5 Summary of Status of Parcel E-2

Parcel E-2 is located immediately west of Parcel E, to the north of the Bay and south of off-base property (Figure 2). To facilitate the closure of the Landfill (Parcel E-2) and its adjacent areas, in September 2004 the Navy divided Parcel E into two parcels (Parcels E and E-2). Parcel E-2 consists of 47.4 acres of shoreline and lowland coast along the southwestern portion of HPS (Figure 2). Parcel E-2 is part of an area created in the 1940s, 1950s, and 1960s by filling in the Bay margin with a variety of material, including soil, crushed bedrock, dredged sediments, and debris. The

overall composition of the fill material, on which the Parcel E-2 Landfill was created, is primarily sand and clay with intermixed construction debris.

Previous environmental investigations at Parcel E-2 included the following (Engineering/Remediation Resources Group [ERRG] & Shaw 2007 and TtECI 2007d):

- **1984:** Initial Assessment Study (Naval Energy and Environmental Support Activity [NEESA] 1984).
- **1987:** Confirmation Study/Verification Step, Area Study for Asbestos-Containing Material and Organic and Inorganic Soil Contamination (EMCON 1987a and 1987b).
- **1986-1988:** Triple A Investigation, Remedial Action Order and RI/FS Scoping Document (HLA 1988).
- **1988-1989:** Solid Waste Air Quality Assessment Test (HLA 1989).
- **1988-1992:** Operable Unit I Remedial Investigation (Tetra Tech, LFR, and Uribe 1997).
- **1991-1992:** Intertidal Sediment Study (Aqua Terra Technologies [ATT] 1991).
- **1991, 1993:** Radiological Investigation (Phases I and II) (PRC 1992b and 1996a).
- **1994-1996:** Ecological Risk Assessment (Phases 1A and 1 B) (PRC 1994, 1996a, and 1996b).
- **1995-1998:** Parcel E Remedial Investigation and Feasibility Study (Tetra Tech 1998c).
- **1999-2000:** Ecological Risk Assessment Validation Study (Tetra Tech and LFR 2000).
- **2000-2002:** Groundwater Data Gaps Investigations (Phases I, II, and III) (Tetra Tech 2001f and 2004c).
- **2001-2002:** Landfill and Soil Data Gaps Investigations, Wetlands Delineation (Tetra Tech 2003i).
- **2001-2002:** Parcel E Nonstandard Data Gaps Investigation, Wetlands Delineation, and Functions and Values Assessment, Parcels B and E (Tetra Tech 2003i).
- **2002:** Nonstandard Data Gaps Investigation, Landfill Gas Characterization (Tetra Tech 2003j).
- **2002:** Final Parcel E Nonstandard Data Gaps Investigation, Landfill Lateral Extent Evaluation (Tetra Tech 2004c).

- **2002:** Final Parcel E Nonstandard Data Gaps Investigation, Landfill Liquefaction Potential (Tetra Tech and ITSI 2004).

- **2001-2003:** Radiological Investigations, Phase V (and other interim investigations) (NAVSEA 2004). The radionuclides of concern associated with Parcel E-2 include cobalt-60, cesium-137, radium-226, and strontium-90. Onsite radiological surveys have been performed since the beginning of radiological work at HPS and are ongoing (TtECI 2007d).

- **2002-2005:** Shoreline Sediment Characterization (Sultech 2007a).

Interim removal actions included:

- **1997-1998:** A groundwater containment and extraction system was installed at the southeast portion of Parcel E-2 to reduce the potential for release of landfill constituents into the San Francisco Bay (IT 1999b).

- **1997-1998:** Sheet piling and a groundwater extraction system were installed at the Industrial Landfill on Parcel E-2 to control the mounding of groundwater at the southern end of the landfill (IT 1999a).

- **2000-2001:** A multilayer interim cap was constructed on a portion of the Parcel E-2 Landfill to prevent oxygen intrusion and extinguish smoldering subsurface areas following a brush fire (Tetra Tech 2005).

- **2000:** A TCRA was completed in March 2001 in response to an extinguished brush fire at the IR-01/21 Industrial Landfill. The TCRA involved construction of an interim cap on the burned portion of the landfill to extinguish any remaining subsurface fire and to prevent the occurrence of fire in the future (Tetra Tech 2003a).

- **2002:** A landfill gas barrier system was constructed at the northern end of the landfill to remove methane gas from the subsurface at the University of California, San Francisco compound and prevent future landfill gas from migrating off Navy property at levels above cleanup goals (Tetra Tech 2003h).

- **2005:** A TCRA was performed to excavate soil at the Metal Debris Reef (Parcel E) and Metal Slag (Parcel E-2) areas. Approximately 8,200 cy was removed from the Metal Slag excavation site. Pathways were eliminated by placing a cap of clean soil on each of the areas (TtECI 2007a).

- **2005-2006**: The southeast portion of Parcel E-2 was excavated, and the excavated material was disposed of off site. Under a PCB Hot Spot Removal Action, 44,500 cy of contaminated soil, including 432 cy of radiologically impacted material were removed (BCT Minutes 2006).

- **2007:** A landfill gas and landfill cap monitoring event was conducted, indicating methane levels in onsite structures are insignificant (Contractors Integration Meeting 2007b).

- **2007:** A work plan for performing a supplemental treatability study to evaluate MCD of PCB-contaminated soil and sediments was prepared. The underlying principal of MCD is the destruction of organic compounds in a soil matrix by the application of mechanical energy through grinding of the soil matrix (Shaw Environmental Inc. 2007b).

Ongoing monitoring programs and landfill gas monitoring results include:

Ongoing Monitoring Programs: The ongoing monitoring programs at Parcel E-2 include quarterly groundwater monitoring (2004 to present), monthly gas monitoring and control (2004 to present), storm water discharge management (2003 to present), and landfill cap inspection and maintenance (2003 to present) (ERRG & Shaw 2007):

- **Quarterly Groundwater Monitoring (2004 to present):** In June 2004, the Navy began quarterly monitoring at Parcel E-2. A total of 21 A-Aquifer wells and 10 B-Aquifer wells were selected for groundwater sampling. The purpose of the sampling was to monitor chemicals that previously had been detected and to establish a baseline for other chemicals and water quality parameters that might be related to the landfill (ERRG & Shaw 2007). The primary area of concern in Parcel E-2 is the Industrial Landfill Area (ILA). Water quality criteria were exceeded in ILA wells in one or both of the two most recent quarterly events (second and third quarter of 2007) for the following analytes: 1,1-dichloroethane (DCA), 1,1-DCE, 1,4-dichlorobenzene (1,4-DCB), ammonia, antimony, arsenic, barium, benzene, chlorobenzene, total chromium, cis-1,2-DCE, copper, cyanide, Freon 150, mercury, nickel, selenium, TCE, tetrachlorethene, thalium, and vinyl chloride (CE2-Kleinfelder 2007h).

- **Monthly Gas Monitoring and Control (2004 to present):** Landfill gas is being monitored on a monthly basis under the Interim Landfill Gas Monitoring and Control Plan to verify that hazardous levels of landfill gas are not migrating beyond the fence line of the landfill and onto the University of California, San Francisco (UCSF) compound. In monthly monitoring performed since January 2004, all concentrations of monitored analytes were below action levels and regulatory requirements identified in the Interim Landfill Gas Monitoring and Control Plan. Methane concentrations have, in nearly all cases, remained below specified regulatory action levels; however, methane concentrations in excess of specified regulatory action levels have been detected in January 2004 and January 2006. In these instances, the Navy has notified the appropriate parties and implemented response measures to control landfill gas at the fence line of the landfill and at the gas monitoring probes (GMPs) located on the UCSF property (ERRG & Shaw 2007).

- **Storm Water Discharge Management (2003 to present):** The Parcel E-2 storm water program involves quarterly non-storm water discharge visual observations, storm water sampling and analysis, monthly storm water discharge visual observations, and an annual comprehensive site compliance evaluation (ERRG & Shaw 2007).

- **Landfill Cap Inspection and Maintenance (2003 to present):** The operation and maintenance (O&M) plan addresses and provides guidance for inspecting and reporting activities that are required to ensure the integrity of the landfill cap. It contains requirements that facilitate and support implementation of the O&M plan. Also included in the O&M plan are emergency response procedures, which are to be followed in the event of flood, major storm event, earthquake, or fire (ERRG & Shaw 2007).

The radionuclides of concern associated with Parcel E-2 include cobalt-60, cesium-137, radium-226, and strontium-90. Onsite radiological surveys have been performed since the beginning of radiological work at HPS and are ongoing (TtECI 2007d).

An RI/FS for Parcel E-2 (ERRG & Shaw 2007) and a radiological addendum to the RI/FS (TtECI 2007d) were completed. These documents identified remedial alternatives for Parcel E-2. These alternatives include the following: no action; excavate and dispose of solid waste, soil, and sediment (including monitoring and institutional controls); and contain solid waste, soil, and sediment (including monitoring and institutional controls).

2.6 Summary of Status of Parcel F

Parcel F was added to the HPS IR Program in 1996. Parcel F is located off shore and comprises 440 acres of underwater land surrounding the central portion of HPS to the north, east, south, and southwest. Figure 2 shows Parcel B in relation to Parcels C, D, E, and F. Features of Parcel F include pier, slip, and dry dock areas and offshore sediment (PRC 1996c).

Since 1996 when Parcel F was established, the following events have occurred as part of the CERCLA process (PRC 1996c):

- Parcel F RI, which consisted of a qualitative and quantitative ERA (PRC 1996c).

- Parcel F FS (Tetra Tech and LFR 1998a).

- Validation study (Battelle and Neptune 2005).

The first 5-year review identified technical issues warranting resolution prior to finalizing the Parcel F FS, selecting a remedy, and preparing a ROD; these included finalizing the validation study and completing data gaps sampling.

The following activities have been implemented at Parcel F since the first 5-year review:

2007: A feasibility study data gaps investigation was performed to support the development and evaluation of remedial alternatives for offshore sediments in South Basin (Areas IX and X) and Point Avisadero (Area III) (Barajas, Battelle, Neptune and Sea Engr. 2007). The scope of work included defining the horizontal and vertical distribution of mercury, copper, and/or PCBs in sediment; defining possible onshore-to-offshore PCB transport pathways to ensure that all sources have been identified; and characterizing the distribution and transport of PCBs in offshore sediments.

2007: An update to the 1998 FS was prepared, developing remedial alternatives to address the chemical contamination found in sediments at Parcel F. Eight remedial alternatives were evaluated and ranked, including those combining near-shore removal with monitored natural recovery, which meet the criterion of long-term effectiveness (Barajas & Associates 2007b).

2007: With the assistance from the Navy, in 2006-2007, a preliminary treatability study was conducted at the HPS tidal mudflat in South Basin to assess how activated carbon (AC) treatment technology may be applied in the field for treatment of PCBs. The results indicate that after 7 months of AC-sediment contact in the field, the 28-day PCB bioaccumulation for the bent-nosed clam, Macoma nasuta, field deployed to this AC-amended sediment, was approximately half of the bioaccumulation resulting from exposure to untreated sediment (Cho, Y.M. et al 2007).

2008: An update to the 1998 FS was prepared, developing remedial alternatives to address the chemical contamination found in sediments at Parcel F. Remedial alternatives were evaluated and ranked, including those combining focused removal/activated backfill, in situ stabilization, institutional controls, and monitored natural recovery (Barajas & Associates 2008b).

Section 3
Parcel B Overview

The 5-year review process for HPS is particularly relevant to Parcel B, where significant RA (see Figure 4) and monitoring (see Figure 5) activities have been implemented since the ROD. The following sections provide a comprehensive overview of conditions at Parcel B.

3.1 Physical Characteristics

Parcel B occupies approximately 59 acres of the base's northern side, bordering the Bay. Topographic features on site consist of lowland and shoreline coast areas. Ground surface elevations range from 0 to 15 feet above mean sea level. Parcel B is bordered by the Bay to the north and east, Parcel C to the south, and the Bayview/Hunters Point district to the south and west. Several buildings exist on this parcel, ranging in use from rental to artists to being vacant and out of use.

The boundary of Parcel B has changed twice since the October 1997 ROD. The first change was to move IR-06 to Parcel C due to the association of the VOC contamination at Parcel B with its source area, Building 134 at nearby Parcel C. This change reduced the area of Parcel B from 63 to 59 acres. The second change affected the southeastern boundary with the former Parcel A. Minor adjustments in the boundary in this area were made to ensure that soil contamination related to activities in Parcel B was contained within the boundary of Parcel B. The adjustment involved only a small fraction of an acre, and the area of Parcel B remained approximately 59 acres.

3.2 Land and Resource Use

Past and Present Uses: Parcel B was formerly part of the industrial support area and was used for shipping, ship maintenance and repair, training, barracks, and offices.

HPS operated as a commercial dry dock facility from about 1867 until 1940 when the Navy acquired title to the land and began developing it for various naval shipyard activities. Approximately 400 acres of the dry land portion of HPS was filled to create a level plain from 12 to 15 feet above mean sea level. The area was filled in stages beginning in 1940 and completed by the early 1960s. IR-07 and IR-18 were the last areas filled within Parcel B. After 1948, the IR-07 and IR-18 areas were filled with soil, rock, and construction debris. By 1963, IR-07 and IR-18 were almost completely filled (Tetra Tech 2003c).

From 1945 to 1974, the Navy used the shipyard primarily as a maintenance and repair facility. The Navy also conducted industrial activities at Parcel B, such as fuel distribution, sandblasting, painting, machining, acid mixing, and metal fabrication. The Navy discontinued activities at HPS in 1974, and the shipyard remained relatively unused until 1976.

In 1976, the Navy leased most of HPS, including all of the area now known as Parcel B, to Triple A Machine Shop, Inc. (Triple A). Triple A operated a commercial ship repair facility from July 1976 to June 1986 but did not vacate the property until March 1987. During the lease period, Triple A used dry docks, berths, machine shops, power plants, various offices, and warehouses to repair commercial and Navy vessels. Triple A also subleased portions of the property to various other businesses.

Since 1986, portions of Parcel B have been leased for such uses as artists' studios, storage, and cabinet making. Most of Parcel B is covered with concrete or asphalt and buildings. The western portion of Parcel B, including IR-07 and IR-18, is unimproved and covered only with soil and minor vegetation (Tetra Tech 2003h).

The ecology at Parcel B is limited to plant and animal species adapted to an industrial environment. Viable terrestrial habitat is inhibited at Parcel B because about 75 to 80 percent of the ground surface is covered by pavement and buildings. Potential ecological receptors near the shoreline areas of Parcel B include benthic invertebrates, birds, and mammals (ChaduxTt 2007).

Present and Future Uses of Area Resources: The area resources at Parcel B include groundwater, land, and surface water, though no permanent surface water exists on Parcel B. Surface water runoff flows to the nearby San Francisco Bay over covered concrete and asphalt surfaces and percolates through surface soil during storm events. One tidal wetland, totaling approximately 0.03 acre, exists along the IR-07 shoreline at Parcel B. Wetlands are planned for Parcel B according to the reuse plan (San Francisco Redevelopment Agency [SFRA] 2007).

The groundwater consists mainly of the A-Aquifer and B-Aquifer.

A-Aquifer. The A-Aquifer consists primarily of artificial fill, ranging in thickness from 0 to 90 feet bgs. On Parcel B, the depth to groundwater ranges from 2 to 15 feet bgs and generally flows to the north and northeast toward the Bay. The bedrock water-bearing zone was encountered in the southern portion of Parcel B, and groundwater levels range in depth from 4 to 40 feet bgs. RWQCB sent a letter to the Navy dated September 25, 2003 (RWQCB 2003), stating that RWQCB does not consider the A-Aquifer at HPS a source of drinking water per State Water Resources Control Board (SWRCB) Resolution 88-63 (Tetra Tech 2003h).

B-Aquifer. The B-Aquifer has limited beneficial use due to site-specific factors, including (1) the City of San Francisco's prohibition on installing domestic wells and the proximity of sewer lines and storm drains, (2) the lack of current or historical use of the aquifer for water supply, (3) the limited size of this groundwater resource, and (4) the proximity of saltwater to the aquifer and the potential for saltwater intrusion if significant quantities of groundwater are withdrawn from the aquifer (ChaduxTt 2007).

Based on the City and County of San Francisco's reuse plan, Parcel B is expected to be zoned to accommodate mixed uses, including a mixed residential/retail complex, a research and development area, a cultural and educational area, open space, and a potential wetland. Figure 6 shows the future land-use designations, divided to blocks, currently planned for Parcel B.

3.3 History of Contamination

The Navy identifies, evaluates, and addresses past hazardous waste sites at HPS as part of the IR Program. From 1945 through 1987, contaminant releases occurred during site operation under the Navy and Triple A; however, specific dates of releases are not known. Contaminant releases have been evidenced by a variety of organic and inorganic chemicals discovered in soil and groundwater at levels exceeding cleanup goals and trigger levels established in the Parcel B ROD (Navy 1997b). Prior to 1984 and the initial discovery of a problem and contamination at Parcel B, investigations and surveys of various HPS sites included:

- 1946 through 1948 Radiological Safety Section and NRDL decontaminated and surveyed OPERATION CROSSROADS ships and HPS berths and dry docks. This included areas in Parcel B (NAVSEA 2004).
- 1955 NRDL surveys to decommission NRDL buildings at HPS (NAVSEA 2004). There are no reports of surveys for Parcel B NRDL radiologically impacted sites.
- 1969 NRDL survey for dis-establishment of NRDL (NAVSEA 2004). There are no reports of surveys for Parcel B NRDL radiologically impacted sites.

The chronology of CERCLA-related events at Parcel B (Table 2) is as follows:

- **1984:** Initial discovery of problem or contamination.
- **1984 through 1989:** Pre-NPL investigations.
- **1989:** NPL listing.
- **1991:** Designated for closure under BRAC Program.
- **January 22, 1992:** FFA signed.
- **1994:** Preliminary assessment and site inspection.
- **1996:** Removal actions at IR-23 and IR-26 EEs and IR-50 (sediment in Parcel B storm drains).
- **October 16, 1996:** Proposed plan released to the public.
- **November 1996:** RI and FS completed.

- **October 9, 1997:** ROD signed.
- **July 8, 1998:** Actual RA start (construction mobilization start).
- **October 1998:** First explanation of significant differences (ESD).
- **August 1999:** Remedial design (RD) completed.
- **May 2000:** Second ESD.
- **June 2000 through September 2002:** SVE treatability study at IR-10.
- **June 2000 through present:** Groundwater sampling.
- **2002:** The HRA designated sites as impacted or non-impacted with respect to radiological contamination. Phase V investigation and surveys were completed at Buildings 103, 113, 130, and 146 and Dry Dock 6. Further details on activities at these buildings can be found in Chapters 6 and 8 and Table 6-6 of the final Historical Radiological Assessment (NAVSEA 2004).
- **2003-2004:** The Navy conducted an HPS-wide action in 2003 and 2004 to address aboveground issues identified previously at buildings and in the vicinity of buildings, including removal of waste material, decontamination or removal of equipment and structures, and abatement of friable, accessible, and damaged asbestos-containing materials. The primary objective of this action was to address potential environmental issues associated with the industrial use of buildings that could affect the planned transfer of the property to the City and County of San Francisco (Tetra Tech FW, Inc. 2004).
- **December 2003:** Implementation of first 5-year review of remedial actions. See Figure 4, which depicts excavation locations across Parcel B.
- **March 2004:** Shoreline characterization.
- **June 2004:** ZVI performance evaluation at Building 123.
- **July 2004 through January 2005:** The Navy removed and disposed of 9,800 cy of soil impacted with fuel-related products from two areas at Parcel B.
- **2005 to present**: The base-wide radiological removal action focused on storm water and sewer drain lines at Parcel B. The pipelines and surrounding soil were screened for radionuclides of concern, and overburden soil was characterized for disposal or reuse. As of May 2008, 3,800 cy of radiologically impacted soil, 503 LF of radiologically impacted pipe, and 14 radiologically impacted manholes have been removed. All waste material was disposed at an appropriate offsite facility**.**
- **November 2005:** Lactate and hydrogen injection evaluation was performed.
- **December 2007:** TMSRA, including radiological addendum, was prepared.

- **February 2008:** Text for draft proposed plan was prepared.

As part of implementing the above CERCLA activities, the nature and extent of chemicals in various media have been defined. Table 5 summarizes the chemicals that have been discovered in soil at Parcel B above cleanup goals and lists site descriptions, possible sources identified during the RI and RA, volumes of soil contamination for each site within Parcel B covered by the ROD, and the status of RA activities implemented at each site (Tetra Tech 2003h). Table 3 presents the history of investigations since the ROD and includes actions after the completion of the first 5-year review report. The primary chemicals in Parcel B soils at concentrations above cleanup goals include VOCs, semivolatile organic compounds (SVOCs), PCBs, and metals (PRC, LFR, and Uribe 1996a; Tetra Tech 2002f).

Table 1 presents the remedial action monitoring program (RAMP) wells and exceedances showing that VOCs and metals are the primary chemicals that have been detected in groundwater at concentrations above the ROD trigger levels. Metals have exceeded the trigger levels throughout the site, but VOCs have been detected only in groundwater underlying Building 123 in IR-10. Soil and bedrock are the primary sources of metals in Parcel B groundwater. Other possible sources of metals include releases of waste acids and plating solutions into the floor drains inside Building 123. The available data suggest that releases of the waste acids and plating solutions are potential sources of hexavalent chromium and VOCs (Tetra Tech 2003h).

Petroleum hydrocarbons have also been detected in Parcel B soil and groundwater (Tetra Tech 2003h). Potential radiological contamination was identified in the following areas: IR-07, IR-18 and Buildings 103, 113, 113A, 114, 130, and 146, and extensive removal action has taken place since the first 5-year review. See Table 6 for the past use and status of radiologically impacted sites. New World Technology (NWT) Phase V investigation and Class 3 survey were conducted in 2002 at Dry Dock 6. No surveys or investigations were conducted at Dry Docks 5 and 7 (NAVSEA 2004)

The nature and extent of contamination referenced above is discussed in more detail as part of the summary of activities prior to and following the first 5-year review presented in the sections below.

3.4 Pre-ROD Cleanup Activities

Pursuant to CERCLA (Title 42 United States Code [U.S.C.] Section (§) 9601, et seq.), SARA, and Executive Orders 12580 and 13016, the Department of Defense (DoD) has the authority to respond to the release of a CERCLA hazardous substance on property owned by the United States under the jurisdiction of DoD. SARA § 211 codified at Title 10 U.S.C. § 2701, et seq., required the DoD to respond to the release of CERCLA hazardous substances, pollutants, and contaminants in accordance with CERCLA § 120 (Tetra Tech 2003h). Between 1984 and 1991, the Navy performed a number of installation-wide investigations under the IR Program. These included 17 areas

across Parcel B that were identified as potential sources of hazardous substances in the soil or groundwater. After performing a CERCLA preliminary site assessment and site inspection on all 17 sites, evidence showed that 15 sites required further investigation in an RI (PRC, LFR and Uribe 1996a); no additional investigation was needed for the other two sites. HPS accordingly was included on the NPL in November 1989 (ChaduxTt 2007)

In 1990, the Navy, EPA, and the State of California (via DTSC) entered into an FFA to coordinate environmental activities at HPS; in 1991, the FFA was modified, and RWQCB was included in the agreement (Navy 1991). In 1991, the DoD determined that it would close and dispose of HPS within the BRAC program (ChaduxTt 2007).

Between July 1996 and January 1997, the Navy conducted EEs at 18 sites across HPS, five (EE-01 through EE-05) of which were at Parcel B (Tetra Tech 2003h). The excavations included removal actions at IR-23 and IR-26. The EEs were conducted to reduce the risk to human health and the environment. The screening criteria were based on Hunters Point ambient levels and EPA's preliminary remediation goals (PRC 1995; EPA 1995). Confirmation samples were taken from the sidewalls and bottom of each EE to characterize limits of excavation (Tetra Tech 2003h).

Of the five EEs, three needed additional investigation under RA activities. EE-01 and EE-03 samples were below screening levels once the chemicals of concern were removed. Samples from EE-05 exceeded screening criteria. Screening levels for polynuclear aromatic hydrocarbons (PAHs) at EE-02 and EE-4 were also elevated but may have been caused by matrix interferences (Tetra Tech 2003h).

The Navy also conducted non-TCRA activities to remove contaminated sediment in the storm drain system (IR 50). Approximately 200 cy of sediment were removed from 10,500 linear feet of Parcel B storm drains and disposed of off site (Navy 1997b).

3.5 Remedial Actions since the First 5-year Review Report

A wide range of activities ranging from characterization, treatability studies, TCRAs, and quarterly groundwater monitoring have been performed at Parcel B since the first 5-year review. These activities are depicted in Tables 4 and 5, and summarized below.

3.5.1 Interpretation of Fill Conditions at IR-07 and IR-18

In 2003, the Navy reviewed historical documents, including aerial photographs, and geophysical surveys, and this resulted in the following conclusions (Tetra Tech 2003c):

- Fill activities gradually took place between 1948 and 1972.
- Historical soil borings indicate a difference between fill material used at HPS and that of IR-07 and IR-18.

- A comparison of aerial photographs to the geophysical data shows a progression of fill activities and suggests a progress of fill material.

- Observations during remediation activities show dense areas of debris fill in the western portion of IR-07 and IR-18. Debris fill materials were also encountered in the central portion of IR-07 and IR-18. Geophysical data appear to be consistent with observations made during the remediation activities.

Based on aerial photograph comparisons, historical records, and field observations, the fill was characterized as follows:

- A mixture of soil and debris with construction debris

- Low-quality fill with dense debris content

- Rock fill

- High quality fill with a high clay content and little to no debris (Tetra Tech 2003c)

3.5.2 Parcel B Shoreline Characterization

In 2003, shoreline areas at Parcel B that were not delineated as part of the remedial actions completed from 1996 through 2003, as specified in the Parcel B remedial design amendment (Tetra Tech 2001b), were characterized. The scope of work included performing an initial characterization of the nature and extent of chemicals of potential concern (COPCs) present at the IR-07 and IR-26 shoreline (Naval Facilities Engineering Command [NAVFAC] 2004).

Data collected from the shoreline investigation and previous remedial actions at areas adjacent to the IR-07 and IR-26 shoreline areas indicate that:

- At IR-07, a correlation exists between the COPCs identified at the excavations adjacent to the shoreline area (non-removed samples) and the analytes detected at shoreline sampling locations (namely, metals, PAHs, and PCBs).

- All shoreline samples were collected within the sandy fill at depths ranging from 0 to 4 feet bgs; shoreline borings advanced to a maximum depth of 4 feet bgs did not encounter industrial fill.

- Many samples at IR-26 were not collected because riprap interfered with sample collection (that is, no sediment was present).

3.5.3 Total Petroleum Hydrocarbon Program Corrective Action Implementation Soil Removal

In 2004, petroleum hydrocarbon-impacted soil was removed from corrective action area (CAA) 21 and CAA22 at Parcel B. Approximately 6,331 cy of soil were removed from CAA21, reflecting excavation of two 500-square foot soil columns excavated to a

depth of 13 feet bgs (TPA-CKY 2005). Select confirmation samples collected from the bottom of this excavation exceeded action levels, but these occurred at depths below the maximum targeted excavation depth of 10 feet bgs (TPA-CKY 2005).

Approximately 3,480 cy of soil were removed from CAA22 (TPA-CKY 2005). At this location, excavation extended to a depth of 10 feet bgs, with confirmation samples also exceeding action levels at depths below the maximum targeted excavation depth of 10 feet bgs (TPA-CKY 2005). Table 5 summarizes the chemicals remaining in soil at Parcel B.

In late 2007, the Navy revised the HPS Petroleum Program Strategy and screening criteria per the Water Board's request. As a result, a revised version of the Parcel B corrective action plan (CAP) was prepared (Shaw 2008). The CAP documented the process completed to identify the specific areas of remaining concern at Parcel B that require further characterization or corrective action, which are specifically addressed in the CAP. The CAP considered recent sample results and re-evaluated these specific sites in accordance with the *Final New Preliminary Screening Criteria and Petroleum Program Strategy* (Shaw 2007a). The CAP assesses the current nature and extent of petroleum contamination, evaluates several corrective action alternatives, and develops a cost-effective and timely approach to addressing petroleum-related contamination at each of the sites of remaining concern. In order to obtain site closure for petroleum-impacted areas, the CAP only addresses the nature and extent of petroleum-related contamination in soil and groundwater that is not commingled with CERCLA contamination. The HPS CERCLA Program will address petroleum-related contamination commingled with CERCLA contamination.

3.5.4 Methane and Mercury Source Removal

Two time critical removal actions are being conducted at Parcel B to address methane and mercury, respectively, as discussed below.

TCRA for the Methane Source

In April and May 2005, two phases of soil gas surveys were performed at Parcel B (BCT 2007a). The objective of the Phase I survey was to assess if buried debris in IR-07 and IR-18 was producing methane and/or contained VOCs; the results showed that one soil gas probe exceeded the methane action level at 11 percent (BCT 2007a).

The objective of the Phase II survey was to further investigate the Phase I sample location exceeding the methane action level (BCT 2007a). Results of the second survey indicated that two Phase II probes, E8-SW and E8-SE, exceeded the action level for methane. E8-SE had the highest concentration (15.2 percent sample/17 percent confirmation) (BCT 2007a). The elevated methane was estimated to cover an impacted area of approximately 8,850 square feet (BCT 2007a).

The TCRA to remove the source of methane producing materials is scheduled to be implemented in summer 2008 (TtECI 2008b).

TCRA for the Mercury Source

As an exploratory removal action, between July 1996 and January 1997, soil containing chemicals at concentrations exceeding the Hunters Point ambient level (HPAL) were excavated at 18 exploratory excavation sites located throughout HPS (IT Corporation 1999a). As part of this action, approximately 500 cy of soil containing mercury concentrations greater than cleanup criteria were removed at IR-26 excavation EE-05. The excavation was terminated at groundwater (i.e., soil was excavated to a depth of approximately 7 feet).

Additional excavation activities were performed at IR-26 excavation EE-05 in 2000 and 2001 (Tetra Tech 2002f). During this time-frame, an additional 5,000 cy of soil containing mercury concentrations greater than the HPAL of 2.3 milligrams per kilogram (mg/kg) were excavated at EE-05 and disposed off site. Soils were excavated to a depth of approximately 10 feet bgs. Analysis of confirmation samples collected during the excavation indicates there are areas beneath the backfilled excavation where mercury concentrations exceed the HPAL. Mercury concentrations up to 90 mg/kg were documented at the base of the excavation, which remain in the subsurface.

An additional TCRA for the mercury source at IR-26 excavation EE-05 is planned for the summer of 2008 (Navy 2008).

3.5.5 Phase III Soil Vapor Extraction Treatability Study in Building 123

A Phase III treatability study was conducted to evaluate whether enhancement to the existing SVE system at Building 123 increased the effectiveness of the SVE technology used to reduce residual TCE concentrations in soil (ITSI 2006). Results of the study indicated that with the addition of nine SVE wells, the majority of residual TCE in soil and soil gas at concentrations above cleanup goals was within the treatment area of the Phase III SVE system (ITSI 2006). Highest concentrations of TCE in extracted vapors were consistently detected from SVE well IR10VW-23A; however, TCE (36.0 mg/kg) detected in soil sample IR10SG-074-6 indicated that TCE may be present beyond the SVE system influence (ITSI 2006).

Results of the Phase III SVE treatability system also indicated that SVE technology was successful in reducing concentrations of TCE in the subsurface at Building 123 (ITSI 2006). While the system was in operation, photoionization detector (PID) monitoring showed concentrations of VOCs reduced in the extracted soil vapor below the detection level of the PID at 22 of the 23 SVE wells and 27 of 28 vapor monitoring (VM) wells (ITSI 2006). Even with measured rebound after system shutdown, final PID monitoring at the SVE and VM wells indicated an average of 33 percent reduction from original concentrations or 77 percent when the seven wells that

rebounded above their initial concentrations were excluded. Overall, VOCs were reduced by 99 percent from original (pre-Phase II SVE treatability study) concentrations (ITSI 2006).

3.5.6 Quarterly Groundwater Monitoring

Quarterly groundwater quality and water level data have been compiled from 2003 through 2007. These data indicate that the general groundwater flow direction underlying Parcel B is consistently toward the northeast and the Bay (CE2-Kleinfelder 2007b, c, e). Groundwater quality data have been summarized below, with exceedances of trigger levels in RAMP wells documented in Table 1**.** Figure 5 depicts the location of RAMP monitoring wells at Parcel B**.**

Groundwater quality data beginning in 2003 indicate that the following wells exhibited detected concentrations of specified contaminants exceeding the RAMP trigger levels:

- Hexavalent chromium monitoring well IR10MW12A: Results exceeded the aquatic criterion of 50 micrograms per liter (µg/L) for hexavalent chromium since the first 5-year report (ITSI 2004).
- Supplemental characterization monitoring well IR26MW47A: Three out of four quarters of 2003 results exceeded the proposed trigger level of 0.6 µg/L for mercury (ITSI 2004).
- Supplemental characterization monitoring wells IR26MW47A and IR26MW49A: In the last quarter of 2006 and the following three quarters in 2007, results exceeded the proposed trigger level of 0.6 µg/L for mercury (Table 1).
- Supplemental characterization monitoring well IR10MW61A: In the first three quarters in 2007, results exceeded the proposed trigger level for vinyl chloride (VC) (Table 1).
- Monitoring well IR10MW59A: In the first three quarters in 2007, results exceeded the proposed trigger level for cis-1,2-DCE and VC (Table 1).
- Monitoring well IR07MW24A: In the first three quarters in 2007, results exceeded the proposed trigger level for beryllium (Be) (Table 1).
- Monitoring wells IR07MW19A, IR07MW20A1, IR07MWS-2, and IR26MW47A: Copper was detected above its trigger level at least once between the first quarter of 2006 through the third quarter of 2007 in these wells (Table 1).

Few exceedances of trigger levels have been recorded in the last 3 years of RAMP groundwater monitoring (CE2-Kleinfelder 2006b and 2007i); however, the monitored plumes have remained generally stable. For example, 2005 data for the IR-10 treatability study area indicated that the lateral extent of VOC contamination was stable, an observation noted in subsequent monitoring rounds.

In late 2005, concentrations of VOCs (TCE, cis- and trans-1,2 DCE and vinyl chloride) in groundwater were lower than those detected earlier in 2005 and prior (CE2-Kleinfelder 2006b). This reduction in concentrations (all below trigger levels) followed ZVI injection technology used to treat VOCs in groundwater (ERRG and URS Corporation [URS] 2004), suggesting this methodology was effective in reducing VOC concentrations in the pilot tested area (CE2-Kleinfelder 2006b).

Also worth noting is that hexavalent chromium concentrations were detected from 2004 to 2006 in groundwater underlying Parcel B. These levels exceeded the trigger levels in all four quarters of 2005 but reduced to below trigger levels in 2006 and 2007 (CE2-Kleinfelder 2006b, 2007i). Correspondingly, the available data do not indicate significant hexavalent chromium migration toward the Bay (CE2-Kleinfelder 2006b).

The detection of mercury has been focused in the EE-05 area where its concentrations equaled or exceeded the trigger level in two samples/wells from 2005 to 2007; the highest mercury concentrations were typically detected during the summer months (CE2-Kleinfelder 2006b, 2007i).

3.5.7 Radiological Contamination Removal Actions

The Navy has been performing removal actions of radiological contamination through the TCRA-related activities across HPS, including at Parcel B where these activities are ongoing (DON 2006). These TCRA activities were a result of the Navy's decision to perform removal actions across HPS at locations where radioactive contamination in soils, debris/slag, and buildings were identified in the *Historical Radiological Assessment, Volume II, Use of General Radioactive Materials, 1939-2003, Hunters Point Shipyard*. The purpose of the TCRAs is to substantially eliminate identified pathways of exposure to radioactive contamination for surrounding populations and nearby ecosystems, such as nearby wetlands and the Bay (DON 2006).

At Parcel B, radiological TCRA activities are largely in progress. The TCRAs addressing radiological contamination have targeted radiologically impacted buildings, storm drains, and sanitary sewers based on the defined extent of residual radiological contamination at Parcel B (Table 6). The trenches and soils resulting from the excavation of the storm drains and sanitary sewers are undergoing an investigation using the Multi-Agency Radiological Site Survey (MARSSIM) Manual (DoD et al. 2000). Additionally, MARSSIM investigations are being conducted at the former sites of Building 142 and Building 157. To date, approximately 1,625 cy of radiologically contaminated trench survey material have been removed from Parcel B (personal communication with TtECI 2008c), with more activities underway.

3.5.8 Technical Memorandum in Support of ROD Amendment

In 2007-2008, the Navy prepared two technical memoranda, referred to as TMSRA and the radiological addendum to the TMSRA (ChaduxTt 2007; TtECI 2008b), in support of amending the ROD as recommended by the first 5-year review. These

memoranda provided the technical foundation for identification of revised remedial alternatives and preparation of a proposed plan and subsequent amended ROD for Parcel B. The need for these memoranda stemmed from updated information about the site that became available during past remedial actions, indicating that modifications to selected soil and groundwater remedies should be considered to ensure long-term protectiveness. Updated information incorporated into this process included:

- The ubiquitous nature of metals in soil across Parcel B
- The presence of methane and mercury
- Updated HHRA, including changes in concentrations and toxicity criteria for VOCs in groundwater
- The findings of a screening-level ecological risk assessment (SLERA)
- Findings from removal actions to address radiological contaminants

The updated information mentioned above, the more comprehensive understanding of groundwater quality, and additional information on the planned land use at Parcel B, depicted on Figure 6, led to a revised conceptual site model, evaluation of additional remedial actions, and preparation of a proposed plan identifying preferred alternatives to be incorporated into an amended ROD.

3.5.8.1 Revised Risk Assessment

An updated HHRA and a SLERA were completed as part of the TMSRA process. The revised HHRA was based upon soil data collected during the 1998 to 2001 and 2004 to 2005 soil removals. The risk assessment calculations incorporated regulatory guidance and toxicological criteria that have changed since 2003. Tables 8, 9, 10, 11, and 12 list the revised risk assessment results and provide updated remedial goals for the chemicals in soil for radionuclides for A-Aquifer groundwater, B-Aquifer groundwater, and sediments, respectively. Soil data associated with sampling locations excavated and removed during the activities from 1998 to 2001 and 2004 to 2005 were excluded from the HHRA; however, select samples included in the revised HHRA have since been removed from the site as a result of radiological removal actions at Parcel B. The revised HHRA also incorporated additional groundwater data, including quarter 20 (October to December 2004) as part of the Parcel B remedial action monitoring program.

The HHRAs in the TMSRA and the radiological addendum to the TMSRA combine to provide a complete and revised HHRA addressing all COPCs, serving as the basis for input into the revised PP discussed later herein. The findings of the revised HHRA have been summarized below for non-radiological and radiological COPCs.

Non-Radiological Evaluations

The revised HHRA estimated cancer risks and non-cancer hazards from exposure to all affected environmental media for each pathway identified as potentially complete. Both total and incremental risks were evaluated for exposure to soil at Parcel B. For the total risk evaluation, all detected chemicals were included as chemicals of potential concern regardless of concentration, except for the essential nutrients calcium, magnesium, potassium, and sodium The total risk evaluation estimates the risks posed by chemicals at the site, including any present at concentrations at or below ambient levels (Table 7). For the incremental risk evaluation, the essential nutrients and metals with maximum measured concentrations below HPS ambient levels were excluded as soil chemicals of potential concern; hence, the incremental risk evaluation estimates risks posed by chemicals at the site that are not at or below ambient levels.

As indicated in Table 7, radiological and chemical risks exceed the target risk level of 1E-06 at every Parcel B impacted site; these estimates account for the planned reuse (SFRA 1997), which for Parcel B includes mixed use, research and development, educational/cultural, and open space (Figure 6). Under the incremental risk evaluation, fewer exposure areas at Parcel B exceed the cancer or non-cancer risk thresholds because metals below ambient levels (those considered by the Navy to be naturally occurring) were excluded from the risk analysis (TtECI 2008a). The COPCs in soil at Parcel B include metals above ambient levels and organic compounds, such as PAHs, PCBs, and pesticides (TtECI 2008b).

Based on the above findings, updated remedial goals for chemicals that have significant contribution to unacceptable risks were developed and outlined in Tables 8, 9, 10, 11, and 12. The results of the HHRA for groundwater indicated that the risk from exposure to A-Aquifer groundwater via vapor intrusion exceeds the excess lifetime cancer risk threshold of 1E-06 in several areas at Parcel B (Table 10). The chemicals in groundwater contributing to excess health risk through the vapor intrusion pathway include chlorinated and non-chlorinated hydrocarbons. The B-Aquifer was evaluated for all chemicals for human exposure through the domestic use of groundwater pathway. Several organic and inorganic chemicals of potential concern were identified as having significant contributions to the excess cancer risk (Table 11).

The SLERA evaluated potential ecological risks from exposure to shoreline sediments and exposure to groundwater as it interacts with surface water. The SLERA found potential unacceptable risk to benthic invertebrates, birds, and mammals from exposure to several metals, pesticides, and polychlorinated biphenyls in sediment along the shoreline (Table 12). Likewise, the data evaluated in the SLERA indicate potential risk may be posed by mercury, which was identified as a chemical of concern in groundwater.

A screening evaluation of surface water quality evaluated potential ecological risks from exposure to groundwater as it interacts with surface water. The data evaluated indicate potential risk may be posed by hexavalent chromium, copper, lead, and mercury.

Radiological Evaluations

Radiological risks were developed by estimating related dose/intake and health risks for each redevelopment block across Parcel B using either RESRAD or RESRAD-BUILD (TtECI 2008b). Redevelopment blocks are created to facilitate the designation of use for each area at HPS, such as mixed use, open space, and research and development. Redevelopment blocks are based on "Hunters Point Shipyard Redevelopment Plan" San Francisco Redevelopment Agency, July 14, 1997. The residential exposure scenario provided the most conservative risk estimate and was therefore used to model the risk associated with each redevelopment block.

Estimates of the lifetime risk of cancer to exposed individuals resulting from radiological materials and non-radiological chemicals were summed to determine the overall potential human health hazard associated with Parcel B. In combining the chemical risk and radiological risk, the same approach used to estimate risks associated with non-radiological chemicals was incorporated; the method used calculated total risk from radiological chemicals inclusive of background and calculated incremental risk from the chemicals present at concentrations that do not include background.

Cumulative risks by area across Parcel B, incorporating contribution from both radiological material and non-radiological chemicals, are summarized in Table 7. These estimates served as the basis for revision of the ARARs, as summarized below.

3.5.8.2 Revised ARARs

In response to recommendations of the first 5-year review, the TMSRA process resulted in evaluation and revisions of the ARARs for Parcel B. Appendix B presents the summation for non-radiological and radiological ARARs (ChaduxTt 2007; TtECI 2008b).

3.5.8.3 Updated Remedial Action Objectives

Utilizing the updated information on health risks and ARARs, RAOs for Parcel B were updated for both radiological and non-radiological COPCs. These have been summarized below:

- Prevent exposure to organic and inorganic chemicals in soil above the remediation goals developed in the HHRA for carcinogens or non-carcinogens.
- Prevent exposure to VOCs in soil gas at concentrations that would pose unacceptable risk via indoor inhalation of vapors.

- Prevent exposure of ecological receptors to organic and inorganic compounds in soil and shoreline sediment above remediation goals.
- Prevent or minimize migration of contaminated A-Aquifer groundwater above remediation goals to the surface water of San Francisco Bay. This RAO is intended to provide protection of the beneficial uses of the Bay, including protection of ecological receptors.
- Prevent direct exposure to B-Aquifer groundwater that may contain COPCs through the domestic use pathway.
- Prevent or minimize exposure to metals, VOCs, and SVOCs in the A-Aquifer groundwater from dermal exposure and inhalation of vapors from groundwater by construction workers above remediation goals.

The RAOs for radiologically impacted sites are as follows (TtECI 2008b):

- Prevent ingestion, dermal contact, or inhalation of radionuclides of concern (ROCs) in concentrations that significantly exceed background concentrations.
- Assure that the total effective dose from radiologically impacted sites to any member of the public does not exceed 25 millirem per year (mrem/y).
- Ensure that the increased lifetime cancer risk does not exceed the risk range of 10^{-6} to 10^{-4} for future use scenarios.

3.5.8.4 Evaluation of Remedial Alternatives

The TMSRA process developed RAOs and related remedial alternatives for radiological and non-radiological chemicals based on the medium of concern, potential exposure pathways, and ARARs. The following remedial alternatives, including recommended ICs depicted on Figure 7, were identified and evaluated for non-radiological chemicals in soil and groundwater at Parcel B:

Soil and Sediment Remedial Alternatives:

Alternative S-1: No Action

Alternative S-2: ICs, Maintained Landscaping, and Shoreline Revetment

Alternative S-3: Excavation, Methane and Mercury Source Removal, Disposal, ICs, Maintained Landscaping, and Shoreline Revetment

Alternative S-4: Covers, Methane and Mercury Source Removal, ICs, and Shoreline Revetment

Alternative S-5: Excavation, Methane and Mercury Source Removal, Disposal, Covers, Soil Vapor Extraction, ICs, and Shoreline Revetment

TMSRA Radiological Remedial Alternatives

Three remedial alternatives were identified to satisfy the RAOs for radionuclides. These alternatives were presented in the final TMSRA radiological addendum (TtECI 2008b) and were supplemental to the alternatives presented in the final TMSRA (ChaduxTt 2007). These radiological remedial alternatives are listed below:

Alternative R-1: No Action: No remedial action would be taken for radiologically impacted sites. The no-action response is retained through the evaluation process as required by NCP to provide a baseline for comparison with other alternatives.

Alternative R-2: Survey, Decontamination, Disposal, Release, and ICs: Alternative R-2 consists of decontamination of radiologically impacted buildings and dismantlement if necessary. Surveys of buildings, soils of former building sites, trenches resulting from sewer and storm line removal, and soils of remediated storm drains and sanitary sewers would be conducted to meet the remedial action objectives. The Building 140 shaft below 10 feet would not be surveyed nor released due to the building's current condition, health and safety hazards, and other uncertainties. ICs would be assigned to the Building 140 shaft below 10 feet and associated piping. Surface scans of IR-07 and IR-18 would include removal of anomalies down to 1 foot, backfill with clean material to grade, and use of ICs.

Alternative R-3: Survey, Decontamination, Disposal, Release, Close In-Place, and ICs: Alternative R-3 consists of decontamination of radiologically impacted buildings and dismantlement if necessary of some structures. Surveys of buildings, soils of former building sites, trenches resulting from sewer and storm line removal, and soils of remediated storm drains and sanitary sewers would be conducted to meet the remedial action objectives. This alternative assumes that the Building 140 shaft below 10 feet will not be released. It will be closed in-place with backfilled stone and a concrete cap, and ICs will be assigned. Surface scan of IR-07 and IR-18 would include removal of anomalies down to 1 foot, backfill with clean material to grade, and use of ICs.

Of these three alternatives, R-2 and R-3 both include (1) surveying structures, former building sites, and radiologically impacted areas; (2) decontaminating (and demolishing if necessary) buildings; (3) excavating storm drain and sanitary sewer lines; (4) screening, separating, and disposing of radiological sources from excavated soil at an offsite facility; and (5) ICs. Alternative R-3 adds closure of a pump shaft beneath Building 140 using backfilled stone and a concrete cap.

More specifically, Alternative R-3 consists of decontamination of impacted buildings, (except for Building 140), dismantlement, and survey to ensure the remedial action objectives are met. Using this alternative also implies that the Building 140 shaft below 10 feet would be closed in-place with backfilled stone and a concrete cap and ICs will be assigned (TtECI 2008b). Moreover, this alternative provides protection to human health and the environment because it removes radiologically impacted

surface soils at IR-07 and IR-18 and remediates radiologically impacted buildings, storm drains, and sanitary sewers.

Groundwater Remedial Alternatives

Alternative GW-1: No Action

Alternative GW-2: Long-Term Groundwater Monitoring and ICs

Alternatives GW-3A and GW-3B: In Situ Treatment, Groundwater Monitoring, and ICs. Alternatives GW-3A and GW-3B involve using different in situ treatment reagents. Alternative GW-3A uses a slow-release substrate designed to promote anaerobic bioremediation to degrade chlorinated chemicals of concern to nontoxic compounds. Alternative GW-3B uses a ZVI slurry as an additive that creates a chemically reducing environment in the aquifer that mineralizes chlorinated chemicals similar to the bioremediation reaction.

Discussion of the Presented TMSRA Remedial Alternatives

Of the above alternatives for remediating soil and sediment, Alternative S-5 was rated excellent overall. Alternative S-5 consists of a combination of soil excavation (including methane and mercury source removal) and offsite disposal, covers, soil vapor extraction for VOCs, ICs, and shoreline revetment. This alternative was developed to (1) remove and dispose of organic chemicals of concern, mercury, and lead; (2) implement and maintain block-wide covers; (3) remove and treat VOCs in soil using soil vapor extraction; and (4) implement the ICs and construct the shoreline revetment. Alternative S-5 was considered the most effective, with both excavation and covers (ChaduxTt 2007).

Of the above alternatives for remediating radiologically impacted materials, Alternative R-3 was rated very good, having the highest rating, although it has the highest overall cost. This alternative is more effective than the other R-2 alternatives because it is based on the proposed closure in-place of the Building 140 shaft and associated piping below 10 feet bgs (TtECI 2008b).

Of the above alternatives for remediating groundwater, Alternative GW-3A uses groundwater monitoring and a slow-release substrate designed to promote anaerobic bioremediation to degrade chlorinated chemicals of concern to nontoxic compounds (ChaduxTt 2007). This alternative was developed to reduce the required time to meet the groundwater remedial action objectives and length of groundwater monitoring and possibly the time required for ICs. Alternative GW-3A received the highest rating because it effectively reduces risks to human health and environment. (ChaduxTt 2007).

3.5.9 Proposed Plan

The remedial alternatives outlined by the TMSRA process have been evaluated, yielding a revised PP for Parcel B (Tetra Tech 2008a). This plan provides the basis for choosing the preferred remedial (cleanup) alternatives for soil and groundwater

contamination at HPS Parcel B, which will in turn support the subsequent revision of the ROD.

The preferred alternatives outlined in the revised PP are summarized below.

3.5.9.1 Preferred Alternatives

According to the revised PP, based on the available information, the revised alternatives for soil, groundwater, and radiologically impacted soil and structures meet the NCP threshold criteria and satisfy the following statutory requirements of CERCLA 121(b):

1. Protect human health and the environment

2. Comply with ARARs

3. Are cost effective

4. Use permanent solutions and alternative treatment technologies to the maximum extent practicable

Based on the above rationale, the preferred alternatives selected by the Navy (Tetra Tech 2008a) include Alternative S-5 for soil and sediment, Alternative GW-3 for groundwater, and Alternative R-3 for radiological contamination summarized in the previous section.

As of June 2008, some components of the above proposed alternatives are in progress as TCRAs, such as methane and mercury initiated in 2008, and the continuing radiological source removals initiated in 2006. The use of TCRAs allows the Navy to get an early start on cleanup at newly identified source areas. The TCRAs are consistent with the cleanup alternatives described in the revised PP; for example, several of the soil cleanup alternatives include excavation at areas that are also addressed in the TCRAs. Although the TCRAs may not be completed by the time the amended ROD is signed, the Navy anticipates that the TCRAs will meet the RAOs described in the revised PP.

Section 4
Five-Year Review Process

This section describes the second 5-year review process, including administrative process, community notification and involvement, document review, data review, site inspection, and site interviews.

4.1 Administrative Process

Members of the BCT were notified of the initiation of the second 5-year review during a meeting on December 5, 2007. The second 5-year review for HPS is conducted by the Navy and is submitted to the regulatory agencies for review and approval. The following review schedule was established for the second 5-year review report:

- Draft report to regulatory agencies on June 19, 2008
- Draft final report to regulatory agencies on September 8, 2008
- Final report to regulatory agencies on November 11, 2008

4.2 Community Notification and Involvement

Activities to involve the community in this 5-year review were initiated with an announcement at the Restoration Advisory Board (RAB) meeting on December 6, 2007. First notice was posted in the *San Francisco Chronicle and the San Francisco Bay View* newspapers on January 9, 2008, announcing that the 5-year review process had begun. Community members were also involved with this 5-year review process through interviews. Appendix E summarizes the interviews conducted with members of the community.

A 30-day public comment period started September 9, 2008 after the draft final 5-year review report was made available at the Anna E. Waden Branch Library located at 5075 Third Street in San Francisco and the City of San Francisco's Main Library located at 100 Larkin Street. The 30-day comment period ended October 15, 2008. A second notice was posted in the *San Francisco Examiner and the Sun Reporter* newspapers on September 5, 2008, announcing the completion of draft final second 5-year review report.

Appendix F (Response to Comments on the Draft Version of the Report) provides responses to the regulatory agency comments on the draft second 5-year review report. Appendix G (Response to Comments on the Draft Final of the Report) contains the Navy's responses to these concerns on the draft final 5-year report

A third notice was posted in the weekly newspaper the *Sun Reporter* on November 6, 2008 and in the daily newspaper the *San Francisco Examiner* on November 7, 2008 announcing that the 5-year review report for HPS is complete and that the results of the review and the report are available to the public at the libraries noted above.

In addition to community involvement, as part of the 5-year review process, the Navy developed a communication program to inform and involve the public in base-wide decision-making processes.

4.3 Document Review

This 5-year review consisted of a review of documents pertinent to remedial actions at HPS. Documents reviewed are listed in Appendix A. The updated potential federal and state environmental laws and regulations that were identified as ARARs were evaluated in the TMSRA and are presented as part of the 5-year review process in Appendix B. The ARARs for the first 5-year review remedial actions, included in the 1997 ROD, were also reviewed and are part of the first 5-year review report. These documents were reviewed for pertinent data and the comprehensive list of activities performed to date since the first 5-year review. Activities performed since the first 5-year review for Parcels A, C, D, E, E-2 and F are summarized in Section 2. Parcel B remedial activities are summarized as part of Section 3.

4.4 Data Review

This section discusses the data reviewed for soil and groundwater conditions at HPS as part of this second 5-year review process.

4.4.1 Soil and Radiological Contamination

For this 5-year review, soil sampling results were reviewed from the Parcel B Draft Construction Summary Report (CSR) Addendum, Volumes I through III, (NAVFAC 2004). The CSR dated September 8, 2004 presents and compares confirmation sampling data for excavations that have been completed in accordance with the cleanup requirements (NAVFAC 2004).

The radiological addendum to the TMSRA (TtECI 2008b) was the primary document reviewed for its importance in shaping the proposed remedy for radiological contamination at Parcel B and its function as a prelude for preparing the proposed plan needed for the ROD amendment. Sections 6 and 8 of the historical radiological assessment (NAVSEA 2004) provided the information for the historical activities at HPS, including Parcel B. Information on TCRAs dating from 2005 to actions currently ongoing (May 2008), primarily storm water and sewer drain lines in Parcel B, were obtained from various sources, including BCT meeting minutes, site visit, and other documents mentioned in the references of Section 10 of this report.

4.4.2 Groundwater

A total of 31 quarters of monitoring have been conducted in the RAMP and 18 quarters since the first 5-year review (i.e., since the second quarter of 2003) (ChaduxTt 2007). Figure 5 depicts the monitoring well locations for RAMP wells. Analytical and field results and documentation have been presented in quarterly reports and in annual reports for years 6 and 7. These are briefly summarized below, with parcel-specific discussions provided in their respective sections herein.

Table 1 documents the RAMP wells and chemical exceedances dating back to 1999. As shown in this table, no significant changes in the nature of the COPCs have occurred since the first 5-year review. Metals continued to exceed RAMP trigger levels. The latest exceedances are summarized in Section 3.5.6.

4.5 Site Inspection

From January 9 through January 15, 2008, the Navy conducted a 5-year review site inspection at Parcel B. The primary purpose of the inspection was to assess the integrity of the RAMP wells. Site access and general site conditions were also evaluated during the site inspection. Appendix C contains the site inspection checklist, and Appendix D contains the photographic log, which documents observations made during the inspection. A total of 64 monitoring wells were identified in Parcel B. Of those, a total of 36 RAMP wells were inspected. A summary of well conditions and remarks is presented on Table D-1 in Appendix D and correlates to the photographic log of wells.

No significant issues were identified during the site inspection. Overall, the monitoring wells were in good condition. Most of the wells inspected were properly secured. Of the 36 RAMP wells inspected, 10 wells were considered to have an unknown condition due to the wellhead being submerged under water or mud; five wells were observed in poor condition. Poor condition wells had surface water collected in the well head boxes. Others were missing padlocks. All the wells considered to have unknown or poor condition (Appendix D, Table D-1) are recommended for repair and maintenance. Recommendations include surveying all the RAMP wells to identify and maintain the wells which could not be surveyed during the second 5-year review site visit.

The site was inspected during the rainy season, and it was noted that water had collected in pools on the road. To remedy this, crushed rock was used to fill low areas in the roads as prevention to ponding (Jonas and CDM 2008). Fencing at the site is in good condition and used appropriately. All buildings are secured by gates, padlocks, or are nailed shut. Security personnel are located on site and warning signs are posted for hazardous and radioactive materials. Jonas and CDM personnel who inspected the site received radiation awareness training prior to conducting any field activity.

4.6 Site Interviews

Interviews were conducted with various HPS stakeholders, including San Francisco Health Department, RAB, Parcel B tenants, EPA, SWRCB, and Tetra Tech. Appendix E contains a complete list of the interviewees and complete records of the original interviews. In general, all but the Parcel B tenants stated that they are well informed of site activities and were generally satisfied with the overall progress. Stated concerns related to Parcel B RAs include the following:

- Noise and dust from constant traffic.
- Length of time of the temporary loss of telephone and electricity during remediation.
- Water ponding on the roads in the rainy season.
- Insufficient security (the guard shack is currently moved to another location).
- Roads pooling in the rainy season.
- Non-workable portable trailer toilets.
- Insufficient communication with tenants during construction; not aware of daily activities/schedule.

Parcel B tenants generally expressed concern about the reduced level of security now that the guard shack has been placed elsewhere. They would like the Navy to consider placing a guard gate in front of the Parcel B tenant buildings. The tenants also want additional gravel to be placed on the roads to avoid potholing during the rainy season.

Section 5
Technical Assessment of Remedial Actions at Parcel B

This section presents a technical assessment of the RAs outlined in the ROD for soil and groundwater at Parcel B according to the ROD (Navy 1997b). This technical assessment builds on the prior assessment of these RAs in the first 5-year review, with particular emphasis on the Navy's efforts to address the recommended need for revised RAs and the revised PP. Section 5.1 addresses the technical assessment of remedial actions for soil, and Section 5.2 addresses the technical assessment of remedial actions for groundwater.

The technical assessment related to the recently proposed radiological RAs outlined in the revised PP is provided in Section 5.3. The following topics will be covered in each section as relevant:

- Description and status of the RA specified in the ROD and ESD
- Responses and rationale to the technical assessment questions

5.1 Technical Assessment of the Remedial Actions for Soil and Sediment at Parcel B

The Navy and the regulatory agencies signed the ROD for Parcel B on October 9, 1997. The Navy prepared two explanations of significant differences that modified the remedy for soil in the ROD: one in 1998 that changed the maximum excavation depth to 10 feet and one in 2000 that updated cleanup goals for soil (Tetra Tech 2003h).

The following sections discuss the selected remedy, remedy implementation, and current status of the soil remedy outlined in the ROD at Parcel B.

5.1.1 Description and Status of the Soil RAs Specified in the ROD and ESDs

ROD Selected Remedy for Soil

The major components of the soil remedy, described in the ROD and subsequent ESDs, include the following:

- Excavation of contaminated soil to a maximum depth of 10 feet or to a cancer risk of 10^{-6} (residential).
- Offsite disposal of contaminated soil (with treatment at the offsite landfill, if necessary, to meet land disposal restrictions).

- Placement of clean backfill in the excavated areas.

- Deed notification indicating that soil below 10 feet in remediated areas may be contaminated and specifying that (1) all future soils excavated from below 10 feet in remediated areas be managed in accordance with federal, state, and local laws and requirements, including local ordinances such as Articles 4.1 and 20 of the San Francisco Public Works Code and (2) any owner or tenant of Parcel B who excavates soils containing levels of contaminants that exceed cleanup goals will be restricted from placing the excavated soils onto the ground surface and restricted from mixing the excavated soils with soils present in the surface to 10 feet bgs (Tetra Tech 2003h).

- In addition to the remedy components above, the ROD specifies procedures for handling the excavated soil. The attached Table 5 summarizes the Parcel B soil contamination history. Table 3 includes the Parcel B history of investigations since the ROD. Details of the Parcel B remedial actions are listed in Section 3.5 of this report.

Remedy Implementation

The two components of the soil remedy include (1) soil excavation and disposal and backfill and (2) deed restrictions. Deed restrictions have not been developed for Parcel B because the soil RA is not complete and Parcel B is not yet ready to transfer. Remedial and removal actions (Figure 4) at Parcel B since the ROD included:

- Exploratory Excavation Removal Action, 1996-1997: A total of 1,700 cy of stained soil, asphalt, and concrete was removed from five sites.

- Remedial Action Excavations, 1998-2001: A total of 101,600 cy of contaminated soil was removed from 106 areas.

- Fuel-Related Excavations, 2004-2005: A total of 9,800 cy of contaminated soil was removed from two areas.

- TCRA, 2006 through 2008: These activities included removing sewer lines, soil, and other materials impacted with chemicals and radioactive components.

The soil remedial actions implemented through 2003 and reviewed as part of the first 5-year review reduced or eliminated certain risks to human health and ecological receptors at Parcel B. However, the first 5-year review concluded that the remedy selected in the ROD warrants modification to provide long-term protection of human health and the environment. The BCT has therefore extended the schedule of CERCLA activities (contained in the FFA) to incorporate modifications to the Parcel B remedy and support completion of the TMSRA and revised PP process discussed previously.

System Operations

Fencing and control of site access are being implemented as part of the general HPS site access restriction and ongoing site activities related to the radiological (RAD) TCRA. However, the proposed new remedy for the soil as outlined in the TMSRA and the revised PP includes additional measures for the-long term protection of human health and the environment. These measures include excavation, methane and mercury source removal (also being implemented under TCRAs), disposal, covers, soil vapor extraction, ICs, and shoreline revetment, some of which will require operation and maintenance support.

Current Status

Activities related to soil excavation have continued through 2005 (ChaduxTt 2007). These activities are listed below:

- **Exploratory Excavation Removal Action, 1996-1997:** A total of 1,700 cubic yards of stained soil, asphalt, and concrete was removed from five sites.
- **Remedial Action Excavations, 1998-2001:** A total of 101,600 cubic yards of contaminated soil was removed from 106 areas.
- **Fuel-Related Excavations, 2004-2005:** A total of 9,800 cubic yards of contaminated soil was removed from two areas.

TCRAs addressing methane and mercury source removal are being initiated in 2008. Table 3 lists the history of investigations since the ROD.

5.1.2 Responses and Rationale to the Technical Assessment Questions

This section discusses the following three technical assessment questions specified in EPA's 5-year review guidance (EPA 2001, 2003):

- Question A: Is the remedy functioning as intended by the decision documents?
- Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection still valid?
- Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Question A: Is the Remedy Functioning as Intended by the Decision Documents?

Although the 1997 ROD remedy is not functioning as intended for long-term protection (Tetra Tech 2003h), the remedy is currently protective because exposure pathways that could result in unacceptable risks are being controlled. Extensive fencing, locked gates, warning signs, and secured buildings that were observed during the site inspection restrict access and exposure to contaminated areas (Tetra

Tech 2003h). However, for addressing the long-term protectiveness, the Navy evaluated several soil remedial alternatives, ultimately recommending the proposed Alternative S-5 for remediation soil and sediment as discussed in Section 3.0 herein.

The proposed Alternative S-5 combines excavation, methane and mercury source removal, disposal, covers, SVE, ICs, and shoreline revetment and is rated excellent with respect to its intended objectives of comprehensive and long-term protection of human health and the environment. This alternative addresses the issues raised with the current remedy in the ROD. Once implemented, the functionality of this remedy with respect to its intended objective will be evaluated in the subsequent 5-year review report.

Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and RAOs Used at the Time of Remedy Selection Still Valid?

Updated information warranted modifications to the selected soil and groundwater remedies. The updated information included:

- The ubiquitous nature of metals in soil across Parcel B.
- The need for excavation to remove mercury-contaminated soils, as determined from the detections of mercury above trigger levels in groundwater.
- The presence of methane in the soil.
- The findings of a SLERA.
- Changes in concentrations and toxicity criteria for VOCs found in groundwater.
- Findings from removal actions to address radiological contaminants.

As part of the TMSRA process, the existing HHRA was updated to use soil data collected during the 1998 to 2001 and 2004 to 2005 soil removals and to incorporate into the risk characterization regulatory guidance and toxicological criteria that have changed since 2000. Table 8 includes the updated remediation goals for chemicals of concern in soil.

The updated RAOs for Parcel B soil were developed based on human health receptors and results of the incremental risk assessment. The remedial action objectives applying to Parcel B soil are listed in Section 3.5.8.3.

A SLERA was also performed (see Section 3), indicating a potential risk to benthic invertebrates, birds, and mammals from several metals, pesticides, and PCBs in sediment along the shoreline of Parcel B. Similar or higher concentrations of these chemicals also exist in upland soil. As a result, the following RAO was developed for soil and shoreline sediments at Parcel B:

- Prevent exposure of ecological receptors to organic and inorganic compounds in soil and shoreline sediment above remediation goals.

Changes in ARARs. As a result of the updated risk assessments and RAOs, revised ARARs also were developed. Appendix B lists the updated ARARs, which have in part provided the basis for the Navy's newly recommended remedial alternatives.

Question C: Has Any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?

As previously indicated, data obtained from investigations and removal actions since the first 5-year review have identified the need for revision of the current remedy to assure long-term protectiveness based upon 2003 standards, which had been upgraded since the remedy implementation in 1998. This includes the conclusion that the original ROD alternative did not consider excavation below 10 feet bgs, which is likely required to remove the source of methane at IR-07 and mercury at IR-26 (ChaduxTt 2007). Therefore, based on new information, the original ROD alternative does not provide comprehensive protection of human health and the environment, particularly long term, hence, recommendation of revised remedial alternatives by the Navy as part of the revised PP.

5.1.3 Soil Technical Assessment Summary

In summary, the first 5-year review concluded that RAs for Parcel B warranted revision through ROD amendment in order to ensure long-term protection of human health and the environment. The first 5-year review developed a series of recommendations and follow-up actions, which the Navy has addressed over the past 5 years through the previously described TMSRA and revised PP process. This includes a revised remedial alternative for soil and sediment, which comprehensively addresses protection of human health and the environment.

Once the proposed alternative is incorporated into an amended ROD and implemented across Parcel B, further assessment of its effectiveness to meet the intended goals will be documented in the subsequent 5-year review report.

5.2 Technical Assessment of Groundwater Remedial Actions at Parcel B

This section presents a technical assessment of the RA selected and implemented for groundwater at Parcel B. Topics discussed in this section are as follows:

- Description and status of the groundwater RAs specified in the ROD.
- Responses and rationale to the technical assessment questions.

5.2.1 Description and Status of the Groundwater RA Specified in the ROD

ROD Selected Remedy for Groundwater

The major components of the selected remedy for groundwater specified in the ROD are as follows (Tetra Tech 2003h):

- Lining the storm drains and pressure grouting bedding material beneath the storm drains at areas of IR-07 and IR-10 where the storm drain system is below the groundwater table in an affected groundwater area.
- Removal of steam and fuel lines.
- Deed restrictions on Parcel B, such as prohibiting all uses of groundwater within the shallow water-bearing zone(s) to 90 feet bgs.
- Deed notification indicating that contamination may be present in groundwater in the remediated areas and that surface discharge of contaminated groundwater is prohibited.
- Groundwater monitoring for up to 30 years to evaluate the effectiveness of the removal actions for sources of soil contamination and to monitor concentrations of hazardous substances that may migrate toward the Bay; groundwater monitoring at IR-10 to monitor the future potential degradation of TCE to vinyl chloride.

Remedy Implementation

The Navy has been implementing the remedy for groundwater specified in the ROD since 1999. The above-referenced components of the groundwater remedy have been addressed. Pipes and utility corridors below grade may serve as preferential pathways for groundwater flow, allowing contaminants to flow directly to the Bay. In 1998 and 1999, during the Parcel B RA, the fuel line distribution system and the steam lines were removed. In locations beneath buildings, these lines were cleaned out and capped. These actions prevent groundwater migration via these potential preferential pathways (Tetra Tech 2001d). Deed restrictions and the deed notifications specified in the ROD are not necessary until Parcel B is transferred to the City and County of San Francisco. Furthermore, the storm drains have been or will be removed under the ongoing radiological storm drain and sanitary sewer line TCRA. Therefore, the lining of the storm drains is superseded by the TCRA storm drain and sewer line removal actions.

The Navy has investigated the area of IR-10 in considerable detail since the ROD was prepared. The Navy installed more than 25 new groundwater monitoring wells in the area of IR-10 and conducted treatability studies to investigate methods to cleanup the soil and groundwater. Treatability studies using SVE to remove VOCs from the unsaturated zone and injection of ZVI to destroy VOCs in groundwater were successfully implemented at the IR-10 VOC plume (ChaduxTt 2007).

Despite the above activities, the first 5-year review concluded that the groundwater remedy selected in the ROD warrants modification to provide long-term protection of human health and the environment. In response, the Navy has since completed a TMSRA, a TMSRA radiological addendum, and a revised PP for identifying a newly proposed groundwater remedy.

System Operations

System operations for the current groundwater remedy at Parcel B consist of implementation of the groundwater monitoring program. The locations of the monitoring wells were confirmed during the site inspection. The RAMP wells are grouped into the following six categories:

1. Point of measurement (POM) wells between the source and the surface water
2. Sentinel wells near the inland edge of the 5-year buffer zone
3. Post-RA wells located within the tidally influenced zone to monitor the effectiveness of source control measures
4. VOC wells in and around the chlorinated solvent plume at Building 123 in IR-10
5. On and offsite migration wells at the western boundary of HPS
6. Utility line wells

Two other types of wells have been established post-RAMP: hexavalent chromium wells and supplemental characterization wells.

In addition to the original RAMP wells listed above, the Navy incorporated several new and existing wells into the RAMP during the course of the monitoring program. The Navy currently samples 40 wells under RAMP (Figure 5). A total of 33 quarters of groundwater sampling have been implemented from the last quarter of 1999 through the first quarter of 2008. Available data and exceedances through the third quarter of 2007 are presented in Table 1.

As discussed in Section 3.5.8.4, the revised remedial alternative for groundwater includes in situ treatment, groundwater monitoring, and ICs, which will require further system operations, including monitoring and potential operations and maintenance for in situ injections.

Current Status

At present, 33 quarters of groundwater sampling events have been conducted under the RAMP. Analytes with concentrations exceeding the RAMP trigger levels have mostly consisted of metals in various locations and VOCs and hexavalent chromium (Table 1).

5.2.2 Responses and Rationale to the Technical Assessment Questions

Question A: Is the Remedy Functioning as Intended by the Decision Documents?

In response to recommendations of the first 5-year review, the Navy performed a detailed evaluation of the original groundwater remedy against the two threshold and five balancing criteria, with the results as follows (ChaduxTt 2007):

- Protectiveness – the current remedy does not include ICs to limit access to buildings, and the remedy would not be considered protective of VOCs in groundwater that poses an unacceptable risk from vapor intrusion into buildings.
- Compliance with ARARs – the current remedy would meet the ARARs identified in the TMSRA.
- Long-term effectiveness – the current remedy would rank as poor based on the magnitude of potential risks remaining posed by VOCs.
- Reduction of toxicity, mobility, and volume through treatment – the current remedy does not contain any treatment component and therefore, would rank as poor for this criterion.
- Implementability – the current remedy would rank as excellent based on the routine nature of groundwater monitoring.

This evaluation concluded that the current remedy would not meet its intended goals and warrants revisions to account for the increased potential risk from VOCs in groundwater, particularly as it relates to the volatilization-to-indoor air exposure pathway. This was achieved through development of the revised groundwater remedial alternative discussed in Section 3.5.8.4.

Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and RAOs Used at the Time of Remedy Selection Still Valid?

As previously indicated, the revised alternative is in part based on a revised HHRA and SLERA, which incorporate updated groundwater quality data (particularly relevant to the VOCs in the area of IR-10 and the presence of hexavalent chromium) and revised toxicity data (particularly for the inhalation exposure pathway). Corresponding to revised risk estimates, newly developed cleanup goals, ARARs, and RAOs (Section 4.5.7) were developed. The resulting revised remediation goals for COPCs in A-Aquifer and B-Aquifer are summarized in Tables 10 and 11, respectively.

RAOs for groundwater were selected based on the various exposure scenarios, indicating potential risk to human health and ecological receptors from groundwater. These include:

- Prevent exposure to VOCs and mercury in the A-Aquifer groundwater at concentrations above remediation goals (Table 10) via indoor inhalation of vapors from groundwater.

- Prevent direct exposure to B-Aquifer groundwater at concentrations above remediation goals (Table 11) through the domestic use pathway.

- Prevent or minimize exposure of construction workers to metals, VOCs, and SVOCs in the A-Aquifer groundwater at concentrations above remediation goals (Table 10) from dermal exposure and inhalation of vapors from groundwater.

- Prevent or minimize migration to the surface water of San Francisco Bay of hexavalent chromium, copper, lead, and mercury in the A-Aquifer groundwater that would result in concentrations of hexavalent chromium above 50 µg/L, copper above 28.04 µg/L, lead above 14.44 µg/L, and mercury above 0.6 µg/L in the surface water of San Francisco Bay. This RAO is intended to protect the beneficial uses of the Bay, including ecological receptors.

The revised ARARs, RAOs, and cleanup goals provided the foundation for the revised groundwater remedial alternative, which exhibits the following attributes:

- Provides long-term protection by reducing concentrations of VOCs and their associated risk.

- Reduces the toxicity, mobility, and volume of VOCs by implementing an expedient and aggressive treatment strategy.

- Is potentially more effective because the injected biological substrate can flow with groundwater and remediate a larger volume than zero-valent iron that remains in place after injection.

Question C: Has Any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?

The results of the updated HHRA for groundwater show that the risk from exposure to A-Aquifer groundwater via vapor intrusion exceeds the excess lifetime cancer risk threshold of 10^{-6} in several areas at Parcel B. The SLERA evaluated potential ecological risks from exposure to shoreline sediments and exposure to groundwater as it interacts with surface water; this evaluation found potential unacceptable risk to benthic invertebrates, birds, and mammals from exposure to several metals, pesticides, and PCBs in sediment along the shoreline. Likewise, the data evaluated in the SLERA indicate potential risk may be posed by mercury. Lastly, a screening evaluation of surface water quality evaluated potential ecological risks from exposure to groundwater as it interacts with surface water. The data indicate potential risk may be posed by hexavalent chromium, copper, lead, and mercury.

As previously discussed, based on the revised HHRA results, the current groundwater remedy has been updated to provide comprehensive and long-term protection to human health and the environment.

5.2.3 Technical Assessment Summary

Although most of the exposure assumptions and RAOs used at the time of remedy selection for the ROD are still valid, risk assessment parameters and trigger levels for VOCs for groundwater were considered insufficient to provide long-term protectiveness. These parameters and trigger levels have since been updated by the TMSRA to ensure long-term protectiveness by the revised remedy. As such, the TMSRA conducted an HHRA and a SLERA and evaluated new remedial alternatives for groundwater. The revised remedial alternative expands on the current groundwater monitoring implemented at Parcel B by incorporating active remediation of groundwater through in situ treatment and ensuring long-term protectiveness through ICs.

The revised groundwater remedy is designed to achieve the protectiveness needed for short-term and long-term protection of human health and the environment. Once the revised alternative is incorporated into the amended ROD and implemented across Parcel B, further assessment of its ability to meet the intended goals will be documented in the subsequent 5-year review report.

5.3 Technical Assessment of Radiological Contamination at Parcel B

The ROD for Parcel B did not contain a remedy for addressing radiological contamination. However, during site investigations and the TMSRA radiological addendum processes over the past 5 years, the Navy recognized the need for investigation, risk assessment, development of RAOs, and evaluation of remedial alternatives to address the residual radiological contamination encountered across Parcel B, the extent of which is summarized in Table 5. As discussed in Section 3, the Navy has performed the above activities as part of the TMSRA, the TMSRA radiological addendum, and revised PP processes, culminating in identification of a preferred alternative to address radiological contamination at Parcel B (ChaduxTt, 2007, TtECI 2008b, and Tetra Tech 2008a).

5.3.1 Remedial Actions

Selected Remedy

As indicated above, no remedy for radiological contamination was identified in the ROD; however, the revised PP has proposed the following preferred remedy described below in support of amending the ROD.

Radiologically Impacted Soil and Structures (Alternative R-3): The purpose of this alternative is to achieve the RAOs by decontaminating radiologically impacted buildings and dismantling them as necessary. Correspondingly, radiologically impacted storm drain and sanitary sewer lines throughout Parcel B would be

removed and disposed of off site. As discussed in Section 3, some of this removal is already in progress as part of TCRA activities.

Included in this alternative is a surface scan across IR-07 and IR-18, with any radiological anomalies removed to a depth of 1 foot. A demarcation layer would be installed on the surveyed soil surface before covers will be placed at IR-07 and IR-18 to mark the boundary between the existing surface and the new cover. The survey and removals would occur before any covers were installed as part of the previously referenced preferred soil remediation alternative, S-5.

In addition, the pump shaft beneath Building 140 would be closed in place with backfilled stone and a concrete cap. Buildings, former building sites, and excavated areas would be surveyed after cleanup is completed to ensure no residual radioactivity is present above the remediation goals. Lastly, ICs would be implemented to minimize inadvertent contact with radiologically impacted media (Tetra Tech 2008a).

Current Status

As discussed in Sections 2 and 4, through 2007, multiple radiological TCRA activities have taken place at various parcels across HPS. These TCRA activities were a result of the Navy's decision to perform removal actions across HPS at locations where radioactive contamination in soils, debris/slag, and buildings were identified in the HRA. The purpose of the TCRAs is to substantially eliminate identified pathways of exposure to radioactive contamination for surrounding populations and ecosystems, such as nearby wetlands and the Bay (DON 2006).

At Parcel B, radiological TCRA activities are largely in progress, targeting radiologically impacted buildings, storm drains, and sanitary sewers based on the defined extent of residual radiological contamination at Parcel B (Table 5). Excavated material is subjected to the MARSSIM process. Radiologically contaminated trench survey materials have been removed from Parcel B, with more activities underway. Radiological TCRA actions continue to date across HPS.

5.3.2 Technical Assessment Question for Radiological Contamination

As previously indicated, the ROD did not outline any remedies for radiological contamination, instead relying on the basewide removal action plan. However, the previously summarized preferred alternative (Alternative R-3) has been proposed for addressing radiological contamination at Parcel B. As summarized in Section 4, this alternative is a result of an updated HHRA and conforms to relevant ARARs and RAOs (TtECI 2008b).

The questions and answers below help assess the proposed and preferred radiological alternative R-3.

Question: Does the Remedy Meet its Intended Goal of Protecting Human Health and the Environment?

The assessment of this alternative with respect to the above question is evaluated for several aspects below.

5.3.2.1 Overall Protection of Human Health and the Environment

Alternative R-3 is designed to provide protection to human health and the environment because it would remove radiologically impacted surface soils at IR-07 and IR-18 and remediate radiologically impacted buildings, storm drains, and sanitary sewers (TtECI 2008b). Unacceptable risks based on planned reuse associated with radiologically impacted soil remaining at IR-07 and IR-18 would be mitigated by implementing ICs. The Building 140 shaft below 10 feet and associated piping would be closed in-place with backfilled stone, covered with a concrete cap, and ICs implemented. The backfilled stone and concrete cap would provide a barrier to eliminate risk associated with potentially encountering radiological materials. Therefore, Alternative R-3 is considered protective of human health and the environment (TtECI 2008b).

5.3.2.2 Compliance with ARARs: Alternative R-3

Alternative R-3 includes both ICs and remedial actions. Both action- and chemical-specific ARARs associated with this alternative would be met. As a result, Alternative R-3 is considered in compliance with the radiological ARARs (TtECI 2008b).

5.3.2.3 Long-term Effectiveness and Permanence

Per the first 5-year review, long-term effectiveness is a critical aspect of the shortcomings of the non-radiological RAs outlined in the ROD. Similar protectiveness is essential for radiological RAs. The factors evaluated under long-term effectiveness and permanence included the magnitude of residual risks and the adequacy and reliability of the controls.

As currently defined, Alternative R-3 calls for radiologically impacted soil from the surface of IR-07 and IR-18 to be excavated and disposed of off site. Excavation would continue until results of confirmation samples indicate RAOs are met or until the excavation would extend to a depth of 1 foot below ground surface (TtECI 2008b).

Radiologically impacted soils at IR-07 and IR-18 at a depth greater than 1 foot below ground surface would be addressed by implementing ICs. The long-term effectiveness and permanence in areas where soil is excavated is rated excellent. The adequacy and reliability of this alternative is good for radiologically impacted soils below 1 foot where ICs are used (TtECI 2008b).

The long-term effectiveness and permanence of the existing Building 140 condition and shaft below 10 feet has been deemed unacceptable. Hence, closure in-place of the Building 140 shaft below 10 feet with backfilled stone and concrete is considered and expected to provide long-term effectiveness and permanence (TtECI 2008b).

Under Alterative R-3, radiologically impacted buildings, soils of former building sites, trenches resulting from sewer and storm line removal, and soils of excavated storm drains and sanitary sewers will be remediated and surveyed to verify that the RAOs are met. The long-term effectiveness and permanence is considered excellent. The overall rating for Alternative R-3 for long-term effectiveness and permanence is considered to be very good (TtECI 2008b).

5.3.2.4 Reduction of Toxicity, Mobility, or Volume

Alterative R-3 includes excavation of radiologically impacted soil and remediation of radiologically impacted building materials. Therefore, while this remedial approach does not result in destruction, transformation, or irreversible reduction in contamination mobility, removal of this contamination does result in reduced mass/volume and potential for mobility at the site. Moreover, reduced mass/volume will correspond to a reduced potential for exposure, thereby, limiting exposure dose and related health risks.

5.3.2.5 Short-term Effectiveness

Under the proposed alternative, the onsite and offsite community would be protected by containment controls, such as dust suppression during demolition and removal of ROCs. Onsite workers would be protected during remediation from Parcel B-impacted structures by implementing containment controls, such as dust suppression, and following health and safety protocols, including personal protective equipment and decontamination procedures.

The estimated time required to implement Alternative R-3 is less than 1 year, and the effects of implementing this alternative would be nearly immediate. The short-term effectiveness of this alternative is considered very good.

5.3.2.6 Implementability

Implementability includes technical and administrative feasibility and the availability of required resources. The proposed alternative is technically feasible and easily implemented since the action can be readily implemented using widely available commercial services, materials, and equipment. The overall rating for implementability is very good.

5.3.3 Technical Assessment Summary

Radiological RAs were not outlined as part of the Parcel B ROD or the first 5-year review; however, through implementation of the TMSRA and revised PP process following the first 5-year review, the Navy investigated the nature, extent, health risks, and remedial alternatives for addressing radiological contamination at Parcel B. Also, the experience gained from the TCRA of the storm sewer and other radiological removal actions helped support a proposed remedial alternative for the radiological contamination. This effort has culminated in a proposed preferred alternative incorporating a combination of removal actions for soil, building materials, sewer and

storm drains, and ICs; some of these activities have already taken place through TCRA-related removal actions.

The proposed alternative is designed to be protective of human health and the environment from both a short-term and long-term perspective. Once the proposed alternative has been incorporated into the amended ROD and implemented across Parcel B, its effectiveness will be further assessed with respect to the stated objectives; this assessment will be documented in the next 5-year review report.

Section 6
Issues with Soil, Radiological Contamination, and Groundwater Remedies

This section includes the issues encountered with the soil, groundwater, and radiological contamination remedies at Parcel B and the responses provided in the TMSRA since the last 5-year review.

6.1 Issues with Soil and Radiological Contamination Remedies

Issues encountered with the soil and radiological contamination remedies specified in the ROD are listed in Section 7.1. These issues are addressed by the soil remedial action alternatives specified in the TMSRA (ChaduxTt 2007), the radiological addendum to the TMSRA (TtECI 2008b), and the revised remedial alternative proposed in the revised PP (Tetra Tech 2008a). Section 7.1 contains responses to each of the listed issues.

6.2 Issues with Groundwater Remedy

Issues encountered with the groundwater remedy specified in the ROD are listed in Section 7.2. These issues are addressed by the groundwater remedial action alternatives specified in the TMSRA (ChaduxTt 2007), the radiological addendum to the TMSRA (TtECI 2008b), and the proposed alternative in the revised PP (Tetra Tech 2008a). Section 7.2 contains responses to each of the listed issues.

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Section 7
Remedial Action Recommendations and Follow-Up

7.1 Soil and Radiological Contamination Remedy Recommendations and Follow-Up Actions

The first 5-year review recommended the follow-up actions outlined below related to the soil remedy. Below, the Navy provides its response to each recommendation. Once the 1997 ROD is amended to include the revised PP recommendations, the Navy will follow the FFA schedule in implementing the proposed remedial alternatives.

- Subsurface conditions need to be further evaluated at IR-07 and IR-18, the conceptual model needs to be updated, and a site-specific approach should be developed as part of the Parcel B ROD amendment process. Navy Response: The TMSRA addresses the debris fill area at IR-07 and IR-18 (Redevelopment Blocks 2, 3, and BOS-1).

- Potential need for remedial action at the shoreline near IR-07 and IR-26 should be evaluated during the ROD amendment process. Navy Response: The alternatives in the TMSRA include building a shoreline revetment to protect ecological receptors from chemicals in shoreline sediments.

- Potential ecological risk to aquatic receptors from Parcel B contaminants should be evaluated. Navy Response: The TMSRA contains an evaluation of potential risk to ecological receptors along the shoreline.

- Effectiveness of the SVE treatability system at IR-10 should be further evaluated during the ROD amendment process and included in an amended ROD if SVE is selected as a remedy for VOC-contaminated soil. If SVE is not selected as the remedy, remaining portions of IR-10 that have not been excavated will need to be addressed. Navy Response: The TMSRA contains remediation alternatives that include SVE for VOCs in soil at IR-10 (Redevelopment Block 8) (Figure 6). The TMSRA also contains remediation alternatives to address metals concentrations that exist in soil in the same area at IR-10; these metals would not be treated by the SVE system. Metals will be addressed by ensuring that the exposure pathway is broken by a cover consistent with the rest of Parcel B.

- Soil RAOs and remedial action alternatives should be reevaluated during the ROD amendment process to address higher and more variable levels of ambient metals. Navy Response: The RAOs in the TMSRA account for higher and more variable levels of ambient metals.

- The HHRA should be updated with new toxicological data and calculate cumulative risk as part of the ROD amendment process. Navy Response: The

updated HHRA in the TMSRA incorporates new toxicological data and provides information about total risk.

- Enforceable land-use restrictions need to be developed before the remedy is complete. Navy Response: The TMSRA contains more detailed information on potential ICs.

In addition to the above-mentioned responses to recommendations from the first 5-year review, a soil gas survey will be conducted in areas where past uses and data suggest possible concerns regarding soil gas for the purpose of establishing soil gas remediation goals.

Per the above summary, the Navy's responses and the proposed soil remedial alternative are considered adequately responsive to the questions and follow-up actions identified in the first 5-year review. Once finalized, the proposed alternative will serve as the basis for amendment of the ROD and implementation of RAs at Parcel B.

The first 5-year review indicated that the ROD amendment should memorialize the methods and cleanup goals for radiological material being addressed by the base-wide radiological removal action. Radiological issues have been addressed in the radiological addendum to the TMSRA (TtECI 2008b).

The Navy's proposed radiological remedial alternative is designed to meet the stated objective of long-term protectiveness. A summary of the alternative (R-3) is summarized below:

This alternative would achieve RAOs by surveying radiologically impacted buildings and former building sites for unrestricted release. Decontamination would be performed and buildings would be dismantled, if necessary. Radiologically impacted storm drain and sanitary sewer lines throughout Parcel B would be removed, and radiologically contaminated pipe and soils would be disposed of off site as low-level radioactive waste. A surface scan would be completed at IR-07 and IR-18, and any radiological anomalies would be removed to a depth of 1 foot (the maximum effective depth of the surface scan).

Although there is potential, however unlikely, for radiological contamination to exist beyond the depth of 1 foot, the soil cover would be effective in preventing any unacceptable exposure, and additional investigation beyond 1 foot is not proposed. A demarcation layer would be installed on the surveyed soil surface before covers were constructed at IR-07 and IR-18 to mark the boundary between the existing surface and the new cover. The survey and removals would occur before any covers were installed as part of Alternative S-5. Groundwater would be monitored at IR-07 and IR-18. The deep pump shaft beneath Building 140, as shown on Figure 4, would be closed in place with backfilled stone and a concrete cap. Buildings, former building sites, and excavated areas would be surveyed after cleanup is completed to ensure no residual radioactivity is present above the remediation goals. ICs would be

implemented for Building 140 and IR-07 and IR-18 to minimize inadvertent contact with radiologically impacted media and ensure radiological controls would be implemented if the remedies were not in place.

Similar to the preferred alternative for soil, some components of this alternative are in progress as a TCRA (storm drain and sanitary sewer removals and building surveys). Although the TCRA may not be completed before the amended ROD is signed, the Navy anticipates that the TCRA will meet the RAOs described in the revised proposed plan (Navy 2008).

7.2 Groundwater Remedy Recommendations and Follow-Up Actions

The first 5-year review recommended the follow-up actions outlined below related to the groundwater remedy. Below, the Navy provides its response to each recommendation. Once the 1997 ROD is amended to include the revised PP recommendations, the Navy will follow the FFA schedule in implementing the proposed remedial alternatives.

- Refinement of Parcel B groundwater monitoring will be discussed with the regulatory agencies and detailed in the base-wide monitoring plan, which encompasses groundwater monitoring for Parcels B, C, D, E, and E-2. Navy Response: The remediation alternatives in the TMSRA discuss groundwater monitoring options.

- Trigger levels should be reevaluated. Navy Response: Tables 8, 9, 10, 11, and 12 contain recommended revisions to trigger levels for soil, radionuclides, groundwater (A and B aquifers), and sediments.

- Ambient metals in groundwater may be reevaluated, if necessary, to ensure protectiveness of human health and the environment. Navy Response: Ambient levels of metals in groundwater are considered in the risk assessments in the TMSRA.

- Update the HHRA with new toxicological data and calculate cumulative risk as part of the ROD amendment process. Navy Response: The updated HHRA in the TMSRA incorporates new toxicological data and provides information about total risk.

- Potential ecological risk to aquatic receptors from Parcel B contaminants should be evaluated. Navy Response: The TMSRA contains an evaluation of potential risk to ecological receptors along the shoreline.

- Install a point-of-compliance well and characterization wells at IR-07. Navy Response: Point of compliance well IR07MWS-4 and post-remedial action wells IR07MW21A1, IR07MW24A, IR07MW25A, and IR07MW26A were reinstalled in March 2004, and the TMSRA uses data from these wells.

- Effectiveness of SVE and ZVI treatability studies should be evaluated and included in an amended ROD if either is selected as a remedy for VOC-contaminated groundwater. Navy Response: The TMSRA evaluates SVE and ZVI treatability studies and includes these technologies in remediation alternatives.

- Enforceable land-use restrictions need to be developed before the remedy is complete. Navy Response: The TMSRA and the revised proposed plan contain more detailed information on potential ICs.

Per the above summary, the Navy's responses and the proposed groundwater remedial alternative are considered adequately responsive to the questions and follow-up actions identified in the first 5-year review. The groundwater remedy and groundwater monitoring for ROCs are presented in the TMSRA and revised proposed plan (TtECI 2008b and Navy 2008). The proposed alternative presented in the revised PP will serve as the basis for an amended ROD and implementation of RAs at Parcel B.

Section 8
Protectiveness Statements

8.1 Protectiveness Statements for the First Five-Year Review

8.1.1 Protectiveness Statement for Parcel B Soil for the First Five-Year Review

The soil remedy at Parcel B is currently protective of human health and the environment because exposure pathways that could result in unacceptable risks are being controlled through extensive soil excavation and the use of fencing, locked gates, warning signs, and secured buildings that limit access to remaining contaminated areas. New information became available after the RA was implemented, which indicates that, for the soil remedy to be protective in the long term, the HHRA needs to be updated using new toxicological data and methodologies, potential ecological risks to aquatic receptors should be evaluated, and the selected remedy needs to be modified to address remaining areas of contamination. A ROD amendment is planned to ensure that the final soil remedy implemented at Parcel B will be protective of human health and the environment in the long term.

8.1.2 Protectiveness Statement for Parcel B Groundwater for the First Five-Year Review

The groundwater remedy at Parcel B is currently (2003) protective of human health and the environment because the RAMP safeguards aquatic life in the Bay and addresses potential risk to future occupants of Parcel B buildings. New information became available after the remedial action was implemented, which indicates that, for the groundwater remedy to be protective in the long term, the HHRA and groundwater trigger levels need to be updated, potential ecological risk to aquatic receptors should be evaluated, the selected remedy needs to be modified to address VOC contamination, a point of compliance (POC) well and other characterization wells need to be installed at IR-07, and appropriate responses to incidences where trigger levels are exceeded must continue to be implemented.

8.2 Protectiveness Statements for the Second Five-Year Review

8.2.1 Protectiveness Statement for Parcel B Soil and Radiological Contamination Remedy for the Second Five-Year Review

The soil remedy selected in the 1997 ROD at Parcel B is still protective of human health and the environment. Exposure pathways that could result in unacceptable risks are still being controlled through contaminated soil excavation and disposal; the use of fencing, locked gates, and warning signs; and secured buildings that limit access to remaining contaminated areas. However, updated information about the

site that became available during the remedial action indicates that modifications to selected soil and groundwater remedies should be considered to ensure long-term protectiveness. Updated information includes items such as the ubiquitous nature of metals in soil across Parcel B, the presence of methane and mercury, the findings of a SLERA, and findings from removal actions to address radiological contaminants.

In the last 5 years, the Navy responded to the remedy concerns expressed in the first 5-year review in terms of the long-term protectiveness of the soil remedy. The TMSRA included an HHRA and revised remedial alternatives for the soil. The revised PP identified the most viable soil alternative, including excavation, disposal, covers, soil vapor extraction, ICs, and shoreline revetment. The revised remedial alternative has been designed to be protective of human health and the environment in the short and long term. Once the revised soil remedial alternative is incorporated into the amended ROD and implemented at Parcel B, further evaluation of its effectiveness will be completed in the subsequent 5-year review report.

The ROD for Parcel B did not contain a remedy for addressing radiological contamination. Subsequently, the completion of the historical radiological assessment and conducting various radiological removal actions required a reevaluation of the Parcel B remedy. The TMSRA radiological addendum evaluated the radiological remedial alternatives.

The proposed radiological remedy for Parcel B has been designed to be protective of human health and the environment. Such a remedy would achieve RAOs by surveying radiologically impacted buildings and former building sites for unrestricted reuse. Among the measures taken, decontamination would be performed and buildings would be dismantled if necessary. Once the revised radiological contamination remedial alternative is incorporated into the amended ROD and implemented at Parcel B, further evaluation of its effectiveness will be completed in the subsequent 5-year review report.

8.2.2 Protectiveness Statement for Parcel B Groundwater for the Second Five-Year Review

The groundwater remedy at Parcel B selected in the 1997 ROD is not currently (2008) protective of human health and the environment due to the following facts: (1) The remedy would not be considered protective of VOCs in groundwater that pose an unacceptable risk from vapor intrusion into buildings and (2) the remedy includes only groundwater monitoring and does not contain any treatment component and, therefore, would rank as poor for reduction of toxicity and mobility. New information became available after the remedial action was implemented, which indicates that for the groundwater remedy to be protective in the long term, the HHRA and groundwater trigger levels need to be updated; potential ecological risk to aquatic receptors should be evaluated; the selected remedy needs to be modified to address VOC contamination; a point-of-compliance well and other characterization wells need to be installed at IR-07; a flexible groundwater monitoring plan to include

ROC must be implemented; and appropriate responses to incidences where trigger levels are exceeded must continue to be implemented.

In the last 5 years, the Navy responded to the remedy concerns expressed in the first 5-year review in terms of the long-term protectiveness of the groundwater remedy. The TMSRA included an HHRA and a SLERA and revised remedial alternatives for the groundwater. The revised PP identified the most viable groundwater alternative, including in situ treatment, groundwater monitoring, and ICs. The revised remedial alternative was designed to be protective of human health and the environment in both the short term and long term. Once the revised groundwater remedial alternative is incorporated into the amended ROD and implemented at Parcel B, further evaluation of its effectiveness will be completed in the subsequent 5-year review report.

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Section 9
Next 5-Year Review

The next 5-year review for HPS will be completed in December 2013, 5 years from the date of this second 5-year review report. The next 5-year review will discuss the status of proposed remedial alternatives that will be implemented as remedial actions when the amended ROD is completed. The next 5-year review will include further technical assessment of the revised remedial alternatives once they are implemented to ensure long-term protectiveness. The next 5-year review will also address any other HPS parcels where remedies are selected and documented in a ROD.

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Section 10
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Tables

Table 1
RAMP Wells and Chemical Exceedances

Well ID	Well Type	Location	Sampling Frequency	RAMP Trigger Level[a]	Date Added to RAMP	Original Install Date	Replacement Install Date	Decom-missioned Date	Exceedances of Criteria each Quarter																																Number of Consecutive Rounds Below Criteria[b]
									Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	
IR07MWS-2	POC	Near the high-tide line of the TIZ, which is the POC	Quarterly	POC	Original	09/86	06/99	--	*	Zn	*	*	*	*	*	*	*	*	*	*	*	*	*	Be, Tl	*	Cu, Pb	*	*	*	*	*	*	*	*	Cu	Th	*	0
IR07MWS-4	POC		Quarterly	POC	Original	09/86	6/99, 3/04	3/01	*	Ba, Zn	*	*	*	*	--	--	--	--	--	--	--	--	--	--	*	*	Pb	Mn	*	*	*	*	*	*	*	*	Ni	*	4
IR07MW19A	POC		Quarterly	POC	Original	12/90	--	--	*	Ba, Zn	*	*	*	*	*	*	*	*	*	*	*	*	*	*	Be, Tl	*	Be	*	*	*	*	*	*	*	Cu	*	*	*	*	4
IR10MW31A1	POC/VOC		Quarterly	POC/VOC	Original	12/93	05/99	--	*	Ba, Zn	*	*	*	*	*	*	*	*	*	*	*	*	*	*	Be, Tl	*	*	*	*	*	*	*	*	*	*	*	*	*	*	4
IR26MW41A	POC		Quarterly	POC	Original	11/94	--	--	Mn, Ni	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	--	*	*	*	*	*	*	*	*	*	Ni	*	4
IR26MW45A	POC		Quarterly	POC	Original	05/99	--	2/01[c]	*	Ba, Zn	*	Zn	*	*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*	*	2
IR46MW37A[c]	POC		Quarterly	POC	Original	03/94	--	--	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	--	*	*	*	*	*	*	*	*	*	*	*	4
PA50MW01A	POC/VOC		Quarterly	POC/VOC	Original	03/93	--	--	*	Zn	*	*	*	*	*	*	Cu, Zn	*	*	*	*	*	*	*	*	Ba	*	*	*	*	*	*	*	*	--	--	*	*	3
IR06MW45A	Sentinel/VOC	Near the inland edge of the approximate 5-year buffer zone	Semiannually	DAF x POC/VOC	Original	09/91	--	7/06	*	Cu, Pb, Zn	--	--	*	--	*	--	--	*	--	*	*	*	*	*	*	*	*	*	*	*	*	*	--	--	--	*	*	2
IR07MW23A	Sentinel		Semiannually	DAF x POC	Original	12/90	--	--	*	Ba, Zn	--	--	*	--	*	--	--	*	--	*	*	--	*	*	*	*	*	--	*	--	*	*	*	--	*	--	*	*	3
IR07MW27A	Sentinel		Semiannually	DAF x POC	Original	04/99	--	--	*	As, Ba, Zn	--	--	As	--	As	--	--	*	--	As	As	--	*	--	*	*	*	--	*	--	*	*	*	--	*	--	*	*	3
IR10MW28A	Sentinel/VOC		Semiannually	DAF x POC/VOC	Original	09/91	--	--	*	Ba, Zn	--	--	*	--	*	--	--	*	--	*	*	*	*	*	Cr, Pb	*	*	*	*	*	--	--	--	*	--	--	--	*	*	2
IR25MW17A	Sentinel/VOC		Semiannually	DAF x POC/VOC	Original	05/94	--	--	*	Zn	--	--	*	--	--	Co, Ni	--	*	--	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	4
IR61MW05A	Sentinel		Semiannually	DAF x POC	Original	07/95	--	--	*	Ba, Zn	--	--	*	--	*	--	--	*	--	*	*	--	*	--	--	--	*	--	*	--	*	--	*	--	*	*	*	*	3
UT03MW11A	Sentinel		Semiannually	DAF x POC	Original	05/94	--	--	*	Ba, Zn	--	--	*	--	*	--	--	*	--	*	*	--	*	--	*	--	*	--	*	--	*	--	*	--	*	--	*	*	3
IR07MW20A1	Post-Remedial Action	Near remedial action excavations in IR-07	Quarterly	POC	Original	12/90	--	--	*	Ba, Zn	*	*	Be	*	*	*	*	*	*	*	*	*	*	*	Be, Cr	*	Be	*	*	*	*	*	Cu	*	*	Ni,Th	*	4
IR07MW21A1	Post-Remedial Action		Quarterly	POC	Original	12/90	3/04	3/01	*	Ba, Zn	*	*	--	--	--	--	--	--	--	--	--	--	--	--	*	*	As	*	*	*	*	*	*	*	*	*	Ni	*	4
IR07MW24A	Post-Remedial Action		Quarterly	POC	Original	05/99	3/04	2/01	*	Ba, Zn	*	*	*	*	--	--	--	--	--	--	--	--	--	--	*	*	*	*	*	*	*	*	*	*	Be	Be	Be	0
IR07MW25A	Post-Remedial Action		Quarterly	POC	Original	05/99	3/04	11/00	*	*	*	*	*	--	--	--	--	--	--	--	--	--	--	--	*	*	Ba, Cu, Pb	*	*	*	*	*	*	*	*	*	*	*	4
IR07MW26A	Post-Remedial Action		Quarterly	POC	Original	05/99	3/04	3/01	*	Ba, Zn	*	*	*	*	--	--	--	--	--	--	--	--	--	--	--	*	Cu, Pb	*	*	*	*	*	*	*	*	*	Th	*	4
IR10MW12A	Chromium VI/VOC	Near Building 123	Quarterly	NAWQC/VOC	Q5[d]	12/88	--	7/06	--	--	--	--	*	*	*	Cr VI	Cr VI	Cr VI	Cr VI	*	Cr VI	Cr VI	Cr VI	Cr VI	Cr VI	Cr VI	*	Cr VI	Cr VI	Cr VI	Cr VI	Cr VI	Cr VI	Cr VI	Cr VI	--	--	--	*	*	2
IR10MW13A1	VOC Monitoring	In or near the VOC plume in IR-10	Quarterly	VOC	Q5	12/88	--	--	--	--	--	--	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	DCE,TCE,VC	DCE	4
IR10MW14A	VOC Monitoring		Quarterly	VOC	Q5	01/89	--	--	--	--	--	--	*	--	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	4
IR10MW33A	VOC Monitoring		Quarterly	VOC	Original	06/99	--	--	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	--	VC,DCE	*	2
IR10MW59A	VOC Monitoring		Quarterly	VOC	Q7	03/02	--	--	--	--	--	--	--	TCE	TCE	TCE	TCE	TCE	TCE	TCE	TCE	TCE	TCE	TCE	*	*	*	*	*	*	*	*	*	*	DCE,VC	DCE,VC	DCE,VC	DCE,VC	0
IR25MW37A	VOC Monitoring		Quarterly	VOC	Q6	11/00	--	--	--	--	--	--	--	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	--	--	--	*	*	--	*	*	3
IR07MW28A	On-/Off-Site Migration	Along western boundary of Parcel B	Semiannually	POC	Original	05/99	--	--	*	Ba, Zn	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	Th	Th	Th	0
IR18MW21A	On-/Off-Site Migration		Semiannually	DAF x POC	Original	04/93	05/99	--	Zn	--	--	--	--	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	4
IR06MW42A	Utility Line	Near IR-06	Semiannually	SWPCP	Original	06/90	--	--	Ba	Ba, Zn	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	4
IR26MW46A	Supplemental	Around exploratory excavation EE-05 in IR-26	Quarterly	POC	Q9	01/02	--	--	--	--	--	--	--	--	--	--	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	4
IR26MW47A	Supplemental		Quarterly	POC	Q9	01/02	--	--	--	--	--	--	--	--	--	--	*	Cu, Hg	Hg	Hg	*	Hg	Hg	Hg	Hg	Hg	Hg	Hg	As, Hg	Hg	Hg	Hg	*	*	Cu, Hg	Hg	Hg	Hg	Hg	0
IR26MW48A	Supplemental		Quarterly	POC	Q9	01/02	--	--	--	--	--	--	--	--	--	--	*	*	*	*	*	*	*	*	*	*	Pb	*	*	*	Cu	*	*	*	*	*	*	*	4
IR10MW61A	Supplemental	In or near the VOC plume in IR-10	Quarterly	VOC	Q17	8/03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*	*	VC	VC	DCE, VC	DCE	DCE, VC	*	--	*	*	*	VC	VC	0
IR10MW62A	Supplemental		Quarterly	VOC	Q17	8/03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*	*	*	*	*	*	*	*	--	*	*	*	*	*	4
IR10MW71A	Supplemental		Quarterly	VOC	Q17	8/03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	TCE	TCE	TCE	TCE, DCE	TCE, DCE	TCE, DCE	*	*	--	*	DCE	*	*	DCE,TCE	*	4
IR10MW76A	Supplemental		Quarterly	VOC	Q17	8/03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*	*	*	*	*	*	*	*	--	*	*	*	*	*	4
IR10MW79A	Supplemental		Quarterly	VOC	Q17	9/03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*	*	*	*	*	*	*	*	--	*	*	*	*	*	4
IR10MW80A	Supplemental		Quarterly	VOC	Q17	9/03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*	*	*	*	*	*	*	*	--	*	*	*	*	*	4
IR26MW49A	Supplemental	Near EE-05	Quarterly	POC	Q27	7/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*	Hg	Hg	Hg	Hg	0
IR26MW50A	Supplemental		Quarterly	POC	Q27	7/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*	*	*	*	*	4
Sampling Date >>									Oct-Dec 1999	Jan-Mar 2000	Apr-Jun 2000	Jul-Sep 2000	Oct-Dec 2000	Jan-Mar 2001	Apr-Jun 2001	Jul-Sep 2001	Jan-Mar 2002	Apr-Jun 2002	Jul-Sep 2002	Oct-Dec 2002	Jan-Mar 2003	Apr-Jun 2003	Jul-Sep 2003	Oct-Dec 2003	Jan-Mar 2004	Apr-Jun 2004	Jul-Sep 2004	Oct-Dec 2004	Jan-Mar 2005	Apr-Jun 2005	Jul-Sep 2005	Oct-Dec 2005	Jan-Mar 2006	Apr-Jun 2006	Jul-Sep 2006	Oct-Dec 2006	Jan-Mar 2007	Apr-Jun 2007	July-Sep 2007	

Notes:

Two entries in the well type column indicate dual-purpose wells; for example, POC/VOC indicates well serves two purposes: VOC monitoring and POC.
RAMP trigger level of DAF x POC indicates trigger level is 10 times the POC trigger level (DAF is 10); dual entries for trigger levels for dual-purpose wells.

a Criteria are the HGAL, NAWQC, or VOC criteria as specified in the RAMP; the term "trigger level" in the RAMP is different than the rest of the TMSRA. Trigger levels established in the RAMP will be superseded by new trigger levels in the ROD amendment that are based on the analyses presented in the TMSRA.

b During the last four reported rounds in the table.

c 37 wells are currently monitored; 40 in this list--well IR26MW45A was decommissioned and replaced by wells IR26MW46A, IR26MW47A, and IR26MW48A; IR06MW45A and IR10MW12A decommissioned.

d Well IR10MW12A was added in Q5 for VOCs only, and chromium VI was added to the analytical suite in Q8.

Analytical results did not exceed criteria
Analytical results exceeded criteria

--	Not sampled	Cr VI	Hexavalent chromium	IR	Installation Restoration	ROD	Record of decision	Zn	Zinc		
*	All results meet criteria	Cu	Copper	Mn	Manganese	SWPCP	Southeast Water Pollution Control Plant				
As	Arsenic	DAF	Dilution attenuation factor	Ni	Nickel	TCE	Trichloroethene				
Ba	Barium	DCE	Cis-1,2-dichloroethene	NAWQC	National ambient water quality criteria	Th	Thallium				
Be	Beryllium	EE	Exploratory excavation	Pb	Lead	TIZ	Tidally influenced zone				
BRAC	Base Realignment and Closure	Hg	Mercury	POC	Point of compliance	Tl	Thallium				
Co	Cobalt	HGAL	Hunters Point groundwater ambient level	Q1, Q2, etc.	First quarter of RAMP, second quarter of RAMP, etc.	TMSRA	Technical memorandum in support of a record of decision amendment				
Cr	Chromium	ID	Identification	RAMP	Remedial action monitoring program	VC	Vinyl chloride				
						VOC	Volatile organic compound				

Source: Original table was adopted from Parcel B TMSRA, Hunters Point Shipyard, San Francisco, California

Table 2
CERCLA Chronology for Parcel B

CERCLA Process Step	Document	Date Completed
Preliminary Assessment/Site Inspection	Site Inspection Report	April 1994
Remedial Investigation	Remedial Investigation Report	June 1996
Feasibility Study	Feasibility Study Report	November 1996
Proposed Plan	Proposed Plan	October 1996
Record of Decision	ROD	October 1997
Explanation of Significant Differences	Explanation of Significant Differences (first)	August 1998
Remedial Design	Remedial Design Documents	August 1999
Remedial Action (Phase I)	Field Excavations	July 1998 to September 1999
Explanation of Significant Differences	Explanation of Significant Differences (second)	May 2000
Remedial Design Amendment	Remedial Design Amendment	February 2001
Remedial Action (Phase II)	Field Excavations	July 2000 to December 2001
Remedial Action (report)	Construction Summary Report	November 2002
	Construction Summary Report Addendum	September 2004
First Five-Year Review	First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard (focus was Parcel B)	December 2003
TMSRA (update to Feasibility Study)	Technical Memorandum in Support of a ROD Amendment	December 2007
Proposed Plan in Support of a ROD Amendment	Proposed Plan	April 2008
ROD Amendment	ROD Amendment	October 2008
Second Five-Year Review	First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard (focus is Parcel B)	December 2008
Remedial Design	Remedial Design	April 2009
Remedial Action	Field Actions and Report	July 2011

Table Source: TMSRA (St. George Chadux Corp. and Tetra Tech EM Inc 2007)

Notes:

CERCLA Comprehensive Environmental Response, Compensation, and Liability Act; ROD Record of Decision
TMSRA Technical Memorandum in Support of a Record of Decision Amendment
SOURCE: ORIGINAL TABLE WAS ADOPTED FROM PARCEL B TMSRA, HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA

Table 3
History of Investigations Since ROD

Report Date	Title	Author	Activity Description
Soil Remedy-Related Documents			
First Five-Year Review (8 July 1998 to 8 July 2003)			
8/4/99	Nickel Screening and Implementation Plan	Tetra Tech	Evaluation of ambient concentrations of nickel in soil across HPS
8/19/99	Remedial Design Documents	Tetra Tech and MK	Guided first phase of soil excavations from July 1998 to September 1999
8/00	Historical Radiological Assessment, Volume I, Naval Propulsion Program, 1966 to 1995	RASO	Evaluation of potential radiological contamination from maintenance of nuclear-powered ships
2/20/01	Remedial Design Documents Amendment	Tetra Tech	Guided second phase of soil excavations from July 2000 to December 2001
2/28/01	Calculation and Implementation of Supplemental Manganese Ambient Levels	Tetra Tech	Evaluation of ambient concentrations of manganese in soil across HPS
9/11/01	Final Manganese Site Proposal	Tetra Tech	Evaluation and proposal for action related to manganese concentrations in soil at Parcel B
11/18/02	Construction Summary Report (draft)	Tetra Tech	Summary of 78 soil excavations conducted during phases I and II of remedial action, mostly outside of IR-07 and IR-18
12/21/01	Final Evaluation of Ambient Manganese Conditions	Tetra Tech	Evaluation of ambient concentrations of manganese in soil across HPS
3/28/03	Interpretation of Fill Conditions at IR-07 and IR-18	Tetra Tech	Characterization of subsurface conditions using soil borings, geophysics, and historical aerial photographs
Second Five-Year Review (8 July 2003 to 8 July 2008)			
3/23/04	Shoreline Characterization Technical Memorandum	Tetra Tech	Characterization of shoreline sediments at IR-07 and IR-26
8/31/04	Historical Radiological Assessment, Volume II, Use of General Radioactive Materials, 1939 to 2003	RASO	Evaluation of potential radiological contamination from use of general radioactive materials across HPS
9/8/04	Construction Summary Report Addendum (draft)	SulTech	Summary of remaining 28 excavations conducted during phases I and II of remedial action
6/05	Draft Final Site Closeout Report, Total Petroleum Hydrocarbon Program Corrective Action Implementation Soil Removal for Parcels B, C, D, and E	TPA-CKY Joint Venture	Summary of excavations to remove petroleum-contaminated soil across HPS, including two excavations at Parcel B
9/23/05	Soil Gas Survey Technical Memorandum	SES-TECH	Soil gas survey for evaluation of methane and total volatile organic compounds to assess nature and extent of concentrations in soil gas

Table 3 (continued)
History of Investigations since ROD

Report Date	Title	Author	Activity Description
Groundwater Remedy-Related Documents			
First Five-Year Review			
8/19/99	Remedial Action Monitoring Plan	Tetra Tech and MK	Guided groundwater monitoring program
6/23/00	January to March 2000 Second Quarterly Groundwater Sampling Report	Tetra Tech	Groundwater monitoring results
8/31/00	April to June 2000 Third Quarterly Groundwater Sampling Report	Tetra Tech	Groundwater monitoring results
12/22/00	September 1999 to September 2000 Annual Groundwater Sampling Report	Tetra Tech	Groundwater monitoring results
2/19/01	Distribution of the Bay Mud Aquitard and Characterization of the B-Aquifer at Parcel B	Tetra Tech	Distribution and characterization of the B-aquifer and the Bay Mud aquitard that separates the A- and B-aquifers
2/28/01	Storm Drain Infiltration Study	Tetra Tech	Investigation of storm drains as conduits for migration of contaminated groundwater, as required by the ROD; investigation found lining storm drains or grouting bedding material was not necessary
3/2/01	October to December 2000 Fifth Quarterly Groundwater Sampling Report	Tetra Tech	Groundwater monitoring results
6/1/01	January to March 2001 Sixth Quarterly Groundwater Sampling Report	Tetra Tech	Groundwater monitoring results
8/31/01	April to June 2001 Seventh Quarterly Groundwater Sampling Report	Tetra Tech	Groundwater monitoring results
11/20/01	Groundwater Evaluation Technical Memorandum	Tetra Tech	Evaluation of groundwater at Parcel B
1/22/02	July to September 2001 Eighth Quarterly Groundwater Sampling Report	Tetra Tech	Groundwater monitoring results
6/28/02	January to March 2002 Ninth Quarterly Groundwater Sampling Report	Tetra Tech	Groundwater monitoring results
11/8/02	April to June 2002 Tenth Quarterly Groundwater Sampling Report	Tetra Tech	Groundwater monitoring results
Second Five-Year Review			
1/7/03	July to September 2002 Eleventh Quarterly Groundwater Sampling Report	Tetra Tech	Groundwater monitoring results

Table 3 (continued)
History of Investigations since ROD

Report Date	Title	Author	Activity Description
Groundwater Remedy-Related Documents (Continued)			
4/17/03	Groundwater Investigation of Hexavalent Chromium at IR-10	Tetra Tech	Investigation of the extent of chromium VI around well IR10MW12A; chromium VI not detected in samples from 10 temporary monitoring wells (Included as Appendix H)
5/23/03	January to December 2002 Annual Groundwater Sampling Report	Tetra Tech	Groundwater monitoring results
8/11/03	January to March 2003 Thirteenth Quarterly Groundwater Sampling Report	Tetra Tech	Groundwater monitoring results
8/22/03	April to June 2003 Fourteenth Quarterly Groundwater Sampling Report (draft)	ITSI	Groundwater monitoring results
3/8/04	July to September 2003 Fifteenth Quarterly Groundwater Sampling Report	ITSI	Groundwater monitoring results
2/20/04	January to December 2003 Sixteenth Quarterly/4th Annual Groundwater Sampling Report (draft)	ITSI	Groundwater monitoring results
10/15/04	January to March 2004 Seventeenth Quarterly Groundwater Sampling Report	Kleinfelder	Groundwater monitoring results
7/22/05	April to June 2004 Eighteenth Quarterly Groundwater Sampling Report	Kleinfelder	Groundwater monitoring results
8/19/05	July to September 2004 Nineteenth Quarterly Groundwater Sampling Report	Kleinfelder	Groundwater monitoring results
4/28/06	October to December 2004 Twentieth Quarterly/Fifth Annual Groundwater Sampling Report	Kleinfelder	Groundwater monitoring results
4/28/06	January to March 2005 Twenty-first Quarterly Groundwater Sampling Report	Kleinfelder	Groundwater monitoring results
11/1/06	April to June 2005 Twenty-second Quarterly Groundwater Sampling Report	Kleinfelder	Groundwater monitoring results
11/7/06	July to September 2005 Twenty-third Quarterly Groundwater Sampling Report	Kleinfelder	Groundwater monitoring results
10/06	October to December 2005 Quarterly Groundwater Monitoring Report and Annual Report (2005))	CE2-Kleinfelder	Groundwater monitoring results

Table 3 (continued)
History of Investigations since ROD

Report Date	Title	Author	Activity Description
Groundwater Remedy-Related Documents (Continued)			
3/07	January to March 2006 Quarterly Groundwater Monitoring Report	CE2-Kleinfelder	Groundwater monitoring results
4/07	April to June 2006 Quarterly Groundwater Monitoring Report	CE2-Kleinfelder	Groundwater monitoring results
5/07	July to September 2006 Quarterly Groundwater Monitoring Report	CE2-Kleinfelder	Groundwater monitoring results
10/07	October to December 2006 Quarterly Groundwater Monitoring Report and Annual Report	CE2-Kleinfelder	Groundwater monitoring results
11/07	January to March 2007 Quarterly Groundwater Monitoring Report	CE2-Kleinfelder	Groundwater monitoring results
11/07	April to September 2007 Semi-Annual Groundwater Monitoring Report	CE2-Kleinfelder	Groundwater monitoring results
Treatability Study Documents			
First Five-Year Review			
2/14/02	Phase II Soil Vapor Extraction Treatability Study Report, Building 123, IR-10 (draft)	IT Corp.	Treatability study to evaluate soil vapor extraction for removal of TCE and other VOCs from soil beneath Building 123
Second Five-Year Review			
8/19/03	Soil Vapor Extraction Confirmation Study Summary, Building 123, IR-10	Tetra Tech	Soil sampling confirmation study to evaluate the effectiveness of phase II SVE treatability study
6/25/04	Cost and Performance Report for Zero-Valent Iron Injection Treatability Study, Building 123	ERRG and URS	Evaluation of the performance of ZVI to treat VOCs in groundwater beneath Building 123
11/23/05	In Situ Sequential Anaerobic-Aerobic Bioremediation Treatability Study, Remedial Unit C5, Building 134, IR-25	Shaw	Evaluation of injection of lactate and hydrogen to stimulate biological dechlorination of chlorinated solvents in groundwater
11/10/06	Phase III Soil Vapor Extraction Treatability Study Report	ITSI	Expanded treatability study to evaluate soil vapor extraction for removal of TCE and other VOCs from soil beneath Building 123
Regulatory Documents			
10/7/97	Record of Decision (ROD)	Navy	Original record of decision
8/24/98	Explanation of Significant Differences	Navy	Revised remedy to include excavation to 10 feet below ground surface instead of to the groundwater table
5/4/00	Explanation of Significant Differences	Navy	Updated soil cleanup levels

Table 3 (continued)
History of Investigations since ROD

Report Date	Title	Author	Activity Description
12/10/03	First Five-Year Review of Remedial Actions Implemented at HPS	Tetra Tech	Assessment of whether remedy at Parcel B is or will be protective
12/12/07	Parcel B Technical Memorandum in Support of a Record of Decision Amendment (TMSRA)	Tetra Tech	The U.S. Department of Navy has prepared this technical memorandum in support of a ROD amendment (TMSRA) to address remaining contamination in soil and groundwater at HPS Parcel B.
03/14/08	Parcel B Technical Memorandum in Support of a Record of Decision Amendment (TMSRA) Radiological Addendum	Tetra Tech	The U.S. Department of Navy has prepared this technical memorandum in support of a ROD amendment (TMSRA) Radiological Addendum to address remaining radiological contamination at HPS Parcel B.
06/08	Proposed Plan for Cleanup of Parcel B	Navy/Tetra Tech	The U.S. Department of Navy has prepared this proposed plan in support of a ROD amendment.

Table Source: TMSRA (St. George Chadux Corp. and Tetra Tech EM Inc 2007)

SOURCE: ORIGINAL TABLE WAS ADOPTED FROM PARCEL B TMSRA, HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA

ERRG	Engineering/Remediation Resources Group, Inc.
HPS	Hunters Point Shipyard
IR	Installation Restoration
IT Corp.	International Technology Corporation
ITSI	Innovative Technical Solutions, Inc.
MK	Morrison Knudsen Corporation
RASO	Radiological Affairs Support Office
ROD	record of decision
TCE	trichloroethene
Tetra Tech	Tetra Tech EM Inc.
URS	URS Corporation
VOC	volatile organic compound
ZVI	zero-valent iron

Table 4
Status of Parcel B Remedial Actions

Selected Remedy	Components of Remedy	Applicable Sites	Current Status
Soil Remedy, S-2	Excavation and Offsite Disposal	IR-07, IR-10, IR-18, IR-20, IR-23, IR-24, IR-26, IR-42, IR-46, IR-60, and IR-61	Action initiated, but not yet complete
	Deed Notifications	All	Not yet initiated; will be initiated during parcel transfer process
Groundwater Remedy, GW-2	Groundwater Monitoring	IR-07, IR-10, IR-18, IR-23, IR-24, IR-26, IR-46, and IR-61	Action in progress; optimization modifications planned as part of basewide groundwater monitoring plan
	Fuel and Steam Line Removal	IR-46 and SI-45	Action complete
	Storm Drain System Lining	IR-50	Action complete; investigation found lining was not necessary because groundwater contamination was not present at storm drain lines subject to groundwater infiltration
	Deed Restrictions and Notifications	All	Not yet initiated; will be initiated during parcel transfer process

Table Source: TMSRA (St. George Chadux Corp. and Tetra Tech EM Inc 2007)

Notes:

IR Installation Restoration
Navy U.S. Department of the Navy
PRC PRC Environmental Management, Inc.
SI site inspection

Sources:

Navy. 1997b. "Hunters Point Shipyard, Parcel B, Record of Decision." November 16.
Navy. 1998. "Explanation of Significant Difference, Naval Station Treasure Island, Hunters Point Annex." August 24.
Navy. 2000. "Final Explanation of Significant differences, Parcel B, Hunters Point Shipyard, San Francisco, California." May 4.
PRC. 1996d. "Parcel B Feasibility Study Final Report, Hunters Point Shipyard, San Francisco, California." November 26.
PRC, Levine-Fricke-Recon, Inc., and Uribe & Associates. 1996a. "Parcel B Remedial Investigation, Draft Final Report, Hunters Point Shipyard, San Francisco, California." June 6.
Tetra Tech EM Inc. 2002e. "Draft Parcel B Construction Summary Report, Hunters Point Shipyard, San Francisco, California." November 18.

Table 5
Summary of Chemicals Remaining in Soil at Parcel B

Site Name[a]	Redevelopment Block(s)	Site Description	Chemicals of Concern[b]	Possible Sources[c]	Volume of Contaminated Soil Removed[d] (Cubic Yards)
IR-07	2, 3, BOS-1	Sub-Base Area	Metals, SVOCs, pesticides, and PCBs	Disposal of sandblast waste, disposal of waste oil at IR-07 and IR-18, and bedrock-derived fill	52,500
IR-10	8	Building 123 (Battery and Electroplating Shop)	Metals, VOCs, SVOCs, and PCBs	Naturally occurring or anthropogenic metals, releases of waste acids and plating solutions into the floor drains inside Building 123, leaks from acid drain lines	1,400
IR-18	1, 2, BOS-1	Waste Oil Disposal Area	Metals, SVOCs, pesticides, and PCBs	Disposal of waste oil containing lead or placement of lead-contaminated fill material, disposal of waste oil, and bedrock-derived fill	22,000
IR-20	12	Building 156 (Rubber Shop)	Metals, VOCs, SVOCs, and PCBs	Naturally occurring or anthropogenic metals and storage of waste oils and chemicals in Building 156	3,100
IR-23	5, 6, BOS-1, BOS-2	Building 146 (Tactical Air Navigation Facility), Building 161 (Maintenance Service), Building 162 (Paint Storage), and Tank S-136	Metals, VOCs, SVOCs, pesticides, and PCBs	Petroleum hydrocarbon surface spill and naturally occurring or anthropogenic metals	2,800
IR-24	9, 12, BOS-2	Building 124 (Acid Mixing Plant), Building 125 (Submarine Cafeteria), and Buildings 128 and 130 (Machine Shop)	Metals, VOCs, SVOCs, and PCBs	Naturally occurring or anthropogenic metals, lead-containing fuel and waste paint, releases of diesel fuel and lubrication oil along the distribution pipelines that make up IR-46, and leakage of fuel from the fuel distribution lines	9,211
IR-26	15, 16, BOS-3	Building 157 (Nondestructive Testing Laboratory) and Area XIV	Metals, VOCs, SVOCs, pesticides, and PCBs	Naturally occurring or anthropogenic metals and petroleum-related contamination	7,500
IR-42	7	Building 109 (Police Station), Building 113 (Tug Maintenance Shop and Salvage Divers Shop), and Building 113A (Machine Shop, Torpedo Maintenance Shop, Tug Maintenance Shop, and Electrical Substation)	Metals, SVOCs, and PCBs	Naturally occurring or anthropogenic metals and petroleum-related contamination	300

Table 5 (continued)
Summary of Chemicals Remaining in Soil at Parcel B

Site Name[a]	Redevelopment Block(s)	Site Description	Chemicals of Concern[b]	Possible Sources[c]	Volume of Contaminated Soil Removed[d] (Cubic Yards)
IR-46 (Fuel Lines)	9, 12, BOS-2	Fuel Distribution Lines	Metals, SVOCs, and PCBs	Naturally occurring or anthropogenic metals, releases from fuel line system, spilled fuel or oil from tanks and distribution pipelines, diesel fuel and lube oil pipelines (and waste fuel and oil lines), and other petroleum-related contamination	19,100
IR-60	BOS-2	Dry Docks 5, 6, and 7	Metals and SVOCs	Naturally occurring or anthropogenic metals and ship painting activities	600
IR-61	6	Building 122 (Electrical Substation V and Compressor Plant)	Metals and PCBs	Naturally occurring or anthropogenic metals and transformer release of PCBs	100
IR-62	4, 5	Buildings 115 and 116, Submarine Training Buildings and School	None[e]	Not applicable	Not applicable
SI-31	7	Building 114, Offices	None[e]	Not applicable	Not applicable
SI-45	7	Steam Line System	None[e]	Not applicable	Not applicable

Table Source: TMSRA (St. George Chadux Corp. and Tetra Tech EM Inc 2007)

Notes:

a IR-06 is not included in this table because it will be addressed as part of Parcel C and will be evaluated in future 5-year reviews that follow a Parcel C ROD. Although portions of IR-50 (storm drain and sanitary sewer systems) and IR-51 (former transformer sites) within Parcel B are addressed by the Parcel B ROD, information on contamination associated with these sites is presented with the IR sites that contain the contamination associated with IR-50 and IR-51.

b Chemical groups listed include chemicals evaluated in the human health risk assessment; these chemicals also exceed the remedial action objectives defined in the ROD (Navy 1997) and subsequent ESDs (Navy 1998, 2000).

c Sources listed were identified in the Parcel B remedial investigation and feasibility study (PRC, HLA, Levine-Fricke, and Uribe and Associates 1996; PRC 1996), and information gathered during the remedial action.

d Volumes of contaminated soil are based on the volumes excavated according to the construction summary report (Tetra Tech 2002a), addendum (SulTech 2004), TPH closeout report (TPA-CKY Joint Venture 2005), and other estimates from remedial action activities.

e No chemicals were detected at levels that exceed remedial action objectives defined in the ROD (Navy 1997) and subsequent ESDs (Navy 1998, 2000). IR-62 contained only fuel-related contamination that was not commingled with chemicals identified in the ROD and ESDs.

ESD	explanation of significant difference	ROD	record of decision	TPH	total petroleum hydrocarbons
HLA	Harding Lawson Associates	SI	site inspection	VOC	volatile organic compound
IR	Installation Restoration	SVOC	semivolatile organic compound		
PCB	polychlorinated biphenyl	Tetra Tech	Tetra Tech EM Inc.		
PRC	PRC Environmental Management, Inc.				

Table 5 (continued)
Summary of Chemicals Remaining in Soil at Parcel B

ORIGINAL SOURCES:

Navy. 1997. "Hunters Point Shipyard, Parcel B, Record of Decision." November 16.
Navy. 1998. "Explanation of Significant Difference, Naval Station Treasure Island, Hunters Point Annex." August 24.
Navy. 2000. "Final Explanation of Significant differences, Parcel B, Hunters Point Shipyard, San Francisco, California." May 4.
PRC. 1996. "Parcel B Feasibility Study Final Report, Hunters Point Shipyard, San Francisco, California." November 26.
PRC, HLA, Levine-Fricke, and Uribe & Associates. 1996. "Parcel B Remedial Investigation, Draft Final Report, Hunters Point Shipyard, San Francisco, California." June 3.
SulTech. 2004. "Draft Parcel B Construction Summary Report Addendum, Hunters Point Shipyard, San Francisco, California." September 8.
Tetra Tech. 2002a. "Draft Parcel B Construction Summary Report, Hunters Point Shipyard, San Francisco, California." November 18.
TPA-CKY Joint Venture. 2005. "Draft Final Site Closeout Report, Total Petroleum Hydrocarbon Program Corrective Action Implementation Soil Removal for Parcels B, C, D, and E, Hunters Point Shipyard, San Francisco, California." June

Table 6
Radiologically Impacted Sites

Building/Site Number	Redevelopment Block(s)	Former Use	Current Status
103	4	Submarine barracks (1951); personnel decontamination center for Operation Crossroads personnel	Leased to San Francisco Redevelopment Agency; used by artists from The Point
113	7	Tug maintenance facility; salvage diver facility; torpedo storage and overhaul (1951-1964); sample storage from atomic weapons tests	San Francisco Police Department storage
113A	7	Torpedo storage building; nondestructive testing facility (radiography); machine and maintenance shop; shipyard analytical laboratory; radioactive material storage building; radiographer's vault; waste disposal and storage building; used to store sheet lead from Building 364	Unoccupied
114	7	Naval Radiological Defense Laboratory design branch and technical library (1951)	Demolished
130	9, 12	Pipefitter shop; general shops; ship repair shop; machine shop; metal working shop; shop service (1968-1973); occupied by Protective Finishes Co. (1994); used by Navy for low-level radioactive waste and investigation-derived waste storage (1994)	Environmental storage
140 and discharge channel	16, BOS-3	Dry Dock 3 and pumphouse and discharge channel	Unoccupied
142	16	Air raid shelter A; storage; high-level sample counting room; low background counting room	Demolished
146	6	Industrial and photo laboratory (1951-1964); general shops; radioactive waste storage area; radioluminescent device turn-in building; tactical air navigation facility; lead-lined vault for shipyard x-ray sources	Unoccupied
157	15	Industrial laboratory; nondestructive testing; sound laboratory; testing center for metals (radiography); metal shop	Unoccupied
Dry Dock 5	BOS-2	Decontamination of ships from Operation Crossroads and ship repair (submarines)	Unused
Dry Dock 6	BOS-2	Decontamination of ships from Operation Crossroads and ship repair (submarines)	Unused
Dry Dock 7	BOS-2	Decontamination of ships from Operation Crossroads and ship repair (submarines)	Unused
IR-07	2, 3, BOS-1	Flat land area built by the Navy to support conventional (non-nuclear) submarine maintenance; potential disposal of wastes from decontamination of ships from Operation Crossroads	Environmental Storage
IR-18	1, 2, BOS-1	Flat land area built by the Navy; waste oil disposal area; potentially used for disposal of Operation Crossroads decontamination materials; recreational vehicle camping and parking	Undeveloped open land

Table 6 (continued)
Radiologically Impacted Sites

Table Source: TMSRA (St. George Chadux Corp. and Tetra Tech EM Inc 2007)
Original Table from Naval Sea Systems Command Detachment, Radiological Affairs Support Office. 2004. "Historical Radiological Assessment, Volume II, Use of General Radioactive
Materials, 1939-2003, Hunters Point Shipyard." August 31.

Notes:

Ship berths and piers at Parcel B are considered to be radiologically impacted.
IR Installation Restoration

Table 7

Combined Total Risk from Chemical and Radiological Risks

Parcel B Impacted Sites	Radiological Risk	Chemical Risk'	Redevelopment Block	TMSRA Grid(s)	Risk Combination Results
Building 103	1.48×10^{-6}	Not Evaluated	4	Not Evaluated	1.48×10^{-6}
Building 113	1.48×10^{-6}	2.00×10^{-4}	7	B3228, B3229	2.01×10^{-4}
Building 113A	1.60×10^{-6}	2.00×10^{-4}	7	B3228	2.01×10^{-4}
Building 130	1.60×10^{-6}	3.00×10^{-4}	9	B3718	3.01×10^{-4}
Building 140	1.44×10^{-6}	1.00×10^{-4}	16	AX04	1.01×10^{-4}
Building 142 Site	6.39×10^{-6}	1.00×10^{-4}	16	AX04	1.64×10^{-4}
Building 146	1.16×10^{-6}	1.00×10^{-4}	6	B1523, B1623	1.01×10^{-4}
Building 157 Site	8.90×10^{-5}	2.00×10^{-4}	15	B4716	2.89×10^{-4}
IR-07	4.51×10^{-5}	2.00×10^{-4}	3	B0336, B0434, B0636, B1231	2.45×10^{-4}
IR-18	4.51×10^{-5}	1.00×10^{-4}	2	B0339	1.45×10^{-4}

Table Source: Final Parcel B TMSRA Radiological Addendum

Notes:

[a] Chemical risk was taken from TMSRA Tables A-15 and A-16.

IR Installation Restoration
TMSRA Technical Memorandum in Support of a Record of Decision Amendment

Table 8
Remediation Goals for Chemicals of Concern in Soil

Exposure Scenario	Chemical of Concern[a]	Redevelopment Block	RBC	HPAL	Laboratory Practical Quantitation Limit	Remediation Goal
Residential	Antimony	3, 9	10	9.05	1	10
	Aroclor-1254	3	0.093	--	0.03	0.093
	Aroclor-1260	3, 12	0.21	--	0.03	0.21
	Arsenic	3, 7, 8	0.038	11.1	1	11.1
	Benzo(a)anthracene	3, 12, 15	0.37	--	0.33	0.37
	Benzo(a)pyrene	1, 2, 3, 5, 6, 7, 8, 9, 12, 15	0.037	--	0.33	0.33
	Benzo(b)fluoranthene	3, 12, 15	0.34	--	0.33	0.34
	Benzo(k)fluoranthene	3, 12, 15	0.34	--	0.33	0.34
	Beta-BHC	3	0.0066	--	0.002	0.0066
	Bis(2-ethylhexyl)phthalate	3	1.1	--	0.33	1.1
	Cadmium	6, 7, 8	3.5	3.14	0.2	3.5
	Copper	3	159	124	1.5	159
	Dibenz(a,h)anthracene	2, 3, 9, 12, 15	0.058	--	0.33	0.33
	Dieldrin	3	0.00066	--	0.0034	0.0034
	Heptachlor epoxide	3	0.00054	--	0.0017	0.0017
	Indeno(1,2,3-cd)pyrene	15	0.35	--	0.33	0.35
	Iron	3, 7, 8, 9, 12, 15	21,963	58,000	10	58,000
	Lead	2, 3, 8, 9	155	8.99	1	155
	Manganese	3, 7, 8, 9, 12, 15	843	1,431	0.5	1,431
	Mercury	3	1.6	2.28	0.03	2.3
	Naphthalene	3	1.7	--	0.33	1.7
	Tetrachloroethene	6	0.48	--	0.005	0.48
	Trichloroethene	8	2.9	--	0.005	2.9
	Vanadium	2	65	117	0.5	117
	Zinc	3, 7	373	110	2	373

Table 8 (continued)
Remediation Goals for Chemical of Concern in Soil
Parcel B Technical Memorandum in Support of a Record of Decision Amendment

Exposure Scenario	Chemical of Concern[a]	Redevelopment Block	RBC	HPAL	Laboratory Practical Quantitation Limit	Remediation Goal
Recreational	Aroclor-1254	BOS-3	0.74	--	0.03	0.74
	Aroclor-1260	BOS-1	0.74	--	0.03	0.74
	Arsenic	BOS-1	0.37	11.1	1	11.1
	Benzo(a)pyrene	BOS-1	0.13	--	0.33	0.33
	Lead	BOS-1, BOS-3	155	8.99	1	155
Industrial	Arsenic	16	0.43	11.1	1	11.1
	Benzo(a)anthracene	16	1.8	--	0.33	1.8
	Benzo(a)pyrene	16	0.18	--	0.33	0.33
Construction Worker	Aroclor-1260	BOS-1, BOS-3	2.1	--	0.03	2.1
	Arsenic	3, 5, 7, 8, 16, BOS-2, BOS-3	1.6	11.1	1	11.1
	Benzo(a)pyrene	15, 16, BOS-1	0.65	--	0.33	0.65
	Lead	BOS-1, BOS-2	800	8.99	1	800
	Trichloroethene	8	151	--	0.005	151

Table Source: TMSRA (St. George Chadux Corp. and Tetra Tech EM Inc 2007)

Notes: All concentrations shown in milligrams per kilogram (mg/kg).

a Chemicals of concern shown are based on the results of the incremental risk evaluation for soil

-- Not applicable
BHC benzene hexachloride
HPAL Hunters Point ambient level
RBC risk-based concentration

Source: Parcel B TMSRA

Table 9
Remediation Goals for Radionuclides

Radionuclide	Surfaces[g] (dpm/100 cm^2)		Soil [c g] (pCi/g)		Water [e g] (pCi/L)
	Equipment, Waste	Structures[b]	Construction Worker	Residential	Equipment, Waste
cesium-137	5,000	5,000	0.113	0.113	119
cobalt-60	5,000	5,000	0.0602	0.0361	100
plutonium-239	100	100	14.0	2.59	15
radium-226	100	100	1.0[d]	1.0[d]	5.0[f]
strontium-90	1,000	1,000	10.8	0.331	8.0

Table Source: TMSRA Radiological Addendum (TtECI 2008a)

Notes:

a These objectives are based on AEC *Regulatory Guide 1.86* (1974). Objectives for removable surface activity are 20 percent of these values.
b These objectives are based on 25 mrem/y.
c EPA PRGs for two future-use scenarios.
d Objective is 1 pCi/g above background per agreement with EPA.
e Release criteria for water have been derived from *Radionuclides Notice of Data Availability Technical Document,* (EPA 2000) by comparing the limits from two criteria and using the most conservative limit.
f Limit is for total radium concentration.
g Taken from *Revised Final Basewide Radiological Removal Action, Action Memorandum.* Hunters Point Shipyard, San Francisco, California. February 14, 2006.

AEC — Atomic Energy Commission
cm^2 — square centimeter
dpm — disintegration per minute
EPA — U.S. Environmental Protection Agency
mrem/y — millirem per year
pCi/g — picocurie per gram
pCi/L — picocurie per liter
PRG — preliminary remediation goal
TMSRA – Technical Memorandum in Support of a Record of Decision

Table 10
Remediation Goals for Chemicals of Concern in A-Aquifer Groundwater

Exposure Scenario	Chemical of Concern	Associated Plume[a] or Grid Number	RBC	HGAL	Laboratory Practical Quantitation Limit	Remediation Goal (µg/L)
Residential - Vapor Intrusion	1,2,4-Trichlorobenzene	IR-25	66	--	0.5	66
	1,2,4-Trimethylbenzene	IR-25	25	--	0.5	25
	1,2-Dichlorobenzene	IR-25	2,561	--	0.5	2,561
	1,2-Dichloroethane	IR-25	2.3	--	0.5	2.3
	1,2-Dichloroethene (total)	IR-25	209	--	0.5	209
	1,2-Dichloropropane	IR-25	1.1	--	1	1.1
	1,3,5-Trimethylbenzene	IR-25	19	--	1	19
	1,4-Dichlorobenzene	IR-25	2.1	--	1	2.1
	2-Methylnaphthalene[c]	IR-25	707	--	2	707
	Benzene	IR-25	0.4	--	0.5	0.5
	Bromodichloromethane	IR-25	1.0	--	1	1
	Chlorobenzene	IR-25	392	--	1	392
	Chloroethane	IR-25	6.5	--	1	6.5
	Chloroform	IR-10A, IR-25	0.7	--	1	1.0
	cis-1,2-Dichloroethene	IR-25	209	--	1	209
	Dichlorodifluoromethane	B4516	14	--	5	14
	Mercury	IR-25, B4219, B5117	0.68	0.60	0.1	0.68
	Methylene chloride	IR-25	27	--	1	27
	Naphthalene	IR-25	3.6	--	1	3.6
	Tetrachloroethene	IR-25, B1528	0.5	--	1	1
	trans-1,2-Dichloroethene	IR-25	182	--	1	182
	Trichloroethene	IR-10A, IR-25	2.9	--	1	2.9
	Trichlorofluoromethane	IR-25	176	--	1	176
	Vinyl chloride	IR-10A, IR-25	0.028	--	0.5	0.5

Table 10 (continued)
Remediation Goals for Chemicals of Concern in A-Aquifer Groundwater

Exposure Scenario	Chemical of Concern	Associated Plume[a] or Grid Number	RBC	HGAL	Laboratory Practical Quantitation Limit	Remediation Goal (µg/L)
Industrial - Vapor Intrusion	Chloroform	AY04	1.2	--	1	1.2
Construction Worker - Trench Exposure	1,2,4-Trichlorobenzene	IR-25	55	--	0.5	55
	1,2,4-Trimethylbenzene	IR-25	72	--	0.5	72
	1,2-Dichlorobenzene	IR-25	2,215	--	0.5	2,215
	1,2-Dichloroethane	IR-25	30	--	0.5	30
	1,2-Dichloroethene (total)	IR-25	363	--	0.5	363
	1,2-Dichloropropane	IR-25	40	--	1	40
	1,4-Dichlorobenzene	IR-25	68	--	1	68
	2,4,6-Trichlorophenol	AU05	15	--	10	15
	2,4-Dimethylphenol	IR-25	9,801	--	10	9,801
	2,4-Dinitrotoluene	IR-25	179	--	10	179
	2-Methylnaphthalene	IR-25	140	--	2	140
	4-Methylphenol	IR-25	3,500	--	10	3,500
	Arsenic	AH11	40	27.34	1.0	40
	Benzene	IR-25	22	--	0.5	22
	Benzo(a)anthracene	IR-25	0.67	--	2	2
	Benzo(a)pyrene	IR-25	0.045	--	2	2
	Bromodichloromethane	IR-25	26	--	1	26
	Chlorobenzene	IR-25	594	--	1	594
	Chloroform[c]	IR-25	36	--	1	36
	Chrysene	IR-25	6.4	--	2	6.4
	cis-1,2-Dichloroethene	IR-25	363	--	1	363
	Mercury[c]	IR-25	4.68	0.60	0.1	4.68
	Naphthalene	IR-25	20	--	1	20
	Pentachlorophenol	IR-25, AF13	8.1	--	25	25
	Tetrachloroethene	IR-25	19	--	1	19
	trans-1,2-Dichloroethene	IR-25	721	--	1	721
	Trichloroethene	IR-10A, IR-25	374	--	1	374
	Vinyl chloride	IR-10A, IR-25	7.2	--	0.5	7.2

Table 10 (continued)
Remediation Goals for Chemicals of Concern in A-Aquifer Groundwater

Exposure Scenario	Chemical of Concern	Associated Plume[a] or Grid Number	RBC	HGAL	Laboratory Practical Quantitation Limit	Remediation Goal (µg/L)
Environmental Evaluation	Mercury	IR-26	--	0.60	0.1	0.60

Notes:
All concentrations shown in micrograms per liter (µg/L).

a The plumes listed (IR-10A, IR-25) are those defined for the risk assessment

b Chemical is a COC based on the MAX scenario

-- Not applicable or not available

HGAL Hunters Point groundwater ambient level

IR Installation Restoration

MAX maximum concentration exposure

RBC exposure scenario-specific risk-based concentration

Table Source: TMSRA (St. George Chadux Corp. and Tetra Tech EM Inc 2007)

Table 11
Remediation Goals for Chemicals of Concern in B-Aquifer Groundwater

Exposure Scenario	Chemical of Concern	Associated Grid Number	RBC	HGAL	Laboratory Practical Quantitation Limit	Chemical-Specific ARAR[a]	Remediation Goal
Residential - Domestic Use	1,4-Dichlorobenzene	B0139	0.30	--	1	7.5[b]	7.5
	Antimony	B0139	15	43.26	10	6[b]	43.26
	Arsenic	B0139, B0238	0.0071	27.34	1	10[b]	27.34
	Benzene	B0139	0.11	--	0.5	5[b]	5
	Chloroethane	B0139	4.6	--	1	--	4.6
	Manganese	B0139, B0237	876	8,140	100	--	8,140
	Pentachlorophenol	B0139	1	--	25	1[b]	25
	Thallium	B0139	2.4	12.97	2	0.5[c]	12.97
	Trichloroethene	B0139	2.9	--	1	5[b]	5

Table Source: TMSRA (St. George Chadux Corp. and Tetra Tech EM Inc 2007)

Notes: All concentrations shown in micrograms per liter (µg/L).

a Chemical-specific ARARs are discussed in Section 4.2 of Parcel B TMSRA
b The ARAR shown is the federal primary MCL.
c The ARAR shown is the federal MCLG.
-- not applicable or not available
ARAR applicable or relevant and appropriate requirement
HGAL Hunters Point groundwater ambient level
MCL maximum contaminant level
MCLG maximum contaminant level goal
IR Installation Restoration
RBC exposure scenario-specific risk-based concentration

Table 12
Remediation Goals for Chemicals of Concern in Sediment

Exposure Scenario	Chemical of Concern[a]	Redevelopment Block	RBC	HPAL	Laboratory Practical Quantitation Limit	Remediation Goal (mg/kg)
Ecological receptor	Aluminum	BOS-1, BOS-3	3,400	--	1.0	3,400
	Copper	BOS-1, BOS-3	270	124	0.1	270
	Dibenz(a,h)anthracene	BOS-1, BOS-3	0.26	--	0.33	0.33
	Dieldrin	BOS-1, BOS-3	0.008	--	0.004	0.008
	Lead	BOS-1, BOS-3	218	8.99	0.1	218
	Methoxychlor	BOS-1, BOS-3	0.4	--	0.015	0.4
	Total Aroclors	BOS-1, BOS-3	0.18	--	0.02	0.18
	Total DDT	BOS-1, BOS-3	0.046	--	0.009	0.046
	Zinc	BOS-1, BOS-3	410	110	0.09	410

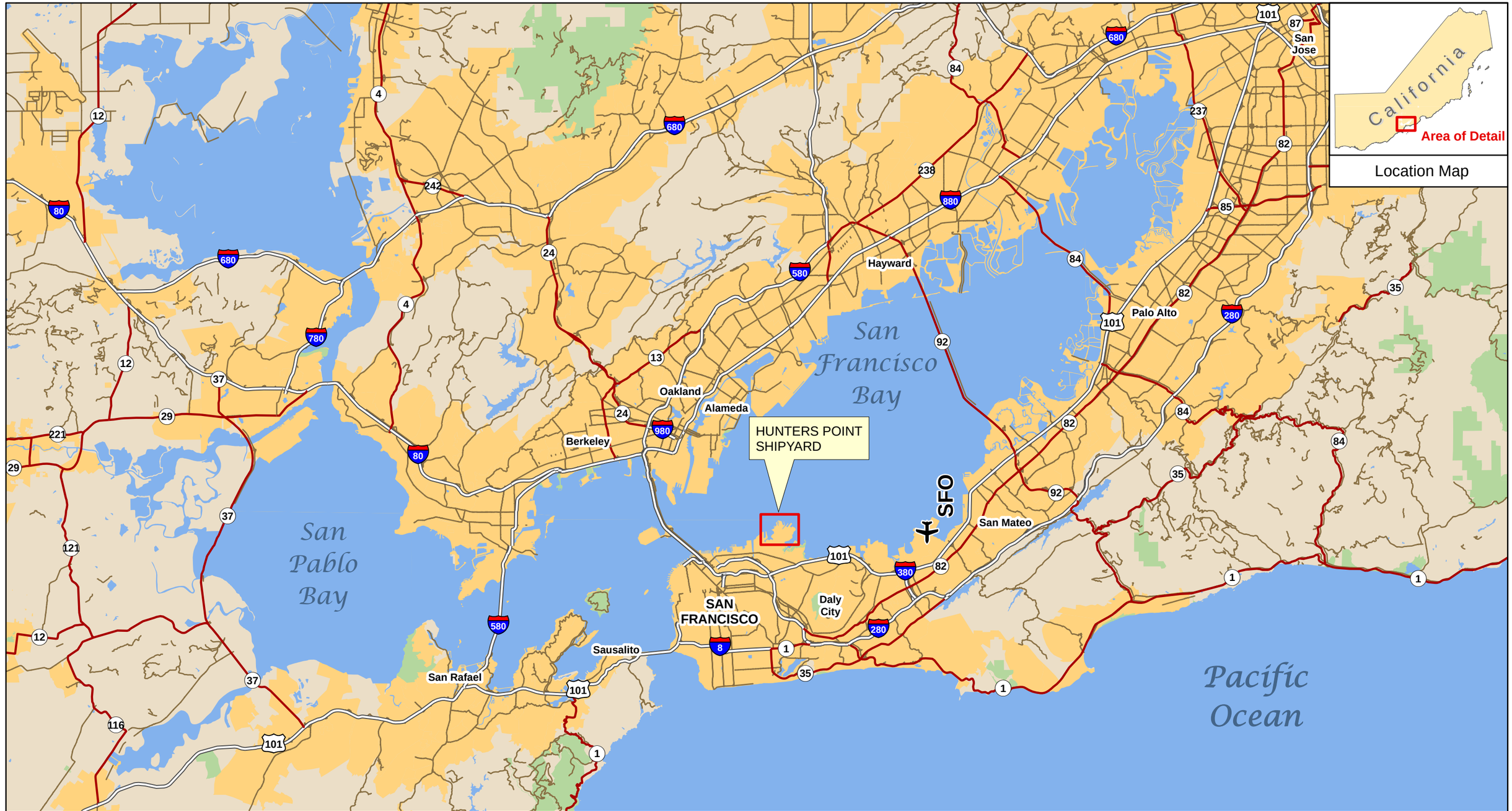
Table Source: TMSRA (St. George Chadux Corp. and Tetra Tech EM Inc 2007)

Notes: All concentrations shown in milligrams per kilogram (mg/kg).

a Chemicals of concern shown are based on the results of the screening-level ecological risk assessment.

-- not applicable
DDD dichlorodiphenyldichloroethane
DDE dichlorodiphenyldichloroethene
DDT dichlorodiphenyltrichloroethane
HPAL Hunters Point ambient level
RBC risk-based concentration
Total Aroclors summed concentration of aroclors
Total DDT summed concentration of DDT and its metabolites (DDD and DDE)

Figures



Legend

- Highway and Major Road
- State Route
- US Highway and Interstate
- Water Feature
- Park Boundary
- Incorporated Areas

N

5 2.5 0 5

Miles

Data Sources: The following shapefiles are from the California Spatial Information Library at http://gis.ca.gov/data.epl: State Boundary (CERES, 1997), Highways and Major Roads (CERES, 2002), California Park Boundaries (CERES, 2007). Major local roads and hydrography compiled from the USGS Bay Area Regional Database (BARD), 2001, at http://bard.wr.usgs.gov/index.html.
Location of shipyard from: SulTech, A Joint Venture of Sullivan Consulting Group and Tetra Tech EM Inc. June 2007. Parcel B Technical Memorandum in Support of a Record of Decision Amendment (TMSRA), Hunters Point Shipyard, San Francisco, California.

U.S. Department of the Navy
Base Realignment and Closure Program Management Office San Diego, California

Hunters Point Shipyard, San Francisco, California

JONAS & ASSOCIATES INC.
Environmental Consultants & General Contractors

Figure 1
Location Map

Second Five-Year Review of Remedial Actions

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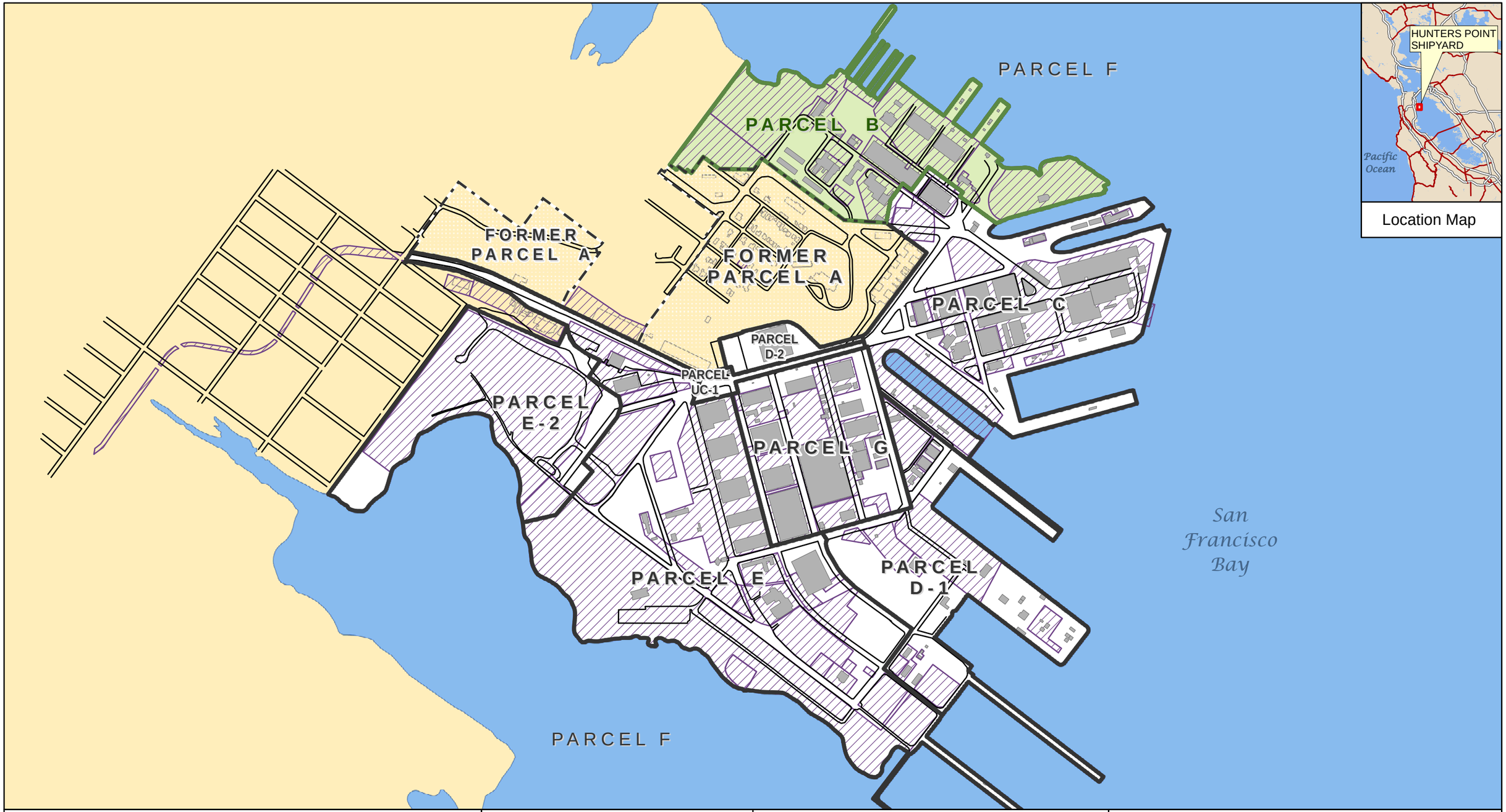

Legend

- Parcel Boundary
- Parcel B Boundary
- Former Parcel A
- Building
- IR or SI Site
- Non-Navy Property/City of San Francisco
- Waterbody
- Road

Notes: IR - Installation Restoration SI - Site Inspection

N

800 400 0 800

Feet

Data Sources: Shapefiles from: SulTech, A Joint Venture of Sullivan Consulting Group and Tetra Tech EM Inc. June 2007. Parcel B Technical Memorandum in Support of a Record of Decision Amendment (TMSRA), Hunters Point Shipyard, San Francisco, California.

U.S. Department of the Navy
Base Realignment and Closure Program Management Office San Diego, California

Hunters Point Shipyard, San Francisco, California

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Figure 2
Facility Location Map

Second Five-Year Review of Remedial Actions

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San Francisco Bay

DRY DOCK 7
DRY DOCK 6
DRY DOCK 5
DRY DOCK 3
DRY DOCK 2

IR-07
IR-18
IR-23
IR-60
IR-62
IR-10
IR-24
IR-20
IR-26
IR-42
SI-31

146
121
122
159
125
128
131
130
133
117
103
116
115
120
123
104
113
113A
156
134
140
Former Bldg 157
Former Bldg 142
109
135
204
205
207
208
206
231

INNES AVE.
DONAHUE ST.
GALVEZ AVE.
HUDSON AVE.
LOCKWOOD ST.
ROBINSON ST.

Location Map

B
UC-1
D-2
C
E-2
G
E
D-1
San Francisco Bay

Legend

- Parcel Boundary
- Parcel B Boundary
- IR or SI Site
- 111 Building with Number
- Non-Navy Property
- Waterbody
- Road

Notes: IR - Installation Restoration SI - Site Inspection

N

250 0 250
Feet

Data Sources: Shapefiles from: SulTech, A Joint Venture of Sullivan Consulting Group and Tetra Tech EM Inc. June 2007. Parcel B Technical Memorandum in Support of a Record of Decision Amendment (TMSRA), Hunters Point Shipyard, San Francisco, California.

U.S. Department of the Navy
Base Realignment and Closure Program Management Office
San Diego, California

Hunters Point Shipyard, San Francisco, California

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Figure 3
Parcel B Installation Restoration and Site Inspection Sites

Second Five-Year Review of Remedial Actions

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Legend

- Parcel Boundary
- Parcel B Boundary
- Extent of Excavation
- 111 Building with Number
- Non-Navy Property
- Waterbody
- Road

Note:
Excavations conducted from 1996 through 2005.

N

250 0 250
Feet

Data Sources: Shapefiles from: SulTech, A Joint Venture of Sullivan Consulting Group and Tetra Tech EM Inc. June 2007. Parcel B Technical Memorandum in Support of a Record of Decision Amendment (TMSRA), Hunters Point Shipyard, San Francisco, California.

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San Diego, California

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Figure 4
Parcel B
Excavation Location Map

Second Five-Year Review of Remedial Actions

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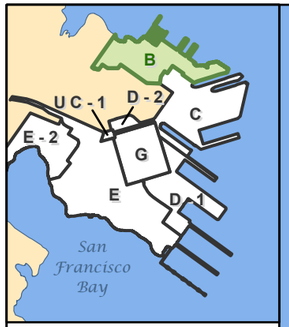


Location Map

San Francisco Bay

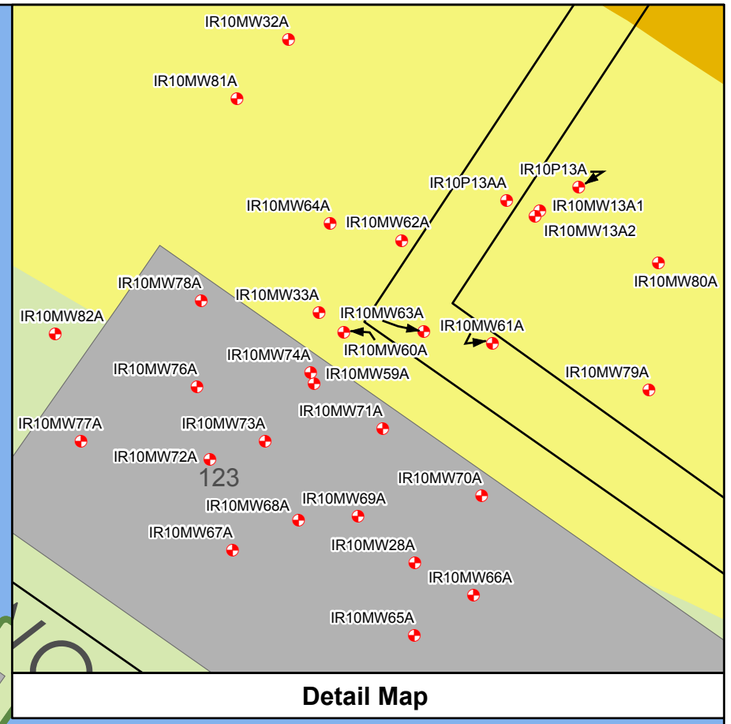
DRY DOCK 7
DRY DOCK 6
DRY DOCK 5
DRY DOCK 3
DRY DOCK 2

IR07MW28A
IR07MW25A
IR07MW21A1
IR07MW24A
IR07MW26A
IR07MWS-2
IR07MWS-4
IR07MW20A1
IR07P20A
IR07MW19A
IR46MW43A
PA24MW01A
IR07MW94A
IR07MW23A
IR07MW27A
IR18MW21A
PA18MW09A
IR18MW100B
IR18MW101B
IR07MW93A
IR18MW92A
UT03MW16A
UT03MW11A
UT03MW12A
IR61MW05A
IR61MW04A
IR62MW07A
UT02MW15A
IR62MW08A
IR06MW46A
IR46MW46A
IR46MW39A2
IR46MW39A3
IR46MW39A
IR46MW47A
IR10MW31A1
IR46MW48A
IR46MW40A3
IR46MW38A
IR46P38AB
IR24MW07A
IR24MW05A
IR24MW06A
IR46P38AA
IR10MW29A2
IR10MW29A1
IR10MW14A
IR46MW37A
IR46MW41A
IR26MW40A
IR25MW61A1
IR25MW61A2
IR25MW37A
IR20MW17A
IR26MW41A
IR26MW43A
IR26MW44A
PA50MW02A
IR26MW48A
IR26MW50A
IR26MW46A
IR26MW47A
IR26MW49A

See Detail Map

LOCKWOOD ST.
INNES AVE.
DONAHUE ST.
GALVEZ AVE.
HUDSON AVE.
ROBINSON ST.
PARCEL C

146
125
159
121
122
128
131
130
133
117
103
116
115
120
104
113
113A
109
134
135
156
140
204
205
207
208



Detail Map

Legend

- Monitoring Well
- Parcel Boundary
- Parcel B Boundary
- Tidally Influenced Zone
- Five-year Buffer Zone
- 111 Building with Number
- Non-Navy Property
- Waterbody
- Road

N

250 0 250

Feet

Data Sources: Monitoring Well locations from: CE2 - Kleinfelder Joint Venture. June 2007. Parcel B Quarterly Groundwater Monitoring Report (January-March 2007), Hunters Point Shipyard, San Francisco, California. All other shapefiles from: SulTech, A Joint Venture of Sullivan Consulting Group and Tetra Tech EM Inc. June 2007. Parcel B Technical Memorandum in Support of a Record of Decision Amendment (TMSRA), Hunters Point Shipyard, San Francisco, California.

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Figure 5
Parcel B Monitoring Well Location Map

Second Five-Year Review of Remedial Actions

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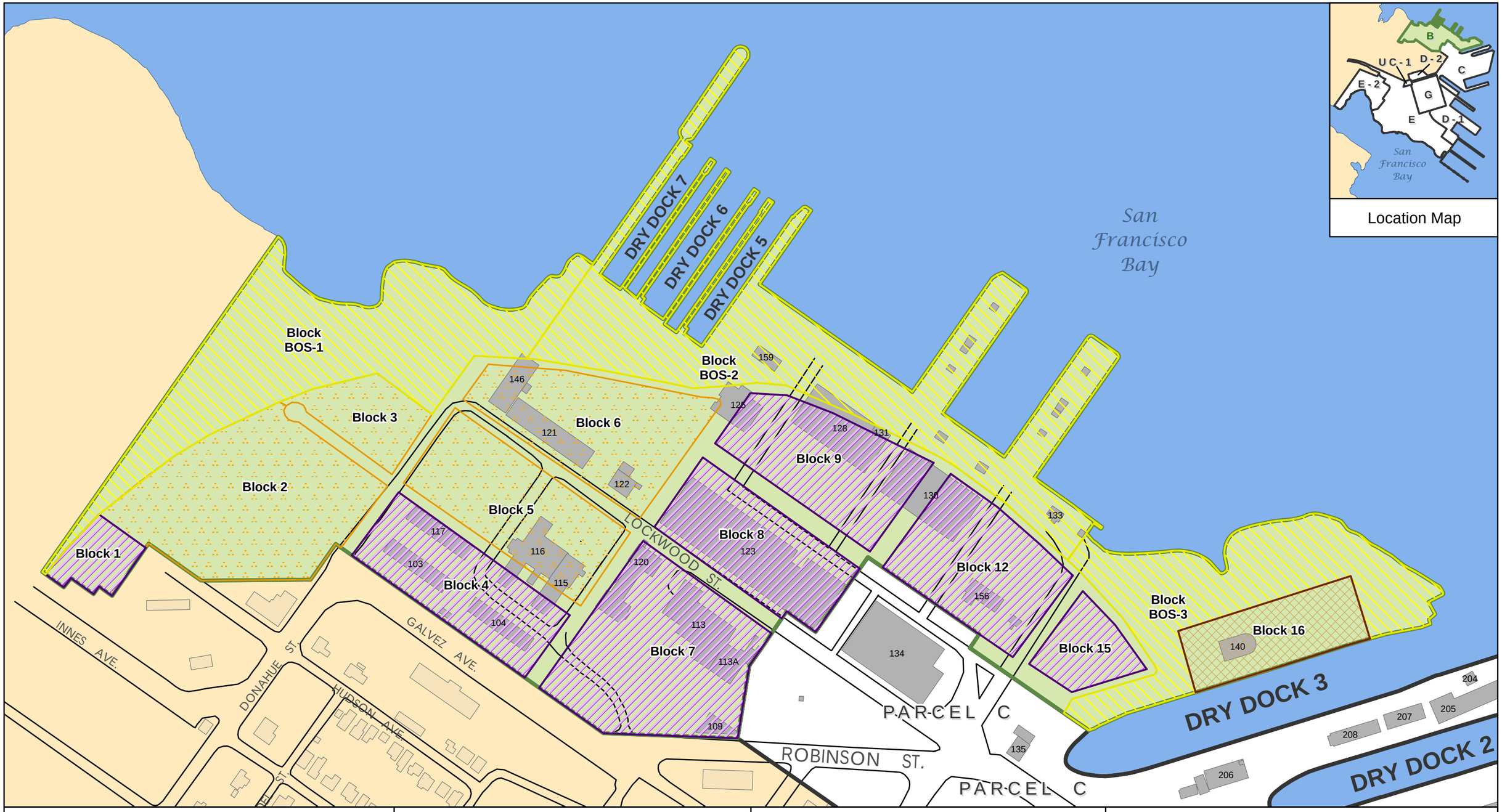

Location Map

Legend

- Parcel Boundary
- Parcel B Boundary
- 111 Building with Number
- Non-Navy Property
- Waterbody
- Road

Parcel B Redevelopment Blocks:

- Educational/Cultural
- Mixed Use
- Open Space
- Research and Development

N

250 0 250

Feet

Data Sources: Shapefiles from: SulTech, A Joint Venture of Sullivan Consulting Group and Tetra Tech EM Inc. June 2007. Parcel B Technical Memorandum in Support of a Record of Decision Amendment (TMSRA), Hunters Point Shipyard, San Francisco, California. Redevelopment blocks developed for the TMSRA based on "Hunters Point Shipyard Redevelopment Plan" San Francisco Redevelopment Agency. July 14, 1997.

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Figure 6
Parcel B Redevelopment Blocks and Planned Reuses

Second Five-Year Review of Remedial Actions

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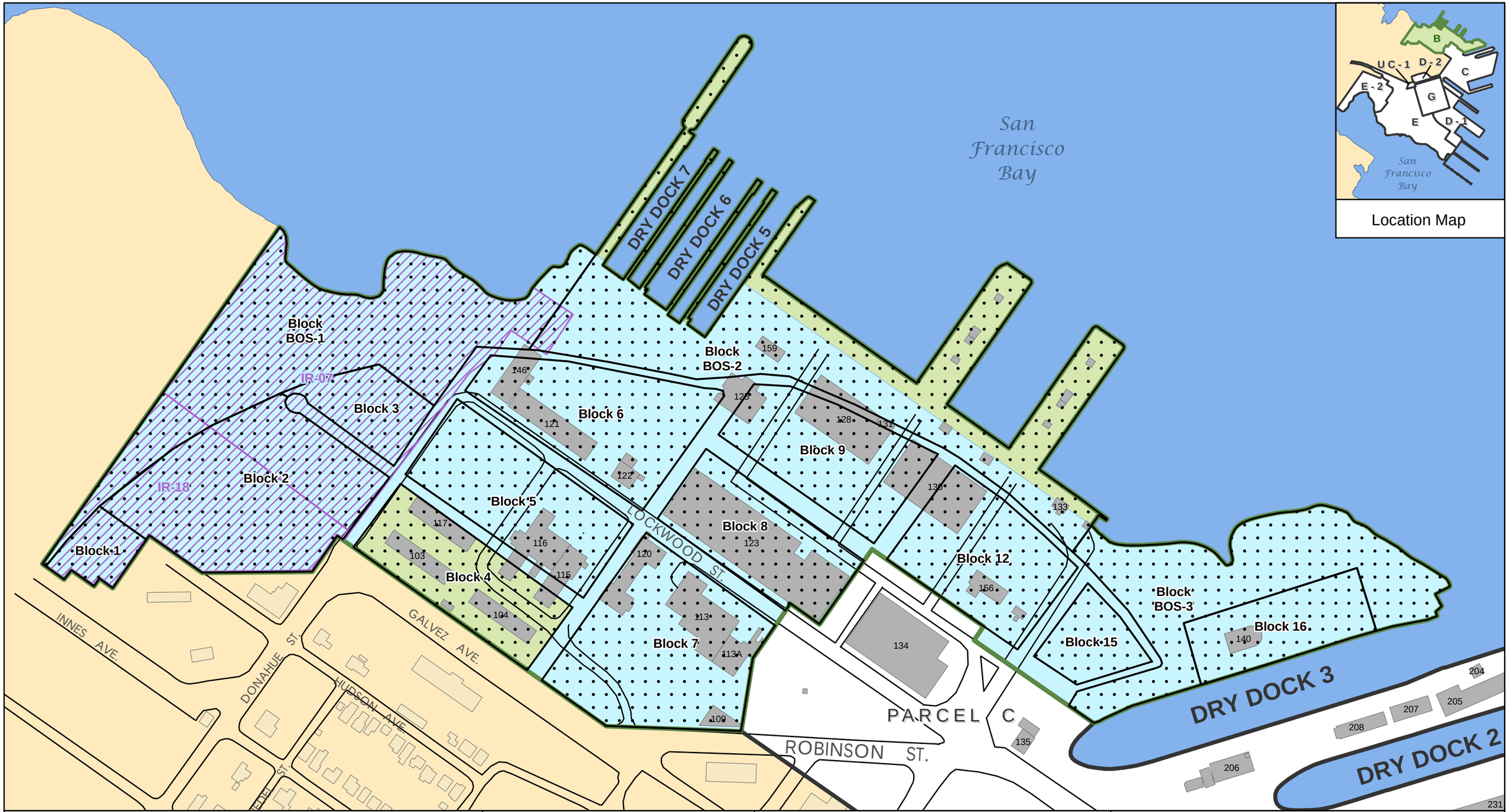

Legend

- Parcel Boundary
- Parcel B Boundary
- General Land Use Restrictions for IR Sites 7 and 18
- Restrictions Related to VOC Vapors
- Parcel B Redevelopment Blocks
- 111 Building with Number
- Non-Navy Property
- Waterbody
- Road

Notes: Deep pump shaft below Building 140 and IR Sites 07 and 18 will have radiologic restrictions.
IR - Installation Restoration
VOC - Volatile Organic Compound

N

250 0 250
Feet

Data Sources: Shapefiles from: SulTech, A Joint Venture of Sullivan Consulting Group and Tetra Tech EM Inc. June 2007. Parcel B Technical Memorandum in Support of a Record of Decision Amendment (TMSRA), Hunters Point Shipyard, San Francisco, California.Redevelopment blocks developed for the TMSRA based on "Hunters Point Shipyard Redevelopment Plan" San Francisco Redevelopment Agency. July 14, 1997.

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Figure 7
Parcel B Areas Requiring Institutional Controls

Second Five-Year Review of Remedial Actions

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Appendix A

Bibliography

Bibliography

Appendix A lists the relevant documents reviewed as part of the five-year review process. Documents included in this appendix were referenced when preparing the second five-year review report and they describe remedial actions implemented at Parcels B through E. Although Parcels C through E remedial actions are summarized, Parcel B is the focus of this five-year review. Documents are listed in alphabetical order by author.

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Appendix B

Applicable or Relevant and Appropriate Requirements

Tables are copied from Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

TABLE C-1: POTENTIAL FEDERAL CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
		GROUNDWATER		
Safe Drinking Water Act (42 U.S.C., ch. 6A, § 300[f]–300[j]-26)[b]				
National primary drinking water standards are health-based standards for public water systems (MCLs).	Public water system.	40 CFR § 141.61(a) and (c)	Relevant and appropriate	The Navy considers the B-aquifer a Class II aquifer under federal criteria and a potential source of drinking water based on an evaluation of site-specific factors. The Navy and the Water Board have determined that the A-aquifer is not a potential source of drinking water; therefore, drinking water standards (MCLs) are not potential ARARs.
MCLGs pertain to known or anticipated adverse health effects (also known as recommended MCLs).	Public water system.	40 CFR § 141.51	Relevant and appropriate	The Navy considers the B-aquifer a Class II aquifer under federal criteria and a potential source of drinking water based on an evaluation of site-specific factors. The Navy has identified the non-zero MCLG for thallium as a potential chemical-specific ARAR for the B-aquifer. The Navy and the Water Board have determined that the A-aquifer is not a potential source of drinking water; therefore, drinking water standards (MCLs and non-zero MCLGs) are not potential ARARs.

TABLE C-1: POTENTIAL FEDERAL CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
GROUNDWATER				
Resource Conservation and Recovery Act (42 U.S.C., ch. 82, §§ 6901–6991[i])[b]				
Groundwater protection standards: owners/operators of RCRA treatment, storage, or disposal facilities must comply with conditions in this section that are designed to ensure that hazardous constituents entering the groundwater from a regulated unit do not exceed the concentration limits for contaminants of concern set forth under Cal. Code Regs. tit. 22, § 66264.94 in the uppermost aquifer underlying the waste management area of concern at the POC.	A regulated unit that receives or has received hazardous waste before July 26, 1982, or regulated units that ceased receiving hazardous waste prior to July 26, 1982, where constituents in or derived from the waste may pose a threat to human health or the environment.	Cal. Code Regs. tit. 22, § 66264.94(a)(1), (a)(3), (c), (d), and (e)	Relevant and appropriate	There is no RCRA-regulated unit at HPS Parcel B; therefore, these standards are not applicable. These standards are potentially relevant and appropriate for the A-aquifer. The Navy will develop site-specific concentration limits for use in its groundwater monitoring program.
Defines RCRA hazardous waste. A solid waste is characterized as toxic, based on the TCLP, if the waste exceeds the TCLP maximum concentrations.	Waste.	Cal. Code Regs. tit. 22, § 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100	Applicable	These requirements are potential ARARs for all waste generated by the Navy in constructing monitoring wells for groundwater Alternatives GW-2 and GW-3. The Navy would determine if the waste is RCRA hazardous at the time it is generated.

TABLE C-1: POTENTIAL FEDERAL CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
SURFACE WATER				
Clean Water Act (Title 33 U.S.C., Chapter 26, §§ 1251-1387)[b]				
Surface water quality standards.	Discharge to waters of the United States.	40 CFR § 131.38	Applicable	These standards, known as the CTR, are potentially applicable surface water ARARs for the bay. The Navy has identified the CTR as potential ARARs for the A-aquifer at HPS Parcel B because contaminated groundwater may discharge to the bay. The Navy will meet the potential CTR ARARs at the interface of the A-aquifer groundwater and the bay for contaminants in the groundwater that do not have a promulgated concentration in Table 3-3 of the Basin Plan, identified as potential state chemical-specific ARARs. The Navy has identified MCLs as potential ARARs for the B-aquifer groundwater, which are protective of any discharge of B-aquifer groundwater to the bay. Therefore, the CTR are not potential ARARs for the B-aquifer.
SOIL				
Resource Conservation and Recovery Act (42 U.S.C., ch. 82, §§ 6901–6991[i])[b]				
Defines RCRA hazardous waste. A solid waste is characterized as toxic, based on the TCLP, if the waste exceeds the TCLP maximum concentrations.	Waste.	Cal. Code Regs. tit. 22, § 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100	Applicable	These requirements are potential ARARs for all waste generated by the Navy in implementing soil Alternatives S-2, S-3, S-4, and S-5. The Navy would determine if the waste is RCRA hazardous at the time it is generated.

TABLE C-1: POTENTIAL FEDERAL CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
SOIL (Continued)				
Resource Conservation and Recovery Act (42 U.S.C., ch. 82, §§ 6901–6991[i])[b]				
LDRs prohibit disposal of hazardous waste unless treatment standards are met.	Hazardous waste land disposal.	Cal. Code Regs. tit. 22, §§ 66268.1(f), 66268.40, 66268.44, 66268.48, 66268.49	Not ARARs	None of the alternatives evaluate the permanent on-site disposal of excavated soil or other waste. Therefore, requirements that RCRA hazardous waste comply with LDRs are not ARARs. There are alternatives that evaluate the off-site disposal of excavated soil and other waste. The Navy will characterize this waste for off-site disposal and will dispose of it at an appropriately licensed facility if necessary. If the excavated soil or other waste is determined to be RCRA hazardous waste, the disposal facility will have responsibility for complying with these LDRs.
Toxic Substances Control Act (15 U.S.C., ch. 53, §§ 2601–2692)[b]				
Regulates storage and disposal of PCB remediation waste. There are three options: (a) self-implementing on-site cleanup and disposal; (b) performance-based disposal using existing approved disposal technologies; and (c) risk-based disposal.	Soils, debris, sludge, or dredged materials contaminated with PCBs at concentrations greater than 50 mg/kg.	40 CFR § 761.61(c)	Applicable and relevant and appropriate	This is a potentially applicable requirement for soil containing PCB concentrations equal to or greater than 50 mg/kg. This is a potentially relevant and appropriate requirement for soil containing PCB concentrations less than 50 mg/kg. A measured concentration of 50 mg/kg has been documented near the shoreline at IR-07.

TABLE C-1: POTENTIAL FEDERAL CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Notes:

a	Only the substantive provisions of the requirements cited in this table are potential ARARs.
b	Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as potential ARARs. Specific potential ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered potential ARARs.
§	Section
§§	Sections
ARAR	Applicable or relevant and appropriate requirement
Cal. Code Regs.	California Code of Regulations
CFR	*Code of Federal Regulations*
CTR	California Toxics Rule
HPS	Hunters Point Shipyard
MCL	Maximum contaminant level
mg/kg	Milligram per kilogram
LDR	Land disposal restriction
PCB	Polychlorinated biphenyl
POC	Point of compliance
RCRA	Resource Conservation and Recovery Act
TCLP	Toxicity characteristic leaching procedure
U.S.C.	*United States Code*
Water Board	San Francisco Regional Water Quality Control Board

TABLE C-2: POTENTIAL STATE CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
		GROUNDWATER		
State and Regional Water Quality Control Boards[b]				
Authorizes the SWRCB and Water Board to establish in water quality control plans beneficial uses 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.		Cal. Water Code, div. 7, §§ 13240, 13241, 13243, 13263(a), 13269, and 13360 (Porter-Cologne Water Quality Control Act)	Applicable	The Navy accepts the substantive provisions of §§ 13240, 13241, 13243, 13263(a), 13269, and 13360 of the Porter-Cologne Act enabling legislation, as implemented through the beneficial uses, WQOs, waste discharge requirements, promulgated policies of the Basin Plan for the San Francisco Bay Region as potential ARARs.
Describes the water basins in the San Francisco Bay Region, establishes beneficial uses of groundwater and surface water, establishes WQOs, including narrative and numerical standards, and incorporates statewide water quality control plans and policies.	Waters of the state.	Chapters 2 and 3 of the Water Quality Control Plan for the San Francisco Bay Basin (Cal. Water Code §13240), Except the MUN designation for the A-aquifer	Applicable	Substantive requirements pertaining to beneficial uses, WQOs, and certain statewide water quality control policies are potential state ARARs for the groundwater components of this response action.

TABLE C-2: POTENTIAL STATE CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
GROUNDWATER (Continued)				
State and Regional Water Quality Control Boards[b]				
Establishes the policy that high-quality waters of the state "shall be maintained to the maximum extent possible" consistent with the "maximum benefit to the people of the State." It provides that whenever the existing quality of water is better than that required by applicable water quality policies, such existing high-quality water will be maintained until it has been demonstrated to the state that any change will be consistent with maximum benefit to the people of the state, will not unreasonably affect present and anticipated beneficial use of such water, and will not result in water quality less than that prescribed in the policies. It also states that any activity that produces or may produce a waste or increased volume or concentration of waste and that discharges or proposes to discharge to existing high-quality waters will be required to meet waste-discharge requirements that will result in the best practicable treatment or control of the discharge.	High quality waters of the state.	Statement of Policy With Respect to Maintaining High Quality of Waters in California, SWRCB Res. 68-16	Not an ARAR	The Navy has determined that SWRCB Res. 68-16 is not a potential chemical-specific ARAR for HPS Parcel B. SWRCB Res. 68-16 is not more stringent than the potential federal chemical-specific ARAR at Cal. Code Regs., tit. 22, § 66264.94. SWRCB Res. 68-16 is also not a potential action-specific ARAR for the groundwater alternatives evaluated in this TMSRA because none of the alternatives contemplates a direct discharge of groundwater.

TABLE C-2: POTENTIAL STATE CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
GROUNDWATER (Continued)				
State and Regional Water Quality Control Boards[b]				
Describes requirements for Water Board oversight of investigation and cleanup and abatement resulting from discharges of hazardous substances. Water boards may decide on cleanup and abatement goals and objectives for the protection of water quality and beneficial uses of water within each region. Establishes criteria for "containment zones" where cleanup to established water-quality goals is not economically or technically practicable.	Discharge of hazardous substance into waters of the state.	Policies and procedures for investigation and cleanup and abatement of discharges under Cal. Water Code § 13304, SWRCB Res. 92-49	Not an ARAR	SWRCB Res. 92-49 is not a potential chemical-specific ARAR for HPS Parcel B because it is not more stringent than the potential federal ARAR at Cal. Code Regs. tit. 22, § 66264.94.
Incorporated into all Water Board basin plans. Designates all groundwater and surface waters of the state as drinking water except where the TDS is greater than 3,000 ppm, the well yield is less than 200 gpd from a single well, the water is a geothermal resource or in a water conveyance facility, or the water cannot reasonable be treated for domestic use using either best management practices or best economically achievable treatment practices.	Waters of the state.	SWRCB Res. 88-63	Applicable	Pursuant to SWRCB Res. 88-63, groundwater in the A and B-aquifers is not a potential source of drinking water. The Navy will consider groundwater in the B-aquifer a potential source of drinking water under federal criteria and site-specific factors.
California Environmental Protection Agency, Department of Toxic Substances Control[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	These requirements are potential ARARs for all waste the Navy generates in constructing monitoring wells under groundwater Alternatives GW-2 and GW-3. The Navy would determine if the waste is non-RCRA hazardous waste when it is generated.

TABLE C-2: POTENTIAL STATE CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
GROUNDWATER (Continued)				
State and Regional Water Quality Control Boards[b]				
Definitions of designated and nonhazardous waste.	Waste.	Cal. Code Regs. tit. 27, §§ 20210 and 20220	Applicable	These requirements are potential ARARs for all waste the Navy generates in constructing monitoring wells under groundwater Alternatives GW-2 and GW-3. The Navy would determine if the waste is non-RCRA hazardous waste when it is generated.
SURFACE WATER				
State and Regional Water Quality Control Boards[b]				
Surface water quality standards.	Marine waters with salinities equal to or greater than 10 ppt 95 percent of the time.	Basin Plan Table 3-3	Applicable	These standards are potentially applicable to the bay. The Navy has identified Table 3-3 as potential ARARs for HPS Parcel B because contaminated groundwater may discharge to the bay. The Navy will meet the potential Table 3-3 ARARs at the interface of the A-aquifer groundwater and the bay. The Navy has identified MCLs as potential ARARs for the B-aquifer groundwater, which are protective of any discharge of B-aquifer groundwater to the bay. Therefore, Table 3-3 is not a potential ARAR for the B-aquifer.

TABLE C-2: POTENTIAL STATE CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
		SOIL		
California Environmental Protection Agency, Department of Toxic Substances Control[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	These requirements are potential ARARs for all waste the Navy generates in implementing various alternatives. The Navy would determine if the waste is non-RCRA hazardous waste when it is generated.
State and Regional Water Quality Control Boards[b]				
Definitions of designated and nonhazardous waste.	Waste.	Cal. Code Regs. tit. 27, §§ 20210 and 20220	Applicable	These requirements are potential ARARs for all waste generated by the Navy in implementing various alternatives. The Navy would determine if the waste is designated or nonhazardous waste when it is generated.
		AIR		
State Water Resources Control Board and Regional Water Quality Control Boards[b]				
Requires the operator of a landfill to ensure that the concentration of methane gas migrating from a landfill does not exceed 5 percent by volume in air at the facility property boundary and that the concentration of methane gas does not exceed 1.25 percent by volume in air in any on-site structures during closure and post-closure of the landfill.	Landfill.	Cal. Code Regs. tit. 27, § 20921(a)(1) and (2)	Relevant and appropriate	There is no landfill at Parcel B; however, the Navy has determined this requirement is potentially relevant and appropriate for excavating waste that contains methane gas in excess of these limits.

TABLE C-2: POTENTIAL STATE CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Notes:

a	Only the substantive provisions of the requirements cited in this table are potential ARARs.
b	Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as potential ARARs. Specific potential ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered potential ARARs.
§	Section
§§	Sections
ARAR	Applicable or relevant and appropriate requirement
Cal. Water Code	California Water Code
Cal. Code Regs.	Code of California Regulations
gpd	Gallon per day
HPS	Hunters Point Shipyard
MCL	Maximum contaminant level
MUN	Municipal and domestic supply
ppm	Part per million
ppt	Part per thousand
NPDES	National Pollutant Discharge Elimination System
RCRA	Resource Conservation and Recovery Act
Res.	Resolution
SWRCB	State Water Resources Control Board
TDS	Total dissolved solids
TMSRA	Technical memorandum in support of a record of decision amendment
Water Board	San Francisco Bay Regional Water Quality Control Board
WQO	Water quality objective

TABLE C-3: POTENTIAL FEDERAL LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Location	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
Exec. Order No. 11990, Protection of Wetlands[b]					
Wetland	Avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and avoid support of new construction in wetlands if practicable alternatives exist.	Wetland meeting definition of Section 7.	40 CFR § 6.302(a) and 40 CFR pt. 6, app. A, § 6(a)(1), (3), and (5) (at the end of § 6.1007)	Relevant and appropriate	Construction of the shoreline revetment will result in filling of a small (1,300 ft^2) wetland.
Coastal Zone Management Act (16 U.S.C. §§ 1451–1464)[b]					
Within coastal zone	Conduct activities in a manner consistent with approved state management programs.	Activities affecting the coastal zone, including lands thereunder and adjacent shore land.	16 U.S.C. § 1456(c)(1)(A) 15 CFR Part 930	Relevant and appropriate	The CZMA excludes federal lands from the coastal zone; however, since portions of HPS Parcel B are within the coastal zone, the Navy has determined that it is relevant and appropriate.

Notes:

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

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

§ Section
§§ Sections
ARAR Applicable or relevant and appropriate requirement
CFR *Code of Federal Regulations*
CZMA Coastal Zone Management Act
ft^2 Square foot
HPS Hunters Point Shipyard
U.S.C. *United States Code*

TABLE C-4: POTENTIAL STATE LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Location	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
McAteer-Petris Act (California Government Code §§ 66600 through 66661)[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 the San Francisco Bay and 100 feet landward of the shoreline.	San Francisco Bay Plan at Cal. Code Regs. tit. 14, §§ 10110 through 11990	Relevant and appropriate	The Navy has determined that the substantive provisions of the Coastal Zone Management Act are potentially relevant and appropriate federal location-specific requirements for HPS Parcel B. The Coastal Zone Management Act requires federal agency activity be conducted in a manner consistent with approved state management programs to the maximum extent practicable. The McAteer-Petris Act is enabling legislation for the San Francisco Bay Plan, an approved state management program for the San Francisco Bay. Substantive provisions of the McAteer-Petris Act and the San Francisco Bay Plan are relevant and appropriate because their authority is derived from the Coastal Zone Management Act, a relevant and appropriate federal requirement. The Navy will continue to conduct its response actions in accordance with the substantive provisions of the San Francisco Bay Plan.

Notes:

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

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

§§ Sections

ARAR Applicable or relevant and appropriate requirement

Cal. Code Regs. *California Code of Regulations*

HPS Hunters Point Shipyard

TABLE C-5: POTENTIAL FEDERAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
SOIL ALTERNATIVES					
Resource Conservation and Recovery Act (42 U.S.C., Chapter 82, §§ 6901-6991[i])[a]					
Construct a shoreline revetment or soil cover.	The final cover must accommodate lateral and vertical shear forces generated by the maximum credible earthquake so that the integrity of the final cover is maintained.	RCRA hazardous waste management unit.	Cal. Code Regs. tit. 22, § 66264.310(a)(5)	Relevant and appropriate	The Navy has determined that this regulation is a potential ARAR for constructing a shoreline revetment and covers for the soil. This regulation is relevant and appropriate because the revetment and covers will not be constructed as landfill waste management units. Instead, the revetment and covers will be constructed solely to prevent exposure to contaminants in the soil.
Construct a shoreline revetment or soil cover.	Maintain the integrity and effectiveness of the final cover, including making repairs to the cover as necessary to correct the effects of settling, subsidence, erosion, or other events throughout the post-closure period. Prevent runon and runoff from eroding or otherwise damaging the final cover throughout the post-closure period.	RCRA hazardous waste management unit.	Cal Code Regs. tit. 22, § 66264.310(b)(1) and (4)	Relevant and appropriate	The Navy has determined that these requirements are potential ARARs for constructing a shoreline revetment and covers for the soil. These requirements are relevant and appropriate because the revetment and covers will not be constructed as landfill waste management units. Instead, the revetment and covers will be constructed solely to prevent exposure to contaminants in the soil.
Construct a shoreline revetment or soil cover.	Protect and maintain surveyed benchmarks throughout the post-closure period.	RCRA hazardous waste management unit.	Cal. Code Regs. tit. 22, § 66264.310(b)(5)	Relevant and appropriate	The Navy has determined that this regulation is a potential ARAR for constructing a shoreline revetment and covers for the soil. This regulation is relevant and appropriate because the revetment and covers will not be constructed as landfill waste management units. Instead, the revetment and covers will be constructed solely to prevent exposure to contaminants in the soil.

TABLE C-5: POTENTIAL FEDERAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
SOIL ALTERNATIVES (Continued)					
Resource Conservation and Recovery Act (42 U.S.C., Chapter 82, §§ 6901-6991[i])[a]					
Construct a shoreline revetment.	Alternative requirements that are protective of human health or the environment may replace design, operating, or closure standards for temporary tanks and container storage areas.	Temporary storage of RCRA hazardous waste.	Cal Code Regs. tit. 22, § 66264.553(b), (d), (e), and (f)	Applicable or relevant and appropriate	These requirements are applicable for the temporary storage of dredged material that meets the definition of RCRA hazardous waste or non-RCRA, state regulated hazardous waste under Cal. Code Regs. tit. 22, including sediment with TTLC wet weight concentrations of PCBs greater than or equal to 50 mg/kg. Concentrations of PCBs equal to or greater than 50 mg/kg have been measured in the sediment along the shoreline of IR-07. These requirements are relevant and appropriate for dredged material that does not meet the definition of RCRA hazardous waste.
Excavate soil or generate waste.	Person who generates waste shall determine if the waste is a RCRA hazardous waste.	Generator of waste.	Cal. Code Regs. tit. 22, § 66262.10(a), 66262.11	Applicable	These regulations are applicable to excavation of soil and generation of waste. The Navy will determine whether the soil or any waste is RCRA hazardous waste when it is generated.
Excavate soil or generate waste.	Requirements for analyzing waste for determining whether waste is hazardous.	Generator of waste.	Cal. Code Regs. tit. 22, § 66264.13(a) and (b)	Applicable	These regulations are applicable to the excavation of soil and the generation of waste. The Navy will determine whether the soil or any waste is RCRA hazardous waste when it is generated.

TABLE C-5: POTENTIAL FEDERAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
SOIL ALTERNATIVES (Continued)					
Resource Conservation and Recovery Act (42 U.S.C., Chapter 82, §§ 6901-6991[i])[a]					
Stockpile soil for off-site disposal.	Allows generators to accumulate solid remediation waste in an EPA-designated pile for storage only up to 2 years during remedial operations without triggering land disposal restrictions.	RCRA hazardous remediation waste temporarily stored in piles.	40 CFR § 264.554(d)(1)(i) through (ii), (d)(2), (e), (f), (h), (i), (j), and (k)	Applicable or relevant and appropriate	The Navy will temporarily stockpile soil in staging piles for off-site disposal. The Navy will characterize the soil, but does not anticipate that all soil will be RCRA hazardous waste, in which case the requirements will be relevant and appropriate. These requirements would be applicable to stockpiled soil that meets the definition of RCRA hazardous waste. Therefore, the Navy will identify these requirements as either applicable or relevant and appropriate, depending on the results of sampling and analysis for waste characterization.
Clean Water Act, as Amended (33 U.S.C., ch. 26, §§ 1251–1387)[a]					
Construct a shoreline revetment.	Action to prohibit discharge of dredged or fill material into waters of the United States without permit.	Waters of the United States.	33 U.S.C. § 1344 40 CFR § 230.10; 230.11; 230.20 through 230.25; 230.31; 230.32; 230.41; 230.42; 230.53	Applicable	Alternatives S-2 through S-5 for soil evaluate construction of a shoreline revetment that will result in the discharge of fill material into a wetland sufficiently connected to the bay to be regulated under the Clean Water Act. This discharge will be done in compliance with the substantive provisions of Nationwide General Permit 38. The Navy is not required to obtain a permit or submit notification that it will discharge in compliance with Nationwide General Permit 38; however, the Navy will use the substantive requirements of this permit as a means by which to comply with these potential ARARs. In addition, the loss of the wetland will be mitigated by the Navy.

TABLE C-5: POTENTIAL FEDERAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
SOIL ALTERNATIVES (Continued)					
Resource Conservation and Recovery Act (42 U.S.C., Chapter 82, §§ 6901-6991[i])[a]					
Construct a shoreline revetment.	U.S. Army Corps of Engineers requirements for permitting discharges of dredged material into waters of the United States.	Discharge of dredged material into waters of the United States.	33 CFR § 320.4 and 323	Applicable	Alternatives S-2 through S-5 for soil evaluate construction of a shoreline revetment that will result in the discharge of fill material into a wetland sufficiently connected to the bay to be regulated under the Clean Water Act. This discharge will be done in compliance with the substantive provisions of Nationwide General Permit 38. The Navy is not required to obtain a permit or submit notification that it will discharge in compliance with Nationwide General Permit 38; however, the Navy will use the substantive requirements of this permit as a means by which to comply with these potential ARARs. In addition, the loss of the wetland will be mitigated by the Navy.
Construct a soil cover or excavate soil.	Owners and operators of construction activities must be in compliance with discharge standards.	Construction activities at least 1 acre in size.	Clean Water Act §402 40 CFR § 122.44(k)(2) and (4)	Applicable	The Navy anticipates disturbing more than 1 acre in the alternatives that involve excavation and off-site disposal of soil and constructing soil covers. The Navy will use the requirements of state general storm water discharge permit, Order 99-08-DWQ, as TBCs for complying with the storm water discharge requirements under the Clean Water Act.
Clean Air Act (42 U.S.C. §§ 7401–7671)[a]					
Construct a shoreline revetment or soil cover; excavate soil.	Prohibits emission equal or greater to 20 percent opacity.	Emission from a source.	BAAQMD Rule 6-302	Applicable	This requirement is applicable to construction required for installation of the shoreline revetment and soil covers as well as for excavation.

TABLE C-5: POTENTIAL FEDERAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
SOIL ALTERNATIVES (Continued)					
Clean Air Act (42 U.S.C. §§ 7401–7671)[a] (Continued)					
Operate an SVE system.	New emission sources must use best available control technology.	New emission source.	BAAQMD Regulation 2-1-301	Applicable	The Navy would treat the off-gas resulting from the SVE system with a granular activated carbon unit.
Operate an SVE system.	Requirements for SVE systems.	SVE system.	BAAQMD Regulation 8-47	Applicable	These requirements are applicable to the SVE system.
GROUNDWATER ALTERNATIVES					
Resource Conservation and Recovery Act (42 U.S.C., Chapter 82, §§ 6901-6991[i])[a]					
Monitor groundwater.	In conjunction with corrective action measures, the owner or operator shall establish and implement a water quality monitoring program to 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.	RCRA hazardous waste management unit.	Cal. Code Regs. tit. 22 § 66264.100(d)	Relevant and appropriate	These requirements are applicable to RCRA hazardous waste facilities; however, the Navy has determined that they are relevant and appropriate to the monitoring component of the groundwater response action.
Monitor groundwater.	Contaminants of concern are the waste constituents, reaction products, and hazardous constituents that are reasonably expected to be in or derived from the waste contained in the regulated unit.	RCRA hazardous waste management unit.	Cal. Code Regs. tit. 22 § 66264.93	Relevant and appropriate	These requirements are applicable to RCRA hazardous waste facilities; however, the Navy has determined that they are relevant and appropriate to the monitoring component of the groundwater response action.

TABLE C-5: POTENTIAL FEDERAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
GROUNDWATER ALTERNATIVES (Continued)					
Resource Conservation and Recovery Act (42 U.S.C., Chapter 82, §§ 6901-6991[i])[a]					
Monitor groundwater.	Owner or operator of shall establish a groundwater monitoring system for each regulated unit and include a sufficient number of monitoring points installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer that represent the quality of groundwater passing the point of compliance.	RCRA hazardous waste management unit.	Cal. Code Regs. tit. 22 § 66264.97(b)(1)(A), (b)(1)(D)(1) and (b)(1)(D)(2)	Relevant and appropriate	These requirements are applicable to RCRA hazardous waste facilities; however, the Navy has determined that they are relevant and appropriate to the monitoring component of the groundwater response action.
Monitor groundwater.	Requirements for monitoring well construction and sampling intervals.	RCRA hazardous waste management unit.	Cal. Code Regs. tit. 22 § 66264.97(b)(4), (5), (6), and (7)	Relevant and appropriate	These requirements are applicable to RCRA hazardous waste facilities; however, the Navy has determined that they are relevant and appropriate to the monitoring component of the groundwater response action.
Monitor groundwater.	Requirements for collecting samples.	RCRA hazardous waste management unit.	Cal. Code Regs. tit. 22 § 66264.97(e)(6), (e)(12)(A)(3), (e)(12)(B), (e)(13), and (e)(15)	Relevant and appropriate	These requirements are applicable to RCRA hazardous waste facilities; however, the Navy has determined that they are relevant and appropriate to the monitoring component of the groundwater response action.
Generate investigation-derived waste.	Person who generates waste shall determine if the waste is a RCRA hazardous waste.	Generator of waste.	Cal. Code Regs. tit. 22, §§ 66262.10(a), 66262.11	Applicable	These regulations are applicable to generation of waste associated with groundwater alternatives. The Navy will determine whether the waste is RCRA hazardous waste when it is generated.
Generate investigation-derived waste.	Requirements for analyzing waste for determining whether waste is hazardous.	Generator of waste.	Cal. Code Regs. tit. 22, § 66264.13(a) and (b)	Applicable	These regulations are applicable to the generation of waste associated with groundwater alternatives. The Navy will determine whether the waste is RCRA hazardous waste when it is generated.

TABLE C-5: POTENTIAL FEDERAL ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
GROUNDWATER ALTERNATIVES (Continued)					
Safe Drinking Water Act (42 U.S.C. § 300[f]-300[j]-26)[a]					
Inject biological amendment or zero-valent iron into groundwater.	The underground injection control program prohibits injection that allows movement of contaminants into underground sources of drinking water that may result in violations of MCLs or adversely affect health.	An approved UIC program is required in states listed under SDWA Section 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(a) excluding the reporting requirements in § 144.12(b) and 144.12(c)(1)	Applicable	This requirement is applicable to the Navy's injection of zero-valent iron into the groundwater. The Navy will use the basic information requirements contained in 40 CFR §144.83 as TBCs for complying with the requirement in 40 CFR §144.12(a).

Notes:

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

§	Section	MCL	Maximum contaminant level
§§	Sections	mg/kg	Milligram per kilogram
ARAR	Applicable or relevant and appropriate requirement	PCB	Polychlorinated biphenyl
BAAQMD	Bay Area Air Quality Management District	RCRA	Resource Conservation and Recovery Act
Cal. Code Regs.	*California Code of Regulations*	SDWA	Safe Drinking Water Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	SVE	Soil vapor extraction
CFR	*Code of Federal Regulations*	TBC	To be considered
EPA	U.S. Environmental Protection Agency	UIC	Underground injection control
IR	Installation Restoration	U.S.C.	*United States Code*

TABLE C-6: POTENTIAL STATE ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
SOIL ALTERNATIVES					
California Civil Code (Cal. Civil Code § 1471)[a]					
Land use controls.	Provides conditions under which land use restrictions will apply to successive owners of land.	Transfer property from the Navy to a nonfederal agency.	Cal. 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.
California Health and Safety Code Land Use Controls (Cal. Health & Safety Code § 25202.5, § 25222.1, § 25232(b), § 25233(c), § 25234, § 25355.5)[a]					
Land use 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 agency.	Cal. 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."
Land use controls.	Provides a streamlined process to be used to enter into an agreement to restrict specific use of property in order to implement the substantive use restrictions of Cal. Health & Safety Code § 25232(b)(1)(A)–(E).	Transfer property from the Navy to a nonfederal agency.	Cal. Health & Safety Code § 25222.1	Relevant and Appropriate	Cal. 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 Cal. Health & Safety Code § 25222.1 is the general narrative standard: "restricting specified uses of the property."

TABLE C-6: POTENTIAL STATE ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
SOIL ALTERNATIVES (Continued)					
California Health and Safety Code Land Use Controls (Cal. Health & Safety Code § 25202.5, § 25222.1, § 25232(b), § 25233(c), § 25234, § 25355.5)[a]					
Land use controls.	Prohibits certain uses of land containing hazardous waste without a specific variance.	Hazardous waste property.	Cal. Health & Safety Code § 25232(b)(1)(A)–(E)	Relevant and Appropriate	This section is a potential ARAR for ICs that prohibit 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.
Land use controls.	Provides a process and criteria for obtaining a written variance from a land use restriction.	Transfer property from the Navy to a nonfederal entity.	Cal. Health & Safety Code § 25233(c)	Relevant and Appropriate	Cal. 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.
Land use controls.	Provides a process and criteria by which DTSC can remove land use restrictions.	Transfer property from the Navy to a nonfederal entity.	Cal. Health & Safety Code § 25234	Relevant and Appropriate	Cal. 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."
Land use controls.	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.	Cal. Health & Safety Code § 25355.5(a)(1)(C)	Relevant and Appropriate	The substantive requirements of the following Cal. 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 C-6: POTENTIAL STATE ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
SOIL ALTERNATIVES (Continued)					
Department of Toxic Substances Control[a]					
Implementing an institutional control.	A land use covenant imposing appropriate limitations on land use shall be executed and recorded when Facility closure, corrective action, remedial or removal action, or other response actions are undertaken and hazardous materials, hazardous wastes or constituents, or hazardous substances will remain at the property at levels which are not suitable for unrestricted use of the land.	Property transfer by federal government to non-federal entity.	Cal. Code Regs. tit. 22, § 67391.1	Relevant and appropriate	These requirements are relevant and appropriate when the Navy is transferring property to a nonfederal agency. EPA specifically considers substantive provisions of §§ (a), (b), (d), and (e) to be potential ARARs.
State Water Resources Control Board[a]					
Constructing a shoreline revetment and soil covers.	Alternatives to construction or prescriptive standards contained in the SWRCB-promulgated regulations of this subdivision may be considered.	Waste management unit. Cal. Code Regs. tit. 27 requirements are only applicable for waste discharged after 18 July 1997 unless otherwise noted.	Cal. Code Regs. tit. 27 § 20080(b)	Relevant and appropriate	The Navy has determined that this regulation is a potential ARAR for constructing a shoreline revetment and covers for the soil. This regulation is relevant and appropriate because the revetment and covers will not be constructed as landfill waste management units. Instead, the revetment and covers will be constructed solely to prevent exposure to contaminants in the soil.
Constructing a shoreline revetment and soil covers.	Actions taken by or at the direction of public agencies to clean up or abate conditions of pollution or nuisance resulting from unintentional or unauthorized releases of waste or pollutants to the environment; provided that wastes, pollutants, or contaminated materials removed from the immediate place of release shall be discharged according to the SWRCB-promulgated sections of Article 2, Subchapter 2, Chapter 3, Subdivision 1 of this division (§ 20200 et seq.); and further provided that remedial actions intended to contain the wastes at the place of release shall implement applicable SWRCB-promulgated provisions of this division to the extent feasible.	Action taken by or at the direction of a public agency to cleanup release of pollutant.	Cal. Code Regs. tit. 27, § 20090(d)	Relevant and appropriate	This requirement is a potential ARAR for the Navy's response actions.

TABLE C-6: POTENTIAL STATE ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
SOIL ALTERNATIVES (Continued)					
State Water Resources Control Board[a]					
Constructing a shoreline revetment and soil covers.	Closed units shall be provided with at least two permanent monuments installed by a licensed land surveyor or a registered civil engineer, from which the location and elevation of containment structures can be determined throughout the post-closure maintenance period.	Waste management unit.	Cal. Code Regs. tit. 27 § 20950(d)	Relevant and appropriate	The Navy has determined that this regulation is a potential ARAR for constructing a shoreline revetment and covers for the soil. This regulation is relevant and appropriate because the revetment and covers will not be constructed as landfill waste management units. Instead, the revetment and covers will be constructed solely to prevent exposure to contaminants in the soil.
Constructing a shoreline revetment and soil covers.	In spite of differential settlement, the final cover of closed landfills (including waste piles and surface impoundments closed as landfills) shall be designed, graded, and maintained to prevent ponding and to prevent soil erosion caused by high run-off velocities. All portions of the final cover shall have a slope of at least 3 percent unless Water Board allows portions of the final cover to be built with slopes of less than three percent when the discharger proposes an effective system for diverting surface drainage from laterally adjacent areas and preventing ponding in the allowed flatter portion. The final grading design shall be designed and approved by a registered civil engineer or certified engineering geologist taking into consideration pertinent natural and constructed topographic features (including any related to the proposed post-closure land use), and climate.	Waste management unit.	Cal. Code Regs. tit. 27, § 21090(b)(1)	Relevant and appropriate	The Navy has determined that this regulation is a potential ARAR for constructing a shoreline revetment and covers for the soil. This regulation is relevant and appropriate because the revetment and covers will not be constructed as landfill waste management units. Instead, the revetment and covers will be constructed solely to prevent exposure to contaminants in the soil.

TABLE C-6: POTENTIAL STATE ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
SOIL ALTERNATIVES (Continued)					
State Water Resources Control Board[a]					
Constructing a shoreline revetment and soil covers.	Throughout post-closure maintenance period, the discharger shall prevent erosion and related damage of the final cover caused by drainage.	Waste management unit.	Cal. Code Regs. tit. 27, § 21090(c)(4)	Relevant and appropriate	The Navy has determined that this regulation is a potential ARAR for constructing a shoreline revetment and covers for the soil. This regulation is relevant and appropriate because the revetment and covers will not be constructed as landfill waste management units. Instead, the revetment and covers will be constructed solely to prevent exposure to contaminants in the soil.
Constructing a shoreline revetment and soil covers.	For a closed landfill, when all closure activities are complete for the unit, the discharger shall conduct an aerial photographic survey, or alternative survey under (e)(3), of the closed portions of the unit and of its immediate surrounding area, including at least the surveying monuments [of § 20950(d)]. The data obtained shall be used to produce a topographic map of the site at a scale and contour interval sufficient to depict the as-closed topography of each portion of the unit, and to allow the early identification of any differential settlement. The map produced pursuant to this paragraph shall act as a baseline against which to measure the total settlement, through time, of all portions of the final cover since the date when that landfill, or portion thereof, was closed.	Waste management unit.	Cal. Code Regs. tit. 27, § 21090(e)(1) and (3)	Relevant and appropriate	The Navy has determined that this regulation is a potential ARAR for constructing a shoreline revetment and covers for the soil. This regulation is relevant and appropriate because the revetment and covers will not be constructed as landfill waste management units. Instead, the revetment and covers will be constructed solely to prevent exposure to contaminants in the soil.

TABLE C-6: POTENTIAL STATE ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
SOIL ALTERNATIVES (Continued)					
State Water Resources Control Board[a]					
Constructing a shoreline revetment and soil covers.	The final cover shall function with minimum maintenance and shall be compatible with post-closure land use. Alternative final cover designs shall meet the performance requirements of paragraph (a). The local enforcement agency may require additional thickness, quality, and type of final cover depending on, but not limited to the future reuse of the site.	Waste management unit.	Cal. Code Regs. tit. 27, § 21140	Relevant and appropriate	The Navy has determined that this regulation is a potential ARAR for constructing a shoreline revetment and covers for the soil. This regulation is relevant and appropriate because the revetment and covers will not be constructed as landfill waste management units. Instead, the revetment and covers will be constructed solely to prevent exposure to contaminants in the soil.
Constructing a shoreline revetment and soil covers.	The operator shall ensure the integrity of final slopes under both static and dynamic conditions to protect public health and safety and prevent damage to post-closure land uses, roads, structures, utilities, and to prevent exposure of waste.	Waste management unit.	Cal. Code Regs. tit. 27, §21145(a)	Relevant and appropriate	The Navy has determined that this regulation is a potential ARAR for constructing a shoreline revetment and covers for the soil. This regulation is relevant and appropriate because the revetment and covers will not be constructed as landfill waste management units. Instead, the revetment and covers will be constructed solely to prevent exposure to contaminants in the soil.
Constructing a shoreline revetment and soil covers.	The drainage and erosion control system shall be designed and maintained to ensure integrity of post-closure land uses, roads, and structures; to prevent public contact with waste; to prevent safety hazards; and to prevent exposure of waste. Slopes not underlain by waste shall be stabilized to prevent soil erosion. Methods used to protect slopes and control erosion shall include, but are not limited to, terracing, contour furrows, and trenches.	Waste management unit.	Cal. Code Regs. tit. 27, § 21150	Relevant and appropriate	The Navy has determined that this regulation is a potential ARAR for constructing a shoreline revetment and covers for the soil. This regulation is relevant and appropriate because the revetment and covers will not be constructed as landfill waste management units. Instead, the revetment and covers will be constructed solely to prevent exposure to contaminants in the soil.

TABLE C-6: POTENTIAL STATE ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
SOIL ALTERNATIVES (Continued)					
Air Resources Board[a]					
Maintaining landscape on previous excavations, excavating soil, constructing a shoreline revetment, and constructing soil covers.	No person shall engage in any construction or grading operation on property where the area to be disturbed is greater than 1 acre unless an asbestos dust mitigation plan for the operation has been submitted to and approved by the district before the start of any construction or grading; and the provisions of that dust mitigation plan are implemented at the beginning and maintained throughout the duration of the construction or grading. Further, upon completion of project, the disturbed areas must be stabilized using one of the following methods: (1) vegetative cover, (2) placement of at least 3 inches of non-asbestos-containing material; (3) paving; (4) any other measure deemed sufficient to prevent wind speeds of 10 miles per hour or greater from causing visible dust emissions.	Construction and grading activities in an ultramafic rock unit; or naturally occurring asbestos, serpentine, or ultramafic rock.	Cal. Code Regs. tit. 17, § 93105	Applicable	The Navy has determined that this regulation is a potential ARAR for maintained landscaping, excavating, constructing a shoreline revetment, and soil covers.
State Water Resources Control Board[a]					
Excavation of soil and generation of waste.	Sampling and analysis of discharges shall be used for accurate characterization of wastes.	Waste.	Cal. Code Regs. tit. 27, 20200(c)	Applicable	This regulation is applicable to excavation of soil and generation of waste. The Navy will characterize the soil or any waste when it is generated.
Excavation of soil and generation of waste.	Requires that designated waste as defined at *California Water Code* § 13173 be discharged to Class I or Class II waste management units.	Discharges of designated waste after July 18, 1997, (nonhazardous waste that could cause degradation of surface or groundwaters) to land for treatment, storage, or disposal.	Cal. Code Regs. tit. 27, § 20210	Applicable	This regulation is applicable to excavation of soil and generation of waste. The Navy will determine whether the soil or any waste is designated waste when it is generated.
Excavation of soil and generation of waste.	Requires that nonhazardous solid waste as defined at § 20220(a) be discharged to a classified waste management unit.	Discharge of nonhazardous solid waste after July 18, 1997, to land for treatment, storage, or disposal.	Cal. Code Regs. tit. 27, § 20220(b), (c), and (d)	Applicable	This regulation is applicable to excavation of soil and generation of waste. The Navy will determine whether the soil or any waste is nonhazardous solid waste when it is generated.

TABLE C-6: POTENTIAL STATE ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Appendix C, Parcel B Technical Memorandum in Support of a Record of Decision Amendment, Hunters Point Shipyard, San Francisco, California

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
GROUNDWATER ALTERNATIVES					
State Water Resources Control Board[a]					
Generation of investigation-derived waste.	Sampling and analysis of discharges shall be used for accurate characterization of wastes.	Waste.	Cal. Code Regs. tit. 27, 20200(c)	Applicable	This regulation is applicable to generation of waste associated with groundwater alternatives. The Navy will characterize any waste when it is generated.
GROUNDWATER ALTERNATIVES (Continued)					
State Water Resources Control Board[a]					
Generation of investigation-derived waste.	Requires that designated waste as defined at *California Water Code* § 13173 be discharged to Class I or Class II waste management units.	Discharges of designated waste after July 18, 1997, (nonhazardous waste that could cause degradation of surface or groundwater) to land for treatment, storage, or disposal.	Cal. Code Regs. tit. 27, § 20210	Applicable	This regulation is applicable to generation of waste associated with groundwater alternatives. The Navy will determine whether the waste is designated waste when it is generated.
Generation of investigation-derived waste.	Requires that nonhazardous solid waste as defined at § 20220(a) be discharged to a classified waste management unit.	Discharge of nonhazardous solid waste after July 18, 1997, to land for treatment, storage, or disposal.	Cal. Code Regs. tit. 27, § 20220(b), (c), and (d)	Applicable	This regulation is applicable to generation of waste associated with groundwater alternatives. The Navy will determine whether the waste is nonhazardous waste when it is generated.

Notes:

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

§ Section
ARAR Applicable or relevant and appropriate requirement
Cal. Code Regs. *California Code of Regulations*
CERCLA Comprehensive Environmental Response, Compensation, and Liability Act
CFR *Code of Federal Regulations*
SWRCB State Water Resources Control Board
TBC To be considered
Water Board San Francisco Bay Regional Water Quality Control Board
WDR Waste discharge requirement

Appendix C

Site Inspection Checklist

I. SITE INFORMATION

Site name: Hunters Point Shipyard	**Date of inspection: 1/9/2008**
Location and Region: San Francisco, California	**EPA ID:** CA1170090087
Agency, office, or company leading the five-year review: U.S Department of the Navy	**Weather/temperature: Partly Cloudy/50 degrees F**

Remedy Includes: (Check all that apply)

- □ Landfill cover/containment
- ☑ Access controls
- ☑ Institutional controls
- ☑ Excavation and Disposal
- □ Groundwater pump and treatment
- □ Surface water collection and treatment
- ☑ Other Groundwater monitoring
- ☑ Monitored natural attenuation
- □ Groundwater containment
- □ Vertical barrier walls

Attachments: ☑ Inspection team roster attached ☑ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ _____ _____
   Name Title Date
   Interviewed □ at site □ at office □ by phone □ Phone no. _____
   Problems, suggestions; □ Report attached _____

2. **O&M staff** Brad Wheeler Project Quality Control Manager 1/10/08
   Name Title Date
   Interviewed: ☑ at site □ at office □ by phone Phone no. _____
   Problems, suggestions; □ Report attached _____

   O&M staff Dennis McWade Site Superintendent 1/09/08
   Name Title Date
   Interviewed: ☑ at site □ at office □ by phone Phone no. _____
   Problems, suggestions; □ Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

_____

_____

_____

4. **Other interviews** (optional) ☑ Interview records are attached to the Five-Year Review Report.

Interviewees listed include only those interviewed on January 9 or 10, 2008, as part of the site inspection.

Tom Sayre with Kleinfelder on 1/09/08.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

□ O&M manual	□ Readily available	□ Up to date	☑ N/A
□ As-built drawings	□ Readily available	□ Up to date	☑ N/A
□ Maintenance logs	□ Readily available	□ Up to date	☑ N/A

Remarks_____
_____

2. **Site-Specific Health and Safety Plan** ☑ Readily available ☑ Up to date ☐ N/A
☑ Contingency plan/emergency response plan ☑ Readily available ☑ Up to date ☐ N/A
Remarks_____
_____

3. **O&M and OSHA Training Records** ☑ Readily available ☑ Up to date □ N/A
Remarks_____
_____

4. **Permits and Service Agreements**

□ Air discharge permit	□ Readily available	□ Up to date	☑ N/A
□ Effluent discharge	□ Readily available	□ Up to date	☑ N/A
□ Waste disposal, POTW	□ Readily available	□ Up to date	☑ N/A
□ Other permits_____	□ Readily available	□ Up to date	☑ N/A

Remarks_____

_____

5. **Gas Generation Records** □ Readily available □ Up to date ☑ N/A

Remarks_____

_____

6. **Settlement Monument Records** □ Readily available □ Up to date ☑ N/A

Remarks_____

_____

7. **Groundwater Monitoring Records** ☑ Readily available ☑ Up to date □ N/A

Remarks Reports are available for review when downloaded from a file transfer protocol web address.

_____

8. **Leachate Extraction Records** □ Readily available □ Up to date ☑ N/A

Remarks_____

_____

9. **Discharge Compliance Records**

□ Air	□ Readily available	□ Up to date	☑ N/A
□ Water (effluent)	□ Readily available	□ Up to date	☑N/A

Remarks_____

_____

10. **Daily Access/Security Logs** ☑ Readily available ☑ Up to date □ N/A

Remarks There are security guards that monitor who enters the site, but you are not required to sign any logbooks._____

IV. O&M COSTS – □ Applicable ☑ N/A

1. **O&M Organization**

□ State in-house	□ Contractor for State
□ PRP in-house	□ Contractor for PRP
□ Federal Facility in-house	□ Contractor for Federal Facility

□ Other_____

_____

2. **O&M Cost Records**

□ Readily available □ Up to date

□ Funding mechanism/agreement in place

Original O&M cost estimate_____ □ Breakdown attached

Total annual cost by year for review period if available

From_____ To_____ _____ □ Breakdown attached
Date Date Total cost

From_____ To_____ _____ □ Breakdown attached
Date Date Total cost

From_____ To_____ _____ □ Breakdown attached
Date Date Total cost

From_____ To_____ _____ □ Breakdown attached
Date Date Total cost

From_____ To_____ _____ □ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: _____

_____

_____

_____

_____

_____

V. ACCESS AND INSTITUTIONAL CONTROLS ☑ Applicable □ N/A

A. Fencing

1. **Fencing damaged** □ Location shown on site map ☑ Gates secured □ N/A

Remarks Fencing is in good condition and used appropriately.

_____

_____

B. Other Access Restrictions

1. **Signs and other security measures** □ Location shown on site map □ N/A

Remarks: All buildings are secured by gates, padlocks or nailed shut. Security personnel are located onsite. Warning signs are posted for hazardous and radioactive materials.

_____

_____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☑ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☑ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Workers onsite observe institutional controls.
Frequency Daily
Responsible party/agency Tetra Tech
Contact NA _____ _____ _____ _____
Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☑ N/A
Reports are verified by the lead agency ☐ Yes ☐ No ☑ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☑ N/A
Violations have been reported ☐ Yes ☐ No ☑ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☑ ICs are adequate ☐ ICs are inadequate ☐ N/A
Remarks

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☑ No vandalism evident
Remarks

2. **Land use changes on site** ☑ N/A
Remarks

3. **Land use changes off site** ☑ N/A
Remarks

VI. GENERAL SITE CONDITIONS

A. Roads ☑ **Applicable** ☐ **N/A**

1. Roads damaged ☐ **Location shown on site map** ☑ **Roads adequate** ☐ **N/A**

Remarks Site was visited during rainy season. Water had collected in pools on roads.

B. Other Site Conditions

Remarks Crushed drainage rock is used to fill low areas in the roads to prevent water from pooling.

VII. LANDFILL COVERS ☐ Applicable ☑ N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent_____ Depth_____
   Remarks_____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks_____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
Areal extent_____ Height_____
Remarks_____
_____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent_____
☐ Ponding ☐ Location shown on site map Areal extent_____
☐ Seeps ☐ Location shown on site map Areal extent_____
☐ Soft subgrade ☐ Location shown on site map Areal extent_____
Remarks_____
_____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
Areal extent_____
Remarks_____
_____

B. Benches ☐ Applicable ☐ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks_____
_____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks_____
_____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks_____
_____

C. Letdown Channels ☐ Applicable ☐ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent_____ Depth_____
Remarks_____
_____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_____ Areal extent_____
Remarks_____
_____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent_____ Depth_____
Remarks_____
_____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____
_____

5. **Obstructions** Type_____ ☐ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____
_____

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____
_____

D. Cover Penetrations ☐ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ Good condition ☐ N/A
Remarks_____
_____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐☐ Needs Maintenance ☐ N/A
Remarks_____
_____
_____
_____

4. **Leachate Extraction Wells**

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks_____
_____

E. Gas Collection and Treatment ☐ Applicable ☐ N/A

1. **Gas Treatment Facilities**
   ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
   ☐ Good condition☐ Needs Maintenance
   Remarks_____
   _____

2. **Gas Collection Wells, Manifolds and Piping**
   ☐ Good condition☐ Needs Maintenance
   Remarks_____
   _____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   ☐ Good condition☐ Needs Maintenance ☐ N/A
   Remarks_____
   _____

F. Cover Drainage Layer ☐ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
   Remarks_____
   _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
   Remarks_____
   _____

G. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A

1. **Siltation** Areal extent_____ Depth_____ ☐ N/A
   ☐ Siltation not evident
   Remarks_____
   _____

2. **Erosion** Areal extent_____ Depth_____
   ☐ Erosion not evident
   Remarks_____
   _____

3. **Outlet Works** ☐ Functioning ☐ N/A
   Remarks_____
   _____

4. **Dam** ☐ Functioning ☐ N/A
   Remarks_____
   _____

H. Retaining Walls ☐ Applicable ☐ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____
   _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
Remarks_____
_____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
Areal extent_____ Depth_____
Remarks_____
_____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
☐ Vegetation does not impede flow
Areal extent_____ Type_____
Remarks_____
_____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent_____ Depth_____
Remarks_____
_____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks_____
_____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☑ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent_____ Depth_____
Remarks_____
_____

2. **Performance Monitoring**
Type of monitoring_____
☐ Performance not monitored ☐ Evidence of breaching
Frequency_____
Head differential_____
Remarks_____
_____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☑ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☑ N/A

1. Pumps, Wellheads Plumbing, and Electrical
☐ Good condition ☐ All required wells located ☐ Needs O&M ☐ N/A
Remarks_____
_____

2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances
☐ Good condition ☐ Needs O&M
Remarks_____
_____

3. Spare Parts and Equipment

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks_____

_____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☑ N/A

1. Collection Structures, Pumps, and Electrical

☐ Good condition ☐ Needs O&M

Remarks_____

_____

2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances

☐ Good condition ☐ Needs O&M

Remarks_____

_____

3. Spare Parts and Equipment

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks_____

_____

_____

_____

_____

_____

C. Treatment System ☐ Applicable ☑ N/A

1. **Treatment Train** (Check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☐ Air stripping ☐ Carbon adsorbers

☐ Filters_____

☐ Additive (*e.g.*, chelation agent, flocculent)_____

☐ Others_____

☐ Good condition ☐ Needs Maintenance

☐ Sampling ports properly marked and functional

☐ Sampling/maintenance log displayed and up to date

☐ Equipment properly identified

☐ Quantity of groundwater treated annually_____

☐ Quantity of surface water treated annually_____

Remarks_____

_____

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☐ Good condition☐ Needs Maintenance

Remarks_____

_____

3. **Tanks, Vaults, Storage Vessels**
□ N/A □ Good condition□ Proper secondary containment □ Needs Maintenance
Remarks_____
_____

4. **Discharge Structure and Appurtenances**
□ N/A □ Good condition□ Needs Maintenance
Remarks_____
_____

5. **Treatment Building(s)**
□ N/A ☐ Good condition (esp. roof and doorways) □ Needs repair
□ Chemicals and equipment properly stored
Remarks_____
_____

D. Monitoring Data

1. Monitoring Wells

☑ **Properly secured/locked** ☑ **Functioning** ☑ **Routinely sampled** ☑ **Good condition**
□ **All required wells located** □ **Needs Maintenance** □ **N/A**

Remarks Some wells observed had surface water collected in the well head boxes. Some wells were missing padlocks. Access to all monitoring wells was not possible due to debris piles and pooling of rainwater on top of well boxes. See Appendix D for a detailed list of well conditions, photos and descriptions._____
Total number of wells inspected was 59._____
Number of wells considered as good is 49._____
Number of wells considered as poor is 5._____
Number of wells with a condition unknown is 5._____

2. Monitoring Data
☑ Is routinely submitted on time ☑ Is of acceptable quality

3. Monitoring data suggests:
☑ Groundwater plume is effectively contained □ Contaminant concentrations are declining
Groundwater is being monitored for containment and concentrations. Results are presented in quarterly reports.

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☑ Properly secured/locked ☑ Functioning ☑ Routinely sampled ☑ Good condition
□ All required wells located ☑ Needs Maintenance □ N/A
Remarks Not all of the wells were located due to debris piles and pooling of rainwater on top of the well boxes. Some well boxes need maintenance to prevent rainwater from entering the box. Locks were missing from some wells. See Appendix D for a detailed list of well conditions, photos and descriptions.
_____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks Soil vapor extraction system is present in Building 123. At the time of the site visit the system was not in use.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).
The remedy, described in the Record of Decision, at Hunters Point Shipyard Parcel B is to cleanup sewer and storm lines contaminated with radiation, and to remove contaminated soils. Contaminated soils and sewer/storm lines are removed and hauled to disposal facilities. The Record of Decision needs to be amended to address soil vapor and groundwater contamination. Parcel B Technical Memorandum in Support of a Record of Decision was written to amend the Record of Decision and address groundwater and soil contamination.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.
Quarterly groundwater monitoring appears to be implemented in accordance with the Record of Decision. Not all groundwater monitoring wells were well maintained and labeled on site maps.

C. Early Indicators of Potential Remedy Problems

No early indicators were identified, but other remedial options are being explored. The Record of Decision needs to be amended, as discussed in part A, before remediation can be completed.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.
Parcel B Technical Memorandum in Support of a Record of Decision details how to optimize remediation at Parcel B. The spill model was appropriate for many of the contaminated sites in Parcel B, but new conceptual models need to be developed to address all of the contamination. Information obtained during earlier site remediation needs to be applied to remaining contaminations for the most effective model.

Appendix D

Photographic Log

Photo of building 116 which contains artist studios, all buildings with artist studios are in good condition.
Photo Orientation - West
Date 9 Jan 08

Photo is of general site condition and shows, former excavation, current excavation, excavated material, road conditions and drainage rock.
Photo Orientation - West
Date 9 Jan 08

Photo is of drainage rock laid down to prevent pooling of surface water on streets.
Drainage rock has been laid down in low areas along roads to increase access.
Photo Orientation - South
Date 9 Jan 08

Photo is of broken windows. Photo is
representative of broken windows in Parcel B.
Photo Orientation - South
Date 9 Jan 08

Photo is of secured building. All unoccupied buildings in Parcel B are secured.
Photo Orientation - West
Date 9 Jan 08

Photo is of excavated sewer lines and storm drains. All excavations in Parcel B are properly fenced with warning signs posted.
Photo Orientation - North
Date 9 Jan 08

Photo is of stock piled earth treated with "Super Snot". "Super Snot" is an adhesive that prevents contaminated soils from washing away during rains.
Photo Orientation - East
Date 9 Jan 08

Well IR25MW44A; Well is in poor condition, casing is bent, locked, and there is water in vault
Photo Orientation - East
Date 14 Jan 08

(2) Unidentified Wells; wells in good coondition,
not locked, water in vault, no name.
Photo orientation - South
Date 09 Jan 08

Well IR10MW63A; Well is in poor condition with cover
broken, well is locked and there is water in vault.
Photo orientation - South
Date 09 Jan 08

Well IR10MW60A; Well is in good condition, locked, and no water in vault.
Photo Orientation South
Date 09 Jan 08

Well IR10MW33A; Well is in good condition and locked.
Photo orientation - South
Date 09 Jan 08

Well IR 10MW71A; Well is in good conditon, locked, and water in vault.
Photo orientation - North
Date 09 Jan 08

Well IR10MW77A; Well is in good condition, locked and there is no water in vault.
Photo orientation - South
Date 09 Jan 08

Well IR10MW78A; well is in good condition, locked with no water in vault.
Photo orientation - South
Date 09 Jan 08

Well IR10MW59A; covered in water.
Photo orientation - South
Date 09 Jan 08

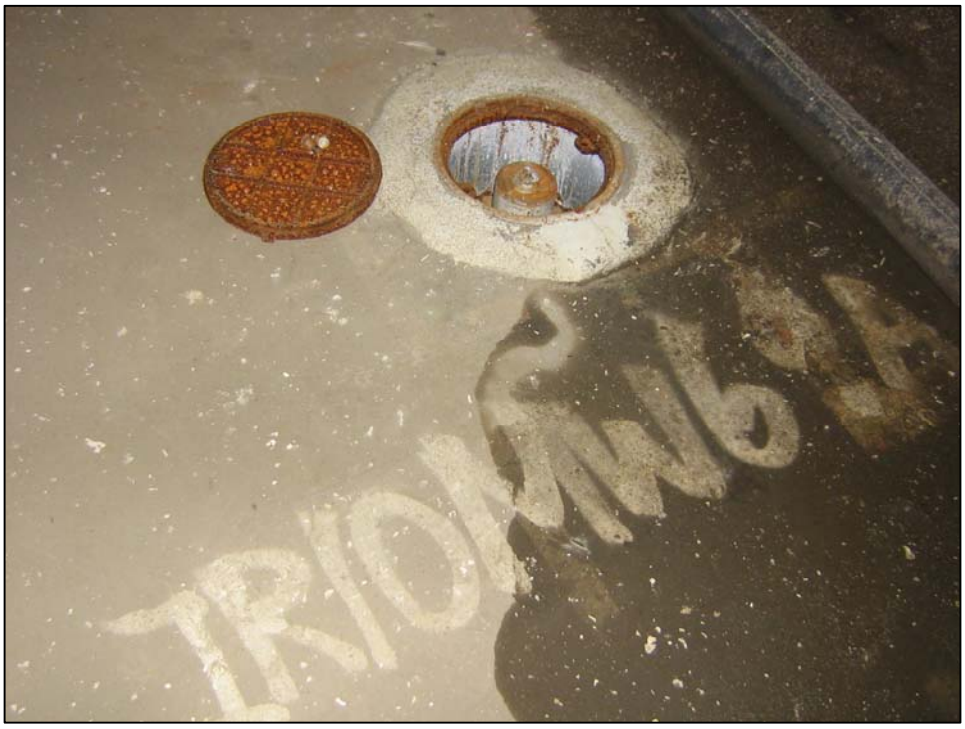
Well IR10MW74A; Well is in good condition,
locked, with no water in vault.
Photo orientation - South
Date 09 Jan 08

Well IR10MW73A;Well is in good condition, locked, and there is water in vault.
Photo orientation - South
Date 09 Jan 08

Well IR10MW72A; Well is in good condition, locked, and no water in vault.
Photo orientation - North
Date 10 Jan 08

Well IR10MW67A; Well is in good condition, not locked, and there is no water in vault.
Photo orientation - East
Date 09 Jan 08

Well IR10MW68A; Well is in good condition but the cap
does not fit right, not locked and no water in vault.
Photo orientation - South
Date 09 Jan 08



Well IR10MW69A; Well is in good condition, is not
locked and there is no water in vault.
Photo orientation - North
Date 09 Jan 08

Well IR10MW28A; Well is in good condition, locked, and no water in vault.
Photo orientation - West
Date 09 Jan 08

Well IR10MW66A; Well is in good condition, locked, and no water in vault.
Photo orientation - North
Date 09 Jan 08

Well IR10MW65A; Well is in good condition, locked, and no water in vault.
Photo orientation - West
Date 10 Jan 08

Well IR10P13A; Well is in good condition, locked and there is no water in vault.
Photo orientation - North
Date 09 Jan 08

825

Well IR10MW32A; Well has cracked lid, locked, and water in vault.
Photo orientation - West
Date 10 Jan 08

824

Well IR10MW81A; Well is in good condition, locked, and there is no water in vault.
Photo orientation - West
Date 10 Jan 08

Well IR10MW82A; Well is covered with water.
Photo orientation - South
Date 09 Jan 08

IR07MWS2; Appears good, locked.
Photo orientation - West
Date 10 Jan 08

Well IR07MW20A1; Well is in good condition , 1 bolt needs repair, well is locked with no water in vault .
Photo orientation - North
Date 10 Jan 08

Well IR07MW19A; Well has been excavated.
Photo orientation - East
Date 09 Jan 08

Well IR07MW20A; Well is in good condition with bolts stripped, locked and there is no water in vault.
Photo orientation - North
Date 10 Jan 08

Well IR16MW04A; Well is in good condition, missing bolt, locked and water in vault.
Photo orientation - North
Date 10 Jan 08

Well IR10MW05A; Well cover cracked, well is locked and there is water in vault.
Photo orientation - East
Date 10 Jan 08

Well IR62MW07A; Well is in poor condition
with no bolts, locked, and no water in vault.
Photo orientation - North
Date 10 Jan 08

Well IR62MW08A; Well is in good condition with no bolts, locked, and there is no water in vault.
Photo orientation - North
Date 10 Jan 08

Well UT02MW15A; Well is in good condition, locked with small amount of water in vault.
Photo orientation - South
Date 10 Jan 08

Well PA24MW01A; Well is in good condition, locked and
there is water in vault.
Photo orientation - East
Date 10 Jan 08

IR10MW31A1; Well is in good condition and locked and there is no water in the vault.
Photo orientation - South
Date 10 Jan 08

Well IR46MW47A; Well is in good condition with missing bolt, locked and there is water in vault.
Photo orientation - North
Date 10 Jan 08

Well IR46MW46A; Well is in good condition, locked, and no water in vault.
Photo orientation - East
Date 10 Jan 08

Well IR24MW05A; well in good condition, well
is not locked and there is water in vault.
Photo orientation - North
Date 10 Jan 08

Well IR26MW48A; Well is in good condition, locked and water in vault.
Photo orientation - North
Date 10 Jan 08

Well IR46MW48A; Well is in good condition, locked and there is no water in vault.
Photo orientation - North
Date 10 Jan 08

Well IR24MW07A; Well is in good condition, locked, and
water in vault.
Photo orientation - South
Date 10 Jan 08

Well IR26MW49A; Well is in good condition, locked and there is water in vault.
Photo orientation - North
Date 10 Jan 08

Well IR26MW50A; Well is in good condition, locked, and water in vault.
Photo orientation - North
Date 10 Jan 08

Well IR26MW46A; Well is in good condition, bolt eyelet broken, and locked.
Photo orientation - North
Date 10 Jan 08

Well PA50MW02A; Well is in good condition with no
bolts, it is not known if locked, and there is water in vault.
Photo orientation - North
Date 10 Jan 08

Well IR26MW43A; Well is in good condition, locked, with water in vault.
Photo orientation - North
Date 10 Jan 08

IR26MW40A; Well in good condition, locked with water in the vault.
Photo orientation - South
Date 09 Jan 08

Well IR25MW61A2; Well is in good condition, locked and there is water in vault.
Photo orientation - South
Date 09 Jan 08

Well IR25MW61A1; Well is in good condition,
locked. and there is water in vault
Photo Orientation - North
Date 10 Jan 08

Well IR10MW80A; Well is under water.
Photo orientation - North
Date 10 Jan 08

Well IR07MW21A; Well is in good condition, and locked.
Photo Orientation - East
Date 14 Jan 08

Well IR25MW25A; Well is in good condition, locked.
Photo Orientation - East
Date 14 Jan 08

Well IR07MW24A; Well is in good condition, and locked.
Photo Orientation - East
Date 14 Jan 08

Well IR07MW27A; Well is in good condition,
unlocked. and there is water in vault
Photo Orientation - East
Date 14 Jan 08

Well IR07MW23A; Well is in good condition,
locked, and there is no water in vault.
Photo Orientation - East
Date 14 Jan 08

Well IR18MW100B; Well is covered in mud
Photo Orientation - North
Date 14 Jan 08

Well IR18MW92A; Well is in good condition,
locked, and there is water in vault.
Photo Orientation - West
Date 14 Jan 08

Well IR07MWS-4; Well is in good condition, and locked.
Photo Orientation - East
Date 14 Jan 08

Well IR07MW26A; Well is in good condition, and locked.
Photo Orientation - East
Date 14 Jan 08

Well IR25MW41A; Well is in good condition,
unlocked, and there is water in vault.
Photo Orientation - East
Date 14 Jan 08

Well IR07MW17A; Well is covered with excavation debris.
Photo Orientation - East
Date 14 Jan 08

Appendix E

Interview Forms

Name	Title/Position	Organization	Date of Interview
Russell Herrman	Artist	The Point	31 Jan 08
Tor Archer	Artist	The Point	31 Jan 08
Jack Hain	Artist	The Point	31 Jan 08
Lorna Kollmeyer	Artist	The Point	31 Jan 08
Orit Yanai	Artist	The Point	31 Jan 08
Barbara Bushnell	RAB Member	NA	29 Jan 08
Tim Mower	Project Manager	Tetra Tech	17 Jan 08
Gina Kathura	NA	San Francisco Bay Water Quality Board	4 Feb 08
Brad Wheeler	Project Quality Control Manager	Tetra Tech	10 Jan 08
Amy Brownell	Environmental Engineer	San Francisco Department of Public Health	28 Jan 08
Thomas Lanphar	Senior Scientist	Cal DTSC	25 Jan 08
Mark Ripperda	Remedial Project Manager	EPA	25 Jan 08

Notes:

NA	Not Applicable
Cal DTSC	California Department of Toxic Substance Control
EPA	Environmental Protection Agency

INTERVIEW RECORD

Site Name: Hunters Point Shipyard, Parcel B		**EPA ID No.: CA1170090087**
Subject: 5-year Review		**Time: NA** **Date: 1/25/08**
Type: □ Telephone □ Visit ☑ Other **Location of Visit:**		□ Incoming □ Outgoing
Contact Made By:		
Name: Andrew Greazel	**Title: Geologist**	**Organization: CDM**
Name:	**Title:**	**Organization:**
Individual Contacted:		
Name: Thomas Lanphar	**Title: Senior Scientist**	**Organization: Cal DTSC**
Summary Of Conversation		

1. What is your impression of the project Parcel B (general sentiment)?

The original ROD for Parcel B was very deficient in addressing all contamination and environmental risks at Parcel B. The Navy is currently completing a Technical Memorandum in Support of a Record of Decision Amendment (TMSRA). A final TMSRA was issued in January 2008. The first 5 year review concluded that a ROD amendment was needed and that is still the case. The TMSRA is a document similar to a Feasibility Study. The conceptual model has been changed and the alternative remedies considered in the TMSRA reflect the new conceptual model. A complete cover of Parcel B soil and a revetment system along the shoreline is proposed. Two additional removal actions are planned to address methane generation at Sites 7 and 18 and mercury at Site 26. Groundwater treatment is also considered. Radiological contamination is also now being addressed in Parcel B. The ROD amendment is needed and the Navy is on the right track on the proposed alternatives.

2. **Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.**

Yes, our office has conducted site visits to review ongoing removal actions. The visits concluded that the activities were advancing as they were planned. Other visits were conducted to understand site conditions as we developed remediation alternatives and investigations. For example locating groundwater monitoring wells at site 26.

3. **Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.**

No.

4. **Do you feel well informed about the site's activities and progress?**

Yes, as the representative from the Department of Toxic Substances Control, I participate in monthly update meetings and am in regular communication with the Navy and other regulatory agencies.

5. **Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**

No.

General Comments

The Navy and the regulatory agencies are in agreement with the need to amend the Parcel B ROD. New remedies will be implemented because of the amended ROD. The next five year review will be important to assess the effectiveness of the amended ROD, especially in regards of Parcel B redevelopment.

INTERVIEW RECORD

Site Name: Hunters Point	**EPA ID No.: CA1170090087**	
Subject: 5-Year Review	**Time: NA**	**Date: 1/25/08**
Type: □ Telephone □ Visit ☑ Other **Location of Visit:**	□ Incoming □ Outgoing	

Contact Made By:

Name: Andrew Greazel	**Title: Geologist**	**Organization: CDM**
Name:	**Title:**	**Organization:**

Individual Contacted:

Name: Mark Ripperda	**Title: RPM**	**Organization: USEPA**

Summary Of Conversation

1. What is your impression of the project Parcel B (general sentiment)?

The Navy and regulators identified problems with the original remedy and a ROD Amendment is being developed to address those problems and also to allow the City's redevelopment plan. The rad removal program is going extremely well. Overall, EPA agrees with the work at Parcel B and we believe that the result will be protective of human health and the environment.

2. **Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.**

Yes, we have monthly technical BCT meetings, along with typically one or more technical meetings on specific issues. We also have at least one meeting each month with the Navy, regulators and community (RAB meetings and sub-committee meetings). EPA visits the site to observe field work or site conditions at least once per month.

3. **Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.**

No.

4. **Do you feel well informed about the site's activities and progress?**

Yes.

5. **Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**

No.

General Comments

INTERVIEW RECORD

Site Name: Hunters Point Shipyard	**EPA ID No.: CA1170090087**	
Subject: 5-year Review	**Time:NA**	**Date: 1/28/08**
Type: □ Telephone □ Visit ☑ Other **Location of Visit:**	□ Incoming □ Outgoing	

Contact Made By:

Name: Andrew Greazel	**Title: Geologist**	**Organization: CDM**
Name:	**Title:**	**Organization:**

Individual Contacted:

Name: Amy Brownell	**Title: Environmental Engineer**	**Organization: San Francisco Department of Public Health**

Summary Of Conversation

1. **What is your impression of the project Parcel B (general sentiment)?**

The entire Hunters Point Shipyard Project is a large, complex, multi-year, multi-million dollar cleanup project. Parcel B is one piece of this large project. And since the contamination issues and cleanup remedies are similar throughout the site – Parcel B work has to be integrated and considered in relation to all the other sites. In addition, all the cleanup work has to be coordinated with the redevelopment planning efforts. These past 7 years, the Navy's commitment and funding has increased greatly which has resulted in tremendous progress being made on all issues. On Parcel B – the remedial action efforts in the late 90's and 2000 and 2001 resulted in the Navy re-evaluating the site model in relation to the ubiquitous metals. This reevaluation took many hours of effort by the Navy and the regulators and the City played a significant role in trying to push towards a workable solution that would properly protect public health and the environment without unnecessarily restricting the property and hindering long-term redevelopment.

The Navy, the Regulators and the City and the San Francisco Redevelopment Agency are continuing to work through other contamination issues with the same objectives of properly protecting public health and the environment without unnecessarily restricted the property and hindering long-term redevelopment. The contamination issues related to radioisotopes slightly above background levels is one of the biggest challenges that we are currently working our way through. I'm confident the issues will be resolved to meet the aggressive time schedules that are being pursued for redevelopment.

2. **Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.**

I am in active communication with the Navy and Regulatory Agencies about the cleanup of the site. I conduct site visits of Parcel B on an irregular basis. I don't have an official regulatory role for Parcel B – however, in my capacity as a representative of the Department of Public Health and advisor to other City Departments and the San Francisco Redevelopment Agency, I can assist the Navy and Agencies in resolving issues especially as they relate to future use of the site and technical coordination of environmental contamination issues that impact future use.

I also assist members of the public, especially members of the Restoration Advisory Board, in investigating concerns they may have about the Navy's work. This sometimes includes site visits and discussions with Navy personnel and their contractors to discuss contamination areas or alleged contamination areas.

Under the Conveyance Agreement between the Navy and the City, the City is authorized to conduct sampling of air, soil and groundwater at the site if prior approval and proper authorization is obtained from Navy. We may use this authority to verify environmental conditions or to obtain independent information that will support reuse of the property.

3. **Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.**

The Department of Public Health does not have a direct regulatory role for Parcel B so we are not required to respond to incidents or issue violations. However, my office can and does assist the Navy and Regulatory Agencies especially with coordinating with other City Agencies when they are required to coordinate with them.

Under the Conveyance Agreement between the Navy and the City, the City is authorized to conduct sampling of air, soil and groundwater at the site if prior approval and proper authorization is obtained from Navy. We may use this authority to verify environmental conditions or to obtain independent information that will support reuse of the property.

I will play a future regulatory role once the property is transferred – so I provide input and verify that the future regulatory role is properly spelled out and feasible in the Navy's transfer documents.

4. **Do you feel well informed about the site's activities and progress?**

Yes. I attend the monthly Base Closure Team and Restoration Advisory Board meetings and additional topic specific meetings with the Navy and Regulators. In addition, I regularly speak with the Navy and regulatory agency project managers when we are working on specific issues.

5. **Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**

I hope that the Navy will continue to aggressively pursue funding efforts and cleanup technologies that will allow them to efficiently remediate the property and turn it over for productive reuse.

General Comments

INTERVIEW RECORD

Site Name: Hunters Point Naval Shipyard		**EPA ID No.:**
Subject: 5 yr review		**Time:** 1415 **Date:** 1/18/07
Type: ☐ Telephone ☑ Visit ☐ Other **Location of Visit:**		☐ Incoming ☐ Outgoing

Contact Made By:

Name: Andy Greuzel	**Title:** Geologist	**Organization:** CDM
Name:	**Title:**	**Organization:**

Individual Contacted:

Name: ~~Mei Tsukada~~ Brad Wheeler	**Title:** ~~Site Health & Safety~~ Project Quality Control Manager	**Organization:** IT

Summary Of Conversation

1. **What is your impression of the project Parcel B (general sentiment)?**

Time Critical remedial action cleanup activities w/in Parcel B were performed in a thorough and effective manner. Radiological surveying/sampling protocols for final radiological release of excavations is a very extensive process and has been successful at ensuring the any residual contaminants are identified and removed.

2. **Is the remedy functioning as expected? How well is the remedy performing?**

See answer to question #1. It is my impression the remedy is very thorough and complete

3. **What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?**

~~Post remediation~~ Final Status Survey (FSS) and post remediation sampling shows isotopic concentrations are lowered following remedial activities.

4. **Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspections and activities.**

Yes, there is continuous construction and project activity management and supervision on-site. Project management, H&S, Construction Management, Quality Control, Radiation Safety, ~~and~~ Compliance and other staffing is on-site

5. **Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.**

No significant changes to the originally approved O&M requirements or sampling protocols have been required for Parcel B Sewer/storm drain removal.

6. **Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.**

Not to my knowledge.

7. **Have there been opportunities to optimize O&M, or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.**

No significant changes to approved procedures have occurred to my knowledge. The procedures for radiological release of areas subject to surveying or remediation are prescribed by agency approved documents.

8. **Do you have any comments, suggestions, or recommendations regarding the project?**

لا.

General Comments

INTERVIEW RECORD

Site Name: Hunters Point Shipyard	**EPA ID No.: CA1170090087**	
Subject: 5-year Review	**Time: 15:15**	**Date: 2/4/08**
Type: ☑ Telephone □ Visit □ Other **Location of Visit:**	□ Incoming □ Outgoing	

Contact Made By:

Name: Andrew Greazel	**Title: Geologist**	**Organization: CDM**
Name:	**Title:**	**Organization:**

Individual Contacted:

Name: Gina Kathura	**Title:**	**Organization: San Francisco Bay Water Quality Board**

Summary Of Conversation

1. **What is your impression of the project Parcel B (general sentiment)?**
   Input will be provided when the Regional Water Quality Board reviews the 5-year Review.

2. **Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.**

3. **Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.**

4. **Do you feel well informed about the site's activities and progress?**

5. **Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**

General Comments

INTERVIEW RECORD

Site Name: Hunters Point Shipyard		**EPA ID No.:** CA1170090087
Subject: 5-Year Review	**Time:** NA	**Date:** 1/31/08
Type: ☐ Telephone ☐ Visit ☒ Other	☐ ☐ Incoming	☐ Outgoing
Location of Visit:		

Contact Made By:

Name: ~~Jack Hain Bldg. 116~~ via 1/31/08	**Title:** ~~1/25/08~~	**Organization:**
Name: Andrew Greazel	**Title:** Geologist	**Organization:** CDM

Individual Contacted:

Name: Jack Hain	**Title:** ARTIST	**Organization:** THE POINT

Summary Of Conversation BLDG: 116

1. **What is your impression of the project Parcel B (general sentiment)?**

(1) NAVY CONTRACTOR STAFF VERY CONSIDERATE, WITH ONE MAJOR EXCEPTION BEING LENNAR'S ENVIRONMENTAL OFFICER'S REMOVAL OF 3 LARGE BOULDERS WHICH BELONGED TO ME ~~AT~~ (THEY WERE TRANSPORTED TO ~~THE~~ MY STUDIO BY ME WITH APPROPRIATE APPROVALS BY LENNAR.) THEY WERE THEN REMOVED, CONTRARY TO MY ~~EXPRESS~~ EXPRESS WISHES.) THEY WERE PART OF MY ART INSTALLATION.

(2) ANOTHER BIG ISSUE WAS THAT OUTDOOR SPIGOTS WHICH SUPPLY WATER WERE INSTALLED BY NAVY CONTRACTOR PER CONTRACT. YET, NAVY DECIDED TO TURN THEM OFF. WE HAVE TO TRANSPORT IN ALL OUR WATER.

(3) NAVY CONTRACTOR, THOUGH, HAS DONE ALL IT CAN TO BE HELPFUL + CONSIDERATE.

2. **What effects have site operations had on the surrounding community?**

SOME NOISE + DUST. BUT, AS ~~THE~~ STATED ABOVE, THE NAVY'S CONTRACTOR'S ~~OPERATIONS~~ STAFF HAVE BEEN CONSIDERATE IN TRYING TO MINIMIZE NEGATIVE IMPACTS.

LENNAR STAFF, HOWEVER, HAVE BEEN VERY TROUBLESOME IN THAT ~~THEY~~ THE ENVIRON-MENTAL OFFICER GROSSLY INTERFERED WITH MY ACTIVITIES AS AN ARTIST, BY TAKING PART OF MY WORK.

3. **Do you feel well informed about the site's activities and progress?**

WE'RE NOT WELL INFORMED ABOUT WHAT IS GOING ON.

SOME THINGS APPEAR NONSENSICAL:

1. A LARGE SEMI-TRAILER (APPARENTLY RENTED BY A CONTRACTOR) HAS BEEN PARKED + ABANDONED IN FRONT OF MY STUDIO FOR 6 MONTHS. IT JUST SITS THERE UNUSED, WITH WINDOWS OPEN, IN SPITE OF THE FACT THAT RENTAL FEES ARE BEING WASTED.

2. WE HAVE BEEN TOLD THAT OUR GUARD AT THE ENTRANCE TO THE BASE WILL BE MOVED TO A POINT WHERE HE WILL NOT BE ABLE TO SEE OR MONITOR ANY OUTSIDERS COMING ON TO THE BASE. THIS MAKES NO SENSE.

4. **Do you have any comments, suggestions, or recommendations regarding the site's management or operations?**

SEE ABOVE.

5. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

SEE ABOVE

6. **Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.**

A POLICE OFFICER CAME TO THE STUDIO OF MY NEIGHBOR AT BCOG 116 BECAUSE A BULLET WAS FIRED THROUGH HER WINDOW FROM AN UNKOWN ORIGIN. THE BULLET WAS RECOVERED & GIVEN TO THE POLICE OFFICER.

General Comments

SEE ABOVE.

INTERVIEW RECORD

Site Name: Hunters Point Shipyard	**EPA ID No.:** CA1170090087	
Subject: 5-year Review	**Time:** NA	**Date:** 1/31/08
Type: ☐ Telephone ☐ Visit ☑ Other	☐ ☐ Incoming ☐ Outgoing	
Location of Visit: Hunters Point Shipyard		

Contact Made By:

Name: Andrew Greazel	**Title:** Geologist	**Organization:** CDM
Name:	**Title:**	**Organization:**

Individual Contacted:

Name: Lorna Kollmeyer	**Title:** ARTIST	**Organization:** THE POINT

Summary Of Conversation BLDG: 104, 115

1. **What is your impression of the project Parcel B (general sentiment)?**

I suppose the work has been efficiently executed, and it's nice that it has passed, for the most part. The Tetra-Tech crew was exceedingly helpful and accommodating to us. The telephones work better now, with the new lines up. It remains, however, a muddy, and if not muddy, dusty mess. I miss the good ol' days of running water and indoor toilets. Any running water, and access to it, would be helpful.

2. **What effects have site operations had on the surrounding community?**

It is a problem to not have water. The roads are a mess, and I have given up the idea of ever having a clean car for more than a day! The flooding is a drag, though fortunately it has not effected our buildings. The road leading up to 104 (BTW 103 & 104) is a rutted, potholed mess.

3. **Do you feel well informed about the site's activities and progress?**

NO. What a shock to learn that one day the guard station was to be moved, without telling anyone, and leaving us, if you'll excuse me, to the wolves. So all for it staying right where it is. Our buildings are very vulnerable.

4. **Do you have any comments, suggestions, or recommendations regarding the site's management or operations?**

* Leave the security gate where it is.

* Don't tear our buildings down!

5. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

6. **Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.**

① Bullet hole found in Bldg 116. west side.

② Diesel spill (Jan 8) coming off of hillside mixed with runoff water. Fire dept was called. Not a comfort to know fuel is running around my Bldg (115)

General Comments

INTERVIEW RECORD

Site Name: Hunters Point shipyard		**EPA ID No.:** CA1170090087
Subject: 5-Year Review		**Time:** NA **Date:** 1/31/08
Type: ☐ Telephone ☐ Visit ☒ Other		☐ ☐ Incoming ☐ Outgoing
Location of Visit:		

Contact Made By:

Name: Andrew Greazel	**Title:** Geologist	**Organization:** CDM
Name:	**Title:**	**Organization:**

Individual Contacted:

Name: ORIT YANAI	**Title:** ARTIST	**Organization:** THE POINT

Summary Of Conversation BLDG: 117

1. **What is your impression of the project Parcel B (general sentiment)?**

IT GOES slow!

THERE IS A BIT OF A SENSE OF "THREAT"... LIKE THINGS DO NOT HAPPEN FOR A WHILE AND THEN SUDDENLY - A LOT HAPPENS - SOMETIMES I IMAGINE COMING OVER AND FINDING ALL SURROUNDING BUILDING DEMOLISHED... BUT - SO LONG AS THIS DOESN'T HAPPEN IN REALITY - I'm FEELING FINE ABOUT THE PROJECT / DEVELOPMENT.

2. **What effects have site operations had on the surrounding community?**

NOT SURE

3. **Do you feel well informed about the site's activities and progress?**

NOT TOO WELL.
THE GENERAL FEEL I GET IS THAT
THE PROJECT 'STOPS- GOES- STOPS- ---'

4. **Do you have any comments, suggestions, or recommendations regarding the site's management or operations?**

IN OUR AREA - BUILDING 117 - THE RAIN WATER & DRAINAGE IS SO BAD! ITS HARD TO GET TO THE BUILDING, AND IMPOSSIBLE TO GET TO THE BATHROOM

5. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

6. **Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.**

NO

General Comments

I AM NOT AT ALL AGAINST THE CURRENT DEVELOPMENT.
I HOPE THAT THE DEVELOPERS WILL CONSIDER THIS WONDERFUL ARTIST COMMUNITY, AND NOT 'KICK US OUT' ONE DAY...

THANKS,
ORIT

INTERVIEW RECORD

Hunters Point shipyard

Site Name: Russell Herrman		EPA ID No.: CA 1170090087	
Subject: Building #103 5-year Review		Time: NA	Date: 1/31/08
Type: ☐ Telephone ☐ Visit ☒ Other		☐ ☐ Incoming ☐ Outgoing	
Location of Visit:			

Contact Made By:

Name: Andrew Greuzel	Title: Geologist	Organization: CDM
Name:	Title:	Organization:

Individual Contacted:

Name: Russell Herrman	Title: ARTIST	Organization: THE POINT

Summary Of Conversation Bldg: 103

1. **What is your impression of the project Parcel B (general sentiment)?**

the removal of the storm Drains & Sewer Was very Dusty + Noisy — but the main problems was the loss of the use of my Studio when the phone + electricity was so long before New Electrical Poles + phone lines were restored (6 months total) plus the removal of the concrete Driveway up to Bldg 103 + replacement w/ Gravel was ok for 1st year - but big Potholes are now Formed + its hard to Drive up in rainy season

2. **What effects have site operations had on the surrounding community?**

I am worried that Parcel B artists will loose the gate potects unlocked Buildings from Protections - if it is moved to below Bldg #101 - I hope it is re-located further up - Near 103+104 (stairwell between) so I don't always have to Drive around in big puddles + Potholes all the time

3. **Do you feel well informed about the site's activities and progress?**

I am one of the artists representitives at the CAC Planning + Development meetings so I am well informed - but many of the artists are Not able to attend these meetings & the ones the artists hold to go over developments regularly,

4. **Do you have any comments, suggestions, or recommendations regarding the site's management or operations?**

I would like a guard Gate in front of artists Bldgs one priority - the other is to grade + gravel Roads going down to Parcel B artists periodically —

5. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

the outside community is not well informed of what is being done + Planned for the re-development of the Shipyard — more community meetings as to what's been done + the future of Hunter's Point Shipyard

6. **Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.**

So far NO —

but once again - the artists in Parcel B (or Bldg #101) are not in secure buildings (made for a secure shipyard) and continue to need some sort of Gatehouse to Deter Criminal mischief!

General Comments

So far the Re-development has been fairly responsive to the problems of the artists - the Conditions of No Plumbing + roads that tend to turn to potholes + muddy Pools of water (No drainage) are the biggest problems so far.

I am happy that the Navy + Contractors are in Contact with the artists + fairly responsive! thank you —

Russell Herman
Bldg #103

INTERVIEW RECORD

Site Name: Hunters Point Shipyard	**EPA ID No.:** CA1170090087	
Subject: 5-year Review	**Time:** NA	**Date:** 1/31/08
Type: ☐ Telephone ☐ Visit ☒ Other	☐ ☐ Incoming ☐ Outgoing	
Location of Visit:		

Contact Made By:

Name: Andrew Greuzel	**Title:** Geologist	**Organization:** CDM
Name:	**Title:**	**Organization:**

Individual Contacted:

Name: Tor Archer	**Title:** ARTIST	**Organization:** THE POINT

Summary Of Conversation BLDG: 117

1. **What is your impression of the project Parcel B (general sentiment)?**

The clean up of Parcel B is a necessary remediation. My impression was that parcel B was selective (impaired to other parts of ~~the~~ clean. The clean up seems to have been going on forever at this point. I could not name the year the former RV park was dug up, but it seems like ages ago leaving the impression that the clean up endures. I do not mind the impact on the community of noise, ~~flooding~~

2. **What effects have site operations had on the surrounding community?**

The inconvenience of noise, water being cut off, a trailer of toilets that have worked less than 1/2 the time, whirlwinds of dust in dry months, lakes of water in wet months have not really bothered me whereas I know it has bothered others. My concern has been the back of the mind worry about health hazards that may have been stirred up, aerosolized or leached out in the rainy season.

3. **Do you feel well informed about the site's activities and progress?**

Not at all. I missed the last meeting and I have not been pro active in being well informed. A lot of my information comes from articles in the chronicle.

4. **Do you have any comments, suggestions, or recommendations regarding the site's management or operations?**

I won't bother suggesting a read out from the re-development agency but I gotta say to other tenants if they can imagine any other profession having to put up with such conditions.
If the toilets trailer functioned regularly I think it would have a very positive impact on tenants.

5. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

I would say the health concerns. Going back to the possible 'black beach' discovery in the R.V. dig.
Concerns have arisen when one area gets dug up 2 or 3 times - concerns about what they are finding, why do areas get dug up again and again.

6. **Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.**

No, in fact before any clean up started I would see trespassing incidents every now and then, but have not really seen any since clean up began.

General Comments

Having been a tenant at the Point for 20 years the inconvenience of the clean up of parcel B is a small concern compared to the opportunity to have worked at what I have refered to as an obscure urban sanctuary for all this time. My understanding is that a 'high level/standard' of clean up is going on and that can only benefit all in the long run.

INTERVIEW RECORD

Site Name: Hunters Point Shipyard	**EPA ID No.: CA1170090087**	
Subject: 5-year Review	**Time:NA**	**Date: 1-17-08**
Type: □ Telephone □ Visit ☑ Other **Location of Visit:**	□ Incoming □ Outgoing	

Contact Made By:

Name: Andrew Greazel	**Title: Geologist**	**Organization: CDM**
Name:	**Title:**	**Organization:**

Individual Contacted:

Name: Tim Mower	**Title: Project Manager**	**Organization: Tetra Tech**

Summary Of Conversation

1. **What is your impression of the project Parcel B (general sentiment)?**

Moving forward; optimistic that major issues have been resolved and process of amending the 1997 ROD can begin and lead to completion of the remedial actions.

2. **Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.**

No

3. **Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.**

No

4. **Do you feel well informed about the site's activities and progress?**

Yes; have regular (at least weekly) communications with Navy staff.

5. **Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**

No

General Comments

Continued public involvement in the upcoming proposed plan for Parcel B will be important.

INTERVIEW RECORD

Site Name: Hunters point Shipyard		**EPA ID No.: CA1170090087**
Subject: 5-year Review		**Time: NA** **Date: 1/29/08**
Type: □ Telephone □ Visit ☑ Other **Location of Visit:**		□ Incoming □ Outgoing
Contact Made By:		
Name: Andrew Greazel	**Title: Geologist**	**Organization: CDM**
Name:	**Title:**	**Organization:**
Individual Contacted:		
Name:Barbara Bushnell	**Title: RAB Member--BVHPS**	**Organization:**
Summary Of Conversation		

1. **What is your impression of the project Parcel B (general sentiment)?**

Parcel B has been thoroughly investigated and preparations are obviously being finalized to initiate the process of transfer of the parcel,
The emphasis on HHRA was appreciated and thoroughly identified at the varied locations with solutions being presented. Problems noted by the various regulators were noted and addressed.

The groundwater reports were also thorough and interesting especially since this is the first parcel with immediate adjacency to SF Bay. The slow but proceeding study of parcel F (the Bay) there is apparent concern about the use of the parcel and protection of the waters.

There is a consideration that the Radiation report regarding the removal of serer drains and other underground lines is still outstanding; this makes any final statement about the review as still pending.

2. **What effects have site operations had on the surrounding community?**
3.

The Navy and their contractors have made concerted efforts to hire local (Bayview/Hunter's Point Residents); not all locals feel the effects. While trained professional experts are brought in from elsewhere as very few residents match their skills. There is no effort on anyone's part to provide education/training for locals through the various schools in the community. I acknowledge that this might be largely voluntary but eventual benefits for the contractor and knowledge of the scope of /details of work at HPSY could benefit local labor pool.

4. **Do you feel well informed about the site's activities and progress?**

Yes, as a RAB member for last 7 years, I listen to the Navy and community progress. I have also attended the BCT meetings monthly and receive all documents from the Navy.

5. **Do you have any comments, suggestions, or recommendations regarding the site's management or operations?**

Keith Forman has been an excellent communicator /coordinator for the Navy. He is very patient with community members who resist hearing what he is saying; especially when it something they don't want to hear.

Progress on the shipyard has accelerated a great deal in the last few years.

Of special note are the metal slag/ metal reef cleanup at sites affecting SF Bay; along with the debris removal at an adjacent IR site. (Jose Payne deserves an award).

The soil gas removal on Parcel E-2 deserves acknowledgement as a thorough, continuous investigation.

These are not on Parcel B but they illustrate the level of commitment demonstrated at the entire site.

6. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

There has been a recent community "fuss" about the former parcel A, which they keep being told is not a Navy concern.

There is also local groups who continuously try to "inflame" the locals; they have not succeed but they don't go away

7. **Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.**

NONE

General Comments

Awaiting RAD reports from Parcel B

Appendix F

Responses to Regulatory Agency Comments on the Draft Second 5-Year Review of Remedial Actions at Hunters Point Shipyard

RESPONSE TO COMMENTS ON
THE DRAFT SECOND FIVE-YEAR REVIEW OF REMEDIAL ACTIONS AT HUNTERS POINT SHIPYARD (HPS), SAN FRANCISCO, CALIFORNIA
29 August 2008
CONTRACT NUMBER: N68711-05-G-7417

TASK NUMBER: 0004

Draft response to comments to the following reviewers:

Erich Simon of the Regional Water Quality Control Board, San Francisco Bay Region (BARWQCB), (comments received on 22 July 2008)

Thomas Lanphar, of the Department of Toxic Substances Control (DTSC), (comments received on 21 July 2008)

Mark Ripperda, of the U.S. Environmental Protection Agency (EPA), Region IX , (comments received on 22 July 2008)

Amy Brownell, City and County of San Francisco Department of Public Health, (comments received on 24 July 2008)

Monica McEaddy, EPA Headquarter (comments received on 06 August 2008)

COMMENTS	RESPONSE
Responses to Erich Simon of the RWQCB	
Thanks for your review. Please find the responses below:	
1. General – Because this draft discusses the proposed remedy in the Parcel B Proposed Plan that is currently under public review, it will be appropriate to not finalize this 5-year review report until the Parcel B Proposed Plan responsiveness summary is completed.	**Response:** Please note that the second five-year review report for Hunters Point Shipyard (HPS) covers the period between 8 July 2003 and 8 July 2008 (5 years). Any information or references created after 8 July 2008 was not included in the second five-year review report at HPS. Such information will be a part of the next five-year review report (2013). The information in the Revised Proposed Plan for Parcel B at HPS, dated June 2008, was included in the Second Five-Year Review Report. Any information beyond 8 July 2008, such as the Parcel B Proposed Plan responsiveness summary, will be the subject of the next five-year review report of 2013.

2. Page 2-2, Section 2.2 Summary of Status of Parcel C – Include the following reports in the list of events that have occurred since April 1992: Final Radiological Addendum to the Revised Feasibility Study Report for Parcel C (6/20/08) Draft Final Revised Feasibility Study Report for Parcel C (2/4/08)	**Response:** The Final Radiological Addendum to the Revised Feasibility Study Report for Parcel C (6/20/08) was added as requested and included in the Reference section (TtECI 2008d). The Draft Final Revised Feasibility Study for Parcel C (02/04/08) was included in the last bulleted item of Section 2.2, Page 2-4. Please note that the date at the beginning of this bulleted item was corrected to be 2008 instead of 2007 to correspond to the date of the Draft Final Revised Feasibility Study for Parcel C (02/04/08).
3. Section 2.3 — Summary of Status of Parcel D — A discussion of how Parcel D has recently been split up into Parcel D, D-2, G, and UC-1 is needed.	**Response:** Two additional bulleted paragraphs were included in Section 2.3 to account for the latest Parcel D Proposed Plan. The first paragraph was placed at the end of Section 2.3, page 2-8 and reads as follows: ▪ "The Navy completed a Proposed Plan for Parcel D in July 2008 (Tetra Tech 2008a). This Proposed Plan applies to any potential sub-parcels that are within the original boundary of Parcel D (Figure 2). Although separate RODs would be developed for these sub-parcels, no new proposed plan will be issued. The four new parcels envisioned in the current redevelopment strategy are described below. ▪ **Parcel D-1:** This area is proposed for reuse under the redevelopment plan for maritime or industrial use. ▪ **Parcel D-2:** This area is proposed for research and development reuse. This area was brought into Parcel D from the former Parcel A to allow further evaluation for possible radiological contamination in one building (Building 813). The Navy surveyed Building 813 for radiological impacts and concluded that no radiological material was present at or above risk levels at or in the building. The *California Department of Public Health (CDPH)* approved the Final Status Survey Report for Building 813 on April 1, 2008.

	▪ **Parcel G:** This area is proposed for commercial reuse. Long-term uses include educational/cultural use, mixed use, open space, and industrial reuse. ▪ **Parcel UC-1:** This area along Spear Avenue is proposed for commercial use as an access street and utility corridor, as part of the ongoing site redevelopment." The second paragraph was included in chronological order in Section 2.3, page 2-7. The paragraph below was added due to the completion of the Proposed Plan for Parcel D in July 2008. "2008: The Proposed Plan (Tetra Tech 2008b) summarizes the alternatives evaluated under *CERCLA* and explains the basis for choosing the preferred remedial (cleanup) alternatives for soil, structures, and *groundwater* contamination in Parcel D at Hunters Point Shipyard." The following reference was included in the reference section in relation to the above added language: Tetra Tech. 2008b. "Parcel D Proposed Plan, Hunters Point Shipyard, San Francisco, California." July.
4. Section 2.6 — Summary of Status for Parcel F — Include the following report in the list of events that have occurred since 1996: Final Revised Feasibility Study (FS) Report for Parcel F (4/30/08).	**Response:** The Final FS Report for Parcel F (4/30/08) was included in the Reference section. The last paragraph of Section 2.6, page 2-16 was updated to read as follows: "**2008:** An update to the 1998 FS was prepared, developing remedial alternatives to address the chemical contamination found in sediments at Parcel F. Remedial alternatives were evaluated and ranked, including those combining focused removal/activated backfill, in-situ stabilization, institutional control, and monitored natural recovery (Barajas & Associates 2008b)." The following reference was included in the reference section in relation to the

	above language: Barajas & Associates, Inc. 2008b. "Feasibility Study Report for Parcel F, Hunters Point Shipyard, San Francisco, California." April 30.
5. Section 4.5 — Remedial Actions since the First 5-year Review Report — This section includes a discussion of the Methane TCRA in Section 4.5.4, but doesn't include a discussion of the Mercury TCRA. Include a similar section that summarizes the Mercury TCRA.	**Response:** The heading for Section 4.5.4 (it is now Section 3.5.4), page 3-8 "Methane Source Removal" was modified to read "Methane and Mercury Source Removal" and the following text was added at the end of this section: **"TCRA for the Mercury Source** As an exploratory removal action**,** between July 1996 and January 1997, soil containing chemicals at concentrations exceeding the Hunters Point Ambient Level (HPAL) of 2.3 mg/kg were excavated at 18 exploratory excavation sites located throughout HPS (IT Corporation 1999a). As part of this action, approximately 500 cubic yards of soil containing mercury concentrations greater than cleanup criteria were removed at IR-26 excavation EE-05. The excavation was terminated at groundwater (i.e., soil was excavated to a depth of approximately 7 feet). Additional excavation activities were performed at IR-26 excavation EE-05 in 2000 and 2001 (Tetra Tech EMI 2002). During this time-frame, an additional 5,000 cubic yards of soil containing mercury concentrations greater than the HPAL of 2.3 mg/kg were excavated at EE-05 and disposed off site. Soils were excavated to a depth of approximately 10 feet bgs. Analysis of confirmation samples collected during the excavation indicates there are areas beneath the backfilled excavation where mercury concentrations exceed the HPAL. Mercury concentrations up to 90 mg/kg were documented at the base of the excavation, which remain in the subsurface. An additional TCRA for the mercury source at IR-26 excavation EE-05 is planned for the Summer of 2008 (Navy 2008)." In support of the above added section, the following documents were added to

	the Reference section of the report: IT Corporation. 1999a. "Completion Report, Exploratory Excavations, Hunters Point Naval Shipyard, San Francisco, California." June. ChaduxTt, 2008. "Final Construction Summary Report for Parcel B, Hunters Point Shipyard, San Francisco, California." July 25. Navy. 2008. "Final Action Memorandum, Time-Critical Removal Action for the Mercury Source at IR-26, Parcel B, Hunters Point Shipyard, San Francisco, California." May 29.
6. Section 4.5.3 — TPH Corrective Action Implementation Soil Removal — Include a discussion of the Draft Final Corrective Action Plan for Parcel B, Revision 2008 (4/30/08)	**Response:** A new paragraph was added at the end of Section 4.5.3 (it is now 3.5.3), Page 3-8 to read as follows: "In late 2007, the Navy revised the HPS Petroleum Program Strategy and screening criteria per the Water Board's request. As a result, a revised version of the Parcel B Corrective Action Plan (CAP) was prepared (Shaw 2008). The CAP documented the process completed to identify the specific areas of remaining concern at Parcel B that require further characterization or corrective action, which are specifically addressed in the CAP. The CAP considered recent sample results and re-evaluated these specific sites in accordance with the *Final New Preliminary Screening Criteria and Petroleum Program Strategy* (Shaw, 2007). The CAP assesses the current nature and extent of petroleum contamination, evaluates several corrective action alternatives, and develops a cost-effective and timely approach to addressing petroleum related contamination at each of the sites of remaining concern. In order to obtain site closure for petroleum-impacted areas, the CAP only addresses the nature and extent of petroleum related contamination in soil and groundwater that is not commingled with CERCLA contamination. The HPS CERCLA Program will address petroleum related contamination commingled with CERCLA contamination."

	The following reference related to the above paragraph was added to the reference list: Shaw Environmental, Inc. 2007a. "Final New Preliminary Screening Criteria and Petroleum Program Strategy, Hunters Point Shipyard, San Francisco, CA." December 21.
Responses to Thomas Lanphar of the Department of Toxic Substances Control	
1. Section 5.3, page 5-10 - The Record of Decision (ROD) for Parcel B had no remedy for radiological materials, because the Historical Radiological Assessment had not been completed at the time of the original Parcel B ROD and an understanding of radiological concerns had not been formulated at that time. The original Parcel B ROD did not specify or rely on the cleanup of radiological contaminants to be addressed by the base-wide radiological removal actions. Please modify the first sentence of this section.	**Response:** The first sentence of Section 5.3, Page 5-10 was modified to read as follows: **"**The ROD for Parcel B did not contain a remedy for addressing radiological contamination." The part of the sentence saying "and instead relied on the cleanup of radiological contaminants to be addressed by the base-wide radiological removal action (DON 2006)" was deleted.
2. Section 5.3.3, page 5-14- Please include the storm sewer and other radiological removal actions as support for the proposed alternative.	**Response:** A phrase was inserted in the first paragraph of Section 5.3.3, page 5-13, after the first sentence, to read as follows: "Also, the experience gained from the TCRA of the storm sewer and other radiological removal actions helped support a proposed remedial alternative for the radiological contamination." The first sentence of this paragraph now reads as follows: "Radiological RAs were not outlined as part of the Parcel B ROD or the first 5-year review; however, through implementation of the TMSRA Radiological addendum and PP process following the first 5-year review, the Navy investigated the nature, extent, health risks, and remedial alternatives for

	addressing radiological contamination at Parcel B. Also, the experience gained from the TCRA of the storm sewer and other radiological removal actions helped support a proposed remedial alternative for the radiological contamination."
3. Section 8.1, page 8-1 - Please include the completion of the Historical Radiological Assessment and updated information that then required a re-evaluation of the Parcel B remedy.	**Response:** A phrase was inserted as a third paragraph of Section 8.2.1, page 8-2 as follows: "The ROD for Parcel B did not contain a remedy for addressing radiological contamination. Subsequently, the completion of the Historical Radiological Assessment and conducting various radiological removal actions required a re-evaluation of the Parcel B remedy. Parcel B TMSRA Radiological Addendum evaluated the radiological remedial alternatives." The above statement was inserted in other places in the report where the protectiveness statement for Parcel B soil and radiological contamination remedy appears.
4. Table 2: Please include the Historical Radiological Assessment on this table.	Response: Table 2 summarizes the CERCLA chronological activities for Parcel B. The Historical Radiological Assessment was listed in Table 3, under History of Investigations Since ROD.
5. Table 3 - The status of remedial actions excavations for IR-07 and IR-18, and other remedial actions undertaken under the first Parcel B ROD, should have been reported in the Construction Summary Report and Construction Summary Report Addendum. Please review these actions and update this table accordingly.	**Response:** Please note that these activities at IR-07 and IR-18 occurred in the period covered by the first Five-Year Review. However, the First Five-Year Review report did not tabulate these activities. Table 3 (it is Table 5 now) included the tabulated activities from the First Five-Year Review report and the updated activities from the second five-year review.

RESPONSE TO COMMENTS ON THE DRAFT SECOND FIVE-YEAR REVIEW OF REMEDIAL ACTIONS AT HUNTERS POINT SHIPYARD (HPS), SAN FRANCISCO, CALIFORNIA 29 August 2008 CONTRACT NUMBER: N68711-05-G-7417 TASK NUMBER: 0004	
6. Table 4 - To clarify the history of investigations prior to and summarized in each 5 year review, please modify the row that includes, "First Five Year Review" by adding the date of the 5 year review, or change the heading to: " Activities completed prior to the (First or Second) Five Year Review.	**Response:** As requested, Table 4 (it is now Table 3) was updated to include dates beside the headings. That is the "First Five Year Review" heading was changed to "First Five-Year Review (8 July 1998 to 8 July 2003) and the "Second Five Year Review" Heading was changed to "Second Five-Year Review (8 July 2003 to 8 July 2008)."
Responses to Mark Ripperda of the U.S. EPA	
General Comments **1.** The text of the Draft Second Five-Year Review of Remedial Actions Hunters Point Shipyard (the Second Five-Year Review), particularly in Section 5, discusses the proposed alternative rather than the remedy selected in the existing Record of Decision (ROD) in some sections. The technical assessment questions first should be considered in light of the remedy proposed in the existing ROD. Then, the proposed remedy could be discussed. Please clearly discuss technical assessment questions in light of the remedy selected in the existing ROD and clarify when the proposed alternatives are being discussed in the Second Five-Year Review.	**Response:** Each section first includes a discussion of the existing ROD and then progresses to a discussion of the proposed remedial alternatives. Please see Section 5.1.1, which describes the ROD selected remedy for soil and Section 5.2.1, which describes the ROD selected remedy for groundwater. After the discussion of the proposed remedial alternatives, each section then includes a discussion of each technical question from the ROD remedy to the proposed remedy. To distinguish between the ROD remedy and the proposed remedy, the text of the report was revised to specify "the ROD remedy" or mention "the proposed alternatives" instead of simply saying "the Alternatives." For example, on page 5-4, "Alternative S-5" was changed to "The proposed Alternative S-5."
2. The tables do not include remediation goals for radionuclides. Please include a table summarizing remediation goals for radionuclides.	**Response:** A new table was included and named Table 9 and titled Remediation Goals for Radionuclides." This table was adopted from Final Parcel B TMSRA Radiological Addendum Table 3-2.

RESPONSE TO COMMENTS ON
THE DRAFT SECOND FIVE-YEAR REVIEW OF REMEDIAL ACTIONS AT HUNTERS POINT SHIPYARD (HPS), SAN FRANCISCO, CALIFORNIA
29 August 2008
CONTRACT NUMBER: N68711-05-G-7417

TASK NUMBER: 0004

Specific Comments **1. Executive Summary, Revised Soil Alternatives, Page iv and Five-Year Review Summary Form (continued), Page ix:** The summary of the revised soil alternative should specifically identify the methane source removal, since this was not part of the original soil remedy and it is specifically identified in the Proposed Plan. Also, the last sentence of the second bullet is incomplete; it appears to be missing a word. The text states, "New covers will be installed according to the redevelopment	**Response:** A new bulleted item was added as a first bullet on page iv and directly under the heading reading "Revised soil remedial alternative" on page ix to read as follows; "This alternative would achieve RAOs by removing soil where chemicals exceed remediation goals, including the methane and mercury source areas, and disposing of excavated soil at an offsite facility." The description of the revised soil remedial alternative on page iv was changed to agree with the revised proposed plan (PP) for Parcel B.
2. Section 1, Introduction, Page 1-2 and Section 2, Overview of Hunters Point Shipyard and Other Parcels: The division of Parcel D into Parcels D and G should be discussed in these sections and Parcel G information should be separated from the Parcel D information presented in Section 2.3. Please update the Draft Second Five-Year Review of Remedial Actions (the Second Five-Year Review) with information about the creation and status of Parcel G.	**Response:** Two additional bulleted paragraphs were included in Section 2.3 to account for the latest Parcel D proposed plan. The first paragraph was placed at the end of Section 2.3, page 2-8 and reads as follows: ▪ "The Navy completed a proposed plan for Parcel D in July 2008 (Tetra Tech 2008a). This proposed plan applies to any potential sub-parcels that are within the original boundary of Parcel D (Figure 2). Although separate RODs would be developed for these sub-parcels, no new proposed plan will be issued. The four new parcels envisioned in the current redevelopment strategy are described below. ▪ **Parcel D-1:** This area is proposed for reuse under the redevelopment plan for maritime or industrial use. ▪ **Parcel D-2:** This area is proposed for research and development reuse. This area was brought into Parcel D from the former Parcel A to allow further evaluation for possible radiological contamination in one building (Building 813). The Navy surveyed Building 813 for radiological impacts and concluded that no radiological material was present at or above risk levels at or in the building. The *California Department of Public Health (CDPH)* approved the Final Status

	Survey Report for Building 813 on April 1, 2008. ▪ **Parcel G:** This area is proposed for commercial reuse. Long term uses include educational/cultural use, mixed use, open space, and industrial reuse. ▪ **Parcel UC-1:** This area along Spear Avenue is proposed for commercial use as an access street and utility corridor as part of the ongoing site redevelopment." Also, the second paragraph was included in chronological order in Section 2.3, page 2-7. The paragraph below was added because the proposed plan for Parcel D was recently completed in July 2008. "2008: The proposed plan (Tetra Tech 2008a) summarizes the alternatives evaluated under *CERCLA* and explains the basis for choosing the preferred remedial (cleanup) alternatives for soil, structures, and *groundwater* contamination in Parcel D at Hunters Point Shipyard."
3. Section 2, Overview of Hunters Point Shipyard and Other Parcels: Several buildings have been removed, but the number of structures (i.e., Section 2.2, page 4) and parcel descriptions have not been updated with this information. Also, the parcel descriptions should include similar information. For example, the Parcel C description does not include the number of Installation Restoration (IR) sites, but it does include the number of structures. The Parcel D description does not include the number of structures, but does include the number of IR sites.	**Response:** The introductory paragraphs for each parcel in Section 2 were made consistent with the correct number of IR sites and structures. Section 2.2, page 2-2: The introductory paragraph for Parcel C was revised to include the missing number of IR sites and to update the number of buildings and ship berths. The introductory paragraph was changed: From: "Parcel C is located immediately south of Parcel B and north of Parcel D, to the north and west of the Bay and Parcel F, and east of Parcel A and off-base property (Figure 2). Parcel C comprises 76 acres of shoreline and lowland coast along the east-central portion of HPS. Parcel C is the oldest portion of the shipyard and has been used primarily for industrial operations since the late 1800s. Located within the boundaries of Parcel C are 35 buildings, 2 dry docks,

	1 wharf, 9 ship berths, and 1 pier. Soil at Parcel C consists largely of artificial fill, and the lithology is primarily sand, silt, and clay, with lesser amounts of gravel and boulders. Asphalt, concrete, or buildings cover 90 percent of the surface soil (Tetra Tech and Levine-Fricke-Recon, Inc [LFR] 1998b; Tetra Tech 2002b). To: "Parcel C is located immediately south of Parcel B and north of Parcel D, to the north and west of the Bay and Parcel F, and east of Parcel A and off-base property (Figure 2). Parcel C comprises 79 acres of shoreline and lowland coast along the east-central portion of HPS. Parcel C is the oldest portion of the shipyard and has been used primarily for industrial operations since the late 1800s. Located within the boundaries of Parcel C are 70 building and 14 IR sites (SulTech 2008). Soil at Parcel C consists largely of artificial fill, and the lithology is primarily sand, silt, and clay, with lesser amounts of gravel and boulders. Asphalt, concrete, or buildings cover 90 percent of the surface soil (Tetra Tech and Levine-Fricke-Recon, Inc [LFR] 1998b; Tetra Tech 2002b). Section 2.3, page 2-5: The introductory paragraph for Parcel D was revised to include the missing number of building and was updated as follows: From: "Parcel D is located immediately south of Parcels A and C, to the north and west of the Bay and Parcel F, and east of off-base property (Figure 2). Parcel D comprises 101 acres of the southeast-central portion of HPS. Originally, Parcel D comprised 128 acres and 27 IR sites, which were investigated during the RI (PRC, LFR and Uribe 1996b). In 1997, IR-36 was transferred from Parcel D to Parcel E, thereby reducing the Parcel D area to 101 acres. Most of the land at Parcel D was formerly part of the industrial support area and was used for shipping, ship repair, and office and commercial activities. (Tetra Tech 2002a)."

	To: "Parcel D is located immediately south of Parcels A and C, to the north and west of the Bay and Parcel F, and east of off-base property (Figure 2). Currently, Parcel D comprises 98 acres and 23 IR sites (SulTech 2007b). A total of 16 buildings and one Gun Mole (Regunning) Pier exist within the boundary of this parcel (TtECI 2008a, Table 2-3). Most of the land at Parcel D was formerly part of the industrial support area and was used for shipping, ship repair, and office and commercial activities. The docks at Parcel D were formerly part of the industrial production area (Tetra Tech 2002a)." The number of buildings and IR sites were added to the introductory paragraph for Parcel E Section 2.4, Page 2-8, after the second sentence as follows: "A total of 22 IR sites and 43 buildings are located within the boundary of Parcel E (Barajas & Associates 2007a, Figure 1-3 and Table 3-1)."
4. Section 2, Overview of Hunters Point Shipyard and Other Parcels: There are several missing investigations and removal actions: Sections 2.2, 2.3, and 2.4(Parcels C, D, and E) should include the Phase I, II, and III groundwater data gap investigations.	**Response:** These investigations and removal actions were added to Section 2. The following bulleted item was included in Section 2.2, page 2-3, after the second bullet: "2000-2001: A groundwater data gaps investigation at HPS, including Parcel C, was implemented to update the previous assessment of groundwater conditions and to supplement groundwater information gathered during remedial investigations (Tetra Tech 2001f, g)." The following bulleted item was included in Section 2.3, page 2-6, under the seventh bullet: "2002: In 2002, a groundwater data gaps investigation was implemented to provide additional understanding of the groundwater conditions under the parcel (Tetra Tech 2001f,g)." The following references were added to the reference section in conjunction

	with the above added bullets: Tetra Tech. 2001g. "Revised Information Package for Phase I Groundwater Data Gaps Investigation, Hunters Point Shipyard, San Francisco, California." January 8. Tetra Tech. 2001f. "Parcel E Package, Phase II Groundwater Data Gaps Investigation, Hunters Point Shipyard, San Francisco, California." August 10. The following bulleted item was included in Section 2.4, page 2-10, after the second bullet: "2001-2002: Two phases of a groundwater data gaps investigation were implemented at Parcel E to update the previous assessment of groundwater conditions and to supplement groundwater information gathered during remedial investigations (Tetra Tech 2001f, 2004b)." The following reference was added to the reference section in conjunction with the above added bullet: Tetra Tech. 2004b. "Revised Final Parcel E Groundwater Summary Report, Phase III Data Gaps Investigation, Hunters Point Shipyard, San Francisco California." May 11.
Sections 2.2, 2.4, and 2.5 (Parcels B, E, and E-2) should include the nonstandard data gaps investigation, wetlands delineation and functions and values assessment (2001-2002).	**Response:** The following bullet was added to Section 2.4, page 2-10, after the first bullet and to Section 2.5, page 2-12, after the first bullet. ▪ 2001-2002: Parcel E Nonstandard Data Gaps Investigation, Wetlands Delineation and Function and Values Assessment, Parcel B and E (Tetra Tech 2003i).

	The following reference was added to the reference section in conjunction with the above-added bullet: Tetra Tech. 2003i. "Final Parcel E Nonstandard Data Gaps Investigation, Wetlands Delineation and Function and Values Assessment, Parcel B and E, Hunters Point Shipyard, San Francisco, California." August 14.
Sections 2.2 and 2.3 (Parcels C and D) should include the storm drain and sanitary sewer radiological removal action for IR-06 and IR-25 in Parcel C and Building 813 in Parcel D. In addition the storm drain and sanitary sewer radiological removal action in Parcel G should be discussed.	The following bullet was added to Section 2.2, page 2-3: ▪ 1999-2000 – Removal Actions were conducted at IR-06 and IR-25 for the purpose of excavating the soil called for by the 1997 ROD when these IRs were part of Parcel B. (IT Corp 2000) The following reference was added to the reference section in conjunction with the above-added bullet: IT CORP. 2000. "Post-Construction Report, Hunters Point Shipyard, San Francisco, California." March 1. The following bulleted item was added to Section 2.3, page 2-7, as the last bullet regarding Parcel G: ▪ 2008: The following radiological removal actions have been completed as of June 18, 2008 on Parcel G (BCT Meeting 2008): ▪ Completed 14,401 linear feet (LF) of trench excavations, of which 1,468 LF was previously unidentified ▪ Excavated 32,564 cubic yards (CY) of soil, of which 3,2450 CY was put in containers for disposal as low-level radioactive waste ▪ Thirty-one (31) survey units developed, 18 have been

	backfilled or approved for backfill ▪ Screening of soil continues ▪ PG&E completed the removal of power poles and overhead lines on "H" Street and deactivated the natural gas line ▪ Sewer removals on H Street began June 17, 2008 The following reference was added to the reference section in conjunction with the above-added bullet: BCT Meeting. 2008. "Hunters Point Radiological Program Update." June 24.
Section 2.4 (Parcel E) should include the standard data gaps investigation conducted in the interior areas. In addition, the wetlands delineation, and functions and values assessment (2001-2002) should be included.	**Response:** the wetlands delineation and functions and values assessment (2001-2002) was added and responded to in RTC 4 previously.
The bullet covering the "Landfill and Soil Data Gaps Investigations, Wetlands Delineation" in Section 2.5 (Parcel E-2) should be expanded to specify all of the nonstandard data gap investigations, including the landfill gas characterization (2002), landfill lateral extent evaluation (2002), landfill liquefaction potential (2002-2004), wetlands delineation,	**Response:** The following bullets were added in Section 2.5, page 2-12: ▪ 2001-2002: Parcel E Nonstandard Data Gaps Investigation, Wetlands Delineation and Function and Values Assessment, Parcel B and E (Tetra Tech 2003i). ▪ 2002: Nonstandard Data Gaps Investigation, Landfill Gas

and functions and values assessment (2001-2002). Sections 2.3, 2.4, and 2.5 (Parcels D, E, and E-2) should include the 20052007 quarterly groundwater monitoring program sampling.	Characterization (Tetra Tech, 2003j) ▪ 2002:Final Parcel E Nonstandard Data Gaps Investigation, Landfill Lateral Extent Evaluation (Tetra Tech b, 2004c) ▪ 2002:Final Parcel E Nonstandard Data Gaps Investigation, Landfill Liquefaction Potential (Tetra Tech and ITSI, 2004) The following references were added to the reference section in connection with the above bulleted items: Tetra Tech. 2003j. "Final Parcel E Nonstandard Data Gaps Investigation, Landfill Gas Characterization, Hunters Point Shipyard, San Francisco, California." December 23. Tetra Tech 2004c. "Final Parcel E Nonstandard Data Gaps Investigation, Landfill Lateral Extent Evaluation, Hunters Point Shipyard, San Francisco, California." October 29. Tetra Tech and ITSI. 2004. “Final Parcel E Nonstandard Data Gaps Investigation, Landfill Liquefaction Potential” August 13. **Response:** The fifth bullet in Section 2.3, page 2-7 addresses briefly the groundwater sampling. The date at the beginning of the bullet was changed from “2007” to “2005-2007”. The last bullet in Section 2.4. Page 2-11 addresses briefly the **groundwater** sampling. This bullet was revised to read as follows: ▪ “2004-2007: Groundwater sampling under the basewide groundwater monitoring program began in June 2004 and has been conducted on a quarterly basis. The two areas of concern in Parcel

	E include the Northwest Bay Fill Area (NBFA), and Former Oil Reclamation Ponds Area (ORPA). Water quality criteria were exceeded in NBFA wells in one or both of the two most recent reported events (second and third quarters of 2008) for the following analytes: barium; copper; nickel; selenium; vinyl chloride; and zinc. Water quality criteria were exceeded in ORPA wells in one or both of the two most recent reported events (second and third quarters of 2007) for the following analytes: antimony; arsenic; barium; benzene; copper; nickel; p-dioxane; selenium; thalium; and vinyl chloride (CE2-Kleinfelder, 2007i)." See also changes to Section 2.5, page 2-14 regarding the groundwater monitoring, first bullet.
Sections 2.4 and 2.5 (Parcels E and E-2) should include the MechanoChemical Destruction Supplemental Treatability Study conducted on Polychlorinated Biphenyl (PCB) Hot Spot soils.	**Response:** The following bulleted paragraph was added to Section 2.4, page 2-11 and to Section 2.5, page 2-14, as a last bullet: ▪ 2007 - A work plan for performing a supplemental treatability study to evaluate mechanochemical destruction (MCD) of PCB-contaminated soil and sediments was prepared. The underlying principal of MCD is the destruction organic compounds in a soil matrix by the application of mechanical energy through grinding of the soil matrix (Shaw Environmental Inc. 2007b). The following reference was added to the reference section in connection to the above bulleted item: Shaw Environmental, Inc. 2007b. "Final Workplan MechanoChemical Destruction Supplemental Treatability Study, PCB Hot Spot – Soil Stockpiles, Hunters Point Shipyard, San Francisco, California." September 5.

There were surveys, decontamination, and removal of industrial process equipment; waste consolidation and removal; cleaning of dip tanks, sumps, batch tanks, and aboveground storage tanks; and asbestos removals in Parcels B, C, D, E buildings conducted between 2002 and 2004 that should be discussed.	**Response:** An additional bullet was added to Section 4.3 (it is now Section 3.3), page 3-4, as follows: ▪ 2003-2004: The Navy conducted an HPS-wide action in 2003 and 2004 to address aboveground issues identified previously at buildings and in the vicinity of buildings, including removal of waste material, decontamination or removal of equipment and structures, and abatement of friable, accessible, and damaged asbestos-containing materials. The primary objective of this action was to address potential environmental issues associated with the industrial use of buildings that could affect the planned transfer of the property to the City and County of San Francisco (TtFW 2004). The following reference was added to the reference section in connection with the above bulleted item: Tetra Tech FW, Inc. 2004. "Draft Final Post Construction Report, Hunters Point Shipyard, San Francisco, California." July 9. An additional bullet was added to Section 2.2, page 2-3, as follows: ▪ 2002 – 2004: From 2002 through 2004, the Navy completed activities to consolidate and remove waste throughout Parcel C. Industrial process equipment was decontaminated, sumps cleaned, and waste consolidated, including removal of waste material stored in or near buildings and removal or encapsulation of asbestos-containing material (Tetra Tech FW, Inc. 2004). An additional bullet was added to Section 2.3, page 2-6, as follows: ▪ 2002-2003: From April 2002 to June 2003, decontamination and waste consolidation and disposal activities were conducted. Decontamination and waste consolidation and disposal activities included: encapsulating or removing asbestos-containing material;

	removing and disposing of structural materials, paint booths, and numerous abandoned waste items; removing and disposing of hoods, vents, and ducts associated with industrial processes; removing or disabling existing aboveground storage tanks; and cleaning industrial process-related sumps, vaults, trenches, and equipment foundations (SulTech 2007b). An additional bullet was added to Section 2.4, page 2-10, before the fourth bullet as follows: ▪ 2003-2004: The Navy conducted activities in 2003 and 2004 to address aboveground issues identified previously at buildings and in the vicinity of buildings, including removal of waste material, decontamination or removal of equipment and structures, and abatement of friable, accessible, and damaged asbestos-containing materials. The primary objective of this action was to address potential environmental issues associated with the industrial use of buildings that could affect the planned transfer of the property to the City and County of San Francisco (TtFW 2004).
Section 2.6 (Parcel F) should include the preliminary field test and field demonstration of activated carbon mixing and in-situ stabilization of PCBs in sediment.	**Response:** A paragraph was included to address the activated carbon mixing and in-situ stabilization of PCBs in sediment, as the paragraph before last, in chronological order, in Section 2.6, page 2-16, as follows: "2007: With the assistance form the U.S. Navy, in 2006-2007, a preliminary treatability study was conducted at the Hunters Point Shipyard tidal mudflat in South Basin to assess how activated carbon treatment technology may be applied in the field for treatment of PCBs. The results indicate that after seven months of AC-sediment contact in the field, the 28-day PCB bioaccumulation for the bent-nosed clam, Macoma nasuta, field deployed to this AC-amended sediment was approximately half of the bioaccumulation resulting from exposure to untreated sediment (Cho, Y.M. et al 2007)."

There was a removal action focusing on stockpiles (soil and other materials) in Parcels D, E, and possibly E-2 that should be included.	In relation to the above added paragraph, the following reference was added to the reference section: "Cho, Y.M. et al. 2007. "Field methods for amending marine sediment with activated carbon." April. **Response:** An additional bullet was added to Section 2.3, page 2-7, first bullet as follows: ▪ 2003 – 2004: In July 2003, the Navy inventoried all the stockpiles at HPS and identified 37 piles located within Parcel D (Tetra Tech and ITSI 2005). In February 2004, nine stockpiles were removed from Parcel D as part of a TCRA. An additional bullet was added to Section 2.4, page 2-10, sixth bullet as follows: ▪ 2003 – 2004: The Navy conducted a field inventory of soil stockpiles located throughout HPS in July and August 2003. The inventory documented more than 80 stockpiles at Parcel E. Five stockpiles in Parcel E were removed in 2004 (Tetra Tech and ITSI 2005).
5. **Section** 2.2, **Summary of Status of Parcel C, Page** 2-3: The Dry Dock 4 removal action is discussed twice, once in the third bullet (2001) and once in the fifth bullet (2003) on this page. The removal action occurred in 2001. However, the water sampling that was done in 2004 at multiple locations so that the caisson could be opened in 2005 should be discussed in the text. In addition, debris and a metal tank were removed from the Dry Dock. Please consolidate the information in the two Dry Dock 4 removal action bullets and include the 2004 water sampling and 2005 caisson removal.	**Response:** The dry dock removal action was discussed only once. The third bullet on page 2-3, Section 2.2 was deleted.

6. **Sections** 2.2, 2.3, **and** 2.4: It is unclear why summaries of radionuclides of concern associated with Parcels C, D, and E are not included. This information is provided for Parcel E-2 (page 2-11). Please provide similar summaries for each of the other parcels.	**Response:** Section 2.2, Page 2-2, added the following summary of radionuclides to the 7th bulleted item to read as follows: ▪ Phase V Radiological Investigation (Sections 6 and 8 of the historical radiological assessment (Naval Sea Systems Command [NAVSEA] 2004). The radionuclides of concern at Parcel C include: cesium-137, cobalt-60, plutonium-239, radium-226, strontium-90, thorium-232, and potassium-40 (NAVSEA 2004). Section 2.3, page 2-5, added the following summary of radionuclides to the 9th bulleted item from the top to read as follows: ▪ Phase V Radiological Investigation (Sections 6 and 8 of the historical radiological assessment (NAVSEA 2004). The radionuclides of concern at Parcel D include: cesium-137, cobalt-60, plutonium-239, radium-226, strontium-90, thorium-232, americium-241, uranium -235, and tritium (H-3) (NAVSEA 2004). Section 2.4, page 2-9, added the following summary of radionuclides to the 10th bulleted item from the top to read as follows: ▪ Phase V Radiological Investigation (Sections 6 and 8 of the historical radiological assessment (NAVSEA 2004). The radionuclides of concern at Parcel E include: cesium-137, cobalt-60, plutonium-239, radium-226, strontium-90, americium-241, uranium -235 and tritium (H-3) (NAVSEA 2004).

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7. **Section 2.3, Summary Status of Parcel D, Page** 2-6: The final status surveys that have been performed for Buildings 819 and 813 in Parcel D should be included. In addition, there has been ongoing work in some of the buildings and several buildings have been demolished as part of the radiological removal actions. Please include these activities.	**Response:** A short bullet was included in Section 3.3, page 2-7, as follows: "2008: Buildings 813 and 819 have been surveyed for release from radiological control pending regulatory approval (TtECI 2008a)."
8. **Section 2.4, Summary Status of Parcel E, Page 2-8:** The sixth bullet on Page 2-8, which discusses the PCB Hot Spot Removal Action, should include the other 108 drums (i.e., other than the 2 drums that contained mixed waste) and 537 miscellaneous containers and bottles of laboratory waste. Also, it is unclear why the seventh bullet includes a Parcel E-2 removal action. In addition, please revise the seventh bullet to include only the Metal Debris Reef portion of the removal action, since this occurred in Parcel E.	**Response:** The bulleted item of Section 2.4, page 2-10 was changed to add the requested drums and containers to read as follows: ▪ **2005:** A TCRA was performed to excavate petroleum, PCB, and radiological-impacted soils at hot spots across Parcels E and E-2. Approximately 65,200 tons of PCB-contaminated soil and debris were removed for disposal (Tetra Tech EC, Inc. [TtECI] 2007a). The debris removed included low-level radioactive waste consisting of 533 cy of soil and firebrick, 78 cy of metal debris, 19 pieces of debris, and two low-level mixed waste drums (TtECI 2007a). Also, 110 drums, containing mostly oil and grease, were discovered in the central area of the excavation, and 537 small containers and laboratory bottles were found within the PCB Hot Spot. Radiological RAOs were met through confirmation sampling, while additional remediation was necessary to meet RAOs for PCBs (TtECI 2007a). The 8th bullet of Section 2.4, page 2-11 was changed to include only the metal debris reef portion of the removal action to read as follows: ▪ **2005:** A TCRA was performed to excavate soil at the Metal Debris Reef in Parcel E. Approximately 11,200 cy of soil, metal slag and debris were excavated (TtECI 2007b).
9. **Section 2.5, Summary Status of Parcel E-2, Page 2-10:** Information in the ninth bullet should be limited to the Metal Slag Area removal action. In	**Response:** The 9th bulleted item (page 2-13) was revised to read as follows:

addition, for completeness the five drums found during this removal action should be discussed. Please revise the ninth bullet to include only information about the Metal Slag Area and discuss the five drums that were found in this excavation. In addition, it is unclear why the monthly landfill gas monitoring that has been conducted since 2004 was not included. Please include a bullet summarizing the monthly landfill gas monitoring.	▪ **2005:** A TCRA was performed to excavate soil at the Metal Debris Reef (Parcel E) and Metal Slag (Parcel E-2) areas. Approximately 8,200 cy was removed from the Metal Slag excavation site. Pathways were eliminated by placing a cap of clean soil on each of the areas (TtECI 2007a). The monthly landfill gas monitoring program was addressed under the ongoing monitoring in Section 2,5. The following language was included: The language changed from: ▪ **"**The ongoing monitoring programs at Parcel E-2 include Storm Water Discharge Management Program; Landfill Cover Inspection and Maintenance Program; Basewide Groundwater Monitoring Program; and Landfill Gas Control and Monitoring Program (EERG & Shaw 2007). ▪ **2004-2007:** Groundwater sampling under the basewide groundwater monitoring program began in June 2004 and has been conducted on a quarterly basis. As for the last available data for this report, of the first quarter of 2007, groundwater sampling in Parcels C, D, E, and E-2 was conducted from February 12 through May 21, 2007. Groundwater samples were collected from 172 monitoring wells. Water quality criteria exceedances were reported in 68 analyses for metals (13 different metals), 74 analyses for VOCs (13 different VOCs), and 25 analyses for four other compounds (1,4-dioxane, ammonia, cyanide, and PCB-1260). No water quality exceedances were reported for pesticides or SVOCs. The current magnitude and lateral extent of contamination in groundwater are generally consistent with previous quarters, with one exception: vinyl chloride in RU-05 well IRO6MW40A appears to be migrating downgradient (to the north) (CE2-Kleinfelder

	2007h)." To: **Ongoing Monitoring Programs:** The ongoing monitoring programs at Parcel E-2 include: Quarterly Groundwater Monitoring (2004 to present); Monthly Gas Monitoring and Control (2004 to present); Storm Water Discharge Management (2003 to present); and Landfill Cap Inspection and Maintenance (2003 to present): ▪ **Quarterly Groundwater Monitoring (2004 to present):** In June 2004, the Navy began quarterly monitoring at Parcel E-2. A total of 21 A-aquifer wells and 10 B-aquifer wells were selected for groundwater sampling; the purpose of the sampling was to monitor chemicals that previously had been detected and to establish a baseline for other chemicals and water quality parameters that might be related to the landfill (EERG & Shaw 2007). The primary area of concern in Parcel E-2 is the Industrial Landfill Area (ILA). Water quality criteria were exceeded in ILA wells in one or both of the two most recent quarterly events (second and third quarter of 2007) for the following analytes: 1,1-dichloro ethane (DCA); 1,1-dichloroethene (DCE); 1,4-dichlorobenzene (1,4-DCB); ammonia; antimony; arsenic; barium, benzene, chlorobenzene; total chromium; Cis-1,2-DCE; copper, cyanide; Freon 150; mercury; nickel; selenium; trichloroethene (TCE), tetrachloroethene; thallium; and vinyl chloride (CE2-Kleinfelder 2007h). The radionuclides of concern associated with Parcel E-2 include cobalt-60, cesium-137, radium-226, and strontium-90. Onsite radiological surveys have been performed since the beginning of radiological work at HPS and are ongoing (TtECI 2007d). ▪ **Monthly Gas Monitoring and Control (2004 to present):** Landfill gas is being monitored on a monthly basis under the Interim Landfill Gas Monitoring and Control Plan to verify that hazardous

levels of landfill gas are not migrating beyond the fence line of the landfill and onto the University of California, San Francisco (UCSF) compound. In monthly monitoring performed since January 2004, all concentrations of monitored analytes were below action levels and regulatory requirements identified in the Interim Landfill Gas Monitoring and Control Plan. Methane concentrations have, in nearly all cases, remained below specified regulatory action levels; however, methane concentrations in excess of specified regulatory action levels have been detected in January 2004 and January 2006. In these instances, the Navy has notified the appropriate parties and implemented response measures to control landfill gas at the fence line of the landfill and at the GMPs located on the UCSF property (EERG & Shaw 2007).

- **Storm Water Discharge Management (2003 to present):** The Parcel E-2 storm water program involves quarterly non-storm water discharge visual observations, storm water sampling and analysis, monthly storm water discharge visual observations, and an annual comprehensive site compliance evaluation (EERG & Shaw 2007).
- **Landfill Cap Inspection and Maintenance (2003 to present):** The operation and maintenance (O&M) plan addresses and provides guidance for inspecting and reporting activities that are required to ensure the integrity of the landfill cap. It contains requirements that facilitate and support implementation of the O&M plan. Also included in the O&M plan are emergency response procedures which are to be followed in the event of flood, major storm event, earthquake, or fire (EERG & Shaw 2007).

10. Section 3.3, Document Review and Section 3.4, Data Review, Page 3-2: The last sentence of Section 3.3 states that "Parcel B remedial activities are summarized as part of Section 4" but under Subsection 3.4.2, Groundwater, numerous bulleted items provide well-specific contaminant information about Parcel B wells that have not yet been described. Please consider placing Section 4, Parcel B Overview immediately after Section 2, Overview of Hunters Point Shipyard and Other Parcels, so that the reader will have read about Parcel B prior to reading about well-specific contaminant information in Parcel B wells.	**Response:** Section 4 was named Section 3 and was placed immediately after Section 2.
11. Section 4.2, Land and Resource Use, Page 4-1: The last sentence of the first paragraph states, "Other significant activities at Parcel B included potential disposal of decontamination materials from ships used during nuclear weapons testing in 1946 and 1947 that were decontaminated at the shipyard," but IR07 and IR18 were filled beginning in the 1950s, so it is unlikely that this material was disposed in Parcel B. Please delete the quoted sentence.	**Response:** It is now Section 3.2 page 3-1. As requested, the following sentence was deleted: "Other significant activities at Parcel B included potential disposal of decontamination materials from ships used during nuclear weapons testing in 1946 and 1947 that were decontaminated at the shipyard."
12. Section 4.2, Land and Resource Use, Page 4-1: The second paragraph describes both the chronology of the creation of dry land and various uses, but the first two sentences describe what happened between the 1940s to the 1960s; the next sentence describes what happened between 1867 and 1940, and the last three sentences describe what happened between 1974 and 1976. The text should also specifically discuss the filling of IR 07 and IR18; filling of this area began in the 1950s. Please re-order the six sentences of the second paragraph into chronological order	**Response:** It is now Section 3.2 page 3-1. The second paragraph of Section 3.2, Land and Resource Use, page 3-1 was reorganized and re-written to include the activities of filling at IR 07 and IR 18, to read as follows: "HPS operated as a commercial dry dock facility from about 1867 until 1940 when the Navy acquired title to the land and began developing it for various naval shipyard activities. Approximately 400 acres of the dry land portion of HPS was filled to create a level plain from 12 to 15 feet above mean sea level. The area was filled in stages beginning in 1940 and completed by the early

and include the fill history of IR 07 and IR 18.	1960s. IR-07/18 was the last area filled within Parcel B. After 1948, IR-07/18 area was filled with soil, rock, and construction debris. By 1963, IR-07/18 was almost completely filled (Tetra Tech 2003c). From 1945 to 1974, the Navy used the shipyard primarily as a maintenance and repair facility. The Navy also conducted industrial activities at Parcel B, such as fuel distribution, sandblasting, painting, machining, acid mixing, and metal fabrication. The Navy discontinued activities at HPS in 1974, and the shipyard remained relatively unused until 1976. These investigations and surveys of various HPS sites also included: ▪ 1946 through 1948 Radiological Safety Section and Naval Radiological Defense Laboratory (NRDL) decontaminated and surveyed OPERATION CROSSROADS ships and HPS berths and dry docks. This included areas in Parcel B (NAVSEA, 2004). ▪ 1955 NRDL surveys to decommission NRDL buildings at HPS (NAVSEA, 2004). There are no reports of surveys for Parcel B NRDL radiologically-impacted sites. ▪ 1969 NRDL survey for dis-establishment of NRDL (NAVSEA, 2004). There are no reports of surveys for Parcel B NRDL radiologically-impacted sites. In 1976, the Navy leased most of HPS, including all of the area now known as Parcel B, to Triple A Machine Shop, Inc. (Triple A). Triple A operated a commercial ship repair facility from July 1976 to June 1986 but did not vacate the property until March 1987. During the lease period, Triple A used dry docks, berths, machine shops, power plants, various offices, and warehouses to repair commercial and Navy vessels. Triple A also subleased portions of the property to various other businesses. “

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13. Section 4.3, History of Contamination, Page 4-4: The 2001-2002 wetlands delineation and functions and values assessment included the Parcel B shoreline. Please include the wetlands delineation and function and values assessment.	**Response:** This is a part of the first five-year review.
14. Section 4.3, History of Contamination, Page 4-4 and Section 4.5.2, Parcel B Shoreline Characterization, Page 4-7: The Parcel B shoreline characterization was conducted in 2003, not 2004 and the report was finalized in 2004. Please include the correct date for the shoreline characterization.	**Response:** The date at the beginning of Section 4.5.2 (it is now Section 3.5.2, page 3-7) was changed from 2004 to 2003.
15. Section 4.5.2, Parcel B Shoreline Characterization, Page 4-7: It was not possible to collect samples from most of the proposed locations at IR 26; only three of ten locations could be sampled so it is somewhat misleading to make conclusions about contaminants of potential concern (COPCs) at IR 26. Please revise the text to include the difficulty obtaining samples at IR 26 to provide a framework for the conclusions in the third and fourth bullets.	**Response:** It is now Section 3.5.2**.** The third bulleted item on page 3-7 was deleted. The third bulleted item in Section 3.5.2 was modified to read as follows: ▪ Many samples at IR-26 were not collected because riprap interfered with sample collection (that is, no sediment was present).

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16. Section 4.5.6, Quarterly Groundwater Monitoring, Page 4-9: The discussion of mercury in groundwater should include monitoring well IR26MW49A, where mercury has also been detected above the proposed trigger level for mercury. Please revise the text to include trigger level exceedances in IR26MW49A. In addition, copper has been detected above trigger levels in IR07MW19A, IR07MW20A1, IR07MWS-2, and IR26MW47A. Please include these exceedances in the discussion in this section. Also, the discussion of volatile organic compounds (VOCs) in the fourth complete paragraph should be updated to include 2006 through first quarter 2008 data (Note that first quarter 2008 data is referenced on Page 5-7). In 2007, VOC concentrations increased in several wells in IR-10. Please update the fourth paragraph to include VOC trends through first quarter 2008.	▪ **Response:** It is section 3.5.6 now. Please see the new updated groundwater bullets on page 3-10.
17. Section 5.1.2, Responses and Rationale to the Technical Assessment Questions, Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and RAOs Used at the Time of Remedy Selection Still Valid? Page 5-4: It is somewhat misleading to simply list "The presence of methane and mercury," because the need for excavation to remove mercury contaminated soils was determined from the detections of mercury above trigger levels in groundwater. Please revise the text to clarify the rationale for the mercury excavations.	**Response:** The second bulleted item on page 5-4 was broken into two bullets to read as follows: ▪ The need for excavation to remove mercury-contaminated soils, as determined from the detections of mercury above trigger levels in groundwater. ▪ The presence of methane in the soil.

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18. Section 5.2.1, Description and Status of the Groundwater RA Specified in the ROD, Remedy Implementation, Page 5-6: Since most of the storm drains have been removed under the radiological time-critical removal action (TCRA), it appears that lining storm drains has been superseded. Please discuss the implications of the radiological storm drain and sanitary sewer TCRA for the original remedy.	**Response:** A phrase was added to the end of the first paragraph on page 5-6, under the heading "Remedy Implementation" to read as follows: "Furthermore, the storm drains have been or will be removed under ongoing radiological storm drain and sanitary sewer line TCRA. Therefore, the lining of the storm drains is superseded by the TCRA storm drain and sewer line removal actions.
19. Table 3, Summary of Parcel B Soil Contamination: It is unclear why the Status of the Remedial Action Excavations is "Initiated, not yet reported" or "Initiated, under review" for many IR sites. The second Construction Summary Report was issued in 2004. Please revise the table to be consistent with the current status of the excavations.	**Response:** Table 3 was deleted since it is similar to Table 6. Table 6 was updated and is similar to Table 2-4 of the final TMSRA for Parcel B. (please see the newly numbered Table 5).
20. Table 6, Summary of Chemicals Remaining in Soil at Parcel B: Pesticides were risk drivers in some areas, but pesticides are not listed as chemicals of concern. Please revise the table to include pesticides	**Response:** It is Table 5 now. Pesticides were added to the following rows in Table 6: o IR-07 o IR-18 o IR-23 o IR-26
MINOR COMMENTS **1. Executive Summary, Page iv:** The term "Redevelopment Block" should be defined since it is not commonly used. Please provide a brief definition of the term "Redevelopment Block" when it is first used in the Executive Summary and in the main body of the text.	**Response:** The following statement was included after the first appearance of the word "Redevelopment Block" in the executive summary and in the body of the report. "Redevelopment blocks were created to facilitate the designation of use for each area at Hunters Points Shipyard; such as mixed use, open space, and research and development. Redevelopment blocks are based on "Hunters Point Shipyard Redevelopment Plan" San Francisco Redevelopment Agency, July 14, 1997."

2. Section 4.5.7, Radiological Contamination Removal Actions, Page 4-10: The fourth sentence of the second paragraph refers to two former sites, Buildings 142 and 157; please indicate the locations of these former buildings on a figure.	**Response:** We have indicated the location of former Buildings 142 and 157 on Figure 3, titled **"** Parcel B Installation Restoration and Site Inspection Sites**"**
3. Section 8.1, Protectiveness Statement for Parcel Soil and Radiological Contamination Remedy, Page 8-1 and Section 8.1, Protectiveness Statement for Parcel B Groundwater Remedy, Pages 8-1 and 8-2: As per the Exhibit 3-3 in the U.S. EPA Comprehensive Five-Year Review Guidance, EPA-540-R-01-007 dated June 2001 (the Five-Year Review Guidance) please include the protectiveness statements from the first five-year review.	**Response:** The protectiveness statements from the first five-year review were included. Section 8.1 reads as follows: **<u>Protectiveness Statement for Parcel B Soil for the First Five-Year Review</u>** The soil remedy at Parcel B is currently protective of human health and the environment because exposure pathways that could result in unacceptable risks are being controlled through extensive soil excavation and the use of fencing, locked gates, warning signs, and secured buildings that limit access to remaining contaminated areas. New information became available after the RA was implemented, which indicates that, for the soil remedy to be protective in the long term, the HHRA needs to be updated using new toxicological data and methodologies, potential ecological risks to aquatic receptors should be evaluated, and the selected remedy needs to be modified to address remaining areas of contamination. A ROD amendment is planned to ensure that the final soil remedy implemented at Parcel B will be protective of human health and the environment in the long term. **<u>Protectiveness Statement for Parcel B Soil and Radiological Contamination Remedy for the Second Five-Year Review</u>** The soil remedy selected in the 1997 ROD at Parcel B is still protective of human health and the environment. Exposure pathways that could result in unacceptable risks are still being controlled through contaminated soil excavation and disposal, the use of fencing, locked gates, warning signs, and secured buildings that limit access to remaining contaminated areas. However,

	updated information about the site that became available during the remedial action indicates that modifications to selected soil and groundwater remedies should be considered to ensure long-term protectiveness. Updated information includes items such as the ubiquitous nature of metals in soil across Parcel B, the presence of methane and mercury, the findings of a SLERA, and findings from removal actions to address radiological contaminants. In the last 5 years, the Navy responded to the remedy concerns expressed in the first five-year review in terms of the long-term protectiveness of the soil remedy. The TMSRA included a human health risk assessment (HHRA) and revised remedial alternatives for the soil. The draft PP identified the most viable soil alternative, including excavation, disposal, covers, soil vapor extraction, ICs, and shoreline revetment. The revised remedial alternative has been designed to be protective of human health and the environment in the short and long term. Once the PP is finalized, the revised remedial alternative will be incorporated as an amendment in the ROD. After implementing the proposed remedial action at Parcel B, further evaluation of its effectiveness will be conducted in the subsequent five-year review report. The proposed radiological remedy for Parcel B has been designed to be protective of human health and the environment. Such a remedy would achieve RAOs by surveying radiologically impacted buildings and former building sites for unrestricted reuse. Among the measures taken, decontamination would be performed and buildings would be dismantled if necessary. Once the proposed alternative for radiological contamination has been incorporated into the amended ROD and implemented across Parcel B, its protectiveness will be further evaluated as part of the next 5-year review. **The protectiveness statement for Groundwater from the first five-year review was included. Section 8.2 reads as follows:**

	Protectiveness Statement for Parcel B Groundwater for the First Five-Year Review The groundwater remedy at Parcel B is currently (2003) protective of human health and the environment because the RAMP safeguards aquatic life in the Bay and addresses potential risk to future occupants of Parcel B buildings. New information became available after the remedial action was implemented, which indicates that, for the groundwater remedy to be protective in the long-term, the HHRA and groundwater trigger levels need to be updated, potential ecological risk to aquatic receptors should be evaluated, the selected remedy needs to be modified to address VOC contamination, a POC well and other characterization wells need to be installed at IR-07, and appropriate responses to incidences where trigger levels are exceeded must continue to be implemented. **Protectiveness Statement for Parcel B Groundwater for the Second Five-Year Review** The groundwater remedy at Parcel B selected in the 1997 ROD is not currently (2008) protective of human health and the environment due to the following facts: (1) The remedy would not be considered protective of VOCs in groundwater that pose an unacceptable risk from vapor intrusion into buildings; (2) The remedy includes only groundwater monitoring and does not contain any treatment component and, therefore, would rank as poor for reduction of toxicity and mobility. New information became available after the remedial action was implemented, which indicates that, for the groundwater remedy to be protective in the long-term, the HHRA and groundwater trigger levels need to be updated; potential ecological risk to aquatic receptors should be evaluated; the selected remedy needs to be modified to address VOC contamination; a point-of-compliance well and other characterization wells need to be installed at IR-07; implementing a flexible groundwater monitoring plan to include ROCs; and appropriate responses to incidences where trigger levels are exceeded must continue to be implemented.

	In the last 5 years, the Navy responded to the remedy concerns expressed in the first 5-year review in terms of the long-term protectiveness of the groundwater remedy. The TMSRA included an HHRA and a SLERA and revised remedial alternatives for the groundwater. The draft PP identified the most viable groundwater alternative, including in situ treatment, groundwater monitoring, and ICs. The revised remedial alternative was designed to be protective of human health and the environment in both the short term and long term. Once the PP is finalized, the revised remedial alternative will be incorporated into the amended ROD. After implementing the revised remedial alternative at Parcel B, further evaluation of its effectiveness will be completed in the subsequent 5-year review report.
4. Table 4, History of Investigations since ROD: Please add the Final Parcel B Technical Memorandum in Support of a Record of Decision Amendment Radiological Addendum to the table.	**Response:** The Final Parcel B Technical Memorandum in Support of a Record of Decision Amendment (TMSRA) Radiological Addendum was added to Table 4 (it is Table 3 now) at the end of the Table. Also, the revised proposed plan was listed after the TMSRA Radiological Addendum.
5. Table 9, Remediation Goals for Chemical of Concern in Soil: Please add an "s" to Chemical. Also, please add a bold line between the Industrial and Construction Worker exposure scenario entries.	**Response:** An “s” was added to the word chemical for the heading of Table 9 (it is Table 8 now) Also, a line to separates the “Industrial” and “Construction Worker” on the last page of the table was added.

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THE DRAFT SECOND FIVE-YEAR REVIEW OF REMEDIAL ACTIONS AT HUNTERS POINT SHIPYARD (HPS), SAN FRANCISCO, CALIFORNIA
29 August 2008
CONTRACT NUMBER: N68711-05-G-7417

TASK NUMBER: 0004

Responses to Amy Brownell of San Francisco Department of Public Health

General: This document has numerous typos and sentences that need to be reworded and/or have words missing. Please conduct adequate technical edit. A few examples include Section 4.3, 42 years should read 24 years, p. 4-5 1st paragraph reword 2nd sentence; Section 2.5 p 2-11, 3rd paragraph reword 1st sentence, consistent capitalization of "buildings", "quarter" and "parcel", 10th bullet on page 2-10 reverse phrases in last sentence, fix first bullet p 3-3, consistent document references, etc. The Parcel B Revised Proposed Plan has been published and the Five Year Review needs to reflect the current status and content of the Proposed Plan.	**Response:** The document went through further technical and editorial review. Section 4.3, page 4-3 (it is Section 3-3, Page 3-3 now); first paragraph was changed as follows: The Navy identifies, evaluates, and addresses past hazardous waste sites at HPS as part of the IR Program. From 1945 through 1987, contaminant releases occurred during site operation under the Navy and Triple A; however, specific dates of releases are not known. Contaminant releases have been evidenced by a variety of organic and inorganic chemicals that have been discovered in soil and groundwater at levels exceeding cleanup goals and trigger levels established in the Parcel B ROD (Navy 1997b). The chronology of CERCLA-related events at Parcel B (Table 2) is as follows:" Page 4-5 (it is page 3-5 now), the first paragraph starting with the word Petroleum, second sentence was deleted due to its redundancy in light of the recent radiological investigations at the HPS and its mention in the first five-year review report. The following statement was deleted: "In addition, radioactive material has been investigated at Parcel B since 1946 and most recently have occurred in a four-phase process from 1991 through 1999. Results from the phased processes indicate that radioactive materials are not a significant concern at Parcel B (Tetra Tech 2003h). " Section 2.5 page 2-15, 3rd paragraph, the mentioned sentence was revised From: "A Remedial Investigation (RI)/Feasibility Study (FS) for Parcel E-2 (ERRG & Shaw 2007) and a Radiological Addendum to the RI/FS study was also completed (TtECI 2007d) identified remedial alternatives for Parcel E-2. These

	alternatives include the following:" To: "A remedial investigation (RI)/feasibility study (FS) for Parcel E-2 (ERRG & Shaw 2007) and a radiological addendum to the RI/FS (TtECI 2007d) were completed. These documents identified remedial alternatives for Parcel E-2. These alternatives include the following:" Regarding the 10th bullet on page 2-13, the following bulleted item was revised: From: "**2005-2006**: A Polychlorinated Biphenyl Hot Spot Removal Action, removed 44,500 cubic yards of contaminated soil, including 432 cubic yards of radiologically impacted material. Excavated material was disposed of off-site from this area in the southeast portion of Parcel E-2." To: "**2005-2006**: The southeast portion of Parcel E-2 was excavated and the excavated material was disposed of off site. Under a Polychlorinated Biphenyl (PCB) Hot Spot Removal Action, 44,500 cubic yards of contaminated soil, including 432 cubic yards of radiologically impacted material, were removed."
FIGURES Figure 2 - Label Former Parcel A and revise Parcel D boundaries to show D-2, G, Utility corridors, etc.	**Response:** Figure 2 was updated to reflect the changes in Parcel D boundaries and its split to other parcels.

Figure 7 - Figure 7 which shows the boundaries of the ARIC for IR7/18 implies that the entire area of IR7/18 will need the proposed radiological restrictions. The extent of proposed restriction is not supported by the historical information. The boundaries of IR7/18 were originally drawn because of historical uses (including a paint shop) unrelated to suspected radiological contamination. The suspicions about radiological contamination in the area were not identified until the publication of the HRA – long after the IR7/18 boundary had been drawn. It was convenient to refer to the whole area when discussing the radiological concerns because detailed research had not been performed to identify the area within IR7/18 that actually contained possible radiological contamination – which may or may not exist. The Navy has since performed research into the extent of the debris fill in the IR7/18 area. The debris fill may contain possible radiological contamination, but the Navy's research indicates that the fill does not extend all the way to the boundaries of the IR7/18 area. We request that the Navy propose boundaries for the extent of the radiological restricted area that are limited to the areas supported by the historical information and not overly restrict land where it is not warranted. Specifically, we request that all references to the proposed radiological restriction in IR7/18 be changed to "a portion of IR7/18" and that a footnote should be added to Figure 7 that clearly states that the final boundaries will be decided as part of the Radiological Remedial Design.	**Response:** The HRA is the source document for the definition of areas that are radiologically impacted. The HRA considered all of IR Site 7 and 18 to be radiologically impacted as the boundaries of the IR sites were consistent with the boundaries of the fill areas. To address various concerns of regulatory agencies and the city, the Navy is reviewing the history of the Parcel B fill area to confirm the fill area boundaries that could be considered radiologically impacted. The Navy will provide the results of this review to the regulatory agencies to discuss the determination of the boundaries of radiologically impacted areas in comparison to the boundaries of the area requiring institutional controls (ARIC) at IR Sites 7 and 18. Figure 7 was not changed in response to this comment.

Figure 7 illustrates that "Restrictions Related to VOC Vapors" includes all of Parcel B except Redevelopment Block 4. We think this is a misrepresentation of the current state of knowledge about the ARIC for VOC vapors and unnecessarily restricts Parcel B. Our request is to phrase the restriction as "Actual area will include all areas of the parcel with soil gas levels above the remediation goals" and remove the blue highlight from Figure 7. The soil gas surveys will be performed in areas where past uses and data suggest possible concerns regarding soil gas and establishment of the soil gas remediation goals will be done in the future. However, based on the current knowledge of the site we are certain that there are many areas where no soil gas sampling will be required and there will be no requirement for a VOC restriction.	**Response:** The ARIC for vapor intrusion may be modified as remediation is completed or in response to further sampling and analysis that establishes that areas now in the ARIC do not pose unacceptable potential exposure risk to volatile organic compound (VOC) vapors. The initial ARIC is proposed to include the entire parcel (except Redevelopment Block 4) because existing data for soil gas are insufficient to further reduce the size of the ARIC. Figure 7 was not changed in response to this comment.
Indicate pump shaft below Building 140 will have radiological restrictions.	**Response:** The figure was changed as requested. Please see the footnote regarding Building 140 in Figure 7.
SECTION 2.0 OVERVIEW OF HUNTERS POINT SHIPYARD AND OTHER PARCELS **General Comment:** Be consistent in format of summaries for each parcel. State previous investigations, interim removal actions, ongoing monitoring, COCs and preferred alternatives, if available.	**Response:** The introductory paragraphs for each parcel in Section 2 were revised to be consistent. Please see the response to EPA Comment Number 3.
Section 2.3 Summary Status of Parcel D	**Response:** See the revised section on groundwater monitoring in Section 2.4, page 2-11; the last bullet reads as follows:

Give appropriate range of years for groundwater monitoring.	**2004-2007:** Groundwater sampling under the basewide groundwater monitoring program began in June 2004 and has been conducted on a quarterly basis. The two areas of concern in Parcel E include the Northwest Bay Fill Area (NBFA), and Former Oil Reclamation Ponds Area (ORPA). Water quality criteria were exceeded in NBFA wells in one or both of the two most recent reported events (second and third quarters of 2008) for the following analytes: barium, copper, nickel, selenium, vinyl chloride, and zinc. Water quality criteria were exceeded in ORPA wells in one or both of the two most recent reported events (second and third quarters of 2008) for the following analytes: antimony, arsenic, barium, benzene, copper, nickel, p-dioxane, selenium, thalium, and vinyl chloride (CE2-Kleinfelder 2007i)
Section 2.5 Summary Status of Parcel E-2 Mention recent Parcel E-2 Data Gaps Investigation. First bullet top of page 2-11 is describing ongoing monitoring not interim removal actions. Split into separate section and give status of landfill gas monitoring results.	**Response:** The E-2 Data Gaps Investigation is ongoing and therefore will be included in the next 5-Year Review. This 5-Year Review included documents dated up through June 2008. A heading reading "Ongoing Monitoring Programs" was added before the first bullet on page 2-11. Landfill gas monitoring results were added under this heading.. This was addressed under RTC number 9 of Mr. Mark Ripperda's comments.
SECTION 3.0- FIVE-YEAR REVIEW PROCESS ▪ Are Figures 3 and 4 referenced?	**Response:** Figure 3 was referenced in the third paragraph of Section 2.0, page 2-1. Figure 4 was referenced in the first paragraph of Section 4.0 (Section 3.0 now), page 4-1 and under the Remedy Implementation heading on page 5-2. **Response:** Soil excavation was covered in Section 4.0 (Section 3.0 now).

▪ Expand soil excavation description P 3-3, text description does not match table. o Section 3.5 – How can a visual inspection indicate that routine sampling has been performed? o Table 1– numbers in last column to the right "number of consecutive rounds below criteria, do not seem to add correctly.	**Response:** The statement in Section 3.5, (Section 4.5 now) second paragraph, on page 4-3 saying "Most of the wells inspected were properly secured, functioning, and appeared to be routinely sampled" was revised to simply read "Most of the wells inspected were properly secured." **Response:** Table 1 was revised, and the last column numbers were corrected.
SECTION 4.0 - PARCEL B OVERVIEW **Section 4.5.7 Radiological Contamination Removal Actions** Update status of removal actions **Section 4.5.8 Technical Memorandum in Support of ROD Amendment** Clearly state COCs	**Response:** TCRA activities are briefly discussed. These activities are not part of the ROD remedial actions. **Response:** To refer to COCs , a reference to Table 6 (it is Table 5 now) was made in Section 4.5.8.1 (it is Section 3.5.8.1 now) , under the heading of "Non-Radiological Evaluation," at the end of the third sentence to read as follows: "For the total risk evaluation, all detected chemicals were included as chemicals of potential concern regardless of concentration, except for the essential nutrients calcium, magnesium, potassium, and sodium.

RESPONSE TO COMMENTS ON THE DRAFT SECOND FIVE-YEAR REVIEW OF REMEDIAL ACTIONS AT HUNTERS POINT SHIPYARD (HPS), SAN FRANCISCO, CALIFORNIA 29 August 2008 CONTRACT NUMBER: N68711-05-G-7417 TASK NUMBER: 0004	
Paragraph at top of page 4-16 is out of place and seems to belong in Radiological Remedial Alternatives Section	**Response:** The last paragraph on page 4-15 (It is Page 3-17 now) and the following two paragraphs meant to discuss the ranking of the remedial alternatives for soil, radionuclides, and groundwater, respectively, in the same order (Soil Remedial Alternatives, Radiological Remedial Alternatives, and Groundwater Remedial Alternatives) are presented previously in this section. However, to clarify the last intent of presenting the last three paragraphs of Section 4.5.8.4 (it is now Section 3.5.8.4), the following heading was placed before the last paragraph on page 3-15 to read as follows: **<u>TMSRA Remedial Alternatives</u>**"
SECTION 5.0 - TECHNICAL ASSESSMENT OF REMEDIAL ACTIONS AT PARCEL B **General** Why reference CPOCs (should be COPCs) ? The TMSRA clearly defines COCs.	**Response:** COPCs are identified in the TMSRA as COCs when the chemical-specific risk exceeds 1E-06 or the noncancer hazard exceeds 1.0. In some places in the report, it is appropriate to reference COCs instead of COPCs. In other locations in the report, we quoted the reference as is. We revised the following: Page 5-8, First paragraph under Question B heading, last sentence, COPCs was be replaced with COCs. Page 5-13, Section 5.3.2.5, in first sentence, COPCs was replaced with radionuclides of concern (ROCs).
Section 5.1.1 Description and Status of the Soil RAs Specified in the ROD and ESDs – 1st bullet top of page 5-2, give correct reference to City and County of San Francisco Public Health Code Article 31.	**Response:** Please note this is a direct quote from the first five year review report, which has been reviewed and approved by all parties. Changing the language and reference alters the validity of quoting the reference.

RESPONSE TO COMMENTS ON THE DRAFT SECOND FIVE-YEAR REVIEW OF REMEDIAL ACTIONS AT HUNTERS POINT SHIPYARD (HPS), SAN FRANCISCO, CALIFORNIA 29 August 2008 CONTRACT NUMBER: N68711-05-G-7417 TASK NUMBER: 0004	
Section 5.1.3 Soil Technical Assessment Summary Describe assessment and system operation for Soil Vapor Extraction at IR-10. State proposed alternative for soil.	**Response:** This section is a soil technical assessment summary in relation to the ROD remedy. Soil vapor extraction at IR-10 is not part of this discussion.
Section 5.2.1 Description and Status of the Groundwater RA Specified in the ROD Top of page 5-6 third bullet, reword *"future potential degradation of TCE to vinyl chloride"* to indicate complete dechlorination breakdown process and not emphasize or indicate a stall at vinyl chloride, i.e. "future potential degradation of TCE to DCE, vinyl chloride, ethene and chloride".	**Response:** This is a direct quote from the first five year review report, which has been reviewed and approved by all parties. Changing the language and reference alters the validity of quoting the reference.
Section 5.3.1 Remedial Actions **Current Status** Clarify that Radiological TCRA actions continue to date across HPS.	**Response:** A sentence reading **"**Radiological TCRA actions continue to date across HPS" was added after the last sentence on the bottom of Section 5.3.1, page 5-11.
Section 5.3.2 Technical Assessment Question for Radiological Contamination Delete sentence in 2nd paragraph repeated below.	**Response:** Page 5-11, Section 5.3.2, the 2nd paragraph reading**: "**This alternative has been assessed for the overarching question outlined below."

	Was changed to: "The questions and answers below help assess the proposed and preferred radiological alternative R-3."
SECTION 7 REMEDIAL ACTION RECOMMENDATIONS AND FOLLOW-UP **Section 7.1 Soil and Radiological Contamination Remedy Recommendations and follow-up Actions** Last paragraph, 5th sentence, please reword *"a two foot layer soil cover* to state "a soil cover to be developed as part of the radiological remedial design".	**Response:** The last paragraph in section 7.1, page 7-2 was updated to correspond to the revised proposed plan, to read as follows: **"**The Navy's proposed radiological remedial alternative is designed to meet the stated objective of long-term protectiveness. A summary of the alternative (R-3) is summarized below: This alternative would achieve RAOs by surveying radiologically impacted buildings and former building sites for unrestricted release. Decontamination would be performed and buildings would be dismantled, if necessary. Radiologically impacted storm drain and sanitary sewer lines throughout Parcel B would be removed and radiologically contaminated pipe and soils would be disposed of off site as low-level radioactive waste. A surface scan would be completed at IR Sites 7 and 18, and any radiological anomalies would be removed to a depth of 1 foot (the maximum effective depth of the surface scan). Although there is potential, however unlikely, for radiological contamination to exist beyond the depth of 1 foot, the soil cover would be effective in preventing any unacceptable exposure, and additional investigation beyond 1 foot is not proposed. A demarcation layer would be installed on the surveyed soil surface before covers were constructed at IR Sites 7 and 18 to mark the boundary between the existing surface and the new cover. The survey and removals would occur before any covers were installed as part of Alternative S-5. Groundwater would be monitored at IR Sites 7 and 18. The pump shaft beneath Building 140, as

	shown on Figure 4, would be closed in place with backfilled stone and a concrete cap. Buildings, former building sites, and excavated areas would be surveyed after cleanup is completed to ensure no residual radioactivity is present above the remediation goals. ICs would be implemented for Building 140 and IR Sites 7 and 18 to minimize inadvertent contact with radiologically impacted media and ensure radiological controls would be implemented if the remedies were not in place. Similar to the preferred alternative for soil, some components of this alternative are in progress as a TCRA (storm drain and sanitary sewer removals and building surveys). Although the TCRA may not be completed before the amended ROD is signed, the Navy anticipates that the TCRA will meet the RAOs described in the Revised Proposed Plan (Navy 2008)."
State that soil gas surveys will be performed in areas where past uses and data suggest possible concerns regarding soil gas and establishment of the soil gas remediation goals will be done in the future.	**Response:** The following sentence was added on page 7-2,Under the bulleted item: "In addition to the above-mentioned responses to recommendations from the first 5-year review, a soil gas survey will be conducted in areas where past uses and data suggest possible concerns regarding soil gas for the purpose of establishing soil gas remediation goals."
Section 7.2 Groundwater Remedy Recommendations and Follow-up Actions Will a revised RAMP be prepared? Page 7-3, last bullet, restate last sentence to say "The TMSRA and Proposed Plan contain more detailed information on potential ICs". Last paragraph, 2nd sentence, mention and reference the TMSRA RA.	**Response:** The RAMP will be revised once the Amended ROD is finalized. **Response:** The last sentence in the last bullet on page 7-4 was changed as follows: From: **"**The TMSRA contains more detailed information on potential ICs."

RESPONSE TO COMMENTS ON THE DRAFT SECOND FIVE-YEAR REVIEW OF REMEDIAL ACTIONS AT HUNTERS POINT SHIPYARD (HPS), SAN FRANCISCO, CALIFORNIA 29 August 2008 CONTRACT NUMBER: N68711-05-G-7417 TASK NUMBER: 0004	
	To: **"**The TMSRA and the Revised Proposed Plan contain more detailed information on potential ICs." Last paragraph, 2nd sentence, mentions and references the TMSRA RA. **Response:** The last paragraph, 2nd sentence, page 7-4 was modified as follows: From: "The groundwater remedy and groundwater monitoring for ROCs are presented in the TMSRA." To: "The groundwater remedy and groundwater monitoring for ROCs are presented in the TMSRA RA and revised proposed plan (TtECI 2008b and Navy 2008)."
Responses to Monica McEaddy of EPA Headquarter	
Page2-1, Section 2.1 states that because Parcel A was transferred to the city of San Francisco, then it should not be discussed in future five year review reports. This isn't quite correct. Property transfer does not remove a site from 5-Year Reviews; rather, the test is whether the site is suitable for unrestricted use. Please clarify in this section that Parcel A is clean and suitable for unrestricted use, and thus not subject to future 5-Year Reviews.	**Response:** The last sentence of the last paragraph of Section 2.1, page 2-1 was modified as follows: From: "Therefore, this parcel will not be covered by future reviews." To: "Cleanup at Parcel A is complete. Parcel A is suitable for unrestricted use, and thus not subject to future 5-year reviews."

Section 7, Remedial Actions and Recommendations and Follow-up: The text states that the recommendations are from the previous review and provides the Navy response. Please make it clear in the response which actions have been completed, and for those actions that are still pending, please provide a target date for when these follow-up actions will be implemented. Please refer to page E-30 in the Comprehensive Five-Year Review Guidance.	**Response**: The first paragraph of Section 7.1 was modified as follows: From: "The first 5-year review recommended the follow-up actions outlined below related to the soil remedy. The Navy's response to each recommendation through implementation of the TMSRA and PP process is also outlined below." To: "The first 5-year review recommended the follow-up actions outlined below related to the soil remedy. Below, the Navy provides its response to each recommendation. Once the 1997 ROD is amended to include the revised PP recommendations, the Navy will follow the FFA Schedule in implementing the proposed remedial alternatives. The first paragraph of Section 7.2, Page 7-2 was modified as follows: From: "The 5-year review identified the following actions related to the groundwater remedy. Each item below also indicates how these items have been addressed by the TMSRA and PP process." To: "The first 5-year review recommended the follow-up actions outlined below related to the groundwater remedy. Below, the Navy provides its response to each recommendation. Once the 1997 ROD is amended to include the revised PP recommendations, the Navy will follow the FFA schedule in implementing the proposed remedial alternatives."

Appendix G

Responses to Regulatory Agency and Public Comments on the Draft Final Second 5-Year Review of Remedial Actions at Hunters Point Shipyard

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

September 9, 2008

Keith Forman
BEC, Hunters Point Shipyard
Department of the Navy, BRAC
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, CA 92108-4310

RE: Draft Final Second Five-Year Review

Dear Keith:

EPA has reviewed the Draft Final Second Five-Year Review of Remedial Actions for the Hunters Point Shipyard, dated September, 2008. All of our comments on the draft version have been adequately addressed and we agree with the Draft Final version progressing to Final.

Please contact me at 415-972-3028 if you have any questions.

Sincerely,

Mark Ripperda

Mark Ripperda
Remedial Project Manager
Superfund Division (SFD-8-3)

From: Erich Simon [redacted]
Sent: Wednesday, October 15, 2008 15:50
To: Forman, Keith S CIV OASN (I&E) BRAC PMO West
Cc: Tom Lanphar; [redacted]; Urizar, Lara L CTR OASN (I&E), BRAC PMO West; Amy Brownell; Steve Hall
Subject: No comments on the Draft Final Second Five-Year Review Report

Keith-

We have no further comments on this Draft Final document, so will not be submitting a comment letter.

-Erich

Erich Simon
San Francisco Bay Water Board
1515 Clay Street, Suite 1400
Oakland, CA 94612
[redacted]