**DEPARTMENT OF THE NAVY**
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132 - 5190

5090
Ser 06CH.KF/1550
December 10, 2003

Mr. Joel Jones (SFD 8)
Chief, Federal Facility and Site Cleanup Branch
U.S. Environmental Protection Agency, Region IX
75 Hawthorne Street
San Francisco, CA 94105-3901

Dear Mr. Jones:

Enclosure (1) is provided for your information and records regarding the Final First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard. Enclosure (1) meets both the Federal Facilities Agreement and statutory requirements for five-year review submittals. The Navy certifies that the protectiveness determination is accurate and that the document is consistent with EPA guidance (OSWER No. 9355.7-03B-P).

Changes have been incorporated into the document to reflect the comments received on the draft and draft final document from the U.S. Environmental Protection Agency (EPA), the Department of Toxic Substances Control (DTSC), and Regional Water Quality Control Board (RWQCB). Responses to EPA, DTSC, and RWQCB comments are contained in Appendices F and G of the final document. Appendix G also contains responses to comments received during the public comment period.

HPS is divided into 6 Operable Units (Parcels A through F). The Parcel A No Further Action Record of Decision (ROD) was signed in 1995. A ROD for Parcel B was signed in 1997 documenting the selected remedies for soil and groundwater. This five-year review document focuses on Parcel B because remedial actions are not necessary at Parcel A, and remedial actions have not yet been implemented at Parcels C through F.

Enclosure (1) documents that the remedies selected for Parcel B are currently protective of human health and the environment; however, the remedies have yet to be completed. Based on new information since the remedial actions began, the remedies need to be updated. Enclosure (1) recommends the following actions:

- Update the human health risk assessment;
- Evaluate potential ecological risks;
- Amend the Parcel B ROD to address remaining areas of contamination; and
- Document the radiological cleanup levels and methodologies specified in the Action Memorandum for the Basewide Radiological Removal Action.

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December 10, 2003

Should you have any concerns with this matter, please contact the undersigned at (619) 532-0913.

Sincerely,

KEITH FORMAN
BRAC Environmental Coordinator
By direction of the Commander

Enclosure (1): Final First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard, December 10, 2003

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December 10, 2003

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JUL 0 1 2004

CAPT Donel S. Bianchi, CEC, USN
Commanding Officer
Engineering Field Activity, West
Naval Facilities Engineering Command
2001 Junipero Serra Blvd., Suite 600
Daly City, CA 94014-1976

**RE: Final First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard, San Francisco, California, December 10, 2003**

Dear Captain Bianchi:

The U.S. Environmental Protection Agency, Region 9 (EPA) has reviewed the *Final First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard, San Francisco, California,* dated December 10, 2003. This document addresses completed and ongoing remedial actions taken pursuant to Records of Decision at the Hunters Point Shipyard Superfund Site. The "no further action" Record of Decision for Parcel A was signed in 1995. The ROD for Parcel B was signed in 1997 requiring remedial action and thus necessitating a five-year review. The remedies for the remaining parcels (C, D, E, and F) have yet to be selected. EPA agrees that the soil and groundwater remedies for Parcel B are currently protective. We also agree that in order to be protective in the long-term, these remedies will need to be reevaluated in a ROD amendment.

We appreciate the opportunity to work with you on this project. If you have any questions, please feel free to contact Michael Work of my staff at 415-972-3024.

Sincerely,

for

Kathleen Johnson, Chief
Federal Facility and Site Cleanup Branch
Superfund Division

cc: Tony Landis, Cal-EPA/DTSC
Curtis Scott, Cal-EPA/RWQCB

**Public Summary:** **Final First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard San Francisco, California**

*This document summarizes the "Final First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard, San Francisco, California." The U.S. Department of the Navy (Navy) conducted a five-year review of the remedial actions (RA) implemented at Hunters Point Shipyard (HPS) in San Francisco, California. The purpose of the five-year review is to assess whether the remedy is or will be protective of human health and the environment. This five-year review focuses on Parcel B because RAs have not been implemented yet at the other parcels at HPS. The methods, findings, and conclusions of reviews are documented in the five-year review report. Key components of the five-year review report are discussed below.*

**Parcel B RA Background:** The Navy and the regulatory agencies signed the Parcel B record of decision (ROD) on October 9, 1997. The 1997 ROD was followed by two explanations of significant difference (ESD), signed on October 28, 1998, and May 9, 2000. The ROD and ESDs selected cleanup goals and a remedy for soil and groundwater. The major components of the soil portion of the remedy, as described in the ROD and subsequent ESDs, include the following:

- Excavation of contaminated soil to a maximum depth of 10 feet or $10^{-6}$ excess lifetime cancer risk (residential) or hazard index (HI) of 1, except where ambient concentrations of inorganic chemicals exceed $10^{-6}$ or an HI of 1 because of fill material
- Off-site disposal of contaminated soil
- Placement of clean backfill in the excavated areas
- Deed notification indicating that soil below 10 feet in remediated areas may be contaminated

Although many excavations were completed from 1998 through 2001, not all excavations at Parcel B are complete and deed restrictions have not been implemented. Several issues need to be resolved before construction can be completed. A ROD amendment is planned to resolve issues with the selected remedy for soil. The ROD will be amended after preparation of (1) a supporting technical memorandum that will reevaluate site risks and RA alternatives, and (2) a proposed plan that will summarize the proposed remedy and be presented to the community for review.

The major components of the selected remedy for groundwater are as follows:

- Lining the storm drains and pressure grouting of the storm drain bedding material at select locations based on the findings of an infiltration study
- Removal of steam and fuel lines
- Deed restrictions and notifications for Parcel B groundwater use
- Groundwater monitoring for up to 30 years

Steam and fuel lines have been removed and 16 quarters of the groundwater RA monitoring program (RAMP) have been conducted. Results of the 2001 storm drain infiltration study indicated that lining of the storm drains was not necessary because groundwater intrusion was not observed in areas with contaminated groundwater. Deed restrictions have not been implemented because the soil RA is not complete and the reuse plan continues to be refined.

**Five-Year Review Conclusions:** The conclusions of a five-year review are presented as protectiveness statements. Based on documents and data reviewed, interviews with community members, and a site inspection, the protectiveness statements for Parcel B soil and groundwater remedies are as follows:

- **Protectiveness Statement for Soil:** 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 human health risk assessment (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.
- **Protectiveness Statement for Groundwater:** The groundwater remedy at Parcel B is currently protective of human health and the environment because the RAMP safeguards aquatic life in San Francisco Bay and addresses potential risk to future occupants of Parcel B buildings. New information became available after the RA 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 risks to aquatic receptors should be evaluated, the selected remedy needs to be modified to address volatile organic compound contamination, a point-of-compliance well and other characterization wells need to be installed at Installation Restoration Site 07, and appropriate responses to incidences where trigger levels are exceeded must continue to be implemented.

In addition, a ROD amendment is planned to memorialize the methods and cleanup goals for radiological contaminants being addressed by the basewide radiological removal action.

**Next Steps:** The Navy will conduct the next five-year review for HPS by July 2008, 5 years from the date of this review. The next five-year review will (1) discuss the status of follow-up actions identified in this five-year review that are needed to make certain that the Parcel B remedies are protective in the long-term and (2) address any other HPS parcels where remedies are selected and documented in a ROD.

**Information Repositories:** A complete copy of the final five-year review report is available to members of the community at the following locations:

San Francisco Main Library
100 Larkin Street
Government Information Center, 5th Floor
San Francisco, CA 94102
Telephone: (415) 557-4500

Anna E. Waden Library
5075 Third Street
San Francisco, CA 94124
Telephone: (415) 715-4100

The five-year review is also available to community members upon request to the Navy. For more information about environmental investigation and cleanup at HPS, contact Mr. Keith Forman of the Navy at (619) 532-0913 (telephone), (619) 532-0995 (fax), or formanks@efdsw.navfac.navy.mil (e-mail).

A-E CERCLA/RCRA/UST STUDIES AND REMEDIAL DESIGN

CONTRACT NUMBER N68711-00-D-0005

# First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard

## San Francisco, California

***DS.A057.10749***

**FINAL**

**December 10, 2003**


**Southwest Division**
**Naval Facilities Engineering Command**
**1220 Pacific Highway**
**San Diego, California 92132-5190**

**TETRA TECH, INC.**

Final

# FIRST FIVE-YEAR REVIEW OF REMEDIAL ACTIONS IMPLEMENTED AT HUNTERS POINT SHIPYARD

**San Francisco, California**

**December 10, 2003**

DEPARTMENT OF THE NAVY
Southwest Division
Naval Facilities Engineering Command
San Diego, California

Approved By:

D.S. BIANCHI
CAPTAIN, CEC, USN
Commanding Officer
Engineering Field Activity West
Naval Facilities Engineering Command

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8 Issues With Groundwater Remedy

9 Recommendations and Follow-Up Actions for Issues With Groundwater Remedy

## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| § | Section |
| µg/L | Micrograms per liter |
| ARAR | Applicable or relevant and appropriate requirement |
| Basin Plan | "Water Quality Control Plan" |
| Bay | San Francisco Bay |
| BCT | BRAC Cleanup Team |
| bgs | Below ground surface |
| BRAC | Base realignment and closure |
| CAP | Corrective action plan |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CSR | Construction summary report |
| DTSC | Department of Toxic Substances Control |
| EBS | Environmental baseline survey |
| EE | Exploratory excavation |
| ELCR | Excess lifetime cancer risk |
| EPA | U.S. Environmental Protection Agency |
| ERA | Ecological risk assessment |
| ESD | Explanation of significant differences |
| FFA | Federal facility agreement |
| FS | Feasibility study |
| GDGI | Groundwater data gaps investigation |
| HHRA | Human health risk assessment |
| HI | Hazard index |
| HLA | Harding Lawson Associates |
| HPS | Hunters Point Shipyard |
| IR | Installation Restoration |
| LFR | Levine-Fricke-Recon, Inc. |
| mg/kg | Milligram per kilogram |
| MK | Morrison Knudsen Corporation |
| Navy | U.S. Department of the Navy |
| NAWQC | National Ambient Water Quality Criteria |

## ACRONYMS AND ABBREVIATIONS (Continued)

| | |
|---|---|
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| NPL | National Priorities List |
| PAH | Polynuclear aromatic hydrocarbon |
| PCB | Polychlorinated biphenyl |
| POC | Point of compliance |
| PRC | PRC Environmental Management, Inc. |
| PRG | Preliminary remediation goal |
| RA | Remedial action |
| RAB | Restoration advisory board |
| RAMP | Remedial action monitoring program |
| RAO | Remedial action objective |
| RD | Remedial design |
| RI | Remedial investigation |
| ROD | Record of decision |
| RWQCB | San Francisco Regional Water Quality Control Board |
| SFRA | San Francisco Redevelopment Agency |
| 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. |
| TPH | Total petroleum hydrocarbons |
| Triple A | Triple A Machine Shop, Inc. |
| UST | Underground storage tank |
| VOC | Volatile organic compound |
| ZVI | Zero-valent iron |

## EXECUTIVE SUMMARY

The U.S. Department of the Navy (Navy) has conducted a five-year review of the remedial actions (RA) implemented at Hunters Point Shipyard (HPS) in San Francisco, California. This five-year review focuses on Parcel B because RAs have not been implemented yet at the other parcels at HPS. This is the first five-year review conducted for HPS.

The Navy and the regulatory agencies signed the record of decision (ROD) for Parcel B on October 9, 1997. The 1997 ROD was followed by two explanations of significant difference (ESD), 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 RAs and protectiveness statements for each medium are discussed below.

### SOIL

The following text describes the RAs and the protectiveness level for soil.

#### Remedial Actions

The Navy selected excavation and off-site disposal as the final remedy for contaminated soil at Parcel B. The major components of the soil portion of the remedy, as described in the ROD and subsequent ESDs, include the following:

- Excavation of contaminated soil to a maximum depth of 10 feet or $10^{-6}$ excess lifetime cancer risk (residential) or hazard index (HI) of 1, except where ambient concentrations of inorganic chemicals exceed $10^{-6}$ or an HI of 1 because of fill material
- Off-site disposal of contaminated soil (with treatment at the off-site 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 below ground surface (bgs).

Although many excavations were completed from 1998 through 2001, not all excavations at Parcel B are complete and deed restrictions have not been implemented. Several issues need to be resolved before construction can be completed. A ROD amendment is planned to resolve issues with the selected remedy for soil. The ROD will be amended after preparation of (1) a supporting technical memorandum that will reevaluate site risks and RA alternatives, and (2) a proposed plan that will summarize the proposed remedy and be presented to the community for review.

### Protectiveness Statement

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 human health risk assessment (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.

## GROUNDWATER

The following text describes the RAs and the protectiveness level for groundwater.

### Remedial Actions

The major components of the selected remedy for groundwater are as follows:

- Lining the storm drains and pressure grouting of the bedding material in the storm drains at Installation Restoration (IR) Sites 07 and 10 in those locations 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 soil and to monitor concentrations of hazardous substances that may migrate toward San Francisco Bay (Bay); groundwater monitoring at IR-10 to monitor the future potential degradation of trichloroethene to vinyl chloride.

Steam and fuel lines have been removed, and 16 quarters of the groundwater RA monitoring program (RAMP) have been conducted. Results of the 2001 storm drain infiltration study indicated that lining the storm drains was not necessary because groundwater intrusion was not observed in areas with contaminated groundwater. Deed restrictions have not been implemented because the soil RA is not complete and the reuse plan continues to be refined.

**Protectiveness Statement**

The groundwater remedy at Parcel B is currently 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 RA 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 volatile organic compound contamination, a point-of-compliance 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.

## 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:** Kelly Hirsch/Tim Mower/Pat Brooks | |
| **Author title:** Environmental Engineer/Project Manager/Lead RPM | **Author affiliation:** Tetra Tech/Tetra Tech/Navy |
| **Review period:** 07/08/1998 to 07/08/2003 | |
| **Date(s) of site inspection:** 05/12-13/2003 | |
| **Type of review:**<br>☒ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only<br>☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead<br>☐ Regional Discretion | |
| **Review number:** ☒ 1 (first) ☐ 2 (second) ☐ 3 (third) ☐ Other (specify) _____ | |
| **Triggering action:**<br>☐ Actual RA On-site Construction at OU#____ ☒ Actual RA Start at OU#: Parcel B<br>☐ Construction Completion ☐ Previous Five-Year Review Report<br>☐ Other (specify) | |
| **Triggering action date *(from WasteLAN)*:** 07/08/1998 | |
| **Due date *(five years after triggering action date)*:** 07/08/2003 | |

## FIVE-YEAR REVIEW SUMMARY FORM, Continued

**Issues:**

**Soil**
- Subsurface conditions at IR-07 and a portion of IR-18 differ from conceptual model developed for the RI/FS.
- The proximity of some excavations to the 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 an SVE treatability study is being implemented.
- It is the Navy's position that 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.

**Groundwater**
- The existing RAMP should be improved to better focus groundwater monitoring at Parcel B.
- Trigger levels may not reflect current guidance.
- It is the Navy's position that 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 POC well and other characterization wells were destroyed during excavation activities at IR-07.

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

**Recommendations and Follow-Up Actions:**

**Soil**
- 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.
- Potential need for remedial action at the shoreline near IR-07 and IR-26 should be evaluated during the ROD amendment process.
- Potential ecological risk to aquatic receptors from Parcel B contaminants should be evaluated.
- Effectiveness of SVE 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.
- Soil RAOs and RA alternatives should be reevaluated during the ROD amendment process to address higher and more variable levels of ambient metals.
- Update HHRA with new toxicological data and calculate cumulative risk as part of the ROD amendment process.
- Enforceable land-use restrictions need to be developed before remedy is complete.

**Groundwater**
- Refinement of Parcel B groundwater monitoring will be discussed with the regulatory agencies and detailed in the basewide monitoring plan, which encompasses groundwater monitoring for Parcels B, C, D, and E, and is currently being developed.
- Trigger levels should be reevaluated.
- Ambient metals in groundwater may be reevaluated, if necessary, to ensure protectiveness of human health and the environment.
- Update HHRA with new toxicological data and calculate cumulative risk as part of the ROD amendment process.
- Potential ecological risk to aquatic receptors from Parcel B contaminants should be evaluated.
- Install a POC well and characterization wells at IR-07.
- 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.
- Enforceable land-use restrictions need to be developed before remedy is complete.

**Radiological**
- ROD amendment should memorialize the methods and cleanup goals for radiological contaminants being addressed by the basewide radiological removal action.

## FIVE-YEAR REVIEW SUMMARY FORM, Continued

**Protectiveness Statements:**

**Soil**
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 remedial action 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.

**Groundwater**
The groundwater remedy at Parcel B is currently 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 risks 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.

**Other Comments:**
A technical memorandum in support of a ROD amendment, a proposed plan, and a ROD amendment are planned to address issues with the soil and groundwater remedies. The technical memorandum in support of a ROD amendment will reevaluate site risks and RA alternatives, and the proposed plan will summarize the proposed remedy and will be presented to the community for review. The selected remedy for radiological contamination at Parcel B is expected to be protective of human health and the environment. In the interim, exposure pathways that could result in unacceptable risk are being controlled.

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 |
| 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 |

## 1.0 INTRODUCTION

The purpose of the five-year review is to evaluate the implementation and performance of the remedy and to assess whether the remedy is or will be protective of human health and the environment. The five-year report presents the methods, findings, and conclusions of the review and documents a protectiveness determination. In addition, the five-year review report identifies issues found during the review and makes recommendations to address them.

The U.S. Department of the Navy (Navy) has prepared this five-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, 2003b). CERCLA § 121 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* §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 five years after the initiation of the selected remedial action."

The Navy has conducted a five-year review of the remedial actions (RA) implemented at Hunters Point Shipyard (HPS) in San Francisco, California, in accordance with EPA's guidance for five-year reviews (EPA 2001, 2003b) and the Navy's policy for conducting five-year reviews (Navy 2001). This review was conducted from March 2003 through July 2003. This report documents the results of the review.

This is the first five-year review for HPS. The triggering action for this review is the date of mobilization for the RA activities at Parcel B, which was July 8, 1998.

This five-year review focuses on Parcel B because RAs have not been implemented at the other parcels at HPS. However, Section 2.0 of this report discusses the status of Parcels A, C, D, E, and F. Although the trigger date was set by RAs at Parcel B, July 8, 1998, is the trigger date for

all other RAs conducted at HPS. The next five-year review is scheduled for July 2008, and future RAs at the other parcels will be included at that time, as specified in the Federal Facility Agreement (FFA) for HPS (Navy 1991).

Following the introduction, this five-year review report is organized in the following sections:

- Section 2.0, Overview of Hunters Point Shipyard and Other Parcels. This section provides an overview of HPS, including background information for Parcels A, C, D, E, and F.
- Section 3.0, Parcel B Chronology. This section summarizes the chronology of CERCLA-related events at Parcel B.
- Section 4.0, Parcel B Background. This section summarizes the background information for Parcel B.
- Section 5.0, Five-Year Review Process. This section describes the five-year review process, including administrative process, community notification and involvement, document review, data review, site inspection, and site interviews.
- Section 6.0, Technical Assessment of Soil Remedial Actions at Parcel B. This section summarizes soil RAs implemented at Parcel B and presents the results of the technical assessment of those RAs.
- Section 7.0, Technical Assessment of Groundwater Remedial Actions at Parcel B. This section summarizes the groundwater RAs implemented at Parcel B and presents the results of the technical assessment of those RAs.
- Section 8.0, Technical Assessment of Radiological Contamination. This section summarizes the issues regarding radiological contamination at Parcel B and explains how radiological contamination will be addressed.
- Section 9.0, Next Five-Year Review. This section provides information on the next five-year review for HPS.
- Section 10.0, References. This section presents the references used to prepare this five-year review report.

Figures and tables are presented after Section 10.0. Appendices containing supporting information are presented following the figures and tables. Appendix A contains the list of documents reviewed in support of this five-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 five-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 and public meeting.

## 2.0 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. 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 under an FFA among the Navy, EPA, and the State of California (including the Department of Toxic Substances Control [DTSC] and Regional Water Quality Control Board [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. Figure 2 identifies all parcels located at HPS. A remedy has been selected only for Parcels A and B. The other parcels are undergoing various phases of investigation, removal actions, and treatability studies. Although the focus of this five-year review is on Parcel B, Parcels A and C through F are discussed below.

### 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. Currently, 67 buildings are present on Parcel A, 45 of which are former residences. In addition to the 67 buildings, the foundations of 43 former structures are located in Parcel A. Parcel A also contains storm drains, steam lines, a sanitary sewer system, and an active natural gas distribution system that serves Buildings 322, 813, 915, and 916 (Tetra Tech EM Inc. [Tetra Tech] 2002c).

Since April 1992, when Parcel A was established, the following events have occurred at Parcel A as part of the CERCLA process (Tetra Tech 2002c, 2003d):

- Phase I radiological investigation (PRC Environmental Management, Inc. [PRC] 1992)
- Parcel A site inspection (PRC and Harding Lawson Associates [HLA] 1993)
- Parcel A RI, including a human health risk assessment (HHRA) and ecological risk assessment (ERA) (PRC and HLA 1995)
- No-further-action record of decision (ROD) for Parcel A (Navy 1995)
- Basewide environmental baseline survey (EBS) (Tetra Tech 1998b)
- Parcel A was deleted from the NPL in 1999

The finding of suitability to transfer for Parcel A is currently being finalized, which will enable the transfer of Parcel A to the City and County of San Francisco.

The following actions were implemented at Parcel A (Tetra Tech 2002c).

- **1991:** Underground storage tank (UST) S-812 and its associated piping were excavated and removed.
- **1993 and 1994:** Soil containing hazard substances was excavated, disposed of at an appropriate off-site landfill, and replaced with clean soil during site inspection activities at Parcel A.
- **1994 and 1995:** Sediment in the storm drain system at Parcel A was removed during system maintenance activities.

## 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 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).

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 1992)
- Parcel C site inspection (PRC and HLA 1994b)
- Basewide site assessment (PRC and HLA 1994a)
- Parcel C RI, including an HHRA and an ERA (PRC and others 1997)
- Parcel C FS (Tetra Tech and LFR 1998b)
- Basewide EBS (Tetra Tech 1998b)
- Phase V radiological investigation (Appendix E of historical radiological assessment [Tetra Tech 2002d])

Technical issues that must be resolved before selecting a remedy and preparing a ROD for Parcel C include (1) completing the evaluation of the Phase III groundwater data gaps investigation (GDGI), (2) completing the evaluation of a soil-vapor extraction (SVE) system and the zero-valent iron (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 basewide radiological removal action (Tetra Tech 2003d).

The following removal actions and treatability studies have been implemented at Parcel C (Tetra Tech 2002d, 2003d):

- **1991 to 1993:** Twenty-eight 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; SVE at Buildings 134, 211/253, 231, and 272; and ZVI injection at Building 272.
- **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 of soil contaminated with non-volatile organic compounds (VOC) was excavated and removed from the site.

- **2001:** Sediment that was not removed from the drainage culverts beneath Dry Dock 4 was encapsulated in concrete.

- **2003:** A radiological removal action was initiated in early 2003 at Building 253 in response to findings from the phase V radiological investigation (removal action is ongoing).

## 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). 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 and others 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. The docks at Parcel D were formerly part of the industrial production area (Tetra Tech 2002a).

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 1992)

- Parcel D site inspection (PRC and HLA 1994c)

- Basewide site assessment (PRC and HLA 1994a)

- Parcel D RI, including HHRA and ERA (PRC and others 1996b)

- Parcel D FS (PRC and LFR 1997)

- Parcel D proposed plan for public review (Navy 1997a)

- Phase III radiological investigation (Attachment E of the Parcel E RI [Tetra Tech and others 1997])

- Basewide EBS (Tetra Tech 1998b)

- Phase IV radiological investigation (Tetra Tech 2000)

- Parcel D revised FS (Tetra Tech 2002a)

- Phase V radiological investigation (Appendix E of the historical radiological assessment [Tetra Tech 2002d])

Technical issues that must be resolved before selecting a remedy and preparing a ROD for Parcel D include (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. These activities are planned for 2003 (Tetra Tech 2002d, 2003d).

The following removal actions have been implemented at Parcel D (Tetra Tech 2003d):

- **1989:** Approximately 1,255 cubic yards of polychlorinated biphenyl (PCB)-contaminated soil was 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 cubic yard 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 cubic yards of soil was 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 cubic yards of soil affected by a cesium-137 spill was removed from IR-33 South.

## 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 173 acres of shoreline and lowland coast in the southern portion of HPS. 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 have been used as a landfill; a waste, construction, and industrial materials storage area;

and for office and laboratory space by the Naval Radiological Defense Laboratory (Tetra Tech and others 1997).

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

- Phase I radiological investigation (PRC 1992)
- 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 and others 1997)
- Phase III radiological investigation (Attachment E of the Parcel E RI [Tetra Tech and others 1997])
- Parcel E FS (Tetra Tech 1998a)
- Basewide EBS (Tetra Tech 1998b)
- Phase IV radiological investigation (Tetra Tech 2000)
- Phase V radiological investigation (Appendix E of historical radiological assessment [Tetra Tech 2002d])

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. These activities are planned for 2003 and 2004 (Tetra Tech 2003d).

The following removal actions and treatability studies have been implemented at Parcel E (Tetra Tech 2002d, 2003d):

- **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**: Navy implemented an SVE treatability study at Building 406 on Parcel E.

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

- **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).

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

- **2002**: A landfill gas barrier system was constructed at the northern end of the landfill to (1) remove methane gas from the subsurface at the University of California, San Francisco compound and (2) prevent future landfill gas from migrating off Navy property at levels above cleanup goals.

## 2.5 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. 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 others 2002)

Technical issues that must be resolved before finalizing the Parcel F FS, selecting a remedy, and preparing a ROD include finalizing the validation study and completing data gaps sampling. Sampling is currently being conducted in Areas III and X and between Areas VIII and IX. No removal actions or treatability studies have been implemented at Parcel F to date.

## 3.0 PARCEL B CHRONOLOGY

The chronology of CERCLA-related events at Parcel B 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 (additional work is continuing)

## 4.0 PARCEL B BACKGROUND

Parcel B is divided into several sites based on past uses and site characteristics. Sites at Parcel B at the time of the ROD included the following: IR-06, IR-07, IR-10, IR-18, IR-20, IR-23, IR-24, IR-26, IR-42, IR-60, IR-61, IR-62, and SI-31, as well as portions of IR-46 (fuel lines), IR-50 (storm drains and sanitary sewers), IR-51 (former transformer sites), and SI-45 (steam line system) that are located within Parcel B. This five-year review focuses on all Parcel B sites, except for IR-06. IR-06 will be addressed under a Parcel C ROD because the IR-06 groundwater VOC plume is related to the IR-25 VOC plume and can be addressed more efficiently in Parcel C. The Parcel B boundary change will be discussed in the Parcel B ROD amendment, and

RAs at IR-06 will be evaluated more thoroughly in future five-year reviews that follow the Parcel C ROD.

This section discusses the location of Parcel B and the surrounding areas, past and present land uses, present and future uses of area resources, history of contamination, pre-ROD cleanup activities, and basis for an RA. Figure 3 shows the layout and features of Parcel B.

## 4.1 SITE LOCATION

Parcel B comprises approximately 59 acres of shoreline and lowland coast in the northeastern portion of HPS. Ground surface elevations range from 0 to 18 feet above mean sea level (Tetra Tech 2002e).

## 4.2 SURROUNDING AREAS

HPS is bounded by the Bay to the north, east, and south and by the City and County of San Francisco's Bayview/Hunters Point district to the west. Parcel B is bounded by the Bay to the north and east, Parcels A and C to the south, and the Bayview/Hunters Point district to the west (Tetra Tech 2003d).

## 4.3 PAST AND PRESENT LAND USES

The original cliffs of Hunters Point were quarried and used to fill the Bay, thereby creating surrounding lowland areas for further development. Construction debris was also used as fill material in the western portion of Parcel B (IR-07 and IR-18). 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.

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. 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 2002e).

## 4.4 PRESENT AND FUTURE USES OF AREA RESOURCES

Area resources discussed in this section include surface water, groundwater, and land. No perennial surface water exists on Parcel B; however, Parcel B is adjacent to the Bay and is subject to overland surface water flow during storm events. One tidal wetland, totaling approximately 0.03 acre, exists along the IR-07 shoreline at Parcel B (Tetra Tech 2003e). Wetlands are planned for Parcel B according to the reuse plan (San Francisco Redevelopment Agency [SFRA] 1997).

Two aquifers (A-aquifer and B-aquifer) and one water-bearing zone (bedrock) have been identified at HPS, but only the A-aquifer and the bedrock water-bearing zone are present throughout Parcel B. The B-aquifer is present in limited areas of Parcel B; in other areas, it is indistinguishable from the A-aquifer or is absent (Tetra Tech 2001b).

The A-aquifer consists primarily of artificial fill, ranging in thickness from 0 to 90 feet below ground surface (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 (Navy 1997b).

The Navy and RWQCB have discussed whether groundwater at Parcel B meets the definition of a potential drinking water source under the State Water Resources Control Board (SWRCB) Resolution No. 88-63, "Sources of Drinking Water Policy." That policy excludes from the definition of a potential drinking water source (1) groundwater with concentrations of total dissolved solids that exceed 3,000 milligrams per liter; (2) groundwater zones where there is contamination, either by natural processes or by human activity (unrelated to a specific pollution incident) that cannot reasonably be treated for domestic use using either best management practices or best economically achievable treatment practices; or (3) a groundwater source that does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day. 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 SWRCB Resolution 88-63. RWQCB's determination addresses state regulations; however, the Navy will complete an additional evaluation in the technical memorandum in support of a ROD amendment to assist in a drinking water determination with respect to federal criteria and U.S. EPA policies.

Based on the City 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 (SFRA 1997). Figure 4 shows the future land-use designations currently planned for Parcel B.

Parcel B cleanup goals are based on the assumption that future land use will be residential, which is more conservative (protective) than the currently planned land-use designations, with the exception of wetlands.

## 4.5 HISTORY OF CONTAMINATION

The Navy has been identifying, evaluating, and addressing 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).

Table 1 summarizes the chemicals that have been discovered in soil at Parcel B above cleanup goals. Table 1 also lists IR site descriptions, possible sources identified during the RI and subsequent RA, the volumes of soil contamination for each IR site associated with Parcel B that are addressed in the ROD and this five-year review, and the status of RA activities implemented at each site. The status of RA activities implemented at each site is expanded on in Table 2. The primary chemicals in Parcel B soils at concentrations above cleanup goals include VOCs, semivolatile organic compounds (SVOC), PCBs, and metals (PRC and others 1996a; Tetra Tech 2002e).

VOCs and metals are the primary chemicals that have been detected in groundwater at concentrations exceeding the ROD trigger levels (Table 3). Metals have been detected at concentrations above 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. Therefore, possible sources of metals listed in Table 1 apply to sources of metals in groundwater. Releases of waste acids and plating solutions into the floor drains inside Building 123 are possible sources of hexavalent chromium and VOCs. Mercury detected in soil samples suggest that releases of mercury to soil is the likely source of mercury in groundwater. Section 5.4 of this five-year review details concentration trends for VOCs and metals in groundwater at Parcel B (PRC and others 1996a; Tetra Tech 2002e).

Petroleum hydrocarbons have also been detected in Parcel B soil and groundwater. Areas where petroleum hydrocarbons are commingled with CERCLA hazardous substances are addressed in the ROD and this five-year review. However, areas where petroleum hydrocarbons are the only contaminants were not addressed directly in the ROD and are not a focus of this five-year review. The corrective action plan (CAP) for total petroleum hydrocarbons (TPH) addresses areas that have only petroleum hydrocarbon contaminants (Tetra Tech 2001a).

Radioactive material has been investigated at HPS and Parcel B since 1946. The most recent investigations have occurred in a four-phase process from 1991 through 1999. A fifth phase is currently being conducted. Findings from the four-phase investigations and preliminary findings from the fifth phase indicate that radioactive material is not a significant concern at Parcel B. Areas of potential contamination that have been identified through the five-phase investigations

include IR-07, IR-18, and Buildings 103, 113, 113A, 114, 130, and 146. However, the ongoing historical radiological assessment will evaluate whether further action is necessary to address potential radiological contamination at Parcel B (Tetra Tech 2002d). If future findings from ongoing investigations reveal radiological contamination at Parcel B, appropriate actions would be conducted in accordance with the basewide radiological removal action.

## 4.6 PRE-ROD CLEANUP ACTIVITIES

Between 1984 and 1991, the Navy performed a series of installation-wide investigations under the IR Program. Seventeen areas on Parcel B were identified as potential source areas for hazardous substances in soil or groundwater. A CERCLA preliminary site assessment and site inspection was conducted on each of the 17 sites. Fifteen of these sites were investigated further in an RI (PRC and others 1996a). The Navy and regulatory agencies concluded that no additional investigations were needed for the other two sites (Navy 1997b).

In 1990, the Navy, EPA, and the State of California (through DTSC) entered into an FFA to coordinate environmental activities at HPS; in 1991, the FFA was modified, and RWQCB became a signatory to the agreement (Navy 1991). In 1991, the U.S. Department of Defense designated HPS for closure as an active military base under its BRAC Program.

Between July 1996 and January 1997, the Navy conducted EEs at 18 sites at HPS. These excavations included removal actions at five areas (EE-01 through EE-05) at IR-23 and IR-26 on Parcel B. The goal of the removals was to reduce the risk to human health and the environment. The Navy used Hunters Point ambient levels and EPA's preliminary remediation goals (PRG) as screening criteria during the removals (PRC 1995; EPA 1995). Discrete confirmation samples from the sidewalls and bottom of each EE were collected to characterize limits of excavation.

Of the five areas, three were included for additional investigation under RA activities and two were not. Samples from EE-05 indicated that chemical concentrations exceeding screening criteria remained at the site. Elevated detection limits for polynuclear aromatic hydrocarbons (PAH) at EE-02 and EE-04 were caused by matrix interferences. These three areas were included for additional investigation. At the remaining two EE areas (EE-01 and EE-03), the objective of removing chemicals of concern to below screening levels was achieved, and these areas were not included for additional investigation (Tetra Tech 2002e).

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

### 4.7 BASIS FOR REMEDIAL ACTION

As discussed in Section 4.5, soil on Parcel B is contaminated primarily with VOCs, SVOCs, PCBs, and metals. Groundwater underlying Parcel B is contaminated with VOCs and metals. VOCs are isolated to the groundwater beneath Building 123 in IR-10. Hexavalent chromium and mercury are the primary metal contaminants.

The HHRA conducted during the RI for Parcel B indicates that future worker and residential receptors may be exposed to hazardous substances in soil through ingestion of and dermal contact with this soil, ingestion of produce grown in the soil, and inhalation of volatile emissions from soil and soil particles in air. Risks from exposure to soil were mainly because of the presence of arsenic, beryllium, and hexavalent chromium; trichloroethene (TCE); PAHs; PCBs (Aroclor-1254 and Aroclor-1260); and aldrin (PRC and others 1996a).

Future residents and workers may be exposed to VOCs through inhalation of VOCs that volatilize from soil and groundwater and migrate into future buildings through cracks in the walls and foundations. Potential risk from migration of indoor air is mainly due to the presence of TCE (PRC and others 1996a).

The qualitative Phase 1A ERA, as summarized in the Parcel B RI, did not identify any ecological receptors because Parcel B is generally devoid of flora and fauna and was considered to have insignificant habitat value (PRC and others 1996a). Exposure pathways were considered incomplete because of the lack of habitat and the predominance of paved areas (PRC and others 1996a; Navy 1997b). Site conditions have not changed appreciably, and the area still has very low terrestrial habitat value. However, the potential for risk to aquatic receptors due to Parcel B contaminants has not been evaluated.

## 5.0 FIVE-YEAR REVIEW PROCESS

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

### 5.1 ADMINISTRATIVE PROCESS

Members of the BRAC Cleanup Team (BCT) were notified of the initiation of the five-year review during a meeting on April 22, 2003. The HPS five-year review was conducted by the Navy and submitted to the regulatory agencies for review and approval. The following review schedule was established for the five-year review report:

- Draft report to regulatory agencies on July 8, 2003
- Draft final report to regulatory agencies on September 22, 2003
- Final report to regulatory agencies on December 10, 2003

## 5.2 COMMUNITY NOTIFICATION AND INVOLVEMENT

Activities to involve the community in the five-year review were initiated with an announcement at the Restoration Advisory Board (RAB) meeting on April 24, 2003. The five-year review was listed as an agenda item in RAB meetings that were held during the five-year review process. A notice was posted in the *San Francisco Chronicle* on May 12, 2003, and in the *New Bayview* on May 14, 2003, that announced that the five-year review process had begun.

A 30-day public comment period began on September 22, 2003, after the draft final five-year review 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 on October 22, 2003. A public meeting was held during the public comment period on September 30, 2003. The following concerns were expressed during the community meeting:

- The selection of a future remedy to address residual contamination.
- Risks to the community if the future remedy leaves contaminants in place.
- The cause of elevated metal concentrations in soil.
- The effectiveness of SVE.
- The effect of the historical radiological assessment on the ROD amendment.
- The effect of cleanup goals on future construction.
- Evaluation of land use controls as a remedy.
- The overall ROD amendment process.
- Parcel boundary changes.

Appendix G describes these and other community concerns that were identified during the public comment period. Appendix G also contains Navy responses to these concerns.

A notice is expected to be posted in mid-December in the same local newspapers announcing that the five-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.

Community members were also involved with the five-year review process through interviews. Section 5.6 of this report summarizes the interviews conducted with members of the community.

In addition to community involvement as part of the five-year review process, the Navy developed a communication program to inform and involve the public in basewide decision-

making processes. The program is contained in the 2003 community involvement plan (Tetra Tech and Innovative Technology Solutions, Inc. 2003), which was recently submitted to the BCT.

## 5.3 DOCUMENT REVIEW

This five-year review consisted of a review of relevant documents that are listed in Appendix A. Federal and state environmental laws and regulations that were identified as ARARs in the 1997 ROD were also reviewed and are identified in Appendix B.

## 5.4 DATA REVIEW

This section discusses the data reviewed for soil and groundwater.

### Soil

For this five-year review, the Navy reviewed soil sampling results from the Parcel B RI and FS (PRC and others 1996a; PRC 1996d) and the construction summary report (CSR) (Tetra Tech 2002e). The CSR dated November 18, 2002, presents the most recent data and compares confirmation sampling data for excavations that have been completed with cleanup requirements. Section 6.1.1 of this report discusses the cleanup requirements specified in the ROD and ESDs.

### Groundwater

Since September 1999, the Navy has conducted 16 quarters of groundwater monitoring under the RA monitoring program (RAMP) (Tetra Tech and Morrison Knudsen Corporation [MK] 1999b); however, only 13 quarters of analytical results are available. Analytical and field results and documentation have been presented in quarterly reports for each quarter and in annual reports for years 1 and 3. In year 2, an eighth quarterly report was submitted rather than the year 2 annual report, in addition to a groundwater evaluation technical memorandum. The quarterly reports evaluated all historical groundwater data (including RAMP data) for Parcel B. The year 3 annual report summarizes incidences where trigger levels were exceeded during all three years of the RAMP (Tetra Tech 2003f). As shown in Table 3, few exceedances of the trigger levels have occurred in most RAMP wells. During several quarters, arsenic was detected in samples from sentinel well IR07MW27A at concentrations above the National Ambient Water Quality Criterion (NAWQC), but less than the sentinel well trigger level, which is the NAWQC multiplied by the dilution attenuation factor. The arsenic concentrations have not shown an increasing trend. The following analytes of concern have been detected at concentrations exceeding trigger levels (or the proposed trigger levels) during RAMP monitoring: (1) copper and mercury in supplemental characterization well IR26MW47A in eastern Parcel B, (2) hexavalent chromium in well IR10MW12A, and (3) TCE in well IR10MW59A in central Parcel B. Copper exceeded its trigger level in quarter 10 in well IR26MW47A and appears to be an artifact because copper concentrations were substantially lower, or not detected, in the other quarters. Mercury concentrations in well IR26MW47A exceeded the trigger level in quarters 10,

11, and 12. The mercury concentrations do not exhibit a trend. The concentrations of hexavalent chromium detected in well IR10MW12A during year 3 have been decreasing to nondetected in quarter 12; however, the concentration detected in quarter 13 is higher than the concentrations reported in previous quarters. TCE concentrations detected at well IR10MW59A have not been increasing during the RAMP. Monitoring data indicate that the plume is not migrating. Vinyl chloride, a degradation product of TCE, has not been detected in the IR-10 plume. Monitoring will be continued at all existing RAMP wells until the RAMP is updated and approved.

## 5.5 SITE INSPECTION

On May 12 and 13, 2003, the Navy conducted a five-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. Although institutional controls are part of the selected remedy, institutional controls (other than physical controls such as fences and signs) could not be inspected because deed restrictions have not yet been developed. Appendix C contains the site inspection checklist, and Appendix D contains the photographic log, which documents observations made during the inspection.

No significant issues were identified during the site inspection. Minor issues that were noted include the need for well vault repairs at wells IR07MW19A, IR10MW59A, IR18MW21A, IR26MW46A, PA50MW01A, and UT03MW11A and potholes along Parcel B roads. Overall, monitoring wells were in good condition. Wells were clearly labeled, locked, and appeared to be regularly maintained because some vaults had been recently replaced. Access to Parcel B and contaminated areas appeared to be sufficiently restricted. Permanent fences, temporary fences, and locked gates that block access to areas of Parcel B that are not occupied by tenants were observed throughout the site. New fences along the shoreline and locked gates at the end of the piers were also observed. In addition, abandoned buildings were boarded up and various signs were posted on the buildings and fences identifying and providing warning of site hazards.

## 5.6 SITE INTERVIEWS

Interviews were conducted with various parties connected to the site. Organizations represented included the RAB, Parcel B tenants, Business Development Incorporated, Arc Ecology, Citizen Advisory Committee, and The Point. Appendix E contains a complete list of the interviewees and complete records of the interviews. In general, the interviewees stated that they are well informed of site activities and were generally satisfied with the overall progress. However, concerns about Parcel B RAs that were raised by various interviewees included:

- Excess dust throughout excavation activities
- Possibility of radiation dust particles being spread into the community
- Constant truck traffic

- Noise from trucks being left on idle over night
- Uncovered soil piles
- Uncovered soil in trucks that hauled soil off base
- Insufficient access restrictions around open excavation pits
- Insufficient communication with the tenants during construction; meetings were monthly, but activities were daily
- Suspected deviations from the ROD, not meeting cleanup goals
- Fear that future changes to the remedy will be made without community input
- Local businesses were not utilized for remedial activities

Community members were also interviewed during development of the draft community involvement plan for HPS (Tetra Tech and Innovative Technical Solutions, Inc. 2003). Interviewees expressed a need for updates on Navy cleanup activities as they are happening and contact information for Navy personnel who are on base.

## 6.0 TECHNICAL ASSESSMENT OF SOIL REMEDIAL ACTIONS AT PARCEL B

This section presents a technical assessment of the RA selected and implemented for soil at Parcel B. Section 7.0 discusses the RA selected and implemented for groundwater. Topics discussed in this section are as follows:

- Description and status of the soil RA specified in the ROD and ESDs
- Responses and rationale to the technical assessment questions
- Listing of issues related to the selected soil remedy
- Listing of recommendations and follow-up actions to address issues with the remedy and the RA
- Protectiveness statement for the soil remedy selected for Parcel B

### 6.1 REMEDIAL ACTIONS FOR SOIL

The Navy and the regulatory agencies signed the ROD for Parcel B on October 9, 1997. The 1997 ROD was followed by two ESDs, one that was signed on October 28, 1998, and another that was signed on May 9, 2000 (Navy 1997b, 1998, 2000). The 1998 ESD changed the excavation depth to 10 feet bgs to make certain that the remedy was protective of human health in both the short- and long-term; the 1997 ROD called for excavation to the groundwater table, but a change was needed since groundwater was encountered at depths as shallow as 2.3 feet bgs in early 1998. The 2000 ESD updated the soil cleanup levels to incorporate (1) EPA's 1999

PRGs (EPA 1999), including adjustments by the Navy to incorporate the produce uptake pathway, and (2) revised ambient levels for nickel.

The ROD and ESDs address Parcel B soil and groundwater that is contaminated by CERCLA hazardous substances and by petroleum hydrocarbons that are commingled with CERCLA hazardous substances. Areas containing only petroleum hydrocarbons, which are not hazardous substances as defined by CERCLA, are addressed in a separate CAP for TPH under oversight of RWQCB (Tetra Tech 2001a). Consequently, this five-year review does not focus on petroleum hydrocarbons.

The following sections discuss the selected remedy, remedy implementation, system operations, and current status of the soil remedy at Parcel B.

### 6.1.1 Selected Remedy for Soil

This section discusses the remedial action objectives (RAO) and selected remedy for soil that are described in the 1997 Parcel B ROD and ESDs completed in 1998 and 2000.

The RAO for soil is to prevent ingestion of, direct dermal contact with, or inhalation of hazardous substances in soil. To achieve this objective, the FS considered different soil cleanup goals corresponding to excess lifetime cancer risks (ELCR) of $10^{-4}$, $10^{-5}$, and $10^{-6}$ under both future industrial and future residential scenarios. Only certain portions of Parcel B are slated for residential use under the current reuse plan (SFRA 1997); however, in the ROD, the Navy proposed to clean up the entire parcel to residential risk-based standards (Navy 1997b). The NCP establishes an acceptable risk range of $10^{-4}$ to $10^{-6}$ and a point of departure for remedial alternatives of $10^{-6}$ for carcinogens. The Navy has chosen to set its cleanup goal at the lower end of the risk range, which is more protective of human health. The Navy has established the following cleanup goals for soil remaining on Parcel B:

- ELCR risk of $10^{-6}$ or less for carcinogens, except where ambient concentrations of inorganic chemicals exceed $10^{-6}$ because of fill material
- Hazard index (HI) of 1 or less for noncarcinogens, except where ambient concentrations of inorganic chemicals exceed an HI of 1 because of fill material
- Lead levels of less than 221 milligrams per kilogram (mg/kg)

Chemical-specific cleanup goals for soil remaining on Parcel B were calculated to correspond to a risk level of $10^{-6}$ or an HI equal to 1. Table 4 lists the cleanup goals. However, because of the limits of analytical methodologies, it may not be possible to achieve laboratory detection limits that are as low as the cleanup goals; for those chemicals, the cleanup goal is the detection limit. Table 4 lists the 1997 ROD and 2000 ESD cleanup goals.

The BCT selected excavation and off-site disposal as the final remedy for contaminated soil at Parcel B. The major components of the soil portion of the remedy, as described in the 1997 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).
- Off-site disposal of contaminated soil (with treatment at the off-site 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.

In addition to the remedy components above, the ROD specifies procedures for handling the excavated soil. The ROD requires that (1) soils be stockpiled within the area of contamination, (2) controls be instituted to eliminate surface water runon and runoff while the soil is stockpiled, (3) excavated soil be sampled and characterized, (4) soil that is classified as hazardous be containerized before off-site shipment, (5) soil that is nonhazardous be stockpiled in a centralized location before shipment, and (6) soil be shipped off site either by rail cars or by trucks (Navy 1997b).

### 6.1.2 Implementation of Soil Remedy

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.

The final RD for Parcel B RAs was completed on August 19, 1999. The RD consisted of about 100 remedial areas that required excavation throughout Parcel B (Tetra Tech and MK 1999a).

Excavations were conducted in 1998 and 1999 at about 60 remedial areas in Parcel B, where substances defined as hazardous under CERCLA were detected during the RI at levels associated with human health risks exceeding ROD cleanup standards for soil (PRC and others 1996a). Excavation activities were paused in September 1999 while the Navy updated cleanup levels to reflect changes in 1999 PRGs, which are documented in the 2000 ESD (Navy 2000). Additional excavation activities were conducted in 2000 and 2001 at about 40 remedial areas, some of

which were started in 1998 or 1999 but not completed. Excavations conducted in 2000 and 2001 used the revised cleanup levels contained in the 2000 ESD (Navy 2000).

The confirmation sampling approach changed according to an RD amendment that was completed on February 20, 2001 (Tetra Tech 2001c). Similar to the 1998 to 1999 activities, the sampling strategy was based on the concept of random, systematic random, and judgmental sampling. However, instead of only post-excavation sampling, the 2000 to 2001 activities involved a large amount of pre-excavation sampling using a direct-push rig to delineate the extent of contamination before excavation resumed. The confirmation sampling for the 2000 to 2001 RA activities was conducted according to the RD amendment.

Approximately 100,000 cubic yards of soil at about 100 remediation areas was excavated during the 1998 through 2001 RA activities. About 80 of these excavations are documented in the draft CSR (Tetra Tech 2002e). About 20 excavations are pending because of various issues discussed in Section 6.1.4. In addition, not all of the 80 excavations that are documented in the CSR are considered to be complete.

In addition to the soil RA specified in the 1997 ROD, an SVE treatability study was implemented between December 2000 and June 2001 to evaluate removal of VOCs in soil underlying Building 123 at IR-10. The Navy also conducted an SVE confirmation study at Building 123 to evaluate the long-term effectiveness of the SVE system at that location in September 2002 (Tetra Tech 2003b). Pre- and post-treatment concentrations of TCE in vapor, soil, and dissolved matrices were evaluated to obtain an estimate of about 80 percent for mass removal of TCE. Average TCE concentrations in soil decreased from approximately 20 to 5 mg/kg (Tetra Tech 2003b). The cleanup goal for TCE in soil is 1.7 mg/kg.

### 6.1.3 System Operations

Fencing and control of site access are the only operation and maintenance associated with the soil remedy at this time. However, future operations and maintenance may include monitoring to ensure that the institutional controls are being implemented and future excavations are restricted below 10 feet bgs.

### 6.1.4 Current Status

Although RA excavations started in 1998, the excavations are not complete and the remedy is still under construction. Tables 1 and 2 present the status of soil RAs at each IR and SI site. The schedule for completion depends on resolution of the following issues:

- Fill at IR-07 and a portion of IR-18 contains a large fraction of construction debris. The Navy conducted a geophysical survey throughout a majority of IR-07 and IR-18 to more accurately define the location of the debris fill (Tetra Tech 2003c), and the Navy and the regulatory agencies are continuing discussions of risk management related to soils at IR-07 and IR-18 as part of the ROD amendment process.

- The northern boundaries of some excavations in close proximity to the Bay at IR-07 and IR-26 were not fully delineated during 2000 to 2001 RA activities. The proximity of these excavations to the Bay shoreline delayed a complete delineation of contaminated soil and prevented excavation of the soil. The Navy is discussing options for delineating and cleaning up soil contamination along the shoreline at IR-07 and IR-26 with the regulatory agencies.

- An SVE treatability study is being implemented at IR-10 near the northwest portion of Building 123. The Navy is evaluating the results of SVE treatability studies at IR-10 to assess the effectiveness of the SVE system in removing VOCs from soils. The Navy will complete the evaluation of SVE as a potential soil remedy in the Parcel B ROD amendment process.

- It is the Navy's position that background levels of ambient metals in soil are more variable and higher than originally estimated. Soil RAOs and RA alternatives should be reevaluated during the ROD amendment process to address higher and more variable levels of ambient metals.

Deed restrictions will be implemented after excavations are complete and land reuse designations are final.

## 6.2 TECHNICAL ASSESSMENT QUESTIONS FOR SOIL REMEDY

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

- 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?

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

Although the soil remedy at Parcel B is still under construction, it is not functioning as intended by the ROD and ESDs. It is the Navy's position that soil RAOs are not being achieved because background levels of metals in soil are higher and more variable than originally estimated. Delineation methods described by the RD and RD amendment are not possible along the shoreline and in areas of IR-07 and IR-18 where fill soil contains a large fraction of debris. Although the remedy is not functioning as intended, 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.

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

Some toxicity data used at the time of the remedy selection have not been updated. As discussed below, the HHRA for Parcel B is undergoing revisions that may affect the RAOs.

**Changes in ARARs.** Appendix B lists the ARARs. Changes to these ARARs may include new standards affecting soil excavation and stockpiling procedures. New state guidance has been implemented for excavation in asbestos–containing soil and for best management practices to control surface water runoff from stockpiles or bare soil created during and after excavation. However, these new state policies do not affect the protectiveness of the remedy.

**Changes in Exposure Pathways, Risk Assessment Methods, Toxicity, and Other Contaminant Characteristics.** Land use on Parcel B has not changed since the time of the ROD. The future land-use designations for Parcel B have not been finalized, but any future land-use changes are not expected to affect the protectiveness of the remedy.

Since 1996, when the HHRA was originally conducted as part of the RI, several changes have been made to risk assessment methodology, chemical toxicity values, and exposure parameters. However, the Parcel B HHRA has been regularly updated to incorporate these changes. Specifically, these changes include the following:

- Revisions to exposure parameters for potential residential and industrial receptors, as provided in the most recent version of the EPA Region 9 PRG table (EPA 2002a)

Changes in EPA and DTSC toxicity values for several chemicals and classes of chemicals, as reflected in EPA's Integrated Risk Information System (EPA 2003a) and DTSC's Toxicity Criteria Database (Office of Environmental Health Hazard Assessment 2003)

- Revisions to chemical uptake factors for the ingestion of homegrown produce pathway for residential receptors

- Assessment of cumulative risk

The last formal update of the HHRA for Parcel B was in 2000, and the updated HHRA served as the basis for the 2000 ESD (Navy 2000). The HHRA is currently being updated to include new toxicity values, estimate cumulative risk, and evaluate risks associated with future land use according to the current reuse designations. Soil cleanup goals will be reevaluated during the ROD amendment process after completion of the revised HHRA.

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

The qualitative Phase 1A ERA, as summarized in the Parcel B RI, did not identify any ecological receptors because Parcel B is generally devoid of flora and fauna and was considered to have insignificant habitat value (PRC and others 1996a). Exposure pathways were considered to be incomplete because of the lack of habitat and the predominance of paved areas (PRC and others 1996a; Navy 1997b). Site conditions have not changed appreciably, and the area still has very low terrestrial habitat value. However, the potential for risk to aquatic receptors due to Parcel B contaminants has not been evaluated.

### 6.2.4 Technical Assessment Summary

The technical assessment summary is based on documents and data reviewed, the site inspection, and the interviews (Appendix E). Toxicity data and risk assessment methodology have changed and may affect HHRA results, the RD methodology is not appropriate for delineating contaminants at IR-07 and IR-18, ARARs should be updated to address new state guidance for soil excavation and stockpiling, higher than anticipated ambient metals concentrations need to be addressed, and potential aquatic receptors have been identified and potential ecological risk to aquatic receptors due to Parcel B contaminants is not addressed.

## 6.3 ISSUES WITH SOIL REMEDY

Table 5 lists the potential issues with the soil remedy.

## 6.4 SOIL REMEDY RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 6 lists recommendations and follow-up actions to the issues listed in Table 5. Table 6 also lists additional action items that are not necessary in response to an issue or problem. The last column of Table 6 lists milestone dates. These milestone dates identify the date for the most immediate follow-up action for a given issue; however, each of these dates marks a step in an overall process. The future RA process for Parcel B could include a technical memorandum in support of a ROD amendment, a proposed plan (with community involvement), a ROD amendment, RD, and RA, followed by closeout activities. The technical memorandum in support of a ROD amendment will reevaluate site risks and RA alternatives.

## 6.5 PROTECTIVENESS STATEMENT FOR PARCEL B SOIL REMEDY

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.

# 7.0 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 groundwater RA specified in the ROD and ESDs
- Responses and rationale to the technical assessment questions
- Listing of issues related to the selected groundwater remedy
- Listing of recommendations and follow-up actions to address issues with the remedy and the RA
- Protectiveness statement for the groundwater remedy selected for Parcel B

## 7.1 REMEDIAL ACTIONS FOR GROUNDWATER

As discussed in Section 6.1, the Navy and the regulatory agencies signed the ROD for Parcel B on October 9, 1997. The two ESDs that were signed in 1998 and 2000 did not affect the groundwater remedy and are, therefore, not discussed in this section. This section discusses the selected remedy, remedy implementation, system operations, and current status of the groundwater remedy selected in the Parcel B ROD.

### 7.1.1 Selected Remedy for Groundwater

RAOs for groundwater are as follows:

- Preventing inhalation of VOCs that may enter into buildings from A-aquifer groundwater
- Preventing exposure of aquatic receptors to contaminated groundwater migrating to the Bay

The trigger levels for VOCs are human health-based criteria that correspond to an ELCR of $10^{-6}$ based on analysis of groundwater-to-indoor-air modeling. The trigger levels for metals are the higher values between ambient levels of metals (PRC 1996b) and the NAWQC as set forth in the RWQCB's "A Compilation of Water Quality Goals" (RWQCB 2000) or the water quality

objectives set forth in the "Water Quality Control Plan (Basin Plan) for the San Francisco Bay Region" (RWQCB 1995). Table 7 lists the trigger levels established, NAWQC, the Basin Plan objectives, and ambient levels for metals.

The major components of the selected remedy for groundwater are as follows:

- 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.

The ROD specifies that a groundwater monitoring program be developed during the RD and that the entire monitoring program, including the analyses conducted, the frequency of sampling, and the overall duration of the monitoring program, be reevaluated as part of the five-year review (Navy 1997b). The ROD requires that the Navy monitor groundwater to make certain that trigger levels are not exceeded at the high-tide line of the Parcel B tidally influenced zone, which is the point of compliance (POC). The ROD also requires that a series of sentinel wells be located upgradient from the POC at a distance equivalent to a groundwater travel time of 5 years and that data from these sentinel wells be compared with 10 times the POC trigger levels. If groundwater monitoring indicates that concentrations of hazardous substances exceed these criteria, the ROD requires that the Navy undertake the following actions:

- Verbally notify EPA, DTSC, and RWQCB (the FFA signatory agencies) within 15 days of any exceedance of the groundwater monitoring criteria, followed by a written notice to the signatory agencies within 15 days of the oral notification.
- Consult with the signatory agencies regarding the exceedances.
- Conduct monitoring to verify the exceedance in accordance with the monitoring plan.
- At the written request of one or more of the signatory agencies, develop a proposal for their review and comment as to what should be done to address the exceedance, which may result in a change in the remedy and may require a ROD amendment.

The ROD also requires that the Navy develop a groundwater model to calculate a site-specific multiplier to be applied to NAWQC, the Basin Plan objectives, and ambient levels for metals to reflect the expected dilution attenuation that is likely to occur as contamination migrates from the monitoring well to the Bay. These site-specific criteria would replace the 10 times default criteria as the trigger level after they are approved by the FFA signatory agencies (Navy 1997b).

### 7.1.2 Remedy Implementation

Storm drains normally transport runoff of surface water to the Bay; however, leaky storm drains may also transport groundwater, which may contain contaminants. A storm drain study was conducted to evaluate whether the storm drains in Basins 2 and 4 needed to be lined to prevent groundwater intrusion. The study concluded that Basin 2 storm drains did not need to be lined because chemical concentrations of presumed contaminants were not detected in or in the immediate vicinity of Basin 2 storm drains. The study concluded that Basin 4 storm drains did not need to be lined because groundwater infiltration was not observed during the study. Furthermore, analytical results from RAMP monitoring wells at Parcel B near Basins 2 and 4 have not exceeded POC trigger levels since the infiltration study (Tetra Tech 2001d).

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 2002e).

Deed restrictions and the deed notifications specified in the ROD have not been necessary so far because Parcel B has not yet been transferred to the City and County of San Francisco.

The RAMP was prepared as part of the RD, which was submitted on August 19, 1999, and is consistent with ROD requirements (Tetra Tech and MK 1999b). The RAMP established POC wells to make certain that trigger levels are not exceeded at the high-tide line of the Parcel B tidally influenced zone. A series of sentinel wells are located upgradient from the POC at a distance equivalent to a groundwater travel time of 5 years. Figure 3 shows the POC wells, the five-year buffer, and the sentinel wells.

An SVE treatability study was implemented at IR-10. The Navy conducted an SVE confirmation study to evaluate the long-term effectiveness of the SVE system, and the study estimated that the system removed approximately 80 percent of the TCE mass that was present before the system began operating, which suggests that SVE can be used to remove the source of VOC groundwater contamination (Tetra Tech 2003b). The Navy is continuing to evaluate the effectiveness of SVE at the site. The Navy is also in the preliminary stages of planning a treatability study for the injection of ZVI in the subsurface to treat VOCs in groundwater at IR-10.

### 7.1.3 System Operations

System operations for the groundwater remedy at Parcel B consist of implementation of the groundwater monitoring program. Twenty-four A-aquifer monitoring wells were originally included in the RAMP. Six of the original wells were decommissioned, and eight existing or newly installed monitoring wells were added to the RAMP. The Navy currently samples 26 wells under the RAMP (Figure 3). The locations of the 26 monitoring wells were confirmed during the site inspection. The RAMP wells are grouped into the following six categories:

1. POC wells at the high-tide line of the tidally influenced zone
2. Sentinel wells set back from the POC by a buffer zone
3. Post-RA wells downgradient of the RA excavations in IR-07
4. VOC wells in and around the chlorinated solvent plume at Building 123 in IR-10
5. On- and off-site migration wells at the western boundary of HPS
6. A utility line well in IR-06 near the former tank farm to monitor whether contaminants enter the utility line behind Building 134 (in Parcel C)

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: (1) well IR10MW59A near the center of the IR-10 VOC plume, (2) three supplemental characterization wells (IR26MW46A, IR26MW47A, and IR26MW48A) around EE-05 in IR-26, and (3) hexavalent chromium well IR10MW12A, based on historical results. The supplemental characterization wells were added after EE-05 grew extensively in size, necessitating the removal of the nearby POC well. All RAMP wells are sampled quarterly except for the sentinel wells, which are sampled semiannually. Sixteen quarters of sampling have been conducted under the RAMP as of December 2003.

### 7.1.4 Current Status

Table 2 presents the status of groundwater RAs for each IR and SI site. At present, 16 quarters of groundwater monitoring have been conducted under the RAMP. After the data are received from the laboratory each quarter, the Navy sends a letter to the BCT notifying them of the analytical results that exceed the RAMP trigger levels. The data are subsequently evaluated by a technical reviewer in the data validation process and then presented in quarterly and annual reports, which are issued about 3 months after each RAMP sampling event. To date, analytes with concentrations exceeding the RAMP trigger levels have mostly consisted of metals in various locations and VOCs and hexavalent chromium in IR-10. Because of the type or location of RAMP exceedances, or their limited occurrence or magnitude, and since access to Building 123 is controlled, groundwater at Parcel B does not appear to pose unacceptable risks to the Bay or to humans, and no special contingency actions have been required above the regular monitoring program and building access controls. Dilution attenuation factors, which were

required by the ROD to replace the default value of 10 for the sentinel wells, have only been modeled for arsenic at sentinel well IR07MW27A in IR-07 because no exceedances (other than suspected artifacts) have occurred at other sentinel wells.

POC well IR07MWS-4 and post-RA characterization wells IR07MW25A, IR07MW24A, IR07MW21A1, and IR07MW26A were destroyed during excavation activities at IR-07 in March 2001; therefore, no groundwater data exist at these wells after quarter 6. The Navy plans to install a POC well and other characterization wells at IR-07 as part of the basewide groundwater monitoring plan. Although there is no current POC well to evaluate whether groundwater concentrations of metals that exceed POC trigger levels are migrating to the Bay, review of historical data shows that no exceedances of metals were observed at well IR07MWS-4 in four consecutive monitoring events that preceded destruction of the POC well in March 2001. In addition, approximately 52,500 cubic yards of contaminated soil, which is the primary source of groundwater contamination, has been excavated from IR-07 and replaced with clean backfill soil. Therefore, it is the Navy's position that groundwater with concentrations of metals greater than trigger levels is not likely to be migrating to the Bay and that well replacement as part of the basewide groundwater monitoring plan will be sufficient to ensure protection of the Bay. However, the Navy recognizes that its position cannot be confirmed without groundwater monitoring data at IR-07 after quarter 6.

## 7.2 TECHNICAL ASSESSMENT QUESTIONS FOR GROUNDWATER REMEDY

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

- 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?

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

The overall groundwater remedy at Parcel B is functioning as intended by the ROD because the location of the wells and trigger levels established by the RAMP are protective of aquatic life in the Bay and future occupants of Parcel B buildings. However, several monitoring wells along the IR-07 shoreline were destroyed during soil excavation activities in 2001 and need to be replaced for the groundwater remedy to perform as precisely specified in the RAMP.

Although storm drains in Parcel B were not lined; groundwater intrusion was not observed in areas with groundwater contamination during the Parcel B storm drain infiltration study; therefore, contaminated groundwater is not migrating to the Bay through the storm drains. In addition, analytical results from RAMP monitoring wells located in the vicinity of the storm drains have been consistently less than POC trigger levels.

The fuel line distribution system and the steam lines were removed in 1998 and 1999, during the Parcel B RA. In locations beneath buildings, these lines were cleaned out and capped. These actions prevent groundwater migration via these potential preferential pathways as intended by the ROD.

Although TCE concentrations in groundwater underneath Building 123 exceed its trigger level, the RAO for VOCs in groundwater is being achieved because inhalation of VOCs that may enter Building 123 from the A-aquifer is being prevented through controlling building access. All Building 123 windows are boarded up and all doors are locked to prohibit unauthorized building access. Institutional controls and other remedial alternatives to ensure long-term protectiveness will be evaluated as part of the ROD amendment process.

The Navy plans to install a POC well and other characterization wells at IR-07, which will safeguard aquatic receptors in the long-term. It is the Navy's position that groundwater with concentrations of metals that exceed POC trigger levels is not likely to be migrating to the Bay because (1) no metal exceedances were observed at the POC well during four consecutive monitoring events that preceded destruction of the POC well in March 2001 and (2) approximately 52,500 cubic yards of contaminated soil has been excavated from IR-07 and replaced with clean backfill soil. However, the Navy acknowledges that its position cannot be confirmed without groundwater monitoring data at IR-07 wells after quarter 6.

Although the RAMP is operating effectively, opportunities exist for optimization of the program. To date, the 16 quarters of RAMP groundwater monitoring at Parcel B provide sufficient data for an evaluation of the monitoring program in light of overall program goals. Some areas of concern remain, and the Navy has identified the following chemicals and areas for continued or additional monitoring: (1) mercury in IR-26 (the eastern region), (2) VOCs and hexavalent chromium in IR-10 (the central region), and (3) analytes associated with debris in IR-07 and IR-18 (the western region). For areas where few exceedances occurred during the RAMP, the Navy recommends reductions in sampling frequency or analyses. These areas include (1) the sentinel and POC wells in the central region and (2) the on- and off-site migration wells near the western boundary. These recommendations are preliminary and will be developed in an upcoming basewide groundwater monitoring plan. Before the development and approval of a basewide groundwater monitoring plan, groundwater at Parcel B will be monitored in accordance with the existing RAMP.

Although deed restrictions are not in place, extensive fencing, locked gates, warning signs, and secured buildings that were observed during the site inspection restrict access and exposure to contaminated areas. Deed restrictions will be developed after the reuse plan is final.

Estimates and actual O&M costs are also typically reviewed when evaluating whether the remedy is functioning as intended. However, it is the Navy's position that it is not necessary to discuss groundwater O&M costs in this five-year review report because costs associated with groundwater monitoring do not reflect remedy effectiveness.

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

Although the exposure assumptions and RAOs used at the time of remedy selection are still valid, risk assessment parameters and trigger levels for VOCs in groundwater need to be updated.

Trigger levels for the POC wells are equivalent to the trigger levels established in the ROD, with a few exceptions. The ROD trigger level for zinc is 75.7 micrograms per liter (µg/L) compared with 81 µg/L, which is the POC trigger level under the RAMP. The ROD trigger levels for barium, chromium, and thallium are 5,000, 1,030, and 213 µg/L, respectively, which are based on NAWQC. The POC trigger levels under the RAMP are 504, 15.7, and 13 µg/L, respectively, which are based on ambient levels. These trigger levels should be reevaluated during the ROD amendment process.

**Changes in ARARs.** Appendix B lists the ARARs. No changes in these ARARs and no new standards affecting the protectiveness of the remedy have been identified. However, the NAWQC for mercury did change, and NAWQC for aquatic life protection was a factor considered in developing the trigger levels, as specified in the ARARs. The NAWQC for mercury changed from 0.03 to 0.94 µg/L; however, the numerical water quality objective in the 1995 Basin Plan remained unchanged at 0.025 µg/L. Therefore, the trigger level for mercury remained unchanged at 0.6 µg/L (which is the ambient concentration).

As the groundwater remedy has been implemented, ARARs for groundwater contamination cited in the ROD have been met according to the RAMP, annual monitoring reports, and the site inspection. Compliance with the coastal zone management plan has not been documented, but it is assumed that groundwater monitoring activities are in compliance with the coastal zone management plan because the activities associated with groundwater monitoring are nonintrusive.

**Changes in Exposure Pathways, Risk Assessment Methods, Toxicity, and Other Contaminant Characteristics.** Except for the trigger levels for VOCs in indoor air, which are risk-based criteria, trigger levels are not dependent on exposure pathways, risk assessment methods, and toxicity characteristics. Trigger levels are based on NAWQC for saltwater aquatic life, water quality objectives in the Basin Plan, and ambient levels for metals.

The only exposure pathway that may change would be if Parcel B were not used for residential land use, which would affect the trigger levels for VOCs in indoor air. The future land-use designations for Parcel B have not been finalized, but any future land-use changes are not

expected to affect the protectiveness of the remedy because trigger levels established for residential land are more protective than trigger levels that would be established for any of the currently proposed land uses.

Since 1996, when the HHRA was originally conducted as part of the RI, several changes have been made to risk assessment methodology and chemical toxicity values. For example, EPA's vapor intrusion guidance (EPA 2002b) documents a significant change to the risk assessment methodology used at the time of the ROD. In addition, TCE toxicity values for vapor have changed since the time of the ROD. The Parcel B HHRA will be updated to incorporate these changes. The HHRA is currently being updated to include new toxicity values, estimate cumulative risk, and evaluate risks associated with future land use according to the current reuse plan. Groundwater VOC trigger levels will be reevaluated during the ROD amendment process after completion of the revised HHRA. Development of soil vapor VOC trigger levels may be considered during the ROD amendment process. The Navy will evaluate human health risk via the inhalation pathway consistent with accepted technical guidance and the most current risk assessment protocols.

Except for a few exceedances of trigger levels, RAOs are being achieved. After all sources are removed, including soils contaminated with VOCs, all RAOs are expected to be achieved. The implementation of a treatability study for the injection of ZVI to reduce VOCs in groundwater at IR-10 may accelerate long-term achievement of the RAOs.

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

No other information has come to light that could call into question the protectiveness of the groundwater remedy.

### 7.2.4 Technical Assessment Summary

The overall groundwater remedy at Parcel B is functioning as intended by the ROD because the location of the wells and trigger levels established by the RAMP ensure the protection of aquatic life in the Bay and of future occupants of buildings at Parcel B. However, several monitoring wells along the IR-07 shoreline were destroyed during soil excavation activities in 2001 and need to be replaced for the groundwater remedy to perform as precisely specified in the RAMP. Although most of the exposure assumptions and RAOs used at the time of remedy selection are still valid, risk assessment parameters and trigger levels for VOCs for groundwater are not still valid and need to be updated to ensure long-term protectiveness of the remedy. In addition, higher than anticipated levels of ambient metals in groundwater need to be addressed.

## 7.3 ISSUES WITH GROUNDWATER REMEDY

Table 8 lists the issues related to the groundwater remedy.

### 7.4 GROUNDWATER REMEDY RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 9 lists recommendations and follow-up actions to the issues presented in Table 8. Table 9 also lists additional action items that are not a response to an issue or problem.

### 7.5 PROTECTIVENESS STATEMENT FOR PARCEL B GROUNDWATER REMEDY

The groundwater remedy at Parcel B is currently 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.

## 8.0 TECHNICAL ASSESSMENT OF RADIOLOGICAL CONTAMINATION

Cleanup of radiological contaminants is being addressed by the basewide radiological removal action. However, the action memorandum is not referenced in the Parcel B ROD to memorialize cleanup methods and cleanup goals. Any radiological removal actions will be conducted as part of the basewide radiological removal action and summarized in a closeout report.

## 9.0 NEXT FIVE-YEAR REVIEW

The next five-year review for HPS is required by July 2008, 5 years from the date of this review. The next five-year review will (1) discuss the status of follow-up actions identified in this five-year review that are needed to make certain that the Parcel B remedies are protective in the long-term and (2) address any other HPS parcels where remedies are selected and documented in a ROD.

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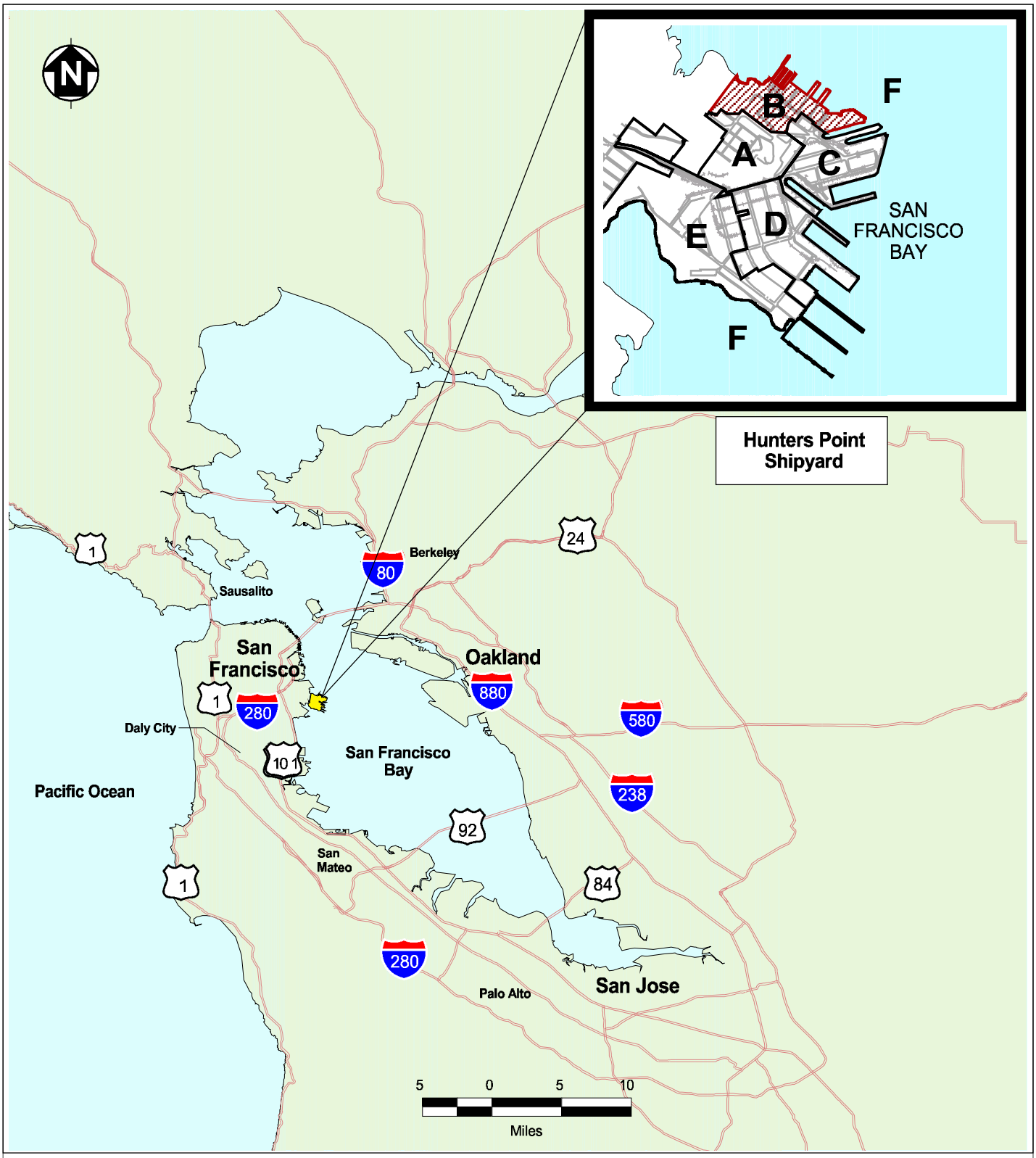
## FIGURES



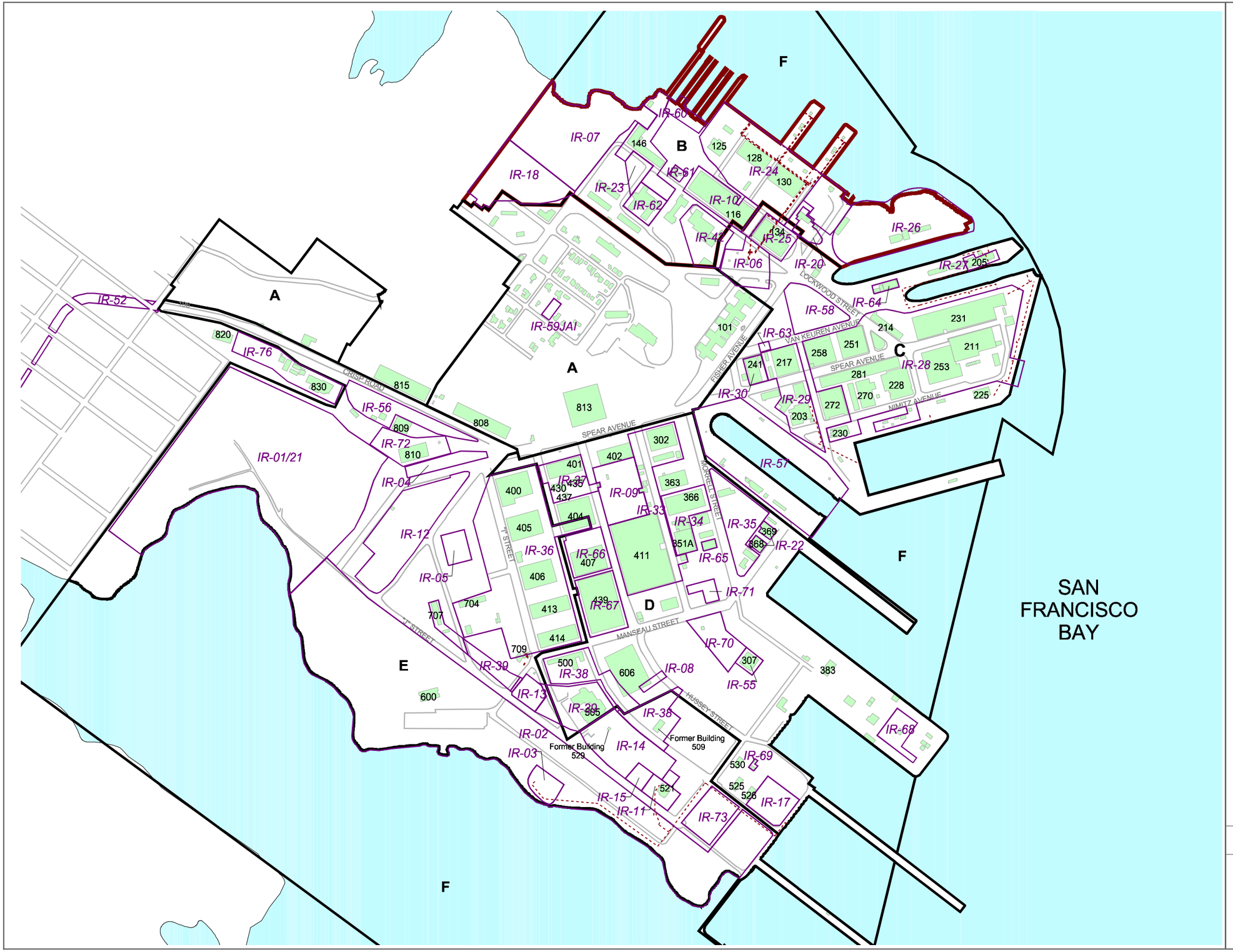

Tetra Tech EM Inc.

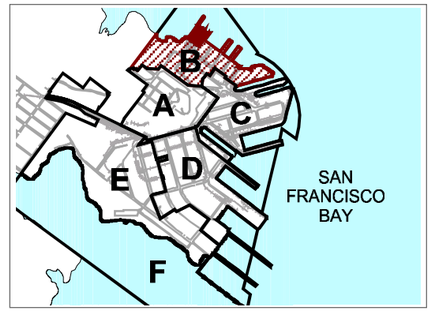
**Hunters Point Shipyard, San Francisco, California**
U.S. Navy Southwest Division, NAVFAC, San Diego

**FIGURE 1**
**LOCATION MAP**

First Five-Year Review of HPS Remedial Actions

06/26/03 O:\HUNTERS POINT\PROJECTS\PARCEL B WGI\Parcel_b.apr MKH DN




Location Map

IR-05 IR SITE BOUNDARY
PARCEL BOUNDARY
PARCEL B
405 BUILDING
HISTORICAL FUEL LINE
ROAD

Notes:

1. Boundaries of IR sites associated with utility lines, such as IR-50, sanitary sewers, and storm drains, are not shown.

IR Installation Restoration

N

350 0 350 700

Feet

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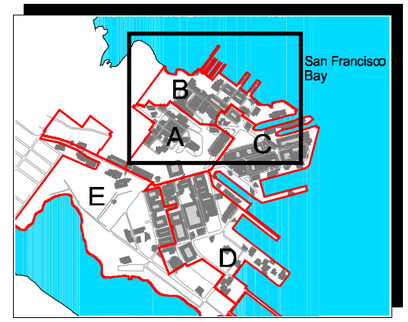
**FIGURE 2**
**LAYOUT MAP**

First Five-Year Review of HPS Remedial Actions

07/07/03 O:\HUNTERS POINT\PROJECTS\PARCEL B WGI\parcel_b.apr MKH DN

San Francisco Bay

BERTH 63
BERTH 62
BERTH 64
DRY DOCKS 5, 6, AND 7 AND BERTHS 62, 63, AND 64 ARE CONCRETE-WALLED DRY DOCKS
NORTHERN REACH (ARTIFICIAL FILL MATERIAL)
BERTH 61
CONCRETE SEAWALL
WOODEN SEAWALL
MIDDLE REACH (SEAWALL)
WOODEN PIER
PIER B
BERTH 59
PIER C
BERTH 56
BERTH 55
IR07MW25A
IR07MW28A
IR07MW24A
IR07MW21A1
IR07MW26A
IR07MW20A1
IR07MWS-4
IR07MWS-2
IR07MW19A
IR-60
7-1
7-3
7-4
7-5
7-2
IR-07
IR07MW23A
IR07MW27A
IR18MW21A
IR-18
Approximate Edge of Tidally Influenced Zone (Point of Compliance)
PA50MW01A
UT03MW11A
IR-23
IR10MW31A1
IR61MW05A
IR10MW13A1
IR10MW12A
IR10MW33A
IR10MW59A
IR-61
IR-24
IR10MW28A
IR10MW14A
IR46MW37A
IR-62
IR-10
IR25MW37A
IR25MW17A
IR26MW41A
IR06MW45A
IR-25
IR-26
IR26MW46A
IR26MW47A
IR26MW45A
IR26MW48A
EE-05
SI-31
IR-42
IR06MW42A
IR-06
FORMER TANK FARM
CONCRETE SEAWALL DRY DOCK 3
CONCRETE SEAWALL DRY DOCK 2
IR-27
IR-64
IR-59JAI
IR-58
IR-63
IR-30
IR-28
B
A
C



Location Map

- Well Decommissioned As a Result of Soil Remedial Action Activities
- Supplemental Characterization Monitoring Well
- On-/Off-Site Migration Monitoring Well at IR-07 and IR-18
- Point-of-Compliance Monitoring Well
- Postremedial Action Monitoring Well
- Sentinel Well Along Inland Buffer Zone
- Utility Line Monitoring Well
- VOC Monitoring Well for IR-10
- Remedial Action Excavation (2000-2001)
- Remedial Action Excavation (1998-1999)
- Unopened Remedial Action Excavation (1998-1999)
- Tidally Influenced Zone
- Five-Year Buffer Zone
- Parcel Boundary
- IR Site Boundary
- Road
- 134 Building/Building Number

Notes:
EE Exploratory Excavation
IR Installation Restoration
VOC Volatile Organic Compound

300 0 300
Scale in Feet

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**Hunters Point Shipyard, San Francisco, California**
U.S. Navy Southwest Division, NAVFAC, San Diego

**FIGURE 3**
**LOCATION OF REMEDIAL ACTION MONITORING WELLS, PARCEL B**

First Five-Year Review of HPS Remedial Actions

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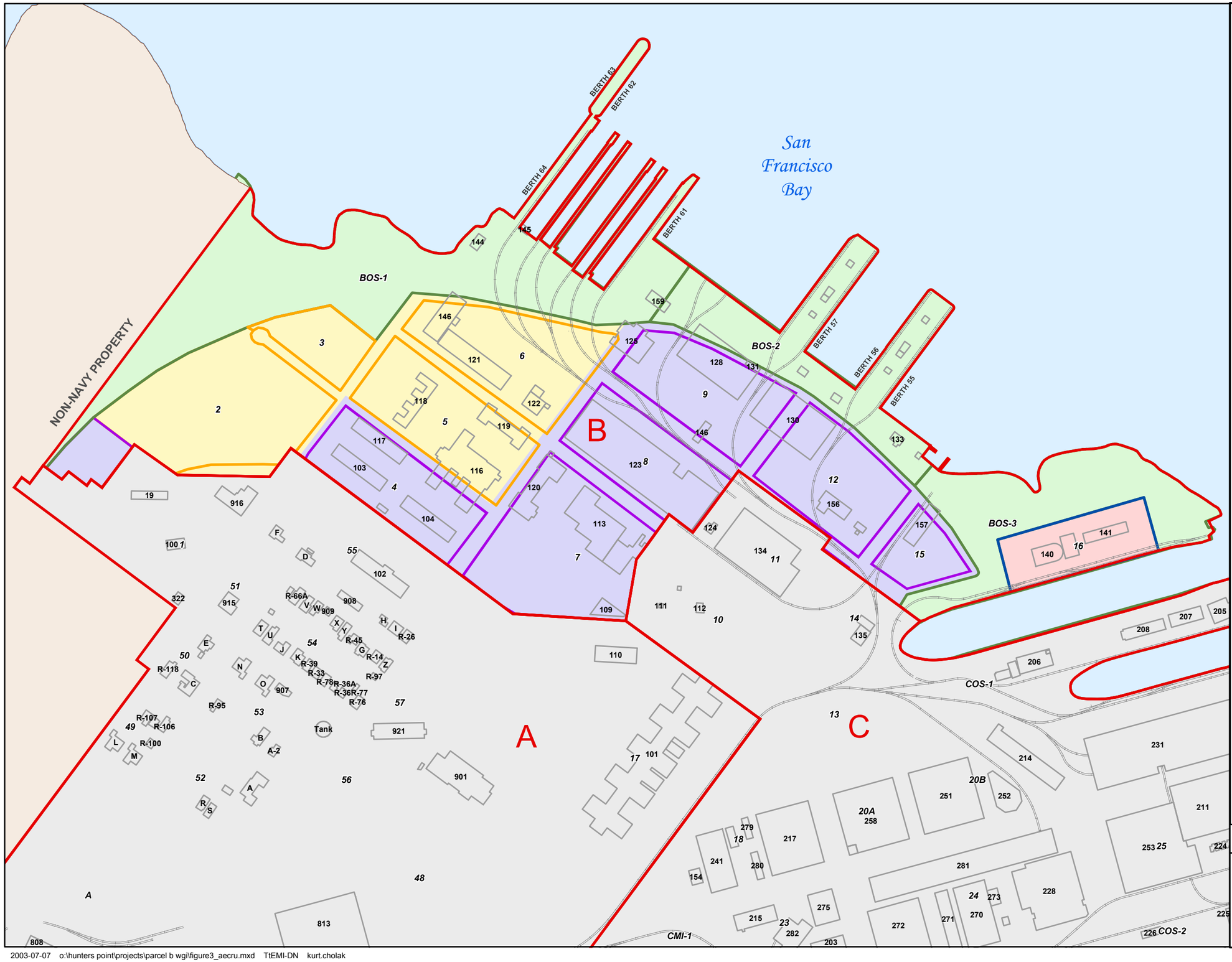


Location Map

**Reuse Category with Redevelopment Block Designation**

- 16 Educational/Cultural
- 7 Mixed Use
- BOS-1 Open Space
- 2 Research & Development
- Parcel Boundary
- Building
- Rail Line

N

300 0 300
Feet

Tetra Tech EM Inc.

**Hunters Point Shipyard, San Francisco, California**
U.S. Navy Southwest Division, NAVFAC, San Diego

**FIGURE4**
**PARCEL B LAND-USE DESIGNATIONS**

First Five-Year Review of HPS Remedial Actions

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## TABLES

## TABLE 1: SUMMARY OF PARCEL B SOIL CONTAMINATION

First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard, San Francisco, California

| Site Name[a] | Site Description | Chemical Exceeding Cleanup Goals[b] | Possible Sources[c,d] | Volume of Contaminated Solids[e] (Cubic Yards) | Status of Remedial Action Excavations[f] |
|---|---|---|---|---|---|
| IR-07 | Sub-Base Area | SVOCs, PCBs, and Metals | Disposal of sandblast waste, disposal of waste oil at IR-07 and IR-18, and bedrock-derived fill | 52,500 | Initiated, not yet reported |
| IR-10 | Building 123 (Battery and Electroplating Shop) | VOCs, SVOCs, PCBs, and Metals | 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 | Initiated, not yet reported |
| IR-18 | Waste Oil Disposal Area | SVOCs, PCBs, and Metals | Disposal of waste oil containing lead or the placement of lead-contaminated fill material, disposal of waste oil, and bedrock-derived fill | 22,000 | Initiated, not yet reported |
| IR-20 | Building 156 (Rubber Shop) | VOCs, SVOCs, PCBs, and Metals | Naturally occurring or anthropogenic metals and storage of waste oils and chemicals in Building 156 | 3,100 | Initiated, under review |
| IR-23 | Building 146 (Tactical Air Navigation Facility), Building 161 (Maintenance Service), Building 162 (Paint Storage), and Tank S-136 | VOCs, SVOCs, PCBs, and Metals | Petroleum hydrocarbon surface spill and naturally occurring or anthropogenic metals | 2,800 | Initiated, under review |
| IR-24 | Building 124 (Acid Mixing Plant), Building 125 (Submarine Cafeteria), and Buildings 128 and 130 (Machine Shop) | VOCs, SVOCs, PCBs, Cyanide, and Metals | Naturally occurring or anthropogenic metals, lead-containing fuel and waste paint, releases of diesel fuel and lubrication oil along the distribution pipelines that comprise IR-46, and leakage of fuel from the fuel distribution lines | 4,200 | Initiated, under review |
| IR-26 | Building 157 (Nondestructive Testing Laboratory) and Area XIV | VOCs, SVOCs, PCBs, and Metals | Naturally occurring or anthropogenic metals and petroleum-related contamination | 7,500 | Initiated, under review |
| IR-42 | 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) | SVOCs, PCBs, and Metals | Naturally occurring or anthropogenic metals and petroleum-related contamination | 300 | Initiated, under review |

## TABLE 1: SUMMARY OF PARCEL B SOIL CONTAMINATION (Continued)

First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard, San Francisco, California

| Site Name[a] | Site Description | Chemical Exceeding Cleanup Goals[b] | Possible Sources[c,d] | Volume of Contaminated Solids[e] (Cubic Yards) | Status of Remedial Action Excavations[f] |
|---|---|---|---|---|---|
| IR-46 (Fuel Lines) | Fuel Distribution Lines | SVOCs, PCBs, and Metals | 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 | 9,300 | Initiated, under review |
| IR-60 | Dry Docks 5, 6, and 7 | SVOCs and Metals | Naturally occurring or anthropogenic metals and ship painting activities | 600 | Initiated, under review |
| IR-61 | Building 122 (Electrical Substation V and Compressor Plant) | PCBs and Metals | Naturally occurring or anthropogenic metals and transformer release of PCBs | 100 | Initiated, under review |
| IR-62 | Buildings 115 and 116, Submarine Training Buildings and School | None[g] | Not applicable | Not applicable | Not needed |
| SI-31 | Building 114, Offices | None[g] | Not applicable | Not applicable | Not needed |
| SI-45 | Steam Line System | None[g] | Not applicable | Not applicable | Not needed |

Notes:

a IR-06 is not included in this table because it will be addressed as part of Parcel C and will be evaluated thoroughly in future five-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 and this five-year review, contamination information associated with these sites are presented with the IR sites that contain contamination associated with IR-50 and IR-51.

b Chemicals considered contaminants are those chemicals that exceed the remedial action objectives defined in the ROD (Navy 1997b) and subsequent ESDs (Navy 1998, 2000).

c Sources listed were identified in the Parcel B remedial investigation and feasibility study (PRC and others 1996a; PRC 1996d), and information was gathered during the remedial action.

d Although the Navy suspects that naturally occurring metals are a source of metals identified as contamination at Parcel B, naturally occurring metals as a source of these metals cannot be a confirmed until additional evaluation has been completed.

e Volumes of contaminated soil are based on the volumes excavated according to the construction summary report for Parcel B (Tetra Tech 2002e) and other estimates from remedial action activities. Actual volume of contaminants is expected to be greater than what is shown in the table at some sites because excavation is not complete.

f Excavation status explanation: "initiated, not yet reported" indicates excavation activities have been undertaken, but not yet presented in a report; "Initiated, under review" indicates excavation activities have been undertaken and reported and the adequacy of the excavation actions is under review by the regulatory agencies; "not needed" indicates excavation activities were not necessary for this site.

g No chemicals were detected at levels that exceed remedial action objectives defined in the ROD (Navy 1997b) 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.

## TABLE 1: SUMMARY OF PARCEL B SOIL CONTAMINATION (Continued)

First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard, San Francisco, California

Notes (Continued):

| | |
|---|---|
| ESD | Explanation of significant difference |
| IR | Installation Restoration |
| Navy | U.S. Department of the Navy |
| PCB | Polychlorinated biphenyl |
| PRC | PRC Environmental Management, Inc. |
| ROD | Record of decision |
| SI | Site inspection |
| SVOC | Semivolatile organic compound |
| Tetra Tech | Tetra Tech EM Inc. |
| VOC | Volatile organic compound |

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. 2002e. "Draft Parcel B Construction Summary Report, Hunters Point Shipyard, San Francisco, California." November 18.

## TABLE 2: STATUS OF PARCEL B REMEDIAL ACTIONS

First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard, San Francisco, California

| Selected Remedy | Components of Remedy | Applicable Sites | Current Status |
|---|---|---|---|
| Soil Remedy, S-2 | Excavation and Off-Site 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 |

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 3: RAMP WELLS AND EXCEEDANCES

First Five-Year Review of Implementation of Remedial Actions at Hunters Point Shipyard, San Francisco, California

| Well ID | Well Type | Location | Sampling Frequency | RAMP Trigger Level[a] | Date Added to RAMP | Original Install Date | Replacement Install Date | Decommissioned Date | Exceedances of POC Criteria each Quarter[b] | | | | | | | | | | | | | Number of Consecutive Rounds Clean[c] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 | Q11 | Q12 | Q13 | |
| IR07MWS-2 | POC | Near the high-tide line of the TIZ, which is the POC | Quarterly | POC | Original | 09/86 | 06/99 | -- | * | Zn | * | * | * | * | * | * | * | * | * | * | * | **11** |
| IR07MWS-4 | POC | | Quarterly | POC | Original | 09/86 | 06/99 | 3/01 | * | Ba, Zn | * | * | * | * | -- | -- | -- | -- | -- | -- | -- | **4** |
| IR07MW19A | POC | | Quarterly | POC | Original | 12/90 | -- | -- | * | Ba, Zn | * | * | * | * | * | * | * | * | * | * | * | **11** |
| IR10MW31A1 | POC/VOC | | Quarterly | POC/VOC | Original | 12/93 | 05/99 | -- | * | Ba, Zn | * | * | * | * | * | * | * | * | * | * | * | **11** |
| IR26MW41A | POC | | Quarterly | POC | Original | 11/94 | -- | -- | Mn, Ni | * | * | * | * | * | * | * | * | * | * | * | * | **12** |
| IR26MW45A | POC | | Quarterly | POC | Original | 05/99 | -- | 2/01 | * | Ba, Zn | * | Zn | * | * | -- | -- | -- | -- | -- | -- | -- | **2** |
| IR46MW37A | POC | | Quarterly | POC | Original | 03/94 | -- | -- | * | * | * | * | * | * | * | * | * | * | * | * | * | **13** |
| PA50MW01A | POC/VOC | | Quarterly | POC/VOC | Original | 03/93 | -- | -- | * | Zn | * | * | * | * | * | * | * | Cu, Zn | * | * | * | **3** |
| IR06MW45A | Sentinel/VOC | Near the inland edge of the approximate 5-year buffer zone | Semiannually | DAF x POC/VOC | Original | 09/91 | -- | -- | * | Cu, Pb, Zn | -- | -- | * | -- | * | -- | -- | * | -- | * | * | **5** |
| IR07MW23A | Sentinel | | Semiannually | DAF x POC | Original | 12/90 | -- | -- | * | Ba, Zn | -- | -- | * | -- | * | -- | -- | * | -- | * | * | **5** |
| IR07MW27A | Sentinel | | Semiannually | DAF x POC | Original | 04/99 | -- | -- | * | As, Ba, Zn | -- | -- | As | -- | As | -- | -- | * | -- | As | As | **0** |
| IR10MW28A | Sentinel/VOC | | Semiannually | DAF x POC/VOC | Original | 09/91 | -- | -- | * | Ba, Zn | -- | -- | * | -- | * | -- | -- | * | -- | * | * | **5** |
| IR25MW17A | Sentinel/VOC | | Semiannually | DAF x POC/VOC | Original | 05/94 | -- | -- | * | Zn | -- | -- | * | -- | -- | Co, Ni | -- | * | -- | * | * | **3** |
| IR61MW05A | Sentinel | | Semiannually | DAF x POC | Original | 07/95 | -- | -- | * | Ba, Zn | -- | -- | * | -- | * | -- | -- | * | -- | * | * | **5** |
| UT03MW11A | Sentinel | | Semiannually | DAF x POC | Original | 05/94 | -- | -- | * | Ba, Zn | -- | -- | * | -- | * | -- | -- | * | -- | * | * | **5** |
| IR07MW20A1 | Post-Remedial Action | Near remedial action excavations in IR-07 | Quarterly | POC | Original | 12/90 | -- | -- | * | Ba, Zn | * | * | Be | * | * | * | * | * | * | * | * | **8** |
| IR07MW21A1 | Post-Remedial Action | | Quarterly | POC | Original | 12/90 | -- | 3/01 | * | Ba, Zn | * | * | -- | -- | -- | -- | -- | -- | -- | -- | -- | **2** |
| IR07MW24A | Post-Remedial Action | | Quarterly | POC | Original | 05/99 | -- | 2/01 | * | Ba, Zn | * | * | * | * | -- | -- | -- | -- | -- | -- | -- | **4** |
| IR07MW25A | Post-Remedial Action | | Quarterly | POC | Original | 05/99 | -- | 11/00 | * | * | * | * | * | -- | -- | -- | -- | -- | -- | -- | -- | **5** |
| IR07MW26A | Post-Remedial Action | | Quarterly | POC | Original | 05/99 | -- | 3/01 | * | Ba, Zn | * | * | * | * | -- | -- | -- | -- | -- | -- | -- | **4** |
| IR10MW12A | Chromium 6/VOC | Near Building 123 | Quarterly | NAWQC/VOC | Q5 [d] | 12/88 | -- | -- | -- | -- | -- | -- | * | * | * | CrVI | CrVI | CrVI | CrVI | * | CrVI | **0** |
| IR10MW13A1 | VOC | In or near the VOC plume in IR-10 | Quarterly | VOC | Q5 | 12/88 | -- | -- | -- | -- | -- | -- | * | * | * | * | * | * | * | * | * | **9** |
| IR10MW14A | VOC | | Quarterly | VOC | Q5 | 01/89 | -- | -- | -- | -- | -- | -- | * | -- | * | * | * | * | * | * | * | **8** |
| IR10MW33A | VOC | | Quarterly | VOC | Original | 06/99 | -- | -- | * | * | * | * | * | * | * | * | * | * | * | * | * | **13** |
| IR10MW59A | VOC | | Quarterly | VOC | Q7 | 03/02 | -- | -- | -- | -- | -- | -- | -- | -- | TCE | TCE | TCE | TCE | TCE | TCE | TCE | **0** |
| IR25MW37A | VOC | | Quarterly | VOC | Q6 | 11/00 | -- | -- | -- | -- | -- | -- | -- | * | * | * | * | * | * | * | * | **8** |
| IR07MW28A | On-/Off-Site Migration | Along western boundary of Parcel B | Semiannually | POC | Original | 05/99 | -- | -- | * | Ba, Zn | * | * | * | * | * | * | * | * | * | * | * | **11** |
| IR18MW21A | On-/Off-Site Migration | | Semiannually | DAF x POC | Original | 04/93 | 05/99 | -- | Zn | -- | -- | -- | -- | * | * | * | * | * | * | * | * | **8** |
| IR06MW42A | Utility Line | Near IR-06 | Semiannually | SWPCP | Original | 06/90 | -- | -- | Ba | Ba, Zn | * | * | * | * | * | * | * | * | * | * | * | **11** |
| IR26MW46A | Supplemental Characterization | Around EE-05 in IR-26 | Quarterly | POC | Q9 | 01/02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | * | * | * | * | * | **5** |
| IR26MW47A | Supplemental Characterization | | Quarterly | POC | Q9 | 01/02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | * | Cu, Hg | Hg | Hg | * | **1** |
| IR26MW48A | Supplemental Characterization | | Quarterly | POC | Q9 | 01/02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | * | * | * | * | * | **5** |

Notes: The analytical suites for wells at Parcel B are as follows:

- POC, sentinel, and postremedial action wells: Metals, hexavalent chromium, VOCs, and TPH
- VOC wells: VOCs
- On- and off-site migration, and utility line wells: Metals, hexavalent chromium, VOCs, SVOCs, pesticides and PCBs, and TPH
- Hexavalent chromium wells: Hexavalent chromium
- Supplemental characterization wells: Arsenic, copper, chromium (total), hexavalent chromium, lead, manganese, mercury, and zinc; chlordane, PAHs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]ant hracene, and indeno[1,2,3-cd]pyrene); and Aroclor-1260

Analytical results did not exceed criteria

Analytical results exceeded criteria

a POC criteria is the HGAL/NAWQC or VOC criteria specified in the RAMP.

b For evaluation purposes, all wells are screened against the POC criteria, rather than the RAMP trigger levels listed.

c Rounds must be the most recent.

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

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| -- | Not sampled | Cu | Copper | PAH | Polynuclear aromatic hydrocarbon | Pb | Lead | TCE | Trichloroethene |
| * | All results meet POC criteria | DAF | Dilution attenuation factor | ID | Identification | POC | Point of compliance | TIZ | Tidally influenced zone |
| As | Arsenic | EE | Exploratory excavation | IR | Installation Restoration | Q1 , Q2, etc. | First quarter of RAMP, second quarter of RAMP, etc. | TPH | Total petroleum hydrocarbons |
| Ba | Barium | Hg | Mercury | Mn | Manganese | RAMP | Remedial action monitoring plan | VOC | Volatile organic compound |
| Co | Cobalt | HGAL | Hunters Point groundwater ambient level | Ni | Nickel | SVOC | Semivolatile organic compound | Zn | Zinc |
| Cr VI | Hexavalent chromium | NAWQC | National ambient water quality criteria | PCB | Polychlorinated biphenyl | SWPCP | Southeast Water Pollution Control Plant | | |

## TABLE 4: SOIL CLEANUP GOALS

First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard
San Francisco, California

| Chemical | 2000 ESD Cleanup Goal (mg/kg) | 1997 ROD Cleanup Goal (mg/kg) |
|---|---|---|
| 1,1,1-Trichloroethane | 770 | 12 |
| 1,1,2-Trichloroethane | 0.84 | 0.030 |
| 1,1-Dichloroethene | 0.054 | 0.007 |
| 1,2,4-Trichlorobenzene | 650 | 28 |
| 1,2-Dichlorobenzene | 370 | 160 |
| 1,2-Dichloroethane | 0.35 | 0.019 |
| 1,2-Dichloroethene (Total) | 43 | 9.1 |
| 1,4-Dichlorobenzene | 1.9 | 0.33 |
| 2,4-Dimethylphenol | 29 | 28 |
| 2-Butanone (Methyl ethyl ketone) | 7,300 | 62 |
| 2-Methylnaphthalene | 56 | 140 |
| 4,4'-Dichlorodiphenyldichloroethane (DDD) | 2.1 | 0.17 |
| 4,4'-Dichlorodiphenyldichloroethene (DDE) | 1.6 | 0.16 |
| 4,4'-Dichlorodiphenyltrichloroethane (DDT) | 1.2 | 0.040 |
| 4-Methyl-2-pentanone (Methyl isobutyl ketone) | 790 | 27 |
| Acenaphthene | 3,700 | 140 |
| Acenaphthylene | 3,700 | 130 |
| Aldrin | 0.024 | 0.0017 |
| alpha-Chlordane | 0.32 | 0.28 |
| Aluminum | 73,000 | 74,000 |
| Anthracene | 22,000 | 970 |
| Antimony | 10 | 10 |
| Arsenic | 11 | 11 |
| Barium | 2,700 | 2,700 |
| Benzene | 0.18 | 0.035 |
| Benzo(a)anthracene | 0.37 | 0.12 |
| Benzo(a)pyrene | 0.33 | 0.33 |
| Benzo(b)fluoranthene | 0.34 | 0.030 |
| Benzo(g,h,i)perylene | 1,600 | 360 |
| Benzo(k)fluoranthene | 0.34 | 0.33 |
| Benzoic acid | 2,200 | 2,200 |
| Beryllium | 140 | 0.8 |
| Bis(2-ethylhexyl)phthalate | 27 | NA |
| Bromoform | 0.49 | 0.081 |
| Cadmium | 3.5 | 3.1 |
| Carbazole | 0.64 | 0.64 |
| Carbon disulfide | 360 | 13 |

## TABLE 4: SOIL CLEANUP GOALS (Continued)

First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard
San Francisco, California

| Chemical | 2000 ESD Cleanup Goal (mg/kg) | 1997 ROD Cleanup Goal (mg/kg) |
|---|---|---|
| Carbon tetrachloride | 0.086 | 0.074 |
| Chlorobenzene | 150 | 22 |
| Chloroform | 0.24 | 0.051 |
| Chromium III | [a] | [a] |
| Chromium VI | 0.96 | 0.05 |
| Chrysene | 3.3 | 0.33 |
| cis-1,2-Dichloroethene | 43 | 8.8 |
| Cobalt | [a] | [a] |
| Copper | 160 | 160 |
| Cyanide | 2 | 2 |
| Dibenz(a,h)anthracene | 0.33 | 0.33 |
| Dibenzofuran | 290 | 13 |
| Diethylphthalate | 660 | 650 |
| Endosulfan I | 17 | 17 |
| Endosulfan II | 15 | 15 |
| Endosulfan sulfate | 16 | 16 |
| Endrin aldehyde | 17 | 2.1 |
| Endrin ketone | 17 | 2.1 |
| Ethylbenzene | 230 | 230 |
| Fluoranthene | 2,000 | 160 |
| Fluorene | 2,600 | 110 |
| gamma-Chlordane | 0.29 | 0.0017 |
| Heptachlor | 0.065 | 0.003 |
| Heptachlor epoxide | 0.0017 | 0.00038 |
| Indeno(1,2,3-cd)pyrene | 0.35 | 0.33 |
| Lead | 220 | 220 |
| Manganese | 1,400 | 2,300 |
| Mercury | 2.3 | 2.3 |
| Methoxychlor | 280 | 26 |
| Molybdenum | 79 | 47 |
| N-Nitroso-di-n-propylamine | 0.33 | 0.33 |
| N-Nitrosodiphenylamine | 1.1 | 1.1 |
| Naphthalene | 56 | 69 |
| Nickel | [b] | [b] |
| Pentachlorophenol | 2.6 | 0.8 |
| Phenanthrene | 15,000 | 130 |
| Phenol | 140 | 140 |
| Polychlorinated biphenyls[c] | 0.21 | 0.016 |

## TABLE 4: SOIL CLEANUP GOALS (Continued)

First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard
San Francisco, California

| Chemical | 2000 ESD Cleanup Goal (mg/kg) | 1997 ROD Cleanup Goal (mg/kg) |
|---|---|---|
| Pyrene | 2,300 | 120 |
| Selenium | 140 | 140 |
| Silver | 51 | 51 |
| Styrene | 1,700 | 310 |
| Tetrachloroethene | 0.94 | 0.16 |
| Thallium | 6.1 | 6.0 |
| Toluene | 520 | 230 |
| trans-1,2-Dichloroethene | 63 | 23 |
| Trichloroethene | 1.7 | 0.27 |
| Vanadium | 450 | 450 |
| Vinyl acetate | 430 | 62 |
| Vinyl chloride | 0.022 | 0.01 |
| Xylene (total) | 210 | 890 |
| Zinc | 370 | 370 |

Notes: Table 4 is based on and presented in a consistent format as Table 2-1 in the Parcel B construction summary report (Tetra Tech 2002e).

a The cleanup goal is the 1999 preliminary remediation goal with produce or the HPAL, whichever is greater.

b The HPAL for nickel is calculated on a sample-by-sample basis by using a magnesium regression or, if magnesium is weathered, by using a cobalt regression. The cobalt regression is found in the nickel technical memorandum (Tetra Tech 1999).

c Cleanup goal applies individually to Aroclors-1242, -1254, and -1260.

ESD Explanation of significant difference
HPAL Hunters Point ambient level
mg/kg Milligrams per kilogram
NA Not applicable
ROD Record of decision
Tetra Tech Tetra Tech EM Inc.

Sources:

Tetra Tech. 1999. "Draft Final Technical Memorandum, Nickel Screening and Implementation Plan, Hunters Point Shipyard, San Francisco, California." August 4.

Tetra Tech. 2002e. "Draft Parcel B Construction Summary Report, Hunters Point Shipyard, San Francisco, California." November 18.

U.S. Department of the Navy. 2000. "Final Explanation of Significant Differences, Parcel B, Hunters Point Shipyard, San Francisco, California." May 4.

## TABLE 5: ISSUES WITH SOIL REMEDY

First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard
San Francisco, California

| Issues | Affects Current Protectiveness (Yes/No) | Affects Future Protectiveness (Yes/No) |
|---|---|---|
| Subsurface conditions at IR-07 and a portion of IR-18 differ from the conceptual model developed for the remedial investigation and feasibility study. | No | Yes |
| The proximity of some excavations to the San Francisco Bay shoreline delayed complete characterization and prevented excavation of the soil. | No | Yes |
| Potential ecological risk to aquatic receptors from Parcel B contaminants near the shoreline has not been evaluated. | No | Yes |
| Portions of IR-10 have not been excavated because a soil-vapor extraction treatability study is being implemented. | No | Yes |
| It is the Navy's position that background levels of ambient metals in soil are higher and more variable than originally estimated. | No | Yes |
| Toxicity data used at the time of remedy selection have been updated, and cumulative risk was not estimated. | No | Yes |

Note:

IR Installation Restoration

## TABLE 6: RECOMMENDATIONS AND FOLLOW-UP ACTIONS FOR ISSUES WITH SOIL REMEDY

First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard, San Francisco, California

| Issue[a] | Recommendations and Follow-Up Actions | Party Responsible | Oversight Agency | Milestone Date |
|---|---|---|---|---|
| Subsurface conditions at IR-07 and a portion of IR-18 differ from conceptual model developed for remedial investigation and feasibility study. | Subsurface conditions need to be further evaluated at IR-07 and IR-18, the conceptual model needs to be updated, and a new remediation approach should be developed as part of the Parcel B ROD amendment process. | Navy | EPA | Technical Memorandum in Support of a ROD Amendment: 2004 |
| Proximity of some excavations to the San Francisco Bay shoreline delayed complete characterization and prevented excavation of the soil. | Potential need for remedial action at the shoreline near IR-07 and IR-26 should be evaluated during the ROD amendment process. | Navy | EPA | Technical Memorandum in Support of a ROD Amendment: 2004 |
| Potential ecological risk to aquatic receptors from Parcel B contaminants has not been evaluated. | Potential ecological risk to aquatic receptors from Parcel B contaminants should be evaluated. | Navy | EPA | To be determined |
| Portions of IR-10 have not been excavated because an SVE treatability study is being implemented. | Effectiveness of the SVE system should be further evaluated during the ROD amendment process and included in the amended record of decision if SVE is selected as a remedy for volatile organic compound-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 | EPA | Proposed Plan: 2004 |
| It is the Navy's position that background levels of ambient metals in soil are higher and more variable than originally estimated. | Soil remedial action objectives and alternatives should be reevaluated during the ROD amendment process to address higher and more variable levels of ambient metals. | Navy | EPA | Proposed Plan: 2004 |
| Toxicity data used at the time of the remedy selection have not been updated and cumulative risk has not been estimated. | Update human health risk assessment with new toxicological data and calculate cumulative risk as part of the ROD amendment process. | Navy | EPA | Technical Memorandum in Support of a ROD Amendment: 2004 |
| Deed restrictions[b] | Deed restrictions need to be developed before remedy is complete. | Navy and City and County of San Francisco | EPA | To Be Determined |

Notes:

a More complete descriptions of issues are provided in Table 5

b Recommendation is not based on an issue or problem but needs to be completed

EPA U.S. Environmental Protection Agency
IR Installation Restoration
Navy U.S. Department of the Navy
ROD Record of decision
SVE Soil-vapor extraction

## TABLE 7: GROUNDWATER MONITORING TRIGGER LEVELS FROM PARCEL B ROD

First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard, San Francisco, California

| Analyte[a] | RWQCB Basin Plan[b] (µg/L) | National Ambient Water Quality Criteria Saltwater Aquatic Life Protection[c] (µg/L) | | | 1/10th Acute | HGAL[d] (µg/L) | Trigger Level[e] (µg/L) |
|---|---|---|---|---|---|---|---|
| | | Recommended Criteria | Additional Toxicity Information (Aquatic Life) | | | | |
| | | | Acute | Chronic | | | |
| **Inorganics** | | | | | | | |
| Antimony | — | 500 | — | — | — | 43.26 | 500 |
| Barium | — | — | 50,000[f] | — | 5,000 | 504.20 | 5,000 |
| Beryllium | — | — | — | — | — | 1.40 | 1.40 |
| Cadmium | 9.3 | 9.3 | — | — | — | 5.08 | 9.3 |
| Chromium (III) | — | — | 10,300[g] | — | 1,030 | 15.66 | 1,030 |
| Chromium (VI) | 50 | 50 | — | — | — | NA | 50 |
| Copper | 2.9 | 2.4 | — | — | — | 28.04 | 28.04 |
| Lead | 5.6 | 8.1 | — | — | — | 14.44 | 14.44 |
| Manganese | — | — | — | — | — | 8,140 | 8,140 |
| Mercury | 0.025 | 0.025 | — | — | — | 0.60 | 0.60 |
| Nickel | 7.1 | 8.2 | — | — | — | 96.48 | 96.48 |
| Silver | 2.3 | 0.92 | — | — | — | 7.43 | 7.43 |
| Thallium | — | — | 2,130 | — | 213 | 12.97 | 213 |
| Zinc | 58 | 81 | — | — | — | 75.68 | 75.68 |
| **Organics** | | | | | | | |
| Benzene | — | — | 5,100 | — | 510 | NA | 510 |
| Chloroform | — | — | 12,000 | 6,400 | — | NA | 6,400 |
| 1,2-Dichloroethane | — | — | 113,000 | — | 11,300 | NA | 86[h] |
| 1,2-Dichloroethene | — | — | 224,000 | — | 22,400 | NA | 85[h] |
| 2,6-Dinitrotoluene | — | — | 590 | — | 59 | NA | 59 |
| Heptachlor epoxide | — | 0.0036 | — | — | — | NA | 0.0036 |
| Hexachloroethane | — | — | 940 | — | 94 | NA | 94 |
| Naphthalene | — | — | 2,350 | — | 235 | NA | 235 |
| Pentachlorophenol | — | 7.9 | — | — | — | NA | 7.9 |
| Phenanthrene | — | 4.6 | 300 | — | — | NA | 4.6 |

## TABLE 7: GROUNDWATER MONITORING TRIGGER LEVELS FROM PARCEL B ROD (Continued)

First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard, San Francisco, California

| Analyte[a] | RWQCB Basin Plan[b] (µg/L) | National Ambient Water Quality Criteria Saltwater Aquatic Life Protection[c] (µg/L) | | | 1/10th Acute | HGAL[d] (µg/L) | Trigger Level[e] (µg/L) |
|---|---|---|---|---|---|---|---|
| | | Recommended Criteria | Additional Toxicity Information (Aquatic Life) | | | | |
| | | | Acute | Chronic | | | |
| **Organics (Continued)** | | | | | | | |
| Tetrachloroethene (PCE) | — | — | 10,200 | 450 | — | NA | 145 [h] |
| 1,1,2,2-Tetrachloroethane | — | — | 9,020 | — | 902 | NA | 147 [h] |
| 1,1,1-Trichloroethane | — | — | 31,200 | — | 3,120 | NA | 117 [h] |
| Trichloroethene (TCE) | — | — | 2,000 | — | 200 | NA | 114 [h] |
| Vinyl chloride | — | — | — | — | — | — | 55 [h] |

Notes: Table 7 is based on and presented in a consistent format as Table 10 in the 1997 record of decision for Parcel B (U.S Department of the Navy 1997b).

a Only analytes that (a) have water quality criteria or HGALs and (b) were detected by analysis are presented.

b Values represent most stringent water quality objective for surface waters with salinities greater than or equal to 5 parts per thousand, taken from Table 3-3 of the Basin Plan (RWQCB 1995).

c The NAWQC is the most stringent value of the saltwater aquatic life protection recommended criteria and toxicity criteria (RWQCB 1995).

d HGALs do not exist for chromium (VI), cyanide, and organics, because they are not considered naturally occurring. HGALs apply only to A-aquifer groundwater.

e Trigger levels were developed by comparing HGALs with the more stringent value of the (1) NAWQC for protection of saltwater aquatic life and (2) water quality objectives in the Basin Plan (RWQCB 1995). The HGAL replaced the selected water quality criterion only when the HGAL was greater than the water quality criterion.

f Values taken from U.S. Environmental Protection Agency guidance (1986).

g Based on total chromium.

h Human health-based criteria were developed for VOCs that may represent a human health risk to a future resident at Parcel B. Concentrations of these VOCs in groundwater correspond to an excess lifetime cancer risk of $10^{-6}$ and were selected as groundwater remedial action objectives for protection of human health based on analysis of groundwater-to-indoor air modeling.

— Data not available

µg/L Micrograms per liter

HGAL Hunters Point groundwater ambient level

NA Not applicable; for example, HGALs are not applicable to organics

NAWQC National Ambient Water Quality Criteria

RWQCB California Regional Water Quality Control Board

VOC Volatile organic compound

Sources:

RWQCB. 1995. "Water Quality Control Plan (Basin Plan) for the San Francisco Bay Region." June 21.

U.S. Department of the Navy. 1997b. "Hunters Point Shipyard, Parcel B Record of Decision." October 7.

U.S. Environmental Protection Agency. 1986. "Quality Criteria for Water." EPA 440/5-86-001.

## TABLE 8: ISSUES WITH GROUNDWATER REMEDY

First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard
San Francisco, California

| Issues | Affects Current Protectiveness (Yes/No) | Affects Future Protectiveness (Yes/No) |
|---|---|---|
| The existing remedial action monitoring plan should be improved to better focus groundwater monitoring at Parcel B. | No | No |
| Trigger levels may not reflect current guidance. | No | Yes |
| It is the Navy's position that concentrations of metals in groundwater are affected by background levels of ambient metals in soil, which are higher and more variable than originally estimated. | No | Yes |
| Toxicity data used at the time of remedy selection have been updated, and cumulative risk was not estimated. | No | Yes |
| Potential ecological risk to aquatic receptors from Parcel B contaminants has not been evaluated. | No | Yes |
| A POC well and other characterization wells were destroyed during excavation activities at IR-07. | No | Yes |

Notes:

IR Installation Restoration
POC Point of compliance

## TABLE 9: RECOMMENDATIONS AND FOLLOW-UP ACTIONS FOR ISSUES WITH GROUNDWATER REMEDY

First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard, San Francisco, California

| Issue[a] | Recommendations and Follow-Up Actions | Party Responsible | Oversight Agency | Milestone Date |
|---|---|---|---|---|
| The existing RAMP can be optimized to better focus groundwater monitoring at Parcel B. | Refinement of Parcel B groundwater monitoring will be discussed with the agencies and detailed in the basewide monitoring plan, which encompasses groundwater monitoring for Parcels B, C, D, and E, and is currently being developed. | Navy | EPA | Basewide Monitoring Plan: December 2003: |
| Trigger levels may not reflect current guidance. | Trigger levels should be reevaluated. | Navy | EPA | Basewide Monitoring Plan: December 2003 |
| It is the Navy's position that concentrations of metals in groundwater are affected by background levels of ambient metals in soil that are higher and more variable than originally estimated. | Ambient metals in groundwater may be re-evaluated, if necessary, to ensure protectiveness of human health and the environment. | Navy | EPA | Basewide Monitoring Plan: December 2003 |
| Toxicity data used at time of remedy selection have been updated and cumulative risk was not estimated. | Update HHRA with new toxicological data and calculate cumulative risk as part of the ROD amendment process. | Navy | EPA | Technical Memorandum in Support of a ROD Amendment: 2004 |
| Potential ecological risk to aquatic receptors from Parcel B contaminants has not been evaluated. | Potential ecological risk to aquatic receptors from Parcel B contaminants should be evaluated. | Navy | EPA | To be determined |
| A POC well and other characterization wells were destroyed during excavation at IR-07. | Install a POC well and other characterization wells at IR-07. | Navy | EPA | Basewide Monitoring Plan December 2003 |
| Treatability studies[b] | 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 | EPA | To be determined |
| Deed restrictions[b] | Deed restrictions need to be developed before remedy is complete. | Navy and City and County of San Francisco | EPA | To be determined |

Notes:

a More complete descriptions of issues are provided in Table 8

b Recommendation is not based on an issue or problem but needs to be completed

| | | | | | |
|---|---|---|---|---|---|
| EPA | U.S. Environmental Protection Agency | POC | Point of compliance | SVE | Soil-vapor extraction |
| HHRA | Human health risk assessment | RAMP | Remedial action monitoring program | VOC | Volatile organic compound |
| IR | Installation Restoration | ROD | Record of decision | ZVI | Zero-valent iron |
| Navy | U.S. Department of the Navy | | | | |

Source:

EPA. 2002b. "Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils." November.

## APPENDIX A
## LIST OF DOCUMENTS REVIEWED

## DOCUMENTS REVIEWED

Appendix A lists the relevant documents reviewed as part of the five-year review process. Although other documents were referenced when preparing the five-year review report, documents included in this appendix document remedial actions implemented at Parcel B, which is the focus of this five-year review. Documents are listed in chronological order.


San Francisco Redevelopment Agency. 1997. "Hunters Point Shipyard Redevelopment Plan." July 14.

U.S. Department of the Navy (Navy). 1997. "Hunters Point Shipyard, Parcel B Record of Decision." October 7.

Navy. 1998. "Explanation of Significant Difference, Naval Station Treasure Island, Hunters Point Annex." August 24.

Tetra Tech EM Inc. (Tetra Tech). 1999. "Draft Final Technical Memorandum, Nickel Screening and Implementation Plan, Hunters Point Shipyard, San Francisco, California." August 4.

Tetra Tech and Morrison Knudsen Corporation (MK). 1999. "Final Parcel B Remedial Design Documents, Remedial Action, Hunters Point Shipyard, San Francisco, California." August 19.

Tetra Tech and MK. 1999. "Final Remedial Action Monitoring Plan, Parcel B Remedial Action, Hunters Point Shipyard, San Francisco, California." Revision 2. August 19.

Navy. 2000. "Final Explanation of Significant Differences, Parcel B, Hunters Point Shipyard, San Francisco, California." May 4.

Tetra Tech. 2001. "Final Remedial Design Documents Amendment, Parcel B, Hunters Point Shipyard, San Francisco, California." February 20.

Tetra Tech. 2001. "Final Technical Memorandum Parcel B Storm Drain Infiltration Study, Hunters Point Shipyard, San Francisco, California." February 28.

Tetra Tech. 2001. "Draft Technical Memorandum, Parcel B Groundwater Evaluation, Hunters Point Shipyard, San Francisco, California." November 30.

Tetra Tech. 2002. "Draft Historical Radiological Assessment, Volume II, Use of General Radioactive Materials, 1939-2002, Hunters Point Shipyard, San Francisco, California." March 29.

Tetra Tech. 2002. "Draft Parcel B Construction Summary Report, Hunters Point Shipyard, San Francisco, California." November 18.

Tetra Tech. 2003. "Final Technical Memorandum, Interpretation of Fill Conditions at Installation Restoration Sites IR-07 and IR-18, Parcel B, Hunters Point Shipyard, California." March 28.

Tetra Tech. 2003. "Final January to December 2002, Annual Groundwater Sampling Report, Parcel B, Hunters Point Shipyard, San Francisco, California." May 23.

Tetra Tech and Innovative Technical Solutions, Inc. 2003. "Draft Community Relations Plan, Hunters Point Shipyard, San Francisco, California." June 6.

## APPENDIX B
## APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Table B-1: Applicable or Relevant and Appropriate Requirements for Soil

Table B-2: Applicable or Relevant and Appropriate Requirements for Groundwater

## TABLE B-1: APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR SOIL[a]

First Five-Year Review for Implementation of Remedial Actions at Hunters Point Shipyard, San Francisco, California

| ARAR | Status | Requirement Synopsis | Action To Be Taken To Attain ARAR |
|---|---|---|---|
| **Chemical-Specific** | | | |
| RWQCB Water Quality Control Plan (Basin Plan) | The Navy and State do not agree that the Basin Plan is an ARAR for soil | The Navy does not agree that the Basin Plan is a chemical-specific ARAR for soil because it does not contain health- or risk-based soil cleanup levels. Consequently, soil cleanup levels that have been and will be used were not based on the Basin Plan. Instead, risk-based cleanup levels were based on 1999 EPA, Region 9, PRGs and HPALs (for metals). | Although soil cleanup levels were based on risk-based cleanup levels and HPALs (for metals) that were not identified in the Basin Plan, the selected remedy will satisfy the Basin Plan. |
| SWRCB Resolution No. 92-49 | The Navy and State do not agree that the SWRCB Resolution No. 92-49 is an ARAR for soil | The Navy does not agree that SWRCB Resolution No. 92-49 is a chemical-specific ARAR for soil because it does not contain health- or risk-based cleanup levels for soil. Consequently, soil cleanup levels that have been and will be used were not based on Resolution No. 92-49. Instead, risk-based cleanup levels that have been and will be used were based on 1999 EPA, Region 9, PRGs and HPALs (for metals). | Although soil cleanup levels were based on risk-based cleanup levels and HPALs (for metals) that were not identified in SWRCB Resolution No. 92-49, the selected remedy will satisfy SWRCB Resolution No. 92-49. |
| **Action-Specific** | | | |
| Hazardous waste identification regulations–Title 22 of CCR, Division 4.5, Chapter 11, Article 2-4 (40 CFR Part 261, Subparts B-D) | Applicable | Hazardous waste identification regulations are used to assess whether any media must be managed as hazardous waste. | Soils excavated as part of the remedial action will be analyzed and identified as a hazardous waste in accordance with Title 22 of CCR, Division 4.5, Chapter 11, Article 2-4. |
| Generator requirements–Title 22 of CCR, Division 4.5, Chapter 12, Article 1-3 (40 CFR Part 262, Subparts A-C) | Applicable if excavated soil is hazardous | Generator requirements apply to waste that is classified as hazardous. | Hazardous soils that have been excavated will be managed in containers on site for less than 90 days, in accordance with Title 22 of CCR, Division 4.5, Chapter 12, Article 1-3. |

## TABLE B-1: APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR SOIL[a] (Continued)

First Five-Year Review for Implementation of Remedial Actions at Hunters Point Shipyard, San Francisco, California

| ARAR | Status | Requirement Synopsis | Action To Be Taken To Attain ARAR |
|---|---|---|---|
| **Action-Specific (Continued)** | | | |
| Land disposal restrictions–Title 22 of CCR, Division 4.5, Chapter 18, Article 1, Section 66268.7 (a) (40 CFR Part 268.7(a)) | Applicable | Land disposal restrictions require treatment before disposal in a landfill. | Excavated soil will be analyzed to evaluate whether treatment is required before disposal in accordance with Title 22 of CCR, Division 4.5, Chapter 18, Article 1, Section 66268.7 (a). |
| Control of visible emissions and particulates–BAAQMD Regulations 6-301, 6-302, 6-305 | Relevant and appropriate | Regulations for control of visible emissions and particulates apply to excavation activities. | Controls that are consistent with BAAQMD Regulations 6-301, 6-302, and 6-305 will be implemented during excavation. |
| Aeration of soil–BAAQMD Regulations 8-40-301 and 8-40-303 | Relevant and appropriate | Regulations for aeration of soil apply to stockpiles of excavated soil. Regulation 8-40-301 limits uncontrolled aeration, and Regulation 8-40-303 contains requirements for soil storage piles. | Stockpiles of excavated soil will be managed in accordance with BAAQMD Regulations 8-40-301 and 8-40-303. |
| Waste discharge to land requirements–Title 23 of CCR, Division 3, Chapter 15, Section 2546 | Relevant and appropriate | Waste discharge to land requirements include precipitation and drainage controls for stockpiles of excavated soil. | Appropriate precipitation and drainage controls will be incorporated into the design of stockpiles in accordance with Title 23 of CCR, Division 3, Chapter 15, Section 2546. |
| Waste discharge to land, detection monitoring requirements–Title 23 of CCR, Division 3, Chapter 15, Section 2550.8 | The Navy and State do not agree that detection monitoring requirements are ARARs | Detection monitoring requirements pertain to establishing background values, proposing monitoring parameters, and evaluating whether a statistically significant release has occurred. | Although a monitoring program has not been developed for evaluating whether a statistically significant release has occurred from stockpiled soil, background values have already been established for HPS and a parcel-wide monitoring program has been approved by the regulatory agencies. |
| **Location-Specific** | | | |
| Coastal zone management plan consistency–Coastal Zone Management Act, 16 USC Section 1456(c) | Applicable | Federal activities affecting the coastal zone must be conducted in a manner consistent with the State's coastal zone management plan. | Remedial activities will be conducted in a manner consistent with the coastal zone management plan and in accordance with Coastal Zone Management Act, 16–USC Section 1456 (c). |

## TABLE B-1: APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR SOIL[a] (Continued)

First Five-Year Review for Implementation of Remedial Actions at Hunters Point Shipyard, San Francisco, California

Notes:

| | |
|---|---|
| a | ARARs listed in this table are based on the ARARs identified in the 1997 ROD. No to be considered criteria were listed in the 1997 ROD. |
| ARAR | Applicable or relevant and appropriate requirement |
| BAAQMD | Bay Area Air Quality Management District |
| CCR | *California Code of Regulations* |
| CFR | *Code of Federal Regulations* |
| EPA | U.S. Environmental Protection Agency |
| HPAL | Hunters Point ambient level |
| HPS | Hunters Point Shipyard |
| NAWQC | National Ambient Water Quality Criteria |
| PRG | Preliminary remediation goal |
| ROD | Record of decision |
| RWQCB | California Regional Water Quality Control Board |
| SWRCB | State Water Resources Control Board |
| USC | *United States Code* |

Sources:

RWQCB. 1995. "Water Quality Control Plan (Basin Plan) for the San Francisco Bay Region." San Francisco Bay Region. June 21.

U.S. Department of the Navy. 1997. "Hunters Point Shipyard, Parcel B Record of Decision." October 7.

## TABLE B-2: APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR GROUNDWATER[a]

First Five-Year Review for Implementation of Remedial Actions at Hunters Point Shipyard, San Francisco, California

| ARAR | Status | Requirement Synopsis | Action To Be Taken To Attain ARAR |
|---|---|---|---|
| **Chemical-Specific** | | | |
| Basin Plan–narrative water quality objectives for groundwater as they relate to freshwater replenishment | Applicable | Although the Navy does not agree with the State that the groundwater underlying Parcel B has a beneficial use of freshwater replenishment, the Navy agrees that narrative water quality objectives for freshwater replenishment are applicable. The narrative water quality objectives for groundwater with the beneficial use of freshwater replenishment states that "groundwater shall not contain concentrations of chemicals in amounts that will adversely affect the beneficial use of the receiving surface water." | Parcel B groundwater trigger levels satisfy the narrative water quality objectives stated in the Basin Plan because numerical water quality objectives for surface water (from Basin Plan as described in following row) and NAWQC for protection of saltwater aquatic life were considered when developing the trigger levels. |
| Basin Plan–numerical water quality objectives in Table 3-3 of plan | Relevant and Appropriate | The Basin Plan includes numerical water quality objectives for surface water. Although not applicable because they apply to surface water, the numerical water quality objectives in Table 3-3 of the Basin Plan are relevant and appropriate to the extent that the groundwater migrates to surface water. | Numerical water quality objectives for surface water (Table 3-3 of the Basin Plan) were considered when developing trigger levels for groundwater at Parcel B. Numerical surface water quality objectives were compared with NAWQC for protection of saltwater aquatic life and HGALs. |
| SWRCB Resolution No. 92-49, Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under California Water Code Section 13304 | Relevant and appropriate | Most of Resolution No. 92-49 contains procedural rather than substantive requirements and is therefore not an ARAR; however, the Navy and State agree that Section III.G, which states that dischargers must abate the effects of the discharges "in a manner that promotes attainment of either background water quality, or best water quality that is reasonable," is relevant and appropriate for groundwater. | Excavation of contaminated soil will remove the source, which will promote attainment of the beneficial use of groundwater underlying Parcel B (freshwater replenishment) and will satisfy SWRCB Resolution No. 92-49. |
| SWRCB Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality Waters in California under California Water Code Section 13140 | Navy and State do not agree that SWRCB Resolution No. 68-16 is an ARAR | The State asserts that Resolution No. 68-16 is a potential ARAR that governs the further migration of contaminated groundwater and requires cleanup of groundwater to background levels. The Navy asserts that Resolution No. 68-16 is prospective in intent, applying to new discharges to maintain existing high-quality waters. | Although the Navy does not consider Resolution No. 68-16 an ARAR, the selected remedy meets the requirements of SWRCB Resolution No. 68-16 because the beneficial uses of groundwater underlying Parcel B and surface water that is connected to Parcel B groundwater will be maintained. |

## TABLE B-2: APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR GROUNDWATER[a] (Continued)

First Five-Year Review for Implementation of Remedial Actions at Hunters Point Shipyard, San Francisco, California

| ARAR | Status | Requirement Synopsis | Action To Be Taken To Attain ARAR |
|---|---|---|---|
| **No action-specific ARARs for groundwater are listed in the 1997 ROD or subsequent ESDs** | | | |
| **Location-Specific** | | | |
| Coastal zone management plan consistency–Coastal Zone Management Act, 16 USC Section 1456(c) | Applicable | Federal activities affecting the coastal zone must be conducted in a manner consistent with the State's coastal zone management plan. | Remedial activities will be conducted in a manner consistent with the coastal zone management plan and in accordance with Coastal Zone Management Act, 16–USC Section 1456 (c). |

Notes:

| | |
|---|---|
| a | ARARs listed in this table are based on the ARARs identified in the 1997 ROD. No to be considered criteria were listed in the 1997 ROD. |
| ARAR | Applicable or relevant and appropriate requirement |
| ESD | Explanation of significant difference |
| HGAL | Hunters Point groundwater ambient level |
| NAWQC | National ambient water quality criteria |
| ROD | Record of decision |
| RWQCB | California Regional Water Quality Control Board |
| SWRCB | State Water Resources Control Board |
| USC | *United States Code* |

Sources:

RWQCB. 1995. "Water Quality Control Plan (Basin Plan) for the San Francisco Bay Region." San Francisco Bay Region. June 21.

U.S. Department of the Navy. 1997. "Hunters Point Shipyard, Parcel B Record of Decision." October 7.

**APPENDIX C**
**SITE INSPECTION CHECKLIST**

**FIVE-YEAR REVIEW SITE VISIT CHECKLIST**

## I. SITE INFORMATION

| | |
|---|---|
| **Site Name:** Hunters Point Shipyard | **Date of Inspection:** May 12 and 13, 2003 |
| **Location and Region:** San Francisco, California | **EPA ID:** CA1170090087 |
| **Agency, Office, or Company Leading the Five-Year Review:** U.S. Department of Navy | **Weather/Temperature:** Sunny, about 60 °F |

**Remedy Includes:** (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Other (Note: groundwater monitoring)

**Attachments:** ☐ Inspection team roster attached ☒ Site layout maps attached (Figures 2 and 3 of main report)

## II. INTERVIEWS (Check all that apply)

**1. O&M Site Manager** Not Applicable (N/A) _____ _____ _____
Name Title Date

Interviewed: ☐ by mail ☐ at office ☐ by phone Phone no. _____

Problems, suggestions: ☐ Report attached

**2. O&M Staff** N/A _____ _____ _____
Name Title Date

Interviewed: ☐ by mail ☐ at office ☐ by phone Phone no. _____

Problems, suggestions: ☐ Report attached

**3. Local Regulatory Authorities and Response Agencies** (such as 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 N/A; Federal Facility Agreement signatory agencies have declined the offer to interview and other agencies have not responded

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): ☒ Report attached to Five-Year Review Report

Interviewees listed include only those interviewed on May 12 or 13, 2003, as part of the site inspection.

Keith Tisdell, Lynne Brown, Barbara Bushnell, Dave Terzian, Ahimsa Sumchai, J.R. Manuel, Julian Billote, Tad Britenthol, Maurice Campbell, and Lea Loizos

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

**1. O&M Documents**

| | | | |
|---|---|---|---|
| O&M manual (long-term monitoring plan) (Note: O&M manuals consist of field sampling plans and quality assurance project plans) | ☒ Readily available | ☒ Up-to-date | ☐ N/A |
| As-built drawings | ☐ Readily available | ☐ Up-to-date | ☒ N/A |
| Maintenance logs (semiannual well inspection sheets) | ☐ Readily available | ☒ Up-to-date | ☐ N/A |

Remarks: Maintenance logs were not observed on site but have been completed

| | | | |
|---|---|---|---|
| **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: An up–to-date site-wide health and safety plan and emergency information was available on site

| | | | |
|---|---|---|---|
| **3. O&M and OSHA Training Records** | ☒ Readily available | ☐ Up-to-date | ☐ N/A |

Remarks: A binder with various certifications and training records was observed on site.

**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 |
| **6. Settlement Monument Records** | ☐ Readily available | ☐ Up-to-date | ☒ N/A |
| **7. Groundwater Monitoring Records** | ☐ Readily available | ☒ Up-to-date | ☐ N/A |
| **8. Leachate Extraction Records** | ☐ Readily available | ☐ Up-to-date | ☒ N/A |
| **10. Daily Access/Security Logs** | ☐ Readily available | ☐ Up-to-date | ☒ N/A |

Remarks: Security guards were stationed at entrance to entire base; various logs, including daily tailgate forms, were observed in field trailer.

## IV. O&M COSTS

**1. O&M Organization**

☐ State in-house ☐ Contractor for State

☐ PRP in-house ☐ Contractor for PRP

☒ Other (Navy and Navy contractor are responsible for groundwater monitoring)

**2. O&M Cost Records** (Note: O&M cost information was not identified during site inspection; however, information is available and will be reviewed as part of report preparation)

☐ 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

| Date | Date | Total Cost | | |
|---|---|---|---|---|
| From _____ | to _____ | _____ | - | ☐ Breakdown attached |
| From _____ | to _____ | _____ | - | ☐ Breakdown attached |
| From _____ | to _____ | _____ | - | ☐ Breakdown attached |
| From _____ | to _____ | _____ | - | ☐ Breakdown attached |
| From _____ | to _____ | _____ | - | ☐ Breakdown attached |
| From _____ | to _____ | _____ | - | ☐ Breakdown attached |
| From _____ | to _____ | _____ | - | ☐ Breakdown attached |
| From _____ | to _____ | _____ | - | ☐ Breakdown attached |

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

N/A (because costs were not reviewed during site inspection)

## V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

### A. Fencing

**1. Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: Temporary and permanent fencing was observed throughout Parcel B (Photographs D-27, D-28, D-30, and D-31 of Appendix D). Fencing appeared to be used for traffic control, previous excavation exclusion zones, health and safety reasons, and site access. Fencing that limited access to Parcel B was in good condition. No damage was observed on fencing that is currently in use. All gates were locked during the inspection.

### B. Other Access Restrictions

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

Remarks: Security guards were stationed at the entrance to the base. Various signs were observed throughout the site and Parcel B (Photographs D-28, D-29, D-30, and D-31 of Appendix D). Buildings were boarded up and access restriction signs were posted to prevent people from entering abandoned buildings. Building signs presented Navy contact information. Signs were also posted on fences to restrict access. Most access restrictions were based on physical health and safety concerns.

**C. Institutional Controls**

**1. Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☐ No ☒ N/A (At this time)

Site conditions imply ICs not being fully enforced ☐ Yes ☐ No ☒ N/A (At this time)

Type of monitoring (for example, self-reporting or drive by) N/A

Frequency N/A

Responsible party/agency N/A

Contact: N/A _____ _____ _____ _____

Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☒ N/A (At this time)

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A (At this time)

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☒ N/A (At this time)

Violations have been reported ☐ Yes ☐ No ☒ N/A (At this time)

Other problems or suggestions: ☐ Report attached

(Note: Institutional controls have not been implemented except for some fencing)

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

Remarks: (Note: Institutional controls have not been implemented except for some fencing)

**D. General**

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

Remarks: In general, minimal vandalism was observed. Windows on abandoned buildings were broken throughout the site, but it is unclear if windows were broken as a result of vandalism. Photograph D-32 of Appendix D shows broken windows on Building 123, which provides an example of broken windows throughout the site.

**2. Land-use changes on site** ☐ N/A

Remarks: Land-use changes were not observed during the site inspection.

**3. Land-use changes off site** ☐ N/A

Remarks: Land-use changes were not observed during the site inspection.

## VI. GENERAL SITE CONDITIONS

**A. Roads** ☒ Applicable ☐ N/A

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

Remarks: Potholes were observed throughout Parcel B (Photograph D-33 of Appendix D), but roads seemed adequate for light use.

**B. Other Site Conditions**

Remarks: None

## 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 _____ Depth _____
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 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 that allow 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

☐ Good condition ☐ Evidence of leakage at penetration

☐ Needs O&M ☐ N/A

Remarks: _____

**2. Gas Monitoring Probes**

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled

☐ Good condition ☐ Evidence of leakage at penetration

☐ Needs O&M ☐ N/A

Remarks: _____

**3. Monitoring Wells** (within surface area of landfill)

☐ Evidence of leakage at penetration ☐ Needs O&M ☐ N/A

Remarks: _____

**4. Leachate Extraction Wells**

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled

☐ Good condition ☐ Evidence of leakage at penetration

☐ Needs O&M ☐ 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 O&M

Remarks: _____

_____

**2. Gas Collection Wells, Manifolds, and Piping**

☐ Good condition ☐ Needs O&M

Remarks: _____

_____

**3. Gas Monitoring Facilities** (for example, gas monitoring of adjacent homes or buildings)

☐ Good condition ☐ Needs O&M ☐ 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 _____ Depth _____

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

Frequency _____ ☐ Evidence of breaching

Head differential _____

Remarks: _____

## IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

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

**1. Pumps, Wellhead 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 absorbers

☐ Filters _____

☐ Additive (such as chelation agent, flocculent) _____

☐ Others _____

☐ Good condition ☐ Needs O&M

☐ 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 O&M

Remarks: _____

**3. Tanks, Vaults, Storage Vessels**

☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs O&M

Remarks: _____

**4. Discharge Structure and Appurtenances**

☐ N/A ☐ Good condition ☐ Needs O&M

Remarks: _____

**5. Treatment Building(s)**

☐ N/A ☐ Good condition (especially roof and doorways) ☐ Needs repair

☐ Chemicals and equipment properly stored

Remarks: _____

**6. Monitoring Wells** (Pump and treatment remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs O&M ☐ N/A

Remarks: _____

**D. Monitored Natural Attenuation (Note: Monitored natural attenuation is not part of the Parcel B selected remedy, only groundwater monitoring)** ☒ Applicable ☐ N/A

**1. Monitoring Wells**

☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition

☒ All required wells located ☐ Needs O&M ☐ N/A

Remarks: All monitoring wells appeared to be in good condition. Wells were clearly labeled and were locked. The vault boxes for wells IR07MW19A, IR10MW59A, IR18MW21A, IR26MW46A, PA50MW01A, and UT03MW11A contained standing water (as shown in Photographs D-3, D-15, D-16, D-20, D-25, and D-26 of Appendix D). Several vault boxes (for wells IR06MW42A, IR06MW45A, IR07MW20A1, IR10MW14A, IR25MW17A, and IR46MW37A) appeared to be recently maintained because fresh concrete was observed (Photographs D-1, D-2, D-4, D-11, D-17, and D-23, respectively, of Appendix D).

## X. OTHER REMEDIES

If remedies are applied at the site that 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.

## 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 (for example, to contain contaminant plume, minimize infiltration and gas emission, etc.).

None.

### B. Adequacy of O&M

Quarterly groundwater monitoring appears to be implemented in accordance with the ROD. All wells were identified and were in good condition except for a few vault boxes that contained water.

### C. Early Indicators of Potential Remedy Failure

None.

### D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Several well vaults contained standing water; however, the procedures in the field sampling plan ensure that standing water is removed from the well and is therefore not a problem. No opportunities for optimization were identified.

## APPENDIX D
## PHOTOGRAPHIC LOG


**Photograph D-1. Well IR06MW42A; padlock on well and new concrete associated with vault.**
Orientation: North
Date: May 13, 2003


**Photograph D-2. Well IR06MW45A; padlock on well and new concrete associated with vault.**
Orientation: North
Date: May 13, 2003

**Photograph D-3. Well IR07MW19A; padlock on well and standing water with rust in vault.**
Orientation: East
Date: May 13, 2003


**Photograph D-4. Well IR07MW20A1; padlock on well and new concrete associated with vault.**
Orientation: Northwest
Date: May 13, 2003

**Photograph D-5. Well IR07MW23A; padlock on well.**
Orientation: East
Date: May 13, 2003


**Photograph D-6. Well IR07MW27A.**
Orientation: West
Date: May 13, 2003

**Photograph D-7. Well IR07MW28A; wellhead is above ground and protected by well casing and wooden fencing with reflectors.**
Orientation: North
Date: May 13, 2003

**Photograph D-8. Well IR07MWS-2; wellhead is above ground and protected by well casing and concrete bollards.**
Orientation: Southwest
Date: May 13, 2003

**Photograph D-9. Well IR10MW12A; padlock on well.**
Orientation: East
Date: May 13, 2003

**Photograph D-10. Well IR10MW13A1; padlock on well.**
Orientation: North
Date: May 13, 2003


**Photograph D-11. Well IR10MW14A; note new concrete associated with vault.**
Orientation: North
Date: May 13, 2003


**Photograph D-12. Well IR10MW28A; located inside Building 123.**
Orientation: South
Date: May 13, 2003

**Photograph D-13. Well IR10MW31A1; padlock on well.**
Orientation: East
Date: May 13, 2003

**Photograph D-14. Well IR10MW33A.**
Orientation: South
Date: May 13, 2003

**Photograph D-15. Well IR10MW59A; padlock on well and standing water in vault.**
Orientation: Northwest
Date: May 13, 2003

**Photograph D-16. Well IR18MW21A; padlock on well and standing water in vault.**
Orientation: North
Date: May 13, 2003


**Photograph D-17. Well IR25MW17A; padlock on well and new concrete associated with vault.**
Orientation: East
Date: May 13, 2003

**Photograph D-18. Well IR25MW37A.**
Orientation: West
Date: May 13, 2003


**Photograph D-19. Well IR26MW41A.**
Orientation: East
Date: May 13, 2003

**Photograph D-20. Well IR26MW46A; padlock on well and standing water in vault.**
Orientation: West
Date: May 13, 2003


**Photograph D-21. Well IR26MW47A.**
Orientation: North
Date: May 13, 2003


**Photograph D-22. Well IR26MW48A.**
Orientation: Northwest
Date: May 13, 2003


**Photograph D-23. Well IR46MW37A; padlock on well and new concrete associated with vault.**
Orientation: East
Date: May 13, 2003

**Photograph D-24. Well IR61MW05A.**
Orientation: Southwest
Date: May 13, 2003

**Photograph D-25. Well PA50MW01A; padlock on well and standing water in vault above wellhead.**
Orientation: South
Date: May 13, 2003

**Photograph D-26. Well UT03MW11A; padlock on well and standing water in vault above wellhead.**
Orientation: Northeast
Date: May 13, 2003

**Photograph D-27. Newly installed permanent fence along shoreline new Dry Docks 5, 6, and 7. The fence runs perpendicular to the shoreline between Buildings 125 and 128.**
Orientation: East
Date: May 13, 2003


**Photograph D-28. Warning sign posted on newly installed permanent fence along shoreline near well IR07MW20A1; representative of signs posted along the length of newly installed fencing.**
Orientation: Northwest
Date: May 13, 2003


**Photograph D-29. Access restriction sign posted on Building 146; representative of signs posted on abandoned buildings throughout Parcel B.**
Orientation: Northeast
Date: May 13, 2003

**Photograph D-30. Permanent fence along west property line, with no trespassing sign and barbed wire.**
Orientation: East
Date: May 13, 2003


**Photograph D-31. Permanent fence along west property line, with no trespassing sign that provides warning of environmental health hazards.**
Orientation: East
Date: May 13, 2003

**Photograph D-32. Broken windows on Building 123; representative of broken windows on abandoned buildings throughout Parcel B.**
Orientation: Northeast
Date: May 13, 2003

**Photograph D-33. Large pothole in road on Parcel B near Building 104; extreme example of potholes observed throughout Parcel B roads.**
Orientation: East
Date: May 13, 2003

# APPENDIX E
# INTERVIEW FORMS

## TABLE E-1: INTERVIEW DOCUMENTATION

First Five-Year Review of Implementation of Remedial Actions at Hunters Point Shipyard
San Francisco, California

| Name | Title/Position | Organization | Date of Interview |
|---|---|---|---|
| Julian Billote | Occupies framing and artist studio | Parcel B tenant | May 13, 2003 |
| Tad Britenthol | Cabinet maker | Parcel B tenant | May 12, 2003 |
| Lynne Brown | Community co-chair | RAB member | May 13, 2003 |
| Barbara Bushnell | NA | RAB member | May 13, 2003 |
| Maurice Campbell | NA | RAB member, BDI, CAC | May 12, 2003 |
| Lea Loizos | NA | Arc Ecology | May 13, 2003 |
| J.R. Manuel | NA | RAB member | May 12, 2003 |
| Ahimsa Sumchai | NA | RAB member | May 13, 2003 |
| David Terzian | Director | The Point | May 13, 2003 |
| Keith Tisdell | NA | RAB member | May 13, 2003 |

Notes:

| | |
|---|---|
| NA | Not applicable |
| BDI | Business Development Incorporated |
| CAC | Citizens Advisory Committee |
| RAB | Restoration Advisory Board |

| SUPERFUND SITE SURVEY – INTERVIEW RECORD | | |
|---|---|---|
| **Site Name:** Hunters Point Shipyard | | **EPA ID Number:** CA1170090087 |
| **Subject:** Five-Year Review Assessment of Remedial Actions Implemented at Parcel B | | **Date:** May 13, 2003 |
| **Contact Made By:** (Persons listed below are responsible for five-year review report, but actual contact was made by Jackie Lane, EPA, and Kelly Hirsch and Carolyn Hunter, Tetra Tech EM Inc.) | | |
| **Name:** Keith Forman | **Title:** BRAC Environmental Coordinator | **Organization:** Navy |
| **Name:** Tim Mower | **Title:** Project Manager | **Organization:** Tetra Tech EM Inc. |
| **Individual Contacted:** | | |
| **Name:** Julian Billote | **Title:** Framing and Artist Studio | **Organization:** Tenant |
| **Contacted By:** Telephone: ☐ Visit: ☒ Other: ☐ | | |

**Survey Questions**

Should you choose to respond, please return your survey via e-mail or postal service to Tim Mower

1. **What is your impression of the project Parcel B (general sentiment)?**

   - As a taxpayer, Mr. Billote's impressions are not favorable at all. A hole was dug right in front of his building and filled in, then, during a subsequent year, a bigger hole was dug in the same area. He felt this was inefficient. He also noted that the parking lot in front of Building 116 used to have an ecosystem.
   - After excavations, Parcel B turned into a dust bowl, and there are fewer animals. Parcel B used to be nice. Mr. Billote would like the Navy to plant grass.
   - For a while, dust was bad on base. The tenants were doubly freaked out because they heard the dust was radioactive.

2. **What effects have site operations had on the surrounding community**
   - Dust has been major problem
   - Extraction units – The SVE wells that operated for 24 hours a day for a year were very loud.
   - IT flooded Building 116. IT did not seem to be the most responsive, but they are better now.
   - Trucks would be idled overnight in front; kicked up dust and were loud.

| SUPERFUND SITE SURVEY - FORM C | |
|---|---|
| **Site Name:** Hunters Point Shipyard | **EPA ID Number:** CA1170090087 |
| **Subject:** Five-Year Review Assessment of Remedial Actions Implemented at Parcel B | **Date:** May 13, 2003 |

**Survey Questions (Continued)**

3. **Do you feel well informed about the site's activities and progress?**

   Yes, but only because he put himself out there.

4. **Do you have any comments, suggestions, or recommendations regarding the site's management or operations**

   Mr. Billote would really like to see some ground cover; not in main parking lots, but in areas that used to have some vegetation before excavations began.
   Dust should have been managed better; not only during active excavation but after excavations were complete.
   Dust was problem for 3 years and is still problem, although not as severe.

| SUPERFUND SITE SURVEY - FORM C | |
|---|---|
| **Site Name:** Hunters Point Shipyard | **EPA ID Number:** CA1170090087 |
| **Subject:** Five-Year Review Assessment of Remedial Actions Implemented at Parcel B | **Date:** May 13, 2003 |

**Survey Questions (Continued)**

5. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**
   - Yes. Radiation concerns and dumping of other toxics the article by Lisa Davis discussed.
   - Asthma problem on hill has been linked to the dust.
   - Constant low-level anxiety about toxics. People will go to him regularly to ask about the risks.
   - A guy next door got cancer, which freaked people.

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.**
   - The extent of vandalism is breaking windows.
   - If he sees someone who doesn't belong, he calls security and it is taken care of.
   - IT/Shaw was getting things stolen.
   - They closed the main gate (that is at the turn past the security gate), which he likes, but if a fire occurred it could be a problem. He's not confident that security person on site could respond quickly.
   - "Sink" hole on main road going down to Building 116.

**GENERAL COMMENTS**

Mr. Billote observed a leak to the water in one of the most eastern dry docks at low tide. The leak appeared to be a solvent, not oil. It is clearer than an oil slick. It looks more like gasoline. He thinks that a Navy contractor checked the pipe, but at high tide. He would like the pipes/leak to be checked at low tide.

| SUPERFUND SITE SURVEY- INTERVIEW RECORD | |
|---|---|
| **Site Name:** Hunters Point Shipyard | **EPA ID Number:** CA1170090087 |
| **Subject:** Five-Year Review Assessment of Remedial Actions Implemented at Parcel B | **Date:** May 12, 2003 |

**Contact Made By:** (Persons listed below are responsible for five-year review report, but actual contact was made by Jackie Lane, EPA, and Kelly Hirsch and Carolyn Hunter, Tetra Tech EM Inc.)

| | | |
|---|---|---|
| **Name:** Keith Forman | **Title:** BRAC Environmental Coordinator | **Organization:** Navy |
| **Name:** Tim Mower | **Title:** Project Manager | **Organization:** Tetra Tech EM Inc. |
| **Individual Contacted:** | | |
| **Name:** Tad Britenthol | **Title:** Cabinet Maker | **Organization**: Parcel B Tenant |

**Contacted By:** Telephone: ☐ Visit: ☒ Other: ☐

**Survey Questions**

Should you choose to respond, please return your survey via e-mail or postal service to Tim Mower.

1. **What is your impression of the project Parcel B (general sentiment)?**

   Mr. Britenthol has been a tenant for 20 years, and he thinks the Navy has done a decent job. Dust is a problem, but that comes with the territory. The Navy did water down the area during construction. He indicated that work is very thorough and things are always being checked. He realizes that dust isn't toxic and is not really a problem.

2. **What effects have site operations had on the surrounding community**

   There was general disruption of large machinery, but he felt that the contractors were courteous. He had no problem with the construction; it comes with the territory.

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**Survey Questions (Continued)**

**3. Do you feel well informed about the site's activities and progress?**

Absolutely, so informed it's astounding. Tenants know ahead of time what is going on because workers answer questions. Everyone seemed courteous. He indicated that all of the communication representatives are thorough. His only concern is that he wants to stay in Building 125 as long as possible. He also commented that the Navy's responses are not always quick, but are thorough.

**4. Do you have any comments, suggestions, or recommendations regarding the site's management or operations**

Keep artist on base as long as possible. He would like to see everyone cooperate and allow artists be part of the process for timing and reuse decisions. He does not want to be evicted and have the land sit without being redeveloped. He has been a legitimate tenant and paid bills, and expects the same courtesy in return.

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**Survey Questions (Continued)**

5. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   Bayview Hunters Point Community has a lot of ownership issues. Outside shipyard, there are a lot of concerns. There is anger in community because they think that Navy took advantage of them, but he can't really comment on that. He stated that the CAC is advising City and County correctly.

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.**

   There have been almost no break-ins or burglaries in 20 years. Occasionally, he sees kids breaking into buildings but guards take care of it. In the past, there were copper thieves, but all copper has been removed from the base.

**GENERAL COMMENT**

He referred us to Julian Billote, who supposedly saw a leak in the dry docks during low tide. (See Julian Billote's interview record.)

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| **Contact Made By:** (Persons listed below are responsible for five-year review report but actual contact was made by Jackie Lane, EPA, and Kelly Hirsch and Carolyn Hunter, Tetra Tech EM Inc.) | | |
| **Name:** Keith Forman | **Title:** BRAC Environmental Coordinator | **Organization:** Navy |
| **Name:** Tim Mower | **Title:** Project Manager | **Organization:** Tetra Tech EM Inc. |
| **Individual Contacted:** | | |
| **Name:** Lynne Brown | **Title:** Community Co-Chair | **Organization:** RAB |
| **Contacted By:** Telephone: ☒ Visit: ☐ Other: ☐ | | |
| **Survey Questions** | | |

Should you choose to respond, please return your survey
via e-mail or postal service to Tim Mower

1. **What is your impression of the project Parcel B (general sentiment)?**

   Before it was deplorable, but it is better now (basewide). Mr. Brown feels that the Navy needs to better address manganese hot spots on IR sites in Parcel B.

2. **What effects have site operations had on the surrounding community**

   Before, holes were left open and dust in the community caused people to become sick. Now, Keith Forman is taking care of things.

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**Survey Questions (Continued)**

**3. Do you feel well informed about the site's activities and progress?**

Yes.

**4. Do you have any comments, suggestions, or recommendations regarding the site's management or operations?**

No. Mr. Brown will let the BRAC handle management and operations and then comment later.
He feels that IR-07 and IR-18, the submarine pier, and IR-04 around the pier are not characterized appropriately.

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**Survey Questions (Continued)**

5. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   No.

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.**

   Mr. Brown was aware of the fire that took place. He indicated that homeless people have not been around Hunters Point.

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| **Name:** Keith Forman | **Title:** BRAC Environmental Coordinator | **Organization:** Navy |
| **Name:** Tim Mower | **Title:** Project Manager | **Organization:** Tetra Tech EM Inc. |
| **Individual Contacted:** | | |
| **Name:** Barbara Bushnell | **Title:** N/A | **Organization:** RAB Member |
| **Contacted By:** Telephone: ☐ Visit: ☒ Other: ☐ | | |

**Survey Questions**

Should you choose to respond, please return your survey via e-mail or postal service to Tim Mower.

1. **What is your impression of the project (general sentiment)?**

   Ms. Bushnell feels that there is so much information that it is almost confusing. Some things are not clear and not all data are complete, especially regarding manganese issues. Even though manganese is mainly an air inhalation concern, which is not an issue now, she is concerned about the future. She is also concerned about how the shoreline is being handled. She does not feel that the water should be addressed as a separate parcel.

2. **What effects have site operations had on the surrounding community?**

   She feels that hauling of the dirt during construction affected the community. People were concerned with fact that the trucks were uncovered, which seemed to be a health issue.

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**Survey Questions (Continued)**

**3. Do you feel well informed about the site's activities and progress?**

Yes, Ms. Bushnell does because she is on the RAB. Even before she was on the RAB, she was somewhat aware. There have been articles in The Chronicle and various publications, and she took environmental class through City College in 2000 that also helped.

**4. Do you have any comments, suggestions, or recommendations regarding the site's management or operations?**

Ms. Bushnell feels that given the level of community interest, there should be other sources of communication and information. For example, when community members make statements on asthma problems from the August 2000 fire (increased hospitalization), she would like to see backup for such statements.

She feels that the Community Relations Plan is probably finding other holes, such as the delay in receiving information. For example, the latest newsletter from the Navy was dated December 2002 and the RAB received it much later.

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**Survey Questions (Continued)**

5. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details**.

   Not at the moment. Ms. Bushnell feels that the fire in 2000 united the community. However, she thinks that some situations should be dealt with in a more timely fashion.

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.**

   Not recently. Ms. Bushnell is aware of past fires, but knows that measures have been taken to reduce likelihood of fires happening in the future.

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| **Contact Made By:** (Persons listed below are responsible for five-year review report but actual contact was made by Jackie Lane, EPA, and Kelly Hirsch and Carolyn Hunter, Tetra Tech EM Inc.) | | |
| **Name:** Keith Forman | **Title:** BRAC Environmental Coordinator | **Organization:** Navy |
| **Name:** Tim Mower | **Title:** Project Manager | **Organization:** Tetra Tech EM Inc. |
| **Individual Contacted:** | | |
| **Name:** Maurice Campbell | **Title:** N/A | **Organization:** BDI/RAB/CAC |
| **Contacted By:** Telephone: ☐ Visit: ☒ Other: ☐ | | |

**Survey Questions**

Should you choose to respond, please return your survey
via e-mail or postal service to Tim Mower.

1. **What is your impression of the project Parcel B (general sentiment)?**

   Mr. Campbell feels that PRC's (Tetra Tech's) initial analysis of Parcel B was flawed and some points need to be expanded, such as the shoreline, IR-07, and IR-18.

2. **What effects have site operations had on the surrounding community**

   - IR-07 and IR-18 soil piles were not covered
   - Trucks were uncovered

   He feels that things are better now though.

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**Survey Questions (Continued)**

**3. Do you feel well informed about the site's activities and progress?**

Yes.

**4. Do you have any comments, suggestions, or recommendations regarding the site's management or operations?**

As mentioned in question No. 1, Mr. Campbell feels that some points of analysis need to be expanded. He questions whether Parcel B has been cleaned up to $10^{-6}$.

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**Survey Questions (Continued)**

5. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   Mr. Campbell feels that things have gotten much better since Keith Forman took over.

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.**

   Mr. Campbell is aware of the grass fires at Parcel B. He feels that the emergency response e-mails are good. He is aware that the community is concerned with fencing around the site and security, not because of toxic issues but because a child could walk down to the site and could fall into the holes by the submarine docks.

**GENERAL COMMENT**

He feels that it is important for the Navy to stick to the ROD; otherwise, the community will not trust the Navy and decision-makers.

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| **Contact Made By:** (Persons listed below are responsible for five-year review report but actual contact was made by Jackie Lane, EPA, and Kelly Hirsch and Carolyn Hunter, Tetra Tech EM Inc.) | | |
| **Name:** Keith Forman | **Title:** BRAC Environmental Coordinator | **Organization:** Navy |
| **Name:** Tim Mower | **Title:** Project Manager | **Organization:** Tetra Tech EM Inc. |
| **Individual Contacted:** | | |
| **Name:** Lea Loizos | **Title:** N/A | **Organization:** Arc Ecology |
| **Contacted By:** Telephone: ☒ Visit: ☐ Other: ☐ | | |

**Survey Questions**

Should you choose to respond, please return your survey via e-mail or postal service to Tim Mower.

1. **What is your impression of the project Parcel B (general sentiment)?**

   Ms. Loizos feels that responses to the ROD have been incomplete. She thinks that what was originally stated in the ROD has been forgotten. Many changes have happened in the past 5 years, which has caused things to be overlooked.

2. **What effects have site operations had on the surrounding community?**

   - Exposure to contaminants during excavation, especially the exposure of black sand.
   - Areas of excavation were open for long periods of time.
   - Lack of security at Parcel B with open excavations is a danger to children.

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**Survey Questions (Continued)**

**3. Do you feel well informed about the site's activities and progress?**

Yes and no. Ms. Loizos feels better informed than the average community member because she has been able attend BCT meetings, but it seems to her that a lot is going on behind the scenes, especially regarding future actions and decisions. She does not feel that the community has been able to give feedback on decisions regarding future actions.

**4. Do you have any comments, suggestions, or recommendations regarding the site's management or operations**

Regarding the ROD amendment, Ms. Loizos is concerned that the RMR process will be closed to the community. She feels that the ROD amendment and transfers need to follow the same community involvement standards as the proposed plan standards.

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**Survey Questions (Continued)**

5. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   Ms. Loizos feels that the community's current concerns are regarding the following unanswered questions:

   - What future actions are going to be taken?
   - What work has stopped?
   - What remedial decisions have been made and completed?

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.

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| **Name:** Keith Forman | **Title:** BRAC Environmental Coordinator | **Organization:** Navy |
| **Name:** Tim Mower | **Title:** Project Manager | **Organization:** Tetra Tech EM Inc. |
| **Individual Contacted:** | | |
| **Name:** J.R. Manuel | **Title:** N/A | **Organization:** RAB |
| **Contacted By:** Telephone: ☐ Visit: ☒ Other: ☐ | | |

**Survey Questions**

Should you choose to respond, please return your survey
via e-mail or postal service to Tim Mower.

1. **What is your impression of the project Parcel B (general sentiment)?**

   In general Mr. Manuel feels that for the integrity of all parties be maintained, goals must be established up front and those goals should not change. He also made the following comments:

   - Everything that could reasonably be done is being done.
   - Fair approach to dealing with problem.
   - Regulators and those heading up project are conscious of situations and issues and details of the site.
   - There are reasonable expectations of protecting health.
   - People need to leave RAB meetings feeling like something has been accomplished.

2. **What effects have site operations had on the surrounding community?**

   Mr. Manuel thinks that Parcel B excavations and quarterly monitoring have had the biggest impact on the community. He thinks that the trucks have done what laws require. Community would want expedited remedy, and he feels that project leads are doing a good job at expediting the remedy. Entire group responds to community needs, inquiries, and RAB complaints.

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**Survey Questions (Continued)**

3. **Do you feel well informed about the site's activities and progress?**

   Yes, very well informed. Mr. Manuel stated that people like Jackie Lane (EPA), who represent government and citizens, are always able to answer questions. Even if not presented, information is available for inquiries.

4. **Do you have any comments, suggestions, or recommendations regarding the site's management or operations?**

   Generally, Mr. Manuel feels that the regulators and community need a neutral facilitator. A neutral party could better assure the community that things are OK. A neutral party might also be able to help community members figure out what questions to ask. The neutral party would have to be someone familiar with the subject matter, in tune with emotional questions, and a volunteer or a community member who is motivated by serving the community and has no other self-serving motives. He feels that time could be better used, if there wasn't a communication gap.

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**Survey Questions (Continued)**

5. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   Mr. Manuel explained that, in general, the community is not trusting of anything large. Quite a few community members know that they can't trust Lennar, because Lennar was sponsoring people and things that no one trusts.

   (See question No. 4 for the solution for this problem.)

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.**

   He was vaguely familiar with a fire on Parcel B.

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| **Name:** Keith Forman | **Title:** BRAC Environmental Coordinator | **Organization:** Navy |
| **Name:** Tim Mower | **Title:** Project Manager | **Organization:** Tetra Tech EM Inc. |
| **Individual Contacted:** | | |
| **Name:** Ahimsa Sumchai | **Title:** N/A | **Organization:** RAB Member |
| **Contacted By:** Telephone: ☒ Visit: ☐ Other: ☐ | | |

**Survey Questions**

Should you choose to respond, please return your survey via e-mail or postal service to Tim Mower.

1. **What is your impression of the project (general sentiment)?**

   Dr. Sumchai feels that because of the extent of contamination, it has been a dynamic process. They keep finding contamination. The landfill fire in August 2000 created dynamic circumstances and made the community look more closely at the appropriateness of suggested remedies. The Parcel B ROD needs to be looked at again, with focus on radiological concerns. Need to look at adjacency issues. Parcel-by-parcel cleanup approaches need to be examined and some questions need to be asked about decisions that were made 5 years ago to see if approach is appropriate.

2. **What effects have site operations had on the surrounding community**

   Dr. Sumchai noticed quite a bit of disturbance to the community from trucking in and out of the base. Community was concerned about how contamination was trucked into community. There was community concern about tenants occupying base before cleanup is complete, which raises moral and ethical concerns.

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**Survey Questions (Continued)**

3. **Do you feel well informed about the site's activities and progress?**

   No, other controversial issues are diverting attention from the day-by-day activities that are worthy of examining. Dr. Sumchai wasn't aware that a ROD was completed for Parcel B. She recommended that any changes to the original ROD should be presented to RAB and community.

4. **Do you have any comments, suggestions, or recommendations regarding the site's management or operations?**

   Yes, there has been talk of having a DoD hearing on a base master plan to see if it's appropriate and working. Dr. Sumchai does not believe that HPS will ever be safe for residential use or development, but maybe for industrial use. Community is in a bind to provide honest answers as to what can be done. The shipyard landscape has changed dramatically, and she does not think that remedies from 5 years ago are working now.

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**Survey Questions (Continued)**

5. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   In RAB meetings, redevelopment questions have come up about leasing at the shipyard. Dr. Sumchai is concerned about subleasing at Parcel B.

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.**

   Dr. Sumchai commented on fires documented from last year. She explained that she was never very clear about the BAYCAT project.

   ARC Ecology revealed that workers had been exposed to radiation at Parcel B, but that ended up anomalous. There has been a lot of media in the past 3 years.

**GENERAL COMMENTS:**

Dr. Sumchai is concerned that radiological concerns at Parcel B have not been characterized and that IR-07 and IR-18 have had questionable radioactive anomalies. She explained that even if EPA is concerned with radiation, the Navy has not recommended future action. She is concerned about radioactivity risk being left at the site, leaving residents exposed to radiation and cancer.

There is a Radiological Subcommittee Meeting on May 21, 2003, at Greenhouse Community Center (4919 3rd Street across from Palou). (Tape of meeting will air in June 2003)
RASO, Channel 29 Keven Epps, Outside, Gail Bishop, Se Morman, Edde Welbon (PR), Kevyn Lutton

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| **Name:** Keith Forman | **Title:** BRAC Environmental Coordinator | **Organization:** Navy |
| **Name:** Tim Mower | **Title:** Project Manager | **Organization:** Tetra Tech EM Inc. |
| **Individual Contacted:** | | |
| **Name:** David Terzian | **Title:** Director | **Organization:** The Point |
| **Contacted By:** Telephone: ☐ Visit: ☒ Other: ☐ | | |

**Survey Questions**

Should you choose to respond, please return your survey
via e-mail or postal service to Tim Mower.

1. **What is your impression of the project (general sentiment)?**

   Assuming all timetables have been met, Mr. Terzian's general sentiment is good. He is concerned about the SVE system, whether it is going to be effective and whether its effectiveness is being monitored. He is also concerned that identification of toxins and sources is not complete. The Navy hasn't determined contamination migration fully. He is also concerned that cleanup costs have not been fully defined.

2. **What effects have site operations had on the surrounding community?**

   Mr. Terzian mentioned the following effects on tenants on Parcel B tenants:

   - Truck traffic
   - Dust from excavation
   - Open and uncovered pits
   - Uncontained contamination
   - Excavation staging areas are too close to buildings (because truck drivers would sit in their tucks all night with engines running).

   Mr. Terzian also commented that he would like to have received communication on what was done in the previous 24 hours.

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**Survey Questions (Continued)**

3. **Do you feel well informed about the site's activities and progress?**

   If Mr. Terzian goes to RAB meetings all of the time, yes; however, when activity is daily and meetings are monthly, it's hard to keep track of what has been done.

4. **Do you have any comments, suggestions, or recommendations regarding the site's management or operations?**

   Mr. Terzian suggested that because tenants in Parcel B are active, they should be more involved with figuring out the logistics of the remediation. He's not claiming to be a scientist, but is very familiar with Parcel B logistics.

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**Survey Questions (Continued)**

5. **Are you aware of ant community concerns regarding the site or its operation and administration? If so, please give details.**

   Mr. Terzian is aware of the following community concerns:

   - Site will not be cleaned up to residential standards, which could create future development problems.
   - Hiring practices for remediation aren't benefiting Bayview community.
   - Parcel A will be developed prior to complete remediation of Parcel B, which could create opportunities for future children living on Parcel A to be exposed to dust from Parcel B cleanup activities.
   - Community is frightened about what they've seen in the past; for example, it's all about money and they'll get burned.

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**

- When are they going to identify toxins, and when will they be cleaned up? (not that anyone has an answer)
- Because of homeland security, is cleanup a priority? And what about other base closures that will be priority?

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| **Name:** Keith Forman | **Title:** BRAC Environmental Coordinator | **Organization:** Navy |
| **Name:** Tim Mower | **Title:** Project Manager | **Organization:** Tetra Tech EM Inc. |
| **Individual Contacted:** | | |
| **Name:** Keith Tisdell | **Title:** N/A | **Organization:** RAB |
| **Contacted By:** Telephone: ☒ Visit: ☐ Other: ☐ | | |

**Survey Questions**

Should you choose to respond, please return your survey
via e-mail or postal service to Tim Mower

1. **What is your impression of the project Parcel B (general sentiment)?**

   OK, but Mr. Tisdell feels that communication with the community could be better handled to create trust. Because he is more familiar with Parcels A and E, he suggested that there be a presentation to the RAB on a Parcel B update.

2. **What effects have site operations had on the surrounding community?**

   Mr. Tisdell explained that people/community members are wondering what's going on. People see workers but don't know what they are doing. Site progress should be more frequently communicated to tenants on brief fact sheets.

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**Survey Questions (Continued)**

3. **Do you feel well informed about the site's activities and progress?**

   Yes and no.

4. **Do you have any comments, suggestions, or recommendations regarding the site's management or operations**

   Mr. Tisdell thinks that site managers could be more in-tune with the community. The community doesn't know where to look for information. He suggested introducing Navy personnel who are on base (ROICC) to the community and RAB members.

| SUPERFUND SITE SURVEY - FORM C | |
|---|---|
| **Site Name:** Hunters Point Shipyard | **EPA ID Number:** CA1170090087 |
| **Subject:** Five-Year Review Assessment of Remedial Actions Implemented at Parcel B | **Date:** May 13, 2003 |

**Survey Questions (Continued)**

5. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   Mr. Tisdell is concerned that the two roads down below where he lives will be closed due to cleanup. Residents surrounding his house were also concerned. He was also very concerned with the pump station alarm that went off throughout an entire weekend.

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.**

   Mr. Tisdell is aware of some vandalism and looting that has been going on for a few years. He does not feel that security is doing its job because people that shouldn't be on the base are allowed on. Looting happened during the time that trucks were hauling soil.

# APPENDIX F
# RESPONSES TO REGULATORY AGENCY COMMENTS ON THE DRAFT FIRST FIVE-YEAR REVIEW OF REMEDIAL ACTIONS IMPLEMENTED AT HUNTERS POINT SHIPYARD

# RESPONSES TO REGULATORY AGENCY COMMENTS ON THE DRAFT FIRST FIVE-YEAR REVIEW OF REMEDIAL ACTIONS IMPLEMENTED AT HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA

This document presents the U.S. Department of the Navy's (Navy) responses to comments from the U.S. Environmental Protection Agency (EPA), the Department of Toxic Substances Control (DTSC), and the Regional Water Quality Control Board (RWQCB) on the "Draft First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard, San Francisco, California," dated July 8, 2003. The Navy received the comments addressed below from EPA on August 15 and September 10, 2003; from DTSC on August 22, 2003; and from RWQCB on September 4, 2003.

## RESPONSES TO EPA COMMENTS

### General Comments

1. **Comment:** **The First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard, Hunters Point Shipyard, San Francisco, California, July 2003 (the five year review) does not discuss all of the sites listed in the Hunters Point Shipyard Parcel B Final Record of Decision dated October 7, 1997 (the ROD). Table 1 of the ROD includes Sites IR-06, SI-31, SI-45, IR-50, IR-51 and IR-62. The notes from Table 1 state that site IR-62 is not included in the five year review because it is a petroleum site. As defined in Section 1.4 of the EPA June 2001 Comprehensive Five Year Review Guidance (Review Guidance) "the five year review... as a matter of policy, should address all OUs and remedial actions that have been initiated at the time of the review..." Please include a discussion of all sites identified in the ROD in the five year review.**

   **Response:** The Navy has revised Section 4.0 in the final draft report to explain that, at the time of the Parcel B record of decision (ROD), Parcel B included sites investigated through the remedial investigation (RI) phases, as well as sites investigated through the site inspection (SI) phase. The Parcel B ROD included Installation Restoration (IR) sites IR-06, IR-07, IR-10, IR-18, IR-20, IR-23, IR-24, IR-26, IR-42, IR-60, IR-61, IR-62, and SI-31, as well as portions of IR-46 (fuel lines), IR-50 (storm drains and sanitary sewers), IR-51 (former transformer sites), and SI-45 (steam line system) that are located within Parcel B. Section 4.0 was revised to further explain that this five-year review focuses on all Parcel B sites identified in the ROD except for IR-06, which will be remediated as part of Parcel C and will be evaluated more thoroughly in future five-year reviews that follow a Parcel C ROD. Table 1 was expanded to include all IR and SI sites except for IR-06.

2. **Comment:** **The five year review only discusses the status of Parcels C, D, E, and F, but does not include a full five year review evaluation pursuant to Section 1.5.3 of the Review Guidance. It is recommended that the five year review be revised to evaluate and include protectiveness statements for Parcels C, D, and E as suggested in the Review Guidance and that a more complete evaluation of Parcel F be included.**

**Response:** EPA subsequently rescinded this comment in a letter dated September 10, 2003.

3. **Comment:** **The Summary of Status discussions for Parcels C, D, and E do not include sufficient information about the radiological investigations and removal actions that have occurred. Please include summaries of the radiological investigations and removals in the Summary of Status discussions for Parcels C, D, and E.**

**Response:** The Navy added summaries of radiological investigations at Parcels A, C, D, and E to Sections 2.1, 2.2, 2.3, and 2.4. In addition, detail on radiological removal actions at Parcels C, D, and E was added to Sections 2.2, 2.3, and 2.4. No radiological removal actions have been implemented at Parcel A.

4. **Comment:** **The protectiveness statements for the Parcel B Soil Remedy and the Parcel B Groundwater Remedy require concurrence from the regulatory agencies. Please add a signature page or discuss how signatures denoting regulatory concurrence with the protectiveness statements will be obtained.**

**Response:** The Navy will obtain signatures denoting regulatory concurrence with the protectiveness statements through concurrence letters from the regulatory agencies to the Navy following submittal of the final five-year review document. The Navy made no changes to the document in response to this comment.

## Specific Comments

5. **Comment:** **Five-Year Review Summary Form Recommendations and Follow-up Actions, Page ES-4 and ES-5**

**Some of the follow-up actions described in the Issues Section of the Five-Year Review Summary Form (the Summary Form) are not included in the Recommendations and Follow-up section. For example, the first bullet does not state that the conceptual site model will be updated based on further evaluation of subsurface conditions**

**at IR-07 and IR-18. The fifth bullet of the Soils Recommendation and Follow-up Section (Soils Recommendations) does not specifically state that the human health risk assessment (HHRA) update will include new toxicological data and cumulative risk methodologies. Also, the Soils Recommendations do not include specific statements that the remaining portions of IR-10, which have not yet been excavated, will be addressed. In the Groundwater Recommendation and Follow-up Section (Groundwater Recommendations) there is no specific statement that the HHRA update will include new toxicological data and cumulative risk methodologies. Finally, there is no specific statement addressing the metals in groundwater, which are affected by background levels of ambient metals in soil that are higher and more variable than originally estimated. Please revise the Summary Form to include the specific soil and groundwater recommendations outlined in this comment so that all follow-up actions are discussed in the Issues Section.**

**Response:** The Navy revised the Executive Summary and Tables 4, 5, 7, and 8 so that the follow-up actions described in the issues section are included in the recommendations and follow-up section. Specifically the following revisions were made:

- The first soil recommendation and follow-up action was expanded to include updating the conceptual model.
- The third soil recommendation and follow-up action was expanded to explain that if soil-vapor extraction (SVE) is not selected as the remedy, then remaining portions of IR-10 that have not been excavated will need to be addressed.
- The fifth soil recommendation and follow-up action was expanded to specify that the human health risk assessment (HHRA) will be updated with new toxicological data and cumulative risk will be calculated.
- The third groundwater recommendation and follow-up action was added to explain that ambient metals in groundwater may be reevaluated, if necessary, to ensure protectiveness of human health and the environment.
- The fourth groundwater recommendation and follow-up action was expanded to specify that the HHRA will be updated with new toxicological data and cumulative risk will be calculated.

**6. Comment: Section 3.0, Parcel B Chronology, Page 9**

**This section should include a more detailed chronology of site events. The chronology should include information for all of the 07 Parcel B sites described in the ROD. Dates, for example, for removal actions**

**and remedial action start ups; feasibility study completion; proposed plan releases to the public; remedial design completion; and pilot-testing dates should be included in the chronology. Please revise the five year review to include more detailed information pertaining to each Parcel B site in the Chronology Section.**

**Response:** The Navy revised the events listed in the Parcel B chronology section (Section 3.0) to include the following:

- **October 16, 1996:** Proposed plan released to the public
- **November 1996:** RI and FS [feasibility study] completed
- **August 1999:** Remedial design completed
- **June 2000 through September 2002:** SVE treatability study at IR-10 (additional work also continuing)

In addition, site-specific events were identified as such. For example, the list of events was revised to indicate that removal actions were conducted at IR-23, IR-26, and IR-50, and the above-listed SVE treatability study bullet indicates that the study was conducted at IR-10. All other events listed in Section 3.0 apply to all sites located at Parcel B.

**7. Comment: Section 4.0, Site Background, Page 9**

**This section does not include a discussion of all of the Parcel B sites described in the ROD. For example, SI-31 - Building 114, Offices and SI-45 - Steam Line System sites are not discussed. Also, there is no description of which five year review will discuss IR-50 and IR-51. The text states that these sites "are not included in the five-year review because they are associated with the site-wide storm drain and sanitary sewer systems and former transformer sites, respectively." However, since they are included in the ROD it is required that these sites undergo a five year review. If there is an agreement among the Base Realignment and Closure (BRAC) Cleanup Team (BCT) members that these sites can be included in the five year review of another Parcel this should be stated in the text. Please revise the text to discuss where and when IR-50 and IR-51 will be evaluated as part of a five year review. If these sites remain part of Parcel B, they should be included in this five year review to fulfill the requirement that an evaluation of the implementation and performance of the remedies for these sites is completed within five years of July 8, 1998. Also, please revise this section to include a discussion of all the Parcel B sites listed in the ROD.**

**Response:** The Navy revised Section 4.0 to explain that, at the time of the Parcel B ROD, Parcel B included IR-06, IR-07, IR-10, IR-18, IR-20, IR-23, IR-24, IR-26, IR-42, IR-60, IR-61, IR-62, and SI-31, as well as portions of IR-46 (fuel lines), IR-50 (storm drains and sanitary sewers), IR-51 (former transformer sites), and SI-45 (steam line system) that are located within Parcel B. Section 4.0 was revised to further explain that this five-year review focuses on all Parcel B sites identified in the ROD except for IR-06, which will be remediated as part of Parcel C and will be evaluated more thoroughly in future five-year reviews that follow a Parcel C ROD.

**8. Comment: Section 4.3, Past and Present Land Uses, Page 10**

**The text states that "the original cliffs of Hunters Point were quarried and used to fill Bay, thereby creating surrounding lowland areas for further development," but the excavations at IR 07/18 revealed that other materials, like building debris, were also used as fill. This statement also does not account for the IR 01/21 landfill. Please revise the description of the fill materials to, at a minimum, summarize the different materials used as fill on Parcel B.**

**Response:** The Navy expanded the first paragraph of Section 4.3 to note that construction debris was also used as fill material in the western portion of Parcel B (IR-07 and IR-18). A discussion about IR-01/21, which is part of Parcel E, was not included because Section 4.3 discusses only Parcel B. Parcel E fill material, including the landfill, is discussed in Section 2.4.

**9. Comment: Section 4.5, History of Contamination, Page 12**

**The fourth paragraph discussing petroleum hydrocarbons at Parcel B is unclear and appears to contradict the ROD which states, "... at most sites on Parcel B, petroleum compounds are commingled with CERCLA hazardous substances. Areas of commingled contaminants are addressed in this ROD." Please revise the text to more clearly discuss all sites identified in the ROD even if they are now considered to be petroleum hydrocarbon sites and explain why sites have been excluded under CERCLA when they are included in the ROD and considered to be commingled with CERCLA hazardous substances.**

**Response:** The Navy revised the fourth paragraph of Section 4.5 to be consistent with the ROD and with the second paragraph of Section 6.1 of the five-year review report. The revised paragraph explains that areas where petroleum hydrocarbons are commingled with hazardous substances as defined by the Comprehensive Environmental Response, Compensation, and Liability Act are addressed in the five-year review. However, areas where petroleum hydrocarbons are the only contaminants are addressed by a

separate corrective action plan for total petroleum hydrocarbons; therefore, the five-year review does not focus on petroleum hydrocarbons.

**10. Comment: Table 2: RAMP Wells and Exceedances**

**It is unclear why Table 2 shows that the trigger level criteria have been exceeded at all five of the IR 10 monitoring wells and TCE is shown to have exceeded criteria at four monitoring wells. During Quarter 13, TCE analytical results at IR10MW13A1 and IR10MW14A were non-detect (ND); at IR10MW33A - 18 ug/L and at IR10MW59A - 350 ug/L during Q13. Please clarify why TCE is considered to exceed the trigger level of 114 ug/L in all of these IR10 monitoring wells since it seems contradictory to the monitoring data reported in the Thirteenth Quarterly Groundwater Sampling Report Parcel B, May 2003.**

**Response:** Table 2 originally screened volatile organic compound (VOC) monitoring wells at IR-10 against the primary maximum contaminant level for trichloroethene (TCE), 5 micrograms per liter (µg/L), to assess potential inhalation risk based on current EPA guidance. However, this screening criterion is not reflective of trigger levels established in the ROD. Therefore, the Navy revised Table 2 after screening TCE concentrations against the ROD trigger level of 114 µg/L. The revised table indicates that there have been no TCE exceedances at wells IR10MW14A, IR10MW13A1, and IR10MW33A. These wells were also deleted from the list of wells in Section 5.4 that have TCE detections that exceed the trigger level. Well IR10MW59A is the only well with exceedances of the TCE trigger level established in the ROD. In addition, Section 7.2.2 was revised to explain that EPA's vapor intrusion guidance documents significant changes to the risk assessment methodologies that were used at the time of the ROD and that TCE toxicity values for vapor have changed since the time of the ROD. Revisions to the groundwater VOC trigger level for TCE will be evaluated during the ROD amendment process.

**11. Comment: Section 5.6, Site Interviews**

**This section does not include concerns identified in the recently prepared Draft Community Relation Plan (draft CRP). The CRP also included interviews with various stakeholders. For consistency, please include concerns identified in the draft CRP. At a minimum, any additional concerns should be referenced in this section of the text.**

**Response:** The interviews included in the draft community involvement plan focus on basewide community involvement issues, not Parcel B remedial actions. Nevertheless, the Navy expanded Section 5.6 to explain that during community involvement plan interviews, community members expressed

the need for (1) updates on Navy cleanup activities as they are happening, and (2) contact information for Navy personnel who are on base. Both concerns are applicable to Parcel B remedial activities.

**12. Comment: Section 6.2.1, Question A: Is the Remedy Functioning as Intended by the Decision Documents? Page 22**

**This section does not include a discussion of system operation/ operation and maintenance (O&M) costs. According to the Guidance the Five-Year Review should "review and consider system operation and O&M costs if available. Compare actual/current annual O&M costs to the original cost estimate; large variances from the original cost estimate might indicate potential remedy problems." Please include a discussion of system operation costs/O&M.**

**Response:** Operation and maintenance (O&M) costs for the soil remedy are not available because O&M activities associated with the soil remedy have not been completed. The soil remedy is still in the construction phase. The Navy made no change to the document in response to this comment.

**13. Comment: Section 6.2.1, Question A: Is the Remedy Functioning as Intended by the Decision Documents? Page 22 and Section 7.2.1, Question A: Is the Remedy Functioning as Intended by the Decision Documents? Page 28**

**It is not clear how traffic cones actually restrict access and exposure since traffic cones do not constitute a barrier that cannot be crossed. Please delete the reference to traffic cones from these two sections.**

**Response:** The Navy has deleted references to traffic cones in Sections 5.5, 6.2.1, and 7.2.1 and in the protectiveness statement for the soil remedy (Executive Summary and Section 6.5). These sections were also expanded to explain that extensive fencing at Parcel B restricts access and exposure to contamination. Additional detail was also added to Section 5.5 to explain that new fences along the shoreline and locked gates at the end of the piers were observed during the site inspection.

**14. Comment: Section 7.1.2, Remedy Implementation, Page 26**

**The text indicates that the storm drain "study concluded that the storm drains did not need to be lined," but does not provide the basis for this conclusion. Please discuss the basis for the conclusion that the storm drains did not need to be lined both here and when this conclusion is referenced in the Executive Summary.**

**Response:** The Navy expanded Section 7.1.2 to explain that the storm drain did not need to be lined because chemical concentrations of presumed contaminants were not detected in or in the immediate vicinity of Basin 2 storm drains. The revisions also explain that the infiltration study concluded that Basin 4 storm drains did not need to be lined because groundwater infiltration was not observed during the study. Section 7.1.2 was further expanded to explain that analytical results from remedial action monitoring program wells at Parcel B in the vicinity of Basins 2 and 4 have not exceeded point of compliance (POC) trigger levels since the infiltration study.

The Navy also expanded the Executive Summary to include the overall conclusion of the storm drain study—that lining the storm drains was not necessary because groundwater intrusion was not observed in areas with contaminated groundwater.

**15. Comment: Section 7.1.4, Current Status, Page 27**

**The text does not acknowledge the destruction of the Point of Compliance (POC) and Post Remedial Action (PRA) monitoring wells in IR-07 and IR-18 and the fact that the lack of these wells indicates that it is not possible to conduct the groundwater monitoring required by the Remedial Action Monitoring Plan. Please discuss the fact that POC and PRA monitoring wells were destroyed in IR-07 and IR-18.**

**Response:** The Navy expanded Section 7.1.4 to explain that POC well IR07MWS-4 and post-remedial action characterization wells IR07MW25A, IR07MW24A, IR07MW21A1, and IR07MW26A were destroyed during excavation activities and that the Navy plans to reinstall a POC well and other characterization wells at IR-07, as part of the basewide groundwater monitoring plan. The expanded discussion also explains that, although there is no current POC well to evaluate whether groundwater concentrations of metals that exceed POC trigger levels are migrating to the San Francisco Bay (Bay), review of historical data shows that no exceedances of metals were observed at well IR07MWS-4 in four consecutive monitoring events that preceded destruction of the POC well in March 2001. In addition, the Navy excavated approximately 52,500 cubic yards of contaminated soil from IR-07. It is therefore the Navy's position that groundwater with metals concentrations that exceed the trigger levels is not likely migrating to the Bay and that well replacement as part of the basewide groundwater monitoring plan will be sufficient to assure protection of the Bay.

**16. Comment: Section 7.1.4, Current Status, Page 27**

**The fact that Building 123 has a thick concrete floor does not justify the statement that there is no threat to humans. Concrete floors are porous, have cracks and, in the case of Building 123, have been penetrated by numerous borings and soil vapor extraction points. Please delete the reference to the thick concrete floor or provide indoor air monitoring data as justification.**

**Response:** The Navy has deleted the reference to a thick concrete floor from Section 7.1.4. In addition, Section 7.1.4 was revised to explain that controls are in place to prevent unauthorized access to Building 123.

**17. Comment: Section 7.2.1, Question A: Is the Remedy Functioning as Intended by the Decision Documents? Page 28**

**The text does not discuss how the two remedial action objectives (RAOs), preventing inhalation of Volatile Organic Compounds (VOCs) that may enter into buildings from A-aquifer groundwater; and preventing exposure of aquatic receptors to contaminated groundwater migrating to the Bay have been met. TCE concentrations in groundwater at IR10MW59A exceed indoor air inhalation trigger levels indicating that VOCs from the A-aquifer may enter buildings. There also may be an exposure to aquatic receptors of the Bay from contaminated groundwater, however there are no monitoring wells at IR-07 and IR-18 to determine whether or not contamination is entering the Bay because the existing wells were destroyed for the excavations. Finally, the deed restrictions required by the ROD are not in place. As a result it is unclear if the remedy is actually protective. Please revise this section to provide more detail about the remedy in the context of meeting the RAOs, otherwise please acknowledge that the remedy is not functioning as intended.**

**Response:** The Navy revised Section 7.2.1 to explain that inhalation of VOCs that may enter into buildings from A-aquifer groundwater is currently being prevented through controlling access to Building 123. All Building 123 windows are boarded up and all doors are locked to prohibit unauthorized building access. Section 7.2.1 further explains that institutional controls to prevent VOC inhalation and other remedial alternatives to ensure long-term protectiveness will be evaluated as part of the ROD amendment process.

The revisions to Section 7.2.1 explain that POC well IR07MWS-4 was destroyed during excavation activities and that the Navy plans to reinstall a POC well and other characterization wells at IR-07, as part of the basewide groundwater monitoring plan. The expanded discussion also explains that, while there is no current POC well to evaluate whether

groundwater concentrations of metals that exceed POC trigger levels are migrating to the Bay, review of historical data shows that no exceedances of metals were observed at well IR07MWS-4 in four consecutive monitoring events that preceded destruction of the POC well in March 2001. In addition, the Navy excavated approximately 52,500 cubic yards of contaminated soil from IR-07. It is therefore the Navy's position that groundwater with concentrations of metals that exceed the trigger levels is not likely migrating to the Bay and that well replacement as part of the basewide groundwater monitoring plan will be sufficient to assure protection of the Bay.

**18. Comment: Section 7.2.1, Question A: Is the Remedy Functioning as Intended by the Decision Documents? Page 28**

**This section does not discuss all of the components of the selected remedy for groundwater identified in the ROD. Specifically, the storm drain lining/pressure grouting and stream and fuel line removal are not discussed. Please revise the text to include statements describing the implementation of all components of the groundwater remedy.**

**Response:** The Navy expanded Section 7.2.1 to explain that, although storm drains in Parcel B were not lined, groundwater intrusion was not observed in areas with groundwater contamination during the Parcel B storm drain infiltration study; therefore, contaminated groundwater is not migrating to the Bay through the storm drains. Section 7.2.1 was further expanded to explain that steam and fuel lines were removed, or cleaned out and capped beneath buildings, thereby preventing groundwater migration via these potential preferential pathways as intended by the ROD.

**19. Comment: Section 7.2.1, Question A: Is the Remedy Functioning as Intended by the Decision Documents? Page 28**

**This section does not include a discussion of system operation/ O&M costs. According to the Guidance the Five-Year Review should "review and consider system operation and O&M costs if available. Compare actual/current annual O&M costs to the original cost estimate; large variances from the original cost estimate might indicate potential remedy problems." Please include a discussion of system operation costs/O&M.**

**Response:** Groundwater monitoring is not an active treatment. Any variances between estimated and actual costs would reflect changes to assumptions that were made at the time of the FS, which was completed over 5 years ago. Variances would not reflect remedy problems. It is the Navy's position that it is not necessary to discuss groundwater O&M costs in this five-year review report because costs associated with groundwater

monitoring are not reflective of remedy effectiveness. The Navy made no change to the document in response to this comment.

**20. Comment: Section 7.2.2, Changes in Exposure Pathways, Risk Assessment Methods, Toxicity, and Other Contaminant Characteristics, Page 29**

**Although the text acknowledges that the HHRA is currently being updated and a treatability study is underway for the injection of zero-valent iron (ZVI), the five year review does not discuss how, given the current exceedances of the trigger levels for TCE at IR-10 in groundwater, inhalation of VOCs in Building 123, which is currently planned for residential use, will be prevented. Please discuss how the indoor air pathway in Building 123 will be addressed; any proposed indoor air monitoring; and institutional controls that will be put in place to prevent this building from residential reuse both during remediation and while trigger level criteria are exceeded.**

**Response:** The Navy revised Section 7.2.1 to explain that the inhalation of VOCs in Building 123 is currently being prevented through controlling access to Building 123. All Building 123 windows are boarded up and all doors are locked to prohibit unauthorized building access. The Navy further revised Section 7.2.1 to explain that institutional controls to prevent VOC inhalation and other remedial alternatives to ensure long-term protectiveness will be evaluated as part of the ROD amendment process. Section 7.2.2 was revised to explain that EPA's vapor intrusion guidance documents significant changes to risk assessment methodologies that were used at the time of the ROD and that TCE toxicity values for vapor have changed since the time of the ROD. Revisions to the groundwater VOC trigger level for TCE will be evaluated during the ROD amendment process. In addition, no indoor air monitoring is planned.

**21. Comment: Section 7.2.3, Question C: Has Any Other Information Come to Light That Could Call Into Question the Protectiveness of the Remedy?**

**This section should provide more detail about the VOCs detected in groundwater that exceed the trigger level criteria at IR-10, Building 123 and their relationship to the indoor air pathway as well as how contamination is prevented from reaching aquatic receptors at IR-07 and IR-18. Please provide further explanation that supports that the remedy is protective considering the new information for IR-10, IR-07 and IR-18.**

**Response:** Information about how inhalation of VOCs in Building 123 is being prevented and how contamination is prevented from reaching aquatic receptors at IR-07 and IR-18 is presented in the appropriate sections (Sections 7.1.4 and 7.2.1); therefore, Section 7.2.3 has not been revised.

22. **Comment:** **Section 7.5, Protectiveness Statement for Parcel B Groundwater Remedy, Page 30**

**Given the fact that VOCs exceed the indoor air inhalation trigger levels and the lack of POC and PRA monitoring wells in IR-07 and IR-18, the statement that the groundwater remedy at Parcel B is protective is not convincing. Please provide a more convincing argument that the remedy is protective or indicate that the remedy is not protective.**

**Response:** Additional information supporting Navy's conclusions has been added to Sections 7.1.4 and 7.2.1. The protectiveness statement has been expanded to explain that, for the remedy to be protective in the long-term, a POC well and other characterization wells at IR-07 need to be installed. This issue has been added to the issues and recommended follow-up actions listed in the Executive Summary and Tables 7 and 8.

## Minor Comments

23. **Comment:** **Spine: The spine indicates that this is the "Final" Five-Year Review. Please provide the correct designation when the document is revised.**

**Response:** The spine has been changed to "Draft Final."

24. **Comment:** **Section 1.0, Introduction, Page 1: It appears that the word "and" is missing from the first sentence of this section. The first sentence states, "The purpose of the five-year review is to evaluate the implementation and performance of the remedy [and] to assess whether...". Please correct this sentence.**

**Response:** The word "and" has been added to the above-referenced sentence in Section 1.0.

25. **Comment:** **Section 5.2, Community Notification and Involvement, Pages 14 and 15: The dates of the public comment period and public meeting are missing and should be filled in when the document is revised.**

**Response:** The Navy revised Section 5.2 to include dates of the public comment period, which will extend from September 22, 2003 to October 22, 2003, and the date of the public meeting, which will be September 30, 2003.

## Supplemental Comment (September 10, 2003 Letter)

1. **Comment:** **Additionally, we would like to call your attention to the numerous .references to "deed notification" (e.g., 6.1.1) as well as "deed restrictions" (e.g., 7.1.1). In some cases the two terms are used together and in some cases one or the other is used alone. The term "deed restriction" should be used consistently wherever residual contamination requires limitations on the use of the land or groundwater. If the term "deed notification" is used in this document because it was used in a prior decision document, the recommendation section should provide that the proposed revision to the Parcel B ROD will address the need for enforceable land use restrictions. The Parcel B ROD should also address the recently promulgated DTSC regulation which directs the Navy to sign a Land Use Covenant incorporating the same restrictions as are included in the federal deed.**

   **Response:** The term "deed notification" has been replaced with "deed restriction" throughout the document, except in cases where the term "deed notification" is directly related to language from previous decision documents. The recommendations section of the Executive Summary has been updated to refer to these restrictions as "enforceable land-use restrictions." The Navy will address the cited DTSC regulation during negotiations for the ROD amendment.

## RESPONSES TO DSTC COMMENTS

1. **Comment:** **Page ES-1 and ES-2, Major components of the remedy should be the same as described in Record of Decision (ROD), page 2, Section 1.4 Description of the selected remedy.**

   **Response:** The Navy has revised descriptions of the major components of the soil and groundwater remedies in the Executive Summary to be consistent with page 2, Section 1.4 of the ROD. The main components of the soil remedy listed in the Executive Summary differ slightly from the soil remedy components listed in the 1997 ROD because the remedy components listed in the Executive Summary incorporate both the ROD and subsequent explanations of significant difference.

2. **Comment:** **The Navy needs to more clearly define the terms like "short-term" and "all immediate threats" as remediation of all contaminated areas has not been approved and risk evaluation of a "short term" exposure was not provided.**

**Response:** The Navy has revised the protectiveness statements and Section 6.2.1 to explain that the soil and groundwater remedies are "currently protective," instead of are "protective in the short-term." In addition, the phrase "immediate threats" has been replaced with "exposure pathways that could result in an unacceptable risk" throughout the document.

3. **Comment:** **Page ES-5, Why is the proximity of excavation to the shoreline prevents characterization of the soil?**

**Response:** The second bullet under soil issues, which is listed in the Executive Summary and in Tables 4 and 5, has been revised to, "The proximity of some excavations to the Bay shoreline delayed complete characterization and prevented excavation of the soil." Additional characterization of the Parcel B shoreline was completed in June 2003. The potential for Bay water inflow and suspension of contaminated soil prevented excavation activities in accordance with the remedial design in shoreline areas.

4. **Comment:** **The Navy should refrain from using undefined terms such as "background levels" or "natural occurring metals" as they were never established or approved in any of the previous Hunters Point Shipyard documents. The sentence" Background levels of ambient metals in soil are higher and more variable than originally estimated." should be rephrased as "metals in soil are higher and more variable than originally established ambient concentrations."**

**Response:** The Navy has deleted reference to naturally occurring metals in Sections 5.4 and 6.2.1. The reference to naturally occurring metals in Table 1 has not been deleted because it is listed as one of several possible sources of metals. In addition, "naturally occurring" was listed as a possible source of metals contamination at several RI sites in the approved Parcel B FS report. The following note has been added to the "possible source" column in Table 1: "Although the Navy suspects that naturally occurring metals are a source of metals identified as contamination at Parcel B, naturally occurring metals as a source of these metals cannot be confirmed until additional evaluation has been completed."

The Navy recognizes that background levels of ambient metals have not been reevaluated since the time of the ROD. However, it is Navy's position that background levels of ambient metals in soil are higher and more variable than originally estimated and need to be reevaluated prior to a ROD amendment. Therefore, the Navy did not revise the above-referenced statement, except for adding "It is Navy's position that," to the beginning of the sentence.

5. **Comment:** **The term "RMR Process" is not a commonly recognized term in a superfund cleanup process. The Navy needs to either clearly define that process or replace it with a more commonly recognized term such as " Technical Memorandum in support of ROD amendment"**

**Response:** The Navy has agreed to refer to the upcoming document supporting the ROD amendment as the "Technical Memorandum in Support of a ROD Amendment." Furthermore, the Navy recognizes that the review process underway for Parcel B (and proposed for Parcels C, D, and E) is different from the process undertaken in 1999 for Parcels C, D, and E. The term "RMR process" has been replaced by "ROD amendment process" to more accurately reflect that the ongoing discussions and reviews support an upcoming ROD amendment. The Navy also has revised the document to specify that this process will be documented in the "Technical Memorandum in Support of a ROD Amendment."

6. **Comment:** **Page 5 to 7, Technical issues that must be resolved before selecting a remedy and preparing a ROD for Parcel C, D, and E should all include a revised Feasibility Study (FS).**

**Response:** The Navy has expanded the lists of technical issues that must be resolved before selecting a remedy and preparing a ROD for Parcels C, D, and E to include revising the FS (Sections 2.2, 2.3, and 2.4).

7. **Comment:** **Page 9, the statement "IR-06 was transferred to Parcel C because…" should be deleted. While DTSC recognized the need to move IR-6 and IR-25 from Parcel B to Parcel C, the proper administrative process would be through a ROD amendment. Because both IR sites are included in the Parcel B ROD, they both fall under the remedy selected for Parcel B. By removing these two sites from Parcel B, the Navy in essence is changing the selected remedy for these two sites from "excavation and off-site disposal" to an undetermined remedy to be chosen in the future in Parcel C ROD. Any change of previously approved remedy should be documented in a ROD amendment.**

**Response:** The Parcel B ROD does not address IR-25; therefore, portions of the comment regarding IR-25 cannot be addressed. The above-referenced statement in Section 4.0 has been revised to the following:

"IR-06 will be remediated with Parcel C because the IR-06 groundwater VOC plume is related to the IR-25 VOC plume and can be addressed more efficiently in Parcel C. IR-06 will be evaluated more thoroughly in future five-year reviews that follow a Parcel C ROD."

8. **Comment:** **Page 11, Parcel B ROD which is the subject of this five-year review only considered residential use when setting cleanup criteria. Introducing other uses such as mixed uses, mixed residential/retail complex, research and development area, educational area, open space, and wetland without definitions or any discussions of how they fit under the residential use criteria would confuse the reader as to whether the remedy is protective for planned future uses.**

**Response:** The Navy has expanded the last paragraph in Section 4.4 to explain that Parcel B cleanup goals are based on the assumption that future land use will be residential, which is more conservative (protective) than the currently planned land-use designations shown on Figure 3.

9. **Comment:** **Page 11, Please delete "to a lesser extent" from the end of page 11.**

**Response:** "To a lesser extent," has been deleted from Section 4.5.

10. **Comment:** **Page 14, Administrative Process, Please replace BCT with "regulatory agencies" because BCT does not have any legal standing in the 5-year review process.**

**Response:** "BCT" was replaced by "regulatory agencies" in Section 5.1, except in the first sentence because one of the components of the administrative process according to the five-year review guidance is notification of potentially interested parties. The Base Realignment and Closure Cleanup Team is considered a potentially interested party.

11. **Comment:** **Please replace "The HPS five-year review team is led by …. State regulations." with " the Hunter Point Shipyard five-year review is conducted by the Navy and submitted to the regulatory agencies for review and approval."**

**Response:** The Navy replaced the following sentence in Section 5.1: "The HPS five-year review team is led by …. state regulations," with, "The HPS five-year review was conducted by the Navy and submitted to the regulatory agencies for review and approval."

12. **Comment:** **Page 20, fourth paragraph, regarding the SVE treatability study, pre- and post –treatment concentration should be evaluated against cleanup criteria.**

**Response:** The Navy expanded the last paragraph in Section 6.1.2 to include pre- and post-treatment concentrations of TCE in soil and the TCE cleanup goal for Parcel B.

13. **Comment:** **Page 21, fourth bullet of Section 6.1.4 Please replace "Background levels of ambient metals in soil are more variable and higher than originally estimated." With "metals in soil are more variable and higher than originally estimated ambient concentrations."**

**Response:** The Navy recognizes that background levels of ambient metals have not been reevaluated since the time of the ROD. However, it is Navy's position that background levels of ambient metals in soil are higher and more variable than originally estimated and need to be reevaluated prior to a ROD amendment. Therefore, the Navy did not revise the above-referenced statement, except for adding "It is Navy's position that," to the beginning of the sentence.

14. **Comment:** **Page 21, Section 6.2.1, Please delete "naturally occurring" from the second sentence.**

**Response:** The reference to naturally occurring metals in Section 6.2.1 has been deleted.

15. **Comment:** **Page 22, last sentence of the page, Please delete "RMR"**

**Response:** "RMR" has been deleted from the last sentence in Section 6.2.2.

16. **Comment:** **Page 23, Section 6.5 Protectiveness statement for Parcel B Soil Remedy: DTSC agrees as long as the Navy maintains controlled access at the shipyard there is very little concern with the protectiveness of human health and environment. But the statement of "The soil remedy at Parcel B is protective of human and the environment in the short-term because all immediate threats have been addressed through excavation of highly contaminated areas…" is vague and lack of substantiation. The terms of "immediate threats" and "highly contaminated areas" are not clearly defined.**

**Response:** The above-referenced statement has been changed to "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."

17. **Comment:** **Page 27, Section 7.1.4 Current Status, Please delete the last sentence.**

**Response:** The cited sentence in Section 7.1.4 has been deleted.

18. **Comment:** **Page 28, Section 7.2.2, DTSC is taking a closer look of the changes of toxicity data and related cleanup criteria. This process is taking longer than we had expected. We will try to provide you with our comments as soon as we can.**

**Response:** No response is necessary.

19. **Comment:** **Table 1, Please remove all references to the term "Natural Occurring".**

**Response:** The reference to naturally occurring metals in Table 1 has not been deleted because it is listed as one of several possible sources of metals. In addition, "naturally occurring" was listed as a possible source of metal contamination at several RI sites in the approved Parcel B feasibility study. However, the following note has been added to the "possible source" column in Table 1: "Although the Navy suspects that naturally occurring metals are a source of metals identified as contamination at Parcel B, naturally occurring metals as a source of these metals cannot be confirmed until additional evaluation has been completed."

20. **Comment:** **Table 4, Line 3 was not completed.**

**Response:** Line 3 of Table 4 has been completed.

21. **Comment:** **Table 4 and Table 7, "background levels of ambient metals… originally estimated." Should be rephrased as "metals in soil are higher and more variable than originally estimated ambient concentrations".**

**Response:** The Navy recognizes that background levels of ambient metals have not been reevaluated since the time of the ROD. However, it is the Navy's position that background levels of ambient metals in soil are higher and more variable than originally estimated and need to be reevaluated prior to a ROD amendment. Therefore, the Navy did not revise the above-referenced statement, except for adding "It is Navy's position that," to the beginning of the sentence.

22. **Comment:** **Appendix D, Why some of the well photos show only closed vault without showing padlock inside?**

**Response:** The purpose of the well inspections was to evaluate well integrity. Representative photographs where taken to show that well vault boxes were properly secured and wells were locked to document well integrity. All wells were thoroughly examined. Two photographs of each well

(open and closed) were not deemed necessary to document integrity of monitoring well network. The Navy made no changes to the document in response to this comment.

## RESPONSES TO RWQCB COMMENTS

1. **Comment:** **Board staff anticipates that in conjunction with the anticipated ROD revision, the Navy will be asking the regulatory agencies to review and revise the ARARs that are presented in the existing ROD and in the subject report. Therefore, detailed comments are not provided regarding revisions to the ARARs.**

   **Response:** The Navy will ask the regulatory agencies to review and revise the applicable or relevant and appropriate requirements that are presented in the existing ROD during development of a ROD amendment. The Navy made no change to the document in response to this comment.

2. **Comment:** **As stated in our previous correspondence, Board staff recommends that the groundwater monitoring trigger levels presented in ROD and in the subject report be reevaluated. Board staff has initiated discussions with the Navy regarding trigger levels that would be necessary to consider in the revised ROD in the event that an aquatic receptor is threatened. The trigger levels recommended by Board staff are presented in the "Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater", Interim Final, July 2003. The recommended trigger levels can be found in Appendix 1, Section 2.3.1, "Surface Water Aquatic Habitat Goals". Because Hunters Point is located between the Dumbarton Bridge and the Richmond-San Rafael Bridge, saltwater aquatic goals can be used unless none are available. The goals should be selected based on the order of preference and availability of information as recommended by the July 2003 document. In addition, surface water standards for potential bioaccumulation of chemicals in aquatic organisms and subsequent human consumption of these organisms should be considered a high priority. If bioaccumulation criteria are available and are lower than aquatic goals, they should be used.**

   **Response:** The Navy will continue to discuss with RWQCB trigger levels that would be necessary to consider in the ROD amendment. This discussion is not directly applicable to the five-year review. Modifications to the groundwater trigger levels will be presented, as appropriate, in the technical memorandum in support of a ROD amendment. The Navy made no change to the document in response to this comment.

**APPENDIX G**
**RESPONSES TO REGULATORY AGENCY AND PUBLIC COMMENTS ON THE DRAFT FINAL FIRST FIVE-YEAR REVIEW OF REMEDIAL ACTIONS IMPLEMENTED AT HUNTERS POINT SHIPYARD**

# RESPONSES TO REGULATORY AGENCY COMMENTS ON THE DRAFT FINAL FIRST FIVE-YEAR REVIEW OF REMEDIAL ACTIONS IMPLEMENTED AT HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA

This document presents the U.S. Department of the Navy's (Navy) responses to comments from the U.S. Environmental Protection Agency (EPA), the California Department of Toxic Substances Control (DTSC), and the San Francisco Bay Regional Water Quality Control Board (RWQCB) on the "Draft Final First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard, San Francisco, California," dated September 22, 2003. The Navy received the comments addressed below from EPA on November 3, 2003; from DTSC on November 10, 2003; and from RWQCB on October 22, 2003.

## RESPONSES TO EPA COMMENTS

### Specific Comments

**1. Comment:** **Response to General Comment 1**

**Although Section 4.0 has been revised to include the Parcel B sites investigated through the remedial investigation (RI) and site inspection (SI) phases, there is no systematic discussion of each of these sites explaining individual remedies, when a remedial action or removal action was initiated and whether or not it is completed. Please include this information either as a table or in the text of the next version of the Five-Year Review Report.**

**Response:** The Navy added a new table, Table 2, describing the status of all Parcel B remedial actions. For brevity, Table 2 does not present each Parcel B site individually since the primary remedial actions, soil excavation and groundwater monitoring, were implemented in a consistent manner and concurrently across Parcel B at most Installation Restoration (IR) sites. Additional information regarding the chronology of remedial actions is provided in Section 3.0. In addition, the Navy added a column to Table 1 to discuss the status of soil excavation activities at each site. The Navy also added text to Section 4.5 that references the addition to Table 1 and the new Table 2.

**2. Comment:** **Response to Specific Comment 15, Section 7.1.4 Current Status, Page 27:**

**The response to this comment does not discuss the fact that no data exists after Quarter 6 for the monitoring wells destroyed during excavation activities at IR-07 and it is therefore unknown if contamination is moving into the Bay. Please acknowledge that it is unknown whether contamination is currently migrating to the Bay at**

**this time since no monitoring wells exist in this area to make this determination.**

**Response:** The Navy expanded Section 7.1.4 to clarify that no groundwater data exist past the quarter 6 monitoring event at the locations of IR-07 wells that were destroyed. The Navy also revised Section 7.1.4 to acknowledge that its position (that it is unlikely that groundwater with concentrations of metals greater than trigger levels is migrating to the San Francisco Bay [the Bay]) needs to be confirmed by current groundwater monitoring data at the IR-07 shoreline. The Navy has committed to replacing monitoring wells along the IR-07 shoreline and anticipates sampling these wells during the first quarterly monitoring event in 2004. The Navy believes that its position is defensible considering (1) six quarters of IR-07 monitoring data demonstrates that there has been no impact to the Bay, and (2) removal of 52,500 cubic yards of contaminated soil and replacement with clean backfill soil should have a beneficial impact on groundwater quality at IR-07.

3. **Comment:** **Response to Specific Comment 17, Section 7.2.1, Question A: Is the Remedy Functioning as Intended by the Decision Documents? Page 28:**

**The response appears to address the inhalation pathway both in the short term and long term. However the groundwater remedy does not appear to be functioning as intended since no current information on groundwater quality is available in the IR-07 area due to the loss of the POC and monitoring wells. Please explain how it can be determined that the remedy is functioning as intended when there is no current information.**

**Response:** The Navy expanded the introduction to Sections 7.2.1 and 7.2.4 (Technical Assessment Summary) to include the following: "However, several monitoring wells along the IR-07 shoreline were destroyed during soil excavation activities in 2001 and need to be replaced for the groundwater remedy to perform as precisely specified in the RAMP [remedial action monitoring plan]."

4. **Comment:** **Response to Specific Comment 19, Section 7.2.1, Question A: Is the Remedy Functioning as Intended by the Decision Documents? Page 28:**

**The response that "It is the Navy's position that it is not necessary to discuss groundwater O&M costs in this five-year review report because costs associated with groundwater monitoring are not reflective of remedy effectiveness" should be included in the Report to**

**explain why this information was omitted since the Five-Year Review Guidance recommends evaluation of cost effectiveness.**

**Response:** The Navy added the following paragraph to Section 7.2.1. "Estimates and actual O&M [operations and maintenance] costs are also typically evaluated when evaluating whether the remedy is functioning as intended. However, it is the Navy's position that it is not necessary to discuss groundwater O&M costs in this five-year review report because costs associated with groundwater monitoring do not reflect remedy effectiveness."

**5. Comment: Protectiveness Determination**

**If the Navy is not going to have a signature page in the document, then please have the final document transmitted to EPA via a letter signed by a Navy representative at the senior management level. This transmission letter should state that the Navy has determined that the protectiveness determination is accurate and that the document is consistent with EPA guidance (OSWER No. 9355.7-03B-P).**

**Response:** The Navy has stated in the transmittal letter for the final five-year review report that the Navy has determined that the protectiveness determination is accurate and that the report is consistent with EPA guidance (OSWER No. 9355.7-03B-P). Captain D.S. Bianchi, CEC, USN, Commanding Officer, Engineering Field Activity West, Naval Facilities Engineering Command, will sign the final five-year review report, and it is the Navy's belief that this signature and approval is sufficient to document the accuracy and consistency of the report.

## RESPONSES TO DTSC COMMENTS

### Specific Comments

**1. Comment: Page 10, Section 4.0 PARCEL B BACKGROUND, first paragraph, last sentence: Please insert "This change will be proposed in a Parcel B ROD Amendment and IR-06 will be evaluated more thoroughly….."**

**Response:** It is the Navy's position that parcel boundaries are developed for administrative purposes and that changing parcel boundaries does not require a record of decision (ROD) amendment or an explanation of significant difference. However, the change of the Parcel B boundary will be explained in the ROD amendment; therefore, the Base Realignment and Closure (BRAC) Cleanup Team approval of the ROD amendment will represent approval of the boundary change.

The Navy revised the above-referenced sentence and preceding sentences to the following: "This five-year review focuses on all Parcel B sites, except for IR-06. IR-06 will be addressed under a Parcel C ROD because the IR-06 groundwater VOC [volatile organic compound] plume is related to the IR-25 VOC plume and can be addressed more efficiently in Parcel C. The Parcel B boundary change will be discussed in the Parcel B ROD amendment, and remedial actions at IR-06 will be evaluated more thoroughly in future five-year reviews that follow the Parcel C ROD."

2. **Comment:** **Page 12, Section 4.4 PRESENT AND FUTURE USE OF AREA RESOURCES, Last sentence of the last paragraph: Please insert "…future land use will be residential, which, with the exception of wetland, is more conservative…."**

**Response:** The Navy revised the above-referenced sentence to the following: "Parcel B cleanup goals are based on the assumption that future land use will be residential, which is more conservative (protective) than currently planned land-use designations, with the exception of wetlands."

## RESPONSES TO RWQCB COMMENTS

### Specific Comments

1. **Comment:** **Section 4.4, Present and Future Uses of Area Resources: This section states that "The Navy and RWQCB are discussing whether groundwater at Parcel B meets the definition of a potential drinking water source…..". Board staff sent the Navy a letter on September 19, 2003 stating that Board staff does not consider the A Aquifer at the Hunters Point Naval Shipyard a source of drinking water. In addition, on September 11, 2003, U.S. EPA requested that the Navy take into account Federal criteria for determining beneficial uses of groundwater.**

**Please revise this section of the report to take into account both the RWQCB and U.S. EPA letters.**

**Response:** The Navy revised Section 4.4 to explain that, although the beneficial use designation of the A-aquifer at Hunters Point Shipyard (HPS) was under discussion at the time of the Parcel B ROD, RWQCB sent a letter to the Navy dated September 25, 2003, stating that RWQCB does not consider the A-aquifer at HPS a source of drinking water. The Navy expanded Section 4.4 to state that an evaluation of federal criteria for determining beneficial uses of groundwater will be completed in the technical memorandum in support of a ROD amendment. The evaluation will be based on federal criteria for determining beneficial uses of groundwater outlined in a letter from EPA dated May 12, 1999, which was resubmitted to the Navy on September 11, 2003.

**2. Comment:** **Section 7.2.2 , Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and RAOs Used at the Time of Remedy Selection Still Valid? This section states that the only values that need to be updated are "risk assessment parameters and trigger levels for VOCs in groundwater". Recent studies indicate that properly collected soil gas data may be a more reliable indicator of indoor air risk than either soil or groundwater data.**

**Please revise this section of the report to state that the Navy will evaluate whether soil gas trigger levels for protection of indoor air are appropriate.**

**Response:** The Navy expanded Section 7.2.2 to explain that development of soil vapor trigger levels may be considered during the ROD amendment process. The Navy will evaluate human health risk via the inhalation pathway consistent with accepted technical guidance and the most current risk assessment protocols.

## RESPONSES TO PUBLIC COMMENTS ON THE DRAFT FINAL FIRST FIVE-YEAR REVIEW OF REMEDIAL ACTIONS IMPLEMENTED AT HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA

This document presents the U.S. Department of the Navy's (Navy) responses to public comments received on the "Draft Final First Five-Year Review of Remedial Actions Implemented at Hunters Point Shipyard, San Francisco, California," dated September 22, 2003. The Navy received the comments addressed below during the public comment period that lasted from September 22, 2003, through October 22, 2003, including a public meeting held on September 30, 2003.

### RESPONSES TO PUBLIC COMMENTS

#### Comments from Maurice Campbell, Community First Coalition (Received at September 30, 2003, public meeting)

**1. Comment: Parcel B is a landfill disposal area at IR-07 and IR-18, and I don't know if you can quantifiably say what's there, but have you looked at methane generation? We did run into a problem on Parcel E, and I know that there's some things that can cause methane generation.**

**Response:** Methane generation underground is caused by methanogenesis, which is a process that involves bacteria breaking down organic material in environments deficient in oxygen. The fill material at IR-07 and IR-18, which has been investigated using aerial photography, geophysical surveys, and direct field observations during soil excavation activities, consists primarily of soil and construction debris. The construction debris includes materials such as wood, brick, asphalt, wire, and concrete. This type of debris is relatively inert compared to solid waste typically encountered in municipal or industrial landfills. The waste material in Parcel E IR-01/21 contained more organic waste than Parcel B IR-07 and IR-18. Given the inert nature of the fill material at IR-07 and IR-18, the Navy does not consider methane generation to be a significant concern at Parcel B. The Navy made no changes to the document in response to this comment.

**2. Comment: Since Parcel B is against the shoreline area, and you are concerned about Bay contamination, we were looking at some of your liquefaction reports, and since it is in San Francisco 11/17, 2000 hazard zone defined by U.S. Geological Survey, and we say in the report talking about lateral movement, have you taken that into consideration?**

**Response:** Liquefaction is the process when saturated, loosely consolidated granular soil temporarily loses strength and acts as a fluid. Therefore, liquefaction is an important consideration when designing a building or containment structure because of the potential for the building or structure to collapse. The Navy may evaluate potential liquefaction at Parcel B, as appropriate, to support remedial decisions to be made in the Parcel B record of decision (ROD) amendment. The Navy made no changes to the document in response to this comment.

**3. Comment: SVE is a relatively new technology and if you do not find the source you can have a bounceback of VOCs.**

**Response:** Soil vapor extraction (SVE) is a common technology for treating volatile organic compounds (VOC) in soil that has been in widespread use for more than 15 years. However, it is true that identifying the source area is essential for an SVE remediation system to be successful. The Navy has performed extensive investigation at Parcel B Building 123, where SVE has been implemented as a treatability study, and has identified the primary source area. The Navy is planning a follow-on treatability study at this area, and will perform additional investigation as needed to ensure that the source area is adequately characterized. The Navy made no changes to the document in response to this comment.

**4. Comment: How will the HRA affect the ROD amendment?**

**Response:** The historical radiological assessment (HRA) will identify any potential radiological concerns throughout HPS, including Parcel B. The Navy will perform radiological surveys recommended by the HRA, and any radiological contamination identified at Parcel B will be addressed as part of the ongoing basewide radiological removal action. The Parcel B ROD amendment will memorialize cleanup objectives and cleanup levels for radiological contamination that were previously documented in the action memorandum for the basewide radiological removal action. Radiological surveys and cleanup, if necessary, will be consistent with the action memorandum for the basewide radiological removal action. The Navy made no changes to the document in response to this comment.

**Comments from Richard Nagy, Resident**
**(Received at September 30, 2003, public meeting)**

**5. Comment: Will the change to the remedy leave contaminants in place instead of removing them?**

**Response:** The purpose of the ROD amendment is to identify the best alternative for preventing exposure to remaining risks at Parcel B. The technical memorandum in support of a ROD amendment will evaluate remedial alternatives based on criteria such as cost, effectiveness, and implementability. Leaving contaminants in place and preventing exposure to remaining risk at Parcel B through institutional controls may be one alternative that is evaluated. However, no new remedy has been selected to address remaining contamination at Parcel B, and the list of potential remedies to be evaluated has not been established. The Navy made no changes to the document in response to this comment.

**6. Comment: Have you identified contaminants that are indigenous to the area as opposed to ones that are a more direct result of the Navy's operations here? And are you lumping them all together as one kind of contamination?**

**Response:** The Navy established Hunters Point ambient levels (HPAL) to assist in differentiating metals that are indigenous to the area from metals that are the result of Navy's industrial operations. The Navy is performing supplemental evaluations, using data from Hunters Point and elsewhere in San Francisco, to assist in determining whether elevated metals at Hunters Point can be attributed to the Navy's industrial operations or to the naturally occurring soil and bedrock. The Navy will present these findings in the upcoming technical memorandum in support of a ROD amendment. However, the Navy also plans to perform a cumulative risk assessment in the upcoming technical memorandum in support of a ROD that will not discriminate between indigenous metals and metals from Navy activities. The risk-based cleanup goals and the proposed remedial actions can address protection of human health and the environment regardless of the source of metals. The Navy made no changes to the document in response to this comment.

**Comment from Keith Tisdell, Restoration Advisory Board (RAB) Member**
**(Received at September 30, 2003, public meeting)**

**7. Comment: Isn't crushing serpentine causing the metals in serpentine to be more mobile and more of a concern? Shouldn't the Navy be responsible for cleaning up high metal concentrations from serpentine since the Navy crushed it and made it more of a risk?**

**Response:** Crushing bedrock to use as fill is a common construction practice used in San Francisco and throughout the state. Metals in fill material may be more mobile than metals in bedrock due to an increase in surface area, in much the same way that metals may be more mobile in serpentine-derived soil. Exposure pathways that have been evaluated include direct ingestion (including dust) and consumption of homegrown produce.

Risk from exposure to metals at Parcel B will be reevaluated as part of the ROD amendment process and will be used to develop remedial action objectives in the ROD amendment. Updated risk assessments, remedial action objectives, and remedial action alternatives for Parcel B will be included in the technical memorandum in support of the Parcel B ROD amendment. The Navy will evaluate remedial alternatives that protect human and ecological receptors from remaining metals in fill, regardless of source. The Navy made no changes to the document in response to this comment.

**Comment from Sue Ellen Smith, Resident**
**(Received at September 30, 2003, public meeting)**

**8. Comment: With the decision to leave the contaminated metals in soil, what sort of risks will you be putting the residents in with that decision? There has been a lot of excavation going on at Parcel B. There used to be air quality sample stations triangulated around this parcel. However, the stations were taken out several years ago and I have seen work from my house since then. Tonight we also heard that ground well sampling stations were destroyed. It occurs to me that we have no way to monitor what is happening over this time to assess the risk we are placing ourselves in.**

**Response:** No decision has been made to leave metals in soil in place. Such a decision will not be made until risks associated with leaving existing metals in soil are fully understood. This five-year review does not evaluate this decision. Alternatives for addressing remaining soil contamination at Parcel B will be evaluated in the technical memorandum in support of a ROD amendment and discussed with the public.

Any sampling needed to fully assess the risks associated with contamination at the site will be conducted. Air monitoring is not currently being conducted because there is no ongoing construction, and there are no suspected risks in the air at this time. Air monitoring was conducted during construction activities because risks in air were suspected at that time, but sampling results showed that no unacceptable risks existed in air. Although occasional earthwork occurs at the site, construction activities are not being conducted; therefore, air monitoring is not necessary.

Several groundwater monitoring wells were destroyed at IR-07 during excavation activities. These wells will be replaced to monitor groundwater that enters the Bay. There are no risks to residents from groundwater with metal contamination. The Navy made no changes to the document in response to this comment.

**Comments from Melita Rines, RAB Member**
**(Received at September 30, 2003, public meeting)**

**9. Comment: Have the EPA preliminary remediation goals changed since the ROD was signed? And if so, will a new human health risk assessment be conducted using the latest goals?**

**Response:** U.S. Environmental Protection Agency preliminary remediation goals have changed since the ROD was signed, and the human health risk assessment will be updated with the new goals. A summary of the updated human health risk assessment will be provided in the technical memorandum in support of a ROD amendment. The Navy made no changes to the document in response to this comment.

**10. Comment: How did you come up with a soil cleanup depth of 10 feet instead of the groundwater level in the explanation of significant difference? What criteria did the Navy have and how will it affect future construction?**

**Response:** At the time of the ROD, the groundwater table was expected to be at 8 to 10 feet below ground surface (bgs). However, groundwater was encountered at depths as shallow as 2.3 feet bgs in later investigations. Excavating to only 2.3 feet bgs was not considered to be protective in residential construction scenarios by the City of San Francisco and the BRAC Cleanup Team. Consequently, the 1998 explanation of significant difference (ESD) changed the maximum cleanup depth to 10 feet bgs to be more protective.

The maximum cleanup depth of 10 feet bgs minimally affects future construction because residential construction scenarios typically occur at depths less than 10 feet bgs. However, deed restrictions will be required to restrict excavation of soil that is below 10 feet. For example, contractors would have to excavate soils below 10 feet in a manner that is in accordance with federal, state, and local laws and requirements including ordinances such as Articles 4.1 and 20 of the San Francisco Public Works Code. The Navy made no changes to the document in response to this comment.

**Comment from Gene Sands, Resident**
**(Received at September 30, 2003, public meeting)**

**11. Comment: Will the implementation of land-use controls be evaluated against the nine criteria used to evaluate remedial alternatives? Will the public get to pick and chose the remedial action subject to cost? Will the remedial actions be correlated to an associated highest land use? Couldn't the project be closed by next week by just changing the land use?**

**Response:** If implementation of land-use controls were evaluated as a remedial action alternative in the technical memorandum in support of a ROD amendment, it would be compared against the other remedial action alternatives using the following nine evaluation criteria: overall protectiveness of human health and the environment; compliance with applicable or relevant and appropriate requirements; long-term effectiveness and permanence; reduction in toxicity, mobility, or volume; short-term effectiveness; implementatbility; cost; state acceptance; and community acceptance.

The community will be able to evaluate how the alternatives compare to each other based on these criteria when reviewing the proposed plan, which will follow the technical memorandum in support of the ROD amendment. The community will be able to provide feedback on the remedial action during the public comment period and community meeting for the proposed plan. Each remedial action alternative presented in the proposed plan will be associated with a specific land use that is defined in the City of San Francisco's 1997 Redevelopment Plan. Any of the potential land uses for Parcel B will require an evaluation of remedial action alternatives; the project could not be closed by changing the land use. The Navy made no changes to the document in response to this comment.

**Comments from Arc Ecology (Dated October 15, 2003)**

**12. Comment:** **The steps that will be taken to reach the ROD Amendment need to be better explained. There is brief mention of the Technical Memorandum in preparation for the ROD Amendment; this document should be better explained, including what it will address, how it will help lead to a ROD Amendment and the level of community participation that will be solicited.**

**Response:** The Navy expanded the Executive Summary, the Five-Year Review Summary Form (the Summary Form), and Section 6.4 to explain the components of a ROD amendment process and the purpose of a technical memorandum in support of a ROD amendment.

**13. Comment:** **Throughout the document, statements are made about how the outstanding issues will be addressed. (e.g., Section 6.1.4: "It is the Navy's position that background levels of ambient metals in soil are more variable and higher than originally estimated. The soil remedy will either require an institutional control to prevent exposure to soil or modifications to soil RAOs.") Conclusions about how remaining problems will be resolved are not necessary. Such statements should be included in the Tech Memo in support of the ROD Amendment. In the Five-Year Review, it would be more appropriate to simply state the remaining issues and that they will be resolved through a ROD amendment. Please remove any conclusions about how the remaining problems will be addressed.**

**Response:** The Navy changed the above-referenced statement in the Summary Form, Section 6.1.4, and Table 6 (Table 5 in the draft final five-year review) to include a statement that soil remedial action objectives and alternatives should be reevaluated during the ROD amendment process to address higher and more variable levels of ambient metals.

**14. Comment:** **Figure 4 is not mentioned until Chapter 7 when it is used to show the monitoring well locations and different types of monitoring wells. However the map contains quite a bit of information about other site features, such as excavation locations and the tidally influenced zone, and is a good reference map for those who are not as familiar with the site. This map should be referred to earlier on in the document, perhaps in Chapter 4 to supplement the discussion on the background of the area.**

**Response:** The Navy added a reference to the figure in Section 4.0.

**15. Comment:** **Section 4, pg. 10 states, "IR-06 will be evaluated more thoroughly in future five-year reviews that follow a Parcel C ROD." Since Parcel C does not yet have a ROD in place, the conclusion drawn from this statement is that there is currently no cleanup plan for IR-06. Would it not be more correct, therefore, to say that IR-06 will be addressed under the Parcel C ROD? Was the decision to include IR-06 in the Parcel C ROD agreed upon by the BCT in an ESD? If not, should it not be agreed upon in the ROD amendment?**

**Response:** The Navy revised Section 4.0 to explain that IR-06 will be addressed under a Parcel C ROD because the IR-06 groundwater VOC plume is related to the IR-25 VOC plume and can be addressed more efficiently in Parcel C. Remedial actions that are implemented at IR-06 will be evaluated in future five-year reviews that follow the Parcel C ROD.

It is the Navy's position that parcel boundaries are developed for administrative purposes, and that changing parcel boundaries does not require a ROD amendment or an ESD. However, the change of the Parcel B boundary will be explained in the ROD amendment; therefore, Base Realignment and Closure (BRAC) Cleanup Team approval of the ROD amendment will represent approval of the boundary change.

**16. Comment:** **Section 6.1.4 talks about the current activities planned by the Navy for Parcel B. We suggest including a figure showing the location of these projects, as it may not be so obvious to the average reader.**

**Response:** The Navy revised Section 6.1.4 to better explain the location of geological surveys that have been conducted at IR-07 and IR-18, excavations along the shoreline that require additional characterization, and the Building 123 SVE system. The Navy did not add a figure showing these locations because Figure 4 shows the locations that are referenced in the revised Section 6.1.4.